EDL operations staff

INFRASTRUCTURE

SERVING SOCIETY

The Infrastructure division aims to create a better future, today through its diversified investments in energy infrastructure, transportation infrastructure, water infrastructure, waste management, waste-to-energy, household infrastructure and infrastructure-related businesses.

Globally these businesses provide essential services and they are engaging and supporting stakeholders in meaningful ways to deliver outcomes that really matter. They are leading their industries in many low-carbon innovations and collaborating with governments, partners and customers to achieve their net-zero ambitions.

In delivering on this, the Infrastructure division therefore aims to –
Accelerate the transition to a sustainable future.

Solar installation by Victoria Power Networks

Material topics, goals and progress

The following table highlights the material topics identified for the Infrastructure division, as well as the relevant UN Sustainable Development Goals ("SDG"), division goals and progress made.

Material topics & SDGs	Goals	Highlights
Enabling the net-zero transition 	• Be a partner of choice in helping customers and countries deliver on their net-zero goals.	• At the forefront of leading innovation and technologies that are crucial to enabling net-zero economies including leadership in hydrogen, solar, wind, waste-to-energy, carbon capture, use and storage, circular economy approaches and smart city solutions.
Taking action on climate change 	• Set long-term targets to reduce carbon emissions and invest in the most impactful net-zero transition opportunities identified including: renewable and other clean energy generation; phasing out coal from all operations; energy efficiency; sustainable transportation; circular economy approaches; and climate risk and resilience management.	• Ambitious targets set by nine businesses to help governments deliver on their net-zero goals. • New commitment to phase out coal-fired power generation from global operations by 2035. • 12.9% reduction in scope 1 and 2 emissions in 2021 versus 2020 and 21.8% versus 2018. • 6,405GWh of renewable and other clean energy generated in 2021. • Long-term ambition to replace natural gas with 100% renewable gas (hydrogen or biomethane) for home heating across gas networks. • Over 14GW of distributed energy resources connected to grids by the Group's electricity distribution networks. • World-leading technologies and approaches in flexible exports implemented to cater for renewable energy connections. • Flood mapping tools developed and millions invested in flood defences. • Extensive bushfire mitigation programmes and investment across Australian businesses.
Protecting biodiversity 	• Introduce a biodiversity net gain philosophy into the operational ethos of businesses.	• Northern Gas Networks committed to measure and report the natural capital value of up to 50 of its largest sites by 2026. • Northumbrian Water completed its first natural capital account and is developing a tool to evaluate the biodiversity value of all sites larger than 0.2 ha. • UK Power Networks has identified 100 sites for action plans to enhance the biodiversity potential. • Wales & West Utilities has a long-term ambition to achieve biodiversity net gain by 2039, with an interim goal of achieving no net loss on designated products between 2021 and 2026.

Material topics & SDGs	Goals	Highlights
Creating a great place to work 	• Create a zero harm workplace and culture. • Support employee health and wellbeing. • Attract, develop and retain high-performing talent. • Create quality and rewarding training programmes. • Promote and create inclusive and diverse teams.	• Culture of zero harm promoted across businesses and tone set from the top by: i) including safety KPIs in the compensation schemes of all its businesses CEOs and executive management; ii) making health and safety a focus of all its board meetings around the world; and iii) holding an annual health and safety conference including representatives from each of the Infrastructure businesses. • Extensive employee health, safety and wellbeing support in response to the pandemic. • Emphasis on high impact apprenticeship programmes and maintaining talent. • Multiple recognitions as top businesses to work for.
A steadfast commitment to customers and communities 	• Go above and beyond to engage customers and exceed their expectations. • Support vulnerable customers and turn the tide on fuel poverty.	• Fuel poverty programmes in place across the distribution networks in the UK and Australia.
Ensuring responsible business practices (a focus on cyber security) 	• Implement leading practice approaches to cyber security.	• Cyber security policies, governance mechanisms and cyber-attack security plans in place to protect corporate information assets and critical infrastructure.
	SDG 17, "Partnerships for the goals", underpins action on all material topics and enables the best possible impacts through collaboration and working with relevant partners.	

Enabling the net-zero transition

The Infrastructure division is positioned at the forefront of leading innovation and technologies that are crucial to enabling net-zero economies. Providing 23 million customers with essential services globally in gas, water and electricity services, the following businesses are spotlighted in this section to show the pivotal enabling roles they are playing, while also working to deliver the lowest cost pathways to decarbonisation for a just and fair transition.

Table 24: Business enabling role and supporting local contexts

Business	Role in the net-zero transition	Local context
United Kingdom		
Northern Gas Networks Gas distribution network Customers: 2.7 million	With natural gas use in the UK accounting for one third of the country's carbon footprint, finding solutions to decarbonise the gas grid is essential to achieving net-zero.	• The UK has committed to net-zero by 2050. • The Prime Minister's Ten Point Plan sets out the pathway for a green industrial revolution. • The UK Hydrogen Strategy plans to unlock GBP4 billion of investment and generate 5GW of hydrogen by 2030, which has since doubled to 10GW in Britain's Energy Security Strategy. • The Energy White Paper 2020 envisages the installation of 600,000 heat pumps a year by 2028, alongside trials to provide evidence on the role of hydrogen in domestic heat. • The UK has banned the sale of new combustion engine cars by 2030. • The Net Zero 2030 Routemap sets out how water companies will play their part in reaching net-zero two decades ahead of the UK's 2050 target. • The Department for Transport's net-zero emissions target is supported by Network Rail's Traction Decarbonisation Network Strategy, aiming to displace diesel-only trains by electrification, battery and hydrogen train deployment by 2040.
Wales & West Utilities Gas distribution network Customers: 2.5 million	Northern Gas Networks and Wales & West Utilities are delivering real-world trials to prove how the existing gas networks in the UK can be converted safely and affordably to 100% hydrogen to support the decarbonisation of heat, transport and industry.	
UK Power Networks Electricity distribution network Customers: 8.4 million	As a major electricity network operator in the UK, UK Power Networks is at the heart of enabling the net-zero transition through its crucial role both in connecting renewable energy and facilitating the uptake of new low-carbon technology; it has therefore put net-zero at the heart of its latest Business Plan 2023 – 2028. UK Power Networks became the first distribution network operator in the UK to have its scope 1, 2 and 3 targets validated by the Science Based Targets initiative at a Well Below 2 Degree target. As a Business Ambition for 1.5 °C campaign member UK Power Networks will upgrade its targets in the near future to be aligned to a 1.5 °C pathway.	
Northumbrian Water Water and sewage services Customers: 4.5 million	The UK's water companies together produce almost a third of UK industrial and waste process GHG emissions. Northumbrian Water will achieve a net-zero carbon position by 2027 making it the first water company in England to meet this ambition. It was also approved by the United Nations to become part of the Race to Zero campaign.	
UK Rails Owner of passenger and freight rolling stock	With over 75% of its rolling stock already electric, as well as new innovations being developed in hydrogen and battery technologies to increase the potential for zero-emission trains, UK Rails is well-positioned to be a partner of choice to support the UK transport industry's net-zero journey.	

Business	Role in the net-zero transition	Local context
Australia		
Australia Gas Infrastructure Group Gas distribution network Customers: 2 million	Australian Gas Infrastructure Group is already bringing its vision of converting its entire network to renewable gas by 2040-2050 into reality by being the first gas network in Australia to deliver a green hydrogen blend to customers on an existing gas network.	• Australia has committed to net-zero by 2050. • The National Hydrogen Strategy aims to invest AU$1.4 billion in building a hydrogen industry. • The South Australian Government is targeting 100% renewable electricity by 2030. • The Victorian Government targets 50% renewable electricity by 2030.
EDL Owner and operator of a global portfolio of power stations	EDL is a leading global producer of sustainable distributed energy that helped its customers to abate four million tonnes of GHG emissions in 2021 by producing electricity and renewable natural gas across a large portfolio of landfill gas and waste coal mine gas sites globally.	
SA Power Networks Electricity distribution network Customers: 0.9 million **Victoria Power Networks** Electricity distribution (owner of Powercor and CitiPower) network Customers: 1.2 million **United Energy** Electricity distribution network Customers: 0.7 million	As major electricity distribution networks for the Australian states of South Australia and Victoria, these networks are critical to enabling the transition to renewable electricity. Already, SA Power Networks has the highest penetration of distributed solar of any gigawatt-scale energy system in the world and it's working on doubling its solar capacity in the next five years.	
Centre Continental Europe		
AVR Specialist in treatment of residual waste.	AVR achieves the maximum recovery of energy, raw materials and other materials from residual, unrecyclable waste through smart incineration. Waste is then turned into valuable steam, heat and electricity for supply to its surrounding communities. During 2021, 2,266,000 tonnes of unrecyclable waste was turned into valuable products and services that enabled 926,700 tonnes of avoided CO_2 emissions.	• The EU has committed to net-zero by 2050. • The EU ETS covers 40% of EU GHG emissions, including partial waste-to-energy. • Close to 225 million smart meters for electricity and 51 million for gas will be rolled out in the EU by 2024, representing a potential investment of EUR47 billion. • The EU has set a renewable energy of at least 32% renewable energy mix by 2030.
ista Products and services in energy efficiency, notably sub-metering.	ista's data-based products and services make individual energy consumption transparent to customers so they can save energy, costs and CO_2. ista's core product, data-based heat cost allocation, helps residents of multi-family buildings to save on average 20% of their annual heat consumption and costs. Every year some 3.7 million tonnes of CO_2 emissions are avoided by our customers in Germany alone.	
Hong Kong		
HK Electric Electricity generation and distribution. Customers: 0.6 million	HK Electric is one of two main electricity generation companies in Hong Kong, which combined account for roughly two thirds of the city's GHG emissions, therefore making their actions critical in achieving the targets stipulated in Hong Kong's Climate Action Plan 2050.	• Hong Kong has committed to achieve carbon neutrality before 2050. • As per the Hong Kong's Climate Action Plan 2050, the Hong Kong government aims to phase out coal use for daily electricity generation and increase renewable energy in its electricity generation mix by 7.5 – 10% by 2035.

BRINGING HYDROGEN FROM CONCEPT TO REALITY

With natural gas use in the UK accounting for one third of the UK's total carbon footprint, finding viable and affordable solutions to decarbonise the gas grid is essential to achieving net-zero. Northern Gas Networks has been at the forefront of this movement, by delivering ground-breaking research in hydrogen and supporting the development of integrated energy networks that dissolve the traditional barriers between gas, electricity and energy storage.

Launched in 2014, and led by Northern Gas Networks, in partnership with Wales & West Utilities, the H21 project set out to explore the potential of converting the existing gas networks in the UK to 100% hydrogen. The project began as a desktop exercise, and over the years has progressed to a number of follow-on projects, including real-world trials. The range of partners has expanded to include utilities across the UK, academia and private enterprise.

