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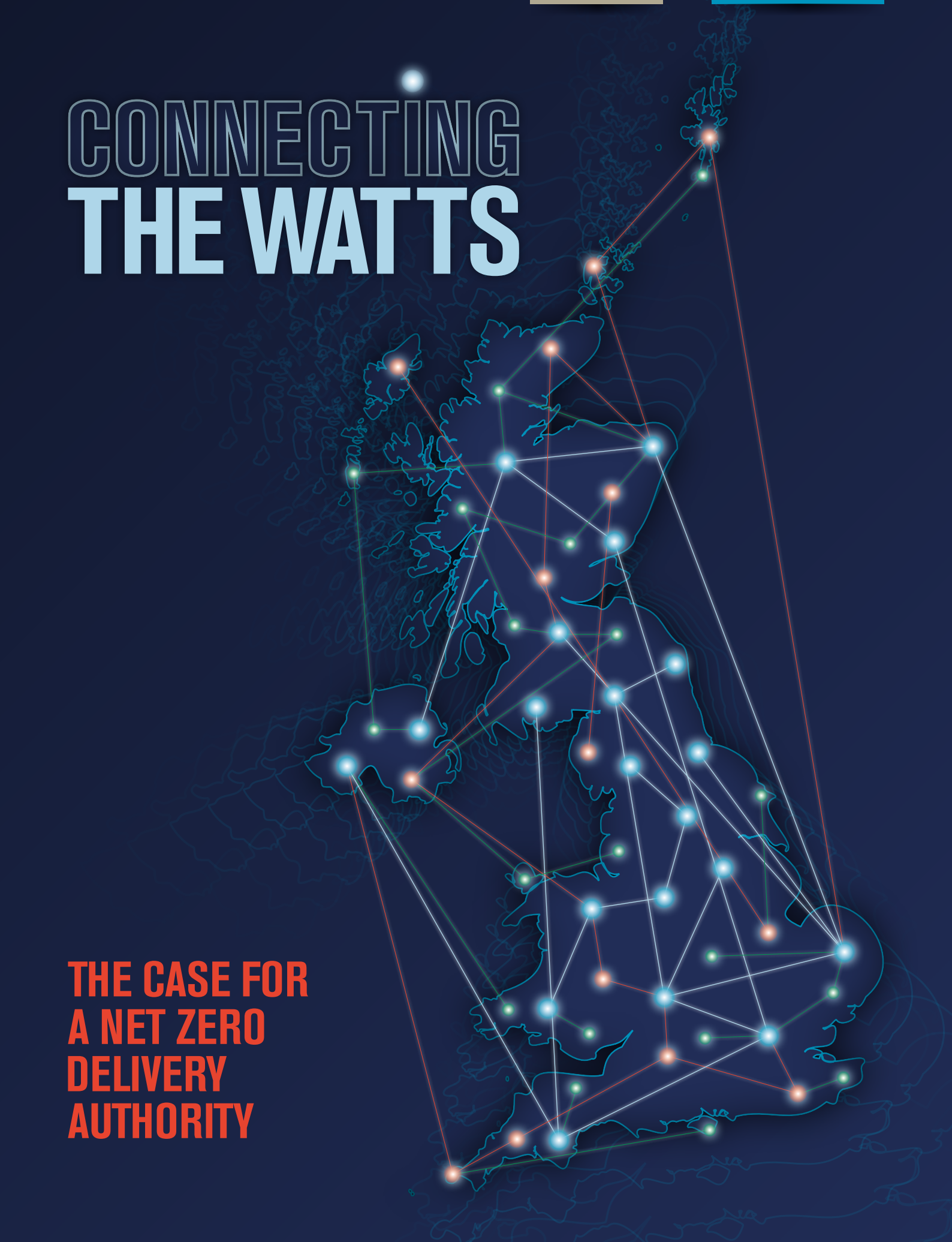

THE CASE FOR A NET ZERO DELIVERY AUTHORITY

Contents

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This report follows a nine-month long inquiry and was written by Rein de Loor, Head of Sustainability, and Verity Winn, Project Co-ordinator for Sustainability at Policy Connect.

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Foreword

In October 2021, the UK Government published a number of strategies critical to the delivery of the UK's legally-binding net zero target. In the wake of the 26th United Nations Climate Change conference (COP26) the time is right to take stock on what implementation measures are needed to deliver on the government's ambitions.

As parliamentarians we are aware of the questions that our constituents – both individuals and companies – have about the implications of reaching net zero. There is an increasing understanding that changes are needed and a growing passion to achieve net zero to protect the planet for our grandchildren.

But without clearer advice and public education from government, people risk becoming uncertain and confused about what action they can take in their individual circumstances and in their businesses.

This cross-party report sets out a new approach to net zero: a joined-up, coordinated approach that connects central to local, people to policymakers and the UK to its net zero-carbon future. Its recommendations point towards changes across the heating, power, transport and industrial sectors, and set out how a net zero authority would provide delivery leadership across governance, skills and standards, public engagement and business models. Crucially, our recommendations would keep a just transition at the heart of every net zero programme.

We are delighted to have co-chaired this inquiry and the consultation roundtables that formed the basis of its findings, bringing together voices from central and local government, Parliament, business, industry, energy, academia and the third sector. We would like to thank everyone who gave their time and expertise, and particularly thank Baxi Heating, the Energy and Utilities Alliance, E.ON, the Institute of Gas Engineers & Managers and Worcester Bosch who kindly sponsored this Policy Connect report.

Darren Jones MP

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Context

In June 2019 the UK Government announced a world-leading net zero target to cease domestic carbon emissions by the year 2050. Two years on, the UK finds itself at a landmark moment on the road to this target, as President for COP26 and releasing key strategies that will determine the decarbonisation of our society. In these two years however, the UK has also experienced the serious challenges presented by the coronavirus pandemic and its widespread impacts. In light of these circumstances, the path to net zero not only presents an opportunity to urgently cease domestic contributions to climate change, but also to build a green future and embed low-carbon measures in daily life as part of recovery from Covid-19.

Important pieces of the puzzle of net zero have come in the form of government's Energy White Paper, Transport Decarbonisation Plan, Industrial Decarbonisation Strategy, Hydrogen Strategy, and Heat and Buildings Strategy, as well as its overarching Net Zero Strategy. Almost every government department has a role to play in making net zero a reality. Despite these commitments, there is currently a lack of follow-through and coordination between these policies and stakeholders, which limits the successful implementation of decarbonisation plans. Unless coordination is prioritised, the UK is in danger of missing its 2050 net zero target. This inquiry proposes a public delivery authority for net zero, to support this and future governments in connecting its net zero action into an unprecedented cohesive delivery effort, of the scale and pace of change never seen in peacetime before.

This nine-month cross-party inquiry has shown that to move quickly enough to deliver on our net zero ambition, the government needs to take, in a very visible and high profile way, three important steps.

First, every government department needs to publicly sign up to apply a **Net Zero Test** to its individual strategies and policies and be held to account.

Second, **local government and its partners** – who have the reach into local communities and businesses – need to be empowered to plan the transition and resourced to make it happen.

Third, the government needs to establish a **net zero delivery authority** with the responsibility for bridging the gaps across government and its agencies as well as between central and local government, and to provide the drive and leadership to enact it.

Whilst being accountable to government and Parliament for delivering on net zero strategies and working within the framework set by government, this authority should have the autonomy to make the necessary implementation decisions. It would need to work across the UK's nations and regions. To provide assurance to business and people about its longevity and clout, it should be established by statute and sponsored jointly by the Department for Business, Energy and Industrial Strategy (BEIS) and Her Majesty's Treasury (HMT), to demonstrate it has cross-departmental backing and fits with the UK's financial and budgetary policies.

Key messages for policy-makers

Connecting departments and strategies

Strategies and targets across government must work together to meet the net zero target. Applying a Net Zero Test to all spending decisions and policy announcements would help ensure these are compatible with, and actively contribute to, net zero by 2050. Government should agree and publish whole-of-government metrics on the delivery of its net zero targets.

Connecting central to local

Local government and communities have a crucial role to play in reaching net zero. The low-carbon transition must centre multi-directional communication and leadership between local authorities and central government departments. Local authorities must be given long-term resources that allow them to plan, autonomy to make transition decisions in their areas and the requisite staff and funding to carry out these functions. A net zero delivery authority would provide the forum to coordinate these relationships and help oversee local decarbonisation plans.

A connected approach

A joined-up approach to the energy system is needed, which requires the breaking down of silos between electricity, heat, transport and industry and the joining up of physical requirements of the energy system with policy, markets and digital arrangements. Infrastructure development and upgrades must also precede the roll-out of low-carbon technology and products. This would optimise consumer cost and experience, and maximise energy efficiency savings. Whilst this will be the responsibility of the Office of Gas and Electricity Markets (Ofgem) and a potential Independent Systems Operator, a net zero delivery authority will have a brokering role to play in this process to ensure it feeds into strategy delivery with local government, businesses and consumers.

Key findings and recommendations

GOVERNANCE

Key findings

- Government must move towards a connected, cross-departmental approach to policymaking to deliver its net zero targets effectively and consistently across the UK.
- Net zero delivery must become an integral part of government policy across all departments, coordinated through long-term strategies and the carbon budgets.
- Local government must play a key part in the delivery of net zero.
- Local government, enterprise agencies and partnerships must be enabled to feed into national net zero policy, acting as a gateway between local actors and national strategies.

Recommendations

Recommendation 1: Government should adopt a Net Zero Test across all departments, as well as agree and publish whole-of-government metrics on the delivery of its net zero targets.

Recommendation 2: Government should establish a net zero delivery authority to facilitate the delivery of net zero strategies in order to meet the UK's 2050 net zero target.

Recommendation 3: Central government should provide local government with the appropriate mandate and resources to deliver net zero in their area.

SKILLS & STANDARDS

Key findings

- More attention to net-zero skills must be paid at primary and secondary education, in order to raise awareness of new possibilities and prepare pupils for the future world of work.
- Training courses currently available at post-16 education level must in future equip individuals with the skills to enter net-zero industries, and be co-designed with local business leaders.
- Government must provide clarity on its roadmap to net zero for businesses, public sector organisations and skills providers to be able to invest in training programmes, apprenticeships and conversion courses, in order to fill skills gaps and provide the jobs needed for the net zero transition.

Recommendations

Recommendation 4: As part of its approach to delivering net zero, the net zero delivery authority should work with local partners to inform comprehensive net-zero skills plans based on targets set by government.

Recommendation 5: Government must provide stronger regulation of new and improved skills standards in addition to incentives to expand and equip the workforce needed to deliver net zero.

PUBLIC ENGAGEMENT

Key findings

- Businesses and government must make links with the organisations that consumers trust to give them impartial, well-informed advice.
- Decarbonisation of heating and power will require local authorities, social housing providers and others to deliver on a street by street basis where appropriate – the delivery authority can coordinate this work with local partners.
- Government must embed fairness and justice into the decarbonisation transition.

Recommendations

Recommendation 6: Government should establish a network of independent consumer information hubs, which would provide information about net zero, consumer protections and offer tailored advice.

Recommendation 7: The net zero delivery authority should work with local authorities and relevant businesses, such as energy suppliers, to deliver a public information campaign about the path to net zero.

Recommendation 8: Government should introduce measures to incentivise homeowners to adopt low-carbon heating, energy and transport early, at key points such as home renovation or sale.

BUSINESS MODELS

Key findings

- Government strategies need to be long term (beyond election cycles) with sustainable, multi-year funding settlements.
- A net zero delivery authority will help drive an enabling business environment for net zero delivery.
- The transition to net zero must be fair and just, ensuring that no one is left behind, fuel poverty is properly addressed, and new net-zero technologies are accessible to all.

Recommendations

Recommendation 9: Government must give the net zero delivery authority the mandate to be involved in long-term strategic energy systems planning; including working closely with Ofgem.

