ESB NETWORKS

2017
PERFORMANCE
REPORT

ESB Networks builds, manages and maintains a transmission and distribution network of over 180,000 kilometres in the Republic of Ireland. Each year we report on our performance for the Commission for Regulation of Utilities (CRU). The following report details ESB Networks performance as the Irish Distribution Network Operator for 2017.

INTRODUCTION

WELCOME TO ESB NETWORKS' 2017 ANNUAL PERFORMANCE REPORT.

In 2017, ESB Networks launched its Innovation Strategy which sets out how the business will meet the challenges of Ireland's changing energy landscape and facilitate the transition to a reliable, affordable, low-carbon energy system. ESB Networks will be central to successfully implementing this transition ensuring that our customers and all energy stakeholders are best served into the future. As part of this strategy, a significant "smart electricity" trial has been launched on the Dingle Peninsula that aims to define a view of the energy landscape in 2030. The trials will be based on collaboration with customers, communities and society and will seek to improve service and allow affordable, reliable and trustworthy energy platforms to be built. ESB Networks also held its inaugural customer conference in the Mansion House with over 200 guests.

As the economy has picked up, so too has the number of new connections to the system and in 2017 we connected nearly 25,000 (2016: 20,000) new homes and businesses. 2017 saw 293 MW of wind generation added to the distribution system, which was an increase of 159% on 2016, bringing the total wind generation connected to the Irish distribution system to 1,820 MW. All of the above connections required significant reinforcement and extensions to the electricity network, in addition to considerable maintenance, vegetation management and refurbishment programmes for the established network.

In September 2017 the Smart Metering Programme was launched. The programme will be implemented through a phased approach, where 250,000 smart meters will be installed by 2020, with an additional 500,000 per year in each of the four subsequent years after 2020. All procurements to purchase the end-to-end solution are now in progress and the High Level Design phase of the Project is now complete.

On the 16th October 2017, Ireland felt the full force of 190 km/h winds from Ex-hurricane Ophelia. At its peak, 385,000 customers were without supply and the network was severally damaged. ESB Networks deployed 2,500 staff, 1,000 contractors and enlisted the assistance of the Defence Forces and 400 utility workers from Northern Ireland Electricity Networks (NIE Networks) and the United Kingdom (UK) / French companies to reconnect and restore power to all homes and businesses and make the network safe again. This required close working co-operation with the National Emergency Coordination Group for Severe Weather, Government Departments, Met Éireann, the Defence Forces and national media. ESB Networks would like to thank all of those agencies for their help during the storm period, and also to sincerely thank our customers for their patience during the restoration effort after this unprecedented weather event.

NEW CONNECTIONS

293MW
of renewables
connected

19,268
new domestic
connections

5,195
new commercial
connections

EX-HURRICANE OPHELIA

385,000
Customers without
supply at the height
of the storm

11.7M
Customer Hours
Lost (CHL)

All customers
RE-CONNECTED
after 7 days

138,000
Customers
re-connected
after day 1

FIBRE TO THE BUILDING

Rolled out in more than **20 towns**
giving an additional **80,000 homes**
access to high speed broadband

SAFETY

New monthly
Safety Brief
launched

53% Reduction in staff
Lost Time Injuries (LTI's)
compared to 2016

4,105 Good catches
recorded in SHIELD
(up from 2,486 in 2016)

STAY SAFE STAY CLEAR SCHOOLS PROGRAMME

196
schools
took part in
the schools
'Stay Safe –
Stay Clear'
poster competition

4,103
entries in to
the colouring
competition

110, 000
hi vis vests given out
to Junior Infants

212 staff visited
schools to distribute
vests

SMART METERING LAUNCH

LAUNCH OF INNOVATION STRATEGY

CUSTOMER SERVICE – CONTACT CENTRE

CCA
Accreditation successfully
retained for 2017

91%
ESATRAT
(Expected satisfaction rating)

1,758,928
calls and emails received

20K likes
on Facebook

32K+
followers on Twitter

Over **3.7M**
Powercheck hits

NEW DIGITAL COMMUNICATIONS CHANNELS

**New Facebook
page launched**

**New online fault
logging service**

**New online pay
an invoice service**

STAFF

156 new employees
welcomed to
ESB Networks

· 43 experienced electricians
  inducted as Network Technicians
· 1,600 courses delivered
· 27,000 training days delivered

WELLBEING

**Pro-Active Health
& Wellbeing Programmes**
were delivered in ESB Networks
throughout the year

APPRENTICESHIP PROGRAMME

National campaign
across social media and in
press launched to recruit
new apprentices

Over
**5,600
APPLICATIONS**

**60 TOP
APPLICANTS**
selected and began their
apprenticeship in September

Ahead of schedule to recruit
300 APPRENTICES
between 2015 to 2020

CONTENTS

In each of the following sections we have reported on our progress and performance delivering on the plans approved by the CRU for Price Review 4 (PR4) – the period from 2016 – 2020.

In 2017 – 2018, the CRU proposed a move towards a more "output based" approach to how we manage and report on our performance. This means placing a greater focus on what value has been delivered to customers. The following sections have been laid out to reflect the "outputs" which we and the CRU agree reflect what we should be delivering for our customers.

CUSTOMER SERVICE

Over the last 10 years we have worked hard to develop our customer communication channels and offerings. We are committed to delivering a first-class customer experience and to improving on our performance every year to ensure customers' needs are met.

CUSTOMER CHARTER

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

1. We aim to restore supply in less than 4 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 fuse has failed, we will call out free of charge, within 3 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 3 working days (for domestic customers, 5 working days for business customers)

5. We will send you a cost quotation for your new connection within:

   a. 7 working days if no site visit is required,

   b. 15 working days if a site visit is required.

6. We will complete your new connection within 2 weeks of receiving your RECI Completion Certificate if you apply and pay 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 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 5 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 one of these guarantees, or when in the cases of Guarantees 1 and 2 if we receive a valid claim, we will send you a cheque within 10 working days (and an additional €35 if we fail to do that).

There were 2,045 payments made to customers in 2017.

CUSTOMER SATISFACTION SCORES

91% ESATRAT
Satisfaction rating of National Customer Care Centre

79.43% RED C
National Customer Satisfaction Survey

CCA
Our Customer Care Centre successfully retained its CCA customer service accreditation in 2017

EX HURRICANE OPHELIA CUSTOMER SERVICE

In October 2017, for ex-hurricane Ophelia, we applied the lessons we learned from Storm Darwin in 2014, about managing customer needs during extreme weather conditions. We established an emergency call centre and had 349 call takers available, alongside our Interactive Voice Response (IVR) system. 40,000 customers used our new online fault logging system to get information and updates on when supply would be restored. 6,800 faults were successfully logged online. We worked to deliver realistic restoration times, and put a Panic Call system in place for emergency calls.

