

Strategic Performance Overview

RIIO-GD1 Annual Monitoring 2019/20
July 2020



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1.0 Strategic Summary

1.1 CEO Update

Setting standards that all of our customers love and others aspire to.

“I am passionate about Cadent delivering the very best service not only in the gas sector but as a true comparator against leading customer service companies. I want to set new standards that our customers love and other companies aspire to”.



Steve Fraser - CEO

Society’s expectations of energy companies are changing rapidly. We take our role in providing an essential service, that keeps the energy flowing to over 11 million homes, offices and businesses, very seriously and our commitment to this is demonstrated in the key outputs of our business plan described below. We are creating a diverse and inclusive organisation representative of the customers we serve, and I have been incredibly impressed by the strength and determination of everyone to aspire to build a company that truly delivers for our customers, stakeholders and society as a whole. This year we have taken major steps towards that goal and our excellent result in the 2019/20 Stakeholder Engagement Incentive reflects the progress we have made. That’s not to say we don’t have challenges, but in these times of economic and social uncertainty I believe the steps we have taken over the last 12 months set a solid foundation for the future.

Prioritising our customers and communities

We are transforming our business to set standards that all of our customers will love and others will aspire to. We are tracking our performance, building on our successes and focusing on the areas we need to improve. Our responsibility is to ensure the services we provide are tailored to the needs of our customers, particularly those who are disadvantaged or less able, with a focus on safeguarding communities and customers in vulnerable situations. We are supporting the safety of our customers in their home, helping alleviate fuel poverty, and making sure our services are accessible to everyone.

Our Customer Vulnerability Strategy has been developed over the last 18 months with input from our customers, stakeholders and expert organisations working to support those who are in vulnerable situations or have additional needs. In 2019/20 and prior to COVID-19 we were well on the way to meeting our eight-year target for connections to those in fuel poverty. The pandemic has made that more challenging, but we are focussing our efforts and remain fully committed to providing services for all focusing on individual needs. We have worked hard to develop partnerships which give us access to more hard-to-reach customers than ever before, enabling us to better support those who are most in need. Through these relationships, we have identified opportunities to tailor our services to customer needs, as well as effectively distribute our gas safety information, locking cooker valves, carbon monoxide (CO) alarms, heated seat covers and further raise awareness of the Priority Services Register.

Delivering a quality experience for all our customers

Our customers expect gas to be there when they need it and expect us to respond quickly when it isn't. This year, we have focused on reducing the number of times customers gas supply is interrupted and increasing the speed at which we get their gas switched back on when there is a problem. As a result, we have seen the number of unplanned interruptions this year reduce by circa 20% compared to last year.

We have transformed our approach to those living in multi occupancy buildings more than halving the number of times customers in these properties have experienced an unplanned interruption. By reviewing our processes, resource requirements and innovations we have dramatically improved customers' experiences with us. Major improvements have been achieved using innovative techniques such as the Micro-stop system to undertake Live Service transfers on buildings which has meant we can complete repairs without any interruption to the customers supply. We have multi-occupancy managers in place who are focused on communicating effectively with customers, building owners and local authorities to deliver a successful result for customers. In our London network this approach has helped us reduce the numbers of MOB unplanned interruptions by 61% and durations from a median of 20.9 days per interruption to 16 days since last year. We recognise there is still some way to go and in the coming year we will be continuing to push forward to find further innovative opportunities to minimise disruptions.

I am passionate about improving our customer's experience with us, which is why we have developed a customer strategy that goes well beyond basic customer satisfaction and complaint handling measures. We have worked hard over the last 12 months to engage and listen to our customers and are continually striving to understand the needs of all our customers and stakeholders and will set high standards and benchmarks to add value and improve their experience when they need to contact us.

Our customers have told us that disruption caused by the work we do in the street is one of the key areas we need to improve, including road congestion, reinstatement of holes in the highway and interruptions to their gas supply. We have been focusing on reducing the time it takes to carry out our work and have worked closely with our partners to improve the speed of response. We have developed new communication materials, videos and literature to ensure our customers are updated and understand the work we are doing.

We have developed a connections transformation programme to radically improve the service we provide to customers and with the programme well underway we are seeing significant improvements in our North London network connections performance. We're taking the learnings from this to improve connections performance across all our networks.