The publication of the UK Government's Hydrogen Strategy in August 2021 shows just how far this nascent industry has come from desktop thinking to reality. The strategy sets out a vision of a thriving, low-carbon hydrogen sector, supporting over 9,000 UK jobs, unlocking GBP4 billion of investment and generating 5GW of hydrogen by 2030 – enough to heat 3 million UK homes each year. More recently, the UK government's British Energy Security Strategy has doubled the target for low-carbon hydrogen production to 10GW by 2030.

Northern Gas Networks' work in hydrogen is now focused on delivering real-world trials to prove that the UK's existing gas networks can be converted safely and affordably to run on hydrogen. With its partners, Northern Gas Networks has launched the world's first 100% hydrogen testing facility in Buxton, and during 2020 and 2021, in the village of Winlaton in the North East of England, it began testing blended hydrogen with more than 660 homes to study how hydrogen performs for everyday heating and cooking. The 10-month pilot, part of a wider project called HyDeploy, has seen a 20% blend of hydrogen added to the local gas supply. Under these conditions, local customers do not need to change their appliances or alter their behaviour in any way. The use of blended hydrogen is considered a crucial first step on the path to 100% hydrogen. In fact, if a 20% hydrogen blend was added to natural gas across the UK, it could save around six million tonnes of CO_2 each year, the equivalent of taking two and a half million cars off the road.

To help the public and key industry partners such as boiler manufactures to become familiar with hydrogen, Northern Gas Networks has built a hydrogen show home at its InTEGReL (Integrated Transport Gas Electric Research Laboratory) site in the North East of England. The show home is fully equipped with hydrogen appliances for visitors to see them working in everyday life. It also enables appliance manufacturers to test products in a real-world setting. The Hydrogen Home is part of a larger Customer Energy Village, which will see the construction of nine houses built to standards from 1910 to the present day. Each home will include monitoring equipment, allowing Northern Gas Networks to test use of services, building performance and technology and help address the technical barriers to achieving net-zero in older properties. Meanwhile at Northern Gas Networks' Spadeadam hydrogen test site, together with its partner DNV, Northern Gas Networks has constructed a mini gas distribution network which is being used to test whether existing gas procedures can be undertaken on hydrogen as they are currently with natural gas.

Northern Gas Networks unveils hydrogen show home

Northern Gas Networks' work in hydrogen is now focused on delivering real-world trials

PIONEERING IN BLENDING GREEN HYDROGEN

Australian Gas Infrastructure Group is committed to delivering for its customers today and tomorrow. Renewable gas will help Australian Gas Infrastructure Group's customers, and Australia, achieve sustainability goals, whilst retaining the most prominent value proposition that gas networks have historically provided – reliable and affordable energy.

Australian Gas Infrastructure Group is targeting 10% renewable gas across its distribution networks by 2030, and conversion to 100% renewable gas by 2040 as a stretch target and by no later than 2050. Renewable gas includes gas from zero-emissions and carbon-neutral sources such as green hydrogen and biomethane.

Australian Gas Infrastructure Group is already bringing this vision into reality by being the first gas network operator in Australia to deliver a green hydrogen blend to customers on the existing gas network. It has led the industry by proving the safety case to the South Australian government and laying the foundations for hydrogen blending in Australian gas networks.

Using a 1.25 MW electrolyser powered by renewable electricity, Hydrogen Park South Australia ("HyP SA") is Australian Gas Infrastructure Group's and Australia's first project that produces green hydrogen for blending with natural gas at volumes of up to 5% and supply to nearby homes via the existing gas network. Australian Gas Infrastructure Group is also developing Hydrogen Park Gladstone with the aim to distribute a blend of up to 10% renewable gas to more than 770 homes and businesses throughout an entire city's existing gas network, which will be another Australian-first.

Building on this experience, Hydrogen Park Murray Valley, a renewable hydrogen project that Australian Gas Infrastructure Group is developing with a joint venture partner, will become Australia's largest renewable hydrogen production facility. Pending final approvals, the project aims to deliver up to a 10% renewable gas blend to approximately 40,000 residential and commercial gas connections and 20 industrial customers in the cities of Albury and Wodonga.

Australian Gas Infrastructure Group is targeting 10% renewable gas across its distribution networks by 2030

PUTTING NET-ZERO AT THE HEART OF UK POWER NETWORKS' BUSINESS PLAN

This is a pivotal time for the energy industry with large-scale shifts occurring in technology, society and energy to achieve a zero-carbon future. Indeed the volume of carbon emitted in producing electricity in Britain has fallen by 40% in just six years. UK Power Networks is playing a pivotal role in this transition through both connecting unprecedented volumes of low-carbon generation at a rapid pace, while enabling other sectors, such as transport and domestic heating, to decarbonise through electrification. Since 2010, UK Power Networks has connected nearly 5GW of distributed generation to its network and is helping to increase the connections available to the 180,000 electric vehicles on the roads across its three networks, a number set to increase to between 1.6 and 2.7 million vehicles by 2028.

In December 2021, UK Power Networks published its Final Business Plan for the RIIO-ED2 period (2023-2028) that puts facilitating the transition to net-zero at the heart of its strategy. Among the business' seven "Keys to Success", UK Power Networks commits to:

- Facilitating decarbonisation at the lowest cost; and
- Delivering the lowest possible bills whilst enabling net-zero.

To enable this future, UK Power Networks' role is changing fundamentally. Alongside the traditional role of being a Distribution Network Operator with the continued and fundamental role of keeping the lights on, UK Power Networks is establishing an independent and legally separate Distribution System Operator business unit to realise its vision of a dynamic distribution system, with electricity demand and supply flexing in response to distribution-level conditions and market signals. UK Power Networks expects to see market-based solutions which influence consumer behaviours, supplemented with traditional network investment that results in the lowest costs for consumers. This will lead to a smarter and more highly utilised distribution network, with faster and cheaper access for the low-carbon technologies needed to achieve net-zero. This evolution is requiring a radical departure from traditional thinking that has guided networks for the last 100 years; it has emboldened UK Power Networks to become a disrupter, thinking in new ways, being more dynamic and agile in line with changing market conditions and customer behaviour, and working in much stronger collaboration with others.

UK Power Networks is connecting unprecedented volumes of low-carbon generation at a rapid pace

DRIVING INNOVATION IN RAIL TRANSPORT

Although railway only accounts for 1.4% of the total domestic transport GHG emissions, it presents an immense opportunity to facilitate a modal shift and support the UK's net-zero ambitions. Even though the objective is clear, the pathway to net-zero for the industry is complex and will require multi-pronged approaches. UK Rails is therefore future-proofing its portfolio by exploring a range of innovations that can enable different pathways along the journey to net-zero.

Decarbonising existing assets

With over 75% of its rolling stock being electric and a portfolio of innovative technologies being explored, UK Rails is already well-positioned to deliver the UK transport industry's decarbonisation journey.

UK Rails is exploring impactful battery technology both as a supplementary power source for diesel trains and for extending the range of electric trains to be able to operate them where part of a route isn't electrified. With plans to develop the Class 802 inter-city battery hybrid train with Hitachi underway, fuel usage and carbon emissions are expected to be reduced by at least 20% with the introduction of the battery technology. By using battery power to travel in and out of stations and urban areas, the train will further improve air quality and dramatically reduce noise levels. UK Rails is also working with UK Power Networks Services to help the rail industry develop early operational experience of battery trains and charging facilities.

Promoting a circular economy is also of focus. UK Rails' new SWIFT Express Freight product offers a cost-effective and low-carbon solution for freight operators. With end-of-life passenger trains repurposed as freight carriers by removing passenger features, and installing new flooring and equipment to store freight parcels, the asset can have an extended use. This is currently receiving interest from an ever-increasing number of freight operators that are seeking to provide solutions to the shortage of HGV drivers in the supply chain.

Enabling the modal shift with enhanced connectivity

At 40% lighter weight than trains of similar capacity, Revolution Very Light Rail – developed jointly by UK Rails and a consortium of organisations – can help boost connectivity and mobility in remote and rural areas with a lightweight, energy-efficient vehicle that is straightforward to operate and geared to the needs of communities. The Demonstrator was launched in September 2021 and is equipped with hybrid diesel-electric powertrain, enabling a low emission rail transport system.

Taking a leading role in hydrogen trains

In an industry-first partnership, UK Rails has signed a Memorandum of Understanding with Alstom, Britain's leading train manufacturer and maintenance provider. Through this, UK Rails will explore the technical and commercial feasibility to build the UK's first-ever, brand-new hydrogen fleet. In 2021, UK Rails also entered into an agreement with H2 Green, a hydrogen network operator, with a view to develop low-cost and reliable green hydrogen supply solutions for the UK railway. This partnership will help determine the production and refuelling infrastructure required to support wide-scale deployment of hydrogen-powered rolling stock fleets.

UK Rails is exploring building the UK's first-ever, brand-new hydrogen fleet

FACILITATING THE RAPID UPTAKE IN RENEWABLES IN SOUTH AUSTRALIA

SA Power Network's newest depot, Angaston, has installed a 94kW solar system on site

Over the past decade, the South Australian electricity system has undergone a dramatic transition from being predominantly coal and gas powered to being powered largely by renewable energy. Indeed, South Australia set an impressive new renewable energy record in the final days of 2021, with the state's solar and wind farms supplying an average of just over 100% of local demand every day for a period of almost one week. Not only has this enabled renewable companies to undercut traditional coal and gas generating businesses, it has dramatically driven down wholesale electricity spot prices.

As South Australia's electricity distribution network operator, SA Power Networks' vision is that by 2030, all South Australians will share the benefits of the world's most advanced, decentralised and dynamic low-carbon energy system. SA Power Networks is developing innovative solutions to help connect more solar and enable new technologies like battery storage and virtual power plants, while also ensuring a safe, reliable and affordable network for all South Australians. Already SA Power Networks has the highest penetration of distributed solar of any gigawatt-scale energy system in the world and it's working on doubling its solar capacity in the next five years.

SA Power Networks is investing more than AU$50 million during 2020-2025 in modernising the network and to adapt to the increasing demands on the grid. It is also building systems that will enable data analysis from hundreds of thousands of smart distributed energy resources (DER) connections to optimise the operation of the network and unlock more value from network assets. SA Power Networks is improving its network planning and forecasting processes to accommodate future high-DER scenarios such as springtime reverse power flows and an expected 350,000 newly added electric vehicles charging on the network. It is also working with the South Australian government, the Australian Energy Market Operator and the state's transmission network operator, Electranet, to improve technical capabilities to help support the state's energy system during severe faults, extreme weather events or other abnormal conditions that could destabilise the system.