In total there were 766,863 website page views, our blog was viewed 310,854 times and Power Outage updates were viewed online 43,306 times.

VULNERABLE CUSTOMERS

We all rely on safe, reliable electricity supplies. 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 get priority attention when there is a fault on the network, we take care to give them extra notice of upcoming planned outages.

36,373 customers are registered as Vulnerable Customers. To register as a Vulnerable Customer, please contact your electricity supplier who will then notify us.

NATIONAL CUSTOMER CARE CENTRE

1,758,928 calls & emails received

CALL HANDLING RESPONSE	2016	2017
Percentage of calls answered within 20 seconds	91.4%	90.9%
Percentage of calls dropped[1]	2.3%	2.3%
Networks customer calls to the call centre[2]	469,195	470,333

Both sets of figures are inclusive of storms, therefore reducing the percentage of calls handled and increasing the percentage of calls dropped.

1 Where the customer has terminated the call without waiting for a response.

2 Calls relating to ESB Networks excluding IVR

SOCIAL MEDIA

20K likes on Facebook

32K+ followers on Twitter

METER READING

ESB Networks schedules four meter reading visits per customer per year. In 2017, ESB Networks managed to make four scheduled visits to **99.5%** of customers, and 100% of customers received at least two such scheduled visits. However these visits may not always result in an actual meter reading being obtained or being submitted by the customer.

ESB Networks aims to obtain 1 actual meter read from 98% of all customers (either from Networks or from the customer themselves), in 2017 the result achieved was **97.8%**.

COMPLAINTS RECEIVED	2016	2017
Concerning low voltage	26	19
For frequent outages	1,066	1,259
Time to connect customers	31	38
Operation delays and overruns	117	93
From suppliers	0	0
On meter reading and estimated reads	356	292
Damage to Property	226	276
Staff/Contractor Performance	299	306
Communications – Customer Service Issues	165	199
Others	454	200
	2,740	**2,682**

CALL & EMAILS RECEIVED
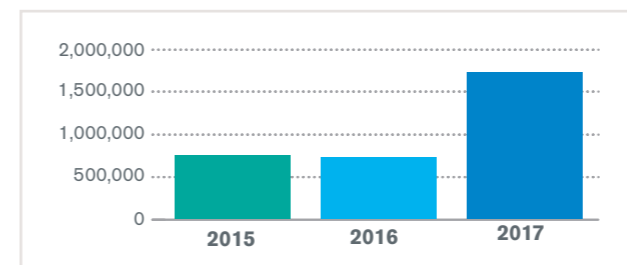
POWERCHECK APP HITS
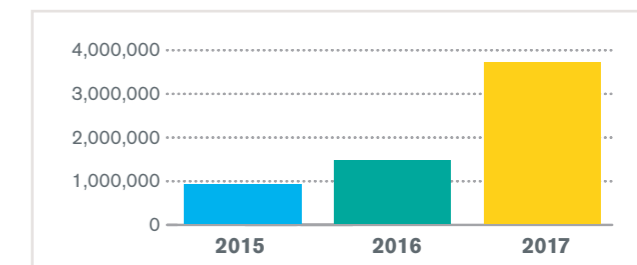
RELIABILITY & RESILIENCE

Safely and efficiently keeping the lights on

Ensuring our customers have access to a reliable and high quality supply of electricity is crucial. We are committed to improving our network each year to ensure that we can continue to supply a reliable connection even through extreme weather.

Customer Interruptions (CI) is the average number of outages that a single Irish electricity customer has each year, and Customer Minutes Lost (CML) is the average number of minutes that a single Irish customer spends in the dark. Storm days – the effect of severe weather – are removed from our normal CI and CML performance reported.

In 2017 we had 151 Customer Minutes Lost and 1.43 Customer interruptions.

This means that an average Irish electricity customer was in the dark for 151 minutes in 2017 – the same time as it would take to watch the 2017 All-Ireland football final and half of the All - Ireland hurling final back to back.

BREAKDOWN OF TOTAL OUTAGES

● Planned   ● Unplanned

BREAKDOWN OF TOTAL OUTAGES

● LV   ● 10kV   ● 20kV   ● 38kV/110kV
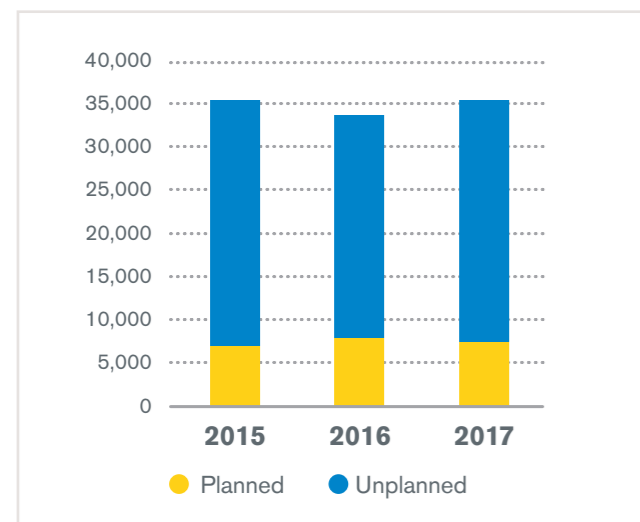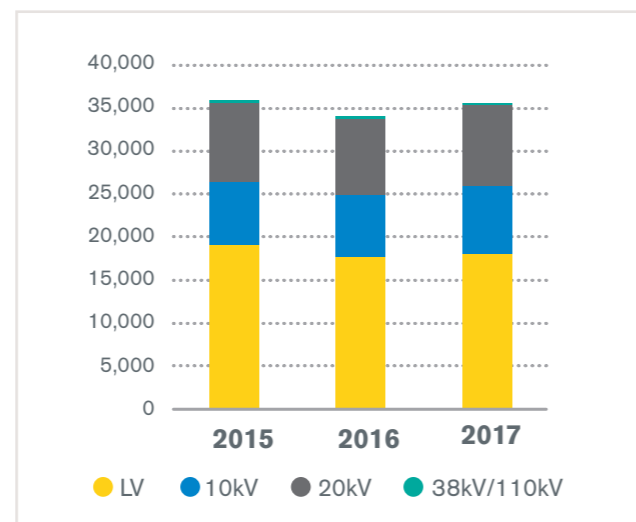
EXPLANATION FOR CHANGE IN OUTAGES

Fault outages fell by 10% in 2016 against 2015 figures, and rose again by 8% in 2017. Planned outages rose by 4% in 2016 but dropped back down again by 2% in 2017. Planned outages are outages that are scheduled by ESB Networks to allow for works such as new connections and networks maintenance and improvements. There was a rise in the number of outages related to new connections in both 2016 and 2017, by 22% and 25% respectively. Outages due to network maintenance and improvements saw a 13% rise in 2016 but then saw a 10% reduction in 2017.