We've made great progress to improve performance for

- planned work activities in West Midlands, and
- emergency, repair and replacement activities in our North West and East of England networks,

but we recognise that there is still more that we need to do to deliver consistently for our customers.

Providing a resilient network to keep the energy flowing

Our network performance is underpinned by a focus on safety and wellbeing of customers, employees, contractors and members of the public. We are proud to provide overall network reliability of 99.998% which delivers a service that our customers rely on and demonstrates our commitment to improve experiences. In addition, we have met or exceeded the 97% standards of service levels for an emergency response (averaging circa 98% for 1 hour

uncontrolled escapes and circa 99% for 2 hour controlled escapes) and engineers across our networks have been able to respond on average within 34 minutes.

I am particularly pleased with our performance on safety. We have made a significant reduction in lost time injuries to our workforce this year and I'm pleased to report that our Lost Time Injury Frequency Rate has fallen from 1.13 in 2018/19 to 0.7 in 2019/20. The safety of our customers, our people and our extended workforce, as well as those living near our assets is of paramount importance. I know this is an area we can never be complacent about. We will continue to reinforce our process and personal safety culture to give our people the tools, knowledge and confidence to make good decisions.

This year we have faced difficult market conditions, exacerbated more latterly by COVID-19, but we have been working hard with our partners to increase the pace and efficiency of our mains replacement programme to ensure that we deliver our eight-year commitment. We have exceeded the primary risk removed output in all our networks but need to increase our delivery rate further to meet our overall RIIO-GD1 length target and our plans have focused on enhancing the supply chain further to create additional delivery capability. With the support of our new Construction Service arrangements we have replaced 1,864km of pipeline.

In 2019/20, using robotic technology with CISBOT has allowed us to repair over 17km of pipes which has contributed to a reduction in leakage on large diameter pipes by up to 3% from previous years. We are also now deploying CISBOT as a reactive tool on emergency gas escapes which has seen real benefits across all our networks. All this work has been carried out without interrupting supply to our customers and using this method has received support and praise from the public. In our North London network, we have signed up to the TfL Roadworks Charter which shows our commitments to ensure roadworks are carried out safely, support sustainable travel, and be efficient by maximising resources for customers.

Our progress with mains replacement also contributes to our network output measures and whilst the full extent of our monetised risk position will not be realised until the end of 2020/21 our forecast pre COVID-19 indicated that our East of England, North West and West Midlands networks are on track to deliver the RIIO-GD1 monetised risk reduction targets. In London, through our mains replacement programme, we have encountered a higher number of services requiring replacement and as a result we expect to exceed the eight-year target for monetised risk reduction.

Tackling climate change and improving the environment

There has never been a more critical time to address Climate Change and deliver Net Zero emissions for the benefit of all of us, and we take our role very seriously in this. We know that the scale of investment and change needed to deliver this in an affordable, secure and sustainable way should not be understated. It is important that government, regulators and businesses strike the appropriate balance between delivering the critical long-term needs for future consumers with affordability for existing consumers. The need to stimulate and incentivise the necessary investment and commitment in both public and private sectors will be critical to achieving net zero.

In the last twelve months we have continued to be at the forefront of developing practical pathways for clean gasses such as biomethane, BioSNG and hydrogen through landmark innovation projects – and in early 2020, we became the first gas company to trial a 20% blend of hydrogen into a public gas network through our HyDeploy project at Keele University.

In the North West, we have also seen significant progress with the HyNet project. Working as part of the HyNet consortium we have developed plans for at-scale hydrogen production via

Steam Methane Reformation and Carbon Capture between Liverpool and Manchester, and associated hydrogen gas distribution infrastructure.

This year we also launched our first biomethane powered HGVs, compressed natural gas and hydrogen vehicles into our fleet, so we deliver equipment to our depots across the country in an environmentally friendly way. We also played a major role connecting Europe's largest CNG refuelling station in Warrington, that opened for business in March and is delivering a low-carbon, low-cost fuel alternative for heavy goods vehicles (HGVs).

We also understand the importance of the environment and the role that our mains replacement programme plays in reducing greenhouse gas emissions from the gas transportation network and ultimately the impact this has upon our customer's bills. Over the course of the RIIO-GD1 price control we have seen a reduction in shrinkage volume of c.22% (equivalent to the gas consumption of over 27,000 homes) and we expect this trend to continue in 20/21. We are also committed to reducing our business carbon footprint and are ahead of our carbon footprint Scope 1 and 2 targets for 2020/21.

