



ADE Response to 'How to capture growth opportunities from the shift to net zero via a Green Recovery' | 17 June 2020

Context

The ADE welcomes the opportunity to respond to the Government's request for submissions on how to capture growth opportunities from the shift to net zero via a Green Recovery.

The ADE is the UK's leading decentralised energy advocate, focused on creating a more cost effective, low carbon and user-led energy system. The ADE has more than 150 members active across a range of technologies, including both the providers and the users of energy equipment and services. Our members have particular expertise in demand side energy services including demand response and storage, energy efficiency, heat networks, and combined heat and power.

Summary

This section provides a summary of the ADE's key recommendations to drive a green recovery. More detail can be found in the answers to individual questions, which are on the page numbers indicated.

Infrastructure investment to drive economic recovery (p.2-4 and p.14-16)

- Develop a national buildings renovation programme focusing on energy efficiency, heat decarbonisation and electricity demand flexibility

Aligning investment with net zero (p.4-7)

- Take a zoned approach to heat decarbonisation
- Incentivise integrated flexibility and efficiency improvements
- Improve access to green finance
- Reform fossil fuel-aligned structures and policies

Addressing regulatory barriers to investment (p.7-11)

- Set out a clear Green Recovery strategy to encourage investment, including:
 - Through the new Smart Systems and Flexibility Plan, setting out the necessary steps to a smart, flexible, zero-carbon electricity grid and a process to monitor whether the necessary levels of flexibility are coming forward to enable this
 - Setting out a roadmap for decarbonising industrial steam and a strategy for greening the gas network
 - Through the Heat and Buildings Strategy, setting out a roadmap for buildings to reach net zero through heat decarbonisation and energy efficiency improvements

- Reform system governance to support net zero, including legislating for Ofgem's duties to include decarbonisation of the energy system
- Improve market access and regulatory frameworks to support investment
- Provide subsidy support where needed to deliver ambitions
- Invest in skills and training
- Make energy data open to support investment

Supporting businesses to access low carbon markets and helping carbon intensive sectors transition to net zero (p.11-12)

- Set out a clear approach to the future of carbon pricing, preferably via a linked ETS and continued Carbon Price Support
- Mandate the CCC to recommend an annual target Total Carbon Price and HM Treasury to announce how this will be achieved via carbon pricing instruments each budget
- Release the calculation methodology and establish a fixed, regular review cycle for the instrument chosen to reflect the EU ETS price (whether a linked ETS, standalone ETS or carbon tax)
- Ensure that the design of the Green Gas Levy improves the carbon signal and avoids double charging heat network customers
- Expand eligibility for Climate Change Agreements beyond static energy efficiency measures towards rewarding carbon emissions delivered through demand flexibility

Ensuring local and regional economies can contribute to net zero (p.12-13)

- Take a local, zoned approach to heat decarbonisation and energy efficiency improvements
- Support pilot projects in leading areas with clearer plans to meet net zero
- Ensure Local Authorities can drive and regulate the changes they wish to see in their area
- Take an active role in the DNO transition to ensure that liquid flexibility markets are established at the distribution level
- Mandate DNOs to commit to using flexibility markets, not curtailment of renewable generation, to manage network constraints by 2028

Detailed Response

Q1 - Which areas of infrastructure investment should we prioritise for early action to drive economic recovery and support delivery of net zero? (e.g. building energy efficiency and heat, low carbon power, energy systems, electric vehicle infrastructure)

The key priority for infrastructure investment should be developing a national buildings renovation programme, focusing on energy efficiency, heat decarbonisation and electricity demand flexibility, to set our building infrastructure on a path consistent with net zero. Government should also use the exceptional circumstances that have faced the UK electricity system during the pandemic to accelerate the transition to the smart, flexible, low carbon energy system of the future – the investments and policy reforms required to do this are outlined in our answers to questions two and three respectively.

Finally, Government should prioritise investments that help deliver industrial decarbonisation, which will help to achieve UK's net zero targets while protecting jobs and the economy across the country. This should be driven by setting out a clear strategy for innovation towards industrial

steam decarbonisation to 2025, maintaining existing incentives to invest in efficient CHP and more broadly, targeting ongoing improvements in primary energy efficiency by strengthening and extending existing planning and energy policy to require the capture of useful heat by all new and existing thermal generation plant. We set out further detail in response to question 3.

The buildings renovation programme should comprise three strands that build on the areas that the CCC and others have highlighted as needed to reach the fourth carbon budget. Firstly, it should focus on significant improvements to energy efficiency in existing homes and non-domestic buildings. Secondly, where there is already a clear decarbonisation pathway, it should target the expanded use of heat pumps, heat networks and other forms of low carbon heat. Thirdly, it is important that tied in with these measures is a clear focus on making buildings smarter and more able to flex their energy use – through, for example, requiring as a condition of funding that all new appliances and measures installed have smart capabilities. Domestic flexibility is essential in delivering net zero without breaking the bank - it helps reduce consumer bills, avoid costly electricity network expansion, and strengthen the case for purchasing electrified heat and transport options.