PERFORMANCE	2012	2013	2014	2015	2016	2017
CML	97.91	128.85	147.45	155.69	142.62	151
CI	0.92	1.30	1.42	1.28	1.27	1.43
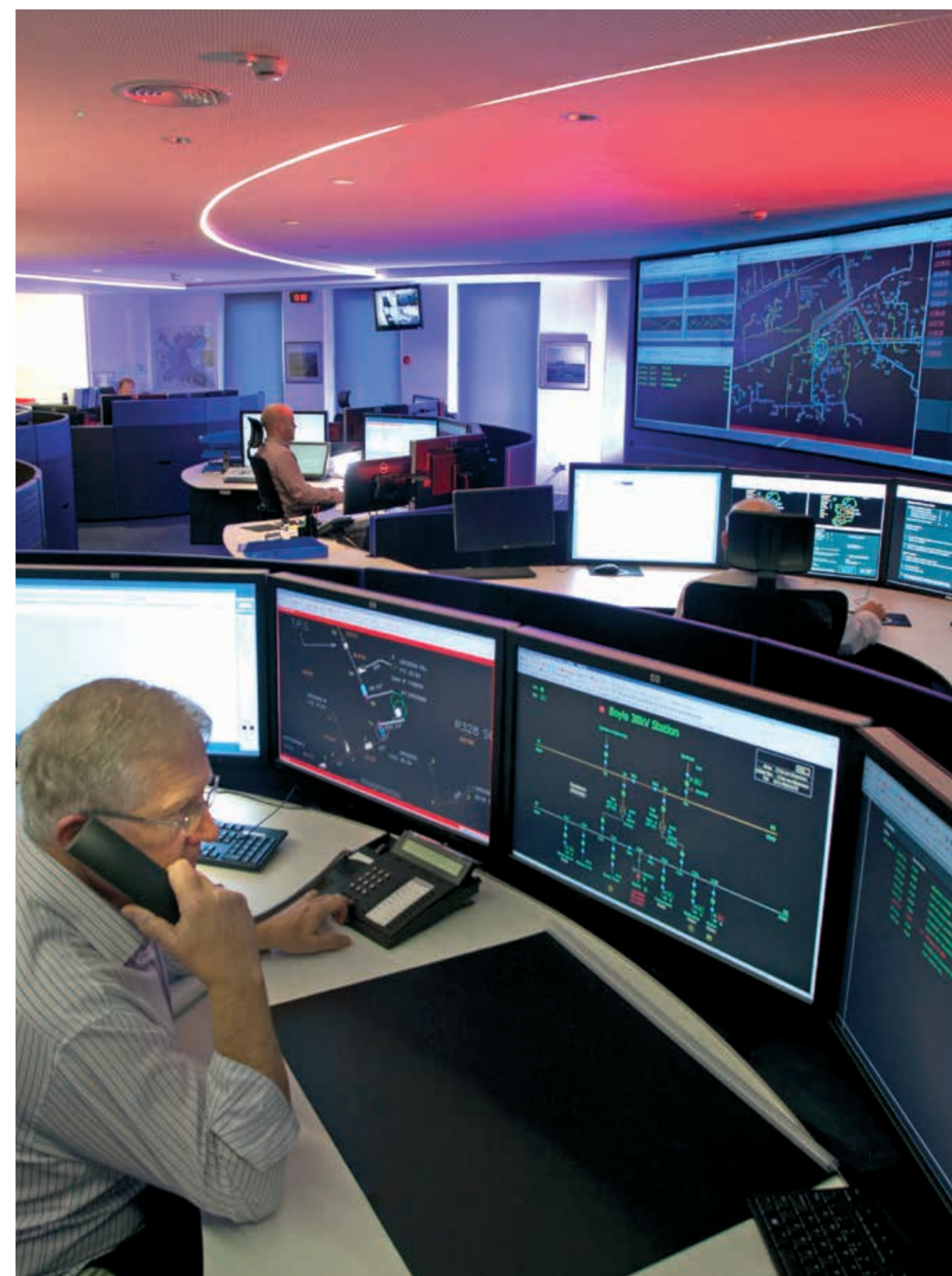
STORM DAYS

In 2017 there were 11 storm days. The two most extreme storms were:

• **Storm Doris which hit Ireland on 23rd February, with gusts of up to 141 km/h causing 1,284 outages, leaving 188,782 customers without power.**

• **Ex-hurricane Ophelia, from 16th to 21st October, with gusts of up to 155.6km/h. At its height 385,000 customers were without supply, 138,000 were reconnected after 1 day and all customers were reconnected within 7 days.**

STORM CML AND CI

In 2017 there were 13,780028.14 Customer Hours Lost due to storms and a total of 1,309,760 Customer Interruptions. These figures serve to show the magnitude of disruption caused by storms this year.

Ex-hurricane Ophelia No. of Customers without power each day 16th - 23rd October, 2017
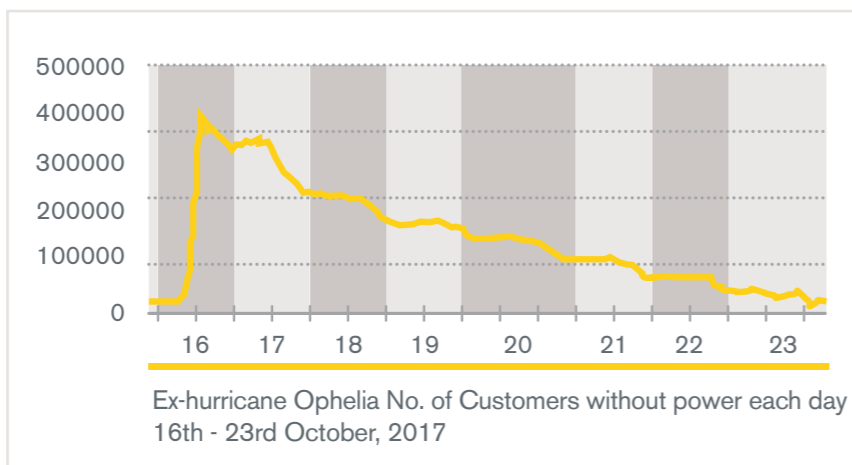
NETWORK RENEWAL

In 2017 our renewal strategy focussed on gathering and analysing information to move from cyclical network renewal to more strategic approaches, targeting parts of the system based on their condition and the impact if they fail.