Trusted to act for our communities

Being an active part of the communities we serve is the foundation of our business. We demonstrate our commitment by the interactions we have and the decisions we make every day in support of our communities. The great work our networks demonstrate at a local level can be highlighted through the range of volunteering and charity efforts where we have shown outstanding support to our local communities. We have a strategy which is supported by our independent Customer Engagement Group (CEG) who have been relentless in challenging us to do better.

This year we launched our Trust Charter as we believe acting in a trustworthy way is more than just about how we engage with people it's about what we deliver for them too. This charter is the culmination of much hard work to ensure we put our customers at the centre of everything we do and start to build trust based on our actions.

During 2019/20 the Board established the Cadent Foundation to make a positive and lasting difference to local communities and the wider society within our network. More recently we recognised the need to support the range of people living in vulnerable situations and

- committed £340,000 grant funding between the Trussell Trust and Royal Voluntary Service,
- allocated up to £125,000 of small grants to charities and groups delivering to those most vulnerable in their local communities, and
- donated £1,000 to Captain Tom Moore's 100th Birthday Walk for the NHS.

Over the next 5 years we have provided funding for the Cadent Foundation to invest over £20m in grants to charities and community groups to support projects that make a real difference.

Delivering on our commitments

As we finished the year we were confronted with the outbreak of COVID-19 pandemic, we have all had to learn and adapt quickly during a difficult and challenging time. I have been proud of the commitment and support shown throughout the business. In our mains replacement programme, we have been particularly agile by switching our efforts to non-customer facing projects so that work could continue, however, the impact of the pandemic inevitably reduced our productivity and rate of delivery. In June, as restrictions eased, we were the first gas network to resume our customer facing mains replacement work, but our ability to return to business as usual has been restricted where customers need to continue shielding or where there are hotspot areas. We have been in regular dialogue with BEIS, Ofgem and the HSE throughout and will continue engagement for the remainder of the year to ensure the

ongoing impacts of the pandemic are reflected in both the close out of RIIO-GD1 and the RIIO-GD2 Final Determinations.

There has been a great determination to deliver outstanding services for our customers, especially those in vulnerable situations, so they continue to receive the services they need. We understand there will be many challenges ahead and we are prepared to face them head on and have taken a lead in working across the industry and with Government and regulators to try to preserve as close to business as usual operations as normal for our customers and to support our supply chain and other parties in the energy market. We all have a part to play to address the new ways of working whilst we continue to deliver for our customers and support the rebuild of our economy.

Inspiring our people

We are focused on recruiting the right people, supporting them to understand their role, our values and culture, and enabling them to develop to the best of their abilities. We are committed to equality, diversity and inclusion and have made progress to strengthen our position towards our vision that; we are a diverse and inclusive organisation representative of the communities we serve, where everyone has an equal chance to succeed and be themselves. We are focused on recruiting the right people, supporting them to understand their role, our values and culture, and enabling them to develop to the best of their abilities. Our strategy will shape our policies, our working practices and how we operate day to day. In December 2019 we appointed a Diversity & Inclusion (D&I) Manager and D&I Executive Sponsor and have since made positive steps, so our employees have a great experience and our customers believe in what we do.

We have sought to ensure that D&I are part of ways in which we attract, recruit, develop and retain people. We have attended targeted diverse career events and amended job description wording to remove indirect perceived barriers discouraging women and BAME (Black, Asian and Minority Ethnic) candidates from applying. In addition, we are using the 'EU Jobs' programme, which aims to encourage job applications from BAME communities and hard-to-reach socially disadvantaged groups.

There is now greater focus on celebrating our diverse mix of employees, role models and their stories and our RIIO-GD2 commitments focus on increasing D&I in our workforce and supporting women in the workplace, all of which demonstrate our commitment to improving diversity and inclusion, and our continuous drive for a diverse pool of talent.

Transforming our operations

In 2019, we started a transformation programme to bring local decision making closer to our assets and giving networks the accountability to develop strategies which reflect the needs of customers, improve performance, and deliver great outcomes.