Investing in green, decentralised energy is lower cost to Government and has higher benefits than many of the other infrastructure options that could play a role in the recovery¹. Improving our building stock towards net zero, in particular, will require hundreds of thousands of skilled workers from across the country, drawn from both the construction industry and the energy industry. This will support immediate job creation and longer-term economic re-balancing outside the South East. It can also be scaled up relatively quickly, particularly if existing structures for funding are used². Supporting the development and rollout of smart, low-carbon technologies also opens up lucrative export markets for the UK in the context of the global race to net zero.

It will also deliver real growth. Every £1 of Government investment in energy efficiency produces £3.20 of additional GDP³, and investment in home renovation for net zero could support over 150,000 jobs to 2030 while reducing household energy expenditure by £7.5 billion per year⁴. Energy efficiency will also play a key enabling role, helping to avoid annual costs of decarbonising heat to 2050 of up to £6.2 billion and facilitating increased levels of Demand Side Response (DSR), resulting in a more flexible electricity system, with associated savings of £15-40 billion by 2050⁵. DSR participation in the Balancing Mechanism alone is estimated to generate £140-580 million of economic benefits by 2030⁶. Adoption of smart electric vehicle charging and technology could have saved the UK £133 million in balancing costs during the lockdown alone⁷. Similarly,

¹ <https://www.carbonbrief.org/leading-economists-green-coronavirus-recovery-also-better-for-economy>

² <https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2020/05/Financing-energy-efficient-buildings-the-path-to-retrofit-at-scale.pdf>

³ <https://www.e3g.org/docs/Building-the-Future-The-Economic-and-Fiscal-impacts-of-making-homes-energy-efficient.pdf>

⁴ https://www.theeeiq.co.uk/media/1096/eeiq_report_rebuilding_for_resilience_pages_01.pdf

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/568982/An_analysis_of_electricity_flexibility_for_Great_Britain.pdf

⁶ https://www.ofgem.gov.uk/system/files/docs/2017/07/an_assessment_of_the_economic_value_of_demand-side_participation_in_the_balancing_mechanism_and_an_evaluation_of_options_to_improve_access.pdf

⁷ <https://www.current-news.co.uk/news/smart-charging-could-have-saved-133m-in-grid-balancing-costs-during-lockdown>

studies have also shown that investment in heat networks could create tens of thousands of jobs and attract billions in private investment⁸. Indeed, the Heat Networks Industry Council has committed to 20,000-35,000 new direct jobs in the sector by 2050 and investment of up to £50bn into the UK market by 2050.

To deliver this programme, the following elements will be crucial:

- Policy mandate to deliver
- Appropriate funding and incentives to invest in innovative technologies
- Public buy-in
- Public sector leadership and local coordination and implementation
- Putting flexibility at the heart of retrofit
- Supply chain capacity
- Customer protection and quality assurance
- Long-term planning

The ADE has included further detail regarding each of these elements in Appendix 1 of this response.

Q2 - What action should we take to align investment in the UK and globally with net zero? (e.g. incentives for investment in net zero aligned infrastructure to reduce exposure to unsustainable investments and sectors)

To put the decentralised energy sector on the right footing, it is firstly crucial that funding already announced should be protected in the next Spending Review. This should include: the Heat Networks Improvement Programme, the Green Heat Networks Fund, the Clean Heat Grant and the Industrial Energy Transformation Fund.

Similarly, existing innovation programmes should also continue; for example, innovation programmes under the National Grid ESO or network operators. Government should consider giving Energy Systems Catapult a greater role in use of innovation budgets, particularly the significant proportion of existing innovation budgets that have gone unspent under RIIO-T1 and RIIO-D1. Where possible, existing policy uncertainty should also be mitigated. In particular regarding heat networks, investment would be supported in the short-term by BEIS and MHCLG working to resolve the current lack of clarity regarding the technology factors which will accompany the new Standard Assessment Procedure (SAP) v10.2 and Future Homes Standard Buildings Regulation.

Looking forward, a number of actions could be taken to help incentivise investment in net zero aligned infrastructure and technologies. The ADE's suggestions cover four areas: zoning for heat decarbonisation and energy efficiency, incentivising integrated energy efficiency and flexibility, greening finance, and reforming fossil fuel subsidies. While these suggestions are divided into sections for ease of reading, many of them interact with each other, so should be considered in a holistic manner.

Zoning for heat decarbonisation and energy efficiency

There is no single solution to decarbonisation of heat - heating is locally specific and the right solutions differ from area to area. A zoned approach should therefore be taken, which empowers

⁸ <https://www.ippr.org/publications/piping-hot>

local decision-making and includes local actors in the process. This means creating zones which specify the most appropriate decarbonisation pathway for an area and then implementing targeted policies to encourage the identified solution to come forward.