With **2.3 million** wooden poles supporting the electricity network, we have almost **one pole for each household and business in Ireland.** If a pole fails, the lights go out. Our staff climb these poles to operate and maintain the system, so their strength or "health" is very important.

We are creating a **"Pole Inventory"** by gathering data on the wood pole network, including each pole's public exposure and condition. If a pole is in danger of collapse, it is replaced immediately.

The rest of the data collected is used to determine a pole replacement strategy for 2018 – 2020 based on the exposure and condition of each pole.

In 2017, **484,269 poles** on the MV network were patrolled, and **402** were replaced immediately. We will patrol the remaining estimated 500,000 MV poles during 2018.

In 2017 we also began to gather the information to monitor the "health profile" of our **550 high voltage stations.** With a customer base of **2,344,445 customers**, each station's reliability is pivotal to assure a reliable service to our customers. Our technicians are gathering, measuring and recording the information to analyse and visualise the health profile of our stations and developing new maintenance and renewal strategies for the future.

NETWORK RESILIENCE

In 2017, there were 13 break-ins to ESB Networks stations resulting in theft of and damage to property, including the theft of metal and equipment, as well as damage to gates, fences and doors. There were 5 additional break-ins to other ESB Networks premises, resulting in further theft and damage.

There were 2 incidents of theft of overhead copper line along our network, involving the theft of one span of the copper Portlaois – Stradbally 38kV overhead line, and the theft of 5 spans of the 38kV Ardnacrusha - Ennis, Shannon, Rineanna line. There were also two incidents were damage was caused to ground mounted substations. ESB Networks are working together with An Garda Síochána and communities to prevent damage to and theft of electricity network assets. We had 8 stations fitted with fire and intruder alarms, and two stations had CCTV installed in 2017.

In order to further improve public safety we launched a new procedure for responding to reports of low or grounded overhead conductors (power lines) in 2017. This procedure sets out the requirements for ESB staff in the event of a report of a low hanging or grounded power line. This can lead to the National Control Centre disconnecting the effected electricity network, making the area safe.

ESB Networks also carries out an extensive programme of timber cutting to restrict timber growth to limits that ensure public safety and supply continuity.

WORST SERVED CUSTOMERS

The worst served customer programme targets service improvement for customers who experience a large number of outages. "Worst Served Customers" are customers who have had at least 15 outages over 3 years, and at least 5 outages in the most recent year.

In recent years there has been an increase in severe weather events, and this severe weather has had an impact on the electricity network, resulting in interruptions in supply to customers. In 2017, 58% of the worst served customer population was as a direct consequence of storms, up from 45% in 2016.

NEW CONNECTIONS & GROWTH

Providing capacity to support new housing and economic growth in Ireland

Efficient and economic connections are vital for our customers. We consistently strive to reduce the time from request to connection. In 2017, a year after the launch of the government's "Rebuilding Ireland" plan, we connected 33% more new homes than forecast in our PR4 plans.

NEW DEMANDS FOR CONNECTION

24,463 new connections, **19,268** domestic connections and **5,195** commercial connections.

That is almost 22% more new connections than the 20,110 we completed in 2016.

NEW CONNECTIONS CONTINUED TO INCREASE IN 2017. WE CONNECTED **33%,** OR ALMOST **5,000, MORE NEW HOMES** IN 2017 THAN WE FORECASTED IN OUR PR4 PLANS, AND **15%** (OR ALMOST 700) MORE NEW BUSINESSES.

ELECTRICITY DEMAND

- ● Urban Domestics
- ● LV non MD
- ● 38kV Looped
- ● Rural Domestics
- ● LV MD
- ● 38kV Tailed
- ● Public Light, Misc
- ● MV
- ● 110kV Network

Electricity demand on the distribution system continued to grow in 2017. This reflects better economic conditions than we saw during the previous regulatory period (2011 – 2015) and is even higher than in our PR4 plans we expected to see during 2016 and 2017

DISCONNECTIONS*	2016	2017
Connection points terminated	18,601	16,042
Connection points de-energised	7,312	4,827

Terminated - This includes connection points in vacant premises that have been terminated following previous de-energisation and de-registration, it also includes MPRN's associated with housing scheme quotations that have not progressed.

De-energisation for non-payment ONLY.
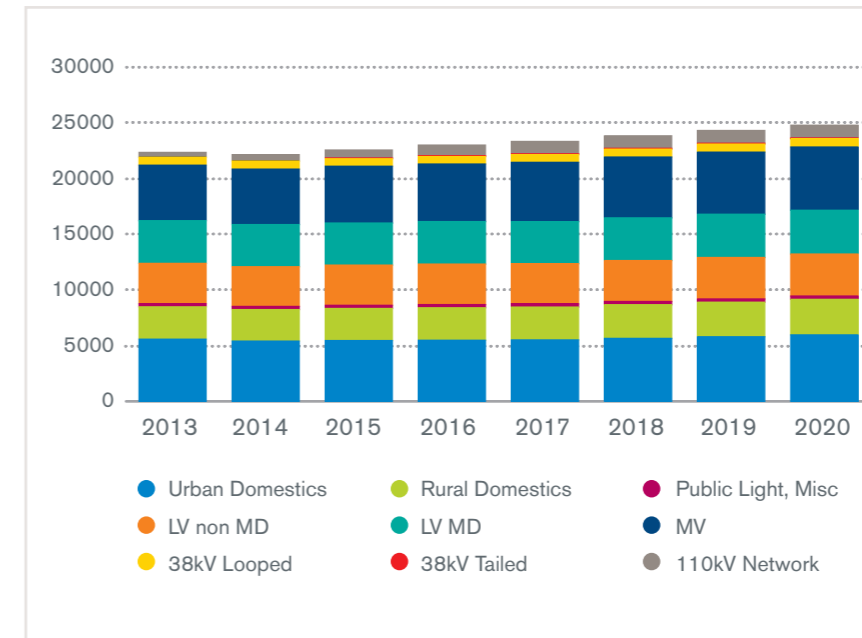
Network Reinforcement

In 2017 ESB Networks completed 92 projects that led to an increase in the capacity of our existing stations for demand growth and new connections. In total 319 MVA, or enough to power close to 130,000 homes, of capacity was added. This capacity has been provided where customers need it across Ireland, as a result of natural economic and demand growth.