Recommendation 10: A government-backed pilot study should be carried out before 2025 to establish how local and combined authorities can be given the resource and mandate to build and deploy their skills and capacity to deliver net zero, in coordination with the net zero delivery authority.

Recommendation 11: Government must cease incentives which lock in reliance upon fossil fuels, instead shifting focus to making the unit price of zero-carbon forms of energy more affordable.

The disjointed net zero policy map

The case for a net zero delivery authority

Subsequent UK governments have committed to reaching net zero by 2050 through the adoption of the Climate Change Act in 2008 and its amendment in 2019 to raise the target from 80% emission reductions to full carbon neutrality by 2050.[1] This is a hugely ambitious target for government to achieve, which will have far-reaching consequences for all economic sectors and sections of society, and thus for many different policy areas and government departments.

Current government strategy to deliver net zero is based on a combination of central targets and policy intention statements, including several white papers and the Prime Minister's Ten Point Plan, as well as sectoral strategies in support of these targets. In the run-up to COP26 the government put in place a number of key strategic road maps such as on heat and buildings. The Net Zero Strategy sets out an overarching framework for all industry sectors; the challenge now is to deliver on that integrated approach to decarbonising the UK economy and society. Delivering on these strategies will require considerable coordination across all parts of government and a much stronger focus on implementation and delivery at pace.

Policy Connect's Climate Policy Dashboard sets out six critical sectors for action to reach net zero: power, transport, manufacturing and construction, agriculture and land use, buildings, waste, as well as action on adaptation.[2] Sectoral strategies to address issues such as heating in homes, building regulations, electricity grid upgrades, transport, waste, renewable fuels and land use are all in the hands of different departments, yet are strongly interdependent for the successful delivery of net zero. The Net Zero Strategy commits to tackling climate change across sectors and across government, including local government. The challenge now is to put these ambitions into practice.

[1] HM Government, UK becomes first major economy to pass net zero law (2019) https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law [Accessed 10 June 2021).
[2] Policy Connect, Climate Policy Dashboard (2021) https://www.policyconnect.org.uk/sustainability/climate-policy-dashboard [Accessed 1 September 2021].

Governance and delivery

Reaching net zero emissions by 2050 is a huge challenge, but existing work shows that with the right strategy and commitment in place, it is achievable.[3] The Climate Change Committee (CCC) recommended in its latest progress report that action is needed across a wide range of areas to get on track to deliver net zero, requiring comprehensive strategies to deal with electric vehicles (EVs), building decarbonisation, manufacturing decarbonisation, low-carbon electricity generation, hydrogen and domestic engineered greenhouse gas removals.[4]

Having set out a number of ground-breaking strategies across these sectors, the government now needs to move towards a whole-systems, cross-departmental approach combined with coherent and focussed delivery mechanisms.[5] At the strategic level this will need close coordination amongst Whitehall departments as well as with devolved administrations and local and regional authorities. Such coordination is particularly important because of the scale of the challenge of reaching net zero and due to the impact it will have on all sections of the economy and society, down to individual homeowners and car users, and consequently across government policy in every department.

A connected approach

This inquiry found that government must move towards a connected, cross-departmental approach to policymaking to deliver its net-zero targets effectively and consistently across the UK.

This is challenging given the need for individual departments to concentrate on their individual responsibilities. It will require buy-in and alignment across all Whitehall departments, devolved administrations, and local and combined authorities. The interdependencies between the energy system, heating, transport or industry will need to be identified and managed, and solutions considered at the local, regional and national level. For example, on the interaction between electricity and gas supply and distribution infrastructure to meet demand from buildings, power generation, industry and transport.

According to the Energy Systems Catapult, a whole-systems approach to the low-carbon energy transition has three key characteristics: a joined up system from primary energy sources to the end consumer; the breaking down of silos between energy vectors, such as electricity, heat and transport fuels; and joined-up physical requirements of the energy system with policy, market and digital arrangements.[6] They argue this is essential for the successful delivery of the 2050 net zero target, given the need for a fundamental transformation of the energy system, which includes electricity, heat, transport and industry.

[3] Centre for Sustainable Energy, Bristol net zero by 2030: The evidence base (2019).
[4] Climate Change Committee, Progress Report to Parliament (2021), p. 32.
[5] Carbon Connect, Uncomfortable Home Truths (2019), p. 27.
[6] Energy Systems Catapult, Markets, Policy and Regulation (n.d.).

RECOMMENDATION 1:

Government should adopt a Net Zero Test across all departments, as well as agree and publish whole-of-government metrics on the delivery of its net zero targets.

Net zero delivery must become an integral part of government policy across all departments, coordinated through long-term strategies and the carbon budgets. In their policy recommendations for meeting the Sixth Carbon Budget, the CCC notes the importance of HMT in ensuring a balance between the need to reduce emissions and fiscal objectives.[7] They see a Net Zero Test as one of the key cross-cutting priorities for a comprehensive net zero strategy, ensuring that all government decisions are compatible with the legislated emissions targets.[8] A Net Zero Test would help to achieve this, and by working across government HMT should plan for a long-term economic and financial framework in support of net zero delivery.

Key to the successful delivery of net zero by 2050 will be adequate funding commitments from HMT and putting in place the right incentives to decarbonise the economy. As HMT put it in their Autumn Budget, Spending Review and the Net Zero Review: "[achieving net zero] will be a collective effort, requiring changes from households, businesses and government."[9] "It will require substantial investment and significant changes to how people live their lives."[10] As part of this investment HMT will need to respond to the recommendation from the CCC to ensure a fair and long-term approach to funding the transition to net zero.[11] In particular, the CCC urges priority be given to a number of its recommendations:

- Ensuring departments are fully equipped to deliver the necessary actions across climate change mitigation and adaptation.
- Ensuring local government is resourced to play a full role in the net zero transition; working with BEIS on delivery of the Heat and Buildings Strategy to ensure that relative prices favour a shift to low-carbon technologies.
- Developing with the Department for International Trade (DIT) the option of applying either border carbon tariffs or minimum standards to imports of selected embedded-emission-intense industrial and agricultural products and fuels.[12]

These recommendations support the concept of a more integrated approach to net-zero policymaking and delivery, in which both BEIS and HMT should play a central role.

At the implementation level, any governance structure for the delivery of timely and ambitious climate action requires the ability to make long-term operational decisions, and will need some form of autonomy from day-to-day political and policy drivers in order to be able to address net zero issues effectively over time. By committing to long-term targets and delivery strategies, the government can create clarity for people and industry, whilst being responsive and adaptable to feedback from the public and businesses. In order to help government do this, the delivery structure needs to have independence – through being based in statute – and longevity.

Future governance structures need to be able to create consistency across different areas of government policy. For example, the impact of domestic net zero policies need to take into consideration the external environment to ensure greenhouse gas emissions are not simply exported abroad. The role of the UK on the international stage should be equally in support of delivering net zero and achieving its climate commitments, through diplomacy and trade agreements for example.

[7] Climate Change Committee, Policies for the Sixth Carbon Budget and Net Zero (2020), p. 31.
[8] Climate Change Committee, Progress Report to Parliament (2021), p. 30.
[9] HM Treasury, Net Zero Review (2021), p. 119.
[10] HM Treasury, Net Zero Review: Interim Report (2020), p. 2.
[11] Climate Change Committee, Progress Report to Parliament (2021), p. 17.
[12] Ibid, pp. 194-195.

A net zero delivery authority

The delivery of net zero policies faces multiple challenges due to the cross-sectoral, long-term nature of solutions required. To remedy some of these challenges, responsibility for delivery of a cross-government route map, which should be agreed by UK and devolved national governments, could be delegated to an independent body, or net zero delivery authority. Such an authority would require delegated powers to ensure effectiveness, whilst the UK and devolved national government decide the rules, regulations, and spending commitments.

A net zero delivery authority could enable the net zero transition by embodying systemic thinking about energy use across different sectors. It would consider a whole energy system comprised of power, heat, transport and industry, and co-ordinate delivery of net zero policies at national, regional and local levels. Accordingly, it would consider an overarching approach to energy, rather than separate gas or electricity markets. It should be removed from the linear understanding of provision to consumption, and instead work with flexible supply, demand, and storage. This would address the lack of consistent coordination in Whitehall, and create an authority with a specific mandate to deliver net zero. This authority would work to deliver overarching targets and strategies set by government and suggest how best to approach green skills gaps.

RECOMMENDATION 2:

Government should establish a net zero delivery authority to facilitate the delivery of net zero strategies in order to meet the UK's 2050 net zero target.

This should be a public body operating at arm's length from government, much in the way the Olympic Delivery Authority did in the planning of the 2012 London Olympic Games.[13] However, there are important differences; this is a more long-term and complex endeavour and will involve major on-going political, financial and delivery choices. The responsibilities of the delivery authority could be as follows:

1. **National to local coordination:** Coordinates delivery of government strategies between the national and local levels, by planning how resources are distributed across the UK and providing detail to government strategies about the practicalities of implementing them on the ground. Helps form a delivery plan for consumers, businesses and local authorities, and in doing so considers the skills required and market incentives to facilitate change.
2. **Informing coherent and practicable strategies:** Gathers information and understanding of local delivery from local government and businesses to inform national strategies. Brings together sectoral strategies from across government to ensure consistency and compatibility, whilst feeding back about the practicalities of delivery from the local level to different government departments.
3. **Engage with communities:** Works with local authorities and communities to engage with people about how delivering decarbonisation will affect them. This will primarily be carried out by local actors, whilst the delivery authority provides leadership and trustworthy information about the national decarbonisation effort.
4. **Connecting net zero agencies:** Works with partner organisations and national bodies to inform both national and local delivery strategies for the decarbonisation of energy systems, heat, transport and industry to foster a connected approach, as a statutory consultee for Ofgem.

[13] Institute for Government, How Government can Achieve Net Zero (2020), p. 78.

Government will set the authority's objectives, rules and principles of operation; the authority will then be responsible for autonomous delivery within this framework, and for reporting to government on progress and providing feedback on any amendments. To allow the authority to act long-term, and operate on an equal basis to other key bodies such as the CCC, it should – like the new Office for Environmental Protection – be based in statute. Having a stable future will also help the authority to understand and thereby be receptive to on-going changes in science and evidence. It needs to have the ability to work with devolved administrations and local and regional authorities in order to bridge the gap between central policy strategy and local delivery.

This inquiry found that the establishment of a net zero delivery authority would have a number of benefits and elements to consider for it to be successful:

- **A net-zero delivery authority would help bridge the gap between central and local government, ensuring delivery of net zero policies are effectively and efficiently coordinated, constraints identified and resources made available.** Where government departments are rightly focussed on national policy design and funding allocation decisions, a delivery authority could play a crucial role in the implementation of government policy and the coordination of policy delivery from the national to the local level. Communication between central and local government, as well as between different regions of the UK, will be paramount to the coherent and effective delivery of national strategies. A delivery authority will be able to highlight any constraints at the local level and play a brokering role for the allocation of resources across the UK to avoid delays and potential inefficiencies.

- **A delivery authority would help drive enhanced policy consistency across different departments and layers of government, by providing feedback to government on implementation issues, thereby helping government departments to make better policy.** The delivery authority would need to have legitimacy and clout through statute for it to have the necessary continuing powers across electoral cycles, and in particular to have multi-level government and cross-party commitment. It could also provide implementation consistency across the Nations and Regions by adopting a structure with accountability lines not just to central government but also to the devolved administrations and potentially to elected combined/regional authorities.

