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By E-Mail only

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25th February 2022

Dear NIC

Sustainability First Response: Call for Evidence, Second National Infrastructure Assessment Baseline Report

Sustainability First is a charity and think-tank working on sustainability issues in essential services – in particular energy, water and communications. We have a long-standing interest in how to promote social, environmental and economic wellbeing in these sectors, short and long-term. We have carried out leading research on future regulation and worked closely with the water sector on their long-term planning work, also sharing our thinking on adaptive planning and regulation with the Ofgem team.

Having directly contributed to the NIC's working group on climate resilience, I am pleased to see many of the themes picked up in our discussions reflected in the Baseline Report.

Question 1: Do the nine challenges identified by the Commission cover the most pressing issues that economic infrastructure will face over the next 30 years? If not, what other challenges should the Commission consider?

The nine challenges identified by the Commission are all important. Taken together, they reflect an environment of deep and radical uncertainty. In this context, the Commission, along with policy makers and regulators, will clearly need to retain sufficient flexibility in how the Assessment is approached. Identifying the nine key challenges is clearly helpful but this shouldn't occur at the expense of understanding the totality of risks in the round, and new and emerging risks. In such an environment, the need for adaptive planning and regulation, scenario planning (including to better understand long-tail distribution risks) and stress testing (of assumptions, theories of change etc) – within and between sectors – becomes more important.

We would note that each of the nine challenges may be amplified if **interdependencies between sectors** are not fully addressed. For example, the potential for hydrogen and CCUS could be curtailed if water resource issues become more acute. And if clean treated water is used for this, the resulting cost could accentuate the affordability crisis.

Infrastructure clearly doesn't operate in isolation from the citizens and communities that use it and in which it operates. This '**social scaffolding**' is important to **build public support for investment, to help ensure communities are willing for works to be carried out in their areas and for resilience during shocks**. We would therefore suggest that the factors listed below are also given more weight in the assessment:

1. **Affordability and who pays for economic infrastructure.** The current cost of living crisis is likely to make this a defining challenge over at least the short to medium term. This has implications for how costs and benefits are shared within and between generations (including regionally). It also raises questions for how to gain and maintain public support for infrastructure investment which uses private capital, and ultimately consumer funding through bills or citizen funding via taxation, to deliver public value. For NIA2 to be publicly acceptable, we consider that more attention needs to be given to this challenge and the engagement and governance processes that will be needed to address it. This will require further research and thinking on **distributional impacts that includes those between generations**. The framework that we have developed with Frontier Economics may be helpful here.¹ New approaches and metrics which take account of issues such as valuing natural capital and how to account for and deliver co-benefits are also needed.
2. **Behaviour change and the demand side:** To reduce environmental impacts, minimise costs and maximise flexibility/adaptability in an uncertain environment, significant behaviour change will be needed over the coming decades. This will be necessary not only in terms of how people heat their homes (as the current list of nine challenges acknowledges) but also in terms of other electricity usage in homes and businesses, EV charging, transport usage, water efficiency, waste etc. We welcome the fact that the NIC proposes to continue to monitor the impacts of behaviour change. However, we consider that more work is needed in this area and that there is a significant need for a strategic joined up view of **'cross-sector sustainability and behaviour change'** as a key plank of NIA2 as indeed stressed in the 6th Carbon budget. Our research and wider experience has shown that demand side issues are currently frequently dealt with on a sector by sector, company by company basis and can get less attention than grey infrastructure spend.
3. **Supply chain issues and geopolitical risk:** The Baseline report makes few references to global supply chain risks and no real mention of workforce shortages or geo-political risk – and a potential move away from just in time approaches, with increased local sourcing, stockpiling and associated costs and risk. Covid, Brexit, the situation with Russia and 'grey zone aggression' (such as cyber-attacks and intellectual property disputes)² have exposed the fragility of existing systems and together could make delivery of infrastructure more challenging.

In addition to the above, we consider that **the following challenges could be reframed differently:**

- **All sectors will need to take the opportunities of new digital technologies:** We agree that this is a challenge but consider it is also important to recognise that the associated increase in **cyber risk** (as noted above) needs to be recognised and appropriately addressed. More account could also be taken of other technological developments, such as bioengineering (e.g. for waste water treatment) and low carbon concrete.
- **Decarbonising heat will require major changes to the way people heat their homes:** We suggest that this is changed to 'the way people heat **and cool** their homes.' The Baseline Report only makes a passing reference to cooling. As the NIC are aware, extreme heat is likely to become more common and may particularly be a problem in dense urban areas. We would note that more people died in the last heat wave in Paris than were killed in the first wave of Covid.

