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20th September 2022

Re: Climate Action Plan 2023 – Call for Expert Evidence

ESB Networks welcomes the opportunity to input into the next revision of the Climate Action Plan through this Call for Expert Evidence. Since the launch of the last climate action plan, there have been significant developments geo-politically and in the energy landscape, such as "EU Fit for 55", "REPowerEU" and "National Energy Security Framework", all of which have increased the need to accelerate the connection of renewables and the decarbonisation of society. From the first Climate Action Plan in 2019, and continuing with the second version in 2021, ESB Networks has played a leadership role in delivering all our lead actions on target. We have also positively supported the progress and delivery of other actions through our involvement as a key stakeholder. This includes supporting Government Departments, CRU and other stakeholders, either directly or through department-led working groups and other forums.

ESB Networks is fully committed to the delivery of the national Climate Action Plan targets and the journey to net zero emissions. Our own strategy is aligned with this with a key focus of connecting renewables to the electricity system and enabling the electrification of other parts of society including heat and transport. This will be underpinned by a reliable, resilient, and flexible electricity network, which will also facilitate customer-centric solutions for citizens to become active participants in the energy system. In addition to playing a crucial role in enabling Ireland to meet its net zero goal, ESB Networks as a business is also committed to removing carbon from our own activities, and we are on the journey to being a net zero company by 2040.

ESB Networks continues to play a proactive and leading role in the existing Climate Action Plan. In Annex A, we have provided further detail on some of the work we have progressed that supports the delivery of the CAP and its targets.

In Annex C of this submission, we have set out extended points in relation to the questions in the Call for Evidence that we believe are most relevant to our activities and expertise. At a higher-level, the following are five key areas that we believe would support the ambitions for 2030 and beyond if given additional focus and actions within the next CAP.

- **Increasing electrification:** Much of the emphasis to date has been on connecting increasing levels of renewable generation, and huge progress has been made with Ireland now a world leader in this area. It is appropriate that a strong focus remains on this to allow the electricity sector to meet its targets. However, to extract the maximum benefit, this clean electricity should be used to deliver carbon savings from other sectors through increased electrification and adoption of associated low carbon technologies. This should be the focus of specific actions in the new Climate Action Plan.

  Influencing consumer behaviour through incentives and communication campaigns will be key in the coming years to increase low carbon technology uptake at the rate required to have a meaningful impact by 2030. It is essential that all customers understand the benefits of these technologies for them, their communities and global climate change. This will build on the successes of the previous Climate Action Plans and aligns with the 'harnessing the citizen and community effort' and 'adoption of known technologies' aspects of the 2023 framework.

- **Distribution flexibility and system services:** In our role as DSO, ESB Networks is establishing the new products, services and market arrangements for flexibility mandated in the Clean Energy Package and needed to enable Ireland's Climate Action target for 20–30% of demand to be flexible. Achieving this ambitious target will rely on distribution-connected resources (individual or aggregated demand,

distributed generation and storage) being empowered to participate in new local flexibility markets, as well as in the SEM and DS3 system services. To do this, throughout 2021 and 2022, we have invested heavily in a programme addressing the full range of technological, market design, behavioural and engineering challenges which must be addressed to achieve this that provides simplicity and certainty for customers and service providers. ESB Networks is the lead for Action 101 of the Climate Action Plan 2021 and has to date delivered our actions on time and are on target to meet our future actions in an agile and collaborative manner for the benefit of our customers. The first local flexibility markets are due go live in October 2022, in a range of locations across the country, with pilots involving thousands of households and tens of businesses. In Annex B we provide for consideration the proposed next steps for Action 101, which we consider critical in enabling Ireland's climate action targets. These are underpinned by our technical analysis and design activities implementing Action 101 throughout 2021 and 2022.

- **Pipeline of renewable projects:** It is crucial that there is a steady drumbeat of renewable projects such that every year between now and 2030 is utilised to the fullest extent possible. The carbon budgets and sectoral emissions ceilings which have been agreed by the Government strengthen this need further. Renewable energy auctions will need to be structured such that capacity is brought on in the frequency and at the scale needed from the early years. If this does not happen it will be difficult to make up the difference in the latter half of the decade. Close alignment between the timing of government RESS auctions and regulated connection policy will be important so there is a steady flow of contracted projects bidding into a competitive RESS auction process. Delivery of grid connections for projects with Corporate Power Purchase Agreements and projects successful in Capacity Auctions in a timely manner will also be important to meeting CAP targets.

- **Minimising planning and consenting delays:** The development of renewable projects and associated grid infrastructure can be a lengthy process. Addressing planning delays and the consenting process would add renewable generation to the system more quickly. Opportunities should be examined to streamline the timelines for the planning process for such projects, which includes appropriate objections and appeals mechanisms.

- **Cross-sectoral collaboration:** The new Zero Emission Vehicles Ireland (ZEVI) office will have a key role in bringing all transport stakeholders together and we look forward to working with them as the change to electrification accelerates. We would advocate for a similar approach for heat: an agency that can look across the full spectrum of activities required to deliver the plan and assist with removing barriers and set clear policy and regulation which can be delivered quickly. This would build upon the SEAI's National Heat Study, which identifies efficient pathways for low carbon heating in Ireland. We believe that the standards requirements developed under existing CAP Action 101 should be adopted at a national level to ensure that devices being installed now, such as heat pumps and electric vehicle chargers, have the necessary smart inverters and standardised communications to enable flexibility at a local level.