To support the recovery, all governments of the UK should expand their current approach to trial the use of zoning in key, strategic locations across different tenures across the UK in the early 2020s for different heating technologies and energy efficiency solutions. This would kick off the learning-by-doing approach and allow for capacity and skills growth in local supply chains. Trials would facilitate better understanding of the impact of strategic planning on networks and of potential avoided costs.

Funding and incentives for industry and consumers will need to be different for different heating solutions. For example, the kind of incentive that will work best to encourage someone to install a heat pump in a heat pump/electrification zone is likely to be different to the kind that will encourage someone to connect to a heat network in a heat network zone. Targeted policy measures could include a locally specific efficiency or emissions targets, NOx targets, tax relief, funding opportunities, and specific policies to support deployment of the identified solution, for example through Building Regulations / Standards and SAP.

Crucial to driving successful decarbonisation of heat will be establishing policy mechanisms around retrofit. At present, local authorities lack powers to drive retrofit, and have very little influence over the existing building stock. Giving local authorities powers over non-domestic retrofit will help to create local, low carbon pipelines, and will support cost reduction and innovation that supports the domestic market.

The Government is already exploring how zoning could be applied to heat networks⁹, as is Scottish Government¹⁰, which is exploring the use of zoning more broadly through LHEES. The Welsh Government explored the idea of heat network priority areas, which mirrors the concept of zoning, in their National Development Framework Draft¹¹. This approach has also been recommended by the Parliamentary Office of Science and Technology: “the Government must commit now to large-scale trials of low carbon heating technologies, convening relevant stakeholders to determine what evidence must be gathered and to co-ordinate existing work.”¹²

To deliver zoning, appropriate funding will be required for local authorities and for low carbon heating technologies and infrastructure. All existing and future funding pots should consider how effectively they encourage the *strategic* deployment of low carbon heat and energy efficiency improvements, moving away from piecemeal approaches.

Whilst the Green Heat Networks Fund may partially address this, there is currently a funding and support gap for large scale heat pumps; particularly where electrification is the most cost-effective heat decarbonisation pathway for non-domestic buildings. Government should seek to address this funding gap, which is posing an investment uncertainty in this market.

The Government is already aligning CCL rates more closely for electricity and gas, which is a welcome move to incentivise investment in net zero-aligned heat solutions. This could be

⁹ <https://www.gov.uk/government/consultations/heat-networks-building-a-market-framework>

¹⁰ <https://www.parliament.scot/parliamentarybusiness/Bills/114590.aspx#:~:text=A%20Bill%20for%20an%20Act,provision%20about%20conferring%20rights%20in>

¹¹ <https://gov.wales/draft-national-development-framework>

¹² https://publications.parliament.uk/pa/cm201719/cmselect/cmsctech/1454/145409.htm#_idTextAnchor106

bolstered, for example, with reforms to Energy Company Obligation (ECO) that give greater support to decarbonised installations. Heat decarbonisation could be further speeded by providing clarity and policy support to help producers of waste heat, such as Energy from Waste plants and data centres, realise carbon benefits from supplying that heat to heat networks.

For more details of the ADE's proposed approach to heat zoning, please see our response to question six.

Incentivising efficiency and flexibility

The Demand Response and flexibility sector is crucial to enabling the UK to meet its net zero goals without breaking the bank. Prioritising increased flexibility volumes will greatly reduce the balancing costs of integrating large amounts of renewable generation which, as seen during lockdown, are currently high. To help the sector grow, it is key to address issues around market access and regulatory reform. This is discussed in more detail in our response to question three.

It is important that industry, government and Ofgem move beyond thinking of flexibility and energy efficiency in siloes and better understand their intimate connection. As well as putting flexibility at the heart of a building renovation programme, this can be achieved via several other policies, which dovetail with the zoning approach set out above, including:

- Setting a trajectory for building retrofit that demonstrably enables net zero commitments to be reached. This must work across tenures and accelerate action towards existing EPC Band C targets and beyond. This should be comprised of a rising trajectory of minimum standards and mandating action at key trigger points such as a sale of a property, a change in tenancy or a major renovation
- Stimulating demand in the able-to-pay sector. The connection between energy efficiency and more comfortable and healthy homes needs to be made much more apparent, as was achieved through the BetterHome initiative in Denmark¹³. Doing so can stimulate demand for retrofit and the products and services that facilitate these upgrades, as being trialled through Green Finance Institute demonstrators¹⁴. Without sufficient demand, uptake of innovative products and services will be low, as demonstrated by the Green Deal experience.
- Reducing VAT on solar and storage installations from 20% to 5% and using business rates relief to incentivise businesses to invest in these technologies
- Requiring distribution network operators and local authorities to identify suitable electric vehicle charging sites where grid costs will be low
- Requiring all new commercial and public developments to have a minimum of 30% of space with charging points, and all existing public parking facilities to ensure they have at least 10% of spaces with charging points by 2022

