NETWORKS

DISTRIBUTION ANNUAL PERFORMANCE REPORT 2021

DOC-210722-HMQ

esbnetworks.ie

Foreword

Welcome to ESB Networks' 2021 Distribution Annual Performance Report. The purpose of this report is to detail ESB Networks' progress and performance during 2021, delivering on the plans approved by the Commission for Regulation of Utilities (CRU) under Price Review 5 (PR5).

At ESB Networks, we are connecting Ireland to a clean electric future by leading the transition to net zero. This means developing, operating and maintaining a network that supports the secure and affordable distribution of sustainable, low-carbon electricity. Our strategy involves working with customers, stakeholders and industry partners to connect more renewable low-carbon generation to Ireland's electricity network. Working together, we can reduce the carbon intensity of our network still further and transform our distribution network to enable clean electricity to drive carbon out of heat, transport and the economy.

In 2021, we continued to deliver on service excellence, connecting new customers, driving innovation and actively investing in the network to ensure it is safe and reliable. We continued to work on reducing our impact on the built environment and developing into a leading business in the area of sustainability by improving our business operations and being open and transparent in all our business activities. We also stepped up our external engagement activities, reaching out and listening to customers and stakeholders across society, so that they can inform our plans for the network and for our continued investment in a net-zero future powered by clean electricity.

As a business, we are acutely aware of the international situation and recognise the risk around security of supply, and we are working with all our partners to ensure appropriate measures are put in place to deal with this going forward. 2021 has been a vital year in terms of putting in place the foundations for delivering on Ireland's Climate Action Plan targets. We worked on a large number of major projects which will see a record volume of renewables (up to 1 GW) connected in 2022. We launched a new, streamlined connection process for renewable connections up to 50 kW, ensuring customers in local communities can more easily and safely install generation at their own properties. 2021 also saw a significant step forward in our digital journey and making our network smarter with c.380,000 new smart meters installed. A major milestone in 2021 was the launch of our National Network, Local Connections Programme which will work intensively over the coming years to ensure there is a proper plan in place to enable a clear line of sight between how renewable energy is generated, and how we as a society use it and store it efficiently for the benefit of all.

Please take some time to review this report which provides a short and informative summary of the key elements of ESB Networks' performance during 2021.

Nicholas Tarrant

Managing Director
ESB Networks

Executive Summary

ESB Networks is planning for the future in enabling Ireland's transition to a net-zero economy and energy system. We are fully committed to connecting greater amounts of renewable generation and to supporting the electrification of heat and transport, helping Ireland's transition to a clean electric future, powered by clean electricity.

The PR5 period began in 2021 with an investment of €328m of capital expenditure on the development and renewal of the distribution network. In addition to this, there was €305m of operating expenditure on distribution operation and maintenance activities.

In 2021, ESB Networks continued to facilitate the connection of more renewables to the national electricity system. ESB Networks processed a total of 86 ECP-2.1 generator applications throughout 2021. This led to 56 connection offers being issued, totalling 441 MW for a mix of wind, solar, and CHP projects. The total volume of renewables connected to the national electricity system at the end of 2021 was 4.69 GW.

The number of new demand connections to the system in 2021 rose slightly with the re-opening of construction and the easing of Covid-19 restrictions, with 29,553 new homes and businesses connected (an increase of 2% on 2020).

In terms of Environmental Performance, we continue to actively reduce our environmental footprint, with a further reduction in carbon emissions from our fleet, SF6 gas, buildings and waste materials. while driving towards becoming a leading business in the area of sustainability.

We welcomed the engagement and feedback from attendees across more than 30 innovation webinars throughout 2021 and have made over 10 hours of recordings available to stakeholders via our online channels.

During 2021, the National Smart Metering Programme replaced 382,188 smart electricity meters in homes, farms and businesses to support the transition to a low-carbon electricity network.

Contents

ESB Networks DAC is the licenced Distribution System Operator (DSO) in the Republic of Ireland. The Irish distribution electricity system includes all distribution stations, overhead electricity lines, poles and underground cables that are used to bring power to Ireland's 2.4 million domestic, commercial and industrial customers.

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EFQM Excellence Model Innovation Lens

2021 Highlights

ANNUAL FINANCIAL PERFORMANCE

- Approved DUoS revenues of **€920.74m**
- **€328m** invested in Distribution Capital Programmes in 2021
- **€305m** of Distribution Operating expenditure

CONNECTING MORE RENEWABLE GENERATION

- **4.69 GW** of renewables connected to date, with 4.3 GW of this being wind generation
- **248.8 MW** of new large-scale battery storage connected in 2021 (19.8 MW Distribution, and 229 MW Transmission)
- **86 ECP-2.1** applications processed during 2021, leading to 56 connection offers totalling 441 MW

NEW CONNECTIONS

- **29,553** total new connections
- **24,868** new domestic connections
- **4,685** new commercial connections

ENVIRONMENT

- **99%** of waste diverted from landfill
- Further reduction in carbon emissions from our fleet, SF6 gas, buildings and waste materials

INNOVATION

- ESB Networks recognised as a 5-star innovation organisation
- **29** active innovation projects delivering a smarter distribution system and electrification of heat and transport

SAFETY

- In 2021 we launched our revised Public Safety Strategy 2021-2025
- ESB Networks was successfully certified to the new ISO 45001 Occupational Health and Safety Management System standard

SMART METERING

- **382,188** smart meters had been installed in 2021
- **622,000** smart meters installed to date

CUSTOMER ENGAGEMENT

- ESB Networks' website was fully updated in 2021 with a new customer-centric design. The new website has a mobile-first user interface, giving more intuitive access to information and improves the key customer journeys throughout the site. Enhancements include a "Storm Mode" version of the website, which is implemented during large-scale weather events, making it easier for customers to report a fault and find estimated restoration times for outages affecting them.

DISTRIBUTION SYSTEM STATISTICS

- c. **151,600** km of overhead lines
- c. **27,000** km of underground cable
- c. **575** HV substations
- c. **23,114** MV ground-mounted substations
- c. **246,853** MV pole-mounted transformers
- c. **225** MW of HV transformer capacity added

2021 Performance Summary

Metric	2021 Target	2021 Performance	2021 Financial Incentive	2020 Performance	2019 Performance	2018 Performance	2017 Performance
Customer Minutes Lost (CML) – unplanned outages	85.00	95.99	-€5.5M	94.9	87.47	97.43	90.34
Customer Interruptions (CI) – unplanned outages	1.19	1.2041	-€0.7M	1.26	1.23	1.23	1.21
Customer Satisfaction (ESATRAT)	90%	85.90%	-€3.3M	90.53%	91.17%	91.75%	91.19%
Customer Satisfaction Survey	81%	82.88%	€1.4M	82.16%	80.82%	78.63%	79.43%
Smart Metering Delivery	372,614 meters (adjusted target agreed with CRU)	382,188 meters	€0.2M	239,347	15,000 meters	N/A	N/A
Smart Metering Functionality	In place by end of Q3 2021	Completed	€0.6M	N/A	N/A	N/A	N/A
Smart Metring Customer Satisfaction	<80% customer satisfaction	97%-98% net satisfied	€0.4M	N/A	N/A	N/A	N/A
Stakeholder Engagement	10	7.54	€0.6M	7.2	7.5	6.8	N/A
Delivering New Connections (ECP-2.1)	All offers issued by February 2022	Completed	€2.1M	Completed	Completed	Completed	N/A
Fault Outage Information	Balanced scorecard	81%	€0.81M	N/A	N/A	N/A	N/A
Flexibility	Balanced scorecad	100%	€3M	N/A	N/A	N/A	N/A
Visibility	Balanced scorecard	98%	€2.96m	N/A	N/A	N/A	N/A
Joint DSO/TSO Coordination	Balanced scorecard	59%	€1.24M	N/A	N/A	N/A	N/A
Independent Role of the DSO	Balanced scorecard	82%	€1.4m (with €2.8m to be deferred to next year for assessment))	N/A	N/A	N/A	N/A
No. of Registered Vulnerable Customers	N/A	66,936	N/A	52,818	48,855	46,767	45,291
Total Number of Outages (planned and unplanned)	N/A	42,687	N/A	52,682	38,930	38,646	37,295
New Demand Connections	N/A	29,553	N/A	29,024	30,206	26,954	24,463
Capital Expenditure	Within PR allowances	€328m	Within PR allowances	€336m	€267m	€244m	€209m

SECTION

01 CUSTOMER SERVICE

Customer Charter

We work hard to deliver a first-class customer experience, developing our customer service channels, touchpoints and offerings. We are committed to improving on our performance every year to ensure customers' needs are met.

Our Customer Charter is a set of commitments to our customers.

1. We aim to restore supply in less than four hours for 95% of fault outages
2. We will give you at least two days' notice of an outage for planned work on the network
3. If your main ESB Networks fuse has failed, we will call out free of charge, either within three hours if you call us between 8.30am and 11.00pm, or before 11.30am the next morning if you call after 11.00pm
4. We will install an electricity meter for you within three working days (for domestic customers, five working days for business customers)
5. We will send you a cost quotation for your new connection if you are building a new house or farm building, setting up a small business or renovating an older property, either within seven working days if no site visit is required, or or within 15 days if a site visit is required
6. We will complete your new connection to your new house or premises within two weeks of receiving your Safe Electric Completion Certificate if you apply and pay while giving us 10 weeks' notice
7. We will contact you within 10 working days if you are concerned about your supply voltage
8. We will resolve verified voltage concerns within 12 weeks (unless major reinforcement is required)
9. If you request a visit from an ESB Networks Network Technician, we will visit at an agreed time, or contact you the day before if we cannot make the agreed appointment
10. Where we agree that you are entitled to a refund, we will make the refund within five working days
11. If you use the Commission for Regulation of Utilities (CRU) complaint resolution service, we will honour any financial settlement they direct within 10 working days
12. If we fail to meet a Charter commitment, or (for 1 and 2) receive a valid claim, we will send you a cheque within 10 working days or pay you an additional €35

2,068 Charter payments were made to our customers in 2021 versus 1,485 in 2020 and 1,924 in 2019

PUTTING CUSTOMERS AT THE HEART OF WHAT WE DO

In 2021, we focused on key customer journeys to streamline and introduce digital online self-serve options to make it more convenient and simpler for customers to interact with us. Some examples are:

› New Connections

- New Connections Online Portal, and Tracker for Domestic and Small Business, saw 85% customer adoption by year end 2021.
- A Robotic Process Automation (RPA) implementation for the New Connections team handling the processing of Microgen applications (circa. 300 per week).
- Completed a Feasibility Study for the expansion of Desktop Quotations.

› Outage Management

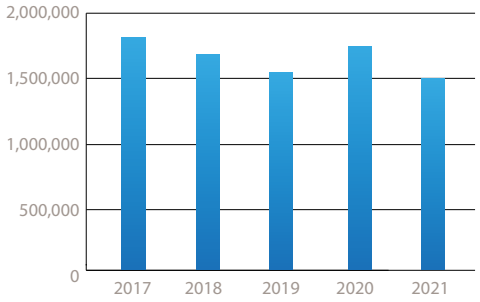
- PowerCheck has changed from being a mobile app to being a mobile responsive website. This re-platforming will enhance performance and customer experience across customer devices, as well as future-proof for future developments.
- Development of Digital Outage Notification Vision & Approach for proactively informing customers of outages affecting them, and implementation of a planned outage notification trial.

› ESB Networks website re-launched based on a customer-centric design.

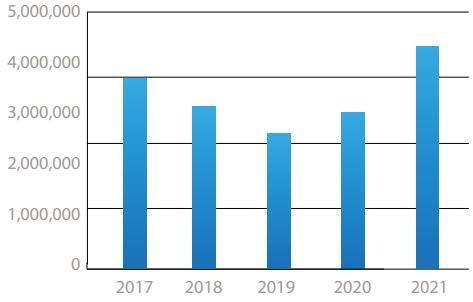
› Data analytics from customer satisfaction and customer operations datasets deliver customer insights to inform customer journey improvements for new connections, outage management and all customer touchpoints.

HOW CUSTOMERS INTERACT WITH ESB NETWORKS

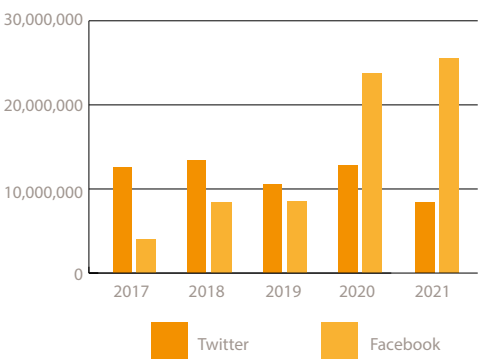
Calls and emails answered



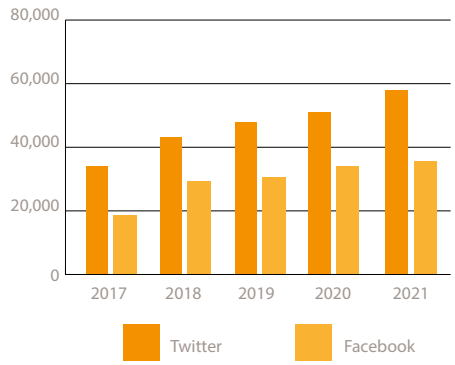
PowerCheck page views



Social media impressions



Social media followers



Social Media

59,240
Followers on Twitter

36,995
Followers on Facebook

3,083
Followers on Instagram

8.3 million
Impressions on Twitter

25.7 million
Impressions on Facebook

11 million
Impressions on Instagram

45.3 million
Combined impressions

4.3 million
Page views on PowerCheck

WEBSITE AND SOCIAL MEDIA

The ESB Networks website was re-launched in 2021 with a new design centred on improving customer experience by building a mobile first user interface and improving the key customer journeys throughout the website. Enhancements include a "Storm Mode" version of the website, which is implemented during large-scale weather events, making it easier for customers to report a fault and find estimated restoration times for outages affecting them. The re-launch ensures a better user journey for our customers, and aligns our website with our security and accessibility standards. It also compliments other customer touchpoints including the National Customer Contact Centre (NCCC), PowerCheck and new connection applications.

The ESB Networks website and social media platforms are significant touchpoints to our customers. ESB Networks now has 59,240 Twitter and 36,995 Facebook followers, achieving more than 45 million combined impressions in 2021. ESB Networks' LinkedIn profile had also gained 9,000 followers by the end of 2021. Our website is seen by our customers as one of the most important touchpoints, in particular Powercheck.ie, which gives real-time information on planned outages, faults and estimated restoration times.

In addition to providing customers with up-to-date information and assurance, the use of social media supports our efforts to provide information to customers via channels other than direct voice and Interactive Voice Response (IVR) contact to the Customer Care Centre during fault events. This facilitates our customer service advisors being more accessible for handling emergency activity during the major outage events. Social media channels allow us to provide a source of proactive contact to customers with advice on storm readiness both in the home and work environments.

NATIONAL CUSTOMER CONTACT CENTRE

ESB Networks' National Customer Care Centre (NCCC) is an award-winning contact centre with 13 years of accreditation from the Contact Centre Association. The 24/7 facility is the gateway for all 2.4 million electricity customers who make queries relating to their electricity supply, faults, new connections, emergencies or general queries. Customers contact us across various channels such as phone, email and social media apps on a 24/7 basis.

In 2021, 1,446,677 customer contacts were handled, compared to 1,687,019 in 2020.

The contact breakdown is as follows:

402k
Telephone Calls

325k
Emails, Meter Reading, Social Media Management

720k
Automated Responses
(No Supply, Meter Reading, Fault Logging)

PERFORMANCE IN CUSTOMER CONTACT CENTRE

Call-handling response	2017	2018	2019	2020	2021
Percentage of calls answered within 20 seconds[1]	90.9%	90.31%	90.83%	84.20%	75.4%
Percentage of calls dropped[2]	2.3%	2.74%	2.57%	4.6%	11.1%
Networks customer calls to the call centre[3]	470,333	451,494	429,589	451,147	401,730

[1]Figures are inclusive of storms, which involve much higher call volumes during these events.
This results in challenges regarding the call handling and percentage-of-calls-dropped performance metrics.

[2] Where the customer has terminated the call without waiting for a response.

[3] Calls relating to ESB Networks excluding IVR.

CONTACT CENTRE ASSOCIATION STANDARDS

ESB Networks' Customer Contact Centre continues to be a member of the Customer Contact Association (CCA) and actively engages with the members on developing contact centre trends, sharing experiences of and responses to remote working challenges and employee support through periods of full lockdown.