ESB Networks welcomes the opportunity to input into the next revision of the Climate Action Plan. The energy system is rapidly developing to enable the decarbonisation of society, to ensure Ireland meets its ambitious targets for 2030 and net zero emissions by 2050. ESB Networks has fully embraced our key role in its successful delivery. We look forward to further close engagement with all stakeholders in producing and implementing an updated plan.

Yours sincerely,

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ESB Networks.

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Annex A – ESB Networks delivery to-date on Climate Action Plan objectives

- National Networks, Local Connection programme
  Throughout late 2021 and 2022, ESB Networks has been delivering the critical actions needed to enable Ireland's 20-30% flexible demand target, as set out in Action 101 of the Climate Action Plan 2021. All are progressing on target, including two completed already in 2022, a further three due to be completed by Q4 2022, and a further action scheduled for completion in Q1 2023.

  In Annex B of this document, the proposed next steps under this measure are outlined for the Department's consideration.

- Electrification
  We are committed to developing a cost effective, smart, sustainable, and resilient distribution system that will enable our customers transition to electrified heat and transport. At the start of 2021 we published our Electrification of Heat and Transport Strategy committing to growing and supporting electrification as follows:

  1. Ensuring ESB Networks policies support and enable electrification
  2. Engaging, enabling, and empowering our customers to electrify
  3. Ensuring network readiness

  Our Electrification of Heat and Transport Strategy is an all-of-organisation mandate, and we are actively coordinating cross-company activities that are relevant to this area. We have already introduced revised standards for the design of new Low Voltage (LV) networks, more than doubling the allocated capacity in new-build housing developments, to accommodate the requirements of these customers with respect to electrification, and we continue to revise our design standards to ensure that LCT load can be accommodated during any works on our existing LV network.

- Connecting large scale renewables
  Under the Enduring Connection Policy 2 (ECP) process, ESB Networks is processing approximately 85 grid applications every year. These applications are a combination of solar projects, wind projects, battery projects, community projects and auto-producers customers installing renewable generation to reduce their dependency on fossil fuels.

  ESB Networks and EirGrid recently opened the new ECP2.3 application window for electricity generation connections which will provide a new pipeline of renewable electricity projects which can participate in RESS auctions, capacity auctions or enter into Corporate Power Purchase Agreements with their supplier.

  In advance of this we have significantly ramped up our engagement with those customers to guide them through the connection process and provide advanced information on grid availability and application requirements. This has involved ongoing meetings and customer clinics; helping to reduce issues as the projects progress.

  2022 is a transformative year for the Irish electricity system, which will see grid scaled Solar generation and Battery Energy Storage establishing their credentials as significant renewable technologies on our Network. We have recently connected the first grid scale solar farm to the network and expect many more in the coming years as we strive to meet the Government ambition of up to 5,500MW of solar generation in Ireland. This year, ESB Networks expect to connect 28 new grid scaled renewable wind and solar generators to the Network. This would represent an increase of circa 700MW a record year for growth of renewable energy in Ireland. A further four battery projects are also expected to be connected in 2022, totaling 80MW.

- Streamlining connection processes
  ESB Networks have introduced a Lean Connections Project which identifies improvements and introduces efficiencies to the delivery of major infrastructure projects while improving our customer's experience. This project will enable us to deliver connections faster and more cost effectively by adopting leaner approaches to how we carry out this work through all stages from planning, scoping, design, costing and delivery. In addition, we have introduced:

  - Modular solution options for MV projects including community projects
  - A dedicated single point of contact through the delivery phase
  - An option to reduce Maximum Export Capacity through customer engagement process pre offer/connection assessment issuance, thus maximising the number of projects who accept their grid connection offer and proceed to connection

- Microgeneration
  Microgeneration and citizen energy participation will play an increasing role in Ireland's electricity system. ESB Networks fully recognises that enabling an increased penetration of microgeneration is an important target of the CAP and that it enables citizens to take an active role in reducing their emissions. ESB Networks has in place a streamlined and free process for customers called "inform and fit" which allows Microgeneration installations of up to 6kW single phase and 11kW three phase to easily progress their installation. In addition, the ESB Networks has this year put the systems in place to allow for electricity suppliers to settle energy payments for microgeneration electricity exported to the grid. There are now over 35,000 such customers registered with ESB Networks and we expect many more to do so in the coming years

- Mini-Generation
  Extensive work is also being undertaken to ensure simple robust processes are in place to enable the adoption of larger scale generation known as Mini-Generation and Small-Scale Generation. On July 1st 2022, ESB Networks re-opened the Mini-Generation Pilot Scheme to accept another 500 applicants in addition to 150 already accepted in the initial pilot scheme launched at the end of 2021 (the same week as the CAP 2021 Annex of Actions was launched, making it among one of the first actions to be delivered). This is in response to the huge level of customer interest and overall positive reaction to the new streamlined Mini-Generation (NC7) connection process. This will continue to enable customers to safely and easily connect renewable generators of up to 50kW to the electricity network.

