



NETWORKS

# ENVIRONMENTAL PERFORMANCE REPORT 2022

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# 1

## EXECUTIVE SUMMARY



# Executive Summary

Welcome to ESB Networks' Annual Environmental Performance Report, 2022. In this report you will find information on the environmental and sustainability aspects of our business.

**Our Networks for Net Zero Strategy sets out ESB Networks' role in enabling the delivery of the government's Climate Action Plan and supports the decarbonisation of the electricity system by 2040. It is based on our role in transforming the electricity distribution network to empower customers to decarbonise their energy consumption, and in our role as Transmission Asset Owner in delivering the ambitious electricity transmission programme.**

2022 was a record year for the Renewables Team of ESB Networks, having connected more renewables to the network than ever before. 688 MW of Wind, Solar and Combined Heat and Power were connected. At year end, ESB Networks had enabled the connection of a total of 5,378 MW of renewable energy. The majority of this capacity is from 4,621 MW of wind energy generation and 361 MW of grid scale solar, with the remaining capacity coming from other renewable sources. Of the 5,378 MW connected to date, 2,529 MW are connected at Distribution (DSO) level and 2,849 MW are connected at Transmission (TSO) level.

Phase Two of the National Network, Local Connections Plan was launched in 2022 following regulatory approval from the Commission for Regulation of Utilities (CRU) with design activities progressing alongside the development, testing and deployment of the first demand side flexibility pilot, which was planned and delivered in Q4 2022.

ESB Networks launched 'Beat the Peak' (BTP) in Q4 2022, which is an umbrella initiative comprised of targeted

measures to help both domestic and commercial customers take control of their electricity use and reduce electricity demand at times of peak events.

During 2022, ESB Networks continued the replacement of over 2.4 million electricity meters, in homes, farms and businesses, with next generation smart meters to support the transition to a low carbon electricity network. 482,000 smart meters were installed in 2022 by almost 400 installers across the country. The programme also reached a significant milestone of 1 million smart meter installs in October 2022.

ESB Networks' Dingle Project concluded in early 2022. The electric vehicle trial clearly demonstrated that modern electric vehicles, when coupled with home EV-charging solutions, are very suitable for people living in remote rural communities. The flexibility trial demonstrated the potential for clean energy enabling technologies, installed at residential and small business properties, to be optimised and controlled so as to provide support services to the local electricity network.

In 2022, ESB Networks' electricity and gas usage in buildings and our vehicle fleet consumption declined in comparison to 2021. Our overall carbon footprint increased due to various factors, such as the increasing carbon intensity of electricity.

During 2022, ESB Networks continued to manage a number of environmental compliance issues as detailed later in this report.



ESB Networks' Environmental Management System (EMS) retained its external certification to the ISO 14001 Standard, following a recertification audit in 2022.

As part of our commitment to ensuring open and transparent reporting of our performance, we expanded and improved the [Environmental and Sustainability section](#) of our website during 2022.

During 2022, ESB Networks continued to effectively manage the environmental and sustainability aspects of our business.

**John Tuohy**  
Environmental Manager, ESB Networks



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## INTRODUCTION



## Introduction

ESB is the owner of the electricity transmission and distribution systems in Ireland. It has been granted a Transmission System Owner (also known as Transmission Asset Owner or “TAO”) licence and the Distribution System Owner Licence (also known as Distribution Asset Owner or “DAO”) by the Commission for the Regulation of Utilities (“CRU”) under the Electricity Regulation Act 1999. ESB Networks DAC, a subsidiary of ESB, is the licensed Distribution System Operator or DSO.

In accordance with arrangements approved by the CRU, the three ESB Group licensed network functions are carried out by staff in a strictly ring-fenced business unit of ESB (known as “ESB Networks”), under the direction and management of the Board of ESB Networks DAC. For ease of reference, in this document, the three network licensed functions of TAO, DAO and DSO are collectively referred to as ESB Networks.

ESB Networks has a number of licence obligations relating to the environment contained in the Distribution System Operator (DSO) licence and the Transmission Asset Owner (TAO) licence.

Condition 30 of the DSO licence and condition 22 of the TAO licence require the respective licence holders to:

- › **Comply with all current and future European Union and Irish Environmental Laws, as well as directions by the CRU in respect of its duties relating to the Environment.**
- › **Maintain an Environmental Policy setting out how it will comply with its duties and obligations under these laws and directions.**
- › **Report annually to the CRU on its environmental performance.**

This report has been prepared by ESB Networks on behalf of the DSO and TAO for the year ending December 2022.

In July 2020 ESB Networks DAC was served with notice of a prosecution by the Environmental Prosecution

Agency (EPA) in relation to fluorinated greenhouse gases (SF6). This prosecution was progressed during 2022. Further information is detailed later in this report.

In 2022, ten requests for information under the European Communities (Access to Information on the Environment) Regulations 2007 – 2018 were received and decisions issued by ESB Networks. Of these ten decisions, one was appealed to the Commissioner for Environmental Information. ESB Networks has dedicated staff involved in the management of these requests to ensure all requests are responded to within the statutory timelines.





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## ESB NETWORKS - WHO WE ARE



## ESB Networks - Who we are

ESB Networks provides the electricity infrastructure that transports electricity to all customers in Ireland through both the distribution and the transmission systems. We have served Irish customers for over 90 years and have provided the electrical infrastructure on which our society has developed.

ESB Networks works to meet the needs of all Irish electricity customers, providing universal affordable access to the electricity system and delivering and managing the performance of a system of almost 157,000 km of overhead networks, 26,000 km of underground cables, over 800 high voltage substations, significant amounts of connected generation (including renewable generation connected to the distribution and transmission systems) and 2.4 million demand customers.

We carry out all the functions relating to the electricity distribution system.

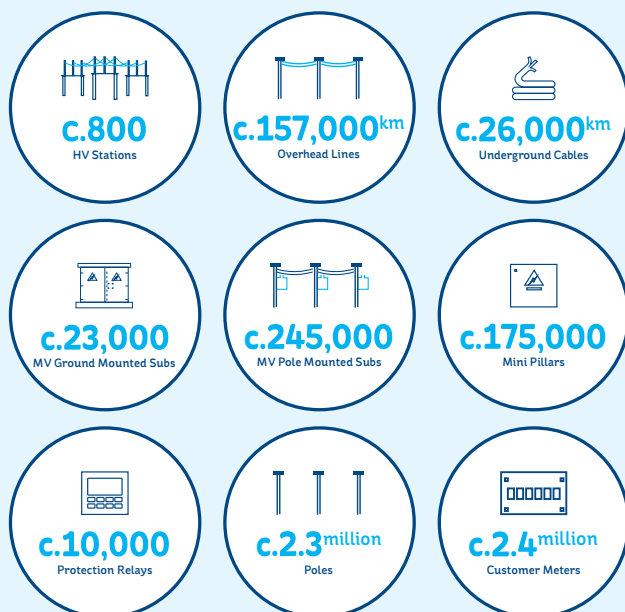
This includes asset management, planning, construction, maintenance, and operation of the high, medium, and low voltage distribution networks. We also deliver a range of services to the Republic of Ireland (RoI) Retail Electricity Market servicing over 2.4 million customers. We manage relationships with market participants and provide data in a timely and accurate fashion on a daily basis. ESB Networks supports the wider Irish market through the ring-fenced Meter Registration System Operator (MRSO) and Retail Market Design Service (RMDS) and supports the wholesale

Single Electricity Market through the provision of aggregated meter data.

ESB Networks build and maintain the high voltage transmission system. By the end of 2022, ESB Networks had facilitated the connection of over 5.37 GW of renewable energy generation to the distribution and transmission systems.

ESB Networks place customer service at the centre of our operations, providing services to all electricity customers regardless of their supplier. Our staff throughout the country strive for excellence in all interactions with customers, while also supporting them in participating in the energy market and transitioning towards low carbon technologies.

### Our Network





## Our Values

### WE'RE COURAGEOUS

Each of us is prepared to challenge the way we've always done things, stand up for what we feel is right and try better ways of working.

### WE'RE CARING

We're putting customers' current and future needs at the heart of what we do and we keep ourselves and others safe and healthy.

### WE'RE DRIVEN

We bring passion and persistence to what we do every day, innovating and collaborating to meet the challenges and opportunities ahead.

### WE'RE TRUSTED

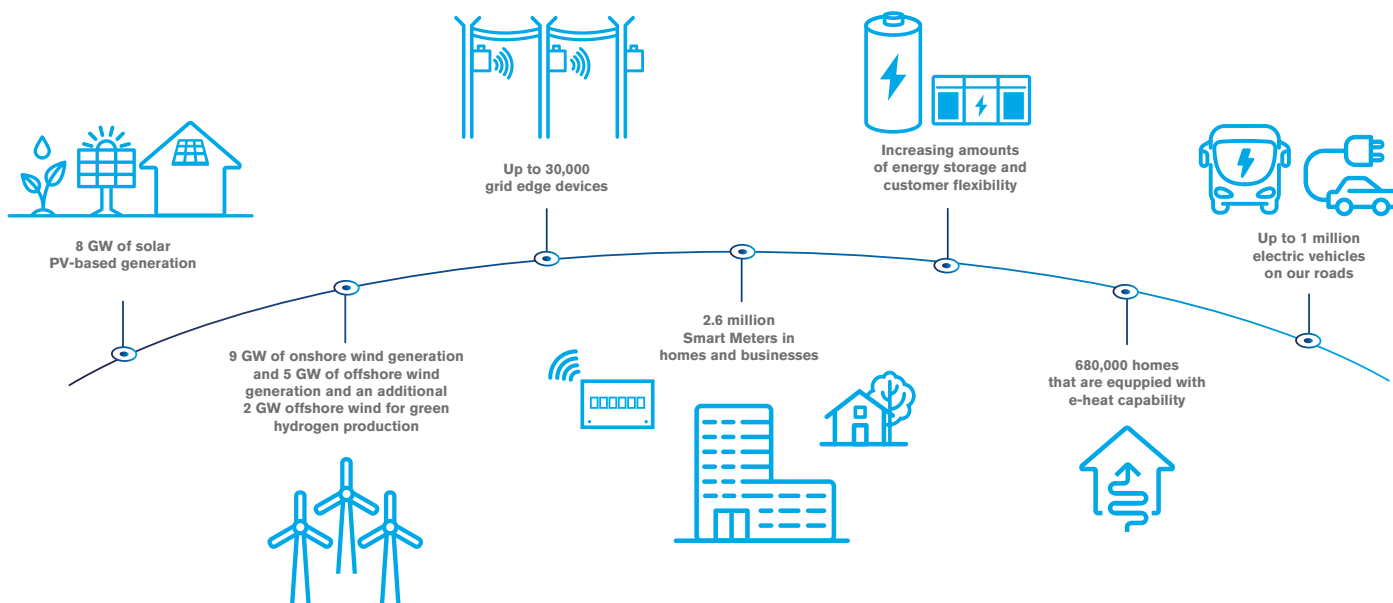
We each play our part, taking ownership of our responsibilities, seeing the job through and protecting our own health and safety, as well as others'.