Greening finance

The transition to net zero will require large investments in net-zero infrastructure and technologies with relatively long payback periods. The availability of patient capital to enable these kinds of investments is therefore of paramount importance. To increase the availability of this type of capital, Government should consider:

¹³ <http://bpie.eu/publication/boosting-renovation-with-an-innovative-service-for-home-owners/>

¹⁴ <https://www.greenfinanceinstitute.co.uk/news/report-financing-energy-efficient-buildings-the-path-to-retrofit-at-scale/>

- Scaling up the supply of green mortgages, using Government investment to create a financial product to enable retrofit when a property is being bought or re-financed, allowing mortgage lenders to cover the cost of retrofit under the same interest rates and conditions of the mortgage. This could build on the approach outlined in the latest Green Finance Institute report¹⁵
- Providing guarantees to help financial institutions offer securitisation of multiple loans for smaller-scale clean energy projects such as energy efficiency, small-scale renewables and EV charging infrastructure, thereby allowing access to larger pools of capital, as suggested in KPMG's report¹⁶. This could build on the work already underway via the Investor Confidence Project and the Launch scheme

Reforming fossil fuel-aligned structures and policies

Increasing incentives to invest in net zero aligned infrastructure should be accompanied by measures to dissuade investment in infrastructure and processes that do not align with the UK's net zero targets. Reforming these structures and policies would require a detailed, consultative approach and could not be achieved overnight. If implemented correctly, however, reforms in this area could increase incentives for investment in net zero-aligned infrastructure and markedly increase Government revenues.

Q3 - What are the key regulatory barriers weakening incentives to invest in net zero, and how do we address them?

A significant number of regulatory barriers currently weaken incentives to invest in net zero.

To release investment towards net zero, the Government should set out a clear strategy for how households and businesses can participate in the transition and implement no regrets actions now to make significant strides forward in primary and final energy efficiency, heat decarbonisation and the shift to a smart, flexible electricity system.

To effectively build supply chain capacity from the recovery, it is important that any short-term support is integrated into a longer-term strategy which will reward businesses for investing in skills and capacity. Businesses engaged in retrofitting buildings to be fit for the future have experienced inconsistent demand over the past decade. As an example, insulation is currently being installed at just 5% of the rate it was in 2012-17. Regulation and advice must also guide the market to make safe investments, protect consumers and reward quality tradespeople. As such, scaled action on energy efficiency retrofit should be underpinned by robust quality assurance schemes.

Set out a clear strategy so that investment can be made

This should include:

- Tying the new Smart Systems and Flexibility Plan being developed to the recovery to set out the steps the UK should make in the short-term and to 2030 to reach a smart, flexible electricity grid that can be operated with 100% renewable generation and can meet increased demand from electric vehicles and low carbon heating. This should include ongoing monitoring

¹⁵ <https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2020/05/Financing-energy-efficient-buildings-the-path-to-retrofit-at-scale.pdf>

¹⁶ <https://assets.kpmg/content/dam/kpmg/uk/pdf/2020/06/green-fiscal-stimulus.pdf>

¹⁷ <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/1730/1730.pdf>

that assesses the policy gap between the annual projections for necessary levels of flexibility in National Grid's net zero-compliant FES scenario and what will be brought forward under the current policy and market framework.

- Set out a clear roadmap for how industrial steam will be decarbonised and on what timelines; with a commitment that substantial changes (for example, required investments or restrictions on technologies) will not be made without significant advance notice that is aligned to investment cycles, ideally at least 10 years.
- Set out a strategy for greening the gas network, with increasing percentages of decarbonised gas introduced over time, investment in production of decarbonised gas and investment in the necessary network upgrades
- Through the Heat and Buildings Strategy, set out a clear roadmap for buildings to reach net zero through heat decarbonisation and energy efficiency improvements. This should include firstly, confirming a commitment to using a zoning framework for all upcoming building energy regulation and subsidy support that recognises that there is no single pathway to decarbonising heating. It should also include a review of energy efficiency retrofit targets across different occupancy tenures to ensure they align with net zero and bring a stronger, more coherent framework across the Government's energy efficiency policy as recommended by the BEIS Committee¹⁸.
- In Scotland, the Scottish Government, alongside the Heat Networks (Scotland) Bill, should commit to use regulatory powers, planning policy and Building Standards in the context of zoning to ensure appropriate heat network connections are made, and to de-risk demand.
- Supporting all of this will need a very strong consumer engagement and awareness campaign to ensure that consumers and businesses are aware of their evolving role in the net zero landscape and to communicate that they will experience some level of disruption.
- The Government should also work with strategic industry bodies such as the Heat Networks Industry Council to help it to deliver on its offers, particularly around jobs creation and investment, by working to deliver the asks.