¹ Sustainability First, [And what about your grandchildren?](#) June 2021

² See, for example, FT, Modern warfare is catching companies in the crossfire, 14th February 2022

It will be important to ensure that making homes more thermally efficient to increase comfort, reduce costs and make them heat pump ready doesn't lead to the unintended consequence of homes that would be dangerous in extreme heat scenarios. We note that whilst heat pumps that are air to air can switch to air-conditioning, the same is not true of air to water heat pumps (which may be taken up by those who want to use existing radiators in their new system). If heat pump contractors are incentivised purely to deliver carbon reductions, not wider outcomes, issues around ventilation may not be addressed. More research, clearer messaging and communications are needed here.

Although the NIC doesn't have responsibility for housing, it does need to take account of the interface between infrastructure and the built environment. And the challenge of extreme heat extends beyond housing to other sectors. For example, thermal expansion of aging train tracks/bridges, algal blooms and evaporation in rivers/reservoirs and the need to cool IT servers and other digital infrastructure.

- **Good asset management will be crucial as the effects of climate change increase:** As currently worded, this could be taken not to give sufficient weight to **green infrastructure or nature-based solutions (NBS)**. These are clearly going to be increasingly important in sectors such as water, particularly given the interaction between water resource and water quality issues – as indeed stressed in Defra's recent strategic policy statement to Ofwat. Whilst the Baseline Report refers to NBS in terms of surface water flooding, it does not appear to cover them in terms of helping to address pollution etc, as has been done with water company initiatives such as Entrade³. This is important given that, as the Report acknowledges, serious pollution incidents have plateaued at an unacceptably high level.
- **The waste sector must support the move to a circular economy:** We would agree that the waste sector needs to change in this regard but we would emphasise that this is a supporting role to the change towards more **circular business models and practice across the whole economy**, including in other infrastructure sectors.

Question 2: What changes to funding policy help address the Commission's nine challenges?

Channelling funding

Local/regional funding: We support previous NIC recommendations for devolved powers and funding for cities and towns to develop locally led infrastructure strategies and agree that these need to be developed and determined locally, by people who understand the needs and strengths of the area. Figures in the baseline Report which highlight the differences in productivity in different regions of the UK compared to other countries, demonstrate the size of the levelling-up challenge.

Local/regional funding for net zero: Our inclusive 'Together for a fair climate future' discussion events and 'Shake up the system' conference that we held in the lead-in up to COP26 identified the importance of local investment and empowering local communities to achieve meaningful and lasting change. Our research found that a sense of community can be an important intrinsic value and that people who hold intrinsic values are more likely to express concern about a range of issues and, importantly, to take action to address those concerns. We identified that community level action is an effective way to support collective wellbeing and long-term action and is vital for

³ <https://www.entrade.co.uk>

sustainable behaviour change.⁴ One of the key recommendations from the conference was the need to make systems change for a sustainable future tangible to people by using local/regional approaches to cut through complexity.⁵ Visible, tangible long-lasting infrastructure in the places people live can play a key role here.

Funding for cities and towns for local infrastructure needs to be of significant scale and long-term duration to have a meaningful impact, enabling capacity building at the local level and the development of robust supply chains and strategic workforce planning. This is particularly the case in areas like energy efficiency, which continues to be the Cinderella of the energy sector despite the fact that investment in this area can deliver multiple co-benefits (reducing carbon, reducing fuel poverty, creating good green jobs and reducing gas dependency/energy price volatility). It will also be essential to achieve thermal comfort in homes powered by heat pumps and to facilitate the heat pumps operating flexibly as part of a smart electricity system. Locally driven street by street energy efficiency programmes are going to be important to reduce carbon at the scale and pace needed to deliver net zero.

Local nature recovery plans: We are delighted to see the focus on these in the Environment Act and Levelling Up White Paper. Future infrastructure needs to take account of these plans, for example, in terms of preserving and enhancing biodiversity, using transport networks as wildlife corridors etc. And crucially for local plans to be effective they need to be backed with sufficient funding. This requires levelling up the playing field between funding green and grey infrastructure and with biodiversity initiatives.

Who pays for net zero?