ENVIRONMENT

Manging our carbon footprint, and delivering a low carbon electricity system

ESB Networks is committed to playing a leading role in enabling Ireland's transition to a low carbon future. During 2017, we made significant efforts to ensure effective management of our environmental responsibilities, and are fully committed to operating to the highest environmental standards as part of our "ESB Networks 2027 lighting the way to a better energy future". Under SI426/2014 Energy Efficiency Regulations, ESB Networks is required to deliver a 33% energy efficiency improvement by 2020 against baseline performance. The significant energy users governed by this legislation are ESB Networks vehicle fleet and ESB office and depot locations.

MANAGING OUR ENVIRONMENTAL FOOTPRINT

BUSINESS CARBON FOOTPRINT

DESCRIPTION	2017 vs 2016 % TONNES CO2
VEHICLE FLEET	5.6%
BUILDING EMISSIONS - HEATING GAS	-13.9%
GASEOUS EMISSIONS - SULPHUR HEXAFLUORIDE	4.2%
INDIRECT EMISSIONS - ELECTRICITY	7.6%
WASTE	16.9%

SF6 GAS LEAKAGE
0.5% LEAKAGE RATE

Sulphur hexafluoride (SF6) is used in most of ESB Networks' high-voltage switch gear on the transmission and distribution networks. It is used because of its very high electrical insulating properties and allows the switch gear to work efficiently and safely. There has been a 5 year trend of consistent leakage reduction, as we replace and repair our older switch gear.

DISTRIBUTION LOSSES
Distribution losses are losses of electricity within the electrical system. In 2017, 6.7% of the energy that was put into the distribution system was accounted for as losses.

This is made up of technical and commercial losses. Technical losses are heat losses arising from the passage of electricity through lines, cables and transformers. While commercial losses are electricity units which are unaccounted-for, for example, as a result of theft arising from unauthorised connections. It is believed that commercial losses represent approximately 0.5% of the electricity entering the electricity system in 2017.

FACILITATING A LOW-CARBON FUTURE

An average of 520,908 tonnes of CO2 was saved in 2017 due to the connection of 293 MW of renewable generation connected to the distribution system, which is made up by 28 wind projects. This brought the total wind energy generation connected to the distribution system to 1,820 MW. ESB Networks is committed to playing a leading role in enabling Ireland's transition to a low carbon energy future, powered by clean electricity.

TOTAL WIND GENERATION CONNECTED TO THE DISTRIBUTION NETWORK
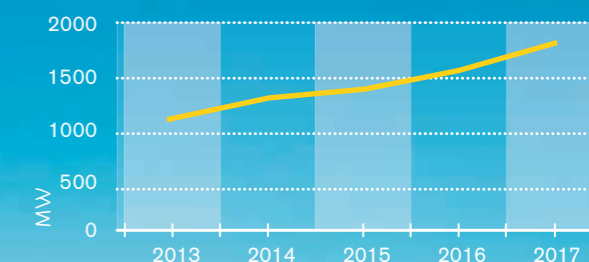
SAFETY

Managing the safety of our staff and the public as they interact with the electricity network

Ensuring the safety of those who work, live and play in the vicinity of the electricity networks is central to what we do. In 2017 we launched our new Safety Action Plan to ensure that our networks are designed and operated in as safe a manner as possible.

PILLAR 1: NETWORKS WORK PROGRAMME

Our network maintenance and renewal programmes, in particular 'hazard patrols', have an important and positive impact on public safety. The delivery of these programmes are monitored and reviewed regularly. Every month the Public Safety team analyse public safety electricity incidents , including those involving fallen wires. The learning from these incidents is included in the monthly safety briefing and is used to communicate with the public. Examples of important public safety processes are:

- stop work notices' which we implement when we see someone working unsafely near overhead electricity wires
- our 'dial before you dig' help desk, which provides map records of where cables are located
- covering electricity wires with shrouding so that customers can safely carry out work on their houses
- remote disconnection of sections of the electricity network when notified of low or grounded conductors

EX-HURRICANE OPHELIA

The safety and wellbeing of our staff and customers during Ex-hurricane Ophelia was our primary concern with daily morning safety briefings for front line staff, and a text alert system pushing key safety information out to field staff. Tailored briefings were provided for all contact centre staff.

Our TV and radio public safety media campaign, including the sponsored time on RTE Radio 1 Weather, social media, and search advertising delivered critical public safety messages. This campaign generated 30 million views and touchpoints, with 13 million TV views, 3,379,500 radio listeners. Our partnerships with The Irish Farmers Journal, Agriland and Independent Farming contributed to our safety messages achieving a wide reach.

PILLAR 2: STAKEHOLDER EDUCATION AND AWARENESS

In 2017 we delivered safety talks to Teagasc colleges, UCD and WIT as part of the FBD 'Champions for Change' initiative, in association with the H.S.A.

2017 marked the third year of our 'Safe Family Farms' partnership with the Irish Farmers Journal. Weekly editorial safety pages and online articles, online videos and full-page public safety advertisements at key times of the year raised awareness of electrical safety and farming. We recorded and made available three online videos during Farm Safety Week. These personal stories of the devastating impact of farm accidents on farming families made an important contribution to farm safety. We also participated in the Tullamore Show.

The National Ploughing Championships in September was an opportunity to meet farming families and the wider rural community, and communicating vital public safety information.

This year we joined the Construction Safety Partnership Advisory Committee. As part of Construction Safety week, we implemented initiatives to provide safety information to the construction industry, including thousands of CIF members, and others in construction and related industries.

We worked with the Fire Services, nationally and locally, to develop a new training video in relation to the risks when responding to electricity related incidents.

PILLAR 3: PUBLIC EDUCATION AND AWARENESS

In our 'Stay Safe, Stay Clear' programme, we teamed up with the Road Safety Authority to promote road safety among children and families. **ESB Networks** distributed high visibility vests to **85,000 junior infants** in September. There were over **4,000 entries** to our safety colouring competition. We support primary schools with safety resources such as safety tips, posters, lesson plan information and activity sheets. These are available at *www.esbnetworks.ie/education*.

Public Safety Information Campaign

Our Public Safety Advertising Campaigns - 'Are You Sure It's Safe?' and "Stay Safe, Stay Clear" - continued throughout 2017, reminding the public of the need to be aware of the dangers of electricity. Awareness figures for the TV campaign reached **92%**, compared with **88% in 2016**. Radio safety messaging highlighted the dangers of electricity when carrying out farming, construction, leisure and gardening activities.

We continued to sponsor the weather forecast on RTE Radio 1, and this provided a relevant and engaging platform to raise awareness of electricity safety.

In response to specific public safety incidents and near misses, we provided information to the GAA, and bodies involved in sailing, fishing and gun clubs.