We have made significant progress against our business transformation programme establishing an operating model based on 28 areas, each with clear accountability for delivering its customer, regulatory, safety and financial targets. The 28 areas report into one of four recently appointed Network Directors. Our organisational transformation relies on us being set up to work differently with a focus on building local capabilities including Emergency and Repair, piloting Local Asset Management frameworks, supporting collaboration and practices of Commitment Based Management and delivering Customer Connections and Alterations.

We have been working on developing local supply chain partnerships with a focus on upgrading our network and increasing customer engagement. These changes have been

driving improvements and we are already seeing a positive impact on the overall customer experience. In addition, we are in the process of sourcing the Construction Management Organisations' that will manage the delivery of most investment work in our networks.

We've also started to establish the foundations for the delivery of future mains replacement programme. Whilst most of our programme to the end of this RIIO-GD1 period will be delivered by our Strategic Partners, we have initiated new Construction Service arrangements in our North West, West Midlands and East of England networks modelled on the way we will operate in the next RIIO period from April 2021. This has required us to create Investment Planning Offices, so we can bring critical design decisions in-house in RIIO-GD2. As well as developing these new arrangements, we've continued to drive the programme to deliver against Ofgem and HSE targets with continual improvements in delivery rates throughout the year.

During the year, our core Information Systems transitioned away from National Grid and this has progressed well. The scale of this undertaking was vast, complex and created some challenges. The whole business responded as one team to ensure we maintained our normal levels of service. The result of this transition is a technology platform which is up to date, fully supported and gives us a solid foundation to transform our day to day operations.

Looking forward

I believe that the plans we have in place for the future are the right ones to help us meet our vision for our customers and I look forward to working with Ofgem to agree, and begin to deliver, our Business Plan commitments for 2021 – 2026. This is a moment to reflect on our achievements over the past year but also a time to accelerate our plans. I am proud of what we have achieved over the last 12 months and looking forward to the exciting future ahead.

1.2 Chairman's Update

“This has been an important and transformational year for Cadent”

I am pleased with the outcomes we have delivered for our customers during a year that saw Cadent transition fully into a standalone entity.

The outbreak of COVID-19 pandemic, has meant that we have all had to learn and adapt quickly during a difficult and challenging time I have been impressed by the exceptional compassion of our employees who have helped in their local communities by delivering essential goods and supporting foodbanks and other charities. The goodwill they have shown has been remarkable and we welcome the positive feedback we have received.



*Sir Adrian Montague CBE,
Chairman*

Throughout 2019/20, we have continued to build on our strong values and create a culture that reflects the business we want to be; a diverse and inclusive organisation representative of the communities we serve, where everyone has an equal chance to succeed and be themselves. These values are embedded into our ways of working and we are focused on recruiting the right people, supporting them to understand their role, our values and culture, and enabling them to develop to the best of their abilities.

Board focus and outlook

With our new vision to set standards that all our customers love, and others aspire to we have made great progress towards becoming the company we aspire to be but recognise that there is more to be done to deliver this ambition. Although there have been improvements, delivering consistently high customer service across our four networks and enhancing efficiency remain our core focus areas as we approach the next regulatory review. We want customers to feel that we are committed to understanding their needs and being courageous in changing our processes to make their lives easier and that we want to be a company that delivers for all of its customers, particularly those in vulnerable situations.

It is with this in mind that the Board appointed a new chief executive officer (CEO), Steve Fraser, who took up the position in September. He brings a wealth of experience in leading and transforming infrastructure businesses and his ambitious vision includes delivering operational improvements, transforming the experience for customers and leading on the future of gas. The Board and I are supporting him and his leadership team fully to realise this vision. Significant changes have been made to the Cadent management team, with the support and approval of the Board with the focus being on decentralising the business and creating a management structure centred on the networks and customers. We now have a chief operating officer (COO), Howard Forster, and four new network directors. They are part of a leadership structure that is designed to support accountability and decision-making by bringing operational planning closer to the customer and network directors closer to the board. On both counts, we are seeing positive results.

Customers are the bedrock of the business and I am pleased that the renewed focus on customer satisfaction – particularly in north London – is starting to deliver results. While we still have some way to go, we have seen improvements in both customer service and complaint handling over the past year. These are key touch points in our relationship with customers and they will continue to be a priority.