- Small-Scale Generation
  Under CAP Action 108, ESB Networks will be launching a pilot for Small Scale Generation (SSG) customers installing generation of up to 200kW in September 2022. This includes a simplified application form and a significantly streamlined application process. This pilot will accommodate 100 applications in the first phase and will inform the enduring process solution. These new streamlined processes will ensure that it is now even simpler for our customers who generate their own renewable electricity to export their excess electricity to the local network and therefore play a more active part in connecting Ireland to a clean electric future.

- Smart metering
  Smart meters are the next generation of electricity meters, replacing older analogue & digital meters and deliver many benefits. The National Smart Metering Programme, established by the CRU, tasks ESB Networks with replacing 2.4 million electricity meters by 2025. Since installations began in Autumn 2019, over 900,000 smart meters have already been installed and one million smart meters will be installed by the end of October 2022. Smart Meters will transform how electricity consumption is measured and managed, by providing customers with greater insights into their consumption, which they can use to make better choices about their electricity consumption. They enable electricity suppliers create new smart services and products, such as Time-of-Use tariffs. Customers will therefore have more choice and can choose tariff products that best suit their energy

needs. Smart meters will also enable ESB Networks to find faults more quickly and to manage the network more efficiently.

- Transmission System Development and Innovation
  As transmission asset owner (TAO) we are working closely with transmission system owner (TSO) to increase the efficiency of the delivery of capital works on the transmission system. To achieve this goal a number of specific programs have been developed such as:

  - **Transmission Line Assessment Review** This program accelerates and significantly de-risks overhead line project construction and delivery.
  - **Network Delivery Programme** TSO and TAO programme teams are engaging to develop, manage and share a 'one source' dataset of the full pipeline of transmission capital works up to 2030. With this program TSO and TAO can plan and react to the emerging trends and needs in a more timely and confident manner driven by the 2030 Climate Action Plan and Net Zero by 2050 targets.
  - **Early Engagement Work Group** To allow TSO and TAO to optimise the opportunities and resources available to support projects in PR5, TSO and TAO have set up a working group to identify key pipeline projects that require priority engagement.
  - **The Transmission Outage Programme (TOP) Working Group** Transmission outage planning is very complex and is one of the key challenges in transmission capital works delivery. This working joint TAO/TSO work group is seeking to optimise work programme delivery in a constrained system within the context of security of supply concerns.

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Annex B – Proposed Measures for Inclusion in CAP 2023

The following actions are proposed as critical next steps in enabling Ireland's 20–30% demand side flexibility target. They are underpinned by extensive technical and market analysis undertaken by ESB Networks in 2021 and 2022 when implementing the initial steps of Action 101 in Climate Action Plan 2021, for which ESB Networks is the nominated lead. As the action lead, we are providing proposed next steps below. Further steps may be deemed necessary based on our planned public consultation in September / October 2022 and consultation with the Electricity Working Group established to support the update of the Climate Action Plan 2021.

Action 101: Enable and Incentivize Demand Side Flexibility				
Step	**Output**	**Timeline**	**Lead**	**Key Stakeholders**
Go-live of local flexibility markets in a range of locations nationwide, targeting domestic and commercial customers, and energy communities.	Local flexibility markets	Q4 2023	ESBN	CRU, SEAI, DECC, EirGrid, demand response aggregators, electricity suppliers
The introduction of standard reporting on flexibility market operations, addressing volumes of flexibility products, schemes, participants, bids, and other key market parameters. Critical to building transparency and supporting flexibility market liquidity.	Flexibility market transparency reporting	Q4 2023	ESBN	CRU, EirGrid, DECC,
Extension of 2030 Flexibility Requirements published in January 2022 to introduce innovative new applications of flexibility.	Technical feasibility studies	Q2 2024	ESBN	CRU, EirGrid
Implement initial community / local energy dashboards' providing local, regional, and community-specific information including renewables and electricity carbon intensity.	Go-live of local community dashboards for pilot group of sustainable energy communities	Q3 2023	ESBN	SEAI, CRU, DECC
Pilot standard control and monitoring requirements for consumer energy technologies to be 'flexibility ready' in a range of technical and customer settings.	Technical pilots and technical reporting on feasibility and effectiveness	Q1 2024	ESBN	SEAI, NSAI
Publish first year's findings from national programme of consumer communications based on research relevant to demand side flexibility.	Insights report	Q1 2024	ESBN	SEAI, CRU, DECC

Annex C - ESB Networks Response to Call for Expert Evidence Questions

We have provided responses to the questions we believe are most relevant to ESB Networks. These are largely in the "Electricity" section of the questionnaire, but also from the "Carbon Pricing and Cross-Cutting Issues," "Public Sector Leading by Example" and "Research and Innovation" sections. In addition, in our cover letter to this response, we have provided five key areas that we believe require additional focus and actions in the Climate Action Plan 2023. We remain ready and willing to assist with any element of the Climate Action Plan where our inputs may be required.