As part of our commitment to a low carbon future, ESB Networks will lead the way in electrifying heat and transportation. We will work to develop and innovate our networks to support this goal, which is crucial to our future success in the changing and uncertain environment of the energy sector. By identifying innovative opportunities, we aim to support significant changes in electricity generation and consumption by 2030.

To ensure that our day-to-day activities are managed sustainably, the ESB Networks Environmental team and senior leadership provide support to various groups and teams across the business with environmental responsibilities. We draw on specialist knowledge from key areas such as electricity, procurement, environment, and construction to achieve this enduring role.



ESB Networks' vision for our network by 2030 is seen below:



## Networks for Net Zero Strategy

Our Networks for Net Zero Strategy outlines ESB Networks' role in facilitating the implementation of the Irish government's Climate Action Plan 2023, with a view to achieving Ireland's net zero target by 2050. The Strategy aims to develop a flexible and intelligent digital electricity network that will serve as a foundation for a clean electric future in Ireland by 2040.

Our Strategy is based on our role in transforming the electricity distribution network to empower customers to decarbonise their energy consumption, and in our role as onshore Transmission Asset Owner in delivering the electricity transmission programme. As we implement this Strategy, we will ensure that we have a safe, reliable, and efficient network with the required

capacity, flexibility, and resilience for the electricity system for 2040.

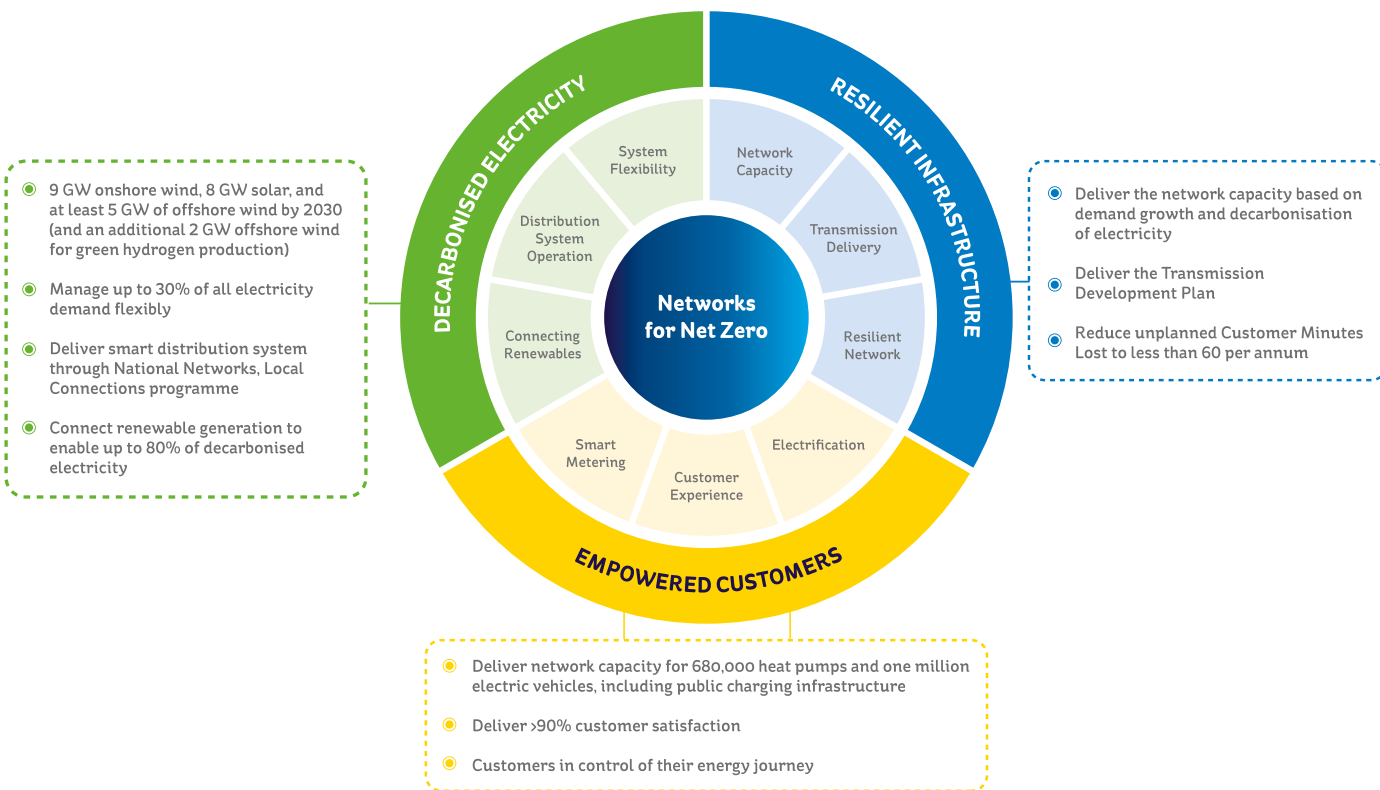
Our customers will continue to have access to a secure and reliable energy source and will also benefit from new opportunities for self-generation and storage, demand management, energy efficiency, and selling electricity back to the network.

We are also committed to becoming a Net Zero Business by 2040, by examining all aspects of our operations, including procurement, fleet management, waste management, and facility upgrades, through a sustainability lens. We recognise that the pace of change is accelerating and are adapting our business processes, systems, and work practices to anticipate future network requirements.





ESB Networks' targets for 2030 are:



## ESB Networks' Internal Environmental Strategy - 2021 to 2025

We continued to roll out ESB Networks' internal Environmental Strategy – 2021 to 2025 across Networks during 2022. This strategy is based on five commitments as they relate to the environment.

From an Environmental perspective this means having environmentally responsible People who: work in an environmentally friendly Workplace (including Asset integrity); use environmentally compliant Tools, Equipment, Vehicles, and Machinery; and adopt documented Systems of Work which place an emphasis on the environment and where environmentally responsible behaviours are the norm.

In 2022, ESB Networks continued to focus on achieving the objectives of this Strategy, which were developed by a cross section of ESB Networks' staff. Some key achievements include environmental awareness training and monthly core briefs that have been rolled out to all staff in ESB Networks. Targeted internal systems of work were updated to ensure environmental consideration is included at key stages of work by our staff and our contractors. These achievements have raised awareness of environmental aspects of ESB Networks' roles.

The strategy is based on the following 5 commitments as these relate to Environment

People

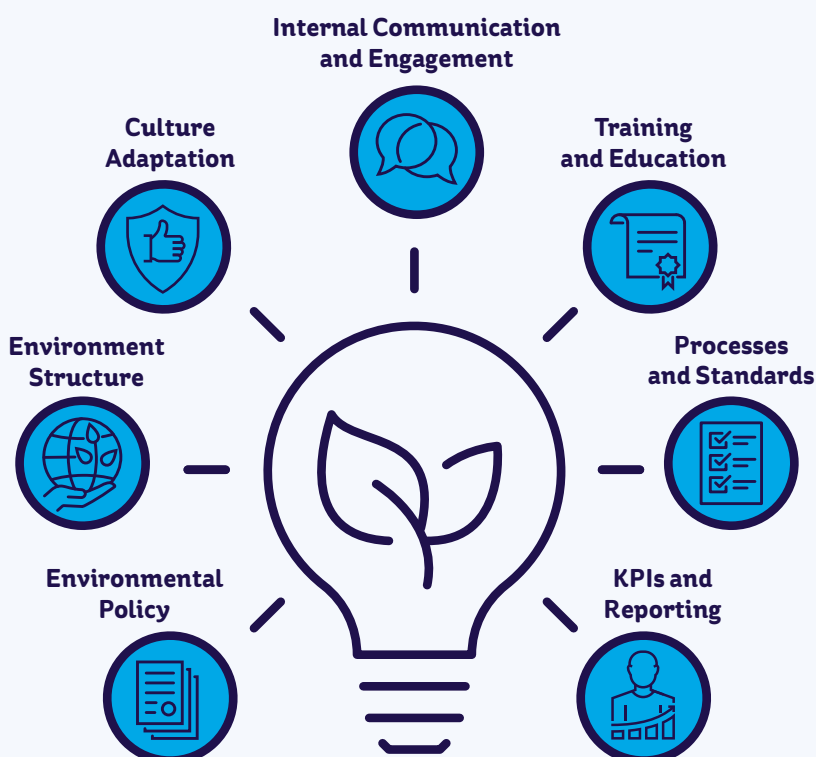
Workplace

Tools  
Equipment  
Vehicles  
Machinery

Systems  
of Work

Behaviours

### Environmental Strategy Seven Strategic Enabling Priorities





## Stakeholder Engagement

Engagement with our external stakeholders is integral to our day-to-day operations and is at the heart of everything we do at ESB Networks.

Our stakeholders are the individuals, groups of individuals, communities or organisations that affect (or could be affected by) our activities, products or services, and associated performance. Given our central role in the electricity industry in connecting over 2.4 million homes, farms, communities, and businesses around the country, we have a very broad range of stakeholders.

### Why We Engage

Engaging with our customers and stakeholders is crucial to how we shape the future of our business and the electricity network. It helps us develop new initiatives which benefit the communities and industries we serve, as well as improving and enhancing existing ones. It shapes our business planning and strategic priorities and informs the decision-making process. Engagement with wider industry accelerates innovation within the business and the energy sector through shared learnings and ideas.

Good engagement benefits our customers, stakeholders, the wider community, and our business. When we engage with each other in a genuine two-way conversation, we can learn from each other, enabling us to make better decisions and work towards mutually beneficial outcomes. Ultimately, better engagement builds stronger relationships and gives us greater opportunities to achieve our



business objectives. The earlier we engage with each other, the more likely these benefits will be realised. For our customers and stakeholders, engagement provides opportunities to contribute to projects and programmes, have their issues heard and inform the decision-making process. It gives these groups better understanding of our priorities, increased ownership of outcomes, and greater capacity to engage in how energy will be used in the future. For ESB Networks, engagement provides insights by understanding changing priorities,

tapping into specialist or local knowledge, and gives us the opportunity to 'road-test' proposals or initiatives with stakeholders. It helps us identify emerging issues and risks and is central to us meeting our statutory obligations and better meeting customer needs.

## Our Engagement Performance in 2022

We have increased our engagement activities more than ever before, recognising the importance of stakeholders' contributions to the successful delivery of our business planning and ensuring it aligns with the needs of our customers and stakeholders in an ever-changing landscape.

In January 2022, we published our 'Stakeholder Engagement Strategy and Plan for 2022', which gave an overview of our key areas of engagement focus for 2022 and provided details of key planned engagement initiatives for the year.

Our most recent report [ESB Networks Stakeholder Engagement Report 2022](#) provides an overview of how we have delivered against our plan for 2022.

For instance, in relation to our environmental priorities for 2022, we recognise that our activities have environmental impacts and that we have a responsibility to manage these impacts in a manner that provides a high level of protection for the natural environment, while also contributing to the sustainable development of our economy.