CUSTOMER INTERACTIONS DURING STORMS

Weather-related outages or damage cause significant disruption to ESB Networks customers. During such incidents, customers contact ESB Networks via a variety of engagement channels including telephone, IVR, ESB Website / PowerCheck, email and social media, resulting in peaks of activity across all channels. Mainstream media, TV and radio campaigns are also used to communicate and engage with customers in a timely and proactive manner. ESB Networks also has a support service with an external partner to provide additional support for no supply / emergency calls, particularly during periods of severe weather and large electricity outages.

CUSTOMER SATISFACTION SCORES 2021

85.92% ESATRAT
(Satisfaction rating of National Customer Care Centre)

82.88% BEHAVIOUR & ATTITUDES SURVEY
(National Customer Satisfaction Rating)

Customer Satisfaction Scores Explained

(1) National Customer Care Centre

The incentivised satisfaction rating of the National Customer Care Centre (ESATRAT) out turn score is derived from five Key Performance Indicators (KPI).

In 2021, our combined incentivised out-turn stood at 85.92%, compared to 90.53% in 2020. The combination of ongoing resourcing challenges and complex customer contacts across all customer contact channels, arising from backlogs during the ongoing Covid-19 pandemic restrictions during Q1, impacted negatively on service level and abandonment rate performance throughout 2021. The engagement performance for the mystery shopper and customer callback KPIs remained stable through Q1 and Q2 but declined slightly during Q3 and Q4, based on information accuracy and impact of wait times causing frustration for customers, as well as higher customer expectation as restrictions were lifted.

The lockdown period at the start of 2021 also led to a significant increase in the volumes of customer submitted meter readings through all channels as meter reading was suspended. An enduring system change was implemented to increase automation of meter readings from multiple channels (SMS, website) similar to existing IVR meter readings. This improved the timeline for provision of meter readings to suppliers and reduced the resource requirement in the NCCC for manual intervention.

Breakdown of National Customer Contact Centre ESATRAT Incentive	2018 Target	2018 Actual	2019 Target	2019 Actual	2020 Target	2020 Actual	2021 Target	2021 Actual
Speed of telephone response	88%	90.31%	88%	90.83%	88%	84.23%	89%	75.40%
Call abandonment rate	4%	2.74%	4%	2.57%	4%	4.59%	4%	11.10%
Customer call-back survey results	83%	94%	83%	90%	83%	89%	89%	94%
Mystery caller survey results	88%	8.31%	88%	85%	88%	95%	84%	87%
First contact/call referral	10%	8.31%	10%	9.31%	10%	9.54%	10%	11%
ESATRAT (Total target)	90%	91.57%	90%	91.17%	90%	90.53%	90%	85.92%

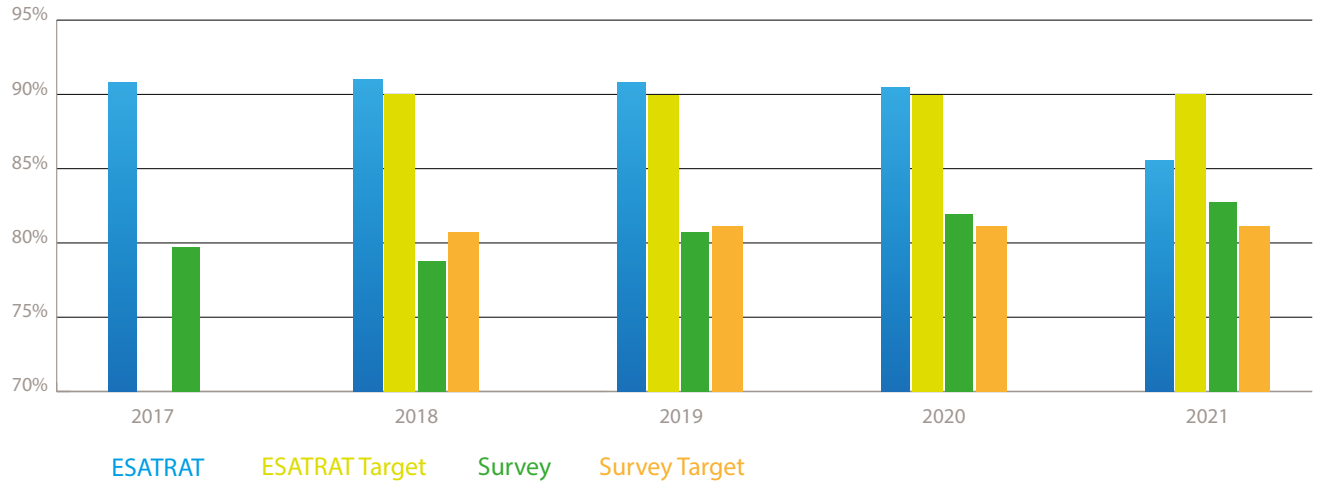
(2) Customer Satisfaction

The incentivised National Customer Satisfaction Rating (Behaviour & Attitudes Survey) outturn score is the average of six KPIs:

Customer Satisfaction Rating (Behaviour & Attitudes Survey)	Overall 2020	Overall 2021
Voltage Complaint Rectified (1yr rolling due to small base size)	85.40%	84.32%
Unplanned Electricity Interruption	81.03%	78.41%
Planned Electricity Interruptions	87.01%	86.03%
New Connection - Scheme Builders	80.10%	83.71%
New Connection - Non-Scheme	84.80%	86.62%
New Connection - Business	74.64%	78.18%
Average	82.16%	82.88%

The overall incentivised score increased to 82.88 for the year 2021, up from 82.16 in 2020. This was driven by increases in KPIs for new connections, mainly scheme builders and businesses but also non-scheme. KPI decreased for unplanned interruptions, and slightly for planned interruptions and voltage complaints rectified.

Customer Satisfaction Scores



Customer service performance for 2021 is explained in detail in this report. The changes in previous years can be summarised as follows.

› In 2018, the ESATRAT score improved despite several significant weather events, including Storm Emma. The advancement of our social media channels, which provide real-time fault information, played a significant role in some of this improvement. On the other hand, our Customer Satisfaction Survey score reduced slightly due to a drop in satisfaction with the new connections process for businesses and for unplanned interruptions. However, satisfaction with planned interruptions and new connections has since improved.

› In 2019, the ESATRAT score decreased slightly. Despite seeing less storm-related calls to the Customer Care Centre than in 2018, it did see a rise in new house completions. In turn, this drove an increase in calls relating to new connections, as well as an increased number of queries around microgeneration, solar panels and external insulation, with new house completions as a driver for increased calls on the General Enquiry line. On the other hand, our Customer Satisfaction Survey score rose in 2019 due to notable improvements in the KPIs for New Connection – Scheme Builders, and New Connection – Business. This was especially driven by improved satisfaction with the application process and information provision, but we also saw notable improvements in results for prompt installation and speed of quotation. The KPIs were also up for New Connection - Non-Scheme and Unplanned Interruptions.

› In 2020, the ESATRAT score decreased slightly despite strong performance in Q1 and Q2 across all elements of ESTRAT. However, the combination of increased customer contact activity across all customer contact channels in Q3 and Q4 arising from backlogs during the ongoing Covid-19 pandemic, and as a result of Storm Ellen in August, impacted negatively on service level and abandonment rate performance. In contrast, performance on mystery shopper and customer callback KPIs remained strong throughout 2020. Meanwhile, our Customer Satisfaction Survey score saw further improvement, mainly driven by service improvements for New Connections Scheme Builders and Voltage Complaints Rectified but we also saw an improvement for Planned Electricity Interruptions. KPI was down slightly for Unplanned Electricity Interruptions.

Complaints Handled by National Customer Care Centre

Complaints Received	2017	2018	2019	2020	2021
Concerning low voltage	19	21	28	20	28
For frequent outages	1,259	1,199	1,655	1,931	1,668
Time to connect customers	38	48	33	17	48
Operation delays and overruns	93	148	186	171	167
From suppliers	0	0	0	0	0
On connection costs and budget quotations	-	-	-	-	3
On meter reading and estimated reads	292	444	247	138	321
Others	981	1,542	1,616	1,811	1,840
Total complaints received	**2,682**	**3,402**	**3,765**	**4,088**	**4,075**

There was a slight decrease in the overall number of complaints received in 2021. There was a 14% decrease in complaints around Frequent Outages / Quality of Supply to 1,668, while complaints regarding to the NCCC rose from 99 in 2020 to 185 in 2021, with most of the complaints received relating to wait times.

We continue to establish and analyse insights on a monthly basis in order to address the concerns raised by our customers through the complaints process and endeavour to close complaints with a meaningful response within five working days.

In 2021, there were 31 complaints which were referred to the CRU. All of these complaints had previously completed the ESB Networks complaints process. Out of these 31 complaints, 10 were upheld, and 19 were not upheld, while two were withdrawn.

VULNERABLE CUSTOMERS

We all rely on a safe, reliable electricity supply. However, some customers are more vulnerable to loss of electricity supply. A 'vulnerable customer' is a household which depends on electrical devices, such as medical equipment, or which is particularly vulnerable to power outages during the winter. Vulnerable customers receive priority attention when there is a fault on the network; furthermore, we take care to give them extra notice of upcoming planned outages.

In 2021, 66,936 customers were registered as vulnerable customers, an increase of 4,118 from 2020. To register as a vulnerable customer, please contact your electricity supplier who will then notify ESB Networks.

METER READING

ESB Networks schedules four meter reading visits per customer per year. Where we fail to gain access, we leave a card for the customer to submit a reading. However, meter reading visits may not always result in an actual reading being obtained for reasons such as our meter reading staff not being able to gain access to the meter, with no meter reading subsequently submitted by the customer. ESB Networks also sends a letter if a customer approaches 12 months without a reading. This can also be followed up with an email if we have a customer's email address. Cases where ESB Networks is not able to gain access to the meter, and no reading is received from the customer, are referred to as Long Term No Access (LTNA).

ESB Networks continues to endeavour to obtain as many meter readings as possible each year in line with targets, and is utilising email campaigns, text campaigns, the visiting of holiday homes during summer months etc., in order to tackle the issue of LTNA.

The Covid-19 pandemic had a major impact on the meter reading activity in 2021, as all meter reading visits were completely suspended from 8th January to 8th March. While meter reading resumed on 8th March, it was only for outdoor meters up until 10th April, when full meter reading resumed; meter readers had previously been instructed not to enter premises to read any meters.

These restrictions had obvious impacts on the number of scheduled visits, which in turn impacted on the number of customers who had back-to-back estimations as a result of forced estimations during those first two months of 2021. The lack of visits also contributed to the number of customers who did not have an actual reading during 2021. In 2021, 89.42% of customers received four scheduled visits, and 99.68% of customers received at least two such scheduled visits, compared to 55.72% and 99.95% respectively in 2020.

ESB Networks aims to obtain one actual meter read per year from 98% of all customers (either from our meter-reading staff or from the customer themselves), and in 2021, the result achieved was 96.77%, compared to 97.15% in 2020. ESB Networks also has a target that 99% of customers will not receive back-to-back meter estimates, and in 2021 the result achieved was 96.19%, compared to 81.53% in 2020.

Meter Reading Performance	2017 Performance	2018 Performance	2019 Performance	2020 Performance Covid Impact	2021 Performance Covid Impact
Two scheduled reading visits per annum	100%	99.99%	99.99%	99.95%	99.68%
Four scheduled reading visits per annum	99.52%	99.64%	99.60%	55.72%	89.42%
One actual read per annum	97.83%	97.80%	97.82%	97.15%	96.77%
No back-to-back meter estimations	99.84%	99.85%	99.94%	81.53%	96.19%

ESTIMATED RESPONSE TIME (ERT) FOR FAULT OUTAGES

The new Estimated Restoration Time (ERT) Accuracy incentive is a project that runs over the PR5 period and measures the performance of the DSO in improving ERT Accuracy for fault outages across the network. In recognition of the importance of customers planning around the outage information provided to them, this incentive focuses on the accuracy of the information provided, as opposed to the speed of power restoration.

Over the initial two years (2021 and 2022), the focus has been about establishing a new ERT monitoring process for fault outages and setting future ERT targets, while the milestones in the final years of PR5 focus on these actual ERT targets and the performance against them. CRU outlined three aspects to be delivered in the first year of PR5, and ESB Networks has delivered the following against these key milestones in 2021.

Detailed ERT Accuracy Incentive Balanced Scorecard Requirements (Source CRU 202226[1])

Aspect	REQUIRED EVIDENCE
Monitoring/Recording and Process Reporting	Define categorisation of outages with criteria for determining which category. Determine precise definitions of outage start / end, actual outage duration, ERT issue, and the precise measures to be used for ERT timeliness and accuracy. Documentation of the data monitoring and data recording processes.
Data Assurance Process Reporting	Documentation of the data assurance processes.
Annual Performance Report	Submit to the CRU the results of the analysis of historical ERT accuracy, including the data distributions. Inclusion within the APR the status of the systems and processes for data collection / assurance as well as the commitments to report on ERT accuracy going forward.

[1]Price Review Five: 2021 Balanced Scorecards - Transmission and Distribution

Specifically, ESB Networks has:

- Defined the categorisation of outages that will be used for the ERT incentive and the criteria for determining which category
- Defined precise definitions of outage start / end, actual outage duration, ERT issue
- Defined the precise measures to be used to measure ERT timeliness and accuracy
- Developed a new system and process to monitor and analyse historic ERT data
- Documented the data monitoring and data recording processes
- Documented the data assurance processes
- Submitted to the CRU the results of the analysis of historical ERT accuracy including the data distributions for the years 2019-2021

In future APRs, we will continue to outline the following for non-storm days, with similar corresponding measures (using different time intervals) for storm days:

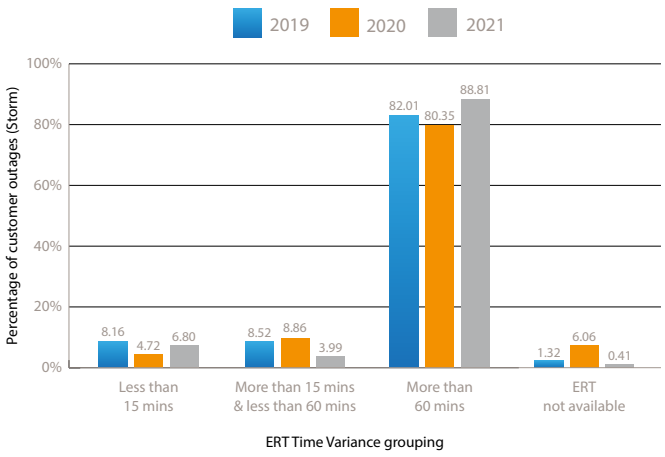
- Time between the commencement of the power disruption and the time that the first restoration time estimate was made publicly available
- Restoration of power within 15 minutes of the initial estimated restoration time
- Restoration of power within one hour of the initial estimated restoration time
- Restoration of power outside one hour of the initial estimated restoration time

The breakdown of the analysis of these figures for the 2019-2021 period has been outlined in the following Non-Storm Day Analysis Summary table.

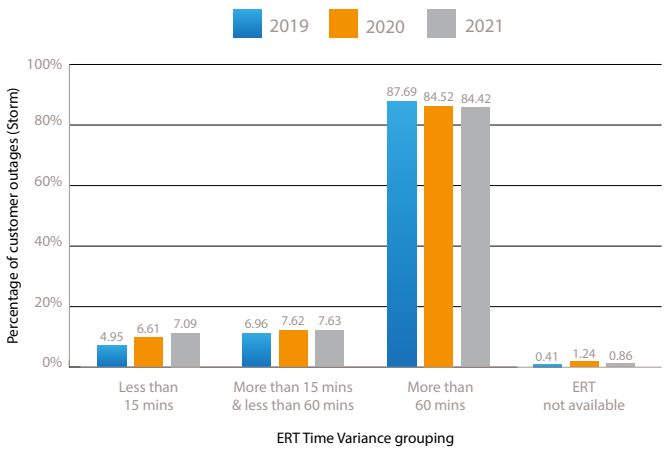
Non-Storm Day Analysis Summary	2021	2020	2019
ERT accurate to within 15 minutes (+/-)	7%	6.6%	4.9%
ERT accurate to within one hour (+/-)	28.5%	28.6%	25.6%
ERT accurate to > one hour (+/-)	71.5%	71.4%	74.4%
% of customers to whom no ERT given	0.86%	1.24%	0.41%
% of customers who received ERT within 15 minutes	86.19%	86.74%	88.16%

Here we see a graphical representation of the ERT restore time variance over the three-year period, broken down separately between storm and non-storm days.