- **Whitehall and Parliament would set the authority's deliverables in the shape of long-term targets and policy strategies, whilst the authority must have sufficient autonomy to make its own implementation decisions to reach these targets.** The delivery authority would derive its mandate from the national targets and strategies by government. By convening local authorities and business leaders it would ensure the precise implementation roadmap and sub-national policy delivery decisions are specific to and suitable for place, thereby increasing the potential for successful and timely implementation of national targets. Examples of this include national numerical targets for heat pump installations combined with the move to new zero emission vehicles by 2030.[14] The delivery authority would convene – in place – industry, business, local government and consumers to develop an integrated approach to electric charging and clean hydrogen infrastructures. A net zero delivery authority would need to work closely and interdependently with the CCC, Ofgem, Infrastructure Commission, HMT and other official institutions, such as the UK Infrastructure Bank which will play a central role in progressing the delivery of net zero at a regional and local level.

[14] Department for Transport, Decarbonising Transport: A Better, Greener Britain (2021), p. 87.

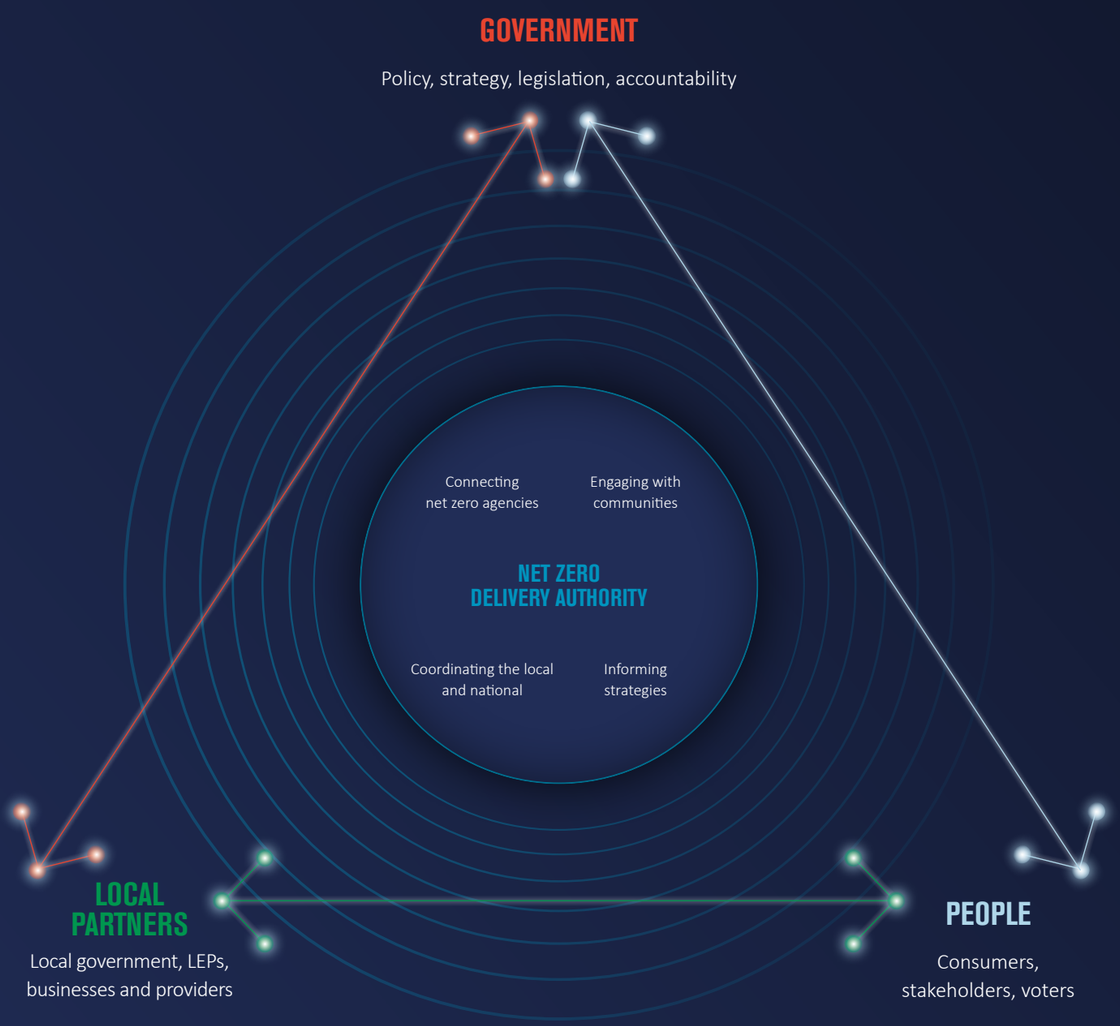
- **A delivery authority should have the mandate to work across the different regions of the UK with devolved administrations and local and combined authorities to ensure the right approach and resources are available consistent with UK targets.** Many decisions will be delivered by local actors, and local government in particular. Consequently, there is a need for local and combined authorities to build and deploy their own skills with the overarching guidance and assurance of a delivery authority. There are significant benefits to empowering local decision making surrounding net zero; through Local Area Energy Plans, local authorities can provide understanding of which solutions will work best in their area, optimise local infrastructure and are more accountable to people. A net zero delivery authority could provide consistent, expert advice to local authorities on their Local Area Energy Plans and skills gaps and help ensure they contribute to meeting national targets, thus ensuring local knowledge is leveraged. This would also ensure that private and public investment filters down beyond the national level. By boosting the capacity and expertise of local authorities with a central authority, local action can be driven forward considerably.

- **A net zero delivery authority should be based in statute and sponsored jointly by BEIS and HMT.** In our 2019 report, *Uncomfortable Home Truths*, we recommended there must be strategic governance and financial structures to drive long-term action to deliver net zero.[15] Given the role of an independent authority in coordinating the effective delivery of net zero policies, alongside a more connected, cross-departmental approach to setting climate policy, both BEIS and HMT will have key roles to play in working with the delivery authority through setting targets and spending commitments. The net zero delivery authority should have the full backing of HMT if it is to be taken as seriously as it needs to be; which could be achieved through HMT being one of the departmental sponsors of the authority.

  One of the CCC's key recommendations for HMT is to ensure all departmental policy and procurement decisions are consistent with the net zero goal and reflect the latest understanding of climate risks.[16] A net zero delivery authority with HMT sponsorship would help entrench this approach and standardise procedures in aid of coordinating net zero policymaking and delivery. There is a clear role for HMT to work in conjunction with the authority to apply the relevant tests and standards to government policy, and as such empower the authority to effectively deliver net zero policies.

[15] Carbon Connect, Uncomfortable Home Truths (2019), p. 65.
[16] Climate Change Committee, Progress Report to Parliament (2021), p. 194.

The net zero delivery authority and its relationships



Core principles of the net zero delivery authority

Local government

The inquiry found that local government can and must play a vital part in the successful delivery of net zero. Future governance frameworks must recognise this and strike the right balance between bottom-up and top-down policymaking. A particular area where local and regional authorities should take a leading role is in developing and deploying the net-zero skills that will be essential for the transition. They should be accorded the responsibility of defining local targets for upskilling and reskilling to create a net-zero labour force, in collaboration with central government so that central skills funding is correctly targeted.

Another key area of responsibility for local authorities relates to the technology solutions suitable for different places. Through Local Area Energy Plans as recommended by Energy Systems Catapult and the Centre for Sustainable Energy, local authorities can provide understanding of which technologies and solutions will work best in their area (for example depending on the nature of the housing stock), optimise local infrastructure and provide accountability to residents.[17]

Despite goodwill within local and combined authorities, many lack the ability and capacity for significant net zero delivery at present. Our inquiry revealed that during cuts to local authorities, sustainability-focussed roles have been most vulnerable, creating a shortage of precisely the expertise that is required for net zero. Fundamental questions remain around where finance and resources for local delivery will come from, whereas central government is in a position to direct both of these assets. Central government must set direction in consultation with local authorities, in which the net zero delivery authority can play a crucial brokering role. Delivery of net zero will not be discretely local or central; both must work creatively in partnership to coordinate effective solutions. In this, local authorities will take an active role as critical brokers and must be financed and upskilled accordingly.

[17] Energy Systems Catapult, Local Area Energy Plans: The Method (2020), https://es.catapult.org.uk/capabilities/markets-policy-and-regulation/ [Accessed 3 September 2021].

RECOMMENDATION 3:

Central government should provide local government with the appropriate mandate and resources to deliver net zero in their area.

In order for local government to be able to play its part in the delivery of net zero, it needs the appropriate tools to be able to do so. 74% of District, County, Unitary and Metropolitan councils in the UK have declared a climate emergency, as well as eight Combined Authorities and City Regions.[18] Many have committed to becoming carbon neutral between 2025 and 2050, with ambitious plans how to re-organise their day-to-day operations and activities to achieve this.

Yet, there is an important role for central government to play for net zero to be achieved in each individual locality. National strategies on decarbonisation are closely linked to the climate issues local governments face, with transport, the industrial and the domestic sectors having the highest shares of greenhouse gas emissions in 49%, 28% and 23% of local authorities respectively in 2016.[19] As part of sectoral strategies, such as the Transport Decarbonisation Plan and the Heat and Buildings Strategy, government must recognise the need for local government to play a key role in the delivery of policies. Local government will need to be given the mandate to deal with these issues based on local requirements and preferences, as well as the funds to enact their policies.

HMT's spending decision considerations should include how local government receives the appropriate mandate and funds from central government to deliver net zero in their area. A more integrated accountability structure, from Whitehall to the devolved and local level, will be key to how spending decisions about net zero are made. The CCC recommends that HMT should give due weight to issues of fairness, including assessments of where the costs of policies are likely to fall; impacts on jobs and job quality and how to manage them; plans to monitor and report publicly on progress towards achieving a fair transition; and where the benefits of net zero fall.[20] This involves numerous geographical considerations for which different regional and local approaches will be required. What works well in Birmingham might not necessarily work in Belfast; requirements to reach net zero in Perthshire will be different to the needs of Pembrokeshire.

The inquiry found that for implementation to have a feedback loop into government policy, it will be important for local government, enterprise agencies and partnerships to feed into national net zero policy. The role of Local Enterprise Partnerships and other agencies will be a critical part of both informing national strategies as well as delivering policy on the ground. By bringing together different actors in any one locality, a comprehensive picture and understanding can be built up of challenges and barriers to success in individual localities. This will be crucial for the national rollout of policies, as it will ultimately need to be enacted at a local level. The net zero delivery authority could work with the Office for National Statistics to ensure data from the local level is collated and fed back to central government, thus informing future strategies and delivery plans.

[18] Climate Emergency UK, List of Councils that have declared a Climate Emergency (2021) https://www.climateemergency.uk/blog/list-of-councils/ [Accessed 1 October 2021].
[19] Arup, You've Declared a Climate Emergency... What next?: Guidance for Local Authorities, p. 6.
[20] Climate Change Committee, Policies for the Sixth Carbon Budget and Net Zero (2020), p. 36.

Skills and standards

Delivering net zero will provide a significant number of new and high-value jobs. Developing a workforce with the skills to deliver net zero requires action at a number of levels, including educational pathways and scale. Today's engineers will see their work environment change as a result of decarbonisation and newly trained technicians will need to be ready for the shifts that will take place in labour demand.

There is an urgent need for re- and upskilling to take place. For example, to ensure enough homes are converted to net-zero heating by 2050, the Heat Pumps Association estimate that approximately 69,500 individual installers will be required by 2035, more than a twenty-fold increase from their 2021 target of 3,200.[21] In comparison, there are currently around 110,000 Gas Safe engineers installing 1.67 million gas boilers in the UK per year.[22,23] There is a huge opportunity for the gas engineering trade to gain the relevant qualifications and licenses to install heat pumps and hydrogen-ready boilers in homes.

These 'green' skills – i.e. skills associated with delivery of green technologies – are not the only changes occurring in the skills market; there are for example also the new professional disciplines that will emerge from the digital economy. All these changes to the future job market, and their implications for skills and skill standards, will need to be worked through in determining how to deliver net zero.