Reform system governance to support net zero

This should include:

- BEIS, MHCLG and Treasury should agree clear accountability for the significant building retrofit improvements that will be required to meet net zero; ideally, placing final accountability within a single Ministerial Portfolio;
- Explicitly legislating for Ofgem's duties to include decarbonisation of the energy system;
- Reforming energy code governance processes to support the significant changes need to build the energy system of the future, including introducing an assessment objective in each code to assess how far any proposed change supports decarbonisation and requiring at least one funded seat on each code panel for a representative of the smart, flexible, decarbonised energy sector

¹⁸ <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/1730/1730.pdf>

Improve market access and regulatory frameworks to support investment

This should include:

- Using the exceptional circumstances that have faced the Electricity System Operator during the pandemic to accelerate the transition to a smart, flexible system. This should include –
 - Ensuring that all providers, including independent aggregators, can access the Wholesale Market and Balancing Mechanism and that market design features are adapted where necessary to allow providers to bid in and be dispatched effectively and without prohibitive costs;
 - Instructing National Grid ESO to design an enduring solution for high-renewable, low-demand days that does not involve disconnecting embedded generation and is more sophisticated than the temporary design of Optional Downward Flexibility Management service. This solution should be open to all technologies, procured through competitive auctions, embed the principle of useful energy only, and be transparent about the carbon content of different assets providing the service;
 - Ensuring that National Grid ESO reforms its approach to procurement of balancing services by requiring: publication of the details of all bilateral contracts held and a plan to phase them out by 2025; procurement of all balancing services via competitive markets, open to all technologies, by 2025; and the necessary IT upgrades and market design changes made to enable automated testing, prequalification, and dispatch of all flexibility assets;
 - Promoting innovation by ensuring that smart meters are not made the only approach for smart charging or operation of smart appliances – allowing alternative approaches to be used as long as they meet BEIS’ tests of interoperability, grid security, data privacy and cyber-security;
 - Reviewing the industry licensing regime, which currently acts as a significant barrier to market entry, as recommended in the Dieter Helm’s Cost of Energy Review¹⁹.
- More strongly targeting primary energy efficiency improvements to prepare for the transition and spur investment. This should include:
 - Strengthening and extending planning policy to require the capture of useful heat by all thermal generation plant, new and existing;
 - Maintaining the CHPQA scheme and the incentives arising from it.
- Reforming and integrating existing policy and regulation to target heat and energy efficiency zoning and encourage investment. This should include –
 - For heat networks, strengthening planning policy to introduce Obligation to Connect for the non-domestic anchor loads, statutory undertaker rights and reform to business rates as applied to heat networks that will be crucial to establishing large-scale networks;

¹⁹https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/654902/Cost_of_Energy_Review.pdf

- Tightening regulation on minimum energy efficiency standards for the private rented sector towards a higher landlord contribution cap and as above, strengthening targets for energy efficiency improvements across tenures to support net zero;
- Ensuring Building Regulations at national and local level for both domestic and commercial buildings support low carbon heating and the continued use of gas CHP in the short and medium term, alone or in conjunction with low carbon sources; through a shift to calculating grid emissions on the more accurate marginal basis²⁰ or through revised Technology Factors within the new 2020 Building Regulations.

Provide subsidy support where needed to deliver these ambitions

To support progress towards zero carbon buildings, subsidy support targeting heat decarbonisation and energy efficiency should be integrated into a zoning framework. This should include ensuring that subsidy schemes already announced are implemented in a zoned way and in appropriate areas, support the strategic deployment of large-scale heat networks; including the Clean Heat Grant, the Green Heat Networks Fund and the Government's Manifesto commitment of £9.2bn towards energy efficiency.

In line with this, it is also crucial that the Government directs funding at least partially towards those in fuel poverty – particularly ahead of the next heating season. The Energy Company Obligation is the leading scheme for energy efficiency retrofit in the UK but is currently delivered through a measures-based approach which does not facilitate more comprehensive retrofit and clear progress towards net zero. In some cases it is right to focus primarily on alleviating fuel poverty but, where possible, ECO funding should take homes both out of fuel poverty and towards compliance with net zero.

Subsidy support should be used in the short-term and to 2025 to support greater innovation towards decarbonisation. This should include:

- As set out above, funding heat decarbonisation trials at scale and introducing strategic zoning pilots;
- Working with industry to set out credible decarbonisation pathways for heat networks and Government action that will be needed to support this; including how the Green Heat Networks Fund and longer-term policy will support greater use of industrial waste heat, heat from Energy from Waste and the scaling up of large-scale heat pumps for heat network energy centres in the UK;
- We welcome the significant policy development work that the Government is currently undertaking to understand the applications for blue and green hydrogen and the most effective way to support them. To ensure hydrogen is used most effectively, this work consider:
 - If providing subsidy support for capex investment for generation plant to use hydrogen, the Government should make high efficiency a condition of eligibility or ringfence dedicated funding for decarbonised CHP;

²⁰ As recommended for new energy projects in the Treasury's Green Book

- Where hydrogen use in CHP and power plants is subsidised, these plants should remain eligible to participate in other electricity markets; including the Capacity Market.