Operating responsibly

With National Grid having fully divested from the business this year, we now have a smaller, more dynamic Board. As Chairman, my priority is to provide the right balance of challenge, accountability, responsibility and support to help drive Cadent's transformation. The Board meets every two months and we have strengthened operational reporting to provide clear oversight of what is happening on the ground. I am pleased with the outcomes of this work.

Cadent is committed to operating in a safe, responsible and sustainable way, and the Board has a crucial responsibility to lead by example through its commitment to 'zero harm' to people. Safety awareness in the business is high and related items are discussed at every Board meeting. Our Safety & Sustainability Committee provides key oversight and assurance of the management of sustainability issues on behalf of the Board. The committee is supporting us in developing a forward looking, goal-oriented strategy to deliver more sustainable outcomes for our customers, the environment and communities that we serve.

The focus of the Board and its committees during the year is a reflection of the developments and challenges the business has faced. Preparation for the next set of regulatory price controls ('RIIO-GD2') has been, and remains, of particular importance, as we have reviewed the progress of the various workstreams. While there has been a great deal of work undertaken to date, there is much yet to be completed, and this will remain a key priority over the coming months.

Shaping the future of gas

The debate about future of gas has been rapidly climbing up the political agenda. As the UK's largest gas distribution network by a considerable margin, it is natural that Cadent should take a role as a leading voice for the industry.

Gas currently powers around 80% of homes in the UK and clean gas has a crucial role to play in the future energy mix as we transition towards a low-carbon future. We are blending hydrogen into the methane stream as part of a small pilot project Keele University to demonstrate the potential opportunity. We are also developing an extensive project to introduce a hydrogen blend into a much larger part of the network in the North West. This complex and ambitious project will make a significant contribution to reducing carbon and will show what can be achieved by using large-scale hydrogen production to support decarbonisation in a cost-effective way. We will continue to engage with government and regulators to build awareness of the opportunities offered by clean gas as we support the journey towards Net Zero.

Looking ahead

Our shareholders have made a significant financial commitment to support the communities we serve and the Board is pleased that the Cadent Foundation has been established to support charities and organisations who provide benefit to communities and people that are in vulnerable situations; it also has committed to aid research into sustainable energy choices for the UK, supporting both the climate and environmental emergencies. It is particularly pleasing that we have already been able to help communities and customers in the current COVID-19 circumstances.

Looking ahead, the focus of the Board will be to continue to oversee the completion of the transformation process and approval of Cadent's RIIO-GD2 business plan later in the year. In this regard I am satisfied that our future business plan sets the right level of ambition and stretching targets that are needed to deliver faster, better and more effectively for our customers.

1.3 COVID-19 Statement - *Supporting our customers and colleagues in a challenging time*

On 26 March this year as the COVID-19 pandemic swept across the world from China, the government declared a lockdown across the UK, limiting movement, imposing social distancing measures and closing down all non-essential business activity. Together with other utilities, Cadent provides a critical service to our customers, communities and the economy and as such has continued to operate throughout the crisis to ensure gas has continued to be transported safely and securely to all who need it. To that end, customers, especially the most vulnerable will have experienced no change to the service they expect from us. Where they have reported an uncontrolled gas escape or potential carbon monoxide emissions, we have been able to deliver exactly the same free at the point of use response as we did prior to the crisis with an engineer on the doorstep within 34 minutes on average. The gas emergency line has operated throughout the period without incident despite new working practices and new locations necessitated by social distancing.

We've been able to do this due to regularly rehearsed and updated Business Continuity Management procedures and a dedicated workforce that have understood and been supported in managing the risks associated with COVID-19 for both themselves, their families and our customers. We have followed government guidelines scrupulously in relation to social distancing and protecting our workforce and customers, especially those who are shielding or self-isolating and at the same time have worked with government to ensure our essential services are able to function throughout.

Although the impact of COVID-19 on the 2019/20 year was limited, it has had a profound effect on some of our key regulatory outputs since 1 April 2020 and is likely to continue through to March 2021 and beyond, depending on how the crisis develops following easing of restrictions and future outbreaks. In particular, our mains replacement programme has been severely curtailed as it requires access to customer's homes to switch off and restore gas supplies and our multi-occupancy building survey work has similarly been affected due to the need to access individual flats.