Designing locally

RECOMMENDATION 4:

As part of its approach to delivering net zero, the net zero delivery authority should work with local partners to inform comprehensive net-zero skills plans based on targets set by government.

Local skills partnerships and local authorities – in conjunction with local business leaders – are best placed to ensure future skills gaps are filled, a sufficient supply of labour is available and the benefits of re- and upskilling are shared across the UK, thereby helping with the Levelling Up agenda. Local skills improvement plans could be the delivery mechanism for setting out how to achieve the skills needed for the government's net zero strategies.

The government's recent publication of the net zero and related strategies will help provide the long-term framework that businesses need to be able to prepare for future commercial opportunities, including getting the right skills sets. However, within that overarching framework of strategies there will be many delivery choices, and hence commercial uncertainties. This is where a net zero delivery authority could help provide consistency of delivery strategy over time, as well as sustained two-way interaction with local government to inform local and national delivery plans.

The inquiry found that training courses currently available at post-16 education level must in the future equip individuals with the skills to enter net-zero industries, and be co-designed with local business leaders. Learners must be given good information about the different routes into low-carbon industries, the skills they can acquire, as well as salary and career progression. Renewed focus on apprenticeships and modular learning would support this educational transition. Policy Connect and the Skills Commission have separately, in their report ***Transition to Ambition: Navigating the careers maze***, recommended that the Careers Information Advice and Guidance system in England should become a truly all-age national service, and this would be the means to help learners into low carbon industries.

[21] Heat Pump Association, Building the Installer Base for Net Zero (2020), p. 7.
[22] Citizens Advice, Written Evidence to the Environmental Audit Committee from Citizens Advice (2019), https://committees.parliament.uk/writtenevidence/7226/pdf/ [Accessed 3 October 2021].
[23] Gas Safe Register & Accent, The Decade Review: The UK Gas Industry Considers its Past, Present and Future (n.d.).

Evidence submitted to the inquiry indicates that tertiary education providers face two main barriers to facilitating upskilling: there is a lack of readily available information required to develop new courses, and the development of these courses is expensive. The government has indicated in the Skills for Jobs White Paper that it will consider awarding colleges multi-year budgets.[24] We would strongly endorse this as it would allow colleges to invest in developing new courses, and ensure they are competing on quality rather than learner numbers.

To meet the UK's 2050 target, upskilling current installers, engineers and technicians from high- to low-carbon roles will form the bulk of the new skills base. There is no time to lose, since upskilling programmes cannot happen overnight. Government must support these courses in development and accelerate their certification, without weakening standards.

Key requirements for building the net-zero workforce include:

1. Learners require multi-disciplinary skills. Professionals must be able to pivot their knowledge and skills from carbon-intensive to low-carbon systems. This is entirely achievable, there are real-life examples such as oil engineers pivoting to work in the off-shore wind sector.
2. Diversity and inclusion is not just desirable in and of itself but is needed to fill employment gaps. There is already a workforce shortage in the UK and, in order to compete, low-carbon industries will need to attract people who would not have previously considered these industries or roles.
3. A narrative needs to be developed that educators and employers can use to communicate low-carbon opportunities in a way that will engage and generate excitement about net-zero jobs amongst learners and those in existing, carbon-intensive industries.

Now is a once-in-a-generation opportunity to embed low-carbon skills and jobs. These roles offer substantial employment, and align strongly with government's Build Back Better and Levelling Up agendas, as well as the recommendations of the Skills for Jobs White Paper.[25]

Training and educating

The inquiry similarly found that more attention to net-zero skills should be paid at primary and secondary education level, in order to raise awareness of new possibilities and prepare pupils for the future world of work. Efforts to attract new people into the net-zero workforce should start at primary and secondary school. Young people are increasingly passionate about the net zero agenda, and this can be built on through a wide range of different subjects including, amongst others, sciences and social studies, as well as vocational subjects and people skills.

The narrative about low-carbon related job opportunities and quality of low-carbon roles should start at school; actively supporting young people into a long-term pipeline of opportunities should be central to a green recovery. This can be brought to life for students through schools and colleges engaging with engineers delivering green technology solutions. These measures would nurture enthusiasm and a sense of mission to drive forward preparing pupils for net zero roles and therefore decarbonisation.

Net zero needs to be at the heart of a long-term science, technology, engineering and mathematics (STEM) education strategy.[26] Business leaders have a key contribution to make to the development of such a strategy, which then to feed into careers advice and teacher recruitment for the delivery of 'green STEM' technical qualifications.

[26] STEM Foundation, STEM Strategy: Develop and Coherent STEM Strategy (n.d.)

Related to the above, another key finding from the inquiry was that the government should provide greater clarity for businesses, public sector organisations and skills providers to be able to invest in training programmes, apprenticeships and conversion courses, in order to fill skills gaps and provide the jobs needed for the net zero transition. If businesses are to invest in their workforce for the future, they need the government to provide certainty over the future business environment, which they can then translate into an analysis of the specific skills required by their company.

As businesses emerge from the pandemic there is an opportunity to put longer-term schemes in place, and thereby to overcome the challenges for business created by short-term schemes such as the Green Homes Grant (GHG).[27] The government's recent consultations on the phasing out of fossil fuel heating, for example, provides a longer-term direction of travel that businesses can use to plan skills needs, and also an opportunity to develop user-friendly and trusted accreditation processes. Good lessons can be learnt from the Local Authority Delivery Scheme (LAD)[28] which provided businesses with the assurance that local authorities would continue to participate in the long term, resulting in greater business investment in staff and supply chains.

Consumer hearts and minds must be won over to the low-carbon transition: it is consumer demand that will help drive business innovation and skills development. But without clear, impartial advice consumers risk becoming uncertain and confused about the suitability for them – as individuals and householders – of low-carbon technology solutions. Consumers need trusted organisations which will provide advice in their best interests.

Similarly, and to respond effectively to consumer demand, industry requires consistent, reliable information about skills and standards which it can act upon with confidence. Having such a central source of information, as well as readily available advisors for consumers on how to effectively decarbonise their homes and lives, is critical to driving forward the transition. The National Centre for the Decarbonisation of Heat (NCDH); proposed by the University of Birmingham, Energy Systems Catapult and others, with a particular focus on manufacturing acceleration, a skills academy, a business incubator and standards and verification; would be a big step forward in realising this need.[29] The net zero delivery authority should work closely with the NCDH to inform its strategy and activities in order to coordinate delivery planning.

[27] Green Alliance, What has gone wrong with the Green Homes Grant? (2021) https://greenallianceblog.org.uk/2021/02/18/what-has-gone-wrong-with-the-green-homes-grant/ [Accessed 3 July 2021].
[28] Energy Savings Trust, Green Homes Grant Local Authority Delivery scheme (2020) https://energysavingtrust.org.uk/report/green-homes-grant-local-authority-delivery-scheme/ [Accessed 3 July 2021].
[29] Birmingham University, National Centre for the Decarbonisation of Heat (n.d.) https://www.birmingham.ac.uk/research/energy/national-centre-decarbonisation-of-heat.aspx [Accessed 3 July].

RECOMMENDATION 5:

Government must provide stronger regulation of new and improved skills standards in addition to incentives to expand and equip the workforce needed to deliver net zero.

There is a role for the government as well as for business in shifting the focus of standards and skills to low-carbon. Existing standards may need to be updated, as well as new standards and quality assurance introduced, in order to achieve adequate and at-scale delivery of net zero jobs and ensure net zero projects are delivered in an effective and timely manner, from the individual consumer level to industrial scale.

As the time remaining to achieve net zero decreases, strong regulatory enforcement would provide fast, effective changes in standards. For example, the 2035 deadline for phasing out installation of natural gas boilers, as is the government's ambition in the Heat and Buildings Strategy[30], has potential to mirror the successful transition to condensing gas boilers. In the interim, the installation of hydrogen-ready boilers should be mandatory once they are available at little or no cost penalty, likely by 2025.[31] Similarly, the move to prohibit the sale of new petrol and diesel powered cars from 2030 is driving a rapid transition in production lines and skill priorities. Such regulation helps assure businesses of the long-term nature of the low-carbon transition.

Further, incentives encouraging businesses to upskill and uphold standards would also be valuable. Some evidence provided to the inquiry suggested that to encourage existing heat pump installers to employ and train new installers, an incentive payment might be helpful to those who provide training and experience under their existing Microgeneration Certification Scheme (MCS) accreditation. This payment incentive could take the form of a tax credit or rebate, and be paid out according to the number of new installers that existing heat pump installer companies train. Another measure could be that the scope of the Construction Industry Training Board (CITB) levy include renewable heating installs, so accredited heat pump installer companies can access installer training funds.[32]

[30] HM Government, Heat and Buildings Strategy (2021).
[31] Carbon Connect, Pipeline to 2050 (2020), p. 13.
[32] Evidence submitted to Carbon Connect; Construction Industry Training Board, CITB Levy, https://www.citb.co.uk/levy-grants-and-funding/citb-levy/about-the-citb-levy/ [Accessed on 30 September].

Public engagement

Public support for action on climate change is high, yet significant gaps remain in the public's understanding of what this means in practice, particularly regarding the decarbonisation of domestic heat. According to a survey undertaken by Baxi Heating, albeit prior to the government's most recent announcements about home heating, 74% of a representative sample of 2,000 homeowners had heard of government's net zero target and were confident activity is underway to meet it.[33] However, only 20% acknowledged changes in home heating will be part of this. Similar research from National Grid found that just 20% of their sample were familiar with ground source heat pumps, air source heat pumps or heat networks.[34] This presents an opportunity for government to begin engaging with the public to build enthusiasm and understanding of net zero measures, adjacent to developing plans to implement them.

We recommend a two-pronged approach to public engagement for net zero. As a foundation, government must ensure people are informed about planned changes that will impact their lives. To ensure widespread, consistent understanding, this information should be disseminated through a net zero public information campaign, delivered by the net zero delivery authority. People must also be able to access tailored consumer information, which should be provided by an independent consumer information hub. This would act as a 'one stop shop' of tailored advice about net zero products, consumer protections and certified installers and providers.

To achieve the necessary scale of housing retrofits and heat supply switchover, government intervention will be required. Government should also – through the consultations published in October 2021 – gather evidence on adequate incentives for homeowners to adopt low-carbon heating and retrofits early, to provide an initial boost to decarbonisation. Thereafter, there needs to be a consistent and oft-repeated information campaign about the priority of decarbonising home heating.

Information and trust

Businesses and government must make links with the organisations that consumers trust will give them impartial, well-informed advice. The inquiry found that building trust in public information about net zero is an essential foundation for an effective public engagement strategy. If government is to engage meaningfully with the public and successfully encourage the take-up of low carbon technologies, people must be able to trust those technologies. In our report ***Uncomfortable Home Truths*** we set out that different actors have different strengths in the eyes of the public.[35] For example, the Gas Safe Register gives customers confidence in gas installers and our inquiry emphasised the value of messaging from independent advice services.

UKERC research points to the importance of using messengers that already have established communications with the public, are perceived to have peoples' best interests at heart, and demonstrate clear separation from industry.[36]

For example, in considering how to reinforce messages from government and public bodies about net zero, there would be merits in using the National Health Service (NHS) as a trusted messenger.[37] The NHS is well-positioned to communicate the significant health co-benefits of transitioning to a low-carbon society, such as healthier buildings and cleaner air. These are important co-benefits of net zero delivery, as we highlight in our report ***Green Bill of Health***.[38]

[33] Carbon Connect roundtable, Next steps towards a Net Zero Delivery Architecture: Public Engagement (2021).
[34] Ibid.
[35] Carbon Connect, Uncomfortable Home Truths (2019), p. 49.
[36] UKERC, How does the British public feel about paying for the energy transition? (n.d.) https://ukerc.ac.uk/publications/paying-for-energy-transitions/ [Accessed 1 February 2021].
[37] The NHS has itself committed to reaching net zero by 2040. NHS, Delivering a 'Net Zero' National Health Service (2020) www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2020/10/delivering-a-net-zero-national-health-service.pdf [Accessed 3 February 2021].
[38] Policy Connect, Green Bill of Health: acting now for a sustainable recovery & healthy future (2021).