Invest now in skills and training

Across heat decarbonisation, flexibility and energy efficiency, assess and provide support to address the skills gap; looking at how to upskill and reskill those from the high carbon industries and with the explicit aim of creating clear signals to employers and training bodies that the value of investment in training lies in the net zero economy.

Make energy data open to support investment

Open energy data is the bedrock upon which providers can build new business cases and products, helping stimulate the economy and create export opportunities for innovative green technologies and systems. As recommended by the Energy Data Taskforce and subsequently accepted by both the Government and Ofgem, a 'Presumed Open' approach to all data should be implemented across the Government, Ofgem, network operators and the system operators. These processes should outcome-focused and designed to:

- Ensure DNOs better understand the assets that are connected to their networks (and share this information);
- Allow National Grid ESO to better understand the carbon content and reliability of assets providing balancing services;
- Enable Government to track volumes of flexibility in different markets, monitor growth and publish this information as a separate chapter of DUKES.

Q4 - How can we more effectively support businesses across the economy in acting to access growing low carbon markets and support delivery of net zero? (e.g. innovation support, advice, regulatory barriers)

The reforms outlined in the ADE's answer to question three would go a long way to resolving these issues and supporting businesses to access markets and support delivery of net zero.

In addition, it is essential that Government sets out a clear approach to the future of carbon pricing. Government should set out the combination of carbon pricing instruments that will be used to achieve the desired carbon price post-January 2021 and ensure that business is given sufficient warning of any changes to prevent windfall gains and losses.

The ADE suggests that the CCC be tasked with formally recommending an annual target Total Carbon Price, and the Treasury mandated to announce how they will achieve this through carbon pricing instruments each budget. Visibility of the trajectory of the Total Carbon Price should be at least four years ahead, to align with the Capacity Market T-4 auction and policy design in comparable international examples. One element of carbon pricing should seek to reflect the signals of the EU ETS, whether through a linked UK ETS, standalone UK ETS or a carbon tax, while Carbon Price Support should be retained as the other element and utilised to ensure that the Total Carbon Price is sufficient to achieve the UK's net zero targets.

The ADE supports strong regulatory alignment to ensure that it is possible to put in place a linked ETS as quickly as possible. Whichever option is chosen to reflect the EU ETS, however, the

Government should release the methodology that they would use to calculate it and establish a regular, fixed review cycle in order to keep it aligned with variations in EU ETS prices.

Finally, the ADE supports the introduction of the Green Gas Levy and support scheme, which should help to improve the carbon signal on the gas price, if designed correctly. It is important that the design avoids any double charging for heat networks, which could occur if their generation falls under ETS or CPS and their customers have to pay the Green Gas Levy.

Q5 - How can we help the UK's carbon intensive sectors to transition to low/zero emissions while maintaining competitiveness?

A clear design and trajectory for carbon pricing, as outlined in the response to question four is an essential prerequisite for helping enable the transition. This should be combined with a zoned approach to industrial steam decarbonisation, along with expanding the innovation work being undertaken in industrial clusters as set out in question 3.

The ADE would also support an expansion of eligibility for Climate Change Agreements beyond static energy efficiency measures towards rewarding carbon emissions delivered through demand flexibility (while preventing energy waste by taking an 'Efficiency First' approach).

Q6 - What actions should we take to ensure local and regional economies can effectively contribute to the Net Zero target?

The Government should take two clear actions to ensure local and regional communities can contribute to Net Zero: support the development of electricity flexibility markets on the Distribution system and introduce a zoned approach to heat and energy efficiency

1. Government should ensure that liquid flexibility markets are established on the Distribution system. This will help ensure that local businesses and participants can play an integral role to keeping the electricity system in balance and maximising the usable output of renewable generation. Government should take an active role in the DNO transition, before, during and after the RIIO-ED2 period (2023-28). Key considerations in establishing these markets are:
 - Ensuring that DNOs commit to not using curtailment of renewable generation to manage network constraints by 2028, instead procuring flexibility through flexibility markets. This will form a major part of the DNOs' contribution to achieving net zero
 - Establishing flexibility markets for each of the services required by DNOs, from close to real-time markets for constraint management and reactive power, through 1-2 year ahead markets for reinforcement deferral, to long-term contracts for permanent demand reduction. All markets should be procured via competitive auctions, accessible to all technologies that can provide the service, and procured and dispatched on an automated and scalable basis
 - Putting a standardised methodology in place for DNOs to publish views of future system requirements across several timeframes, using probabilistic modelling for longer-term views and becoming more concrete closer to the present
 - Ensuring that DNOs act as neutral market facilitators and are not subject to any conflicts of interest

- Ensuring that a common valuation criteria and procurement methodology is followed by DNOs in evaluating decisions on whether to procure flexibility or reinforce, incorporating all relevant variables, including optional value, risk of stranded assets and value to consumers of faster rollout of low carbon generation

2. As discussed in question 2, the ADE believes that a zoned approach to heat and energy efficiency should be taken; including both new buildings and retrofit.