PILLAR 4: STAFF EDUCATION AND AWARENESS

In 2017 we continued to build towards better work-place safety and we launched a new monthly Safety Brief for all staff. Alongside this monthly brief, there are weekly safety performance reports detailing incidents and good catches (a good catch is where an employee logs a safety concern). We also increased our focus on health and wellbeing education for our staff, delivering a number of pro-active programmes throughout the year.

There was a significant increase in good catches recorded, up by 1,619 to 4,105, which was up from 2,486 in 2016. There was a 53% reduction in staff Lost Time Injuries (LTIs).

NUMBER OF SAFETY INCIDENTS

3rd party plant damages (excluding underground cable dig-ins)	1,244
3rd party plant damages caused by underground cable dig-ins	715
Non 3rd party – MV and 38kV notifiable fault incidents (line drops & reduced clearances)	277
Non 3rd party – LV notifiable fault incidents (line drops & reduced clearances)	1,214

DELIVERING ON PRICE

■ How we are investing on behalf of electricity customers

We are committed to delivering on price for Irish electricity customers. When we developed our network development and management proposals for PR4, the likely price impact was a key consideration. In 2017 we continued to deliver work within our PR4 allowances, with the exception of October 2017 when we believed that it was more important that we focus on quickly and safely restoring power after Ireland was hit by the devastating winds of Ex-Hurricane Ophelia.

The portion of our allowances we spend each year varies upwards and downwards, depending on our planned work programme for the year. In 2017 we spent 78.3% of our allowed revenue for investment in developing and renewing the system.

DUoS tariffs are the price per 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. In October 2017 our average prices went down by 1%.

In 2017 there was a 7% increase in our delivery of capital investment developing and renewing the network.

The biggest increase was in the cost of connecting new homes and businesses. Contributing 2/3 of our total increase in investment, **we spent almost 20% more (connecting 22% more new homes and businesses) in 2017 than in 2016.** Our investment in preparation for delivering Smart Metering doubled in 2017, and will continue to grow as we prepare to begin delivering smart metering for Irish electricity customers in 2019. We delivered almost **40%** more renewable generation connection works by value in 2017 compared to 2016. Finally, our investment in telecommunications and IT to help us manage the electricity system better increased by almost **30%** in 2017.

Our investment in preparation for delivering Smart Metering doubled in 2017, and will continue to grow as we prepare to begin delivering smart metering for Irish electricity customers in 2019.

EX-HURRICANE OPHELIA

In 2017 our operational expenditure was higher than normal, as a result of our response to Ex-hurricane Ophelia. The additional cost of damage repair to restore supply was **€15.63 million.**

Staff from across the country were redeployed to the worst affected areas, to return supply to customers as quickly and as safely as possible.

In order to quickly restore supply to the hundreds of thousands of electricity customers, we had to get support crews from nine different network operators in other jurisdictions, as well as from the framework contractors available to ESB Networks.

AMPY METER REPLACEMENT PROGRAMME

Sometimes we deliver new work programmes, in addition to our PR4 allowances, when we believe it is the right thing to do for customers or in response to events.

In 2016, following an investigation of a customer complaint about meter readings, we discovered the widespread failure of a particular meter type. We discovered from the manufacturer that there was a component known to fail in these meters. With 27,000 of these meters installed in homes across Ireland, and given the impact of their high readings in advance of failure, ESB Networks decided to engage in a full replacement programme.

This commenced in December 2016 and was delivered in 2017. In addition to meter replacements, we set up dedicated customer communication channels to address customers' concerns and help arrange refunds.

Delivering this programme cost c. €7.5m which we believe represented value for our customers. Of this, CRU approved the €2m operational cost of customer and legal engagement and refunds.

BREAKDOWN OF AN AVERAGE ELECTRICITY BILL 2016/17
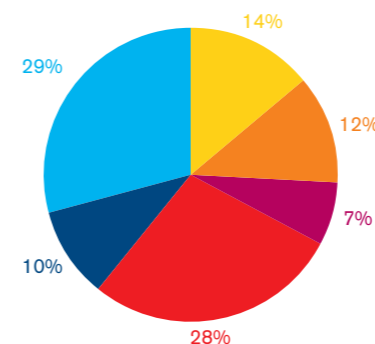
- ● Supply
- ● VAT
- ● PSO Levy
- ● Transmission & Distribution
- ● Generation
- ● Raw Fuel

BREAKDOWN OF DISTRIBUTION COSTS (APPROX. 20% OF YOUR ELECTRICITY BILL)
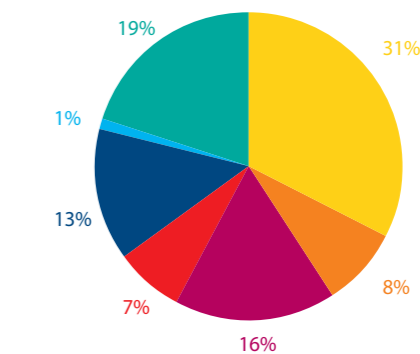
- ● Cost of Maintaining and Renewing the Network
- ● Business Rates
- ● Connecting New Homes and Businesses, and Reinforcement for Growth
- ● IT, Telecoms and R&D
- ● Customer Service and Metering
- ● Connecting Renewable Generation
- ● Other

TOTAL (Dist CAPEX + Dist OPEX)

SOCIAL OBLIGATION & ENGAGEMENT

■ **Listening to and sharing with our customers**

We are proud to have served customers and communities for over 90 years and will continue to do so into our brighter future. As the energy industry changes, we will ensure that our customers remain at the centre of everything we do, as we support the transition to a low carbon future.

ElectricAid

This year ESB Networks staff members took part in our annual 5k run to raise €4,800 for ElectricAid, the social justice and development charity of ESB (and EirGrid) employees and pensioners. Full proceeds from this year's event went towards funding ElectricAid's response to the developing East Africa Food Crisis.

PRIDE

ESB LGBT+ colleagues, allies, friends and family were out in force to join 2017 Dublin Pride Parade festivities. Diversity and inclusion is important to us and we aim to create an environment that enables everyone to bring their whole self to work, every day.

DOWN SYNDROME FIELD OF DREAMS

This year Cork-based ESB Networks staff joined with colleagues from Jones Engineering/O'Shea's Electrical to put their electrical skills and expertise to use, assisting in the wiring of portacabins and public lighting in Down Syndrome Cork's Field of Dreams at Curraheen. The project will provide a range of training, education, and work opportunities for adults with Down Syndrome and will also teach participants to grow their own fruit and vegetables.