Percentage of Customer Outages by ERT Restore Time Variance (Storm)

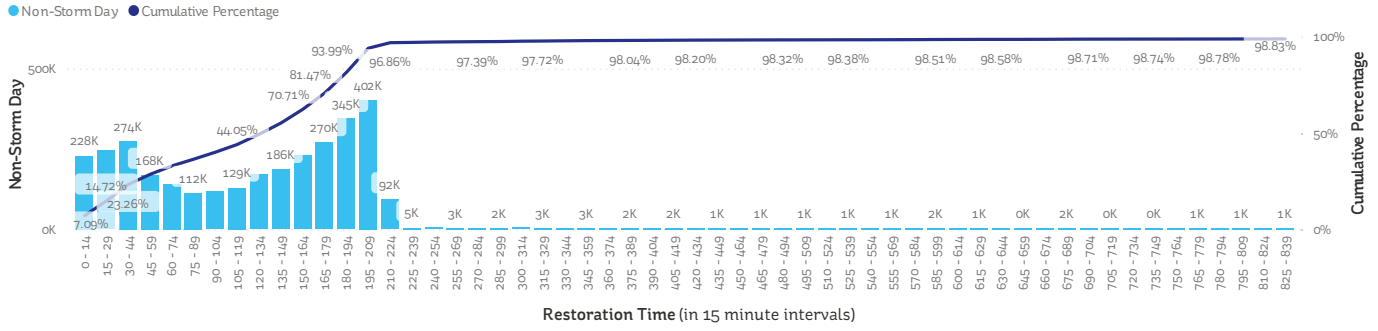


Percentage of Customer Outages by ERT Restore Time Variance (Non-Storm)

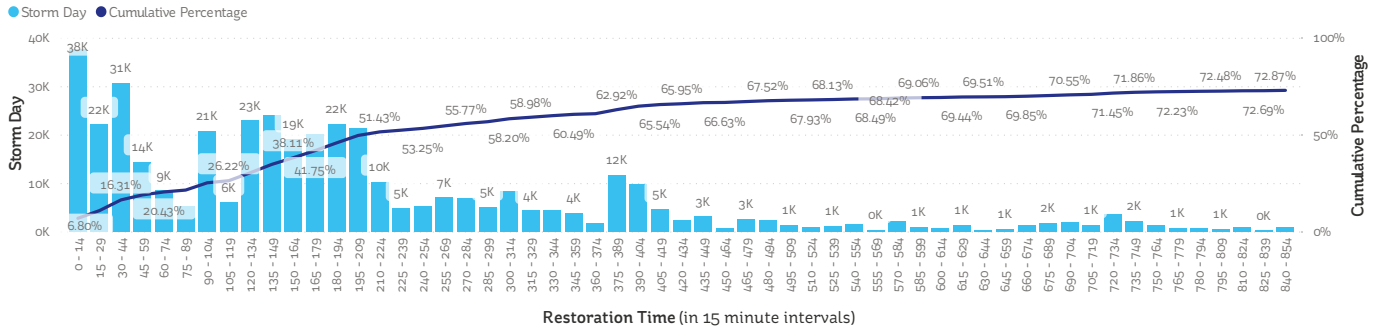


While here, we see the data distributions (broken down in 15-minute periods) for ERT accuracy in 2021. The values for storm and non-storm days are again shown separately, with the longer tail in the storm days graph reflecting the different restoration profile that comes with a major storm.

ERT Accuracy Non-Storm Days 2021



ERT Accuracy Storm Days 2021



SECTION

02

RELIABILITY AND RESILIENCE

CONTINUITY

ESB Networks' strategy is aligned to Government policy and Climate Action objectives in actively promoting the transition to a low-carbon economy by supporting our customers in increasingly electrified systems of heating and transport. This transition will require an ever more reliable electricity system, as homes and businesses become dependent on electricity as their main source of energy. ESB Networks needs to be able to mitigate the impact of climate change on our infrastructure, whilst providing an ever more reliable and resilient system for all electricity customers.

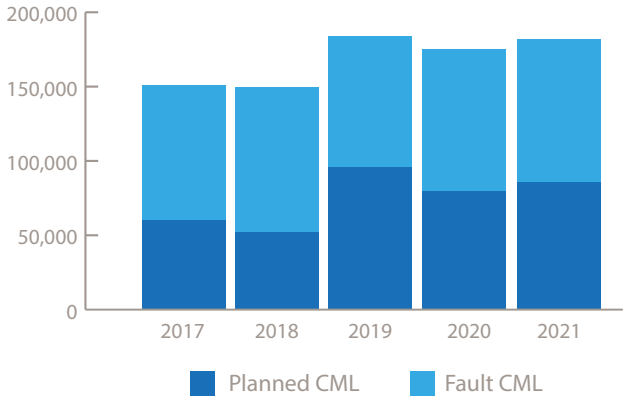
The focus of the PR5 continuity investment programmes is to minimise the impact of unplanned outages through network automation, wildlife mitigation and prioritised investments for Worst Served Customers (WSC). These investment programmes aid better flexible operation of the system in times of unplanned outages such that customers experience minimised disruption.

OUTAGES

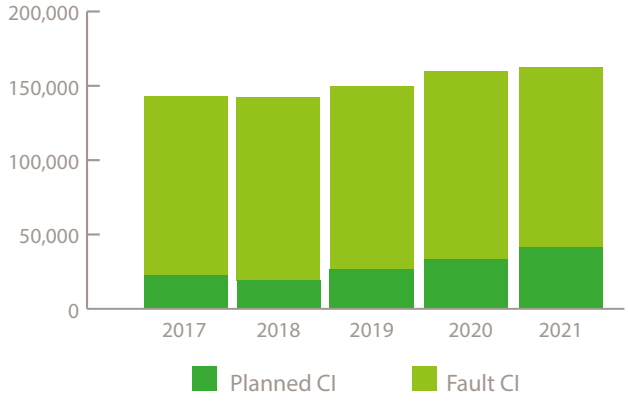
Customer Interruptions (CI) represents the number of interruptions greater than three minutes that an electricity customer has on average each year, and Customer Minutes Lost (CML) is the duration that customers on average spend without supply each year.

To benchmark our outage performance against other utilities, "storm days" (the effects of severe weather) are removed for unplanned CI and CML reporting. Therefore, the analysis in this section excludes storm day outages (CI and CML).
The average Irish electricity customer was without power for 182 minutes in 2021. The average customer experienced an outage greater than three minutes' duration 163 times per 100 customers, or 1.63 times per customer.

Annual Planned and Unplanned CML (excl. Storm Days)

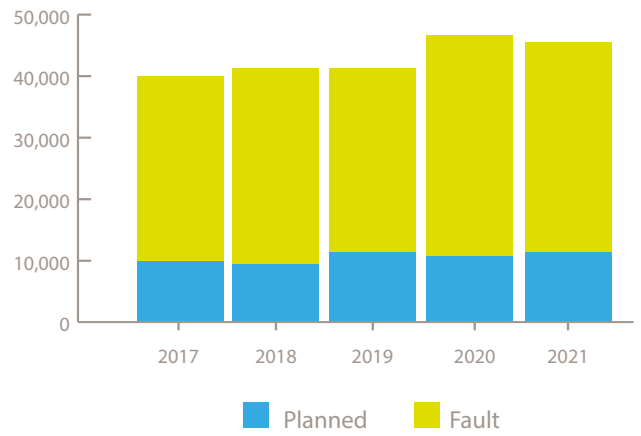


Annual Planned and Unplanned CI (excl. Storm Days)

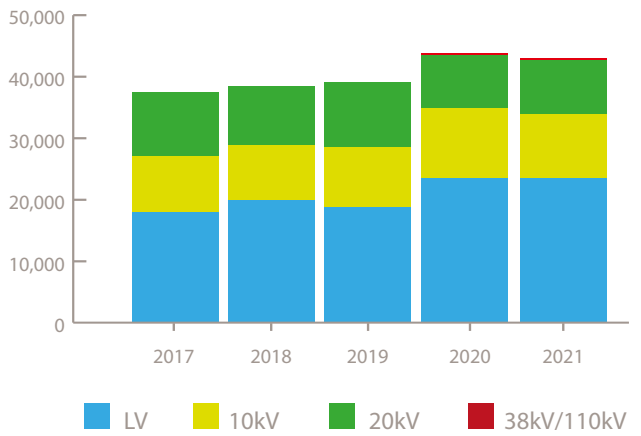


On average 75% of customer outages are due to faults on the network and 25% are due to scheduled planned outages. The highest volume of faults occurs at Low Voltage (LV), as typically an LV outage involves a single customer and the majority of our customers are connected at this voltage level. Fewer faults occur at High Voltage (HV) as there is resilience and redundancy built into the high voltage system. However, when HV faults do occur, they are high impact in terms of CI and CML as larger numbers of customers are involved.

Total Number of Outages



Total Number of Outages by Voltage



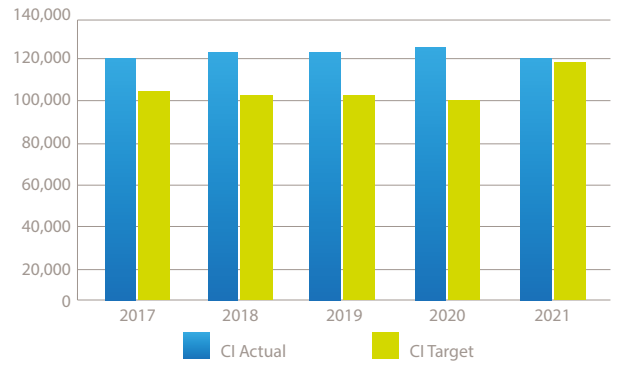
UNPLANNED OUTAGE PERFORMANCE

CRU sets incentivised targets for unplanned CML and CI (which exclude storm-related outages). In 2021, these targets were set at 85 CML and 119 CI. Our performance against these unplanned outage targets stood at 95.99 CML and 120.41CI for 2021.

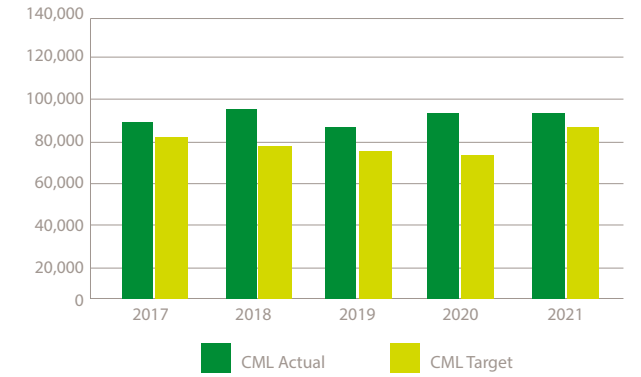
Unplanned (fault) outages inevitably occur on our network. The Irish electricity system has a high proportion of exposed overhead network relative to underground network, with a 6:1 ratio of km of overhead to underground network due to our dispersed rural population. Other European utilities have a significantly lower ratio (typically >1:1). Reliability challenges include climate and environmental issues, third party interference, and low and grounded conductors.

When a member of the public reports an incident of a fallen or low wire, also known as low and grounded conductors (LGC), to our contact centre, a risk assessment is carried out on receipt of such calls to determine if remote disconnection from our National Distribution Control Centre is warranted to ensure public safety.

Unplanned CI versus CRU Target



Unplanned CML versus CRU Target

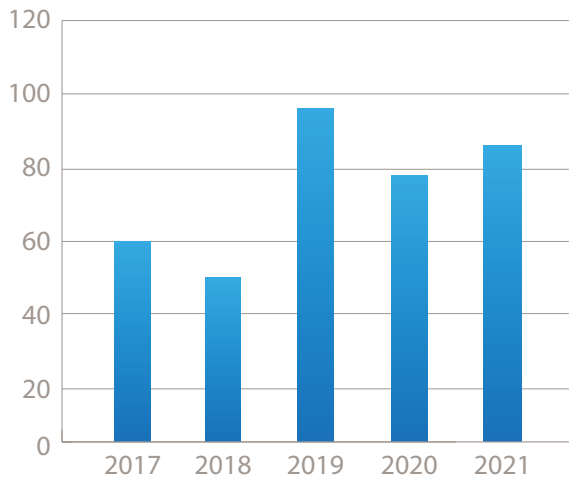


PLANNED OUTAGE PERFORMANCE

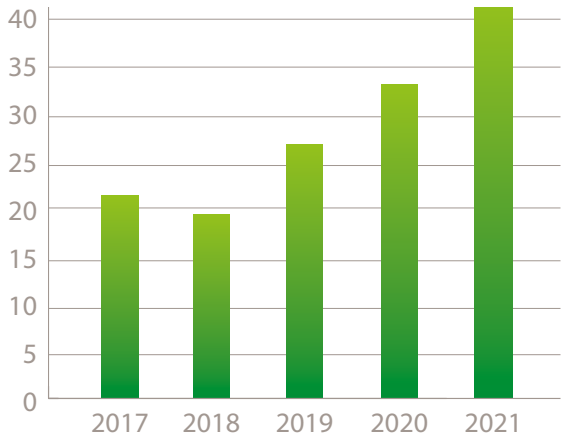
Every year ESB Networks also must carry out scheduled works, such as planned work programmes and new connections, which result in planned outages to customers. The outage date and duration are notified to customers in advance. In 2021, new connections volume increased to 29,553, and 382,188 smart meters were installed. Planned CI are increasing more rapidly than planned CML due to increased outages on the LV network for these programmes.

For the remainder of PR5, there will be a ramp-up of work to improve network reliably in line with agreed PR5 objectives.

Planned CML per Customer



Planned CI per 100 Customers



Third Party Damage causing grounded electricity line

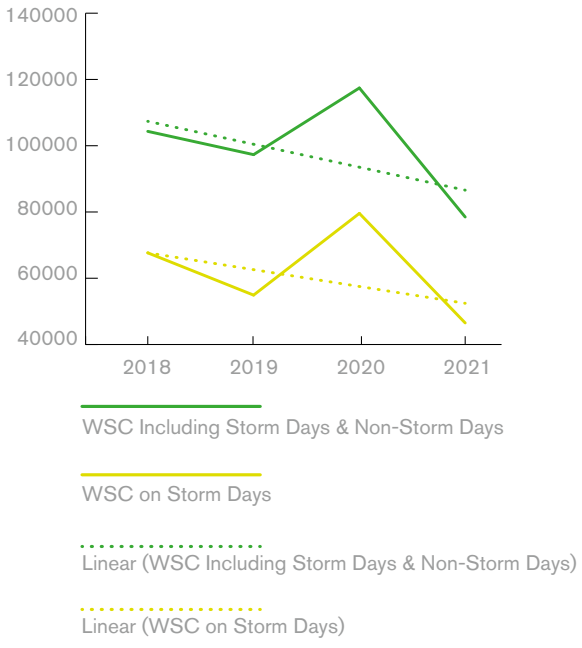
Tree Fall in Mature Forestry Plantation Corridor

WORST SERVED CUSTOMERS

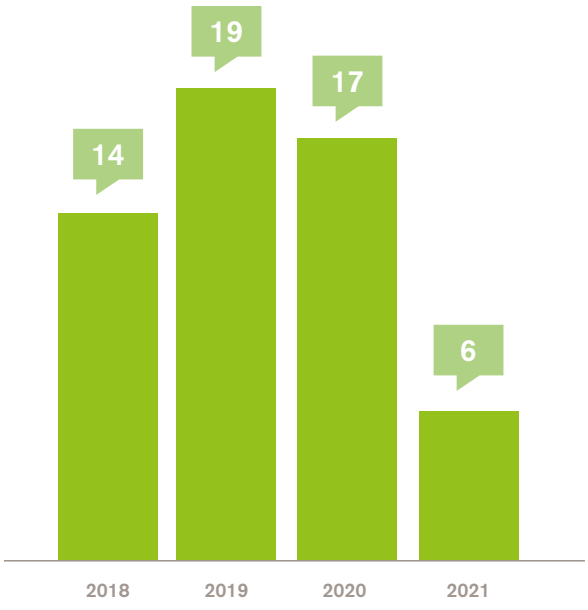
A worst served customer (WSC) is a customer that is supplied from rural overhead networks who experiences more than or equal to five interruptions in the previous 12-month period and more than or equal to 15 interruptions in the previous three years. The Worst Served Customer (WSC) incentive is based on customer interruptions (CI) per customer only. This incentive includes CI on both storm and non-storm days (unlike the CI and CML incentives, which exclude storm days).

The benefits of the PR4 investment programme continue to be realised in PR5 as evidenced by the reduction in 2021 WSC volume. Less storms were experienced in 2021, which also helps WSC performance as interruptions on storm days are included when calculating WSC population.

WSC Population Trend



Storm Days



In PR5, we are implementing an enhanced WSC investment programme for WSCs to reduce the volume of outages these customers experience.

In 2021, ESB Networks commenced the approval and design phase for WSC projects including large and challenging capital-intensive projects to address the reliability performance of these dispersed customers. ESB Networks is committed to this programme to improve service to rural customers in line with our strategy to provide a reliable supply to all customers. Our commitment is demonstrated by the range of projects that will be undertaken across the country, examples of which are given in the table below.