SA Power Networks has the highest penetration of distributed solar of any gigawatt-scale energy system in the world

LEADERSHIP IN THE CAPTURE AND CONVERSION OF METHANE

The decomposition of organic waste in landfill creates methane, a greenhouse gas with 28 times the global warming impact of carbon dioxide. Methane is also emitted during the underground coal mining process. EDL's Clean Energy sites help its landfill and coal mine customers capture and convert approximately 1 billion m^3 of methane into electricity or renewable natural gas. During 2021, EDL helped to remove four million tonnes of greenhouse gases from the earth's atmosphere through methane conversions, and GHG emissions avoided in generating new electricity or natural gas. Most of these emissions reductions are enabled through EDL's 57 landfill gas ("LFG") power stations around the world and its 12 waste coal mine gas power stations in Australia.

EDL owns and operates a large portfolio of LFG powered stations in Australia, Europe and North America. Across sites, LFG is generated from methane produced by decomposing organic matter in refuse tips that would otherwise be released to the atmosphere or flared. EDL captures this methane and converts it to electricity, which also displaces the need to create new electricity from non-renewable sources.

EDL is investing in work that goes beyond the conversion of gas to electricity to also developing renewable natural gas ("RNG"). RNG is LFG processed to pipeline-quality standards making it fully interchangeable with conventional natural gas for use in industry or transportation.

In the United States, EDL has three fully operational RNG sites and another two in development. Operational since 2020, the Indy High BTU RNG Plant at the Indianapolis South Side Landfill converts landfill methane gas into approximately 680,000 MMBtu of pipeline-quality RNG each year, amounting to 19,000 tonnes of carbon emissions avoided annually. The recently completed Wood Road RNG Facility in Michigan will produce approximately 870,000 MMBtu of pipeline-quality RNG each year, which will displace approximately 29,000 tonnes of emissions per year versus combusting comparable fossil fuels. EDL's new Tessman RNG Facility in Texas will produce around 1.2 million MMBtu of pipeline-quality RNG each year resulting in 42,000 tonnes of avoided emissions, once operational in 2022.

During 2021, EDL helped to remove four million tonnes of greenhouse gases from the earth's atmosphere

HELPING REMOTE REGIONS OF AUSTRALIA TRANSITION TO RELIABLE CLEAN ENERGY

Australia is the sixth largest country in the world. While most of its population lives in its major cities, there are many rural and remote towns dotted across this vast land, located hundreds of kilometres from the closest major centre. Most are not connected to the electricity network and rely on trucked diesel to fuel their energy supply, which also exposes them to price volatility, reduced energy security and high carbon emissions. Since 2018, EDL has introduced its award-winning hybrid renewable technology to three remote sites across Australia, as outlined below.

Coober Pedy

EDL provides 100% of the electricity to the remote mining town of Coober Pedy in South Australia. EDL owns and operates the Coober Pedy Hybrid Renewable Power Station which combines 4MW of wind generation, 1MW of solar generation, a 1MW/500 kWhr battery and other integration technologies, with the diesel power station as a backup, achieving generation of approximately 75% through renewable energy for the town's power. This power station has delivered more stable electricity for the community at world-leading renewable energy penetration rates. It is setting a global benchmark for renewables in MW scale isolated grids with the longest continuous period on 100% renewables being 97 hours.

Agnew

Building on the success at Coober Pedy, EDL commissioned the 56MW Agnew Hybrid Renewable Project at the Agnew Gold Mine in Western Australia in 2020. Comprising 18MW wind and 4MW solar generation, a 13MW/4MWh battery energy storage system and an offgrid 21MW gas/diesel power plant, the project is Australia's largest hybrid renewable microgrid and supplies the mine with power that is on average 50-60% renewable, with 99.99% reliability.

Jabiru

In 2021, EDL commenced construction of the Jabiru Hybrid Renewable Project in Australia's Northern Territory. Beginning operations in February 2022, the hybrid renewable power station provides the remote town of Jabiru with at least 50% renewable energy over the long-term, without compromising power quality or reliability.

EDL brings its award-winning hybrid renewable technology to remote regions in Australia

EDL's Agnew Hybrid Renewable Microgrid 56MW is first in the country to utilise wind generation on a large scale at a mine site

CARBON CAPTURE, USE AND STORAGE

AVR's CO_2 capture plant in Duiven

In a circular economy, the use of products and materials is maximised and value destruction is minimised because products are reused as much as possible.

AVR operates two plants including five waste treatment installations in Duiven, near the German border, as well as Rozenburg in the Port of Rotterdam area. AVR's purpose is to take residual, unrecyclable waste and with its expertise in smart incineration technology use it to create electricity, heat, steam as well as new process raw materials for surrounding households and businesses in Rotterdam and the Arnhem region in the Netherlands.

During 2021, 2,266,000 tonnes of unrecyclable waste was turned into valuable products and services that enabled 926,700 avoided CO_2 emissions, including:

	Product & impact	GHG Emissions avoided
	330GWh of process steam used by industry avoiding the use of gas-fired boilers.	74,500 tCO_2e
	1,540GWh of district heating avoiding the use of gas-fired boilers.	347,500 tCO_2e
	532GWh of electricity, of which 54% is renewable electricity.	261,700 tCO_2e
	448,100 tonnes of bottom ash is used as an input for of construction materials (403,000 tonnes) with the remaining ferrous and non-ferrous metals (45,100 tonnes) recycled back into metals by scrap metal recyclers.	134,000 tCO_2e
	42,000 tonnes of CO_2 captured annually and transferred for use in the horticulture sector replacing the need for natural gas-fired heat and power generators.	40,000 tCO_2e
	28,000 tonnes of bi-product after thermal treatment of biomass paper pulp residue which is converted to TopCrete®, a patented calcareous (chalky) product that is used as a cement substitute.	23,000 tCO_2e
	29,000 tonnes of plastic packaging material that instead should be recycled via a third party.	46,000 tCO_2e

Based on the volume of residual waste AVR currently processes, its target is to reduce its annual GHG emissions by 800,000 tonnes CO_2e by 2030 and be a net-zero operation by 2050. Large-scale carbon capture, use and storage is the next step in AVR's journey, which will act as a crucial part of its net-zero transition plan.

Taking action on climate change

Beyond the important role these businesses are playing in enabling a net-zero future they are also taking ambitious action and leveraging technologies to eliminate GHG emissions in as much as possible in their own operations and wider value chain.

GHG emissions reduction targets

The businesses within the Infrastructure division have set ambitious goals to help deliver on net-zero, many of which are leading in their industries and going much further and faster than the local regulatory contexts as outlined in Table 25. The Group continues to work on an Infrastructure-wide division target, which will be an area of focus during 2022.

Table 25: Business-level net-zero goals and plans

Business	Net-Zero Goal	Key plans to achieve net-zero
Australian Gas Infrastructure Group	10% renewable gas by volume in distribution networks by 2030; 100% renewable gas by volume by 2050 at the latest and 2040 as a stretch target.	• Hydrogen Park Gladstone will begin blending 10% green hydrogen into an existing gas network of 770 homes. • Hydrogen Park Murray Valley will extend this model of 10% blending of green hydrogen to an area of 40,000 residential homes and connections. • The Dampier Bunbury Pipeline is one of the largest capacity natural gas pipelines in Australia and the backbone of energy infrastructure in the west. Its ability to store and transport hydrogen is currently being investigated in an 18-month State-backed research project.
AVR	Achieve net-zero in operations by 2050.	• Increasing supply of CO_2 to horticulture greenhouses, steam supply to nearby industrial customers and supply of district heating. • Exploring large-scale capture and storage in depleted offshore gas fields.
ista	Achieve net-zero in scopes 1, 2 and selected scope 3 by 2030.	• Procurement of renewable electricity. • Reducing the lifecycle footprint of products. • Helping customers and users reduce their CO_2 emissions from heat consumption by 10% by 2030, versus a 2015 baseline. • Converting entire fleet to 100% electric.
Northumbrian Water	Achieve net-zero in operations by 2027.	• Ongoing use of 100% renewable electricity. • Increasing generation of renewable energy onsite (solar and hydropower). • Pilots of large-scale battery storage and the production of hydrogen in hydropower sites that cannot be connected to the grid. • Commitment to create zero avoidable waste by 2025.

Business	Net-Zero Goal	Key plans to achieve net-zero
Northern Gas Networks	Achieve net-zero in operations by 2031 (excluding gas shrinkage) and net-zero across the value chain by 2050.	• Purchasing 100% renewable electricity and green gas and installing renewable energy production at all offices and depots by 2026. • Transitioning vehicle fleet to 50% ultralow emission or hybrid by 2026 and 100% by 2031 with supporting electric vehicle charging infrastructure. • Continuing metallic gas pipe replacement programme and system pressure management. • Biomethane and hydrogen will play an increasing role in displacing natural gas supplies, beginning first with blue hydrogen supported by carbon capture and storage, followed increasingly by green hydrogen. • Improving efficiency and reduced gas demand. Expectation that energy delivered through its network will reduce significantly, largely driven by increasing energy efficiency of homes and the uptake of alternative technologies such as heat pumps.
SA Power Networks	Achieve net-zero in operations by 2035.	• Working in collaboration with other market participants necessary to facilitate the uptake of renewable energy sources within the electricity network to reduce the GHG emissions stemming from distribution line losses. • Increasing the use of renewables via the installation of solar panels onsite. • Reducing the use of sulfur hexafluoride and sustainable fleet measures.
UK Power Networks	Achieve net zero for directly controlled operational GHG emissions (excluding network losses) by 2028.	• Using only renewable electricity in buildings. • Replacing all suitable vans and cars with electric vehicles (around two thirds of the fleet), making sure areas with poor air quality get first priority. • Introducing lower carbon fuels and hybrids into the mobile generator fleet.
Wales & West Utilities	Deliver a net-zero ready gas network by 2035.	• Shrinkage reduction through mains replacement. • Ongoing pressure management. • Connecting biomethane producers. • Delivering innovative projects to support hydrogen conversion for the network and gas customers.
HK Electric	Achieve carbon neutrality before 2050.	• Phasing out all coal-fired generation. • Plans for a large-scale offshore wind farm in Hong Kong.

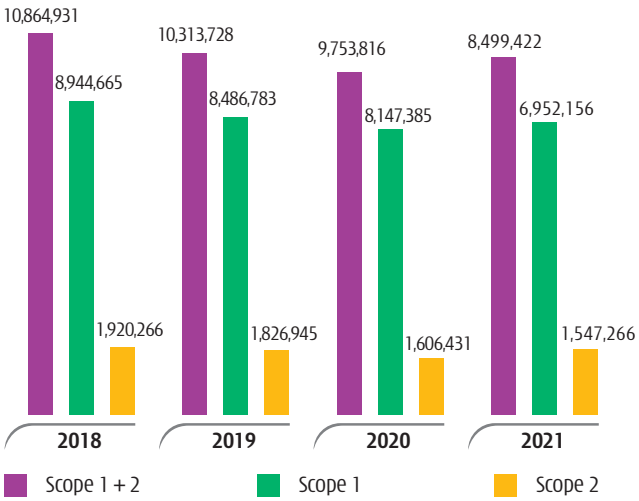
GHG emissions performance

In 2021, total scope 1 and 2 emissions decreased by 12.9% versus 2020, and 21.8% versus 2018.