Inevitably, however, because home decarbonisation and electric vehicle take-up require people to interact with suppliers and installers, what businesses say and do will be key to building consumer trust in services and products. Keeping pace with the low-carbon transition necessitates that a public engagement strategy for trust must begin in the next 18 months, according to the CCC.[39] A TrustMark for net zero would reassure people of the value and quality of net-zero suppliers and installers; developing this could be taken forward by industry groups such as the Federation of Master Builders into a Government Endorsed Quality Scheme. As an established, not-for-profit social enterprise, orientated towards consumers and businesses, TrustMark would be well-positioned to carry out the accreditation process and award the net-zero accreditation. The development and award of this accreditation should take account of compatible accreditation schemes such as the Carbon Trust Accredited Supplier scheme. To avoid businesses having to jump through numerous regulatory hoops members of this scheme could automatically qualify for net zero certification, whilst businesses who gain qualifications in new net-zero British Standards Institution (BSI) skill standards should be automatically redirected to this scheme. These measures would ensure businesses are not deterred by convoluted applications and quality assurance for net zero becomes standardised for consumers and suppliers.

RECOMMENDATION 6:

Government should establish a network of independent consumer information hubs, which would provide information about net zero, consumer protections and offer tailored advice.

As well as understanding timelines for changing to low-carbon technologies, consumers will need technical advice and support. A consumer information hub is required to provide advice for net zero heating, transport and power.[40] It should be independent from government and the delivery authority to ensure consumer confidence and established on the principles of the original Energy Saving Trust.[41] Decarbonisation will impact each person differently, often depending on whether individuals are homeowners, private renters or local authority tenants. Therefore, it is not possible to provide generic consumer information; a consumer information hub should provide tailored advice to individuals who seek it, according to housing type, income and local area. Which? called for this in their recent report, which found that just 13% of consumers feel they know a lot or a fair amount about the need to move to a low carbon system, and only 16% feel they know a lot or a fair amount about government plans to ban the installation of new gas or oil boilers.[42]

This hub should partner with local authorities and community groups to draw upon local knowledge, leverage perceptions of local authorities as trusted partners and ensure local government is embedded in net zero. Home Energy Scotland provides consumer advice anchored in local knowledge, managed by the Energy Saving Trust.[43] Our proposed consumer hub must include the whole UK, and do much more than the government's beta energy advice service Simple Energy Advice, which offers general advice but asks consumers to provide information about their home they may not have access to, and provides limited options for the 36% of the public who live in rental accommodation.[44]

[39] Climate Change Committee, Progress Report to Parliament (2021).
[40] CBI, Net-zero: The Road to Low-Carbon Heat (2020), p. 10.
[41] Energy Saving Trust, Who we are (n.d.) https://energysavingtrust.org.uk/about-us/ [Accessed 3 February 2021].
[42] Which?, Supporting consumers in the transition to net zero (2021), p. 5.
[43] Energy Saving Trust, Green Homes Network (n.d.) https://greenhomesnetwork.energysavingtrust.org.uk [Accessed 3 February 2021].
[44] Based on ONS data from 2020. NimbleFins, Number of Homeowners and Renters in the UK (2020). https://www.nimblefins.co.uk/number-homeowners-and-renters-uk [Accessed 3 April 2021].

A public information campaign for net zero

RECOMMENDATION 7:

The net zero delivery authority should work with local authorities and relevant businesses, such as energy suppliers, to deliver a public information campaign about the path to net zero.

In 2020, members of Climate Assembly UK voted on the principles that should underpin the UK's low-carbon transition. Of 25 agreed principles, the need to inform and educate everyone received the most priority votes by a significant margin.[45] By informing the public about the net zero measures it intends to implement, government can ensure far greater compliance and enthusiasm and create real momentum in low-carbon uptake throughout society.[46] For example, Climate Assembly members responded positively to both hydrogen and heat pumps for home heating after being informed about these options.[47]

The scale of this communication challenge requires a national public information campaign to replace more piecemeal advice sources. Foremost, this campaign must be participatory and engage with people, rather than simply deliver information; it must not be perceived to patronise or lecture the public. It should emulate the reach and success of recent public information campaigns such as on Brexit and begin within the next two years to ensure public understanding and acceptance are sufficiently developed before measures are implemented.

In our ***Uncomfortable Home Truths*** report we proposed a mixture of local and national channels for awareness raising, and this inquiry reinforced the conclusion that it would be beneficial to have a central body to coordinate.[48] We therefore propose the net zero delivery authority should lead on public information, in partnership with industry bodies, local authorities and community groups.[49] To maintain a collaborative relationship with local government, authorities must be given opportunity to develop the messaging of this campaign with the net zero delivery authority, to ensure information is presented most effectively in localities.

Research consistently demonstrates certain values hold almost universal resonance for the public; public information must leverage these shared values and use them to frame the path to net zero. These values include fairness, avoiding waste as well as unity and pride. This framing can be effectively linked with government agendas such as Levelling Up and Building Back Better. Narratives focussed on unity and human stories are likely to be most effective.[50]

[45] Climate Assembly UK, The Path to Net Zero (2020), p. 10.
[46] T. Sasse, S. Allan and J. Rutter, Public engagement and net zero: How government should involve citizens in climate policy making (2021).
[47] Climate Assembly UK, The Path to Net Zero (2020), p. 16.
[48] Carbon Connect, Uncomfortable Home Truths (2019).
[49] Climate Assembly UK, The Path to Net Zero (2020).
[50] C. Shaw and S. Wang, After the lockdown? New lessons for building climate change engagement in the UK (Climate Outreach: Oxford, 2021).

Key features for this campaign proposed throughout our inquiry were as follows:

1. A public information campaign should engage at different governmental levels of decarbonisation. It should promote awareness within local projects and initiatives as well as nationally, to avoid repeating engagement work as these projects progress.
2. Peoples' different roles should be considered. Individuals hold a variety of roles, and act as consumers, practitioners, and installers. People must have a nuanced understanding of their individual responsibilities in order to fulfil them.
3. Home retrofitting requires considerable time, so sufficient time must be allowed for awareness to build leading up to the phase out of gas boilers. This campaign must begin as soon as possible without compromising on quality.
4. Deliberation and conversation must be incorporated, to give people sufficient knowledge to understand and meaningfully take part in low-carbon transitions. Local assemblies are a valuable emergent form of public engagement, and could be utilised both to inform the campaign and perform it.[51] Assemblies must be accessible and dedicated funds must be allocated for accessing hard-to-reach groups.
5. Community demonstrations of low-carbon measures should be foregrounded in the campaign as tangible examples of best practice. Demonstrations such as Hy4Heat's hydrogen homes in Gateshead are already used by Home Energy Scotland to show consumers the reality of low-carbon options.[52] This will accelerate enthusiastic understanding of the transition, and provide resources for local initiatives. Consumer experience is key to acceptance and positive examples will help people embrace change.[53]

The public campaign must fit alongside the provision of financial and other incentives for the take up of new technologies to be mutually reinforcing. Talk on its own will not drive consumer action. Successfully engaging with different demographics, particularly at a local level and with hard-to-reach groups, will depend upon the funding and infrastructure of the net zero delivery authority.

[51] Government has already facilitated several such one-off assemblies, which should now be made permanent and iterative. Climate Assembly UK: where are we now?: Government response to the Committees Second Report Session 2021-2022.
[52] Hy4Heat, Demonstration facilities (2021) https://www.hy4heat.info/wp8 [Accessed 1 October 2021].
[53] Carbon Connect roundtable, Next steps towards a Net Zero Delivery Architecture: Public Engagement (2021).

Heat decarbonisation and disruption

The inquiry found that decarbonisation of heating and power will require local authorities, social housing providers and others to deliver on a street by street basis where appropriate – the delivery authority can coordinate this work with local partners. In 2019, buildings accounted for 18% of the UK's carbon emissions according to the CCC, yet delivery rates of low-carbon heating and insulation have been stagnating in recent years.[54] Policy Connect's Climate Policy Dashboard demonstrates that the buildings sector is currently one of the least-supported by policy, with particular absence of detailed delivery mechanisms and lack of continuity in policy.[55] Government must follow through on commitments made in the Heat and Buildings Strategy and provide long-term sustainable policy that allows industry and people to prepare, with clear backstop dates. Currently, around three in ten (29%) social housing providers consider government policy regarding energy performance initiatives to be clear, and close to half (48%) felt policy was generally unclear.[56] Decarbonising home heating in the UK presents an intractable problem, requiring significant disruption to homes, questions over funding and bespoke solutions required by a heterogeneous, poor-quality housing stock.

The scale and challenge of this task cannot be achieved by individual consumer uptake alone if the UK is to achieve net zero on time. If a gas boiler is typically replaced every 14 years, the UK is only two new boilers per household away from the 2050 target, leaving little margin for error. Therefore, to achieve the necessary rate of decarbonisation, government must intervene to decarbonise the UK's homes on a street by street basis. As government suggests in the Heat and Buildings Strategy, the heat pump market and other infrastructure must scale up significantly before homes can transition to low-carbon heating on a street by street basis. In the interim, therefore, this approach should initially be used to upgrade the energy efficiency of homes in a fabric first approach. This could be achieved with relatively little disruption, and as a project in Nottingham undertaken by Energiesprong demonstrates, could deliver significant benefits for residents and climate.[57] This should be completed by 2030 to deliver the greatest benefits and ensure government's 2035 deadline for as many homes as possible to reach Energy Performance Certificate (EPC) band C.[58]

Following this, decarbonisation of heating systems in some homes should take place using the same model. This approach should only be deployed where it will be successful and appropriate: in housing with similar fabrics and heating infrastructure, and in social housing (in partnership with providers).[59] Infrastructure developments, such as electricity grid upgrades, must precede this mass rollout of low-carbon technology. Because these developments will not take place uniformly across the UK, decarbonisation of home heating must be fundamentally local in delivery.

Decarbonisation of heating and power will require local authorities, social housing organisations and others to deliver local changeovers. Suitable areas could be identified via a partnership between the delivery authority, local authorities and communities who possess crucial knowledge about local housing stock. This engagement could take the form of local assemblies, which must have opportunity to meaningfully inform the pace and nature of disruption.[60] These assemblies could also feed into Local Area Energy Plans as suggested by Energy Systems Catapult and act as trusted messengers for residents.[61] Implications for regional energy security should also be considered and mitigated where necessary, as supply and demand changes significantly over a short period of time within this approach. Recognising the devolved aspects of heat decarbonisation, it is also important for the delivery authority to work with devolved administrations

[54] With the exception of loft installation. Climate Change Committee, Progress Report to Parliament (2021), p. 111.
[55] Policy Connect, Climate Policy Dashboard.
[56] BEIS, Social Housing Decarbonisation Study: Views from Social Housing Providers (2021), p. 11.
[57] Energiesprong UK, Transforming social housing in Nottingham (2017) https://www.energiesprong.uk/projects/nottingham [Accessed 1 November 2021].
[58] EEIG, The Net Zero Litmust Test: Making energy efficiency a public and private private infrastructure investment priority (2019), p. 40.
[59] BEIS, Social Housing Decarbonisation Study: Views from Social Housing Providers (2021). BEIS found that providers were generally enthusiastic to improve EPC ratings, provided that the right funding mechanisms are in place.
[60] S. Capstick, C. Demski, C. Cherry, C. Verfuerth and K. Steentjes, Climate Change Citizens' Assemblies. CAST Briefing Paper 03 (2020).
[61] Energy Systems Catapult, Local Area Energy Planning: The Method (2020).