Zoning gives policy certainty by identifying the most cost-effective heat decarbonisation and energy efficiency pathway for a given area in consultation with local stakeholders and putting in place national and local support and regulation targeted at that pathway through a mix of Building Standards, funding, and more. It enables a learning by doing approach and creates a framework for consumer participation by involving local stakeholders in the decision-making process.

Tailoring policy to support the deployment of a specific decarbonisation pathway appropriate to a given zone helps to increase investor confidence and sends a clear signal to low carbon heat and energy efficiency markets. It will also encourage companies to invest in the skills and training suited to the needs of the local energy area, creating upskilling opportunities and green jobs, and can create local economies of scale and clear pipelines, helping to reduce the costs of low carbon heating and retrofit services and thereby making them a more attractive option for consumers.

For some pathways, there is not sufficient evidence currently to identify zones with confidence. However, and following Heat Hierarchies such as the GLA's, zones where waste heat, including for use in heat networks, can be prioritised now.

Government should therefore put in place an appropriately resourced zoning framework that sits above existing national policy and builds on them; including the upcoming BEIS Heat & Buildings Strategy, Heat Networks regulation and Scottish Local Heat and Energy Efficiency Strategies (LHEES)

In several cases, devolved actors have taken leading approaches towards net zero. For example, the UKGBC's accelerator cities pathfinder works to drive retrofit action towards net zero in leading local authorities. These types of initiatives should be supported in the green recovery to help build and sustain a wider market.

Local and regional economies can specifically be supported towards net zero in the green recovery by:

- Supporting trials/pilots in leading areas with clearer plans to meet net zero. This may include trials of zoning for heat and efficiency or a scaled demonstrator of retrofitting to facilitate flexibility. In both cases, building on existing momentum can help deliver short-term benefits in these areas, and longer-term benefits through lessons learned for the wider market.
- Devolved actors should also be able to effectively regulate the changes they wish to see in their area and the approach that works best for them based on factors including available heat sources and condition of the housing stock. The ability of local authorities to set higher standards for energy efficiency has resulted in considerable carbon savings and these powers should not be eroded through a green recovery.

Appendix 1: Elements needed for a successful green buildings renovation programme

The following will be crucial for such a programme to be work.

Policy mandate to deliver

The Prime Minister's Statement delivered a powerful message of support to Build Back Better. To deliver that ambition, decisions taken on energy in the next few months by the Treasury, MHCLG and BEIS should explicitly support this ambition.

Whilst we recognise that much of the actions needed to place the UK's building stock on a net zero-consistent path are devolved matters, strong, public coordination between the UK, Scottish and Welsh Governments will support confidence to invest at this fragile moment.

There is a moment of opportunity now to both be safe and go big. Any programme to Build Back Better with the UK's building stock should be outcomes-based and based on decarbonisation packages that fund a full low carbon solution including energy efficiency, heat decarbonisation and smart, flexible technology simultaneously.

Appropriate funding and incentives to invest in low carbon technologies

To make this happen at scale will require investment – both public and private.

This programme could make use of, and complement, funding that has already been announced such as the successor to the domestic RHI and the Green Heat Networks Fund. This should also include the significant, £9.2bn funding that the Government's Manifesto committed to improvements in energy efficiency and had been provisionally proposed ahead of the last Budget. In the context of a possible slowdown in private investment, the Government should also consider expanding public procurement to support decarbonisation.

It is likely that a Building Back Better programme would need to include a mix of loans and grants and would need to reflect the diversity of building types and the incentives required to make their owners act. The type of financing needed for a social housing landlord to improve its portfolio will, for example, be very different from that needed by individual domestic homeowners. Incentives will also be needed to promote the uptake of innovative technologies, which is covered in more detail in the response to question 2.

Public buy-in

The pandemic has resulted in unprecedented restrictions on the lives of UK citizens. A programme focusing on upgrading the UK's building stock will require a level of intervention and work in people's homes that has not been allowed for several months and about which households may reasonably feel nervous.

It is therefore crucial that such a programme ensures people are safe, and feel safe, as work is carried out. The Government has already gone some way towards with this with guidance on entering people's homes and construction. However, for this programme to work, this would need to go further with a significant public campaign from national and local government to set out both how this would be done safely and its role in the getting the UK back to normal.