In terms of customer requested work such as gas connections and fuel poor network extensions, we have continued to provide a service on a limited basis however, understandably many customers cancelled or asked us to defer until a later date. This will inevitably create a backlog of work that will need to be managed as economic activity recovers. Throughout this period, we have worked closely with electricity and gas network colleagues, Ofgem, the HSE and government to ensure customers and particularly the most vulnerable are supported and kept safe. The levels of co-operation and support achieved have been unprecedented and we acknowledge and are grateful for the help we have received from our regulators and government in facilitating the service we provide.

Despite the difficulties and from the start of this crisis, we have sought every means to plan for what we can do rather than what we can't and this approach has meant we have been able to achieve far more during lockdown than our peers in terms of supporting our customers and the communities we serve.

Outlined below are examples of how we have pro-actively engaged and progressed our key activities.

Communities and customers:

We have been very conscious of our role in society in these difficult times beyond just that of a gas transporter and have contributed to our communities in a variety of ways ranging from large projects to individuals assisting the most vulnerable in their local area. We were proud to become the first Gas Distribution Network (GDN) to sign the COVID-19 Business Pledge. The pledge encourages businesses and other organisations to find creative ways of supporting the NHS and the public throughout the crisis and this includes taking measures to ensure their own staff's mental and physical health. This has been demonstrated throughout our networks as we have proactively taken steps beyond business as usual, to deliver a huge response to keep our customer and colleagues safe. Supporting those who need us the most, through a range of initiatives and volunteering opportunities as well as supporting our NHS in their vital work. Recognising that increased hardship was putting financial pressure on food banks we donated £240,000 to the Trussell Trust and we also rose to the challenge to equip the Nightingale Hospital in Birmingham by providing 34 engineers from our West Midlands network using their skills to install internal oxygen pipes and associated equipment. We also ensured gas supplies to the new hospitals were secure and diverted pipes to support a hospital in the Northwest.

In addition, we allowed employees to volunteer for up to 2 days a month to support COVID-19 related activities with their local communities and many have done so to give back to those who need help.

Supporting

- **the gas market:**

We have worked closely with Ofgem, gas Shippers and network colleagues across gas and electricity to provide financial relief for Shippers and Suppliers who may be suffering financial strain in supporting their customers who are unable to pay their energy bills. This support has ranged from supporting contractual changes to alleviate gas balancing charges as well as providing at £50 million nearly half the funding for a deferred invoice payment scheme for those Shippers who need help.

- **our supply chain:**

At the very outset of the lockdown we recognised the need to ensure our suppliers and contractors were supported and have continued to liaise with them throughout on our plans and expectations. As outlined above, our intent to continue working where practical and safe to do so within government guidelines, has meant that we have been able to provide our suppliers and contractors with a minimum level of work such that they are able to respond more rapidly as we resume our core activities.

- **our employees:**

As for many employers we have focused considerable effort on supporting our employees throughout the lockdown period, whether they be field- or office-based. In the case of the former, where our role to keep the gas flowing safely and reliably meant by necessity employees had to continue to manage the system, provide connections, maintain assets and attend emergencies, this was done in compliance with all relevant COVID-19 legislation. All necessary PPE was provided and guidance on its correct use as well as the circumstances where precautions were required. This was reinforced with briefings on keeping customers and employees safe while working in proximity to each other.

For office-based staff, our Business Continuity Management plans, guidance and equipment have allowed the vast majority to work from home and use the latest software to communicate with each other and with our partners. While this has been more successful than most would have thought over such a protracted period, we have been mindful that the physical and mental health and well-being of all our employees and contractors can be affected by isolation and strains of home working and not being able to see colleagues on a daily basis. To help to mitigate these issues, we regularly undertake dip checks to see how our teams are feeling backed up by surveys and ensure regular briefs about what is happening across the business so that employees feel connected.

We also maintain a daily record of absences of staff across Cadent including those who are self-isolating, shielding or indeed in very rare circumstances suffering from COVID-19 so we can provide support where needed.

Mains Replacement

In relation to our replacement programme, we switched our efforts to non-customer facing projects and those that may otherwise have been difficult to carry out during normal economic conditions. As restrictions have been eased, we were the first gas network to resume our customer facing mains replacement work on 15 June. This resumption is, however, far from normal as increased health and safety measures to protect our staff and customers and additional customer support has impacted productivity. In addition, the restrictions arising through customer shielding and self-isolation has led to projects being deferred or curtailed and as a consequence we are currently completing around half the replacement length we had otherwise planned at around 26km per week.