Significant questions remain open as to how the funding for net zero is ultimately best raised; from consumers/bill payers or from citizens/tax-payers. This requires fundamental discussions about what level of heating and electricity powered digital connectivity is deemed essential in the UK in the twenty first century. Sustainability First has an active interest in this area. Our research to date, summarised below,⁶ has examined how policy costs can be fairly allocated. We note, this may also be an issue for paying for climate adaptation: enhancing resilience of utility infrastructure, ensuring water infrastructure is drought proofed.

Moving environmental policy costs to taxation would be more progressive than recouping them through household bills and could be relatively simple to implement. Research by Public First suggests that moving policy costs to general tax could reduce the average energy bill of fuel poor homes by up to £178 a year and the overall average energy bill by £168 a year.⁷

In terms of short-term affordability, moving policy costs to general tax would only help electricity and not gas customers. As policy costs currently account for 20.4% of the electricity bill and 1.6% of the gas bill, it would not help pay for gas central heating bills this winter (although in the medium to longer-term shifting policy costs to tax could indeed help). Increasing general tax could also be politically unpopular. To make it more palatable the shift could be limited to certain types of levies (e.g: legacy costs or nuclear costs). There are precedents for other energy related

⁴ Common Cause Foundation (2010) The Case for Working with our Cultural values

⁵ Sustainability First, [Together for a fair climate future](#), October 2021

⁶ https://www.sustainabilityfirst.org.uk/images/Energy_crisis_and_future_retail_markets_FINAL_v8.1.22-1.pdf

⁷ Rachel Wolf et al, Public First, 2021

policy costs being recovered through general taxation (e.g. Commercial and Domestic Renewable Heat Incentives, EV subsidies, R&D funding, Scottish and Welsh energy efficiency programmes).⁸

Consideration of shifting environmental costs from electricity to gas bills to help drive carbon reduction longer-term, as floated before the current energy crisis hit, would need to be underpinned by clear principles. For example, while there may be a logic to shift all remaining social costs from electricity to gas, it is hard to understand the in-principle case for shifting electricity market costs onto gas bills for electricity capacity and for renewables – and which make up the lions share of all policy costs - (RO, FITs, CfD costs).

Perhaps the hardest policy-cost question yet to be addressed, is that for all heat-use gas prices (and oil) do not reflect the cost of their carbon emissions and so do not fairly reflect the full pollution cost. This sits at the heart of retailer concerns that gas pricing for heat, bakes in a disincentive to switch to electricity. To introduce a carbon-tax on gas for heat-use at this point might arguably address the clear environmental distortion – but would also exacerbate the immediate hardship of the current energy crisis. One medium term answer might be to hypothecate the tax receipts - and recycle these to less-able-to-pay households through schemes for energy efficiency and / or a switch to electric heat. While this might offer a 'right' medium-term answer, it may well not be a workable immediate solution.

Question 3: How can better design, in line with the design principles for national infrastructure, help solve any of the Commission's nine challenges for the next Assessment and what evidence is there to support this?

We have carried out significant work on the need for **adaptive planning (and regulation)** in conditions of uncertainty and have been sharing this work with Ofwat and Ofgem.⁹ In our view, there is still further potential to use these techniques to increase flexibility within regulatory price controls, and to take some investments outside of price controls. To get the transformative change for true sustainability, we consider it is important to also consider radical **people centered approaches to urban planning**, such as the creation of 15 minute cities.¹⁰

In our 'Together for a fair climate future' work, our engagement identified that there is significant scope to use planning and design interventions, including for national infrastructure, to help achieve a wide range of **co-benefits and multiple goals**. These can include using design and planning to foster more circular approaches to take pollution and waste out of the system or to develop more inclusive approaches to change to help further goals such as levelling up.¹¹

⁸ Sustainability First. 'What is Fair ? How should we pay for the energy system of tomorrow?'. September 2019

https://www.sustainabilityfirst.org.uk/images/publications/other/Sustainability_First_Future_Energy_Market_Discussion_Paper_September_2019.pdf

⁹https://www.sustainabilityfirst.org.uk/images/publications/presentations/Adaptive_regulation_and_adaptive_planning_slide_deck_sep_t_2021.pdf

¹⁰ <https://www.15minutecity.com>

¹¹ Sustainability First, October 2021, op cit

Question 4: What interactions exist between addressing the Commission's nine challenges for the next Assessment and the government's target to halt biodiversity loss by 2030 and implement biodiversity net gain?