ESB INTER-COLLEGES CHALLENGE

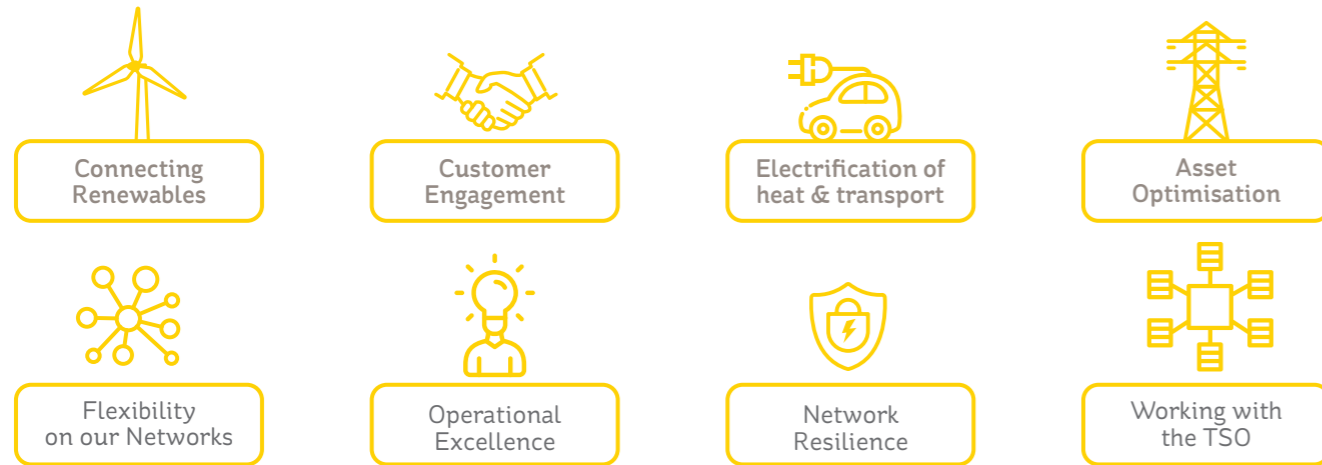The ESB Inter-Colleges Challenge, now in its fourth year, offers engineering and finance students the opportunity to apply their knowledge to develop innovative, creative and commercially focused solutions to real life energy-focused challenges. ESB sponsors the winning team to represent Ireland in the international competition in Montreal and the winning team also receives placements in the organisation.

INNOVATION

■ How we are developing new solutions in a changing energy landscape

Innovation is part of ESB Networks' culture and we are firmly committed to enabling a brighter future for everyone. In September 2017 we launched our new innovation strategy: Innovating for a Brighter Future, based on 8 roadmaps which reflect the challenges and opportunities of a changing energy system.

Connecting Renewables

Customer Engagement

Electrification of heat & transport

Asset Optimisation

Flexibility on our Networks

Operational Excellence

Network Resilience

Working with the TSO

4.
ASSET OPTIMISATION

We manage a network of assets ranging from 2.3 million meters in every house and business in Ireland, to the 400kV stations connecting hundreds of megawatts of generation. We are working to extend our assets' lives, and adopt new technologies to improve their reliability and maximise their capacity.

5.
FLEXIBILITY ON OUR NETWORKS

The economic and reliable operation of our network will over time rely on our ability to help guide customers' generation and consumption patterns. We are developing the tools and insight to enable end use flexibility as part of an 'integrated grid' pathway to a low carbon electricity system.

INSPECTION OF OVERHEAD LINES USING DRONES & IMAGE PROCESSING ANALYTICS

We are trialling new technologies which may support more effective, safe and efficient asset management. In 2017, we trialled and researched drones and image processing analytics for overhead line inspections. Given the success of this work, and the criticality of how we manage our 180,000 km of overhead lines, we are now preparing a tender to introduce this technology into our business as usual maintenance activities.

DINGLE PROJECT

In 2017, at our inaugural customer conference, we launched the Dingle Project, which will look at what the smart electricity network of the future might look like. In Dingle, ESB Networks aims to work with the local community to play a key role in discovering what opportunities the future of energy can unlock for the people of Ireland. We will be installing smart devices on our network to help us to monitor and predict the network events better and to ensure less outages and more resilience on our network.

1.
CONNECTING RENEWABLES

We are committed to enabling Ireland's transition to a low carbon future. As we connect each new renewable energy project, our challenge is to support these new technologies while maintaining high levels of resilience and security for all network customers.

2.
CUSTOMER ENGAGEMENT

ESB Networks is proud to serve all 2.3 million customers across Ireland. This roadmap helps us develop new ways to listen to our customers' needs, as they expect to communicate with us in different ways, and at the times that fit in with their lives.

3.
ELECTRIFICATION OF HEAT & TRANSPORT

Electricity is becoming an increasingly low carbon fuel, making the electrification of heat and transport the most economic way to meet Irish decarbonisation targets. We are delivering new network development strategies and services to help deliver this energy future for our customers.

6.
OPERATIONAL EXCELLENCE

We use state of the art systems and technologies to help us safely and efficiently operate the network. These systems support employees, contractors and customers in their interaction with the system. We continually challenge ourselves to improve these systems and processes, as well as adopting mobile and dynamic staff and fleet management systems, and advanced system operational tools.

7.
NETWORK RESILIENCE

Investment in our network over the last 20 years has resulted in an improvement of more than 60% in our continuity of supply. As our climate continues to change we must ensure that we can maintain a resilient network. It is also important that our network is resilient enough to support our customers as they electrify heat and transport as part of Ireland's journey towards a clean energy system.

8.
WORKING WITH THE TSO

Safe operation of the electricity network in Ireland means that the distribution system and transmission system must work together in a coordinated way so that the needs of all customers are met. The two systems will host over 8GW of renewable intermittent generation by 2030 which makes coordination even more crucial. The aim of this roadmap is to develop relationships and processes that facilitate the development of a zero carbon electrical energy system here in Ireland.

CONNECTIVITY & DIGITALISATION

Three core elements are key to supporting our innovation strategy: smart metering, digitalisation and the energy policy framework. Smart Metering will be rolled out across Ireland from 2019. Its data and real-time interaction will create new opportunities to support customers, from managing supply reliability, to helping customers make better energy choices.

Increasingly we are developing and investing in advanced operational IT systems and remote autonomous devices to enhance operation of our network assets.

These connected and digitalised systems help us achieve a deep, real time awareness and understanding of how our assets and the system as a whole is performing.

Going forward, this connectivity and visibility will become increasingly central to how we and our customers use the system.

As we release more and more capacity in existing assets for customers and renewable generation, the visibility that connectivity and digitalisation offer us will be central to connecting renewables, flexibility, asset optimisation and system resilience.

In our innovation strategy, we are trialling new technologies which make this possible, including operational systems and communications hardware and software.