In 2022 we engaged with relevant stakeholder groups including the Local Authorities, EPA, Waterways Ireland,

Inland Fisheries, and National Parks & Wildlife Services. We continued to enhance the 'Climate Action, Sustainability and the Environment' section of our website to ensure that ESB Networks is open and transparent in communicating its environmental performance.

The environmental webpages received approximately 2,400 views in 2022. We reported to the CRU on our Environmental Performance and published our Annual Environmental Performance report on our website, demonstrating our commitment to transparency. We achieved recertification of our ISO 14001 Environmental Management System and a number of working groups were established with external stakeholders.





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# DELIVERING A LOW CARBON FUTURE



## ESB Networks and the Climate Action Plan

The electricity system is at the centre of the transition to a low carbon energy society and ESB Networks is fully committed to delivering on our leading role in this transformation.

Acknowledging the vital role that electricity plays in climate action, our purpose has evolved to deliver a clean electric future through the electrification of heat, transport, and industry, as well as connecting renewable generation at scale to the electricity network. Delivering this is going to require a challenging transformation of our network, our systems, and our approach. The sustainable social and economic development of communities, businesses, Ireland's climate action response, and transition to net zero are all dependent on ESB Networks delivering our purpose through to 2030 and beyond.

The distribution system is evolving to become a low carbon energy system where 80% of the electricity generated in Ireland will come from renewable sources by 2030. The electrification of heat, transport, and our economy will see our customers adopting low carbon technologies such as heat pumps, electric vehicles, and Micro-Generation such as solar PV. To enable this, the role of the DSO is changing and ESB Networks is designing the products and systems to allow citizen and community participation in the future energy system. ESB Networks is investing in smart meters and extensive digitisation, adding additional capacity through network reinforcement, connecting increasing quantities of Micro-Generation, Mini-Generation and Small Scale Generation, and establishing the systems to enable active participation by customers who choose to take a full and active role.

In 2019, the Irish government published the first Climate Action Plan (CAP), which sets out Ireland's strategy to meet its 2030 climate and energy targets. This plan was revised in 2021 and the target for decarbonised electricity has increased from 70% to 80%. The Climate Action and Low-Carbon Development (Amendment) Act 2021 put Ireland on a legally binding course to transition to net zero no later than 2050 and to a 51% reduction in emissions by the end of 2030. Ireland's CAP will continue to be evolved to deliver on these commitments and we will work closely with our stakeholders to enable accelerated progress as the CAP is updated. In late 2022, the Climate Action Plan was revised (CAP23), and it contains further accelerated targets. At ESB Networks, we welcome the commitments and updates made in CAP23 and we look forward to the opportunity to collaborate with government, industry, our customers, and wider stakeholders to help deliver these ambitious actions.

Since the first CAP in 2019, and through the second issue in 2021, ESB Networks has delivered all our lead actions on target. In addition, we have actively and positively supported the progress and delivery of many other actions

through significant engagement with a range of stakeholders including DECC, CRU, and EirGrid. In the 2021 plan, ESB Networks was assigned as the lead for ten actions, primarily in the area of Demand Side Flexibility, which is being led out by the National Network, Local Connections programme, as well as in Smart Metering and Power System Modelling. In addition, ESB Networks was a key stakeholder in more than 50 other actions. All of our lead actions due in 2022 were delivered on time.

Key deliverables in 2022 included:

- › **Actions to enable and incentivise demand side flexibility**
- › **Smart Metering**
- › **The launch of Mini-Generation and Small Scale Generation pilots**
- › **The introduction of a settlement mechanism for Micro-Generation**
- › **Opening of ECP2.2 window in 2022 for electricity generation connection applications**

The Irish government published CAP 2023 in December 2022. ESB Networks again are key to the delivery of many elements of the plan including leading the delivery of three actions and are a key stakeholder in a further 17 actions across the Electricity, Transport, and Climate Adaptation sectors.





## Connecting Renewable Energy

ESB Networks' mission is to play a leading role in Ireland's transition to a low carbon economy and to provide secure, sustainable, reliable electricity in an affordable manner for all customers. With the government's Climate Action Plan having ambitious targets for increased penetration of renewable energy by 2030, ESB Networks has continued its key role of connecting renewable generation to our Network to help decarbonise electricity.

2022 was a record year for the Renewables Team of ESB Networks, having connected more renewables to the network than ever before: 688 MW

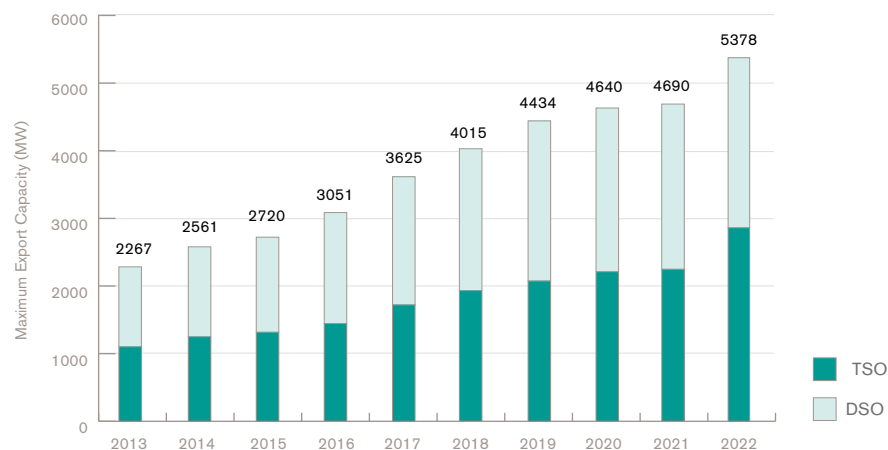
of Wind, Solar and Combined Heat and Power were connected. At year end, ESB Networks had enabled the connection of a total of 5,378 MW of renewable energy. The majority of this capacity is from 4,621 MW of wind energy generation and 361 MW of grid scale solar, with the remaining capacity coming from other renewable sources. 2,529 MW are connected at Distribution (DSO) level and 2,849 MW connected at Transmission (TSO) level (see Figure 1). In addition, ESB Networks conducted scoping, design, and construction works associated with the pipeline of customer projects for connections throughout 2022. Many of these customer projects are participants

in RESS-1 & RESS-2, the Government Renewable Energy Support Scheme.

ESB Networks connected four large energy storage projects for TSO and DSO customers in 2022 totalling 79 MW, resulting in a total energy (battery and pumped hydro) storage capacity of 769 MW on the network by the end of 2022 (see Figure 2). Two of these are distribution system connections and two are transmission system connections. Energy storage provides system support services to the electricity system operators to enable increased penetration of renewable energy on the grid.

### Connected Renewables

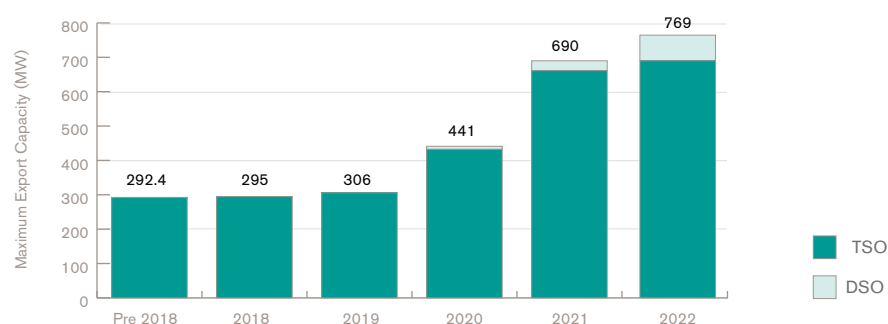
Figure 1 – Renewable energy connected to the electricity system (2012- 2022)



\*This does not include Microgen connections, which total approximately 140 MW

### Connected Energy Storage

Figure 2 – Energy Storage connected to the electricity system



\* Energy Storage includes Pumped Storage, Flywheel and Battery Energy Storage Connections



**Micro-Generation:**

ESB Networks is committed to facilitating Micro-Generation connection applications to the distribution network. Customers who wish to install Micro-Generation and export excess electricity onto the electricity network are referred to as prosumers. As Distribution System Operator (DSO), ESB Networks has an important role to play in facilitating this transformation. We aim to support our customers along each stage of the process as they adopt small-scale low carbon technologies and make the transition towards being active participants in the energy system.

To date, ESB Networks has facilitated over 45,409 Micro-Generation connection applications to the electricity network providing approximately 140 MW of green energy. (See: [Micro-Generation on esbnetworks.ie for more details](#)). These connections are in addition to the renewable energy figures shown above.

In 2022, ESB Networks continued to support innovative ways of connecting more renewables through implementation of its Distribution Security of Supply and Planning Standards. These new Standards are effectively the rules by which we determine how to connect our customers to the electricity distribution network. The rules have the potential to positively impact approximately 80% of the MV network renewable connection applications we expect to receive, enabling more cost effective and faster connections to the grid. The rules also include a provision for the expected future growth in Micro-Generation (domestic Solar PV) connections.

**Mini-Generation:**

In December 2021, ESB Networks announced the launch of its new simplified Mini-Generation application process for larger customers generating up to 50 KW (e.g. farms, business properties, community buildings, etc.) This equates to, for example, between 18 and 150 typical solar panels. (See: [Mini-Generation on esbnetworks.ie for more details](#)). The new Mini-Generation process was initially launched on a pilot basis in line with Ireland's 2030 Climate Action Plan. Feedback and learnings from the pilot will be used to inform the enduring process.

The new streamlined process will ensure that it is 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. Shortly after the launch by ESB Networks of the Mini-Generation pilot, the Irish government also introduced the Micro-Generation Support Scheme (MSS) and Clean Export Guarantee (CEG) which enables these customers to be remunerated for exporting their excess electricity.

**Mini-Generation Connections Pilot**

- › Streamlined process for customers exporting up to 50 KW
- › Greater than 21 MW of renewable generation
- › Connection offers issued to over 350 applicants in 2022, enabling them to complete their installations (over 40 fully installed and registered by the end of 2022)
- › Pilot extended and still accepting applications
- › Review underway aimed at transition to an enduring solution

**Small Scale Generation:**

On 30th September 2022 ESB Networks launched its new simplified Small Scale Generation (SSG) application process for larger sites generating up to 200kW. (See [Small Scale Generation on esbnetworks.ie for more details](#)). The new process was initially launched on a pilot basis in line with Ireland's 2030 Climate Action Plan. Feedback and learnings from the pilot will be used to inform the enduring process. The new streamlined process will ensure that it is 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.

**Enduring Connection Policy (ECP)**

ESB Networks successfully completed the processing of over 50% of the Enduring Connection Policy 2.2 (ECP-2.2) generator applications in 2022, with the remaining scheduled to be completed by April 2023. The Lean process was introduced for ECP-2.2 where projects were first scoped before offers were issued. This increased the period for issuing offers but significantly reduces the overall timeframe to connect customers. The accuracy of the customer offer was enhanced, giving customers more accurate costs, and avoiding potential modifications and re-work post offer acceptance.