To halt biodiversity loss in the UK, and to reduce the biodiversity impacts of supply chains, **circular and zero waste approaches** should be used wherever possible whilst addressing each of the nine challenges.

- If the challenge of decarbonising heat is extended to also include **cooling**, this could then cover the need to supplement the installation of heat pumps etc with **tree planting and urban water bodies**. As well as helping to help tackle extreme heat, these can also provide new habitats and water storage facilities for wildlife.
- The decision to build new networks for CCUS clearly needs to consider other options for sequestering carbon such as **tree planting** which may have wider co-benefits including biodiversity (and potentially urban cooling). If trees are planted alongside rivers, they can also help **reduce run-off** (which will increase if climate impacts lead to more intense rainfall, particularly on dry soils). This can lead to multiple co-benefits including improved **soil and aquatic health**.
- More generally, improved **surface water management** clearly presents numerous possibilities for enhancing habitats and biodiversity.
- As noted above, we consider that the 'Good asset management' challenge should be reframed to give more weight to **green infrastructure / nature-based solutions (NBS)**. These are clearly going to be increasingly important in sectors such as water, particularly given the interaction between water resource and water quality issues. Whilst the Baseline Report refers to NBS in terms of surface water flooding, it does not appear to cover them in terms of **helping to address pollution** etc, as has been done with initiatives such as Entrade¹².
- Cycle lanes to improve urban mobility can be designed alongside **avenues of trees**, which as well as sheltering cyclists from the elements can also encourage biodiversity.
- Water, transport and other infrastructure networks can be used as **biodiversity / wildlife corridors** connecting smaller pockets of wild spaces and enabling species to connect and move.

Question 5: What are the main opportunities in terms of governance, policy, regulation and market mechanisms that may help solve any of the Commission's nine challenges for the Next Assessment? What are the main barriers?

Analysis for us by Slaughter and May,¹³ found that the law and regulation are not always a barrier to delivering sustainable outcomes in energy and water and comms and that there is quite a lot of flexibility in current arrangements. Our subsequent seminar on this topic¹⁴ found that barriers were more likely to be political signalling and how the law and regulation are interpreted and implemented.

¹² <https://www.entrade.co.uk>

¹³ https://www.sustainabilityfirst.org.uk/images/publications/fair_for_the_future/Briefing_paper_-_How_far_do_current_legal_and_regulatory_frameworks_in_public_utilities_deliver_for_sustainability_and_is_further_legislation_required.pdf

¹⁴ <https://www.youtube.com/watch?v=-MmALS9b2Ik>

Our major 2021 Regulation for the future¹⁵ report outlined a package of measures to help the energy, water and comms sectors deliver public purpose and could assist the Commission as it thinks about how best to tackle its nine challenges. Our subsequent adaptive regulation and planning slide deck has expanded on some of these themes.¹⁶ At a high level, we consider that the opportunities for change are:

- Shifting the focus from customers to **consumers, citizens, future customers and communities**. This becomes particularly important for shared and long-term challenges, and for responses to shocks, particularly when these have **regional and place-based** impacts.
- We consider **meaningful engagement**, and where appropriate **co-creation**, with people who are likely to be impacted by future infrastructure, and who will ultimately pay for it, is crucial for good decision-making,¹⁷ and addressing the nine challenges.
- Increased focus on techniques that incorporate **long-term interests such as adaptive planning and regulation** (see above). Ofwat's recent publication on long term business strategies is a welcome step forward here.
- Greater attention to **cross-sectoral approaches, solutions and governance**. We warmly welcome the BEIS Secretary of State's Open Letter on 'Strategic priorities and cross sector opportunities for utility regulators' of 31st January 2022 as a good step in this direction. However, we note that: the section on sustainability focuses primarily on environmental issues and not the social or economic aspects of sustainability; the letter is light on biodiversity issues; and there are no references to engagement and governance as important mechanisms to deal with trade-offs. There is an opportunity for the forthcoming BEIS consultation on economic regulation to address these points. We have noted above the heavy demands that hydrogen and CCS can place on water demands and we would note as well the interactions that Storm Arwen has highlighted in relation the resilience of communications infrastructure and energy. The current regulatory frameworks make proactive and strategic cross-sector approaches difficult and this needs to be addressed.
- **Cultural change** that aligns the interests of different actors. Our major **Sustainability Principles** project¹⁸ is seeking to identify a set of principles that can underpin governance in the energy, water and communications sectors to help address sustainability challenges such as those included in the Commission's nine challenges. The barriers that our research has identified in this area include sustainability challenges not being:
 - **Consistently understood, identified and reported**. How the law and regulations are interpreted in practice can be a barrier to delivering sustainable outcomes. A survey we carried out of 110 policy makers, regulators and companies in the energy, water and comms sectors found that sustainability issues are often narrowly framed and interpreted – with greater focus on environmental as opposed to social or economic outcomes.