Accounting for 82% of GHG emissions, scope 1 emissions include direct emissions from sources owned or controlled by the division. Scope 1 GHG emissions decreased in 2021 by 14.7% versus 2020 mainly due to an overall decrease in the consumption of non-renewable fuel consumed such as diesel and natural gas.

Accounting for the remaining 18% of GHG emissions, scope 2 emissions include GHG emissions from purchased electricity, and those associated with losses in the transmission and distribution networks for the electricity distribution companies. Scope 2 GHG emissions decreased by 3.7% in 2021 versus 2020 predominately due to the procurement of renewable electricity and increases in onsite solar generation.

Figure 26: Scope 1 and 2 emissions performance (tCO_2e)



Net-zero transition opportunities

The most significant transition opportunities for the Infrastructure division in terms of influencing its direct operation include:

1. Renewable and other clean energy generation;
2. Phasing out coal from all operations;
3. Energy efficiency;
4. Clean transportation;
5. Circular economy approaches; and
6. Climate risk and resilience

As mentioned upfront in the report, topics such as the protection of biodiversity and ensuring a just and equitable transition are also fundamental to net-zero planning, these are also discussed on pages 112-113 and 119-120.

1. Renewable and other clean energy generation

In 2021, the Infrastructure businesses were responsible for generating 6,405GWh of renewable and other clean energy (on a gross basis), the largest source being biogas.

Table 27: Renewable and other clean energy generated by the Group's businesses

Renewable and other clean energy source	Installed capacity (MW)	Generation in 2021 (MWh)	Emissions avoided p.a. (tCO_2e)
Biogas*	435	2,092,387	2,735,243
Solar	7	11,955	1,865
Wind	182	485,380	356,291
Green hydrogen	1	628	272
Waste coalmine gas	298	1,413,133	1,224,327
Waste-to-energy**	170	532,000	261,700
Renewable heat and industrial waste heat	390	1,870,000	422,000
Total	**1,483**	**6,405,483**	**5,001,698**

Note:

* Biogas produces both electricity and renewable natural gas. The MW's installed capacity and MWh's generated in 2021 includes the renewable natural gas converted from MMBTU's.

** 54% of the energy output was classified as renewable (biomass origin) and was certificated with Guarantees of Origin.

Biogas

Biogas is a renewable energy produced by the breakdown of organic matter such as food scraps and animal waste. It can be used in a variety of ways including as vehicle fuel and for heating and electricity generation. The precise composition of biogas depends on the type of feedstock and the production pathway. Technologies leveraged by the Group include: biodigesters, landfill gas recovery systems and wastewater treatment plants.

Biomethane (also known as "renewable natural gas") is a near-pure source of methane produced either by "upgrading" biogas (a process that removes any CO_2 and other contaminants present in the biogas) or through the gasification of solid biomass followed by methanation. One of the benefits of biomethane is that this renewable fuel can directly replace fossil fuel-based natural gas without the need for any changes in transmission and distribution infrastructure or end-user equipment, and is fully compatible for use in natural gas vehicles.

Table 28: Biogas

	Projects	Generation in 2021 (MWh), gross basis	Annual avoided GHG emissions
EDL	EDL's landfill gas to electricity and renewable natural gas sites across Australia, North America and Europe help its landfill customers capture and convert approximately 600 million m^3 of methane into electricity or renewable natural gas.	2,052,487MWh	2,731,215 tCO_2e
EnviroNZ	EnviroNZ's Hampton Downs landfill converts over 850,000 tonnes of waste into electricity.	39,900MWh	4,028 tCO_2e

Wind and solar

In 2021, the Group's businesses were responsible for generating 485GWh of wind and 12GWh of solar.

Table 29: Wind and solar generation

	Projects	Generation in 2021 (MWh), gross basis	Annual avoided GHG emissions
Dali and Laoting Wind Farms	Via investments through Power Assets the Group holds interest in two wind farms in Mainland China – a 48MW site in Dali, Yunnan Province and a 49.5MW site in Laoting, Hebei Province. The Dali Wind Farm has 64 units of 750kW wind turbines and the Laoting Wind Farm has 33 units of 1.5MW wind turbines.	213,000MWh	207,000 tCO_2e
EDL	EDL is a leader in providing remote, off-grid communities and operations around Australia with innovative hybrid renewable energy systems incorporating wind and solar.	184,335MWh	91,156 tCO_2e
CANADIAN POWER HOLDINGS INC.	In 2021, the Group acquired Okanagan Wind in British Columbia, Canada. The electricity generated is sold to BC Hydro under a 40-year electricity purchase agreement.	97,800MWh	60,000 tCO_2e

EDL's hybrid renewable microgrid at Agnew is Australia's largest and supplies the mine with power that is on average 50-60% renewable and with 99.99% reliability

Hydrogen

The Group generated 628MWh of green hydrogen in 2021. While small at this stage, it is considered a significant investment opportunity for the Group in terms of both new investments and decarbonising current investments. The Group's businesses are continuing to launch pilots that are laying the foundation for large-scale expansive rollouts.

Table 30: Hydrogen developments

Australian Gas Infrastructure Group	Using a 1.25MW electrolyser powered by renewable electricity, Hydrogen Park South Australia is Australian Gas Infrastructure Group's and Australia's first project that produces green hydrogen for blending with natural gas at volumes of up to 5% and supply to nearby homes via the existing gas network. Australian Gas Infrastructure Group is also developing Hydrogen Park Gladstone with the aim to distribute a blend of up to 10% renewable gas to more than 770 homes and businesses throughout an entire city's existing gas network, another Australian-first.
Northern Gas Networks WALES&WEST UTILITIES	The Group's gas distribution networks businesses are together part of leading the hydrogen transition of gas networks in the UK. This transformational change requires rigorous testing to prove the safety case to the UK government to pave the way for long-term, large-scale replacement of fossil fuel-based natural gas with low-carbon hydrogen. With its partners, Northern Gas Networks has launched the world's first 100% hydrogen testing facility. Building on this, Northern Gas Networks is piloting a 20% blend of hydrogen in a local gas supply in the village of Winlaton in the North East of England. In August 2021, Wales & West Utilities received the green light from the Health & Safety Executive to inject gas containing up to 1% hydrogen into its gas network in Swindon, the first such exemption outside of innovation trials on the UK network. Earlier this year both companies joined together with Britain's other gas network companies to develop Britain's Hydrogen Network Plan, which sets out the detailed action plans to turn Britain's hydrogen ambitions into reality. This includes working towards blending up to 20% hydrogen into local gas grids by 2023 and converting villages to run on 100% hydrogen by 2025.
EVERSHOLT UK RAILS GROUP	UK Rails is collaborating with Alstom to explore the technical and commercial feasibility of building the UK's first brand-new hydrogen train fleet. The agreement aims to share technical and commercial information necessary for Alstom to design, build, commission and support an initial fleet of hydrogen trains. In 2021, UK Rails also entered into an agreement with H2 Green, a hydrogen network operator, to help develop the hydrogen supply solutions required to support wide-scale deployment of hydrogen-powered trains.

Wales & West Utilities' production plant in Swindon with 1% hydrogen injection

Australian Gas Infrastructure Group's Hydrogen Park South Australia

Waste coal mine gas

Waste coal mine gas is produced during the coal mining process as methane gas trapped in coal seams is extracted ahead of the underground mine. A highly potent GHG-intensive waste product that is often vented or flared, the extracted methane is now used by EDL as a power generation fuel, delivering reliable and clean energy to eastern Australia's Electricity Grid, significantly reducing GHG emissions. In 2021, EDL created 1,413GWh of clean energy and removed 1,224,327 tonnes of CO_2 emissions from entering the earth's atmosphere.

Waste-to-energy

AVR's purpose is to take residual, unrecyclable waste and with its expertise in smart incineration technology, use it to create electricity, heat, steam as well as new process raw materials. AVR generates 532GWh of clean electricity annually, of which 54% of the waste is classified renewable due to its content of biogenic waste content. This electricity generated amounts to 261,700 tonnes of avoided GHG emissions.

While there are critics to the waste-to-energy industry which question whether waste should be incinerated, but instead recycled, the reality is however that not all waste can be recycled and this residual waste still needs to be treated. Indeed, waste-to-energy and recycling are complementary waste treatment methods in integrated waste management systems. Household and similar waste should be sorted at source and the clean materials should be sent to high quality recycling. The remaining waste, that cannot be recycled in a technically or economically viable way, should be used to generate energy (electricity, steam and power), among other useful materials.

To ensure that AVR can achieve its goal of reducing its GHG emissions annually by 800,000 tonnes by 2030, and be a net-zero operation by 2050, AVR is exploring large-scale carbon capture and storage in depleted offshore gas fields, in combination with its ongoing programme of carbon capture and use in supplying CO_2 to horticulture greenhouses.

In 2021, EDL was awarded AU$9 million by the Australian Department of Industry, Science, Energy and Resources for its study on capturing CO_2 from biomethane production waste streams for injection into concrete. Further studies will be carried out to investigate how the highly concentrated CO_2 stream can be purified, compressed, liquefied and stored for transportation to customers or use in carbonation curing.

Renewable energy connections

The Group's electricity distribution companies, UK Power Networks, SA Power Networks, and Victoria Power Networks are evolving their business models from distribution network operators to distribution system operators. Instead of simply managing a passive network supplying electricity over the "last mile" to customers, they are needing to actively manage a dynamic, two-way electricity system that also integrates customers' smart energy resources. They are therefore enabling customers to be both consumers and producers of energy through more solar connections while integrating the smart batteries and virtual power plants that will play a vital role in balancing supply and demand in a future energy system dominated by renewables. With the rapid transition to electric vehicles globally, these networks will also become the primary source of energy for road transport.

Innovation, digitalisation and cutting-edge technology are at the heart of this transition in electricity networks. In May 2021, UK Power Networks launched the Constellation project, installing powerful computers in a series of substations, turning them into smart substations, reducing the reliance on communications to and from the central control systems. These substations will analyse millions of data points on how the network is running, and re-configure the network based on specific conditions. The project will increase the resilience of the distribution network, facilitate a rapid increase in renewable energy generation, while also saving consumers across the UK more than GBP750 million by 2050.

SA Power Networks' solar feed-in management capability is one of the most advanced in the world. In 2021, its Enhanced Voltage Management solution won the Premier's Awards: Energy and Mining in the Innovation and Collaboration in Energy category. The solution allows the business to better manage solar feeds into the electricity distribution network. Working with the South Australian Government and Australian Energy Market Operator, SA Power Networks developed this innovative voltage management solution, which not only significantly improves network capacity to host solar but also provides a solution to manage system security emergencies.