1.1 Carbon Pricing and Cross-Cutting Issues

6. Are there any unintended barriers within the planning system that should be addressed at national policy level in order to deliver our climate ambitions?
ESB Networks Response
The development of renewable projects and associated grid infrastructure can be a lengthy process. Addressing planning delays and the consenting process would add renewable generation to the system more quickly. Opportunities should be examined to streamline the timelines for the planning process for such projects, which includes appropriate objections and appeals mechanisms.

1.2 Electricity

11. What options are available to increase the penetration of renewable electricity beyond the up to 80% committed to in Climate Action Plan 2023?

ESB Networks Response

Renewable electricity and electrification are cornerstones of Ireland's climate action strategy and of ESB Networks' strategy. ESB Networks is working with all relevant stakeholders, e.g. DECC, CRU, EirGrid and industry, to put in place the policies, processes, innovative solutions, and capability to connect the 2030 targets for both onshore and offshore renewables to the electricity system. ESB Networks is of the view that, when considering the requirements for renewables beyond the current 80% target for 2030, a holistic view is required across all segments of society to understand where investment is best placed to remove carbon from society.

The challenge now is in achieving the already ambitious 80% target in the timeframe to 2030 to enable the clean use of low carbon technologies. If this is delayed, then a significant amount of carbon will already have been released into the atmosphere.

Significant work is being undertaken by ESB networks to ensure that the electricity network and systems are ready. Some of the challenges and work underway to enable the 80% target are outlined below. Resolving and building on these will be key to delivering 80%, and potentially beyond that.

- One of the main options available to ESB Networks to increase the penetration of renewables onto the network is the introduction of flexible services onto the distribution network. The introduction of 20-30% flexible system demand by 2030 will be crucial for meeting our target of 80% of electricity generated from renewable sources. The technical analysis underpinning this target can be found in 2030 Power Systems Requirements (DOC-230921-GYN).
- In 2021, ESB Networks launched the National Networks Local Connections Programme in collaboration with stakeholders to enable and drive customers active participation in local and system wide services. This programme will play a key part in ensuring efficient use of the network by maximising its utilisation and increasing its resilience and robustness while helping to meet our climate targets for 2030. As part of this programme a number of flexibility "Pilots" are being launched. These are fundamental in determining practical standards and requirements (e.g. communication) for flexible services between now and 2030. Further information on our pilots can be found in our published "Piloting Roadmap (DOC-230921-GYP)".
- Although this is a key aspect of increasing the penetration of renewables to the up to 80% by 2030, there are a number of outstanding requirements for ESB Networks in order for this to be successful:
    - A co-ordination group to deliver and agree these standards in a short-time frame should be developed, where a suitable vehicle does not already exist.
    - ESB Networks require a smart inverter national standard for Electric Vehicle charging and Electric Heat. Without this, ESB Networks cannot leverage DSO "Control Centre of the Future" capabilities and will rely on voluntary incentives.
    - ESB Networks also require legislation to be in place to incorporate DSO provisions for flexible services in a timely manner. This is imperative to enable us to proceed with an enduring solution for pilots beyond 2024.
    - An additional, cross-sectoral and industry co-ordination group is also required for heating transformation.
    - ESB Networks also recognises the importance of end-user tariff design in encouraging domestic "load shifting" behaviour. Although tariff settings must be market led and requires significant supplier engagement, ESB Networks would welcome a role for CRU in monitoring "load shifting" outcomes on a quarterly basis. This would assist with any learnings from our existing pilots, especially those being developed for winter 2022 and associated security of supply issues.

- ESB Networks would welcome investment in energy storage research, development, innovation, and deployment. In particular further research is needed into behind-the-meter storage. We would welcome such research addressing pathways for behind-the-meter storage and EV-to-grid storage. Such research could/should specifically focus on:
  - The technology and architecture requirements to enable behind-the-meter storage
  - The standards for technology in the customer's home for small-scale storage
  - The interoperability, control and utility visibility levels needed
  - The cybersecurity and physical threats (house fires etc.) to behind-the-meter storage

- Procurement challenges need to be overcome. Energy networks are being transformed across the world to meet the needs of the changing energy policy landscape. Given this, Ireland is competing internationally for the same materials and resources and procurement of these will therefore be difficult. This has been exacerbated by Covid-19 and geopolitical factors.
- A national plan is required to address emerging gaps in terms of future technicians and engineers required to meet the challenges in transforming how we power our society in the years ahead.
- It is important that a diversified range of renewable technologies is delivered. This will support security of supply when the weather is not suitable to provide the required quantities from any one technology.

12. What can be done to accelerate/facilitate the delivery/deployment of offshore wind and solar PV in particular, in the context of Climate Action Plan 2021 and the REPowerEU ambition?