RECOMMENDATION 8:

Government should introduce measures to incentivise homeowners to adopt low-carbon heating, energy and transport early, at key points such as home renovation or sale.

Alongside looking at heat decarbonisation on a local, street by street, basis, individual incentives to homeowners will continue to be needed:

- This could create an early boost to retrofitting rates, whilst street by street plans are developed. This would create momentum and enthusiasm as homeowners experience material benefits such as improved building quality and reduced energy bills, and would have greatest benefit in off grid homes which, according to the Heat and Buildings Strategy, cannot be fitted with new fossil fuel heating systems from 2026.[62] It is crucial that Local Area Energy Plans are adopted and developed, to avoid unforeseen knock-on effects for local supply.
- Many buildings are not suitable for street by street decarbonisation and will require bespoke plans, particularly heritage and listed buildings.
- Preserving the choice of consumers where possible was identified as important by the Climate UK Assembly, and requires less intensive public engagement.

A long-term replacement for the GHG is required, to capitalise on the high rates of attempted uptake this scheme saw. Whilst the new Boiler Upgrade Scheme covers up to £5,000 to £6,000 of the cost of a heat pump, a replacement scheme is required which covers energy efficiency measures and is accessible to those who are least to pay for decarbonised heating. Replacement schemes should be guaranteed over a longer period of time, so that consumers can develop confidence in the technology, not least as businesses will be able to create effective supply chains and train high-quality installers. Funding for insulation should be made easily accessible, due to the significant energy efficiency improvements insulation creates for relatively little disruption and cost. Such energy efficiency upgrades are crucial to prepare homes for low-carbon heat systems. The Heat and Buildings Strategy suggests that changes are made at 'natural trigger points', and it is certainly the case that homeowners are more likely to adopt new systems at the point of renovation and sale.[63,64] We propose the government consider a building renovation passports on what changes should be made when to individual homes. This concept could be trialled as a pilot for mandatory change at these intervals and linked to with green mortgage products increasingly offered by buildings societies.

Turning to the rented housing stock, government should ramp up the obligations of private landlords to improve the EPC ratings of their properties. Minimum Energy Efficiency Standards for the Private Rented Sector (PRS MEES) must be extended to a backstop of 2028 for all properties to reach EPC Band C, not just homes experiencing fuel poverty as under the current government consultation. Incentivising property owners to make these improvements is the 'low hanging fruit' of the low-carbon transition, and will provide the renter with a warmer home that is cheaper to run. Government should introduce incentivising schemes in the next 18 months in conjunction with public engagement, to maximise potential decarbonisation benefits, in advance of at-scale decarbonisation.

[62] HM Government, Heat and Buildings Strategy (2021), p. 16.
[63] HHM Government, Heat and Buildings Strategy, p. 31.
[64] Evidence submitted to Carbon Connect.

Accessibility, justice and fairness

The inquiry heard that government must embed fairness and justice into the transitions. A fair and just transition is a high priority for the public, and was voted the second most important value for net zero by members of the Climate Assembly UK.[65] According to the Committee on Fuel Poverty, 3.2 million households currently experience fuel poverty, and government is not on track to meet its interim target to bring all of these homes to EPC Band D by 2025.[66] As low-carbon heating and transport require high upfront investment for long-term savings, fairness must be a foundation of the transition rather than an afterthought. Low-carbon products and services must be accessible to all and fuel poverty must not be exacerbated through increased energy bills. The Heat and Building Strategy's mention of fairness is welcome, but remains light on detail on how this will be achieved.

Implementation of past fuel poverty strategies has been hampered by difficulties in co-ordinating the efforts of relevant policy priorities across government departments.[67] The Committee on Fuel Poverty recommends that net zero-orientated schemes such as Local Authority Delivery scheme are aligned with Energy Company Obligations (ECO).[68] The net zero delivery authority provides an opportunity to sew together this patchwork of policies, and will contribute to delivering government's next fuel poverty strategy by coordinating an efficient programme of decarbonisation. A Net Zero Test should be applied to fuel poverty policies and strategy to ensure they align with decarbonisation targets. However, government must also prioritise measures which have co-benefits of reducing emissions and alleviating fuel poverty, such as a 'fabric first' approach which emphasises energy efficiency measures like home insulation.[69] These co-benefits would materially contribute to government's Levelling Up agenda, by improving the quality of homes across the UK.

[65] Climate Assembly UK, The Path to Net Zero (2020), p. 10; IPPR, Fairness and opportunity: A people-powered plan for the green transition (2021) https://www.ippr.org/research/publications/fairness-and-opportunity [Accessed 1 September 2021].
[66] Committee on Fuel Poverty, Interim report (2021).
[67] Institute for Government, Implementing the Fuel Poverty Strategy (2014).
[68] Committee on Fuel Poverty, Interim report, p. 12.
[69] Energy Efficiency Infrastructure Group and Frontier Economics, Affordable Warmth, Clean Growth: Action Plan for a comprehensive Buildings Energy Infrastructure Programme (2017); M. Frerk and K. MacLean, Heat Decarbonisation: Potential impacts on social equity and fuel poverty (2017) http://fuelpovertyni.org/wp-content/uploads/Heat-Decarbonisation-Report.pdf [Accessed 1 July 2021].

Business models

The route to net zero will see fundamental shifts in business products and services, as well as in consumer choices. This includes the way we travel, heat our homes and use our energy, as well as how these products and services are sold. The operation of our service sectors stems from decades of reliance upon fossil fuels. Businesses and industry have a huge part to play in the move to new business models that are not fossil-fuel based, but they cannot on their own cause fundamental and almost overnight change to markets. Government has now set a framework, though with more work to be done on cross-sectoral interactions, and at the implementation level the shift will need the focus and drive of a delivery authority filling the space between national and local strategies.

In early signals to markets, the government set out in its Energy White Paper the aim to increase heat pump installation capacity to 600,000 per year in 2028 from 30,000 today, which in turn should support 20,000 new jobs.[70] Further, it wants to install 40GW offshore wind power generation by 2030, a fourfold increase on today's installed capacity, and work with industry to reach 5GW of low-carbon hydrogen production by 2030.[71,72] It also intends to "create a sustainable future for UK manufacturing industry through improved energy efficiency and the adoption of clean energy technologies".[73] These and other commitments in the Energy White Paper are being backed up with more detail in sectoral strategies, and in particular the Net Zero Strategy, to help shape the policy framework and create the right preconditions for a net-zero economy.

It is, however, worth pointing out that the Carbon Budgets go even further in what is required. In their balanced pathway, the CCC suggests over 1 million heat pump installations per year are required by 2030 and off-shore wind power generation needs to rise to 65-125 GW by 2050 due to expected increased electricity demand.[74,75]

Whatever the precise targets, according to government the 2020s are a crucial decade for scaling up low-carbon consumer offerings and preparing markets for mass rollout from 2030 onwards.[76] In the industrial sector, new low-carbon options must be developed and scaled up, such as carbon capture and storage (CCS), low-carbon hydrogen and engineered emissions removals.[77] Much remains to be done for transport, including getting a universally available charging and refuelling infrastructure in place for surface transport as well as the challenge of decarbonising shipping and aviation, which is unlikely to be achieved in any meaningful way until after 2040.

All this demonstrates the scale of the transition required and the far-reaching consequences this will have for businesses, consumers and the economy as a whole. It is vital therefore that the government has an ambitious, coherent and long-term strategy to set this in motion whilst minimising disruption and avoiding unintended consequences including from policy clash. A net zero delivery authority could have a central role to play in providing long-term stability and commitment to the required policies set out in the Carbon Budgets and coordinate systemic thinking and cross-sectoral action.

[70] BEIS, The Energy White Paper: Powering our Net Zero Future (2020), p. 110.
[71] Ibid, p. 45.
[72] Ibid, p. 17.
[73] Ibid, p. 118.
[74] Ibid, p. 115.
[75] Ibid, p. 25.
[76] Ibid, p. 394.
[77] Ibid, p. 394.

Contributors to the inquiry were agreed that government strategies need to be long term (beyond election cycles) with sustainable, multi-year funding settlements. Whilst a number of long-anticipated strategies have now been published, such as the Net Zero, Hydrogen and Heat and Buildings Strategies, there is more to be done on a detailed, cross-strategy roadmap.[78,79,80] Many of the announcements in the strategies only give certainty for a limited number of years, talk of ambitions rather than long-term fixed commitments, and rely on further consultations before policy decisions about the future are taken.

Achieving a long-term framework is challenging given the electoral cycle but is possible, as has been shown by the Climate Change Act and subsequent tightening of national net zero targets. These achievements remain a huge UK strength and demonstration of global leadership; the prize now, as we move to accelerated delivery, is to achieve a similar long-term perspective for the sector-specific strategies and implementation plans. Parliament has an important role to play here, to provide cross-party drive and impetus at the strategy level.

For its part, the government needs to work in a very strong cross-departmental way. Strategies and targets across government must work together to meet the net zero target. As we have set out earlier, applying a Net Zero Test to all spending decisions and policy announcements would help ensure these are compatible with, and actively contribute to, net zero by 2050. To drive this integrated approach, the government should **agree and publish whole-of-government metrics on the delivery of its net zero targets.**

At the implementation level, the establishment of the delivery authority, with the backing of and reporting to Parliament, will provide longevity and focus across electoral timeframes. And as the government finalises the low-carbon schemes it is currently consulting upon, such as the replacement schemes to the Renewable Heat Incentive (RHI) and GHG, ensuring these are long-term and whole-systems will harness the consumer demand revealed by past experience, and provide investment certainty for industry to change its business models and invest in new skills and supply chains. Together, these measures will provide certainty to business, industry, the skills sector and communities, and therefore the confidence for action.

A net zero delivery framework

The Heat and Buildings Strategy and Net Zero Strategy make mention of the need for a policy framework to support businesses in reaching net zero, but indicate the government will "pursue and explore" policies, aiming to publish an Energy Related Products Policy Framework in "due course".[81] In considering the design of a comprehensive policy framework, the government should take account of the following factors identified in this inquiry:

1 There is a need to find a balance between avoiding 'picking winners' and leaving net zero delivery to the market alone. Businesses depend upon the presence of national infrastructure in order to be able to deliver, and thus the state has an enabling role to play to allow businesses to thrive.

2 Policy frameworks that will deliver greatest value will not necessarily be those with lowest costs. This may involve stimulus to manage the early costs of decarbonisation, test technologies and build supply chains. Conducting experiments and sharing data and expertise will be crucial in determining value.

3 Clear direction to allow businesses to build supply chain capacity, balance supply and demand, and develop skills. In doing so, business and government must employ lessons from past interventions, such as the smart meter rollout.

[78] HM Government, Net Zero Strategy: Build Back Greener (2021).
[79] HM Government, UK Hydrogen Strategy (2021).
[80] HM Government, Heat and Buildings Strategy (2021).
[81] Ibid, p. 18.

4 It should embody systemic thinking, considering the whole energy system rather than, for example, gas or electricity, road transport or industry fuels in isolation.

Whilst this list is not exhaustive, it reflects businesses' headline requirements for planning decisions on the road to net zero.[82]

The net zero delivery authority will help drive an enabling business environment for net zero delivery: it will be in regular dialogue with industry, continually engage with local partners and communicate clearly about long-term plans for the delivery of the carbon budgets. To accommodate the rapid changes and development of technology and data in the energy sector, it is important that delivery structures and frameworks are dynamic, while the outcomes and incentives are forward-looking and consistent.

Infrastructure investment

To invest in net zero, industry must be assured that the necessary infrastructure will be in place. If businesses involved in infrastructure development are to increase capacity, they require clear policy direction from government, which will allow them to adapt ahead of the curve rather than behind it.