The net zero challenge will require the public to accept a level of in-home disruption, be that through installing energy efficiency measures, smart technologies, or a new heating system. Some sections of society will have to install technologies that are currently unfamiliar to them. And finally, the public must be made aware of their evolving role in reaching net zero, from engaging in system planning, sharing data, and creating opportunities to benefit from the energy

system. In order to ensure high levels of public acceptance, the Government should begin a consumer awareness and engagement strategy as soon as possible to help consumers to understand their role in reaching net zero, and how their interests and rights will be protected. This should sit alongside a public campaign for safe work in home post COVID-19.

In securing this buy-in, national governments can only do so much. Local authorities and other local actors, such as schools and universities, will play a crucial role in building this momentum.

Public sector leadership

One of the most powerful roles that the public sector can play in ensuring we Build Back Better is to lead by example.

Local Authorities and the public sector estate can lead the way in energy efficiency and decarbonisation measures, supporting innovation and bringing together the private sector actors to invest in large infrastructure. In the short term, the Government should bring forward its commitment to drive action on energy efficiency in the public sector through the Public Sector Decarbonisation Scheme. With many public buildings currently at reduced occupancy levels, there is a clear opportunity to set the public estate on track for net zero in advance of COP26 whilst providing a much-needed immediate stimulus to the decentralised energy sector. This will create confidence that building renovation is safe and demonstrate its contribution to the recovery.

BEIS can also encourage local authorities to use their powers around energy, in particular through local planning and public sector buildings, to create clear pipelines and opportunities for local investment. In the long-term, this will provide a key basis for heat and energy efficiency zoning, by upskilling local authorities, bolstering local supply chains, and increasing deployment of local decentralised energy assets which offer benefits to the wider energy system.

Putting flexibility at the heart of building renovation

It is essential that integrating smart technologies to deliver demand flexibility is a core part the renovation strategy. Putting in place efficiency upgrades that enable the highest possible level of flexibility, while preventing energy waste by taking an 'Efficiency First' approach, provides greater system benefits, further reduction in carbon emissions and cheaper bills for consumers than considering efficiency alone.

The renovation programme should prioritise areas where these integrated solutions can deliver greatest cross-cutting benefits, such as improving the fabric efficiency of houses located near renewable generation while installing low carbon heat solutions, thereby enabling local residents to make more use of cheap, low carbon electricity. Retrofit of social housing should also be prioritised, as coordination of shovel-ready projects is cheaper and larger chunks of demand flexibility can be aggregated together to provide system balancing services.

Renovation should be combined with installation of smart, flexible infrastructure wherever possible. All buildings with off-road parking should have electric vehicle chargepoints fitted as standard during renovation works and buildings that install new energy infrastructure (for example, storage or renewable generation) should automatically be offered flexibility services contracts, with the ability to opt out.

Supply chain capacity

Compared to other infrastructure options, investing in the UK's building stock can be scaled relatively quickly and is likely to benefit not only larger companies but also SMEs; including in the hard-hit construction sector.

Retrofitting homes, offices and warehouses will not require extensive planning applications or billions of pounds of funding. However, it will require labour and materials.

To ensure this can begin to scale, the UK and devolved governments should invest grants and other support in re-skilling to deliver in a green economy those with closely matched skills who have lost jobs. This would create a skilled workforce of designers, builders and installers for low carbon heating, passive cooling, energy and water efficiency, ventilation, thermal comfort, and installation and operation of smart, flexible energy assets. This programme should build on the good work already being undertaken through Trustmark and PAS 2030/2035.

Customer protection and quality assurance

As decarbonisation and energy efficiency measures are scaled up, it is crucial that this happens in a way that delivers the promised improvements and protects consumers. This will require, for example, greater use of existing technical standards and a greater focus on verification of installations.

Industry is leading the way in this regard, through guarantee-backed schemes that have recently been embedded into schemes such as ECO. The establishment and continued development of Trustmark will further protect consumers and gather crucial data on work undertaken.

Long-term planning

After the financial crisis, the Obama administration put in place the Better Building Neighbourhood Programme precisely to provide jobs and economic growth in a way that simultaneously improved the performance of people's homes and supported decarbonisation efforts. This was successful in significantly improving the uptake of retrofit efficiency programmes. That programme however ended only a few years later – undermining the gains that had been made to grow the supply chain in those early years. This is one example of considerable international experience showing that supply chains need time to establish and mature. Any stimulus should therefore not be considered as a short-term payment until normalcy resumes but as a short-term kick-start that is integrated into a longer-term strategy for net zero.

Over this year and next, the Government is preparing a new Energy White Paper, a review into the cost of net zero, and several roadmaps, including a Heat and Buildings Strategy. It is also currently developing its revised Smart Systems and Flexibility Plan.

These strategies should now explicitly reflect Government actions so far to address the pandemic and the green recovery. At a strategic level, the recovery offers the opportunity to provide immediate support for action on decarbonisation within a longer-term context of the journey businesses and households will need to take as we decarbonise, including both support and regulation. At a more specific level, strategies from the Government over the next few months should include specific, detailed recommendations for what they will contribute towards a smarter, green energy system.