¹⁵https://www.sustainabilityfirst.org.uk/images/publications/fair_for_the_future/Regulation_for_the_future_the_implications_of_public_purpose_for_policy_and_regulation_in_utilities.pdf

¹⁶https://www.sustainabilityfirst.org.uk/images/publications/presentations/Adaptive_regulation_and_adaptive_planning_slide_deck_sept_2021.pdf

¹⁷https://www.sustainabilityfirst.org.uk/images/publications/other/How_engagement_can_maximise_public_value_in_the_essential_services_of_water_and_energy.pdf.pdf

¹⁸ This briefing outlines the need for change, including barriers and enablers:

https://www.sustainabilityfirst.org.uk/images/Sustainability_Principles_Framework_and_Strawman_Briefing_Nov_2021_FINAL.pdf. This briefing outlines our 'framework and strawman' that we are now testing with key stakeholders

https://www.sustainabilityfirst.org.uk/images/Sustainability_Principles_Framework_and_Strawman_Briefing_Nov_2021_FINAL.pdf

A third of companies didn't know if their organisation used any sustainability frameworks to make decisions. Inconsistency in measurement and reporting is an issue that our recent analysis of the RIIO ED2 business plan Environmental Action Plans has also highlighted¹⁹;

- **Addressed in a more coherent way/in the round.** How the law and regulations are implemented in practice is also an issue;
- **Seen as urgent and dealt with in a timely fashion;**
- **Systematically embedded into core economic decision making.** In the survey referred to above, half the respondents said that sustainability frameworks were only having a slight or no impact on incentives and remuneration in their organisations.²⁰ This can clearly make mainstreaming approaches to deliver on the challenges the NIC has identified more difficult.

Question 6: In which of the Commission's sectors (outside of digital) can digital services and technologies enabled by fixed and wireless communications networks deliver the biggest benefits and how much would this cost?

Much of our research in energy and water has highlighted the scope that remains for greater use of **sensing and monitoring technologies and predictive data analytics** in these sectors. Such services can deliver multiple benefits including: helping to reduce carbon and other emissions and sources of pollution; increasing efficiency; better targeting of asset maintenance and replacement programmes; providing targeted social support; enabling demand side response etc. It is not unreasonable to suggest that 'self managing' systems augmented by robotic, satellite or drone inspection could become standard practice.

Consumer facing digital technologies (Apps etc) can also assist in demand side reduction and response, tariff structures (time of use, seasonal, rising block etc), wider behaviour change initiatives etc. To **realise many of these benefits**, it is important that **data** is securely **shared** in a proactive and timely way, particularly with public interest actors. Our PIAG project has identified the steps that need to be taken to make better use of smart meter energy data.²¹

Question 7: What barriers exist that are preventing the widescale adoption and application of these new digital services and technologies to deliver better infrastructure services? And how might they be addressed?

Potential barriers and enablers include:

- **Silo thinking:** From our experience, there is still considerable potential for greater cross-sectoral learning, sharing of lessons learned (what's worked and what hasn't) etc in utilities. Cultural change is needed to address the 'not invented here' mindsets that can still exist in some companies. **Systems thinking and learning networks** can help tackle this challenge.

¹⁹ https://www.sustainabilityfirst.org.uk/images/ED2_Business_Plans_Ofgem_call_for_evidence_final.pdf

²⁰ https://www.sustainabilityfirst.org.uk/images/Sustainability_Principles_Needs_Case_Briefing_Nov_2021_FINAL.pdf

²¹ https://www.sustainabilityfirst.org.uk/images/publications/piag/PIAG_Snapshot_Report_2017-2021.pdf

- **Risk aversion:** For good reason, many aspects of utility company practices are risk averse. However, this can get in the way of adopting more innovative approaches, including around the use of digital services and technologies. The aging workforce in many utilities can sometimes accentuate this problem. Greater **diversity** in recruitment, including not only of younger people but also around skill sets and ways of thinking, can help address these issues.
- **More pilots than Heathrow?** Continued focus is needed on how to mainstream innovation projects and how to embed an innovation culture which is sufficiently dynamic, flexible and open. We also need more production scale pilots, such as Hynet, and fewer micro pilots.
- **Innovation funding:** Third parties including from the digital sector - can really help bring in new ideas and approaches to sectors such as water. But greater clarity is needed on innovation funding sources, particularly for SMEs and social enterprises etc.