For example, in order for Tata Steel to make the switch to low-carbon technologies like CCUS and hydrogen in their operation in Port Talbot, and to do so competitively, they require the right infrastructure to be in place as part of the South Wales Industrial Cluster (SWIC). The government's commitment to achieve four low-carbon industrial clusters by 2030 is a significant step forward, as is their commitment to largely decarbonise the UK's primary steel production facilities at Port Talbot and Scunthorpe.[83,84] £171 million has now been awarded to the SWIC, amongst others, as part of the UKRI's Industrial Strategy Challenge Fund (ISCF), which aims to support the development of low-carbon technologies for heavy industry.[85] Yet, beyond the outcomes of the ISCF, the long-term investment timeline will stretch far into the 2030s, with currently still little certainty of what it will look like and how net-zero solutions will be reached.

Infrastructure development and upgrades need to precede the roll-out of low-carbon technology and products, otherwise consumers will experience frustration and delays which will undermine confidence. For example, consumers are already hearing about problems with changing to heat pumps due to inadequate power junctions; this needs to be tackled quickly if it is not to undermine the pace of transition needed. Electricity grid upgrades need to be carried out in anticipation of and conjuncture with the rollout of heat pumps in homes and EV charging points. Similarly, the rollout of national hydrogen infrastructure needs to go hand-in-hand with strategic thinking about its uses in the future economy.

A net zero delivery authority could be crucial in driving a whole-systems approach to net-zero infrastructure planning as part of the decarbonisation of heat, energy, industry and transport. All these areas are closely interlinked and will affect consumers and businesses alike, which is why a coordinated effort from the national to the local level is essential. Working with the new net-zero senior roles in BEIS, the delivery authority – based in statute – would be a focal point for implementation leadership. This would be a strong partnership to provide consistency of policy and certainty that future approaches can be assured, giving businesses and consumers peace of mind that a change in political priorities won't lead to the cancellation of existing schemes or investment plans. This will be further aided by committing to following the CCC's advice on the Carbon Budgets, as well as by the work of Ofgem and the UK Infrastructure Bank.

[82] Evidence submitted to Carbon Connect Inquiry and Policy Connect discussions.
[83] HM Government, Industrial Decarbonisation Strategy (2021), p. 20.
[84] Ibid, p. 53.
[85] UKRI, UKRI awards £171m in UK decarbonisation to nine projects (2021) https://www.ukri.org/news/ukri-awards-171m-in-uk-decarbonisation-to-nine-projects/ [Accessed 1 September 2021].

Aligning with net zero

RECOMMENDATION 9:

Government must give the net zero delivery authority the mandate to be involved in long-term strategic energy systems planning; including working closely with Ofgem.

It should take into consideration the findings of Ofgem's Review of GB Energy System Operation and joint consultation with BEIS, assessing the potential need for an Energy Future System Operator, which will play a key role in how net zero targets are achieved.[86] The distribution network is not well designed for a more localised system of supply and demand, as will for example be needed for electrification of all domestic vehicles and smart energy systems in the home. Further, grid capacity and flexibility needs to be strengthened, focusing on an integrated approach to reducing carbon in the system.

As the net zero delivery authority engages with consumers and local actors, it needs to work with the relevant institutions towards a resilient, low-carbon energy system. Our energy system needs to be sufficiently robust and flexible to absorb market shocks, maintain price stability for consumers, respond to meteorological events, mitigate the effects of climate change and build up capacity for increased electricity demand.[87] As 2021's developments in the gas and wider energy markets have shown, a shortage of natural gas for energy and industrial processes, combined with prolonged periods of low wind for power generation and an overreliance on natural gas in the home, makes markets less resilient to deal with disruptions, leaving customers and businesses vulnerable.[88,89]

These are largely the responsibility of Ofgem and a Future System Operator, however a net zero delivery authority will have a contribution to make in this process - to ensure the connections are made to implementation action in local government, businesses and consumers. Diverse energy and heating infrastructure through localised approaches will contribute to national resilience of the energy system and will need to be considered as an integral part of the Heat and Buildings, Industrial Decarbonisation and Net Zero Strategies.

Reaching a net-zero energy system will require changes to the roles participants play, and the financial markets that communicate, incentivise and penalise the value of those roles. It has been argued that the role of participants in the energy sector will change with growing digitalisation, connectivity and automation in support of the decarbonisation of heat, transport and industry. Users of the grid will have increasing power to influence how the energy system develops, working with local authorities as well as regional and national policy levers.[90] These consumers will be looking to optimise their use of energy to minimise cost and carbon impact, such as through solar panels, EV charging and energy storage. However, this requires an enhanced framework for coordinating parties as the system expands and becomes increasing complex. For example, there may be a need for community wind turbines to charge EVs or power heat pumps, whilst storage capability for electricity and heat in the home may be used when there is an excess of power available. The complexity this involves needs to be thought out carefully at the local level and upscaled both regionally and nationally so that lessons can be drawn for other areas and projects.

[86] Ofgem, Review of GB Energy System Operation (2021).
[87] European Environment Agency, Adaptation Challenges and Opportunities for the European Energy System (2019), p. 82.
[88] Power Technology, As it happens: the UK gas price and petrol crisis (2021) https://www.power-technology.com/news/industry-news/uk-gas-crisis-timeline-wholesale-price/ [Accessed 8 October 2021].
[89] Bloomberg, U.K. Power Surges to Record 400 Pounds as Wind Fails to Blow (2021) https://www.bloomberg.com/news/articles/2021-09-13/u-k-power-prices-hit-record-as-outages-low-winds-cut-supply [Accessed 14 September 2021].
[90] Siemens Global, White Paper: Grid Edge White Paper (n.d.), p. 36.

A net zero delivery authority will have to work closely with local partners, Ofgem and national government to feed into delivery decisions and the rollout of low-carbon solutions. It also needs to work with HMT and businesses to put in place efficient and visible market signals to prepare both wholesale and retail markets for the future.

RECOMMENDATION 10:

A government-backed pilot study should be carried out before 2025 to establish how local and combined authorities can be given the resource and mandate to build and deploy their skills and capacity to deliver net zero, in coordination with the net zero delivery authority.

Through local energy plans, local government can provide understanding of which technologies and solutions will work best in their area, optimise local infrastructure and provide accountability to residents.

Each region and locality has its own blend of energy efficiency, transport, heating and generation challenges to weigh up. They will all need a tailored approach to leverage the opportunities decarbonisation will bring to their area, in which local plans have a critical role to play. The expertise of local and combined authorities will be highly valuable to identify and deliver the most cost-effective solutions that are of highest benefit to the community. Local plans will also ensure local and combined authorities can ensure no one is left behind and affordable solutions are available to all. Local plans could further help attract private investment into decarbonisation technologies by providing certainty to investors on the exact technologies that will be needed in local areas. UK100, which convenes central, devolved, regional, city and local government, makes the case for coordinated action between all layers of government to deliver net zero locally. In their widely-supported Net Zero Local Leadership Communique, they highlight the practical roles for local delivery of a variety of decarbonisation policy areas, including finance, homes, transport, energy and local powers.[91]

Local Area Energy Planning (LAEP) is being developed as a serious proposition for the future energy system. The Energy Systems Catapult and the Centre for Sustainable Energy in their joint report for Ofgem highlight the value of LAEP for local communities and national decarbonisation delivery, due to the central role well-informed local leaders and initiative-takers will play in designing the plans.[92] In Scotland, the Community-Led Local Energy Plans are a prime example of how this can be tested and rolled out, with four pilot areas selected to test the range in sizes, locations, attributes and challenges that communities have.[93] We propose that there should be some pilots similarly selected for England in order to test and establish the different ways in which LAEP can be rolled out and coordinated nationally, and draw conclusions on the role local government can and should play in this.

[91] UK100, Net Zero Local Leadership Communique (2021).
[92] Energy Systems Catapult, Local Area Energy Planning: The Method (2020).
[93] Local Energy Scotland, Local Energy Planning; A guide to developing community-led local energy plans (2021).

RECOMMENDATION 11:

Government must cease incentives which lock in reliance upon fossil fuels, instead shifting focus to making the unit price of zero-carbon forms of energy more affordable.

A rapid change and concerted effort to move away from fossil fuels, not only for energy and transport, but also in production processes, will be crucial to achieve net zero targets. Incentives and signals from government can help in this regard, by making fossil fuels the more expensive option where other low-carbon forms of energy are available.

For example, natural gas is considerably cheaper than electricity for consumers; approximately three times cheaper per kWh in 2019.[94] Especially where electricity is the lower-carbon at point of generation, incentives must be used to make electricity the more appealing option for consumers. Electrification of transport is a good example of how this is progressing well, with the costs of charging an EV considerably lower than filling up with petrol or diesel. For an average size and priced car, depending whether you charge at home or a public charger, it costs roughly 4.90p per mile to drive an electric car whereas it costs 12p per mile for a petrol-powered car.[95] Added to that is that the upfront purchase costs of EVs is coming down rapidly both due to the upscaling of production worldwide as well as through government subsidies and grants.[96]

Similarly, high levies on electricity have the undesirable side-effect that running electric forms of home heating is currently very expensive, especially compared to natural gas. Further, with high upfront costs of installing a heat pump, consumers may be tempted to replace their old boilers with new natural gas boilers, thereby locking in and prolonging the use of fossil-fuel heating for longer than necessary. As an intermediary step to open up flexibility in how homes are heated in a low-carbon way, the government should implement the CCC's recommendation that all newly-installed gas boilers should be hydrogen-ready by 2025 at the latest.[97] Further, current energy taxes and subsidies should be looked at to ensure it favours those forms of heating that are lowest-carbon, taking into account national and global market developments and affordability for consumers. In the Net Zero Strategy, the government have announced their Fairness and Affordability Call for Evidence on the options for energy levies and obligations to help rebalance electricity and gas prices and to support green choices, and expects to take a decision on this by 2022.[98]

Government must enable businesses to uphold low-carbon standards by supporting upskilling, removing financial barriers to gas alternatives, and implementing a combination of regulations and incentives. As part of a coordinated approach across government departments, aided by a net zero delivery authority, this is an important principle to adopt which would help create clarity about the long-term direction of policy. The right market signals need to be put in place to ensure the true cost of energy is visible and accessible to energy participants, in terms of production, transportation and carbon impact. Ofgem will have a key role to play in deciding on current and future subsidies for different fuel types, considering the effects on consumers and long-term decarbonisation plans.

[94] Ofgem, State of the Energy Market Report 2019 (Revised) (2019), p. 21.
[95] EDF, How much it costs to charge & run an electric car (n.d.) https://www.edfenergy.com/electric-cars/costs [Accessed 1 September 2021].
[96] HM Government, Low-emission vehicles eligible for a plug-in grant (n.d.) https://www.gov.uk/plug-in-car-van-grants [Accessed 1 October 2021].
[97] Climate Change Committee, Policies for the Sixth Carbon Budget and Net Zero (2020), p. 112.
[98] HM Government, Net Zero Strategy: Build Back Greener (2021).

The inquiry was clear that if the Levelling Up agenda is not to be undermined, the transition to net zero must be fair and just, ensuring that no one is left behind, fuel poverty is properly addressed, and new net-zero technologies are accessible to all. Making the net zero transition accessible and beneficial to all is an essential consideration for government as it works to deliver on the net zero target. Whilst low-carbon technologies such as heat pumps and EVs remain expensive, especially in terms of upfront costs, lower income households are prone to being excluded from the transition to net zero. A whole-systems approach to the decarbonisation of heat, energy, industry and transport is key to avoid unintended negative consequences for lower income households.

For example, electrification of heat without adequate support structures and financial incentives might unintentionally encourage some homes to rely upon fan and resistive heaters, which could have a dual negative impact of increased electricity bills and pressure on the electricity grid, potentially requiring gas-fired power generation to support. Furthermore, where increased uptake of premium EVs creates a need for grid reinforcement, increased electricity bills for those without EVs may lead to resentment and a delayed uptake of lower-cost or second-hand EVs further down the line.