Battery storage also has an important role to play. As part of the Victorian Government's Neighbourhood Battery Initiative, Powercor has received funding to install a community battery to support the growth of rooftop solar in Melbourne's west. Under the plan, Powercor will install a 150 kW/388 kWh battery in Tarneit that will allow customers to share their rooftop solar with others and make the most of the strong local rooftop solar penetration in the area. CitiPower and Powercor are also exploring opportunities to locate community batteries across parts of Melbourne as part of an extensive study which is also funded by the Neighbourhood Battery Initiative. It will examine the best locations for batteries, considering factors such as community benefits, local power demand and network constraints.

3. Energy efficiency

Being in the business of distributing energy, huge amounts of energy may be saved, lost or consumed based on not only direct measures taken, but also due to factors that are outside of their control such as in the case of leakages and losses from networks.

Leakages and losses

One of the greatest challenges an energy network must face with respect to GHG emissions reduction relate to inherent losses in energy systems, termed "losses" or "leakages". While there are many efforts the Group's gas and electricity network distribution businesses take, such as ongoing pipe and mains replacement, technical losses are an unavoidable consequence of energy distribution. Further, the extent of GHG emissions generated will also rely on how the throughput energy is generated i.e. be it from fossil-fuel based GHG emissions or renewable sources.

Table 31: Coal to gas conversion plans

港燈 HK Electric	Following the commissioning of a gas-fired unit (L10) in 2020, HK Electric took another major step forward in its transition from coal to gas-fired generation with the successful synchronisation of another new gas-fired unit (L11) in November 2021. HK Electric will also commission another new gas-fired unit (L12) in 2023 and gradually phase out the remaining coal-fired units by the early 2030s.
CANADIAN POWER HOLDINGS INC.	The 800MW Sheerness Generation Station fully phased out coal-generation in 2021, which will effectively reduce GHG emissions from Canadian Power's 200MW stake by 45-50%.

2. Phasing out coal

Coal fuelled the industrial revolution and today coal remains the world's most dominant source of energy and a major cause of GHG emissions warming the planet. As highlighted by the UN, if it not phased out before 2040, the global 1.5 °C goal set to limit the worst effects of climate change will fall quickly out of reach. The Group has made a new commitment to phasing out all coal globally by 2035. Due to actions taken in 2021, the businesses in OECD countries have fully phased out coal-fired generation, with the balance remaining in non-OECD countries; this progress and plans are further detailed in Table 31.

To date, coal-fired generation installed capacity has reduced from 53% in 2016 to 32% in 2021. This will further reduce to 24% by 2023 and to zero by 2035.

While the decision of throughput energy for the Group's distribution networks is outside of its direct control, they are taking every available step to ready their networks for a transition to renewable and clean sources. The Group's gas businesses are ensuring their distribution networks are hydrogen-ready and the electricity distribution businesses are facilitating the transformation of traditional electricity distribution through enabling increasing levels of renewable energy to be connected to the grid.

UK Power Networks has invested in a fleet of new Unimog vehicles for overhead line work

Demand-side flexibility

Demand-side flexibility provides customers with an opportunity to play a significant role in the operation of the electric grid by reducing or shifting their electricity usage during peak periods in response to time-based rates or other forms of financial incentives with the opportunity to deliver significant savings. On the other hand, it also enables electricity distribution networks to use this resource as an option for balancing supply and demand, as well as ensuring a secure, sustainable and affordable electricity system. It can help soften peaks in demand and fill in the troughs, especially at times when power is more abundant, affordable and clean.

UK Power Networks has led in this approach to flexibility since 2018, when it became the first network operator in the UK to commit to a radical "Flexibility First" approach to cater for new connections, which has saved connecting customers GBP72.6 million over the period of 2016-2020.

In September 2021, SA Power Networks launched a trial of its smart "Flexible Exports" system in Adelaide's southern suburbs, a world-leading technology that enables new solar customers to export up to 10kW per phase from their panels, doubling the current standard export limit. Flexible export limits offered under the trial will enable more customers to connect solar and provide greater solar export opportunities throughout the year.

An important tool in enabling demand-side flexibility, and importantly in enabling customers to connect renewable energy they have generated to the grid, is the deployment of distributed energy resources which are small-scale electricity supply or demand resources, such as rooftop solar PV units, or micro turbines, that are interconnected to the electric grid.

Products and services in energy efficiency

Through ista's data-based suite of digital solutions for smart property management, ista enables residents and owners of buildings to take control of their energy consumption. In Germany alone, 3.7 million tonnes of CO_2 are saved every year thanks to reductions made in the annual heating cost bills enabled through ista's solutions. ista's aim is to help customers and users reduce their CO_2 emissions from heat consumption by 10% by 2030, versus a 2015 baseline.

In 2021, ista launched its digital power tool, MinuteView, for efficient energy management in commercial properties. With opportunities to reduce energy consumption by up to 15%, MinuteView can track and compare energy consumption among individual sensors, buildings, locations and countries. A digital climate protection programme for the building sector was also announced with the aim of reducing GHG emissions. ista intends to equip 10 million apartments with digital metering devices and wireless infrastructure by 2025.

Reliance Home Comfort, which offers both the sale and rental of water heaters, HVAC equipment, comfort protection plans and other services to homeowners primarily in Ontario, Canada, has been expanding its offering of Green Home Solutions such as energy efficient heat pumps, smart thermostats, and tankless water heating systems that can create efficiencies of up to 96%.

The Group's energy distribution businesses are also helping their customers save energy and reduce their bills. Common customer engagement activities include dedicated online sections including downloadable guides and videos with easy tips for being energy smart, as well as active outreach including training and opportunities for personalised consultations, often delivered through partnership arrangements with expert energy advisors. In 2021, HK Electric completed 210 free energy audits for non-residential customers, subsidised 108 buildings for implementing energy efficiency enhancement projects, and organised 350 educational and promotional activities on combating climate change and adopting a low-carbon lifestyle.

Customer engagement at Wales & West Utilities

4. Clean transportation

Transitioning to zero-emission fleets is essential to the Infrastructure businesses net-zero transition, notably where there are large fleets being used by field teams for customer visits needed for meter readings, for example. As similar with other divisions, barriers can sometimes exist where a particular vehicle model and range requirement for operational necessities is not yet fully offered by the market.

Targets already set include:

- Northumbrian Water Group aims for all new vehicle purchases for its fleet of 1,000 to be zero-emission by 2024;
- UK Power Networks aims to replace all suitable vans and cars with electric vehicles (around two thirds of the fleet), making sure areas with poor air quality get electric alternatives first;
- Northern Gas Networks aims to make 50% of its total vehicle fleet ultra-low GHG emission or hybrid by 2026, and 100% by 2031, and to install charging infrastructure across all offices and depots; and
- Wales & West Utilities is committed to ensuring that 75% of company cars are hybrid or ultra-low GHG emission vehicles by 2026.

The Group's network operators are not only rolling out their own electric fleets but also enabling the rollout of electric vehicles and helping to solve challenges that will come with millions of new electric vehicles and chargers being connected to the network.

For example, UK Power Networks forecasts suggest between 1.6 and 2.7 million electric vehicles could be powered through its three networks by 2028. To meet this rapid increase, UK Power Networks is innovating to meet the technical challenge of an unprecedented large-scale shift to electric transport. UK Power Networks' comprehensive Electric Vehicle Strategy outlines the partnerships underway to develop, test and deliver technical and commercial solutions that facilitate the rapid uptake of electric vehicles and the whole systems approach planned to maximise the utilisation of its existing electrical infrastructure.

Northumbrian Water deploys electric fleet for its daily operation

5. Circular economy approaches

The Group's role in contributing to a circular economy is best exemplified by its waste management and processing facilities.

EnviroNZ has been scaling up its organics infrastructure so it can play a bigger role in New Zealand's fight against both organic waste as well as climate change. The business achieved a milestone in October 2021, with the completion of a three-year project to expand its Hampton PARRC organics processing facility. It has doubled its capacity to process green waste and food scraps from its customers and can now handle up to 24,000 tonnes per annum. Rather than this waste ending up in landfill, it is now turned into nutrient-rich compost for residential and commercial use, enabling the reduction of approximately 3,500 tonnes of CO_2 emissions.

EnviroNZ organic waste collection in action

During 2021, AVR used its waste to energy and circular economy technologies to turn 2,266,000 tonnes of unrecyclable waste into valuable new resources.

Green Island Cement's new slag-grinding plant in Hong Kong grinds slag, a by-product from the steel industry, produces ground granulated blast-furnace slag ("GGBS"), a more sustainable cement substitute. The plant has the capacity to produce about 350,000 tonnes of GGBS each year. When added to concrete, GGBS improves long-term strength and extends the durability.

In 2019, ista established the Circular Economy Working Group and appointed a Waste Management Officer with the aim to analyse the flows of recyclable materials in the company, consulting with external partners and testing ideas to eliminate waste. When developing its meters or heat cost allocators, ista now integrates circular economy principles at every step of the lifecycle. It co-ordinates action with its partners along the value chain: from device manufacture and installation to recovery of the devices at end-of-life. The aim is to make its products durable, easy to re-use and easy to recycle, thus creating a closed-loop supply chain. What also helps in ensuring oversight and quality of this process is that most of its devices are leased to customers meaning that together with the in-house expertise to ensure these products are maintained for their maximum lifecycle, the business also ensures they are recycled through specialist, certified recyclers.

UK Rails contributes to circular economy through its new SWIFT Express Freight product, which offers a cost-effective and low-carbon solution for transporting parcels around the UK. The product extends the life of assets by repurposing passenger trains to freight-carrying units. In addition, end-of-life trains can be up to 92% recyclable, and once a train needs to be scrapped, UK Rails works with carefully vetted suppliers including those certified against ISO 9001, ISO 14001 and Railway Industry Supplier Qualification Scheme (RISQS) Waste Disposal.

Northumbrian Water has committed to creating zero avoidable waste by 2025. This will mean eliminating, re-using or recycling 90% of waste from their operations, and working with partners to contribute to the circular economy in their regions.

For the gas distribution networks, the majority of waste created relates to "spoil", i.e. construction waste created through installing and maintaining pipes. With stringent regulatory quality and safety requirements for reusing this spoil, the networks have worked to develop new and innovative recycling measures so that it is fit for reuse. At Northern Gas Networks, less than 0.14%

of spoil is now going to landfill and it has reduced its use of virgin aggregate by over 76%. Reductions have also been achieved by driving innovations in processes and technologies such as no-dig technology. These major improvements are the result of a far-reaching programme which saw the business campaign for more local recycling facilities, and educate and incentivise its supply chain to also follow resource-efficient practices. Northern Gas Networks is also leading work with other utilities and suppliers to move away from single use plastic packaging for utility fittings and has also written on behalf of all gas distribution network operators to ask major pipe manufacturers to do so.

6. Climate risk and resilience

Millions of customers globally rely on the essential services provided by the Group. Enhancing resilience and reliability through future-proofing this infrastructure in the face of more extreme and unpredictable weather is critical. There are two categories of climate risks that are particularly prevalent for the businesses: flooding and storms, and bushfires.