The application window first opened for the ECP2.2 batch in September 2021, and applicants included a mix of wind, solar, hybrid and OCGT projects. ESB Networks processed a total of 86 applications throughout 2022, leading to 51 offers totalling 480 MW issued in 2022 and early 2023.

## Innovation

ESB Networks have a strong history of innovation, and as a result we continue to develop one of the most progressive electricity networks in the world. We will continue to play a leading role in delivering the government's Climate Action Plan.

Our Networks for Net Zero Strategy commits us to deliver on our part to achieve the targets set out for 2025 and 2030. Innovation is a key enabler of our strategy to continuously progress towards a sustainable low carbon energy future and delivering a net zero-ready distribution Network by 2040.

We will continue to innovate to develop the distribution network and supporting systems to meet the changing needs of our customers as we enable decarbonisation of the Irish economy and society. In addition, we continue to collaborate on innovation with the TSO to enable the development of the transmission network and through the delivery of a significant portfolio of transmission projects

Over the past decade, ESB Networks has invested over €7bn to make the electricity network smarter and more resilient, and to allow distributed energy assets like battery storage, wind farms, and EVs. This has enabled intermittent renewable assets, like wind farms and solar plants, to come on stream without undermining the quality of electricity supply. We will invest approximately €10bn in the distribution and transmission networks to deliver on our 2030 targets.

In ESB Networks, we are very clear that the challenge of enabling a low carbon Ireland powered by clean electricity cannot be delivered without extensive and collaborative innovation. To that end our Innovation Strategy sees us delivering on a balanced portfolio of projects across three pillars:



### › Future Customer – Empowering and Supporting Customers and the Economy

### › Climate Action – Decarbonising Electricity, Heat, and Transport

### › Network Resilience – Efficient, Secure, and Reliable Electricity

There is a significant wave of innovation downstream where customers interact with the electricity system throughout our industry. Micro-Generation technologies like solar PV are available, making it possible for future customers to potentially sell power back to the grid; the Internet of Things is connecting everything from energy assets to sensors in the home; and digitally connected customers are able to manage their energy use remotely through smart controls. Battery storage and electric vehicles are opening up the potential of large-scale storage for electricity that could support increased penetration of renewable energy on the grid. The possibilities are interlinked and extensive.

We continue to deliver on innovation to support and enable communities to adopt low carbon technologies and enable the electrification of heat and transport.

In 2022 we successfully completed our Dingle project. The project reduced the average emissions of its five ambassadors' homes from 9.2 t to 4.7 t CO<sub>2</sub>, the 25 Solar PV Installations generated 80,138 kWh of clean energy, and our EV ambassadors drove over 363,529 electric kilometres.

In 2022 over 100 innovation ideas were examined in ESB Networks, we initiated five new projects and have 22 projects which are in active delivery. We also transitioned several innovation projects into business as usual, such as the Modularised EGIP MV substation which will support the faster connection of increased renewables such as solar and wind onto the network. We are collaborating with over 80 external organisation partners on innovation concepts with an estimated potential benefit of €35m. It is through continued collaborative innovation and partnerships that we will develop a future electricity network which empowers our customers, delivers value for money, and provides a sustainable energy system for all customers.

Further details are available on our website: [Innovation in ESB Networks](#).



## Electrification

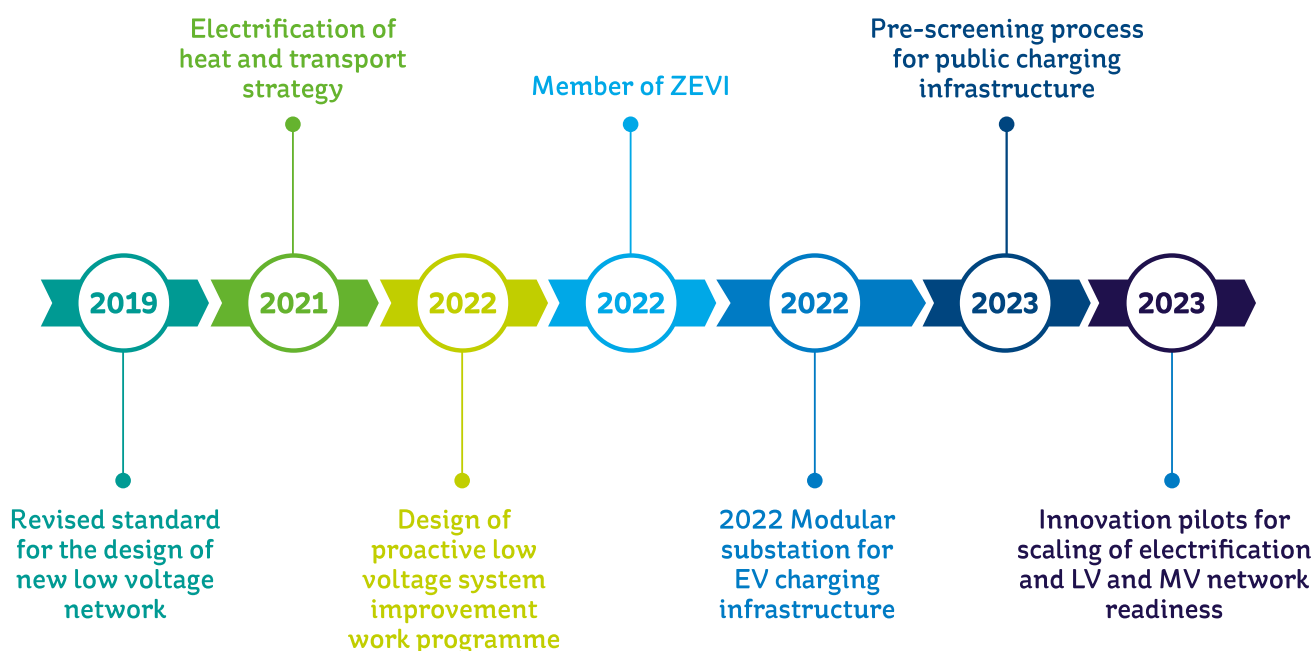
Ireland has committed to achieving a net zero target no later than 2050 in alignment with the European Green Deal. The Irish government has set ambitious goals for low carbon technologies (LCT) for 2030, as outlined in the Climate Action Plan CAP23, to aid in reducing greenhouse gas emissions. These targets include:

- › **Up to 1 million EVs (i.e., one in three private cars will be electric)**
- › **680,000 Heat Pumps (i.e., one home in four has electric heating)**

To meet the electrification needs of its customers, ESB Networks has introduced revised standards for

the design of new Low Voltage (LV) networks. This includes more than doubling the allocated capacity in new-build housing developments. ESB Networks has already designed approximately 50,000 new homes since 2019 that can accommodate electrified heat and transport. We are continuing to revise design standards to ensure that the LCT load can be accommodated during any work that takes place on our existing LV network. We are also developing and ensuring system improvements as the market grows, and the momentum towards mass electrification continues.

ESB Networks has established a collaboration framework with SEAI for future technology trials and initiatives. For instance, we have provided clear guidance to the market on EV charging infrastructure connection requirements for apartment developments. ESB Networks is adopting the FIMSS methodology (Forecast, Identify, Monitor, Smart toolkit, and strengthen the network) to guide our approach to network readiness and the development of the distribution network.



## Smart Metering Project

During 2022 ESB Networks continued the replacement of over 2.4 million electricity meters in homes, farms, and businesses with next generation smart meters to support the transition to a low carbon electricity network.

In 2022, 482,000 smart meters were installed, by almost 400 installers across the country. The programme also reached a significant milestone of 1 million smart meter installations in October 2022.

The upgrade to smart meters will bring many benefits to customers, the environment, and the economy, and is a key enabler of the Government's Climate Action Plan, specifically with regard to Micro-Generation and the electrification of heat and transport.

The following have been delivered in support of these objectives:

- › The programme continued to safely install smart meters, entering almost every county in the Republic of Ireland during 2022. A total of 1.1 million smart meters were successfully installed by the end of December 2022. This means that over 1 million customers now have access to smart tariffs and services.
- › ESB Networks delivered the IT upgrades required to support the delivery of smart services and tariffs by electricity supply companies in February 2021. These products provide customers with more information on their energy usage and allow them to move some of their consumption to times of the day when electricity is cheaper. At the end of 2022 approximately 140,000 customers were availing of smart services and/or tariffs.



- › An interim Micro-Generation solution was delivered in June 2022 to ensure that the 46,000 Micro-Generation registered customers can access export payments through their supplier, including 33,500 Micro-Generation customers with a smart meter.
- › Smart meters are being remotely read and as of the end of 2022, our Smart Metering Operations Centre had issued 4.5 million billing reads to suppliers. This has resulted in a significant reduction in estimated bills and improved billing information for customers with smart meters.
- › In November 2022, the Smart Metering Programme delivered a 'My Energy Consumption' application which will enable customers to access their

smart meter data via ESB Networks' new Customer Portal. This portal is a new customer channel offering self-serve digital services for Networks customers. The Customer Portal, including 'My Energy Consumption', is a key delivery in the strategy of empowering customers and providing consumption insights toward the goal of net zero.

- › Throughout 2022, ESB Networks' Smart Metering Programme ran a range of localised media awareness campaigns across radio, print, and social media. It has also led industry forums and working groups ensuring alignment with supplier systems and process development, and provided on-going support for supplier queries during 2022.

## Dingle Project

ESB Networks' Dingle Project was concluded in early 2022 and technologies installed at trial participant properties were transitioned to them, apart from the electric vehicles which were returned to the leasing company. As part of this technology transition, a full assessment of the status of all solar PV installations was carried out, to bring the electrical wiring configuration up to latest NSAI standards and to ensure stability of the PV installations on all roofs.

Analysis of data from the complete EV trial provided factual insights on journey distances and EV charging patterns and behaviours. It also reaffirmed interim project findings in relation to the suitability of modern electric vehicles, with battery ranges of circa. 350-400 km, when coupled with home EV charging solutions, for people living in rural communities.

Analysis of flexibility trial data was undertaken throughout 2022. This analysis showed that those clean energy-enabling technologies such as electric vehicle chargers, air source heat

pumps, residential scale batteries, and vehicle to grid bi-directional charging can be controlled to offer support services to the local electricity network. This trial also highlighted the challenges and complexities encountered in reliably communicating with and issuing control signals to technologies deployed in rural locations, as well as noting the impact that human behaviours and lifestyles can have on the potential flexibility that can be provided by these technologies.

The trials of technologies on the MV network, to minimise duration of supply interruptions arising from transient faults, such as those caused by lightning strikes, and to enhance fault location identification were concluded. These trials demonstrated the functionality of those technologies; however, the small number of faults encountered on those overhead circuits where these devices were deployed meant that the full capabilities of these technologies in multiple fault scenarios were not fully understood and further trials are recommended.

Marine and Renewable Energy Ireland (MaREI) also published its report into the effectiveness of the Dingle Project's Ambassador Programme and electric vehicle trial in diffusing low carbon and clean energy-enabling technology adoption and wider sustainability behaviours across local communities. The continued growth of Solar Beo, a local solar PV and residential battery installation company on the Dingle peninsula, coupled with the purchase of electric vehicles by circa 50% of EV trial participants, subsequent to completion of trials, are examples of the diffusion-effectiveness of such localised exemplar demonstration projects.