ESB Networks Response

Climate Action Plan revised the 2030 RES-E target from 70% to 80%. In addition, there has been a significant increase in renewable targets following the final agreement on Government sectoral targets. This includes more than doubling the solar target to 5,500 MW and offshore wind increasing from 5,000 MW to 7,000 MW. The accommodation of this additional generation on the electricity systems (both Distribution and Transmission) will be critical to the delivery of our targets. Below we have outlined some key areas to be addressed:

- Long term planning and scenario assessment beyond 2030 is essential for the reconfiguration of the network and creating the necessary infrastructure that will enable and deliver the combined 2050 Net Zero ambition and support the decarbonisation of Irish society.
- It is essential that consenting/wayleave and planning permission issues that restrict the rate at which new networks can be built to connect generation to the grid are speeded up to allow this.
- It is crucial that there is an increasing and steady drumbeat of renewable projects such that every year between now and 2030 is utilised to the fullest extent possible. The carbon budgets and sectoral emissions ceilings which have been agreed by Government strengthen this need further. Renewable energy auctions will need to be structured such that capacity is brought on in the frequency and at the scale needed from the early years, (and it is important to ensure that projects do not fall away after they are successful in the RESS auctions). If this does not happen it will be difficult to make up the difference in the latter half of the decade. Close alignment between the timing of government RESS auctions and regulated connection policy will be important so there is a steady flow of contracted projects bidding into a competitive RESS auction process. Delivery of grid connections for projects with Corporate Power Purchase Agreements and projects successful in Capacity Auctions in a timely manner will also be important to meeting CAP targets.
- ESB Networks plays a key role in the delivery of offshore wind through building the required deep reinforcement onshore. We will work with all stakeholders to deliver this reinforcement which will allow energy from renewables to be transported and used in the demand centres. This will be a key area of focus in the coming years as more offshore projects come to fruition. Consideration should be given how infrastructure

investment now can be enabled to facilitate not only the 2030 targets but also the end goal of Net Zero by 2050.

ESB Networks is already proactively investing in the infrastructure and new processes to enable the development of renewable generation, including a significant increase in solar generation of all sizes. The following are examples of this, with further information in Annex A of this response. ESB Networks has a strong tradition of innovation and will always deploy better ways of delivering when potential improvements are identified and proven.

- Under the Enduring Connection Policy (ECP) process, ESB Networks is processing ~85 grid applications every year. These applications are a combination of commercial solar projects, community projects and auto-producers customers installing renewable generation to reduce their dependency on fossil fuels.
- ESB Networks has developed a modular substation solution for MV projects which will facilitate faster connection timelines for Solar PV projects.
- In 2022, ESB Networks progressed a pilot MV Compact EV Charging Hub Module substation.
- We have introduced a Lean Connections Project which identifies improvements and introduces efficiencies to the delivery of major infrastructure projects while improving our customer's experience. Further innovations to enable more renewables include:
    - A dedicated single point of contact through the delivery phase
    - An option to reduce Maximum Export Capacity through customer engagement process pre offer/connection assessment issuance, thus maximising the number of projects who accept their grid connection offer and proceed to connection

13. What role does renewable gas have in the power generation sector?

ESB Networks Response

Renewable gas

Whilst the conventional generation mix is not part of ESB Networks' remit as the regulated DSO, we believe that, from a network perspective, using the existing connection points where possible for renewable gas generation would best utilise existing assets, ensure speed of connection and thus maximise the opportunity for renewable gas to contribute to the decarbonisation targets in the timeframe necessary.

Hydrogen

Hydrogen may have an important role in future for storing excess wind generation. And may in future provide longer term storage needs for the electricity system. Electrolysis is a promising option for carbon-free hydrogen production from renewable resources. Large scale electrolysis facilities connected directly to the electrical network are large energy intensive point loads. Capacity headroom to supply these facilities on existing electrical networks are finite and generally require deep reinforcement works to enable the electrolysis facilities. Large point loads are challenging to plan for, and the creation of capacity headroom can take years to develop. Early information about the development of such facilities is critical to facilitate the timely development of the associated electrical infrastructure.