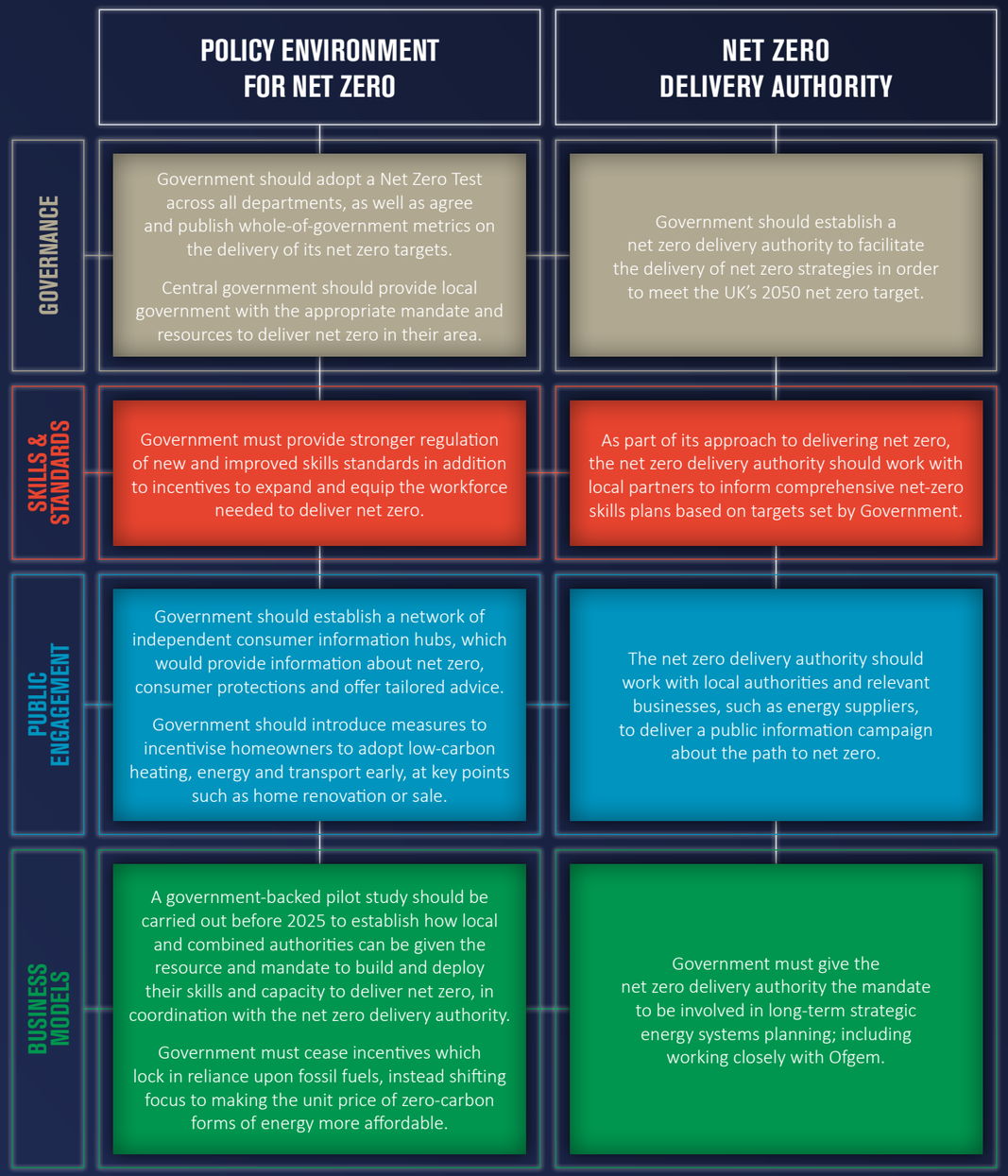
Third sector organisations and communities hold valuable information about how fairness and justice can be embedded. For example, granular data from smart meters could provide valuable insights for many organisations. If the benefits of sharing this information were communicated effectively to consumers it could be transformative.

A delivery authority could provide a way forward by providing advice and solutions tailored for consumers, by bringing down the costs of low-carbon technology and by working as a bridge between local authorities and government.

Both Ofgem and a net zero delivery authority will have a key role to play in ensuring barriers to an equitable financial transition for consumers are identified and addressed. Regulation to ensure fair outcomes will need to be implemented, to ensure a just transition and reduce fuel poverty. As argued in our report Pipeline to 2050: the poorest households pay proportionately more for policy costs levelled through bills than the richest.[99] A UKERC study highlighted that the poorest households spend 10% of their income on heat and power, while the richest households only spend 3%, meaning that any general increase in energy prices levelled equitably across bills is likely to affect the poor disproportionately.[100]

[99] Carbon Connect, Pipeline to 2050 (2020), p. 22.
[100] J. Barrett, P. Taylor and A. Owen, Funding a Low Carbon Energy System: a fairer approach? (2018).

Recommendations



Methodology and steering group

In October 2019, Carbon Connect recommended a central delivery body be set up to manage the transition to low-carbon heating. This was published in the third report of the Future Gas Series, Uncomfortable Home Truths. The idea was investigated further at a roundtable in December 2020, which explored an Olympic-style delivery architecture for net zero.

Between March and June 2021, following up on this proposal, Carbon Connect ran a series of four online consultation roundtables to collect evidence on and discuss various aspects of how to deliver net zero by 2050. These included: governance and place; skills and standards; public engagement; and business models. This report is based upon findings of these consultation roundtables, written evidence submitted to this inquiry, in addition to desk-based research carried out by Carbon Connect.

The views in this report are those of the authors and Carbon Connect. Whilst these were informed by the steering group and listed contributors, they do not necessarily reflect the opinions of these organisations.

Inquiry steering group

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Contributions

Scoping roundtable: An Olympic-style delivery architecture for decarbonisation 02.12.2020
Chair: Darren Jones MP
Speakers: Nicky Roche CBE (UK Sport) and Jo Negrini (ARUP)
Attendees from: Arup, Association for Decentralised Energy, BEIS Clean Heat Directorate, Broadway Initiative/Future Homes Task Force, Cadent, Confederation of British Industry, DNV GL, E.ON, Energy & Utilities Alliance, Energy Systems Catapult, ESP Utilities, IGEM, Institute for Government, IPPR, Knowledge Transfer Network, National Grid, Providence Policy, Siemens, UK Sport, University College London, University of Exeter iGov research group.

Consultation roundtable 1: Next steps towards a Net Zero Delivery Architecture 24.03.2021
Chairs: Wera Hobhouse MP, Darren Jones MP and Alexander Stafford MP
Speakers: Paul Ekins (UCL) and Keith MacLean (Providence Policy)
Attendees from: E.ON, Climate Change Committee, Energy Systems Catapult, Dept. for Business, Energy and Industrial Strategy, The Open University, Energy and Utilities Alliance, University of Edinburgh, Baxi Heating, National Grid, ARUP, Cadent, Providence Policy, Worcester Bosch, APP Wholesale, Grid Edge Policy, Northern Gas Network, KPMG, Energy and Utilities Alliance, Institution of Gas Engineers and Managers, Worcester Bosch, University College London, Old Apple Consulting, DNV, Institute for Government.

Consultation roundtable 2: Next steps towards a Net Zero Delivery Architecture: Skills and Standards 27.04.2021
Chairs: Wera Hobhouse MP, Darren Jones MP and Alexander Stafford MP
Speakers: Liz North (Policy Connect), Scott Couldrige (National Grid) and Graham Wright (Daikin UK)
Attendees from: Daikin UK, National Grid, World Skills UK, Scottish National Party, Providence Policy, The Open University, E.ON, ECITB, ARUP, IGEM, Ørsted/Green Jobs Taskforce, Baxi Heating, UCL Institute for Sustainable Resources, Cadent, Waters Wye, Nesta, Worcester Bosch, APP Wholesale, Grid Edge Policy, KPMG, Energy and Utilities Alliance, Worcester Bosch, Recruitment and Employment Confederation, Energy and Utility Skills, Trustmark, Energy Systems Catapult, Uniper.

Consultation roundtable 3: Next steps towards a Net Zero Delivery Architecture: Public Engagement 12.05.2021
Chairs: Wera Hobhouse MP, Darren Jones MP and Alexander Stafford MP
Speakers: Jim Watson (UCL) and Jeff House (Baxi Heating)
Attendees from: Providence Policy, Baxi Heating, UCL Institute for Sustainable Resources, Centre for Energy Equality, The Open University, Octopus Energy, E.ON, Climate Change Committee, OVO Energy, IGEM, University of Edinburgh, ARUP, Waters Wye, National Grid, APP Wholesale, Energy & Utilities Alliance, Worcester Bosch, Nesta, UCL Institute for Sustainable Resources, Old Apple Consulting, ECITB, Wales & West Utilities, Trustmark, Ofgem, Energy Saving Trust, The Open University, DNV, Sustainability First.

Consultation roundtable 4: Next steps towards a Net Zero Delivery Architecture: Business Models 30.06.2021
Chairs: Wera Hobhouse MP, Darren Jones MP and Alexander Stafford MP
Speakers: Jack Fildew (E.ON) and Chris Train OBE (CT Energy)
Attendees from: Providence Policy, CT Energy, E.ON, Centre for Energy Equality, BEIS Select Committee, The Open University, New Economics Foundation, Tees Valley Combined Authority, West Yorkshire Combined Authority, Climate Change Committee, Calor Gas, University of Cambridge Institute for Sustainability Leadership, OVO Energy, IGEM, University of Edinburgh, Baxi Heating, KTN, ARUP, Cadent, Waters Wye, Smart Energy GB, Worcester Bosch, APP Wholesale, Grid Edge Policy, KPMG, EUA, Worcester Bosch, Wales & West Utilities, National Grid, Trustmark, KPMG, University of Derby, Energy Saving Trust, Institute for Government, Uniper.

Written evidence and other contributions

CAST Centre and Climate Outreach, National Grid, The Open University, OVO Energy, University of Edinburgh

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BAXI HEATING

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EUA energy&utilities alliance

IGEM

WORCESTER Bosch Group

About Carbon Connect

Carbon Connect is the independent, cross-party forum that seeks to inform and guide a low carbon transformation underpinned by sustainable energy.

In 2009 the Rt Hon Ed Miliband MP, then Secretary of State for Energy and Climate Change, delivered a keynote address at the Westminster launch of Carbon Connect. Since then Carbon Connect has been at the forefront of policy debate, parliamentary engagement and research related to sustainable energy.

Over a number of years, Carbon Connect has built up an unrivalled portfolio of parliamentary roundtables and conferences, detailed policy briefings and highly valued reports. This has been achieved by drawing on the expertise of Carbon Connect members and working with a wide range of parliamentarians, civil servants, business leaders and experts who give their time and expertise to support our work.

Carbon Connect's main activities comprise facilitating discussion between industry, academia and policymakers on low carbon energy and producing its own research and briefings in this area. We do this by:

- Holding regular events and seminars in Parliament
- Producing concise briefing papers on energy and climate change policy
- Publishing research reports with evidence-based recommendations for policymakers
- Disseminating updates to parliamentarians and our members, with summaries of relevant stories, industry news, and other political developments

About Policy Connect

Policy Connect is a cross-party think tank. We specialise in supporting parliamentary groups, forums and commissions, delivering impactful policy research and event programmes and bringing together parliamentarians and government in collaboration with academia, business and civil society to help inform and shape public policy in Westminster and Whitehall, so as to improve people's lives.

Our work focusses on five key policy areas which are: Education & Skills; Industry, Technology & Innovation; Sustainability; Health; and Assistive & Accessible Technology.

We are a social enterprise and are funded by a combination of regular annual membership subscriptions and time-limited sponsorships. We are proud to be a Disability Confident and London Living Wage employer, and a member of Social Enterprise UK.

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