ESB Networks continues to share the learnings and insights from the Dingle Project with other energy utility companies, policy makers, community groups, and interested stakeholders both nationally and internationally. The data generated as part of the project has also been anonymised and is available to research-performing organisations for future research and analysis purposes.





## National Networks, Local Connection Programme

National Network, Local Connections Programme is a multi-year project that will transform how energy on Ireland's electricity distribution network is managed. In the decade ahead, all customers, from renewable generators to large energy users, to homes, farms, and business customers will adopt new technologies, products, and services, changing how they generate, store, or consume electricity. With a growing need to connect how we use and store electricity with local renewable generation, the National Network, Local Connections Programme is needed to ensure that the distribution system can monitor, forecast, and manage power at a local level.

We engaged extensively with stakeholders via surveys, round-tables, and webinars to obtain feedback which will inform the development of:

- › a shortlist of locations for the local flexibility markets
- › the definition of the network need
- › the definition of the flexibility that needs to be procured

After extensive analysis, the final locations selected for our first pilot were Finglas McDermott, Tullow-Shillelagh-Baltinglass and Corduff and the successful FSPs selected via our procurement process were Viotas and GridBeyond.

The first pilot comprising local flexibility markets went live in October 2022. Pilot 1 will be followed by Pilot 3b, which is the Pilot of Scale which is starting in Mullingar and the surrounding area. The key objective for Pilot 3b Pilot of Scale is to extend the capability and functionality delivered in Pilot 1 to a wider base of customers and geography.



NATIONAL NETWORK,  
LOCAL CONNECTIONS PROGRAMME

### Pilot 1: Role of early adopters in local markets

Successfully went live in October 2022

This pilot supports:

- Climate Action Plan targets** by shifting customer demand away from local peak periods.
- Customers and Network** by looking at introducing new solutions to support locations with increased growth and demand.
- 3 pilot locations** signed up to flexibility contracts.

1 Corduff

2 Tullow / Shillelagh / Baltinglass

3 Finglas / McDermott



For questions or comments please email the team [engagement@esbnetworks.ie](mailto:engagement@esbnetworks.ie)  
NATIONAL NETWORK, LOCAL CONNECTIONS PROGRAMME



## Beat the Peak

With the onset of the European energy crisis brought about by the Russian invasion of Ukraine, there was a heightened risk that the supply of power may not be able to keep pace with demand, particularly during the winter months of 2022. Following extensive engagement with both CRU and the Department of Environment, Climate and Communications, the NN, LCP was tasked with accelerating a number of measures with the goal of minimising the risk of energy disruption to our customers, particularly during periods of peak demand.

Following engagement with our stakeholders in Q3 2022, the NN, LCP launched 'Beat the Peak' (BTP) in Q4 2022, which is an umbrella initiative comprised of targeted measures to help customers take control of their electricity use and reduce electricity demand at times of peak events.

**BTP Domestic** sets out to engage with consumers to provide education and awareness of peak consumption, and its impact on the security of supply challenge. The key message to customers is 'when you use electricity matters', and the objective is to give customers control over their electricity usage choices. This control is empowered through education, and Beat the Peak Domestic provides educational content and advice to participants with the ultimate goal of delivering behavioural change.

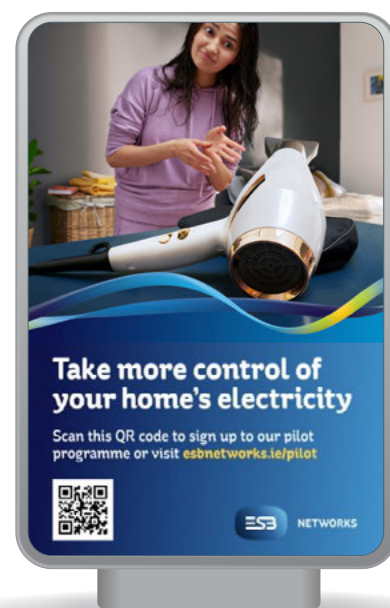
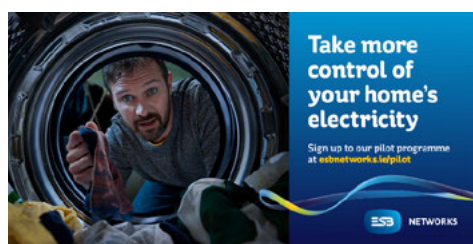
Launched towards the end of 2022, thousands of customers, regardless of their supplier, have been receiving customised communications on how they can take control of their electricity consumption at home, alongside a reward mechanism to play their part in being flexible with their electricity demand in order to 'Beat the Peak' during these peak hours, 5pm-7pm Monday to Friday. Through a nationwide marketing campaign, 'Is This a Good Time?' pilot has supported Ireland's transition to net zero and is a force for positive change. By the end of December 2022, ESB Networks had successfully signed up 5,110 participants to take part in BTP Domestic.

**BTP- Commercial Pledge** ESB Networks successfully launched a pilot operation 'Beat the Peak Commercial Pledge' to provide a vehicle for organisations across Ireland to take action to help Beat the Peak in the winter of 2022 and the engagement with these organisations has opened communication across the industry in a new way. The pilot was mobilised following initial research from the Domestic campaign. The findings showed that many customers wanted to know what larger organisations were doing to help Beat the Peak. Research also showed that many larger companies do not require a financial incentive to participate and are willing to just 'do the right thing!'. Beat the Peak Commercial Pledge went live on the 4th of November.

The introduction of the 'Beat the Peak' suite of initiatives continues to play an important role in the Government's 'Reduce Your Use' campaign. The impact on overall demand and carbon reductions arising from both BTP Domestic and BTP Commercial Pledge was not available at the time of publication but is expected to be made available in the updated Environmental Performance Report for 2023.

### Engagement

NN, LCP's engagement with our stakeholders also evolved in 2022 with the establishment of our NN, LCP Advisory Council to ensure that our stakeholders have early and ongoing opportunity to shape the direction of the programme. Expressions of interest were sought from interested parties to join our Advisory Council which now has an established membership and terms of reference governing the group. The NN, LCP Advisory Council convened three meetings in June, September, and December 2022.





# 5

## CLIMATE ACTION AND SUSTAINABILITY





## Overall Carbon Emissions

ESB Networks' annual carbon footprint for the past five years can be seen in Table 1 and Figure 3. Since 2018, there has been an overall downward trend in the business's carbon footprint.

**Table 1 - Overall CO<sub>2</sub> emissions**

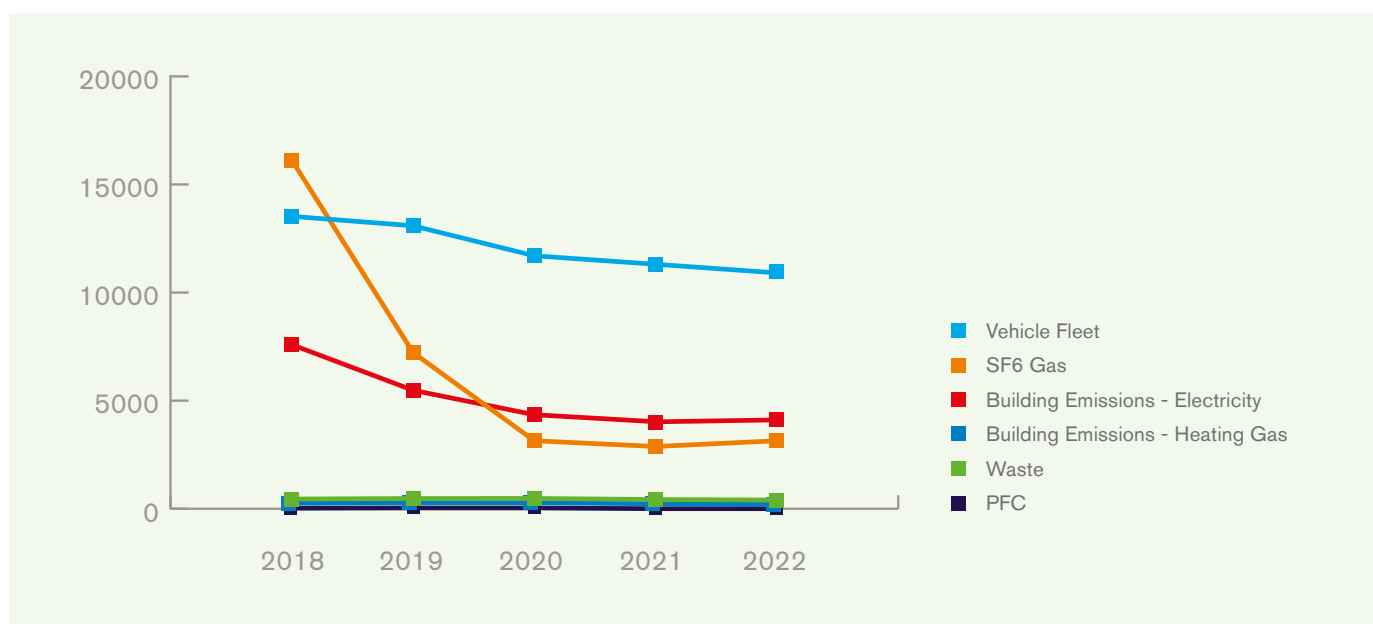
Description	Co <sub>2</sub> Tonnes Per Year				
	2018	2019	2020	2021	2022
Vehicle Fleet	13,526	13,088	11,700	11,309	11,057
SF <sub>6</sub> Gas	16,130	7,225	3,145	2,880	3,790
Building Emissions - Electricity	7,240	5,380	4,647	4,062	4,452
Building Emissions - Heating Gas	166	292	180	136	105
Waste	254	256	206	182	182
PFC	38	38	2.9	3.4	3.3
<b>Total</b>	<b>37,354</b>	<b>26,279</b>	<b>19,901</b>	<b>18,572</b>	<b>19,589</b>

**Notes:**

· Overall CO<sub>2</sub> Equivalent figures compiled using relevant DEFRA and SEAI CO<sub>2</sub> Conversion Factors

· PFC is Perfluorocarbon Gas emitted as part of the Fluid Filled Cables Leakage detection process. ESB Networks began utilising a new calibrated PFC Tracer injection unit in 2021, which provides more accurate data and which has resulted in a perceived significant reduction in emissions of PFC in comparison to earlier years, which were reported conservatively. Following a final analysis in 2021, the emissions of PFC in 2020 have been restated when compared to the 2020 Environmental Performance Report.

**Figure 3 - ESN CO<sub>2</sub> Emissions from 2018 - 2022**



## Energy Usage – Buildings and Fleet

Compared to 2021, electricity usage in our buildings was down by 6.8%. However, due to an increase in the carbon emission factor of electricity generation in between 2021 and 2022, this resulted in a higher carbon footprint associated with our buildings. In ESB Networks, sustainable carbon-reducing measures are a feature of all current and future building upgrade works and include lighting, insulation, energy efficient heating systems, windows, and other works.