15. What other opportunities exist to support the decarbonisation of the electricity sector?

ESB Networks Response

- Much of the emphasis to date has been on connecting increasing levels of renewable generation, and huge progress has been made with Ireland now a world leader in this area. It is appropriate that a strong focus remains on this to allow the electricity sector to meet its targets. However, to extract the maximum benefit, this clean electricity should be used to deliver carbon savings from other sectors through increased electrification and adoption of associated low carbon technologies. This should be the focus of specific actions in the new Climate Action Plan.
- Influencing consumer behaviour through incentives and communication campaigns will be key in the coming years to increase low carbon technology uptake at the rate required to have a meaningful impact by 2030. It is essential that all customers understand the benefits of these technologies for them, their communities and global climate change. This will build on the successes of the previous Climate Action Plans and aligns with the 'harnessing the citizen and community effort' and 'adoption of known technologies' aspects of the 2023 framework.
- The new Zero Emission Vehicles Ireland (ZEVI) office will have a key role in bringing all transport stakeholders together and we look forward to working with them as the change to electrification accelerates. We would advocate for a similar approach for heat: an agency that can look across the full spectrum of activities required to deliver the plan and assist with removing barriers and set clear policy and regulation which can be delivered quickly. This would build upon the SEAI's National Heat Study, which identifies efficient pathways for low carbon heating in Ireland. We believe that the standards requirements developed under existing CAP Action 101, led by ESB Networks, should be adopted at a national level to ensure that devices being installed now, such as heat pumps and electric vehicle chargers, have the necessary smart inverters and standardised communications to enable flexibility at a local level.
- ESB Networks will publish our revised strategy to 2030 by the end of the year, which will, inter alia, enable the delivery of the Climate Action Plan and Project Ireland 2040. Our strategy is focused on the transition to a low carbon society.
- ESB Networks is now delivering the technologies and processes which will enable more decarbonisation across society and the electricity system. It is essential that consideration is given to how we maximise the use of these technologies in the revised Climate Action Plan for 2023. These activities include:
  - Through the National Networks, Local Connections Programme, ESB Networks is establishing the new products, services and market arrangements for flexibility mandated in the Clean Energy Package and needed to enable Ireland's Climate Action target for 20 – 30% of demand to be flexible. Achieving this ambitious target will rely on distribution-connected resources (individual or aggregated demand, distributed generation and storage) being empowered to participate in new local flexibility markets, as well as in the SEM and DS3 system services. Further information on the market based flexibility products and service for these that will assist in the decarbonisation of the electricity sector can be found in our "Phased Flexibility Market Development Plan (DOC-230921-GYU)"
    To do this, throughout 2021 and 2022, we have invested heavily in a programme addressing the full range of technological, market design, behavioural and engineering challenges which must be addressed to achieve this that provides simplicity and certainty for customers and service providers. The first local flexibility markets are due go live in October 2022, in a range of locations across the country. We believe that the standards requirements developed under this action, should be adopted at a national level to ensure that devices being installed now, such as heat pumps and electric vehicle chargers, have the necessary smart inverters and standardised communications to enable flexibility at a local level.
  - ESB Networks recognise that enabling an increased penetration of microgeneration and other small-scale generation is an important target of the CAP and also that it plays a key role in enabling citizens in taking an active role in a decarbonised energy landscape. We believe that these technologies, if supported adequately, will have a positive impact on the decarbonisation of the electricity system. We have outlined in more detail our role in enabling these technologies in Annex A.
  - ESB Networks is engaged in a review of distribution network tariffs, commenced by the CRU. Distribution network tariffs have the potential to support decarbonisation in the electricity sector by sending price

signals to customers which reflect the costs of building, operating & maintaining the distribution network. Network tariffs may incentivise customers to make more efficient use of the distribution system, which could facilitate a reduction in peak demand and potentially an associated reduction in infrastructure investment. One of main objectives of the review is to deliver network tariff structures that are fit for purpose and will help to facilitate a low carbon future.

- Smart meters will support Ireland's transition to a low carbon future by enabling the development of smart grids, and supporting the electrification of heat and transport, local renewable generation, and microgeneration. ESB Networks is leading the roll out of smart meters through the National Smart Metering Programme, which will see 2.4 million electricity meters replaced by 2025. Since installations begin in Autumn 2019, over 900,000 smart meters have already been installed and one million smart meters will be installed by the end of October 2022.

16. What measures might be taken to improve the resilience of the electricity system to the impacts of climate change?

ESB Networks Response

As our climate continues to change, ESB Networks is committed to investing in our network to make it more resilient to the changing weather patterns and more intense storms that Ireland has seen over recent years. We must also ensure that our network is resilient enough to support our customers who will be using more electricity as they electrify heat and transport in their personal lives to support Ireland's journey towards a clean energy system. ESB Networks will continue to build and maintain our network to high standards, in addition to investing in more monitoring and sensing technology to provide us with detailed data about the performance of our assets.

ESB Networks is already taking steps to ensure our network is adaptable and resilient to the increasing impacts of climate change such as more frequent flood events, increased severity and frequency of storms and the impact of increased temperatures on our network operation.

- As part of a proactive approach, we consider and avail of any opportunity to enable our customers for Low Carbon Technologies (LCT) whilst carrying out other extensive works on the Low Voltage (LV) network. For example, when connecting a new customer, as part of the design we not only ensure that the new customer has capacity to be able to adapt and use LCT, but also that any other customer connected to that same subsection of LV network is similarly enabled for LCT.
- We are actively renewing our design standards to ensure that the Government CAP targets for 2030 are achieved, but with a futureproofing mindset we are at the same time considering the needs of the system out to 2050, when we expect that there will be almost 100% penetration of electrified heat and transport in Ireland. This will ensure prudent and optimal investment in the next number of years towards 2030, where the trajectory of LCT uptake levels remains unknown, and indeed other future technological changes and consideration may yet also come to the fore.
- Adaptation measures that have already been implemented on our Low Voltage (LV) network have proved effective in the recent flooding in 2022. Specific LV Mini-pillar sites, which connect our customer service cables to our main LV network, were redesigned at flood prone locations to elevate the LV connection points above water levels during flood events. We have also redesigned our LV network in other towns where severe flooding has occurred such as Athlone and Galway.
- We are revising our designs to provide increased climate-breakdown adaptability and resilience for assets such as HV stations (specifically flooding mitigations) and overhead lines.

As the energy transition accelerates between now and 2030, ESB networks will also ensure network stability and resilience by deploying measures such as:

- Continue to implement our National Networks, Local Connections Programme (NN,LC) project to enhance our operational control systems

- Distributed energy resources
- Smart meters which will assist with issue identification on the network
- Greater use of Digital and ICT technologies
- Adopt analytics and control capabilities to enable a transition to self-healing network capabilities, by moving towards adaptive, centralised automation

Cybersecurity

The 'electricity system' should not be thought about as being just the infrastructure in the electricity grid, overhead/underground wires, substations etc. When reference is made to 'improving the resilience of the electricity system' supporting IT systems and industry processes must also be considered. These IT systems and processes serve the retail and wholesale markets well, are resilient but are complex given the nature and requirements of the electricity industry.