WSC Interventions Summary

INTERVENTION	BENEFITS
Single phase to three phase conversions	Less customers impacted by faults
Phase balancing	Prevents spurious trippings during switching and sectionalising for faults or planned work
Lightning arrestor installation	Reduces the impact of lightning in rocky, mountain locations and coastal locations which are prone to frequent lightning storms
Bird mitigation	Bird guards installed to prevent outages caused by bird strikes and swan deaths
Voltage regulator and IFT site automation	Installed in remote locations with worst served customers to prevent spurious outages during fault switching
Reducing span lengths, wider crossarms	Prevents nuisance frequent transient outages due to wires clashing together
WSC patrolling	Patrols to identify WSC interventions were completed

To measure the effectiveness of WSC interventions, a one-year time lag is necessary. Therefore, no WSC incentive was requested by ESB Networks for 2021, as improvements can only be measured at the end of 2022 at the earliest.

NETWORK AUTOMATION

There are various types of automation on the network used for protection and operations. We are implementing the following PR5 automation programmes to improve network reliability and resilience.

THREE-PHASE RECLOSERS

Automated switching and protection devices known as 'reclosers' reduce the impact of transient faults on MV overhead network and enable Smart Grid options. SCADA automated three-phase reclosers assist when fault hunting as they provide relay grade diagnostics and fault passage information to control room operators. They can be used as part of self-healing schemes or also as remotely operated sectionalising points for manual operation from the National Distribution Control Centre (NDCC).

SINGLE-PHASE RECLOSERS

Single-phase reclosers replace spur fuses. These devices benefit customers on long spurs to limit momentary reclosing interruptions to the customers supplied from that spur (60 to 200 customers typically) e.g., only the faulted spur customers experience momentary interruptions as opposed to customers on the entire feeder (typically 1,000 customers) as per advances in the available functionality of the technology.

This solution provides an enhanced customer experience as it minimises the number of customers impacted by transient overhead faults which account for more than 80% of all faults. This programme is aimed at single phase spurs greater than 10km in length and with more than 20 transformers.

38kV PRIMARY SUBSTATION AUTOMATION

When there is a line fault at 38kV, on average at least 5,000 customers are impacted. The majority of 38kV outlets have circuit breakers, and automatic changeover of stations (ACO) and automatic open (OP) or automatic closing (CL) of breakers can be achieved by installing voltage sensing relays on these existing circuit breakers. This solution will provide for automatic supply restoration to suitable 38kV stations, thus improving reliability for customers.

VOLTAGE REGULATOR AUTOMATION

Many voltage regulators are in remote locations on low population density rural outlets. By adding SCADA (Supervisory Control and Data Acquisition) control to these voltage regulators, the device can be remotely operated from the NDCC, thus reducing outage durations, and preventing spurious protection outages on long-dispersed outlets during switching.

REMOTELY CONTROLLED 38kV SWITCH

The automated device can be opened and closed remotely from the NDCC. In exposed locations with long circuit lengths, for example rural peninsulas, 38kV manual switches will be replaced with remotely-controlled 38kV switches for more efficient fault isolation and supply restoration.

MV URBAN SWITCH AUTOMATION

Urban MV switch automation is required to be able to quickly identify MV cable faults to minimise disruption to businesses and other critical supplies such as hospitals and urban customers. It will also provide fault location information to operators. Targeted remote control of ring main switches will be provided on the urban network with relay grade fault passage information.

NETWORK RESILIENCE

HV SUBSTATIONS

The distribution system includes 575 high voltage (HV) stations. This is comprised of two 220kV stations, 141 x 110kV stations and 432 x 38kV stations. To provide the best service to all of our customers, each substation's reliability is of utmost importance. With a life expectancy of 50-60 years for major equipment, strategic maintenance/replacement before failure is key to providing uninterrupted supply to our customers and ensuring the assets remain safe for our staff and the public.

In line with our PR5 submission focus on Asset Health and making data-driven decisions, there was a continued focus in 2021 on acquiring additional condition-based data for our assets. The first phase of extensive HV station condition surveys has now been completed. This was centred around our indoor rural stations constructed between 1950 and 1960. This provided an in-depth view of the asset health in these stations. A detailed risk profile is now being developed that will consider both Asset Health and Criticality in determining how best to intervene with these stations over remainder of PR5 and beyond.

A particular focus has also centred on identifying key safety-critical programmes where there is a known plant defect/ restriction that may impact staff or public safety and ensuring all of these programmes are ready for delivery and effectively monitored.

In addition to our high-volume Maintenance and Asset Replacement programmes above, work is also well underway with addressing Major Asset Replacement Projects, typically involving the replacement of entire 38kV Stations, many of which will deploy modular (containerised) solutions that allow for standardised 38kV, Medium Voltage and Control Room solutions. These modules allow for faster, more consistent project delivery and commissioning timelines. Removal of these older stations will mitigate key safety and continuity issues associated with older, fault-prone legacy equipment.

Our PR5 goals also saw a particular focus on addressing more enduring risks presented to/by our assets, such as environmental- and climate-related. To that end, an extensive environmental survey programme has been completed that is allowing a more targeted approach to implementing key environmental-related programmes, such as:
- Transformer Replacement
- In-Bund Oil Separators
- Bund Retrofitting

An increased focus has also been brought to bear on assessing stations that may have a higher flood risk in line with OPW data, to allow a more targeted approach to any longer-term flood mitigation measures for particular stations. Work is also underway in addressing stations where there is already a known flood risk via either primary measures (raising of equipment, drainage works) or secondary measures (e.g. bund retrofitting to mitigate consequences of any flood event).

To allow effective delivery of the above programmes, there has been a particular focus on collaboration with our programme and construction teams to allow a more integrated Maintenance and Asset Replacement annual plan, whereby a range of different programmes are executed at the same time in a HV station. This approach looks to maximise the level of work delivered, through an efficient use of resources.

OVERHEAD NETWORK

The overhead distribution electrical infrastructure in Ireland is made up of approximately 60,000 km of LV network, 84,000 km of MV network and 6,000 km of HV network. The fundamental components of this infrastructure are support structures (poles or steel towers), conductors, insulators and electrical equipment for operational switching. The operating voltage will dictate the conductor and insulator type to be used and the support structures used are predominantly wooden poles.

Wooden poles account for over 98% of all overhead line support structures. Network Technicians climb these poles to operate and maintain the system, so the strength or "health" of these poles and the material and equipment supported is of the utmost importance.

2021 saw the continuation and expansion of the asset health project in overhead lines. Essential for these asset health data models is the data gathered both in terms of technical requirements and the ability to analyse and present the results. Collaboration between digital mobile tech experts and overhead line specialists has ensured mobile apps will soon become available across all voltages, facilitating targeted mitigation, asset health scoring and planned future network renewal works.

There was a continued focus in 2021 on delivery of safety and continuity focused programmes i.e:

- Public safety hazard patrols and rectification of identified hazards across all voltages.
- Continued delivery of the pole replacement programmes at MV.
- Ongoing refurbishment of the 38kV overhead network.
- To further improve asset health, and thereby continuity, we have progressed our Triple Pole Switch (TPS) refurbishment programme.

Network resilience in overhead lines is directly related to the delivery of the asset replacement and maintenance programmes and ongoing improvement and refinement to overhead line components.

Review of internal safety and fault monitoring databases resulted in targeted inspections on sections of overhead line with a view to reducing the likelihood of conductor failure.

Considerable progress in the future use of composite and concrete pole technology was made in 2021, with on-site trials completed. It is anticipated that these alternative technologies will provide improved resilience in areas exposed to harsh environmental conditions.

Timber cutting programmes have a significant impact on the resilience of our overhead network, and together with continued focus on delivery, there has been an improved audit programme and focus on quality of cut and compliance to standard.

Our worst performing outlets have been prioritised for targeted specialist technical patrols and follow-up remedial works programmes. This ensures resources are targeted and deployed to the locations most in need of investment.

Wildlife protection for overhead networks was also reviewed to minimise impact on wildlife and to improve network performance.

UNDERGROUND NETWORK

There are approximately 177,000 low voltage (LV) minipillars on the distribution system. ESB Networks carries out public safety hazard patrols (PSPs) on approximately 42,000 minipillars per annum. We previously developed a new software application to capture minipillar data from such inspections. By the end of 2021, survey data for all registered minipillars was inputted into this system, meaning we now have full asset population patrol data. This enables ESB Networks to plan asset replacement and/or corrective maintenance on this significant asset base. It supports further movement from paper-based patrol records to being more digital and data-driven in the lifecycle management of our LV minipillars. Using the software application data to produce a PSP dashboard will enable us to monitor asset condition and hazards identified more efficiently, along with better governance on patrol standards. This will enable us to monitor this asset class for public safety while also maintaining a resilient minipillar asset population.

There are approximately 23,000 Medium Voltage (MV) substations on the distribution system. ESB Networks also carries out PSPs on approximately 11,500 MV substations per annum. Once the PSP dashboard is developed for LV minipillar PSPs, it is intended to roll out the same monitoring and governance dashboard on MV substation PSPs.

On our MV network we also continue to progress planned asset replacement programmes on our cast resin type MV unit substations. To replace these MV unit substations in urban environments is difficult, particularly where the space allowed for the existing substation is too small for our currently supplied standard MV unit substation. To ensure this important asset replacement programme progressed, ESB Networks secured several alternative MV unit substation types from our equipment suppliers. These slimline substation design types have been successfully employed at sites where width, depth and height space can be limited.

By the end of 2021, the cast resin type MV substation population was reduced down to approximately 1,300 units.

METERING ASSETS

ESB Networks owns and maintains 2.4 million customer meters. In 2021, 382,188 smart meters were installed as part of the Smart Meter Project. ESB Networks also carried out the replacements as required of low voltage (LV) meters and medium voltage (MV) meters. A number of HV current transformer (CT) meter replacements/refurbishments were also completed, while a number of power quality (PQ) metered sites were also inspected in 2021 to support planned replacement of PQ meters in PR5.

NETWORK REINFORCEMENT

Continued network reinforcement is of vital importance to the distribution system. ESB Networks has delivered and will continue to deliver large HV projects that facilitate economic growth, provide new connections and improve security of supply for customers.

Important projects to improve resilience, increase capacity and strengthen the network were completed in 2021. A total of five 110kV transformers were replaced, increasing capacity by 220 MVA, with one new 38kV transformer installed, further increasing capacity by 5 MVA. This brings the total net additional transformer capacity added to the network to 225 MVA in 2021 compared to 90.8 MVA in 2020.

Net Increase in 110 kV and 38 kV Transformer Capacity

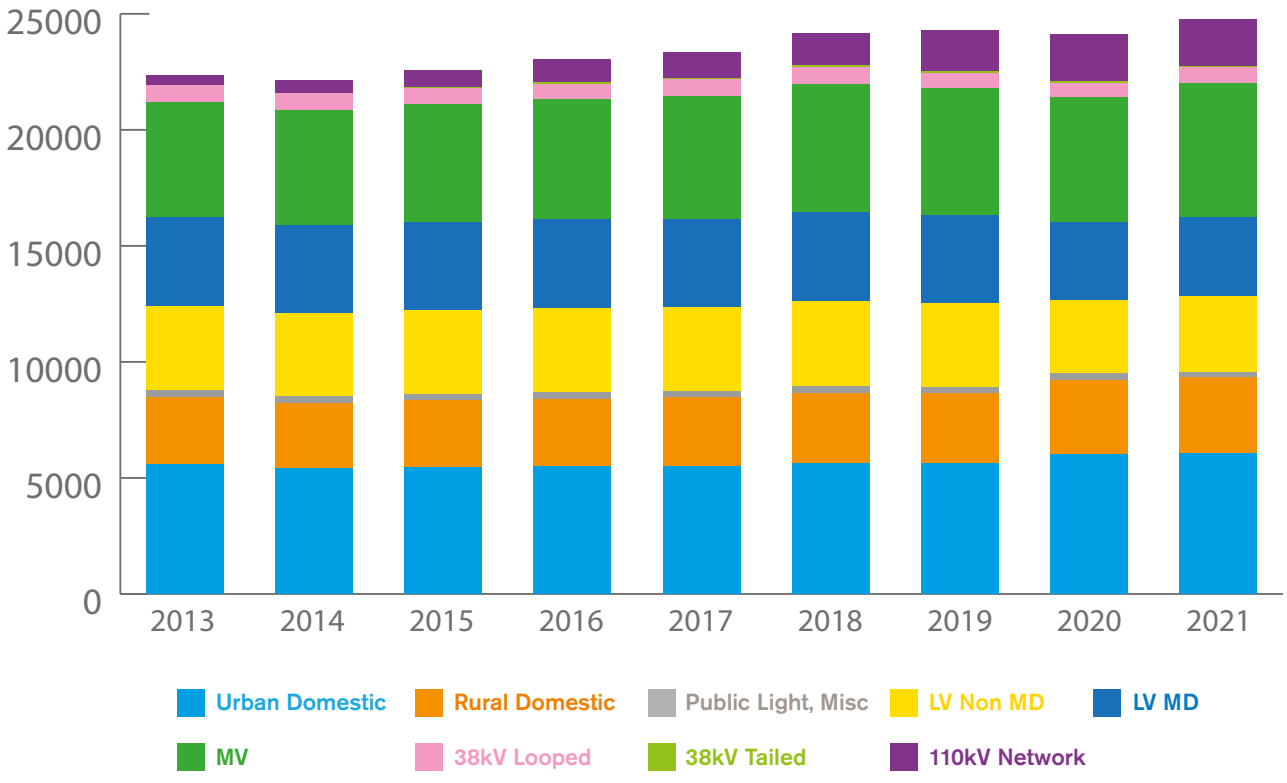
Year	2018	2019	2020	2021
110 kV (MVA)	177.5	303.5	63	220
38 kV (MVA)	75	34	27.8	5
Total	252.5	337.5	90.8	225

SECTION

03 NEW CONNECTIONS AND GROWTH

Efficient and economic connections are vital for our customers. We consistently strive to reduce the time from request to connection. Our focus is to enhance customer relationships through the design of a better experience, turning common field service challenges into customer engagement opportunities, increasing efficiencies to reduce the time from application to connection and the proactive provision of timely information to our customers.

Electricity Consumption



NEW DEMAND CONNECTIONS

In 2021, we completed 29,553 new demand connections, comprised of 8,082 single domestic dwellings, 11,167 housing scheme connections, 5,619 apartments, 2,871 businesses and 1,814 unmetered connections. This was an overall increase of 2% on the 2020 delivery.

Completed Connections	2020	2021	% Difference 2021 v 2020
Apartments	4,445	5,619	26%
Housing Scheme	12,193	11,167	-8%
Single Domestic	8,060	8,082	0
Business	2,715	2,871	6%
Business Unmetered	1,611	1,814	13%
Grand Total	**29,024**	**29,553**	**2%**

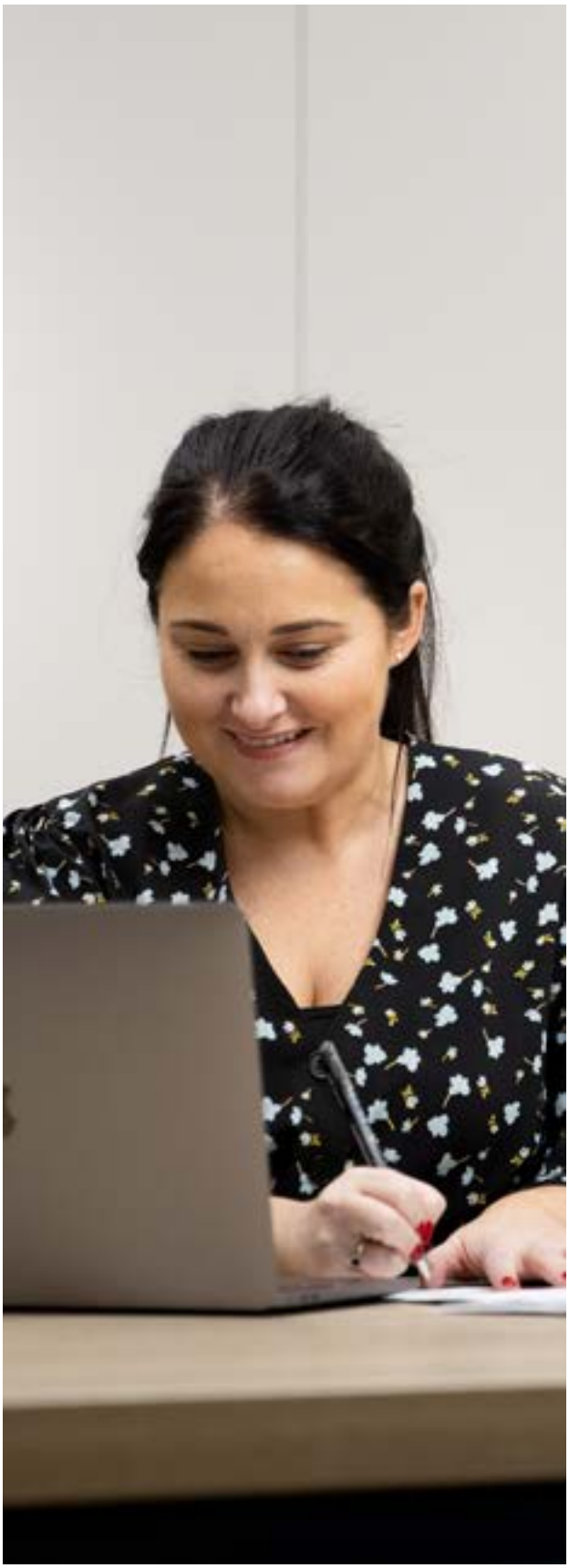
The Covid-19 pandemic continued to impact on new connections in 2021 and we saw a decrease in completed connections in each quarter versus 2020, with the exception of Q2. The substantial increase of 54% in Q2 was driven by the re-opening of construction and the lifting of restrictions which had been in place between January 8th and April 4th, 2021. We saw the largest increase in apartments with an increase of 143% in Q2 2021 versus Q2 2020.