Five more Networks buildings have been added to the scope of the ISO 50001 accredited Energy Management system (Ballina, Inchicore, Nowlan Park, Castlebar and Enniscorthy). This will

see increased improvements in energy efficiency in buildings across ESB Networks' portfolio.

Leopardstown depot also saw extensive refurbishment works to improve its energy efficiency that concluded in Q1 2022. A programme of works to extend the installation of LED lighting to buildings, stores, and yards also continues to be rolled out. A pipeline of building deep retrofits is currently in planning for the next phase of building energy improvements.

Vehicle fleet fuel consumption was lower by 2.2% in 2022 than 2021. This reduction is attributable to newer and more efficient vehicles being brought

onto the fleet, and an expansion of our electric vehicle fleet. In 2022, there were several pilots around introducing more electric vehicles to the fleet. These involved bespoke lightweight vehicle fit-outs to maximise space and store ladders internally to reduce drag, home charging trials, and fast charger trials at ESB Networks' Depots.

Energy consumption in our buildings and fleet is also typically impacted by the weather. The Met Eireann Summary Report for 2022 notes that Ireland received above average temperatures and sunshine and below average rainfall at most locations in 2022.





## Distribution Losses/20kV Conversion Project

In the 1990s, ESB Networks began a program to convert its 10 kV network to 20 kV based on studies at the time which indicated that this was the most cost-effective and efficient way to address voltage and capacity issues on the rural MV network.

One of the primary benefits of converting the electricity network to 20 kV is that the thermal capacity is increased by a factor of two and

voltage drop performance is increased by a factor of four. Voltage drop is the limiting criteria that determines circuit capacity of ESB Networks' typical rural networks. Consequently, circuit capacity is effectively increased by a factor of four. In effect, 20 kV is a vital enabler of demand growth that is anticipated as a result of low carbon government initiatives in relation to e-Heat and e-Transport. In addition,

as conversion to 20 kV reduces losses by a factor of four, the reduction in carbon footprint that can be achieved by extending this programme is very significant. The conversion programme continued in 2022, with 109 km of the network converted to 20 kV.

We expect to significantly ramp up this programme from 2023 onwards.





6

MINIMISING OUR  
IMPACT ON THE  
ENVIRONMENT



ESB Networks are dedicated to conducting its operations in a way that enables us to take pride in our environmental performance. We acknowledge that our activities can have an impact on the environment and understand our duty to manage these impacts in a manner that prevents pollution and ensures a high level of protection for the natural environment.

## ESB Networks Policy Statement on the Environment

**ESB Networks Policy Statement on the Environment approved by the Executive Director, Network Customer Delivery, commits us to:**

- › Conduct our activities and those undertaken on our behalf in an environmentally responsible manner and in compliance with all legal and other requirements and company policies and standards related to our environmental aspects.
- › Develop and maintain an effective environmental management system.
- › Protect the environment and prevent pollution by identifying, managing, and regularly reviewing the environmental aspects and impacts associated with our business activities, services, and processes.
- › Review our environmental programme regularly to ensure continual improvement in environmental performance and to provide a framework for setting and reviewing environmental objectives and targets.
- › Act responsibly in our use of natural resources.
- › Consider environmental matters in all planning and decision making.
- › Make continuous efforts to maximise the energy efficiency of our networks, buildings, and fleet.
- › Minimise the production of all wastes as far as practicable, promptly recover all litter found at Networks locations, and dispose of all residual wastes in a safe and responsible manner.
- › Record and respond swiftly to all environmental incidents and complaints.
- › Promote environmental and sustainability awareness among our staff, contractors, and suppliers and embed these values in our investment and expenditure decisions.
- › Provide the necessary training and support to staff on environmental matters relating to our business activities.
- › Make this Policy Statement available to all our staff, contractors, and interested stakeholders.





## Environmental Management System

Since 2010, ESB Networks have been using an Environmental Management System (EMS), which has received external certification for compliance with the ISO 14001 Standard. The EMS provides a framework that enables ESB Networks to methodically recognise, evaluate, prioritize, and manage environmental hazards connected with its business activities. The EMS encompasses all of ESB Networks' operations, services, and processes linked with managing the electricity network on behalf of the Electricity Supply Board.

During 2022, ESB Networks' EMS underwent a recertification audit by an external certification body, against the requirements of the ISO 14001:2015 Standard. This recertification audit sampled a large range of activities within the scope of ESB Networks' certification, including:

- › Environmental Management Systems
- › Underground Fluid-Filled Cables
- › SF6 Gas Management
- › Smart Metering
- › Depots
- › Dingle Project
- › Renewable Projects
- › Construction Crews
- › Management of Wood Poles
- › HV Stations
- › Working in Environmentally Sensitive Areas
- › Managing Environmental Incidents
- › Waste Management
- › Managing Contractors

No major non-conformances were identified by the Auditors during any EMS audits in 2022. Following the recertification process, ESB Network EMS was recertified in line with [ISO 14001:2015](#).





## Environmental Monitoring and Associated Improvement Works

In line with our EMS, ESB Networks continue to identify and respond to environmental matters across the business, undertaking environmental assessments and associated improvement works where appropriate.

During 2022 regular ground water and surface water monitoring continued at ESB Networks' national wood pole storage facility in Kiltel, Co Kildare. An environmental assessment for the site was completed by an external specialist environmental consultant in 2022 and the findings are being reviewed to determine how best to manage the site going forward.

During 2022, in line with our legal reporting obligations there was engagement with the Environmental

Protection Agency (EPA) in relation to ESB Networks' PCB Management Plan requirements and associated updates on EDEN, the Agency's online reporting system

In addition to bunding all new transformer installations in HV substations, during 2022, ESB Networks retrofitted bunding to ten existing legacy transformers and installed 19 legacy separators to European Norm 858 and Class 1 performance.

ESB Networks' Oil Storage and Transportation Improvement Project continued in 2022. Oil and diesel storage infrastructure upgrades were completed for HV Stations in Dublin and at depots in Tralee and Ballycoolin.

Bunded pallets and transformer oil containment bags were procured for storage of damaged oil-filled plant and equipment, chemicals, and other identified hazardous materials. Mobile oil spill containment kits and consumables were provided at depots, HV stations, fleet and equipment garages and in relevant ESB Networks' fleet.

ESB Networks are managing a number of noise complaints around the country.

ESB Networks communicate with internal and external stakeholders on an ongoing basis.



## Managing the Environment During Construction

In line with our commitments to deliver PR5 by 2025 and in keeping with our ESB Networks strategy, environmental management is a key consideration in the design and construction stage of all our projects.

ESB Networks have remained committed to achieving timely and cost-effective project delivery, despite the demanding landscape of project planning and consenting. To this end, ESB Networks have made continuous improvements and adapted to the challenges of the environment to ensure successful project implementation.

At the planning and design stage for each project, multidisciplinary technical teams work to develop projects and site-appropriate

construction methodologies in order to deliver connections to customers, while protecting sensitive receiving environments. Detailed construction packs, capturing all of the requirements (e.g. planning consents) are provided to our external contractors who are increasingly important to project delivery. Project support through document review processes (e.g. inputs to Construction Environment Management Plans, Traffic Management Plans, Waste Management Plans, etc.) is key to ensuring delivery on planning permission condition requirements. Oversight of construction projects is achieved through the appointment of specialists such as Environmental Coordinators, Project Ecologists, Ecological Clerks of Works, Project Archaeologists, etc.

The Waste Enforcement Regional Lead Authorities (WERLA) oversees enforcing waste regulations and ensuring the appropriate handling of construction and demolition waste at a national level. In 2022, ESB Networks provided WERLA with data on their construction undertakings that could produce construction and demolition waste. This information is then passed on by WERLA to waste enforcement officers from local authorities throughout the country, who conduct inspections to verify that waste and materials are being properly managed at construction sites. This effort is part of a strategic approach to managing construction and demolition waste in the state.





## Biodiversity

ESB Networks continue to be cognisant of the importance of biodiversity in the Irish landscape, and to ensure our activities are managed in a sustainable manner in relation to biodiversity. We are also aware of the requirements to identify potential impacts on biodiversity with the aim of avoiding or mitigating these impacts, and where feasible, work to enhance biodiversity.

In accordance with our 'Networks for Net Zero' Strategy, we will ensure that we have a net biodiversity gain from our operations by 2025. We will produce a comprehensive biodiversity plan for our operations to support this by end of 2023. We will also plan to have a 10% biodiversity gain for individual major projects on our work programme.

A number of ESB Networks' documents have been developed to advise staff on biodiversity matters, including

procedures for designing and undertaking work in designated sites and the identification of and response to invasive species in proximity to ESB Networks' infrastructure. 2022 saw the continuation of a review process of these documents to update them in line with recent guidance and legislation.

ESB Networks staff regularly engage with ESB's ecology staff on various biodiversity-related issues, including screening for Appropriate Assessment, invasive species response and management, and the implementation of appropriate mitigation measures. The ecology staff also deliver training to ESB Networks staff in relation to biodiversity and ecology-related legislation.

ESB Networks continue to support the All-Ireland Pollinator Plan (AIPP), pursuing opportunities for more pollinator-friendly management of

properties, where this fits with the needs of safety, business operations, and property management. Significant progress has been made at the ESB Networks' training centre in Portlaoise, where several areas of the 14-hectare site have been subject to both short-flowering and long-flowering meadow regimes. This has proven to be very successful, with a diverse wildflower community becoming apparent in the first growing season, including two species of orchid. Practicalities of the mowing regimes have been discussed with the ESB Networks staff with responsibility for grass cutting and landscaping. Informative signage sourced from the Pollinator Plan website has been erected throughout the site, while a summer student placement trialled the usage of QR codes for future signage to direct readers to relevant online resources.





## SF6 Gas Management

Sulphur hexafluoride (SF6) is used in a significant portion of ESB Networks' high-voltage switchgear assets on the transmission and distribution networks. It is used because of its very high electrical insulating properties which facilitate efficient and safe operation of the switchgear. Emissions rates for SF6 gas are reported to the Environmental Protection Agency (EPA) on an annual basis.

In 2022, 166.23 kg of SF6 was emitted due to equipment faults, representing 0.08% of the total installed inventory of SF6. The comparable 2021 leak quantity was 126.3 kg, representing 0.06% of inventory. This overall leakage rate still compares favourably to other European utilities. This overall downward trajectory of SF6 emissions over the last seven years can be seen in Figure 4.