Flooding and storms

In 2011, responding to the UK Government's concerns on climate change, Wales & West Utilities took a leading role in developing a pioneering tool to help utilities take action to protect their assets from increased flood risks, working in partnership with Landmark and Ambiental Risk Analytics. Following four years of mapping in the pilot, the mapping product was launched in 2018 as Britain's first national flood map incorporating current and future predictive flood scenarios for 2020 and far beyond. Wales & West Utilities was also the first utility in the UK to use the data as part of its UK Climate Change Adaptation Risk Assessment, Reporting and Investment requirements.

Flooding has been identified as one of the top climate risks in UK Power Networks' latest Climate Adaptation Report released in December 2021. Accumulated rainfall, overflowing rivers, sea level rise, reservoir breach and water main burst can lead to severe water ingress to critical electrical assets and ground-mounted transformers, causing equipment damage and loss of power supply to its customers. Mitigation solutions such as water-resistant bunding and flood gates are delivered at existing substations. The business has also integrated flood risk into business-as-usual by revising its technical design standards for substations to be more resilient against flooding, including measures such as raised switchgear installation. As of today, UK Power Networks has protected over 2.8 million customer connections from flood risk, reduced our customers at risk of flooding from an average of 70% in 2011 to an average of 13% in 2021.

UK Power Networks completes a £500,000 flood defence scheme to increase the resilience of electricity supply to 69,000 homes and businesses

UK Power Networks' Storm Resilience project developed an advanced tool that combines network data, historic fault data and live weather forecasts to predict the number of faults that could occur in an area of the network. This project is taking how the business handles storms to a new level, by combining data science with improved customer service. This is particularly helpful in times of stormy weather to ensure enough engineers are on standby. A separate part of the project trialled a lightning tracking software to help restore power supplies caused by lightning strikes up to 90% faster.

Northumbrian Water delivered a multi-award winning scheme in Killingworth, North Tyneside, which worked to reduce flood risk in times of heavy rain protecting thousands of homes in the surrounding areas, as well as improving water quality and the surrounding biodiversity. Instead of flowing back to the sewerage system, overflows from the lake spill into natural grassed areas alongside the bank and drain back to a local watercourse instead. Three floating island ecosystems, which were designed and built by Biomatrix Water, have been installed in Killingworth Lake to improve biodiversity and provide natural habitats for wildlife such as fish and nesting birds in the area.

Bushfire risk

The electricity distribution businesses in Australia are particularly at risk from bushfires which are exacerbated by rising temperatures. They therefore invest millions every year to reduce the risk of bushfire and loss of power supply in communities.

In hazardous bushfire risk areas, Victoria Power Networks is undergrounding power lines and installing high technology covers over power lines to protect them from climatic conditions. To further reduce fire risk, the business uses advanced Light Detection and Ranging (LiDAR) technology to continually improve the accuracy of scanning and detection of vegetation growing near power lines and ensure overhead conductor clearances remain compliant to Australian Standards throughout their lifetime.

During 2021, Powercor successfully completed the second tranche of a major bushfire mitigation technology rollout and has now installed Rapid Earth Fault Current Limiters ("REFCL") in 18 zone substations, providing additional protection for 15,500 kilometres of the network. Acting like a giant safety switch, the REFCL provides additional protection to the community by reducing voltage levels within milliseconds to mitigate fire risk if a tree strikes powerlines or if lines hit the ground. In recognition of Powercor's successful delivery of the REFCL programme across the distribution network in Ballarat, Greater Bendigo, Ararat and Terang, the business was awarded the Australia Institute of Project Management Project Management Achievement Award in the regional project category.

Similarly, SA Power Networks undertakes a range of bushfire risk preparation, mitigation and adaptation activities, including partnering with organisations such as the Bureau of Meteorology, the Energy Networks Association and the Commonwealth Scientific and Research Organisation to undertake sophisticated modelling to enable more targeted activities.

Protecting biodiversity

Many of the businesses are introducing an environmental "net gain" philosophy into their operational ethos and leading their industries with these approaches. Highlight projects from the businesses include:

- Northumbrian Water has completed its first natural capital account for its southern landholding in Essex, Suffolk and Norfolk. The account combines data on the extent and condition of natural capital assets in the landholding, the benefits they produce, and the value of those benefits to society, in both non-monetary and monetary value. The account provides a baseline assessment of the landholding's natural capital and establishes a consistent way of measuring. Northumbrian Water is working with specialists to develop an in-house tool to evaluate the biodiversity value of all sites larger than 0.2ha. Sites have been ranked from 1-10 so that they can start to monitor change of impact as well as identify sites that need more work.
- Northern Gas Networks has committed to measure and report the natural capital value of up to 50 of its largest asset sites by 2026. Using a bespoke tool developed for Northern Gas Networks by specialist consultants, the assessment provides a valuation in both technical biodiversity units and financial value for relevant ecosystem services provided by the sites. The assessment will be undertaken across the sites three times during the period to identify changes in natural capital in response to Northern Gas Networks land management activities. The findings of these assessments will be publicly reported in Northern Gas Networks' Annual Environmental Report. The tool can also be used to review and assess the natural capital impacts of different design solutions to inform project optioneering and business case production. Northern Gas Networks is also working with maintenance contractors and local groups to deliver site-specific measures such as creating habitats, installing bat and bird boxes, and even a nest camera for a bird watching club to observe peregrine falcons on a gas holder. In 2020, it also entered a five-year partnership with the Community Forest Trust to plant 40,000 trees in areas of its network with high urban air pollution.

- UK Power Networks has committed to a Networks Green Action Plan to enhance biodiversity around its sites, in particular substation sites. As part of the Plan, UK Power Networks identified 100 sites using the Department for Environment, Food and Rural Affairs ("DEFRA") calculator and partnered with ecological experts, ADAS and Wildlife Trusts, to assess the sites and determine a baseline biodiversity measurement. Following each survey, a biodiversity management plan was prepared with site-specific measures to enhance the biodiversity potential. By 2021, UK Power Networks aimed to have identified 100 suitable sites, baselined the biodiversity and developed management plans to improve biodiversity potential by an aggregate of 30%. This phase is complete and the implementation work to address the actions in the plans has commenced with some early success on those sites completed to date.
- Wales & West Utilities has a long-term ambition to achieve biodiversity net gain by 2039, with an interim goal of achieving no net loss on designated products within 2021 and 2026. To ensure the integrity of the network, it is sometimes required to remove trees that represent a risk to the infrastructure (e.g. gas pipelines). To mitigate this impact, Wales & West Utilities is collaborating with stakeholders within Wales and the South West of England to support afforestation across the network in long-term managed schemes through a commitment to plant five trees for every tree that requires felling.
- HK Electric has commissioned a consultancy study on the biological diversity of the Lamma Power Station to establish its biodiversity baseline and recommend measures to protect and promote the biodiversity of the asset. HK Electric, together with CLP Power, has established a Marine Conservation Enhancement Fund and a Fisheries Enhancement Fund under the Hong Kong Offshore LNG Terminal Project. These Funds supports scientific research, promotes environmental education, and supports the local finishing industry, amongst other biodiversity-related activities.

As part of the Abberton Scheme, Northumbrian Water enhanced the Abberton Reservoir for birds and other wildlife

Creating a great place to work

The division is committed to creating rewarding and inclusive workplaces for all employees with the firm belief that attracting and retaining the best talent the industry has to offer is fundamental to ongoing success.

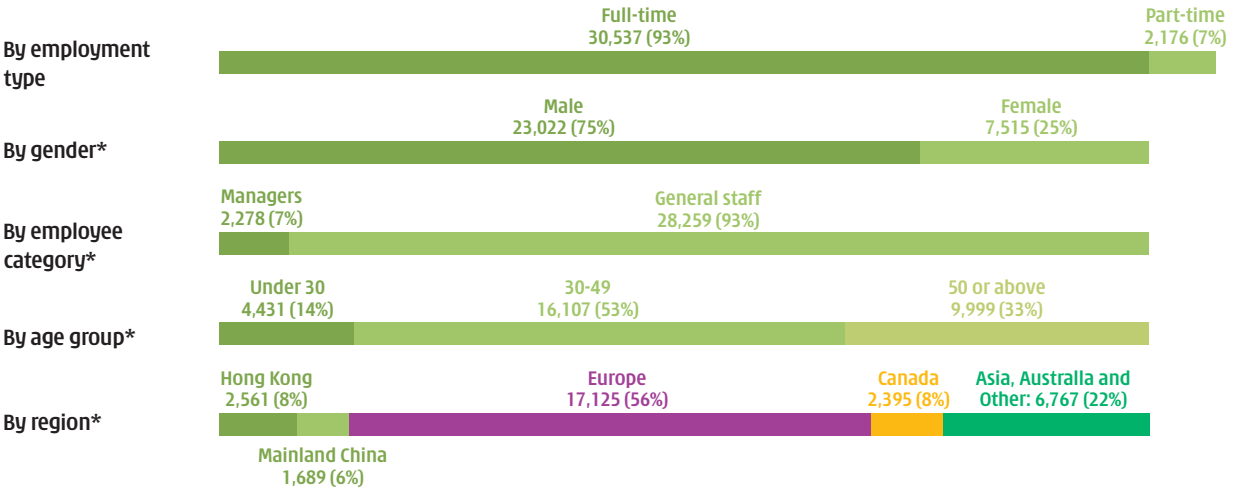
Health and safety

For the Infrastructure division, safety is the number one priority. The division's management approaches are driven by a fundamental belief that all of its people, employees and contractors, have the right to go home safe and well to their families every day. The division's goal is to create a controlled work environment where its people and assets are safe and its operations have minimal impact on the environment and project area communities. Plans and processes are in place to help prevent, prepare for, respond to, and recover from potential emergencies such as fire, oil and chemical spills, typhoons, flooding, emergency evacuations, rescues from confined spaces, and heat-stroke treatment.

It is with great regret however to report the work-related deaths of two employees in 2021 as a result of traffic accidents, which were as a result of third party actions unrelated to the businesses operations.

Safety prioritisation at Wales & West Utilities

Figure 32: Employee profile as at 31 December 2021



* full-time employees only

Safety culture

The Infrastructure division has made considerable progress in creating a culture of zero harm across its businesses and has set the tone by: i) including safety KPIs in the compensation schemes of all its businesses CEOs and executive management; ii) making health and safety the first item on the agenda of any of its global board meetings; and iii) holding an annual health and safety conference including representatives from each of the Infrastructure businesses. Top management's commitment to health & safety is further formalised in the Health & Safety Policy.

In order to foster a positive culture of health and safety, robust safety management systems exist across the businesses with many certified to ISO45001 or OHSAS 18001 and including procedures for hazard identification and risk assessment, industry-specific standard operating procedures, emergency preparedness procedures as well as ongoing monitoring and measurement.