Completed Connections	% difference per Quarter between 2021 & 2020			
	Q1	Q2	Q3	Q4
Apartments	-31%	143%	27%	23%
Housing Scheme	-19%	39%	-13%	-19%
Single Domestic	-1%	37%	-11%	-8%
Business	-15%	58%	12%	-9%
Business Unmetered	16%	32%	5%	4%
Total	**-14%**	**54%**	**-5%**	**-7%**

Terminations and De-energisations	2017	2018	2019	2020	2021
Connection points terminated	16,042	13,215	14,303	18,092	16,399
Connection points de-energised	4,827	5,054	5,267	1,645	1,069

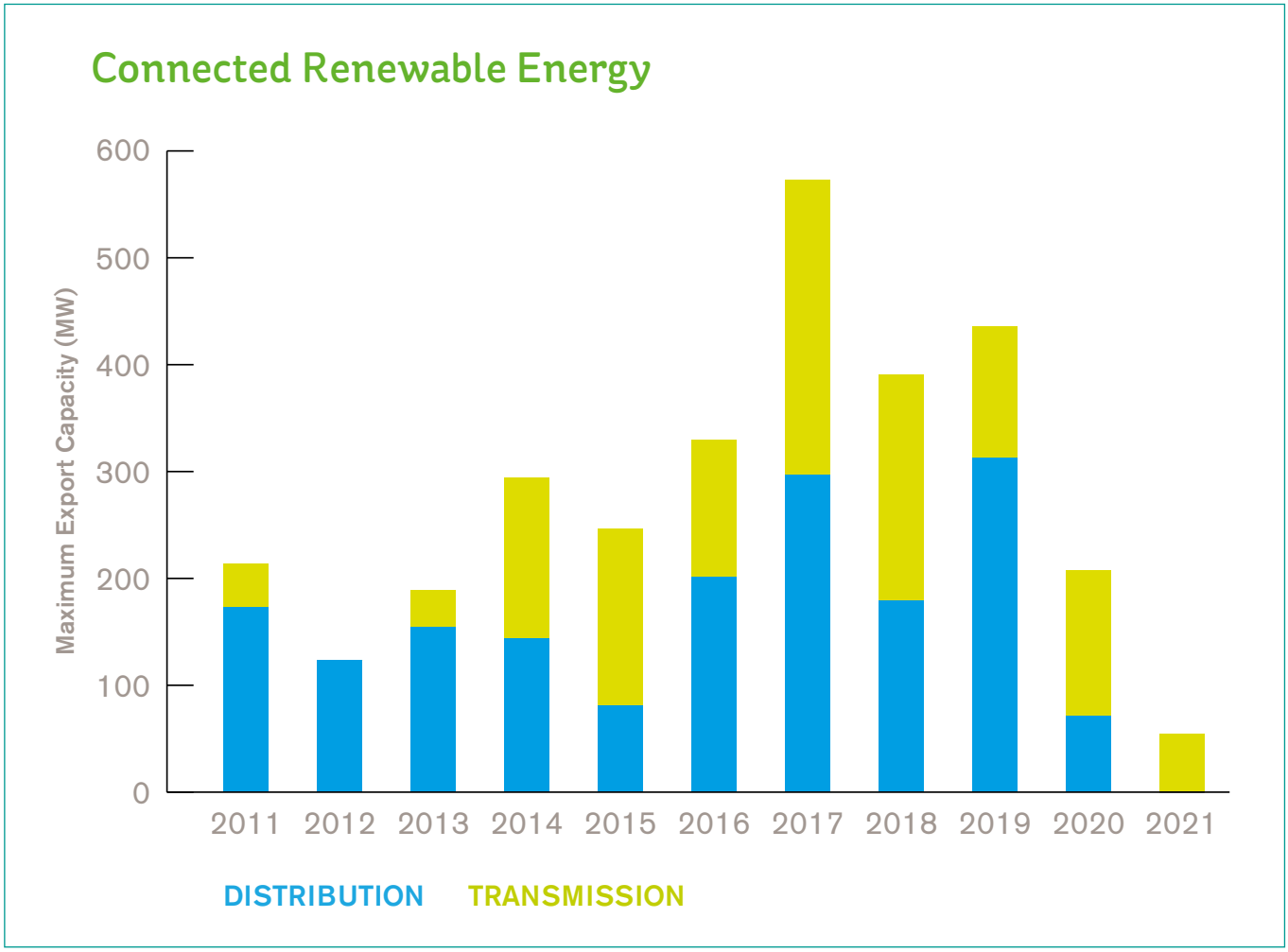
Terminated: This includes connection points in vacant premises that have been terminated following previous de-energisation and de-registration. It also includes MPRNs associated with housing scheme quotations that have not progressed.

De-energised: for non-payment only.



CONNECTING RENEWABLE GENERATORS

From 2011 to 2021, the connected renewable generation has increased by 150% from 1,876 MW (MEC) in 2011 to 4,690 MW (MEC) in 2021.



2021 RENEWABLE STATISTICS

- 4.69 GW total of renewables connected to the national electricity system by the end of 2021 (2,443 MW Distribution and 2,247 MW Transmission) with over 4.3 GW of this being wind generation.
- A total of 248.8 MW of Battery Energy Storage was connected to the electricity system in 2021 (19.8 MW Distribution and 229 MW Transmission).
- ESB Networks processed a total of 86 ECP-2.1 generator applications throughout 2021. This led to 56 connection offers being issued, totalling 441 MW for a mix of wind, solar, and CHP projects.

ENDURING CONNECTION POLICY (ECP-2.1)

ESB Networks successfully completed the processing of the majority of the Enduring Connection Policy 2.1 (ECP-2.1) generator applications in 2021, with the remaining scheduled to be completed in early 2022. The application window first opened for the ECP2.1 batch in September 2020, and applicants included a mix of wind, solar and CHP projects. ESB Networks processed a total of 86 applications throughout 2021, leading to 56 offers. We also carried out extensive customer engagement across the period, with over 100 customer meetings taking place to agree the customer connection methods. As part of the ECP process, customers had the option to withdraw from the process for a partial application fee refund, and to reduce MEC to avoid potential uprates.

The option to re-optimise available capacity proved very successful in allowing projects to remain in the process which otherwise might have been withdrawn or requested to modify in the future. The ECP-2.1 applications were processed in time for the upcoming RESS 2 auction process due to take place in May 2022, and included a mix of Wind, Solar and CHP applications. The aim will be for these projects to proceed with a RESS 2 contract or CPPA, and start contributing to the CAP21 renewable electricity targets of 80% by 2030.

For ECP-2.1, the Stage 1 customer engagement took place between Dec 2020 and early Feb 2021 in advance of the application fee balance requirement. Customer calls were scheduled for approximately nine nodes, where significant uprates were identified. Further to the Stage 1 customer engagement, 14 ECP-2.1 applications were withdrawn and these 14 places were backfilled with the next 14 applications, based on the planning permission expiry date.

The Stage 2 customer engagement took place between April and October, following the technical assessment of the applicant's connection method by the RES & Customer Flexibility team.

These meetings consisted of:

- Outlining the connection method at a high level
- Estimating costs associated with connection
- Discussing whether the possibility of MEC reduction to avoid certain uprates was available
- Offering the option to withdraw ECP-2.1 applications and receive a 75% application fee refund

There were 95 Stage 2 customer engagement meetings, with some applications requiring more than one meeting. In total, 29 applications availed of the option to withdraw their application post-Stage 2 customer engagement and one project transferred to the Transmission network. For the customers who indicated that they wanted to proceed with their application, the connection offer documentation was prepared and issued to each customer.

There was also a small number of applications which withdrew before the Stage 2 customer engagement following communications on various issues such as Planning Permission and the Priority Dispatch SEM decision (SEM-20-72) in December 2020.

ECP - 2.1 Connection Offers Profile

Technology	Connection Offers	MW
Wind	20	146.15
Solar	35	294.62
CHP	1	0.24
Total	**56**	**441.01**

MINI-GENERATION

ESB Networks developed a new, streamlined connections application process for mini-generation customers. These are projects defined as renewable generation in the range of 6-17 kVA for single phase, and 11-50 kVA for 3-phase. This will be trialled as a pilot in 2022. In order to do this, we simplified the existing application form which now requires only the appropriate level of technical information in relation to the proposed generator. We also produced a dedicated page on our website containing a step-by-step guide and eligibility criteria. As well as provided relevant training to staff, we also hosted a number of advanced key stakeholder webinars.

Finally, as part of this streamlined connections application process, we will prioritise customers who apply for an MEC in the smart meter rollout, removing the requirement for them to install a non-smart import / export meter, reducing costs and unnecessary waste.

For further information, please see the Mini-generation section of the ESB Networks website: https://www.esbnetworks.ie/new-connections/generator-connections-group/mini-generation

MICROGENERATION

The Government's Climate Action Plan has a dedicated section on microgeneration where the Government "strongly supports enabling people to sell excess electricity they have produced back to the grid". As DSO, ESB Networks has an important role to play in facilitating the transformation to low-carbon technologies. 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. As such, to date, ESB Networks has facilitated in the region of 25,000 microgeneration connection applications to the electricity network.

Customers should inform ESB Networks in advance of installing microgeneration through completion of an NC6 form. For further information, please see the Microgeneration section of the ESB Networks website: https://www.esbnetworks.ie/new-connections/generator-connections-group/micro-generators

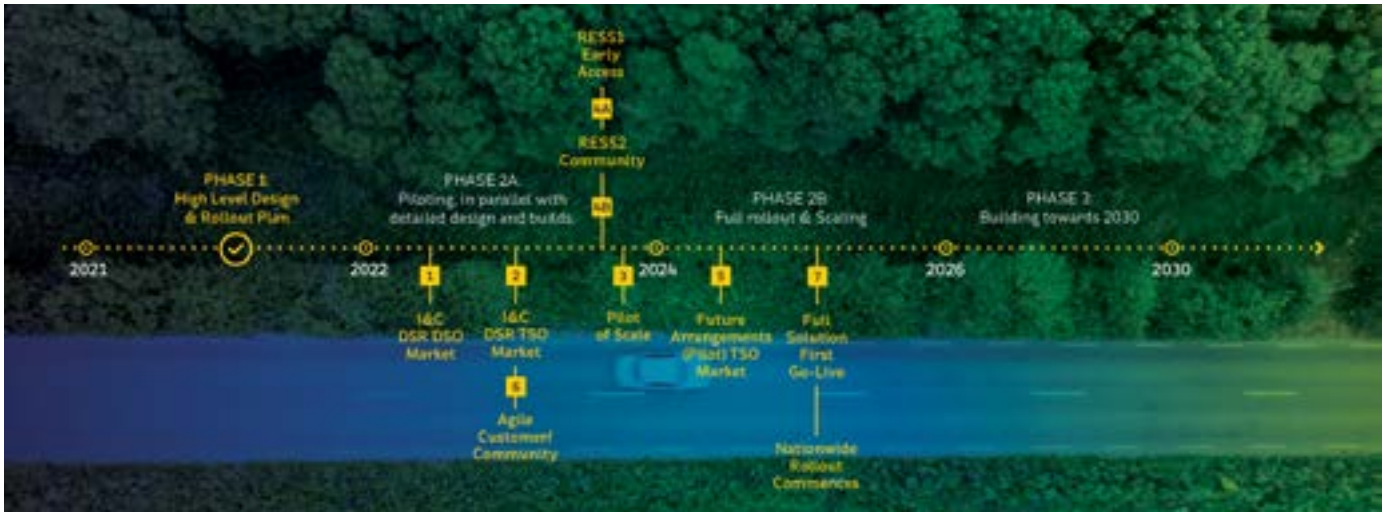
NATIONAL NETWORK, LOCAL CONNECTIONS PROGRAMME, FORMERLY KNOWN AS ACTIVE SYSTEM MANAGEMENT (ASM)

The decarbonisation of Irish society relies on fundamental changes to how energy is generated and consumed. To enable these changes at the right pace and the right price, we will rely on the electricity network, and we need to make the connection between how renewable energy is generated, and how we use or store it. Every Irish home, farm, community, and business is being called on to play a part. The National Network, Local Connections Programme has been established to work with, and for, customers to make this possible. ESB Networks serves, and is funded by, all electricity customers.

The National Network, Local Connections Programme aims to support both government climate action targets, and to meet the needs and expectations expressed by stakeholders to deliver a network for net zero and support customers in getting more from their local connections, so that they can support a clean electric future. The programme will deliver by empowering customers to manage how and when they use renewable electricity in their daily lives, and by rapidly adapting how we manage the existing ESB Network for more renewable connections.

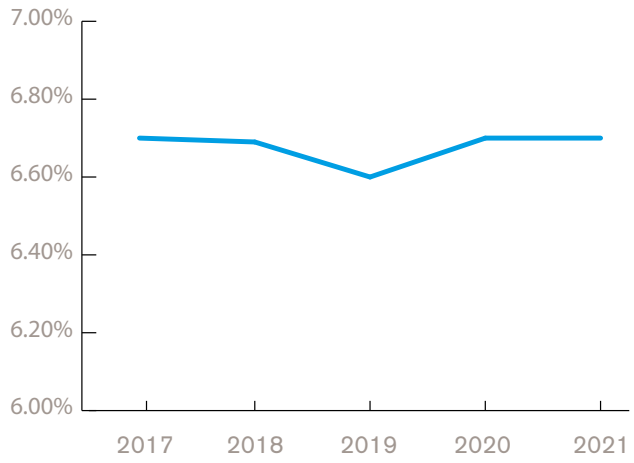
In September 2021, ESB Networks launched the National Network, Local Connections Programme consultation. Stakeholder feedback was requested on the 10 consultation documents, which aligned to the overarching themes of access and awareness, technology, market design and the DSO/TSO Joint Plan. In developing these proposals, time was taken to seek and utilise stakeholder input from round tables and focus groups, as well as to research and utilise exemplar international experiences to inform the delivery plans. These delivery plans were published on the ESB Networks website: https://www.esbnetworks.ie/who-we-are/national-network-local-connections-programme/our-consultations

The programme has also published a piloting roadmap; this allows the programme to engage with, collaborate with, and support stakeholders in delivering sustainable change in how we deliver a network for net zero, and empower customers to be in control of their energy use.



DISTRIBUTION LOSSES

Electricity losses are inherent losses within an electrical system. In 2021, approximately 6.7% of the energy that was put into the distribution system was accounted for as losses, similar to the 6.7% seen in 2020.



Losses are comprised of 'technical' and 'non-technical' losses. Technical losses are heat losses arising from the passage of electricity through lines, cables and transformers. Technical losses depend on the volume of electricity flowing in the system and the characteristics of the lines, cables and transformers. Non-technical losses on the other hand are electricity units which are unaccounted for; for example, as a result of theft arising from unauthorised connections. It is believed that these commercial losses represent approximately 0.5% of the electricity entering the electricity system in 2021.

Factors that affect the % of electricity lost include:

› The proportion of electricity that is distributed at the various voltage levels
- Electricity distributed to customers connected at higher voltages incurs less system losses than electricity connected at lower voltages. In recent years, the addition of data centres connected at 110 kV has caused a reduction in losses as a % of GWh distributed.

› Utilisation of Assets
- If the loading of transformers, lines and cables increases, losses will also increase. As networks are naturally reinforced, this will normally result in a reduction in losses.