FIBRE FOR BROADBAND

The electricity transmission system in Ireland has been used for decades to provide backbone fibre services across Ireland.

The European "Cost Reduction Directive" aims to help reduce the cost of rolling out high speed broadband across Europe.

In 2017, we developed a suite of fibre access products to overcome the unique technical & safety challenges involved in deploying fibre on our medium and low voltage networks. We completed demonstration trials for interested Telecommunications providers.

This means 80,000 more Irish homes and businesses which can choose fibre broadband access. It is planned that 56 towns will be connected using fibre on the electricity network between 2016 and 2019. In 2017, there were 20 Irish towns where fibre access was made available using the electricity network.

INNOVATION ATTACHING FIBRE TO THE DISTRIBUTION SYSTEM

In 2017 ESB Networks delivered a number of technical trials to find safe, efficient ways of connecting fibre to the distribution system. These addressed questions including:

- **ENGINEERING DESIGN FOR FIBRE ATTACHMENT ON ESB NETWORKS WOODEN POLES**

We have tested and developed techniques to position fibres at a safe and secure height, using technologies like LIDAR to profile the network and work out where the fibre should be positioned.

- **WEAK LINK DESIGN**

Fibre cables have to have a weak link, which gives way if it is snagged by a high vehicle. This means that the fibre falls to the ground while the electricity network remains intact. We determined the right strength for this weak link, so that the fibre can still operate reliably over a range of weather conditions.

- **POLE TOP FIBRE REPAIRS AND CONNECTIONS**

To make connections between extremely fine fibres at height is very difficult for an operator. In 2017 we trialled and introduced new mechanical splicing procedures, which can be completed in minutes, and are particularly suited to fibre connections for the 'last drop' – the final fibre bringing broadband to a building.

- **USE OF FIBRE-WRAP**

Wrapping fibre around the power conductor leaves the network more resilient than when the fibre is independently strung. However we have had to develop solutions which reflect the different fibre and electricity network structures, for example routing the fibre through phase-to-earth insulators at network junctions and switching points.

SERVICE LEVEL AGREEMENTS

Service Level Agreements (SLA) set out the target service levels that ESB Networks will operate to in providing market roles to all market participants.

The format of the SLAs, in general terms, outline the time frames within which suppliers can expect the required transactions to have been completed in response to the supplier message. These market messages and related SLA's are based on the agreed processes approved by CRU. They set out performance standards which ESB Networks must strive to achieve and report on, as laid down in condition 13 of the DSO Licence. As provided in that condition, the standards and/or targets of performance may be determined by the CRU from time to time.

Description	No.	Standard Approval Timelines (SLA)	Within the SLA timeline	Within twice the SLA timeline
Change of Supplier (NQH)	1A	Validate within 5 days	99.99%	100%
	1B	Using customer a read supplied by the customer– Complete within 3 days	99.73%	99.91%
	1B	Using a special read organised between the customer and ESB Networks– Complete within 10 days	97.89%	98.95%
	1B	Using one of ESB Networks scheduled reads – Complete within 3 days	91.81%	93.84%
Change of Supplier (QH)	2A	Validate within 5 days	100%	NA
	2B	Complete within 3 days	99.62%	0.00%
Change of Supplier Cancellation	3A	Validate supplier cancellation within 5 days	99.87%	99.89%
	3B	Complete supplier cancellation within 5 days	99.85%	100%
New Connection and registration with supplier (NQH)	5A	Prepare Quote – Within 7 working days where no site visit required. Within 15 working days where site visit required	98.17%	100%
	5B	Complete connection – Within 10 working days of receipt of RECI certificate.	99.27%	100%
	5C	Data Processing – Issue details to Supplier within 10 Days	99.06%	99.75%
New Connection and registration with supplier (QH)	6A	Prepare Quote – Within 7 working days where no site visit required. Within 15 working days where site visit required	98.17%	100%
	6B	Complete Connection –Within 10 working days of receipt of RECI certificate.	99.27%	100%
	6C	Data Processing – Issue details to Supplier within 10 Days	90.91%	93.94%

Change to meter point characteristics	8A	Prepare quote – Within 7 working days where no site visit required. Within 15 working days where site visit required	98.17%	100%
	8B	Complete change – Within 10 working days of receipt of RECI certificate.	99.27%	100%
	8C	Process Change – Issue details to Supplier within 10 Days	96.58%	98.83%
De-energisation of Meter Point	9A	De-energise of meter point within 5 days	96.36%	98.46%
	9B	Issue Meter details to Supplier within 10 Days	99.08%	99.90%
Re-energisation of Meter Point	10A	Re-energise meter point within 5 days	98.73%	99.47%
	10B	Issue Meter details to Supplier within 10 Days	99.02%	99.90%
Change of Meter Configuration	11A	Reconfigure meter within 5 days after the receipt and validation of Supplier request	96.68%	98.69%
	11B	Process data within 10 days	98.77%	99.71%
Meter Problems and Reports of damage	12A	Repair or replace faulty meter within 5 days	83.93%	92.47%
	12B	When a faulty meter is Repaired or Replaced – Process Meter Data within 5 days	94.46%	99.33%
NQH Meter Reading	14A	Scheduled Read – Distribution of Reads to Suppliers within 7 workdays	98.88%	99.93%
	14A	2 Scheduled reading visits per annuM	100%	NA
	14A	4 Scheduled reading visits per annum	99.52%	NA
	14A	Actual reads for scheduled meter reading visit	82.10%	NA
	14A	Actual reads for scheduled MD meter reads	92.00%	NA
	14A	One actual read per annum	97.83%	NA
	14B	No Consecutive Block Estimations	99.84%	NA
	14B	No Consecutive MD Block Estimations	100%	NA
	14C	Out of Cycle Customer Read – Readings processed within 3 workdays	96.62%	98.40%
QH Data Collection	15A	D+4 QH data-Send to SEM-O / Suppliers in 1 workday	100%	NA%
	15B	QH Actual Data . Send to suppliers within 4 and 10 days**	98.23%	98.58%
Request for Special Read	18A	Site visit by 7 days	74.07%	83.58%
	18B	Issue of Meter details within 3 Days	79.42%	90.59%
Data Aggregation	16	Issue of aggregated data to SEM-O/TSO/Suppliers and Generators within 5 workdays	100%	NA
Change of SSAC	20	Complete process in 3 workdays	100%	NA
De-registration	21	Auto Completion within 5 workdays	99.99%	0.00%
		Manual Completion within 10 workdays	100%	NA
Change Customer Details	24	Complete within 5 days	99.98%[1]	100%
Change Legal Entity	25	Complete within 5 days	99.92%	100%

1 The figure provided is an estimate the figure for 2017 is not available.