As an example of management approach, EDL's dedication to safety is embedded in its culture through a range of initiatives including:

- Oversight from the Global Safety Committee which meets monthly, with participation from corporate and operational support services staff;
- A comprehensive safety culture survey conducted every two years through an independent third party that monitors and ensures the business is enabling a consistent maturity of safety culture globally;

- The Health, Safety and Environment Leadership Awards where the business is rewarding excellence in safety and environmental stewardship based on employee-led nominations;
- The Take 5 initiative, which serves as a hazard and risk review prior to a task being conducted;
- EDL's Shared Analysis Management system which provides an effective hazard and incident management recording and reporting process; and
- Emergency Management and Crisis Management Awareness training to ensure senior managers are well-positioned to respond swiftly to emergencies and crises as well as annual update of the Crisis Management and Business Continuity Planning Programme.

The increased focus on safety leadership, improved reporting and the effective delivery of the Take 5 process has changed behaviours across the EDL global workforce resulting in improved safety awareness.

During the pandemic, while many professions have been able to work from home, much of the division's employee base remained critical to providing essential services. Protecting their safety during this crisis has therefore been a priority.

At the start of 2020 and as the impact of COVID-19 was being realised, Northumbrian Water's Business Resilience Group and Executive Leadership Team set up a COVID-19 Response Team to investigate and act on the impact the pandemic would have on employees, customers and the business. The group met weekly to review guidance by the UK government as well as review business plans, guidelines and activity. A key step taken in protecting employees was the in-house developed COVID-19 60 Second Check Tool for field teams to enhance safety before jobs are being carried out. The app follows a simple hierarchy of control that guides employees on what to do in their daily activities to keep them and their colleagues safe. After the initial launch, the tool was adopted enthusiastically by field teams with just under 66,000 checks carried out in just 10 months.

Northern Gas Networks and Yorkshire Centre For Training and Development join forces to upskill workforce for the future

Training

Continuous high-quality health and safety training for employees and contractors is fundamental.

The SA Power Networks Safety Leadership Academy was launched in early 2018 to continue to mature the organisation's safety culture by encouraging and educating leaders and workers to challenge their existing approach to safety and leadership. The programme involves a challenging and interactive series of workshops, underpinned by SA Power Networks' Work Safe Values and Standards. It introduces the principles of "human factors" and their involvement in safety related events and the Just and Fair Framework to guide consequences for both positive and negative safety behaviours. Further all contractors must complete a workplace health and safety induction before starting work on one of its sites or projects.

Training programmes that have influenced Northern Gas Networks' culture include:

- Safety Learning Clinics to review events with a view to identifying and taking forward improvement opportunities and create an increased sense of accountability and ownership within the business;
- A series of Behavioural Safety workshops delivered to employees and contractors looking at what causes incidents; and
- The Leadership Development programme that has been completed by the Senior Operational Leadership team.

UK Power Networks requires all operational employees to complete the "Worker Accreditation Programme" every three years to ensure their competency levels remain up to date. This process is monitored through refresher courses, training, knowledge tests, safety visits, and operational audits. The latest cycle was completed in December 2021, with all operational staff passing the required threshold.

EDL aims to ensure all contractors are aware of its safety policy and system requirements by requiring them to complete a suite of training courses before they begin any work.

Monitoring and Feedback

Health and safety monitoring systems and formal audit programmes are in place across all businesses. Audits on the safety management system at the corporate level, Transmission and Distribution Division-level and Generation Division-level are conducted at least annually by registered safety auditors to ensure all necessary safety regulations and requirements are strictly followed.

UK Rails has an external Safety Panel that meets on a quarterly basis and is chaired by an independent industry expert. The Panel oversees the work of the business' internal Operational Safety Committee to ensure its effectiveness. With suppliers of heavy maintenance, UK Rails encourages suppliers to achieve industry-leading Railway Industry Supplier Approval Scheme certification. Suppliers are further vetted against its Group Supplier Approval and Management Procedure that also requires all safety-critical suppliers to be issued a copy of its Supplier Safety Assurance Assessment framework. In addition, it checks the maturity of its suppliers' systems and processes against its Supplier Safety Assurance Assessment Roadmap, from their safety risk management to ensuring staff competency.

HK Electric employs a number of mechanisms to manage the safety performance of its contractors. It requires contractors to demonstrate a commitment to high standards of health and safety and encourages every contractor to aim for zero fatal accidents, dangerous occurrences, and reportable incidents. HK Electric requests all contractors to submit their safety plans within 28 days after contracting.

Seabank Power operates a stringent process to ensure all contractors engaged meet an adequate safety standard. All potential suppliers must submit a Supplier Information Form, which includes statistics on their health and safety activities. Seabank Power also requests a copy of their health and safety policy to ascertain contractors' suitability before contractor approval. UK Power Networks requires all its external contractors to comply with baseline health and safety policies. To verify this, UK Power Networks monitors the performance through inspection, audit, and performance review meetings.

Apprenticeship in action at Northern Gas Networks

Employee wellbeing

The pandemic has further focused attention on employee wellbeing and ensuring employees both out in the field and those working from home feel supported.

As part of its employee health and wellbeing digital platform, Living Well, Northumbrian Water provides financial wellbeing support, physical health sessions that include desk yoga, Pilates and resilience building workshops. It supports annual events such as World Mental Health Day, World Kindness Day and Men's Health Week and provides tailored information on specific issues. For Northumbrian Waters' 2020 Employee Survey it again worked with the Great Place to Work Institute, where it received its highest response rate, with 84% of employees responding. From this, they assessed a range of questions and those relating to health and wellbeing saw strong results that resulted in Northumbrian Water being named a Centre of Excellence for Wellbeing 2021.

Northumbrian Water has also been a member of the Better Health At Work Award programme, also receiving the Wellbeing Ambassador award, which recognises the efforts of employers in the North East and Cumbria in addressing health issues within the workplace. This recognition is awarded to a select few each year and goes to those employers who demonstrate both long-term commitment and outstanding programmes in workplace health and wellbeing, going above and beyond at every stage of assessment.

SA Power Networks extended its online health hub in 2020 to include the Health Hub @ Home platform which focuses on the health challenges arising from working from home. Features such as mental health, first aid, mindfulness and resilience training courses, and a Traumatic Event Response service for workers exposed to distressing incidents have also been made available to support employees' physical and mental health. SA Power Networks and Enerven are committed to creating a culture that encourages conversation and engagement in support of activities relating to the mental health their staff. A key initiative of this commitment is the Mental Health First Aider (MHFA) programme that teaches employees the skills to help someone who they're concerned about. MHFA's are formally trained volunteers embedded within work groups.

Teamwork at SA Power Networks

Attraction and retention

The Infrastructure businesses offer competitive market-based salaries for all employees as well as a range of non-statutory benefits, including monetary and non-monetary (such as wellbeing benefits) to ensure employees feel supported and rewarded.

Like many businesses driving the net-zero agenda, SA Power Networks recognises that to achieve a high performing, customer centric and commercially sustainable business for the long-term, it will be critical to develop a workforce for the future, with diverse people who are ready and willing to embrace new capabilities. Targeted attraction, retention, workforce planning and development activities will create a future ready workforce that embraces new capabilities and technology. During 2021, to meet the challenges and capitalise on the opportunities of the rapid energy transition, SA Power Networks refreshed its People Strategy with key goals to:

- Drive towards an aligned and purposeful culture that is customer-centric, commercial, accountable and adaptable;
- Ensure its people are inspired and engaged; and
- Ensure its people are empowered and aligned with its purpose in order to consistently deliver high performance.

Testament to the work that the division's businesses have been doing to ensure they are retaining talent and creating great places to work, they have won a number of prestigious awards in 2021, including:

- Best Big Companies to Work For List 2022 – (UK Power Networks);
- Employer of the Year – Utility Week Awards 2021 (UK Power Networks);
- Ranked 10th in the Inclusive Top 50 UK Employers 2021/2022 list (UK Power Networks);
- No. 1 energy company in the Top Apprentice Employers list – The Job Crowd (UK Power Networks);
- Inspiring Employer of the Year 2021 – Inspiring Females Awards 2021 (Northumbrian Water);
- Great Place to Work 2020/21: Centre of Excellence for Wellbeing – Great Place to Work Institute (Northumbrian Water);
- Investors in People – Silver Accreditation (Wales & West Utilities); and
- Top Employer Award 2021 – Top Employers Institute (ista).

Learning and development

Employees across all levels benefit from structured development programmes with the understanding that quality training leads to improved results, productivity and engagement.

SA Power Networks has first-hand proof of how training and a rewarding workplace feeds directly into high levels of retention. More than 550 apprentices and 220 engineering graduates employed since 2003 are now in supervisory and leadership positions across the organisation, with another 105 apprentices in training. Over the past 20 years, the business has trained 575 electrical apprentices and it has retained almost all of them in the business (a 93% retention rate).

At Australian Gas Infrastructure Group, the Manager to Leader Programme is designed to equip employees with the skills, capacity and mindset to lead long-term, and deliver sustainable growth and transformation as focused, accountable and visible leaders. The programme has been designed to enable employees to understand the strategic context in which they operate and adapt their leadership to the needs of Australian Gas Infrastructure Group and its people. In addition, participants have the opportunity to focus on their personal leadership journey through a combination of one-on-one mentorship and workshops.

EDL has developed several leadership development programmes including the IGNITE programme for emerging leaders and the Breaking Ground programme, which is aimed at potential leaders within the Global Frontline leadership area to support them in developing key leadership skills.

With a focus on developing new talent and succession planning, Northumbrian Water currently has 37 employees studying for an apprenticeship qualification and over 105 employees studying for formal qualifications in areas such as water engineering and digital technicians to deepen their skillsets and expand their work horizons. The business also supported the UK Government's Kickstart Scheme, taking on 40 young people at risk of long-term unemployment and supporting them through a level 1 qualification in Occupational studies.

Northern Gas Networks is working with a number of education and training providers to develop training interventions with the primary aim of preparing its workforce for the future. This includes a focus on management development, an extensive programme and focus on colleague mental health and wellbeing and the transition from gas to alternative green solutions.

Putting customers first, Wales & West Utilities has created a skills-building development programme supporting effective stakeholder engagement, including building rapport, collaboration, communication skills and emotional intelligence to deliver better outcomes for its customers. This is alongside well-embedded induction and management development programmes which focus on supporting colleagues from "Hire to Retire" and training for both coaching and development which is rooted in neuroscience.

The Group also supports further education. UK Power Networks' Supported Studies programme has provided funding for professional qualifications, including electrical engineering and accounting to over 300 employees. United Energy and Victoria Power Networks provide education assistance for employees who are undertaking external study programmes, including MBAs, and other related degree programmes.

Teamwork at Victoria Power Networks

Inclusion and diversity

The Infrastructure businesses have been actively working to level the playing field of their traditionally male-dominated industries.