In this regard, ESB Networks continues to develop innovative solutions to support the decarbonisation of the energy sector. These solutions include a new private communications network which will enhance the security and reliability of the electricity network. In addition, the private network will enable further integration of renewable generation and the roll-out of customer projects including the NN,LC programme. ESB Networks remains open to exploring how this technology can also benefit other utilities to improve resilience nationally.

17. What role do you see for electricity storage and demand-side response in providing flexibility to a system comprised of high renewable penetration and in supporting the decarbonisation of the electricity sector?

ESB Networks Response

Demand side management

Demand side management has an important role to play in the Irish electricity market by enhancing security of supply and providing significant benefits to both the Distribution System and the Transmission System and will be essential for:

- Local system management, to be able to securely connect electrification and renewables in a timely manner. And to reduce the constraint of renewable generation (thus reduce CO_2/kWh at a local level);
- Transmission/SEM system services, to maintain a secure system with adequate balance and reserve;
- Reducing CO_2/kWh at a system level, by allowing for price - or carbon - following consumption, where possible, by storage-like demand technologies (e.g. EV batteries, domestic/commercial batteries, some portion of heating and cooling)

By introducing demand side response services and utilising electricity storage as an alternative to reinforcing the network it may be possible to reduce cost and time to connect a new customer or improve the reliability for existing customers. This will assist us in improving reliability for existing customers and allow us to connect new customers more quickly and cost effectively.

As outlined elsewhere in this document, in our role as DSO, ESB Networks is establishing the new products, services and market arrangements needed to enable Ireland's Climate Action target for 20 – 30% of demand to be flexible. Achieving this ambitious target will rely on distribution-connected resources (individual or aggregated demand, distributed generation and storage) being empowered to participate in new local flexibility markets, as well as in the SEM and DS3 system services. To do this, throughout 2021 and 2022, we have invested heavily in a programme addressing the full range of technological, market design, behavioural and engineering challenges which must be addressed to achieve this that provides simplicity and certainty for customers and service providers.

Due to the importance of demand side response in supporting decarbonisation, the first two flexibility pilots of the NN,LC Programme are focused heavily on demand side response. These are due to go-live in October 2022 and H1 2023, respectively. These both relate to industrial and commercial demand side response for either the local/DSO market or the TSO market. Learnings from these pilots will be key in developing long-term policies for demand side response.

Demand side response will also play a key role in the security of supply issues in winter 2022, 2023 and 2024. ESB Networks have introduced two demand side response campaigns – "beat the peak commercial" and "beat the peak domestic" to reduce electricity demand at peak periods.

In Annex B, we provide for consideration the proposed next steps for Action 101, which we consider critical in enabling Ireland's climate action targets. These are underpinned by our technical analysis and design activities implementing Action 101 throughout 2021 and 2022

Storage

Electricity storage will also be important in terms of ensuring greater flexibility for electricity system operators. ESB Networks believe that there are a number of areas which require consideration:

- Currently, there is no mechanism in the retail electricity market to treat battery storage differently to other generators. Therefore, it is vital that any required regulatory policy and market design changes are forthcoming to facilitate greater levels of battery storage and sufficient time allowed to implement these changes in the retail electricity market. For any changes envisaged for ESB Networks or the retail electricity market, the earlier we are involved in the process, the greater our ability to provide effective solutions and efficient implementation timelines.
- It would be worthwhile considering how to encourage community small scale renewable generation projects to integrate battery storage projects in order to reduce their impact on network capacity and avoid expensive reinforcement works, making them more feasible. Such projects could also be valuable to ESB Networks to understand their benefit to the electricity system and society.
- Locational signals are important to ensure that the deployment of future storage projects delivers value both to the investor and the system. The need to maximise the co-locational complementarities of storage and renewable generation (with a focus on charging the storage from renewable energy that might otherwise by constrained or curtailed).
  Furthermore, ESB Networks suggest that consideration should be given to the benefits of storage in aiding large EV charging hubs. Such charging hub installations are becoming more common across the UK and EU, with a significant ramp up of large 1-5MW "hubs" in the coming years to meet EV charging demand (and in compliance with the proposed Alternative Fuels Infrastructure Regulation). These installations could be co-located with batteries, further leveraging the network infrastructure put in place (and introducing the potential to deliver system or flexibility services)

18. What financial incentives are needed to increase renewable generation capacity?

ESB Networks Response

We have not commented on what financial incentives are needed to increase renewable generation capacity. However, as already outlined previously in our response, we would encourage measures in the planning and consenting system to ensure that renewable generation projects, including associated grid infrastructure are brought through the process as quickly as possible.