ESB Networks comply with EU Regulation 517/2014 on fluorinated greenhouse gases in relation to SF6. This compliance is enabled by:

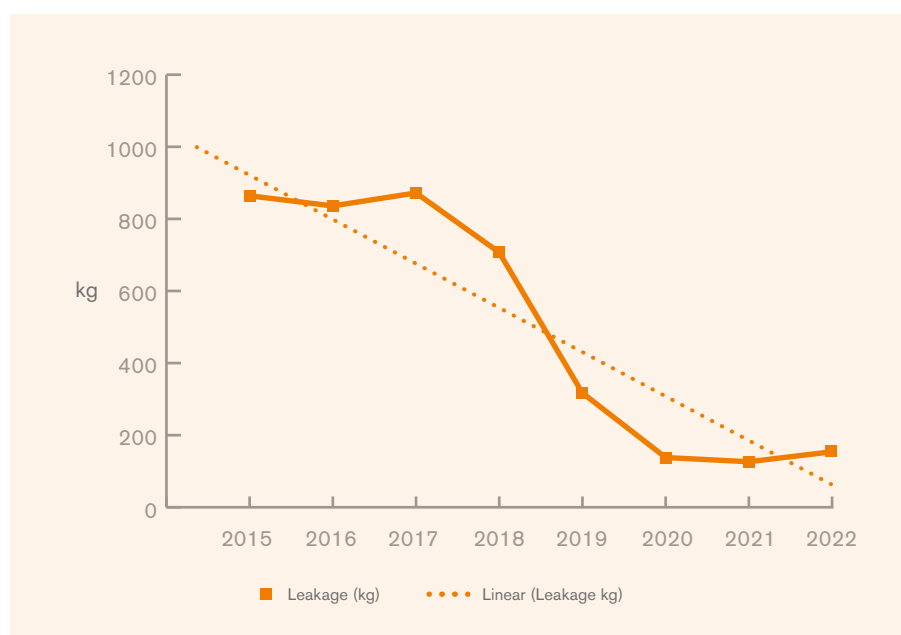
- › Implementation of revised SF6 policy and procedures across the ESB Networks business, addressing:

- Labelling
- Transport
- Gas Handling
- Recording and Reporting
- Leak Response
- Training and Certification

- › Continued training and certification for those involved in handling SF6.
- › Technology improvements related to mobile app-based recording of SF6 gas usage.

- › Further work to improve accuracy of SF6 gas inventory across all assets.
- › Enhanced monitoring/close-out of SF6 leaks on a systematic basis.
- › Renewed nationwide communication of key requirements of EU Reg 517/2014 as part of rollout of revised procedures.
- › Maintaining a critical understanding of market development, regulatory environment, and available SF6-free technology.

Figure 4: SF6 Gas Leakage Trends 2015-2022



## Engagement with Statutory Authorities and Associated Reporting Protocols on SF6

ESB Networks engage with a number of key stakeholders, in relation to SF6 emissions reporting, namely local authorities and the Environmental Protection Agency (EPA).

### LOCAL AUTHORITIES

Where a leak has been identified on a piece of equipment, ESB Networks report this leak to the relevant local authority. This reporting requirement is implemented in accordance with the Air Pollution Act (1987). The reporting structure adopts the following approach:

- › A Stage 1 notification is issued when a SF6 leak has been identified.
- › A Stage 2 notification is issued when the SF6 leak has been stopped.

### ENVIRONMENTAL PROTECTION AGENCY

ESB Networks reports to EPA on an annual basis on our cumulative SF6 emissions for the previous year on/ before 31st March each year. This reporting is undertaken as part of ESB Networks' responsibilities in relation to the Pollutant Release and Transfer Register Regulations (2011).

ESB Networks report all SF6 emissions to the associated license holder where there are emissions from ESB Networks-owned equipment on EPA licensed sites.

EPA issued proceedings against ESB Networks DAC in July 2020. These proceedings included six separate offences alleging a failure to repair leaks of SF6 gas without undue delay in the substation in Carrowdotia South, Co Clare.

The matter came before the District Court in Dublin on 30th June 2022. ESB Networks DAC entered a guilty plea in relation to one of the offences and the EPA withdrew the remaining five offences. The District Court recorded the guilty plea and imposed a fine of €1,000.

### PROCESS IMPROVEMENTS

**Technology Utilisation** – Where SF6 is moved to and from assets, these transactions are recorded via a mobile device-based SF6 App. This simplifies site recording and enables prompt and accurate reporting of gas utilisation.

### Policy and Procedures Enhancement

– Regular reviews and updates of existing SF6 procedures are carried out to ensure consistent and up to date information and guidance is available for all staff, thus embedding the processes to drive ongoing awareness and compliance in the business with regard to SF6 regulations.

### Rationalisation of Existing SF6 Gas Quantities

– Where recovered SF6 was available it has been assigned for use in new projects, negating the need to buy additional SF6 for these projects.

### SF6 Leak Monitoring and Repair Programme Review

– enhanced procedures and IT tools are in place to ensure prompt reporting, capture and close-out of SF6 leaks through a robust process involving Network Assets, Environmental and frontline High Voltage Station staff.

## Fluid-Filled Cables

During 2022, 4,917 litres of cable insulating fluid leaked from ESB's High Voltage Cable network (28 litres per km). This is a decrease of 1,364 litres on the 2021 fluid leakage figure of 6,281 litres.

The breakdown of the fluid leaks was as follows:

- › 220 kV Cable Network = 957 litres
- › 110 kV Cable Network = 1,990 litres
- › 38 kV Cable Network = 1,970 litres

ESB Networks' Company Standard, "Management of Fluid Filled Cables" set a target maximum cable leakage volume of 5,000 litres for 2022. The aim of this value is to encourage efficient leak incident identification and repair. Our leakage total in 2022 came in below this target. Our 2022 leakage figure represents a decrease of approximately 22% on our 2021 total leakage. The overall trend for the past seven years continues to show a downward trend in leakage. See Figure 5.

New local authority notifiable leaks that occurred on the **38 kV Cable Network** in 2022:

- › Coolock-Raheny

New local authority notifiable leaks that occurred on the **110 kV Cable Network** in 2022:

- › Harold's Cross-Ringsend

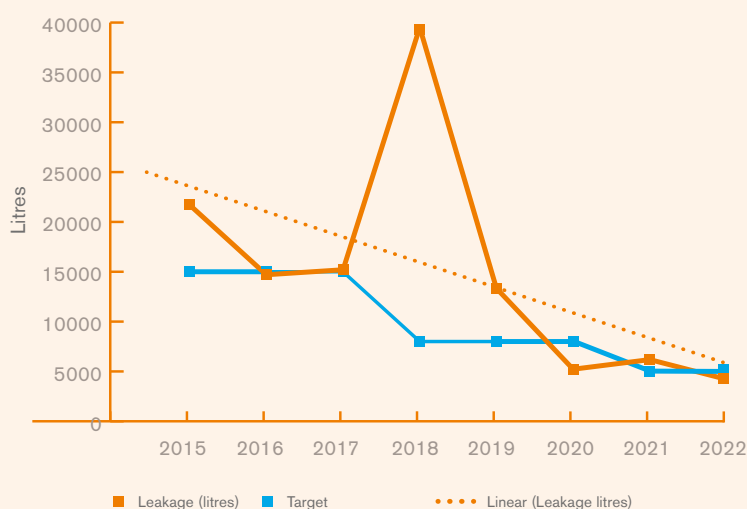
New local authority notifiable leaks that occurred on the **220 kV Cable Network** in 2022.

- › Carrickmines - Poolbeg

Circuits with repaired leaks in 2022 were:

- › Carrickmines - Poolbeg

Figure 5: Fluid-Filled Cables Leakage Trends 2015-2022



## Fluid-Filled Cables - Environmental Assessments

ESB Networks have now completed Preliminary Site Assessment (PSA) reports for 70 cable leak sites.

All leak location information is published on our [website](#). The outcomes of PSA reports were discussed in detail with the relevant local authority, in line with relevant protocols, to ensure transparency and clarity on recommendations and plans. All completed PSA reports are also published on our website.

The consultant's PSA recommendations in 22 of these sites is that no further site assessment is necessary and no remediation is required. For the remaining sites, the consultant recommended further site investigations, for example, trial pits and slit trench excavations at or around a leak site to facilitate collection of relevant samples. In 2022, further works were progressed on a number of sites as we continue to progress

all to a conclusion with the relevant authorities. As they were completed, ESB Networks issued Generic Quantitative Risk Assessments (GQRAs), to the relevant local authority.

After consultation with the local authority involved, we formally closed out 3 further sites at the GQRA stage in 2022. As further detailed site assessments are completed and further GQRAs developed, ESB Networks will continue to update local authorities on our progress in these assessments and will publish the reports on our public website.

The PSA and GQRA assessments are completed in accordance with the EPA guidance entitled "Guidance On The Management Of Contaminated Land And Groundwater At EPA Licensed Sites", 2013.



## Fluid-Filled Cables - Incident Management

Since 2019, ESB Networks have FFC incident protocols in place dealing with both historic and current FFC leaks with relevant local authorities. The protocols ensure all relevant authorities are notified of incidents as they arise and are kept up to date with incident response. Regular communication is maintained with relevant local authorities to ensure close collaboration regarding road opening licences, drainage maps, and other aspects relevant to our work in cable leak location, environmental assessment, and repair.

We continue to have experienced network technicians specially trained in FFC maintenance, leak identification and repair techniques to ensure that we manage these incidents promptly when they occur. ESB Networks' tracer detection equipment has significantly improved our ability to identify leak sites and implement repairs. We continue to implement this state-of-the-art leak detection methodology along with other leak detection methods as required.

ESB Networks' leakage rate in 2022 was approximately 28 litres per kilometre.

The current leakage rate equates to approximately 0.5% of the total installed cable fluid volume per annum, equivalent to or lower than the leakage rates reported by a number of peer network companies in other countries. While we have come in under our target leakage figure in 2022, the total fluid leakage in any year depends upon several factors associated with the cables' condition, route and location.



Damage to fluid-filled cable caused by house building contractor

## Fluid-Filled Cables - Replacement Programme

Recognising the environmental challenges in operating and maintaining FFCs, ESB Networks started a fluid-filled cable replacement programme in 2005. So far, 20% of FFCs have been replaced, removing the source of 40% of the previous cable fluid leaks from the system. At present, there are approximately 176 km of FFCs on the transmission and distribution electricity networks. We have a number of active FFC replacement projects at construction stage and additional projects at route selection stage.

Such major infrastructural projects involve:

- **Scheduled outages, for which businesses and families adjacent to these works must be informed and given adequate notice.**
- **Securing temporary road opening licences.**
- **Traversing third party infrastructure, services, and major road, rail, waterway crossings.**
- **Temporary extended road closures.**
- **Significant trench excavations for new plastic insulated cable and cable replacement.**
- **Jointing works.**

The projects will be undertaken on a phased basis in populated urban areas with significant traffic volumes. Ongoing engagement with relevant stakeholders is vital to ensure efficient and successful delivery of these cable replacement projects.

ESB Networks have now committed to an accelerated investment programme with the CRU. An environmental assessment informs both the schedule and the timing of individual cable replacements.

As part of the Price Review Five (PR5) determination, CRU approved distribution and transmission FFC replacement projects. While there are a number of factors that determine how long it takes to replace a full FFC route, our current expectations are to replace approximately 39 km of DSO FFC routes in PR5.