› Operating voltage of Lines and cables
- The higher the operating voltage of lines and cables, the lower the losses for a given electricity throughput.

› Generator connection
- As more generation is connected to the distribution network, there is an impact on losses. There are additional losses on the connecting lines and cables to wind farms and other large generation sites. Some losses may be avoided due to supply of electricity locally displacing electricity supplied via the transmission system particularly for generation connected at low voltage e.g. photovoltaic generation.

› Unauthorised connections / metering tampering etc.
- The propensity for unauthorised connections and meter tampering in the customer base and the effectiveness of measures to reduce it.

SECTION

04 ENVIRONMENT

At ESB Networks, we are committed to operating our business so that we can be proud of our environmental and sustainability performance.

We recognise that our activities have environmental impacts, and that we have a responsibility to manage these impacts in a manner that prevents pollution and provides a high level of protection for the natural environment. ESB Networks' Policy Statement on the Environment is available at: https://www.esbnetworks.ie/docs/default-source/publications/esb-networks-policy-statement-on-the-environment.pdf?sfvrsn=c85b249f_12

Our strategy in ESB Networks is driven by our central role in leading the transition to a secure and affordable low-carbon future, using clean electricity to drive carbon (in the form of fossil fuels) out of heat, transport and the economy.

During 2021, ESB Networks achieved the following:

- Further reduction in carbon emissions from our fleet, SF6 gas, buildings and waste materials.
- We continued to respond to fluid-filled cable leakage in line with protocols agreed with local authorities.
- 99% of waste materials generated by ESB Networks during the course of its business operations was diverted from landfill.
- We maintained external certification of our Environmental Management System (EMS) to the international standard ISO 14001.
- We 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. By the end of 2021, 622,000 smart meters had been installed.
- The Dingle Project proceeded, facilitating planning for the future in terms of how we are going to support Ireland in transitioning to a low-carbon energy system.
- ESB Networks' Environmental Change Programme was concluded in 2021 and learnings were embedded into day-to-day operations across the business.

ENERGY USAGE – BUILDINGS AND FLEET

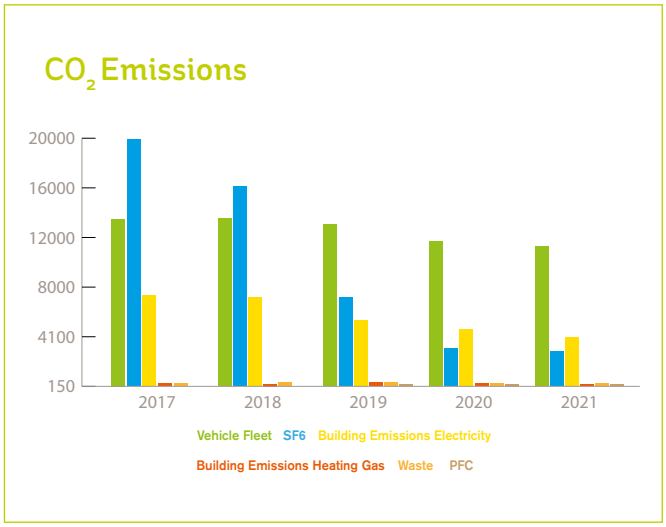
Compared to 2020, electricity usage in buildings was down 4%, and gas for heating use was lower by 24%. In 2021, as in 2020, office occupancy was affected by measures to address the Covid-19 pandemic. Premises with multiple functions, such as depots with workshops, garages and stores facilities, showed relatively minor variations in energy consumption due to ongoing essential activities.

Vehicle fleet fuel consumption was lower by 3% in 2021 than 2020. This reduction is attributable to newer and more efficient vehicles being brought onto the fleet, and an expansion of our electric vehicle fleet. There were 72 small electric vans on the fleet in 2021, with one medium-sized electric van also purchased. Additional medium-sized electric vans will be purchased in 2022. Significant maintenance and firmware upgrades to 100 of our depot chargers was completed to allow the data to be accessed via the back end system for transport energy reporting. A contract was awarded for up to 40 electric forklifts in 2020, and 25 of these were delivered in Q1 2021.

Overall CO_2 Emissions

Description	2017	2018	2019	2020	2021	2002 v 2019 Tonnes CO_2 (%)
Vehicle Fleet	13,517	13,526	13088	11,700	11,309	-3%
SF6	19,870	16,130	7,225	3,145	2,880	-8%
Building Emissions - Electricity	7,374	7,240	5380	4,647	4,062	-13%
Building Emissions - Heating Gas	215	166	292	180	136	-24%
Waste	229	254	256	206	182	-12%
PFC[2]	25	38	38	2.9	3.4	17%
Rounded Total	**41,230**	**37,354**	**26,279**	**19,881**	**18,572**	**-7%**

Note: Overall CO_2 equivalent figures compiled using relevant DEFRA and SEAI CO_2 conversion factors



[2]PFC is perfluorocarbon gas emitted as part of the fluid-filled cables leakage detection process.

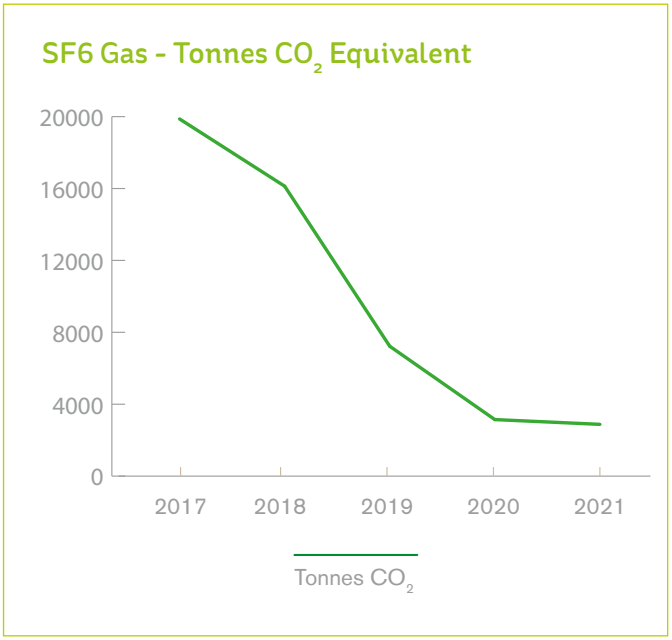
SF6 GAS MANAGEMENT

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 line with Regulation (EC) No 166/2006.

In 2021, 126.3 kg of SF6 was emitted due to equipment faults on distribution and transmission switchgear. Overall emissions from both distribution and transmission switchgear represented 0.06% of the total installed inventory of SF6. The comparable 2020 leak quantity was 137.96 kg, representing 0.08% of inventory. This represents a continued reduction in annual emissions for ESB Networks.

As we replace and repair our older switchgear, we can see a downward trajectory of SF6 emissions which is shown in the following graph:



FLUID-FILLED CABLES

ESB Networks responds to each leak and continuously works to reduce its annual leakage by improving upon leak identification and repair times, and by progressing our FFC replacement programme.

Two distribution circuits had Local Authority notifiable leaks in 2021, with one distribution cable leak repaired. You will find details on our repairs on our website.

ESB Networks' company standard, "Management of Fluid-Filled Cables" set a maximum cable leakage volume of 5,000 litres per annum in 2021, a reduction of 3,000 litres on the 2020 limit. During 2021, 6,281 litres of cable insulating fluid leaked from ESB Networks' high voltage cable network.

WASTE MANAGEMENT

ESB Networks is committed to becoming a leading company in the area of sustainability. The effective management of waste is seen as a key environmental management objective in supporting this strategy. During 2021, ESB Networks diverted 99% of the waste it generated as part of its business operations from landfill.

Suitable arrangements were also maintained and further enhanced where appropriate for the compliant, effective management and disposal of waste arising at depots, stores, HV stations and sites nationwide.

Memorandums of Understanding were 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.

ENVIRONMENTAL MANAGEMENT SYSTEM

ESB Networks utilises an Environmental Management System (EMS) which has been externally certified to the ISO 14001 Standard since 2010. The EMS provides a framework which allows ESB Networks to systematically identify, assess, prioritise and manage the environmental risks associated with its business operations. The scope of the EMS is such that it covers all of ESB Networks' activities, services and processes associated with managing the electricity network on behalf of the Electricity Supply Board. ESB Networks' EMS retained its external certification to the ISO 14001 standard, following two independent external surveillance audits in 2021.

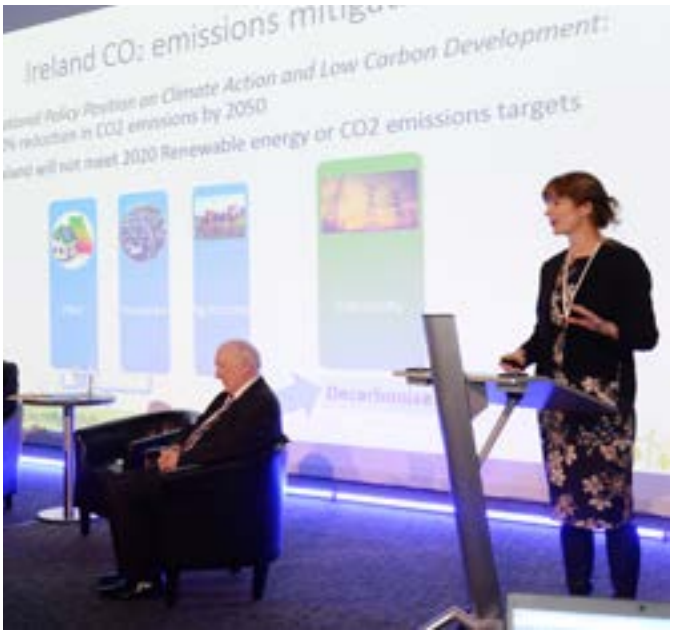
MANAGING THE ENVIRONMENT DURING CONSTRUCTION

We continue to make improvements within the challenging environment of project planning and consenting while maintaining a focus on timely and cost-effective delivery of projects in the best interest of the environment and the customer.

At planning stage, multi-disciplinary technical teams work to develop projects and site-appropriate construction methodologies in order to deliver connections to customers while protecting sensitive habitats. Detailed construction packs, capturing all of the requirements of 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.

Specialists such as Project Ecologists, Ecological Clerks of Works, Project Archaeologists, etc., are tasked with overseeing construction works to ensure that the utmost care is taken in regard to the environment and the planning permission requirements.

In 2021, ESB Networks provided the Waste Enforcement Regional Lead Authorities (WERLA) with information on ESB Networks' Construction Projects that had the potential to generate Construction and Demolition Wastes. WERLA ensure the proper management of construction and demolition waste nationally.



SECTION

05 SAFETY

Our purpose in ESB Networks has always been to connect and distribute electricity - safely, securely and affordably.

The health and safety of our staff and contractors as well as the communities and customers we serve, continues to be a core strategic priority and area of focus. Our Safety Strategy sets out our strategic intent and commitment to how we keep our network safe, and how we raise awareness about the importance of health, safety and wellbeing among our staff and contractors, as well as the dangers of coming into contact with or close proximity to our electricity networks and equipment for the general public. We continued to make improvements across the key areas of compliance, engagement and communications, safety culture transformation, road safety and public safety, while all the time ensuring the provision of essential services against the challenges posed by the Covid-19 pandemic.

ESB NETWORKS RESPONSE TO COVID-19 PANDEMIC

ESB Networks responded to the Covid-19 pandemic in line with government measures, continuously balancing the provision of essential supplies with the need to keep our staff and contractors safe and healthy.

KEEPING OUR CUSTOMERS AND EMPLOYEES SAFE

During 2021, measures continued to be implemented and reviewed in facilitating and supporting most office-based employees to work from home. For staff that needed to attend sites and offices, a range of procedures were developed, approved and trained out. These included a Covid-19 Health and Safety Site Plan, a Covid-19 Risk Assessment and approved procedures (e.g., staff working within two-metre proximities), and protocols for meeting customers at their premises.

MAINTAINING ESSENTIAL SERVICES

ESB Networks provides an essential service and continued to work through the Covid-19 pandemic. Continuity plans were developed across the business to ensure network functions operated as normally as possible, even if some colleagues were restricting movements / self-isolating.

EXTERNAL VALIDATION OF SAFETY MANAGEMENT SYSTEM

In keeping with our aim to continuously improve and develop our capability and performance levels in safety, health and wellbeing, ESB Networks successfully retained its certification to the international ISO 45001 Occupational Health and Safety Management System standard.
The National Standards Authority of Ireland (NSAI) recognised the continued effort and commitment that is required to continuously drive safety improvements. In 2021, ESB Networks aligned their ISO 45001 surveillance audit with their public safety audit to help streamline and bring efficiencies to external auditing of ESB Networks safety management systems. This was recognised as a significant safety improvement by the auditing body, and was a further validation of ESB Networks' efforts and commitment to drive safety performance improvements.

PUBLIC EDUCATION AND AWARENESS

Our partnerships with the Irish Farmers Journal, farm contractor bodies and the Construction Industry Federation (CIF), resulted in the publication of a regular series of electricity safety articles in their publications and across their digital and social media channels; these covered both overhead high-reach risks and underground cable dig-in risks. Through our partnership with the Irish Farmers Journal, we ran eight adverts / articles which were issued to both their online and offline readers (+235K from the farming audiences). Our videos during Farm Safety Week 2021 reached over 366K unique users on social media. During Construction Safety Week, ESB Networks delivered a live webinar to CIF members in partnership with Gas Networks Ireland, and manned a virtual stand at the CIF annual conference.

The campaign messaging of our 'Are You Sure It's Safe?' and 'Stay Safe, Stay Clear' public safety advertising marketing campaigns helps encourage the public to stop and think of the danger when they are close to the electricity network. This campaign has worked well since its launch in 2016 and maintained awareness levels at 85-95%. To maintain engagement, however, we revamped and launched our revised 'Are You Sure It's Safe?' advert in Q4 2021.

Our new safety advert runs across TV, video-on-demand, radio, digital audio, social media, display marketing and paid search. It includes four key risk scenarios: builders using scaffolding near overhead wires; people using drones near overhead wires; people hanging flags and bunting on electricity poles; and a generic fallen wires message, as it remains a serious risk to the public. Awareness figures for the campaign remain high, with more than half of Irish adults (52%) able to recall the advert after only two media bursts, which is higher than the TV norm (41%). 74% of adults 'like' the ad and feel like it stands out, with 86% understanding the key dangers communicated in the advert and recognising the relevance to them.

Our 'Summer Safety' radio and digital audio campaign ran across key months in 2021 to drive awareness of key risks such as hanging bunting, fallen wires, gardening and flying drones. We had 660 spots over the summer months. This, combined with social messaging, helped to drive awareness of outdoor safety risks during the summer.

ESB Networks' social media channels continued to target key at-risk audiences, with always-on safety messaging targeting our key 'at risk' audiences (farming, construction, general public, schools), and achieving a combined result of 5.6 million paid impressions and 534,000 engagements.

ESB Networks' 'Stay Safe, Stay Clear' primary school competition calls for primary school children to create posters with electricity safety poster tips. In 2021 we received 3,000 entries from 162 primary schools, and our supporting social media campaign reached +826K users (targeting teachers and parents) with +287K engagements. Our social media campaign has allowed us to bring the winning safety posters to life all year around.

We also issued several press releases on topics covering transporting of high loads, election posters, winter safety, Christmas safety and working near electricity wires, which resulted in opportunities to engage with large audiences through both national and local radio.

STAKEHOLDER EDUCATION AND AWARENESS

Our customers are at the heart of everything we do, and we will continue to ensure their safety and the safety of those who work on, or may come in close contact with, the electricity network. Increasing everyone's awareness of electrical safety risks is essential, and education and awareness programmes in this regard continue to be a strategic objective of our public safety activities.

In 2021, we launched our revised Public Safety Strategy 2021-2025, which is anchored in the core purpose of our business, and continues to be a core strategic priority and area of focus for ESB Networks.

Our 'Safe Family Farms' partnership with the Irish Farmers Journal continued into its seventh year, with further additions to the library of general farm safety videos, as well as the regular safety pages and full-page public safety advertorials to raise awareness of electrical safety on farms. We delivered safety talks to the Teagasc colleges and to University College Dublin's Agriculture and Food Science School as part of the 'Champions for Change' initiative, in association with the HSA and FBD Insurance.

Our partnership with the CIF resulted in a strong focus on electricity for Construction Safety Week, with electricity recognised and promoted as one of the five key construction risks via the webinar – "The Power of Safety – It's in Your Hands". This was supported by our partners in the ESB Networks-led Joint Utility Safety Forum, Gas Networks Ireland.