18b. What financial incentives are needed to incentivise microgeneration?
ESB Networks Response
ESB Networks implemented an interim solution in the retail electricity market in June 2022 to facilitate introduction of the 'Interim Clean Export Guarantee' tariff which will allow those renewable self-consumers to be remunerated by their electricity supplier for generation exported back to the network. ESB Networks understands that the 'Interim Clean Export Guarantee' will also be supplemented by the introduction of a 'Clean Export Premium' (subject to a final policy decision and an implementation plan) to further incentivise take up of Mini-generation. ESB Networks would welcome detailed projections by DECC in the updated CAP 2023 should any further incentives be introduced which will assist ESB Networks and the retail market to manage the demands on the interim solution. Any new incentives for microgeneration should be cognisant of new regulatory policy on an enduring microgeneration solution in the retail market which ESB Networks understands is due to be consulted on by CRU by December 2022. It is important therefore that any new policy likely to result in changes to the retail electricity market design is done in a coordinated manner and sufficient time allowed to agree and implement changes to retail market design.

19. What are the regulatory challenges for reaching the renewable energy share targets?
ESB Networks Response
In order to facilitate the changes required in the retail electricity market being driven by our overall national energy targets, it is important that planning for these changes is done in a transparent and cohesive manner through open engagement with all stakeholders in the retail electricity market. ESB Networks strongly supports delivery of changes in a sequential manner (regulatory policy, market design and implementation) which is the optimum approach in the retail electricity market. It is also recommended that regulatory policy be designed in such a way as to encourage pragmatic and straightforward changes as opposed to regulatory policy which may lead to overly complex changes to retail market design.

1.3 Public Sector Leading by Example

73. What opportunities exist for the public sector to step up its climate ambition?
ESB Networks Response
ESB Networks is committed to leading in the energy transition. In addition to playing a crucial role in enabling Ireland to meet its net zero goal, ESB Networks as a business is also committed to removing carbon from our own activities, and it is on the journey to being a net zero company by 2040. One of the key areas we are looking to involve the public sector as part of our flexibility services is the introduction of a domestic behavioural peak demand reduction scheme – "Beat the Peak - Commercial Pledged Scheme." This scheme will be open to participation to any commercial, semi-state and public sector entity who is willing to "pledge" actions to reduce their electricity demand at peak periods of electricity demand. As the programme becomes more established, the public sector will have a more active role in the electricity they use, assisting in rapid electrification of transport and heat between now and 2030. There are many internal initiatives underway including the replacement of our fleet vehicles, where it is suitable to do so, with electric vehicles. It is our intention to accelerate this process in the coming years. In addition, we are evaluating the potential of other alternative fuels to decarbonise our heavier vehicles as those technologies mature. We are undertaking the retrofit of our buildings to improve their efficiency and incorporate more renewable technologies. As ESB Networks and other semi state and public bodies learn from these types of initiatives there is an opportunity to act as exemplars to demonstrate how energy savings can be incorporated into existing infrastructure and what technologies are most suitable for the replacement of fossil fuel equipment and vehicles.

74. How can the public sector lead wider society to change? In the short-term, medium/term, long-term?
ESB Networks Response
ESB Networks recommends that a greater emphasis on communication and engagement of the energy citizen be considered as part of the updates to CAP 2023. It is important that consumers have access to clear and simple information to assist with navigating the various services, products, etc. in the electricity market which may assist them on their decarbonisation journey.

1.4 Research and Innovation

91. Are the required research and innovation programmes and structures in place to support our climate ambitions; including the provision of the evidence needed to underpin policy in a timely manner?
ESB Networks Response
ESB Networks has developed an agile innovation programme to develop the network to deliver on the climate action targets. We acknowledge that the challenges posed by the transition to a low-carbon economy are substantial, and a collaborative approach to addressing these challenges is essential. ESB Networks' Dingle Project provided insights and learnings to help inform policy. For example, the year-long electric vehicle trial showed that recent model electric vehicles, when coupled with home EV charging solutions are a very good fit for people living in rural communities. Similarly, the model for community engagement on low carbon energy transition, developed in Dingle, may have elements that are workable for other communities. Awareness and education are a key part of flexibility pilots being developed as part of the NN,LC programme. ESB Networks are continuing to increase our collaboration with research vehicles such as SEAI and universities to research the best available tools to introduce these pilots. As part of our ongoing research, we have worked with SEAI on behavioural studies on demand response to assist with pilots focused on domestic customers as well as our pilot of early access to Community Projects in the renewable space.

92. Are there important areas of research and innovation, where Ireland currently does not have sufficient capability, that need to be developed? If so, what are these areas?
ESB Networks Response
Although there is already capability in place, to reach the required target of 80% renewables of electricity on the network will require more capacity in key areas, such as maximization of renewable energy by improved real time system assessment capabilities allowing optimized management of curtailment and constraint. Another key area of research which will assist us in the development of our pilots for domestic customers is research focused on human factors and behaviour. Similar to above, there is a significant amount of capability in this area, more could be done to increase this level of research.

93. Is the research and innovation system developing and retaining the skills needed to deliver on our climate ambitions?
ESB Networks Response
In conjunction with competition for talent there is currently a skills and resource deficit challenge across the energy sector to continue to develop and implement the solutions at scale to deliver our climate ambitions. There is a need to continue to invest in the research and innovation systems across the energy ecosystem and continued investment in the wide-ranging skills and talent needed to deliver on our climate ambitions.