A significant number of TSO FFC route replacements will have achieved capital approval in late PR5 also. Due to the significant circuit lengths on most of the TSO FFC routes involved, full replacement is not expected to be completed until PR6 (2026-2030) with ESB Networks' TSO project work commencing from 2025. However, we are engaging with the TSO to

take advantage of advanced ducting opportunities as they arise. For example, we are liaising with Dublin City Council's (DCC's) Royal Canal Greenway project team to install 220 kV ducting which may become part of a future 220 kV FFC replacement project in PR6. The TSO is proactively engaging with multiple stakeholders in their Powering Up Dublin strategy. The replacement of five of the existing TSO FFC circuits in Dublin City will result in a significant uprate of the circuits involved. As such, there is both a system uprate and environmental benefit to these circuits being replaced.

The remaining FFCs are planned to be replaced over subsequent Price Reviews subject to CRU approval.

In 2022, ESB Networks replaced 1.4 km of DSO 38 kV FFC network. We also installed 5 km of advanced ducting, in 2022, in ongoing DSO FFC replacement projects.



## Case Study 2022 – Francis Street Watling 38 kV FFC Replacement

ESB Networks have engaged with local authorities on our PR5 replacement programme and requested advance notification of any planned streetworks or greenway projects where we may be able to contribute costs towards the project if advanced ducting could be accommodated. In 2021, DCC's roads department notified ESB Networks of planned street works on Francis Street. We identified Francis Street Watling Street 38 kV FFC circuit, while not on our PR5 replacement project list, was routed along the area of the proposed street works.

The CRU approved an advanced ducting allowance in PR5 to avail of where an

opportunity such as this arises. After confirming a viable advanced ducting route, ESB Networks installed ducting in 2022 along Francis Street in advance of DCC's streetworks.

We then reviewed the remaining section of FFC from Thomas Street further north towards Watling Street 38 kV substation. We engaged further with DCC's roads department and agreed road opening licences to enable further advanced ducting to enable the full FFC section replacement. In late 2022, we successfully energised the new plastic (XLPE) insulated replacement circuit resulting in 850 metres of FFC being removed from the network.





## Waste Management

Throughout 2022, ESB Networks improved our arrangements for effectively managing waste in compliance with waste regulations. Appropriate infrastructure was established to enable correct segregation and safe temporary storage of waste, pending its disposal, treatment or recycling. The company collaborates with all waste management contractors to guarantee compliance with all permits and licenses required.

ESB Networks are committed to being at the forefront of the sustainable and circular economy, and the effective management of waste is a fundamental part of this environmental management goal.

Notably, in 2022, significant advancements were made towards this objective, with some key achievements and initiatives:

- › Contracts for the management of non-hazardous and hazardous waste, service provision, scrap metal, oil-filled equipment, and the disposal of empty cable drums and Creosote poles were effectively managed nationwide.
- › ESB Networks' contracted service providers were facilitated to collect waste, and records of waste disposal were maintained.
- › Data management was continued to track tonnages and waste streams.
- › Depot and substation recycling rate of 68% achieved for municipal solid waste and 71% for all waste streams combined.
- › Standardised office waste management systems maintained at

all our facilities to ensure the proper segregation of associated wastes.

- › Training continued to be rolled out addressing waste management, recycling targets, waste hierarchy, and proper waste segregation and disposal requirements.
- › Memorandums of Understanding are in place and maintained with Dublin City Council, South Dublin City Council and Dun Laoghaire-Rathdown County Council on the management of illegal dumping of waste, litter, and graffiti at unoccupied ESB Networks facilities.
- › Throughout 2022, ESB Networks' appointed waste management contractors were engaged to clean up and dispose of waste illegally dumped at ESB Network facilities in a prompt and timely manner to minimise the risk to the environment.



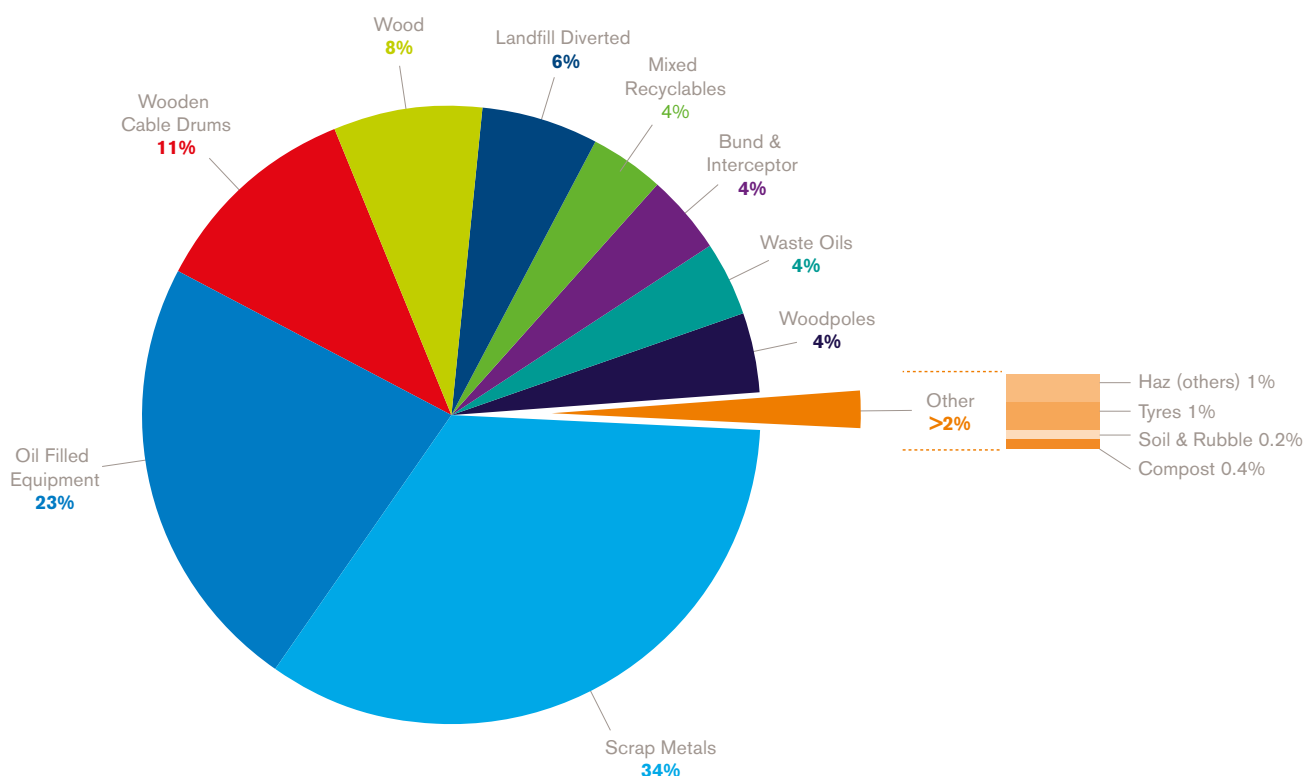


## Waste Statistics (Classification and Quantities)

In 2022, ESB Networks generated 8,579 tonnes of waste from its business operations, a 9.7% increase when compared to 2021. Figure 5 presents

a breakdown of the various waste streams. Statistics are compiled based on management data provided by our service waste contractors.

Figure 6 – Breakdown of Waste Streams



### Notes:

- Statistics include construction and demolition waste generated from internal construction projects.
- Scrap metals, wood poles, oil-filled equipment, and wooden cable drums accounted for 72% of all waste collected during 2022.
- General Waste accounted for a total of 6% of all waste generated. However, the additional processing, recovery, and recycling of waste materials undertaken by ESB Networks' waste service contractors reduced the overall waste sent to landfill to less than 1%.

Table 2 - Compares tonnage quantities for the principal waste categories for 2020, 2021 and 2022.

Waste Stream / Retired Material	Tonnes Per Year		
	2020	2021	2022
Scrap Metals	2913	3087	2957
Oil Filled Equipment	1111	1460	1967
Wooden Cable Drums	789	505	915
Wood	762	711	648
General Waste	569	535	534
Mixed Recyclables	313	338	376
Bund & Interceptor Waste	210	218	359
Waste Oils	407	169	307
Woodpoles	1220	193	303
Hazardous Waste (Others)	125	274	99
Tyres	48	53	65
Compost	33	20	31
Spoil & Rubble	80	253	18
<b>Total</b>	<b>8579</b>	<b>7816</b>	<b>8579</b>

**Note:**

**Hazardous Waste Others includes:** Creosote Contaminated Consumables, Contaminated Soil, Oil Filters, Solid Oily Waste, Batteries, WEEE, Chemicals, Paints, Empty Paint Containers, Mixed Fuels, Resins, Silica Gel

# Waste Disposal Trends



**Scrap Metals**



**Wood**



**General Waste**



**Hazardous Waste (Others)**



**Spoil and Rubble**



**Oil Filled Equipment**



**Wooden Cable Drums**



**Mixed Recyclables**



**Bund and Interceptor Waste**



**Waste Oils**



**Woodpoles**



**Tyres**



**Compost**



## Environmental Incidents

ESB Networks' environmental management systems are designed to minimise, prevent, and mitigate the occurrence of environmental incidents. However, some environmental

incidents occur in the course of ESB Networks' business operations and these are appropriately managed and dealt with. During 2022 there were 182 environmental incidents. We also

updated the way in which we categorise our environmental incidents by consolidating and refining the number of incident categories (as seen in Table 3).

**Table 3 - Environmental Incidents**

Reported Environmental Incidents	Incidents per year		
	2020	2021	2022
Dust nuisance	-	-	1
Ecology, Flora and Fauna (Including invasive species)	6	15	6
Environmental Complaint (External)	-	2	1
Environmental monitoring/abatement equipment malfunction or breakdown	1	-	0
F - Gas leak/storage/handling (excluding SF6)	-	1	0
Fire	-	1	0
Fluid-filled cable leaks	14	7	3
Impact on Conservation area (SACs/SPAs/NHAs) and national monument/heritage sites.	1	3	0
Land - Contaminated land or soil	1	-	5
Leaks/uncontrolled discharges/spillages of chemicals, oils or fuels	21	39	37
Noise nuisance/emissions	5	2	2
SF6 gas leak/ handling/storage	112	81	116
Visual (Litter/Graffiti) (3rd party)	1	1	2
Waste - Unauthorised disposal (3rd party)	6	5	6
Waste management (Internal)	2	4	6
Water & Discharges - Emissions/breaches/leaks to water bodies	-	4	-
<b>Totals</b>	<b>170</b>	<b>165</b>	<b>185</b>

Note:  
Since 2021, ESB updated the way in which it categorises environmental incidents. The incident categories listed in previous reports differ from those in Table 3. The environmental incidents from 2020 have been accommodated within the updated incident categories within this report to facilitate comparison across the years.

ESB Networks use appropriately licensed and permitted environmental incident response contractors and environmental consultant services, and liaises with relevant regulatory authorities in connection with

environmental incident management as necessary. Spill response training is delivered to staff engaged in oil and oil-filled equipment handling, and a range of related ESB Networks guidelines have been developed and are available.

Spill kits and associated consumables are also available in depots, stores, HV stations and in fleet and equipment vehicles as required.





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