ESB Networks participated in the An Garda Siochana-led Metal Theft Forum, which met during the year to share information and coordinate responses to break-ins and metal theft. This impacted ESB Networks in terms of interference and theft of critical electricity equipment, with significant implications for public safety. 2021 saw a minor increase in the number of break-in and metal theft incidents. Five events were recorded in 2020 compared to six in 2021, although both compare very favourably to the 45 such events recorded in 2019. These break-ins and metal theft incidents pose a serious risk to life, and we continued to monitor any emerging trends carefully. Our staff continued to provide an excellent emergency response service in all situations, including major storms, emergency calls from the public and from the other emergency services.

As part of our commitment to engaging with the emergency services sector, we delivered awareness training to approx. 30 newly-appointed Fire Service Incident Commanders at national training events in Sligo and Bray.

NETWORKS WORK PROGRAMMES AND CRITICAL SAFETY PROCESSES

The delivery of our public safety work programmes (including cyclical hazard patrols, maintenance of overhead and underground networks, and timber cutting) continued to be prioritised to ensure public safety. The delivery of these programmes is monitored and reviewed regularly to ensure delivery within agreed cycles. Our incident recording system recorded and actioned all public safety incidents and provided important information that led to focused public safety initiatives and campaign targeting key 'at risk' groups.

The internal staff monthly safety briefing, which is communicated to all staff in ESB Networks, provided information on significant public safety incidents to emphasise the importance of public safety, and to recognise the contribution of staff and contractors in keeping the public safe, as well as to continually reinforce the prioritisation of public safety actions.

We continued to implement critical public safety interventions by serving 'Notifications to Stop Work" where ESB Networks staff became aware of unsafe work near electricity networks. During 2021, we served 91 Notifications to Stop Work to third parties, up from 45 in 2020. Of these, 55 were passed on to the Health and Safety Authority (HSA) Workplace Contact Unit for further follow-up with the parties involved.

As part of our emergency response, where we are notified of low or fallen electricity wires, we continued to implement the remote disconnection of the electricity network, where appropriate, to safeguard the public. The 'Dial Before You Dig' service provided maps of the overhead and electricity networks to construction companies to support compliance with HSA Codes of Practice in relation to electricity.

	2017	2018	2019	2020	2021
3rd party plant damages (excluding underground cable dig-ins)	1,244	1,103	2,637	2,620	2,707
3rd party plant damages caused by underground cable dig-ins	715	1131	1035	778	756
Non-3rd party – MV and 38 kV notifiable fault incidents (line drops and reduced clearances)	277	277	263	132	404
Non-3rd party – LV notifiable fault incidents (line drops and reduced clearances)	1,214	1,270	948	1,012	384

SECTION

06 DELIVERING ON PRICE

Every five years (known as a 'Price Review' period), the CRU determines the revenue price control, which sets out the amount of Distribution Use of System (DUoS) revenues that ESB Networks can recover through tariffs from the DUoS customers. These revenues are utilised for safely operating, maintaining, and improving the distribution network.

The Price Review is a robust process where all capital and operating costs are assessed and benchmarked against peer utility companies. This ensures that costs are efficiently and effectively managed, so that the customer receives the maximum value for money.

In December 2020, the CRU published its final determination for Price Review 5 (PR5), setting the allowed revenue for ESB Networks for the five-year period (2021 to 2025), starting in January 2021. The CRU's key strategic objectives for PR5 are:

1. facilitating a secure, low-carbon future;
2. transforming the role of the DSO;
3. increasing efficiency and protecting customers; and
4. resolving local security of supply (in the Dublin area).

The final determination provides allowances for capital and operating expenditure, totalling €5.9 billion (in 2019 prices), over the five-year period 2021 – 2025, to allow ESB Networks to provide the infrastructure needed to meet the Irish Government's Climate Action Plan and the EU's Clean Energy Package.

The determination also includes a very significant investment (€0.88bn) in Ireland's smart metering programme, which aims to roll out 500,000 smart meters per year between 2021 and 2024.

The Price Review process facilitates annual adjustments to these revenues using the K-factor mechanism for reasons such as updated forecasts, inflation, incentive out-turns, additional unforeseen items (e.g. storms), and updates due to potential under- or over-recovery of revenue. If there is an over-recovery, meaning that the revenue recovered from customers was more than required, this is deducted from the following year's revenue allowance. Likewise, if there is an under-recovery, this is added to the next year's revenue allowance via the K-factor. The CRU approved 2021 calendar year DSO revenues of €920.74m.

DUoS tariffs are the proportion of a unit of electricity which pay for distribution system development and operation. These tariffs are updated in October each year, based on changes in demand, inflation and other decisions made by the CRU. The CRU publishes an Average Unit Price (AUP) every year. The CRU's AUP is calculated by dividing the total allowed revenue by the total forecast units of electricity (measured in kWh).

While the actual tariff allocation is more complex, the AUP gives a high-level indication of network tariff movement between "tariff periods" (i.e., a 12-month period, starting each October). The AUP for the 1st October 2020 to 30th September 2021 period (the first nine months of 2021) was 3.75c/kWh, which was an 11.6% increase relative to the AUP of 3.36c/kWh for the October 2019 to September 2020 period. The AUP for the 1st October 2021 to 30th September 2022 period (including the final three months of 2021) was €3.45c/kWh. This represents an 8.1% decrease relative to the AUP for the first nine months of 2021.

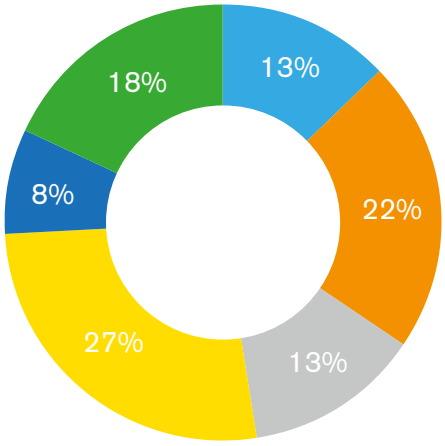
More on the allowed revenues and tariffs for 2021 is available in the CRU's decision paper, 'Electricity Distribution Network Allowed Revenue 2021, Distribution Tariffs 2020/2021 and Distribution Loss Adjustment Factors'[4].

ESB Networks is committed to delivering on price for Irish electricity customers while investing in a safe, reliable network and leading the transition to a low-carbon future. The portion of our allowances we spend each year varies upwards and downwards, depending on our planned work programme for the year. In 2021, ESB Networks invested €328 million of capital expenditure in the development and renewal of the distribution network (2020: €336m) and incurred €305 million of operating expenditure (2020: €316m).

This means that 15% of our allowed net PR5 capital expenditure allowance for investment in developing and renewing the system was invested in the first year of PR5.

[4] https://www.cru.ie/wp-content/uploads/2020/08/CRU20084-The-Electricity-Distribution-Network-Allowed-Revenues-for-2021-and-the-DUoS-Tariffs-DLAFs-for-2020-21-1.pdf

2020 Capital Expenditure



New Business

Reinforcements

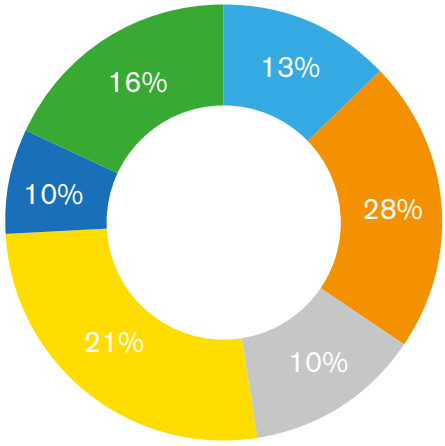
Generation Connections and Line Diversions

Asset Replacement

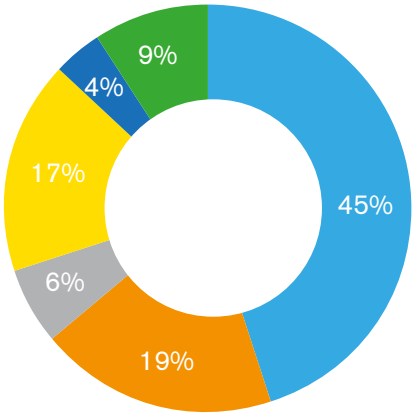
Response & System Control

Property, Tools, Vehicles, IT and Other

2021 Capital Expenditure[5]



2020 Operating Expenditure



Maintaining and Renewing the Network

Business Rates

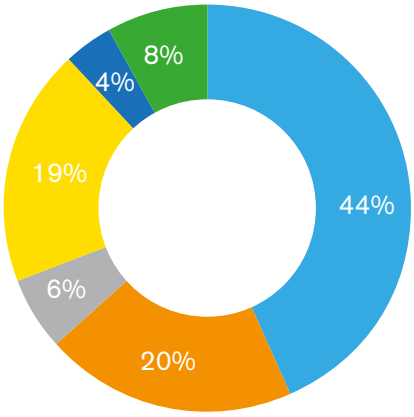
Telecoms and R&D

Customer Service and Metering

Environmental and Health & Safety

Other

2021 Operating Expenditure



[5]Capital expenditure figures are stated net of customer contributions and exclude investments in smart metering

INCENTIVES OUTTURN

The CRU set out the incentives arrangements for ESB Networks under the PR5 decision. This document sets out areas in which ESB Networks is either rewarded or penalised based on our performance. The following table shows ESB Networks' performance against these incentives for 2021.

	2020 DSO Incentive Outturn			2021 DSO Incentive Outturn		
Incentive	**Target**	**Actual**	**Payment/ Penalty(€m)**	**Target**	**Actual**	**Payment/ Penalty(€m)**
Customer Minutes Lost (CML)	75.1 (CML)	94.9 (CML)	-5.3	85	95.99	-5.5
Customer Interruptions (CI)	1.001 (CI)	126.11(CI)	-5.6	119	120.41	-0.7
Customer Satisfaction	90%	90.53%	0.39	90%	85.90%	-3.3
Customer Satisfaction Survey	81%	82.16%	0.85	81%	82.88%	1.4
Smart Metering	250K meters	239K meters	1.3	372,614 (adjusted target agreed with CRU)	382,188	0.2
Smart metering Functionality	N/A	N/A	N/A	In place by end of Q3 2021	Completed	0.6
Smart Metering Customer Satisfaction	N/A	N/A	N/A	<80% customer satisfaction	97%-98% net satisfied	0.4
Stakeholder Engagement	10	7.2	0.5	10	7.54	0.6
Delivering New Connections	All offers issued by 31st May 2020	Completed	0.51	All offers issued by 28th Feb 2022	Completed	2.1
Worst served customer	6,000	9,041	6.8	N/A	N/A	N/A[6]
Outage Information	New for PR5			Balanced scorecard	80%	0.81
Flexibility	New for PR5			Balanced scorecard	100%	3
Visibility	New for PR5			Balanced scorecard	98%	2.96
Joint DSO/TSO Coordination	New for PR5			Balanced scorecard	59%	1.24
Independent Role of the DSO	New for PR5			Balanced scorecard	82%	1.41m (with €2.8m to be deferred to next year for assessment)
Total			**€21.7m**			**€11.22m**

[6]To measure the effectiveness of WSC interventions, a one-year time lag is necessary. Therefore, no WSC incentive was requested by ESB Networks for 2021.

SECTION

07

SOCIAL OBLIGATION AND ENGAGEMENT

TRAINEESHIP PROGRAMME FOR PEOPLE WITH DISABILITIES

Each year, ESB Networks supports traineeship placements for people with disabilities. ESB Networks is a leading employer of people with disabilities in partnership with AHEAD, who also provide training for line managers, mentors, disability awareness and assistive technology awareness. The 2021 Traineeship Programme for people with disabilities was significantly different from other years, in that all trainees were successfully onboarded, supported and worked remotely. The Traineeship Programme is a six-month programme which provides training and experience of working in a modern business environment. It provides opportunities for personal and professional development and is of benefit to participants in applying for future employment opportunities.

ELECTRICAID

Established in 1987, ElectricAid is an independent, standalone charity set up and run by volunteers from ESB and EirGrid. Today, ElectricAid is supported by 2,400 serving and retired staff. As a registered charity, with its own constitution, it is administered and directed by an elected volunteer committee, which includes staff from ESB Networks.

ElectricAid contributes to the development of people at home and abroad through co-funding of projects that aim for long-term sustainable improvement and relief of poverty. Where relevant, it also supports emergency appeals.

Since its foundation, ElectricAid has provided funding for small development projects in Ireland, as well as projects in 91 different countries and territories across Europe and the Developing World. Projects are monitored over the course of their lifetime, and have been shown to have huge impacts on the lives of the poorest people.

In 2021, ElectricAid funded 96 projects in 34 countries to a total of €1,008,058, with each project directly addressing one or more of the United Nations Sustainable Development Goals (UN SDGs). ElectricAid also participated in UNICEF's "Get a Vaccine, Give a Vaccine" campaign and launched an emergency appeal where staff and former staff responded with donations totalling €26,417.

CHARITABLE VOLUNTEERING

When ESB Networks employees volunteer over 20 hours of their time or fundraise at least €250, they can apply to the ESB Energy for Generations Fund for a grant of €250 to that organisation. In 2021, 13 ESB Networks staff submitted volunteering support applications under the initiative.

SCHOOL VOLUNTEERING

In 2021, a total of eight ESB Networks staff took part in 'Time to Read' and 'Time to Count' programmes.
The aim of 'Time to Read' is to improve literacy rates with 2nd class children by increasing the enjoyment of reading, improving confidence and encouraging self-discovery among children during the 20-week programme.

The aim of 'Time to Count' is to help 3rd class children build their confidence around numbers and help develop their problem-solving ability by playing fun numeracy-based games during the 10-week programme.

INCLUSION & DIVERSITY AT ESB NETWORKS 2021

Inclusion and diversity are important to us in ESB Networks, and we work to foster an environment that enables everyone to bring their whole self to work, every day. ESB Networks has a clearly defined Inclusion and Diversity Strategy, supported by a comprehensive implementation plan to sustain an inclusive workplace.

ESB Networks fosters an inclusive working environment by supporting a range of events such as International Women's Day, International Men's Day, Diwali, the BeMe@ESB Ally Awareness Programme and Pride. Throughout 2021, each programme of events was delivered virtually, enabling a broader, increased participation across the business.

PRIDE

BeMe@ESB Network hosted a number of virtual events throughout 2021, highlighting the reasons why individuals and organisations need to continue to create inclusive working environments and support the LGBT+ community, not just during Pride.

STAKEHOLDER ENGAGEMENT

Stakeholder engagement forms a core element of our business processes and remains embedded in our business culture. It's seen as the role and responsibility of every employee within the organisation.

Our strategically important delivery initiatives, such as our National Smart Metering Programme, the National Network, Local Connections Programme and our Dingle Electrification project are shaping and informing how we undertake engagement across all of our activities from day-to-day service areas, such as maintaining the network and customer service through to our flagship innovation programmes to prepare the network for the future.

Only through an open and ongoing two-way dialogue with our stakeholders will we ensure that we are able to meet both the needs of our customers today and prepare the network to meet the needs of our customers in the future.

We are pleased to say that in 2021, we increased our engagement activities more than ever before. ESB Networks Stakeholder Engagement Report for 2021 describes in detail our commitment to being transparent with our customers and stakeholders. It also describes how we have delivered against our engagement plans in 2021, recognising the importance of stakeholders' contributions to the successful delivery of these initiatives. We have delivered strong end outcomes for our customers, including:

- Targeted awareness campaigns such as the all-important matter of safety, with our 'Are You Sure It's Safe?' campaign amassing over 200,000 views in the first two months of its rollout, alone.
- Delivering against our targeted rollout strategies. We more than doubled our smart meter rollout in 2021 compared to 2020, resulting in 620k smart meter installations
- Delivering large-scale programmes for the future. Over 320 stakeholders contributed more than 260 individual insights to inform the shaping of our 2021 National Network, Local Connections Programme.
- Transitioning innovation into business-as-usual. The Modular MV Standard EGIP Substation project supports the faster connection of renewable generation.

As we commence 2022, we look forward to strengthening our engagement activities even further. For us, it is essential that stakeholders play a tangible and measurable role across all our activities.

SECTION

08 INNOVATION

ESB Networks is clear that the challenge of enabling a low-carbon Ireland powered by renewable electricity on our journey to net zero requires extensive and collaborative innovation.

Working and collaborating with our stakeholders and communities, we have advanced our ambitious and active innovation programme throughout 2021. We published our detailed innovation consultation, Innovation to Connect a Clean Electric Future, which provides in-depth commentary on ESB Networks' 2021 innovation projects and activities within our Innovation Strategy Framework.

Throughout 2021, we strengthened and improved our Innovation Strategy Framework by building on the robust innovation foundation created in the years previous, and incorporating feedback received from the CRU, industry, academia, partners and international contacts. Through our smart working approach, we continued to use new digital channels and tools to engage with our stakeholders and ensure the successful delivery of our innovation programme across the three main innovation pillars: Future Customer, Climate Action and Network Resilience.