In late 2020, UK Rails signed up to the Railway Industry Association and Women in Rail's joint Equality, Diversity and Inclusion Charter. The Charter has seen over 100 organisations commit to working together to build a more balanced and higher performing sector. In its latest biennial employee engagement survey, 80% of employees thought UK Rails provides an inclusive work environment, however 20% were unsure how to respond to this question. In response, it commissioned an expert third party to conduct an anonymous survey and follow-on Let's Talk Inclusion workshop, which helped the business gather employee perspectives and examples of desired behaviours to support an inclusive environment. In addition, UK Rails offers benefits such as maternity, shared parental and adoption enhanced pay for 19 weeks, which are all above the legal minimum, as well as childcare vouchers.

During 2021, Northern Gas Networks has continued its focus on inclusion and belonging, developing a strategy and vision alongside objectives and colleague communities. Positive actions have included the option for colleagues to swap some of their bank holidays to days that would better allow them to celebrate festivals associated with their faith, blogs raising awareness about events in the LGBTQ+ calendar and a review of its policies with a focus on women's safety. All of these interventions resulted in a score improvement of 8% (specifically around inclusion) in the Business in the Community's Responsible Business Tracker evaluation.

Already with a balanced Executive Leadership Team, containing five females, including its CEO, and six males, Northumbrian Water has been working hard to increase female representation across its leadership, operational and technical areas. Through its Leadership Shine initiative, and supported by its executive leaders, they act as role models, investing time in mentoring and sharing learning to empower other women.

EDL has set a target of 25% female representation in its workforce by 2023. It is working to meet this goal, having achieved 23% by the end of 2021. One of the initiatives in support of this includes a policy to ensure all EDL primary caregivers on parental leave receive at least three months' full pay; EDL pays the gap between government entitlements (even if this is 0) and the employees' full salary for the period. EDL also rolled out online inclusion and diversity training globally, which will be refreshed every two years.

Diversity and inclusion should of course extend beyond just gender. To support social mobility, Northern Gas Networks committed to The Social Mobility Pledge, which champions organisations dedicated to levelling the playing field in the UK. With some of the country's widest opportunity gaps located within Northern Gas Networks' service area, the network has built on its many areas of best practice to develop an Opportunity Action Plan that will take its efforts to an even higher level of ambition. The Plan includes:

- A targeted approach to supporting local communities;
- Lowering barriers to apprenticeships for the most disadvantaged youth;
- Creating a new work experience standard; and
- Monitoring the impact of COVID-19 on communities and adapting the Plan as needed.

EDL has also established community partnerships in Australia and the UK, aimed at encouraging young people to take up careers in science, technology, engineering, and mathematics (STEM). Additionally, in Australia, EDL provided summer internships to participants from CareerSeekers and CareerTrackers, not-for-profit organisations that provide mentorship and support to migrant and Aboriginal and Torres Strait Islander university students as they embark on their future careers. In 2018, EDL extended its commitment to CareerTrackers by signing up as a 10-Year Partner. EDL's Australian business also completed the implementation of its first Reconciliation Action Plan, to improve opportunities for engagement and participation with First Nations people, and is developing its second plan.

As a result of AVR's efforts to match disadvantaged candidates to job positions within its organisation, as well as encourage its suppliers and contracts to do the same, it was recognised by the Social Entrepreneurship Performance Ladder in 2021.

A steadfast commitment to customers and communities

For the Infrastructure division, customers and communities are inherently intertwined where the businesses serve whole towns, cities and vast parts of countries through its essential services.

Resilient, efficient and affordable supply of services are of course top of mind, and the many accolades the businesses have achieved over the years are testament to this.

However, these businesses deliver value to customers and communities far beyond these benefits. They co-create their services and plans to fit the needs of customers and they build programmes that address the most vulnerable in society.

Proactive customer engagement

Delivering positive outcomes for customers, in the short and long-term, is at the core of how the Infrastructure businesses are run. They develop plans and improve services every day by listening, understanding and responding to customer needs and expectations.

Operating mostly in regulated sectors, a high level of customer engagement is required by regulators to protect customers that are not able to choose their service providers. However, the businesses individually go above and beyond these requirements to engaging in tailored ways to identify their stakeholders' wants and needs while maximising the value they add for customers.

Common engagement methods include meetings, workshops, online surveys, research, and in-depth interviews by phone and face-to-face. The businesses also test more innovative engagement methods to enable them to hear the views of uninformed stakeholders on complex subjects, tailoring engagement and taking professional advice to help get the best results.

Customer vulnerability and the just transition

Not everyone has the luxury of being able to afford energy and water. According to the latest UK government statistics, 13.4% of households in England are living in fuel poverty. Supporting customers in need is therefore a priority for the division. The COVID-19 pandemic and recent energy crises have also hit disadvantaged communities the hardest, compounding deep-rooted socio-economic issues. It is also critical to ensure as the world transitions towards net-zero that it is done so in a just and fair manner and to think ahead to identify and address new forms of exclusion and inequality.

Northern Gas Networks team in the field with the local community

Northern Gas Networks' network area contains some of the poorest neighbourhoods in the UK, with customers having to cope with high levels of fuel poverty and low household income. To make sure it focuses resources where it can have greatest impact, over the past 12 months it has developed an online tool including a heat map of customers against vulnerability factors, such as air quality, fuel poverty levels, number of food banks and number of customers on the Priority Services Register. The business has also continued to support hard hit communities, by adapting existing services, and introducing new forms of support. For example, its Community Partnering Fund, which provides grants for grass roots projects, now has a "recovery from COVID-19" category, and has recently provided grants for schemes ranging from a community fridge project to funding a support centre which helps those in need to purchase essential household items. Its Warm Hubs model, which provides places for communities to come together, has been adapted for remote delivery, with slow cookers and energy advice packs distributed via food banks.

The move to a net-zero economy and the emergence of new technology is exciting but can present a risk of leaving financially vulnerable customers behind. Customers who are already in fuel poverty could be the last to take up new green technology and opportunities, unless interventions help to prevent this. Northern Gas Networks has worked with Newcastle University, Northumbrian Water and Northern Powergrid to collate research and data on fuel poverty, vulnerability and decarbonisation, to ensure fuel poor customers are not left behind. This work will provide insights that will inform the utility sector's approach to the roll out of green technologies and the transition to net-zero.

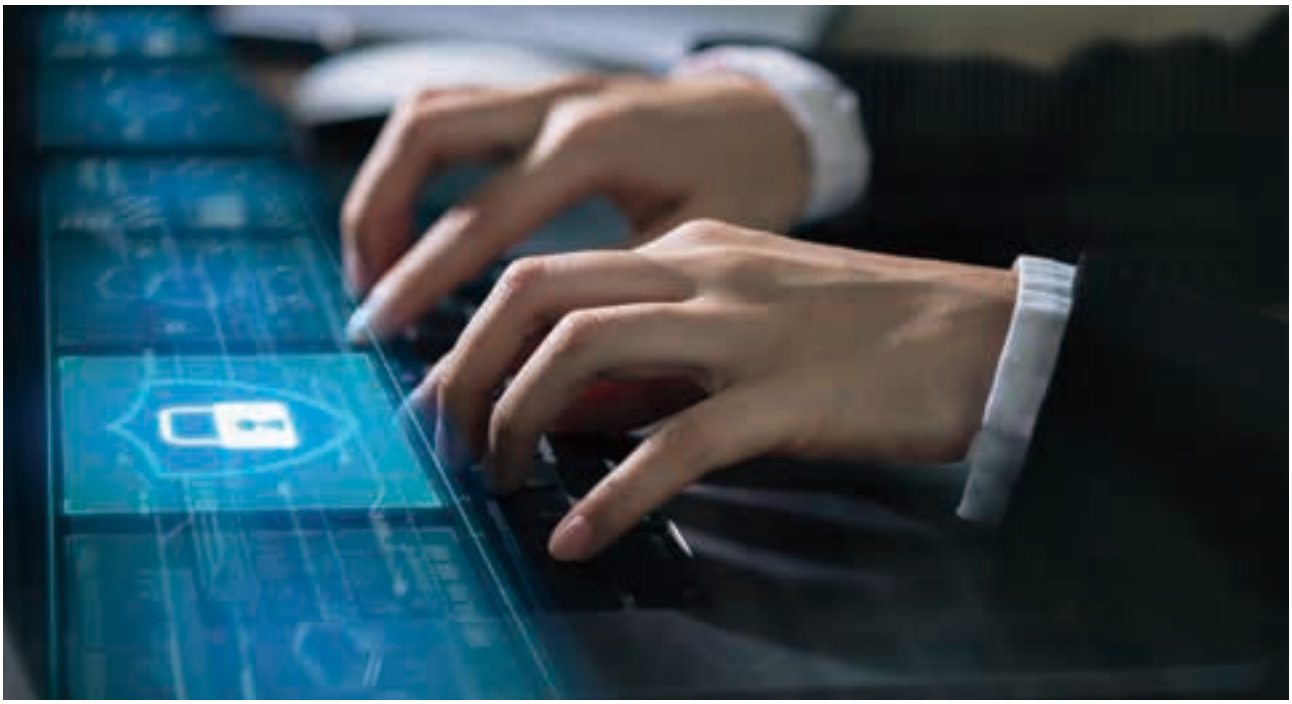
Cyber security

The Group seeks to protect its critical assets and data from cyber-attacks and ensures that there are adequate and effective cyber security defences to protect corporate information assets and critical infrastructure. While a Group-wide priority, that is guided by Group-wide policies, each business has its own tailored programmes and resources.

To illustrate, at SA Power Networks:

- SA Power Networks has made significant investments in the advancement of its cyber security maturity, aligning to the Australian Energy Sector Cyber Security Framework and as well as other well-recognised industry frameworks. This programme of work consists of multiple streams of work on both technical and management cyber security outcomes.
- Driving the cyber security response capability is the SA Power Networks cyber security threat profile. This outlines how SA Power Networks will most likely be attacked, what assets will be targeted and the techniques that will be used. Supporting this are automated threat simulations, where it tests its systems against known advanced attacks and identifies where it needs to better detect and prevent malicious activity.
- SA Power Networks' proactive and threat-led security operational capability is built around a hybrid model, with 24/7 monitoring and actioning of security alerts across the information technology and operational technology networks. This includes automated incident response processes to decrease time to respond. The team regularly participates in desktop simulation exercises to test scenarios and maintain levels of preparedness.
- A business-wide security awareness programme is in place focused on the business' unique cyber security threat profile. All new employees must complete awareness training upon joining, with annual refresher training for all employees. The programme is further supplemented with bi-monthly phishing drills that mimic real attacks, online training includes, business-wide briefings and face-to-face small training.

Together with the Innovation and Technology department, the IT Resilience team is enhancing readiness to respond to operational disruptions based on a recent review of the criticality of applications and sensitivity of information across SA Power Networks.



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