Question 8: What are the greatest risks to security of supply in a decarbonised power system that meets government ambition for 2035 and what solutions exist to mitigate these risks?

- **Long-term storage:** The consultation rightly highlights the important role of flexibility in delivering a decarbonised grid. However current battery storage is really only effective for dealing with within day variations. The risk to security of supply arises when there are prolonged periods without wind or solar (what is known in Germany as a Dunkelflaute). To deal with this risk more emphasis needs to be placed on long duration storage and firm clean generation such as geothermal.
- **Geopolitical risk:** This is a potential risk on various fronts. It can impact supply chains (eg availability of precious metals for EV batteries etc) and workforce availability and planning. And if gas prices remain high, or go higher, the continuing cost of living squeeze could further reduce public support for paying for decarbonisation.
- **Climate risk.** the third climate change risk assessment judged that energy was one of the sectors least developed in its resilience to climate. As storm Arwen demonstrated, overground networks are highly vulnerable to disruption. Understanding the scale of these impacts is important. It is not clear to us whether the metrics reported in Figure 3.2 are the standard Ofgem CML figures which exclude “exceptional events”.
- **Lack of clarity and co-ordination on the future role of DSOs:** A move to a decarbonised grid with more distributed low carbon technologies makes the DSO role a critical one in maintaining security of supply. A 'systems thinking' approach with consumer and citizen interests at the fore is required so that a lack of clarity about the DSO role doesn't become an issue. There is currently a need to establish a better-defined regional (and national) coordination role for the DSO which spells out which DSO outcomes will ultimately serve consumer and citizen interests best and what the over-arching 'vision' is - beyond a set of baseline metrics. Our analysis of the ED2 business plans identified that there are six different DSO strategies proposed by the DNOs and the pace and scope of planned developments appears to differ considerably. Overall, based on the information provided so far, we are concerned that the DSO initiatives may be network-centric, narrowly-focused and uncoordinated, putting the potential benefits at risk.²²

²² https://www.sustainabilityfirst.org.uk/images/ED2_Business_Plans_Ofgem_call_for_evidence_final.pdf

Question 9: What evidence do you have on the barriers to installing heat pumps in different types of properties? What are the potential solutions to these barriers?

The upfront costs of installation for a significant minority of the population, who given the current cost of living crisis may already be struggling financially, needs to be addressed. Other challenges include: ensuring the fabric of homes is thermally efficient before heat pump installation (current energy efficiency initiatives are not sufficiently scaled, funded or strategic); building trust in energy companies so that people are willing to get them to do this work; and workforce availability.

Question 10: What evidence do you have of the barriers and potential solutions to deploying energy efficiency in the English building stock?

Short-term and insufficient signals and funding: This makes it challenging to develop supply chains and train the workforce. A more strategic, long-term and decentralised approach is needed so that this can be done at scale but delivered on a street-by-street basis. While finance is important – in particular for those on lower incomes – it is important that this is not seen simply as a financing problem (as the Green Deal experience highlighted). Many of the barriers are around a lack of interest from customers and concerns around disruption or aesthetics (or loss of space for internal insulation). Timing interventions for when they are least disruptive (when other work is being done or people are moving home) is one solution – the use of trusted partners is another. There is also a need for continued innovation around solutions that would be more acceptable to people.

Question 13: In what ways will current asset management practice need to improve to support better infrastructure resilience? Your response can cover any number of the Commission’s sectors.

- Greater focus on climate impacts: CCRA3 has highlighted need for more action in this area in energy.²³
- Enhanced understanding of cross-sector issues so that interdependencies, cascade effects, single point failures etc are better understood and tackled in a proactive manner;
- Improved information on asset health; particularly for networks such as waste water;
- Better use of data and predictive analytics; and
- Proactive use of customer and stakeholder engagement to gather insights into standards of service, responses to resilience challenges and priorities for future investment.

Best regards

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²³ <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA3-Briefing-Energy.pdf>