We continued to build upon our strong stakeholder engagement and dissemination activities across a range of innovation projects throughout 2021. This included engagements such as our Innovation stakeholder panel, Spring and Autumn Innovation webinar series, and working with the Dingle community as part of the Dingle Project. Here, we hosted a series of 12 in-person showcase events, stakeholder visits, a podcast series, and over 20 webinars, including the Dingle webinar series in December across across days.

During 2021, we collaborated with over 80 organisations and continued to progress our portfolio of 29 active and six completed innovation projects, which have an estimated potential lifecycle savings of approximately €60m available. We are proud to be able to collaborate with local communities on innovation projects in the Dingle Peninsula, Limerick City and the Aran Islands, as we explore the impact and capabilities of new low-carbon and supporting technologies. In these projects, we are testing and trialling potential solutions to help us develop the decarbonised, decentralised and digitised electricity system of the future. We are also working with customers and communities to better understand the impact of, and their interactions with, changing technologies and new developing energy systems.

ESB Networks continued to propose and approve innovation projects, ensuring the embedding of innovation throughout the organisation with four new projects being initiated in 2021.

Our innovation projects continue to deliver better outcomes for our customers, for example;

- enabling the faster connection of new renewables with our Modular MV Embedded Generation Interface Protection project;
- improving network resilience and environment through our Wildlife Overhead Lines Contact Prevention project; and
- enabling the electrification of heat and transport through our Dingle Electrification project.

PERFORMANCE HIGHLIGHTS FOR 2021

Key Innovation improvements, achievements and engagements that were delivered on in 2021 included:

- We welcomed the engagement and feedback from attendees across more than 30 innovation webinars throughout 2021, and have made over 10 hours of recordings available to stakeholders via our online channels.
- ESB Networks undertook an external independent innovation assessment through the internationally recognised EFQM (European Foundation for Quality Management) excellence model innovation lens and were recognised as a **five-star innovation organisation**. We are the first DSO globally to be assessed and accredited under the new EFQM Innovation Lens.
- Successfully carrying out the Dingle Project EV customer and flexibility trials across 2021, with significant engagement across our stakeholders and the Dingle community to share the project and participant learnings.
- Launching a revamped innovation section on ESB Networks' new website in order to inform and share the learnings with our stakeholders about our latest innovation projects and activities. This section launch, which increased our website engagement rate by 25%, included:
  - Updates to our Dingle Electrification Project
  - Publication of our 18-month Innovation programme
  - Publication of innovation project close-out reports
- Completing six innovation projects and initiated four new innovation projects.
- Collaboration with several national and international organisations, including the TSO and industry representative groups.
- Assessed 180 ideas through active horizon scanning for innovative technologies and processes, including involvement in The Innovation Academy, our X-Potential programme, Free Electrons programme and our Fast-Follower programme.

- Published seven publications including consultations and reports e.g., Innovating to Transform the Electricity Network and associated response paper.
- ESB Networks staff also co-authored eight peer-reviewed published papers and articles with academic/industry partners.
- Our Innovation Stakeholder Panel held its biannual meetings in Q1 and Q3, in which the panel members presented and discussed areas of focus such as electrification, flexibility and future challenges. The 18-month term for the current panel was concluded, and we launched a call for new panel members to serve the next term.
- More than 50 bilateral meetings and workshops with stakeholders.
- Use of social media channels to promote innovation engagement and activities through ESB Networks' LinkedIn channel.
- Following the webinar series in autumn, a stakeholder survey was conducted and revealed that 94% of respondents indicated that their understanding of ESB Networks' innovation projects and activities had improved over the previous 12 months.

Innovation KPIs 2021

ESB Networks' innovation efforts are broad-ranging and involve collaboration with a diverse variety of organisations. In order to provide our internal strategic board and stakeholders with information about the extent of our innovation efforts, a set of internal KPIs has been developed. The KPIs for 2021 are:

180
Innovation ideas

€60M
Potential life cycle savings

29
Active projects

590
Staff engaged with innovation

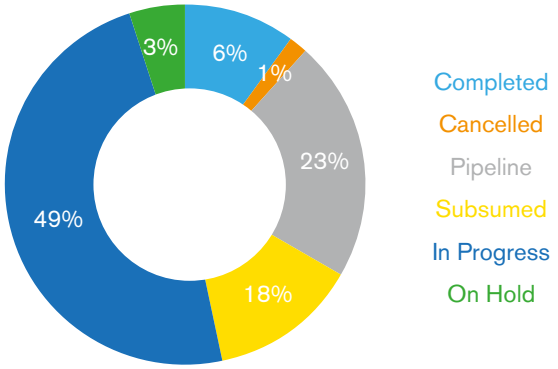
80
External company collaborations

40
Staff working on innovation projects

PROJECT DETAILS FOR 2021

In 2021, our innovation project portfolio had 29 projects in progress, with six projects completed and four new projects being initiated and set into progress.

Innovation Project Portfolio Breakdown 2021



There were six projects completed in 2021:

- Smarter HV and MV Customer Connections
- Servo
- StoreNet – Customer Side Energy Storage
- Using SigFox Current & Temperature Sensors to Assess Substation Loading
- Wind Farm Reactive Power Optimisation
- 630+kVA FR3 Natural Ester Transformer

There were four new projects identified and initiated in 2021:

- Novel Use of Drone Technology and Artificial Intelligence for Fault Location and Line Patrolling
- Developing 400MhZ Spectrum Use for Smart Grid Applications
- Artificial Intelligence (AI) for Smart Metering Applications
- Investigate Statistical Contributions from Distribution Generation F-Factor

SECTION

09 CONNECTIVITY AND DIGITILISATION

NATIONAL SMART METERING PROGRAMME (NSMP)

During 2021, 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.
The programme is a key enabler of the Irish government's Climate Action Plan, specifically with regard to microgeneration and the electrification of heat and transport. The following has been delivered in support of these objectives:

- Safety of customers, staff and contractors is key to the success of the programme and enhanced safety precautions and customer journeys have been implemented as a result of Covid-19
- The programme continued to safely install smart meters in almost every county in Ireland. By the end of December 2021, a total of 622,000 smart meters had been installed, with installations continuing to date
- ESB Networks is committed to ensuring that the NSMP is delivered in compliance with all applicable data privacy laws and that all customer personal data is safe and secure. We have ongoing engagement with the Commission for Regulation of Utilities (CRU), Department of Environment, Climate and Communications (DECC) and the Data Protection Commission (DPC). During 2021 ESB Networks reviewed its published set of comprehensive Data Protection Assessments (DPIAs) which outline how ESB Networks manage and protect customer data. The DPIA's are available on our website at https://www.esbnetworks.ie/existing-connections/meters-and-readings/smart-meter-upgrade/data-protection-impact-assessments
- ESB Networks delivered the V13.00.00 retail market release required to support the delivery of Smart Services by suppliers in February 2021. By the end of 2021, 37k customers have availed of Half-Hourly Interval data and 4k customers had availed of Day/Night/Peak Smart Standard Tariffs
- ESB Networks commenced remote meter reading of smart meters with approx. 1.5m remote readings by the end of 2021. This has resulted in a significant reduction in estimated bills and improved billing accuracy for customers with smart meters
- ESB Networks has led industry forums and working groups ensuring alignment with supplier system and process development, and provided ongoing support for supplier queries during 2021
- ESB Networks continues to lead the implementation of the agreed industrywide Strategic Framework for Communications and Consumer Engagement designed to support the meter deployment programme
- Based on customer feedback, the smart meter upgrade section on the ESB Networks website has been updated to include expanded FAQs, additional information on smart meter benefits and a 'How to Read your Smart Meter' video
- ESB Networks has undertaken a public information campaign across local radio, press and social media channels; developed branding in order for the public to easily identify the contractors' association with the ESB Networks programme; created media assets and stakeholder packs; and delivered briefings to national and local stakeholders
- Consumer surveys conducted during 2021 demonstrate that customer awareness is rising, and that sentiment towards the programme is positive. This is further supported by the 97% customer satisfaction rating of the exchange process.

The Covid-19 lockdown in 2021 resulted in 63 days of smart meter installs lost from 11th January to 09th April inclusive. Despite this, ESB Networks achieved over 382,118 smart meter installations. Subject to ongoing Covid-19 guidelines, the programme plans to replace over 500,000 meters during 2022.

SMART GRID

ESB Networks' distribution and transmission electricity networks rely on resilient, highly available telecommunications to centrally control and operate the grid. This connectivity is provided by an expansive private telecoms network within ESB Networks, covering a range of technologies including fibre, microwave, satellite and polling radio, as well as Operational Technology networking systems.

These telecommunication networks continued to be developed and extended during 2021, to support the growth of the electricity system and the control centres operating them. Telecommunication links and infrastructure to support connectivity and control of new Independent Power Producers (IPPs) being brought onto the electrical system were also provided.

As the SmartGrid extends across the HV and MV networks, the requirements for telecommunications connectivity continues to grow. In the first year of PR5, further work progressed to expand the operational IP telecommunications network with an additional 70 locations being added to supplement the core network of 10 sites at STM-64 (10Gbps). The provision of services (e.g., energy metering) and connections from this new telecom network progressed during 2021, and will continue throughout PR5 and beyond.

To enable secure and reliable connectivity to MV and LV equipment, a new wireless radio network is being deployed. ComReg have supported the work to develop an Irish SmartGrid and awarded a 15-year licence for spectrum in the 410 – 414 MHz band paired with 420 – 424 MHz, which this radio network will be built on. A procurement process for a partner was initiated in 2021 with the publication of a PQQ and subsequent RFT issued to shortlisted tenderers. This procurement process is to conclude in 2022, with network rollout due to commence in the latter half of that year. Preparatory works took place in 2021 to enable the deployment of the network including backhaul upgrades, power upgrades and high-site enabling works.

The impact of the Covid-19 pandemic continued throughout 2021, and the telecoms solutions to enable staff work from home continued to operate with great effect, particularly in support of the call agents working in the National Customer Contact Centre (NCCC). With the support of ESB Networks' mobile and fixed telco suppliers, additional services and equipment continued to be sourced to support remote working within the business.

SYSTEM SEPARATION 2021

The Electricity Market System Separation project ran for the duration of 2021 and involved the cooperation of ESB Networks, NIE Networks, regulatory authorities, and market participants in both the NI and RoI retail electricity markets, following a decision to return to two separate and distinct markets after twelve years of a harmonised model.

Work began on the system separation project in February 2021. The main component of achieving separation of the harmonised market was to split the shared IT market message platform into separate NI and RoI market message hubs, and redirect market participant messaging applications (EMMAs) to the correct hubs.

Input from assurance bodies was also required, and inter-participant testing (IPT) was undertaken and completed in August 2021. Regulatory approval was obtained in advance of system separation cutover and Go Live was delivered in September 2021.

SECTION

10

SERVICE LEVEL AGREEMENTS

The Service Level Agreement (SLA) Report in the following table contains the complete set of results for 2021. The report provides a description of each SLA and the measure against which its level of performance is reported. The actual performance is measured as both the percentage of transactions that were completed within the agreed SLA timeline in 2021, and the percentage completed within twice the SLA timeline during the same time.

Description	No.	Standard Approval Timelines (SLA)	Within SLA Timeline	Within Twice SLA Timeline
Change of Supplier (NQH)	1A	Validate within five days	100%	NA
	1B	Using customer read supplied by the customer – Complete within three days	99.94%	100%
	1C	Using a special read organised between the customer and ESB Networks – Complete within 10 days	96.86%	100%
	1D	Using one of ESB Networks' scheduled reads – Complete within three days	99.03%	100%
Change of Supplier (QH)	2A	Validate within five days	99.89%	100%
	2B	Validate within three days	97.33%	100%
Change of Supplier Cancellation	3A	Validate supplier cancellation within five days	99.94%	100%
	3B	Complete supplier cancellation within five days	99.86%	100%
New Connection and Registration with Supplier (NQH)	5A	Prepare quote – Within seven working days where no site visit required. Within 15 working days where site visit required	96.45%	100%
	5B	Complete connection – Within 10 working days of receipt of ETCI certificate	99.03%	100%
	5C	Data processing – Issue details to supplier within 10 days	99.01%	99.58%
New Connection and Registration with Supplier (QH)	6A	Prepare quote – Within seven working days where no site visit required. Within 15 working days where site visit required	96.45%	100%
	6B	Complete connection – Within 10 working days of receipt of ETCI certificate	99.03%	100%
	6C	Data processing – Issue details to supplier within 10 days	80.00%	95.00%
Change to Meter Point Characteristics	8A	Prepare quote – Within seven working days where no site visit required. Within 15 working days where site visit required	96.45%	100%
	8B	Complete change – Within 10 working days of receipt of ETCI certificate	99.03%	100%
	8C	Process change – Issue details to supplier within 10 days	97.44%	98.44%

Description	No.	Standard Approval Timelines (SLA)	Within SLA Timeline	Within Twice SLA Timeline
De-energisation of Meter Point	9A	De-energise of meter point within five days	90.45%	95.13%
	9B	Issue meter details to supplier within 10 days	99.46%	99.77%
Re-energisation of Meter Point	10A	Re-energise meter point within five days	97.56%	98.78%
	10B	Issue meter details to supplier within 10 days	98.82%	99.67%
Change of Meter Configuration	11A	Reconfigure meter within five days after the receipt and validation of supplier request	92.14%	95.02%
	11B	Process data within 10 days	99.50%	99.79%
Meter Problems and Reports of Damage	12A	Repair or replace faulty meter within five days	48.82%	57.71%
	12B	When a faulty meter is repaired or replaced – Process meter data within five days	98.83%	99.34%
NQH Meter Reading	14A	Scheduled read – Distribution of reads to suppliers within seven workdays	99.78%	99.91%
	14A	Two scheduled reading visits per annum	99.68%	NA
	14A	Four scheduled reading visits per annum	89.42%	NA
	14A	Actual reads for scheduled meter reading visit	79.47%	NA
	14A	Actual reads for scheduled MD meter reads	The MD billing varied during year due to pandemic; two billings 91%, two billings 92%, one 86% and one 75%	NA
	14A	One actual read per annum	96.77%	NA
	14B	No consecutive block estimations	96.18%	NA
	14B	No consecutive MD block estimations	100%	NA
	14C	Out of cycle customer read – Readings processed within three workdays	97.39%	98.54%
QH Data Collection	15A	D+4 QH data - Send to SEM-O / suppliers in one workday	100%	NA
	15B	QH Actual Data. Send to suppliers within four and 10 days**	96.65%	97.12%
Request for Special Read	18A	Site visit by seven days	59.84%	70.34%
	18B	Issue of meter details within three days	59.97%	65.82%
Data Aggregation	16	Issue of aggregated data to SEM-O / TSO / Suppliers and generators within five workdays	100%	NA
Change of SSAC	20	Complete process in three workdays	100%	NA
De-registration	21	Auto-completion within five workdays	100%	NA
		Manual completion within 10 workdays	100%	NA
Change Customer Details	24	Complete within five days	99.97%	100%
Change Legal Entity	25	Complete within five days	99.86%	100%

SECTION

11

REGISTER OF ASSETS

The following is a register of all relevant Distribution System assets on the system at the end of 2021.

Register of Distribution System Assets at end of 2021

Asset	Units	Volume
220 kV		
220 kV Substations	No.	2
220/110 kV Transformer Capacity	MVA	2,500
110 kV		
110 kV Overhead Lines	km	389
110 kV Underground Cable	km	232
11O kV Switching Substations	No.	8
110/38 kV Substations	No.	77
110/38 kV/MV Substations	No.	16
110 kV/MV Substations	No.	40
110/38 kV/MV Transformer Capacity	MVA	7,059
110 kV/MV Transformer Capacity	MVA	1,558
38 kV		
38 kV Overhead Lines	km	5,660
38 kV Underground Cable	km	1,268
38 kV Substations	No.	432
38 kV Transformer Capacity	MVA	5,342
MV		
20 kV 3-ph Overhead Lines	km	15,366
20 kV 1-ph Overhead Lines	km	31,899
120 kV 3-ph Overhead Lines	km	13,255
10 kV 3-ph Overhead Lines	km	29,905
20 kV Underground Cable	km	1,904
10 kV Underground Cable	km	8,557
3-ph Pole-mounted Transformers	No.	22,196
1-ph Pole-mounted Transformers	No.	224,657
MV Ground-mounted Substations	No.	23,114
LV		
LV 3-ph Overhead Lines	km	4,724
LV 1-ph Overhead Lines	km	56,401
LV Underground Cable	km	15,103
Mini-Pillars	No.	176,853

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