To facilitate our work we have been the only gas network to carry out risk research and liaise with the HSE and BEIS to both amend government guidance to support our works where shielding or self-isolating customers are encountered and similarly piloting customers turning their gas supply off and on in limited circumstances. All networks benefit from the work we have done in this regard and in the learning as we proceed.

Connections

As lockdown occurred most of our connections work was either cancelled or deferred by our customers until such time as they were ready to recommence. For those customers who still wanted us to complete works and highway authorities were willing to issue a permit, we carried on and made the new connection on the date agreed subject to a safe working environment for staff and customers. We have continued to offer a service throughout the lockdown period and are now contacting customers who deferred work to arrange a mutually convenient date to carry out the connection. Inevitably the backlog together with requests for new work will mean it may take several months to resume normal operations.

In relation to fuel poor connections approximately half of our planned workload was suspended, although we continued where possible and despite the restrictions were able to achieve approximately 600 customer connections in the first quarter of 2020/21.

Multi-Occupancy Buildings

Planned multi-occupancy building surveys were largely suspended following lockdown as access to buildings and individual flats became increasingly difficult as customers refused entry, preventing completion of inspections. Some work has continued to locate and remediate gas assets which do not involve customer inter-action such as exposing or replacing pipe isolation valves.

We are currently planning to resume surveys during August and will monitor access rates as part of this work, but as with replacement work we anticipate productivity levels will be much lower than before COVID-19.

We continue to follow all necessary guidance whilst working closely with Ofgem, HSE and BEIS to navigate the pandemic and continuously monitor our business continuity plans and working practices to make sure our people stay safe and we keep the energy flowing for our 11 million customers.

2. Output Summary

RIIO-GD1 created a platform that has allowed us to deliver continuous improvement across our services whilst reducing bills in real terms. Customers receive a safer, more reliable and more innovative network service including increasing volumes of green gas. We have developed our Customer Vulnerability Strategy and have worked hard to develop partnerships which give us access to more hard-to-reach customers than ever before, enabling us to better support those who are in vulnerable situations or are most in need.

In the following section we provide a summary of our key highlights, areas of focus for the coming year and performance generally against our RIIO-GD1 outputs as well as.

2.1 2019/20 strategic highlights

Putting customers and communities first

- Improved accessibility of our website and achieving level AA of the Web Content Accessibility Guidelines (WCAG 2.1) to help those customers who have been harder to reach.
- Delivered **2,252** network extensions and connections to support those in fuel poverty and over **30,000** during this RIIO-GD1 price control.
- Transformed our approach where we need to work on multi occupancy buildings
- Improvements achieved in **customer satisfaction** measures and complaint handling
- Distributed over **19,000** CO alarms and led joint GDN billboard campaigns on CO awareness and the Priority Services Register (PSR).
- Established the **Cadent Foundation**, in which we are investing 1.25% of our after-tax profits, ensuring that communities share in our performance.

Ensuring a safe and reliable network

- Conveyed 257 TWh of gas to 11 million homes and businesses equivalent to 86% of the total UK annual electricity system demand (which is around 300TWh).
- **1,864km** of iron mains replaced
- **17.6km** mains refurbishment carried out by **CISBOT an innovative joint sealing** robotic technique.
- **Reduced** the number of **unplanned interruptions in multi-occupancy buildings** in North London by **61%** and the length of these interruptions from circa **21 days** to **16 days**.
- Attended over **300,000** gas escapes. On average 98% of these were within the 1hr or 2hr response times for controlled and uncontrolled escapes exceeding the 97%
- Received **1.6m** telephone calls and answered 92% within 30 seconds, exceeding the 90% regulatory standards of service.

Improving our environment

- **Leakage** of gas from our networks reduced by 3%
- Launched low/zero emission vehicles to our fleet

Supporting the energy transition

- Connection of **3 additional biomethane** plants
- Connection of the **Europe's largest** bio-Compressed Natural Gas filling station at Warrington
- **First hydrogen** being injected in our gas distribution system with **HyDeploy** at Keele University
- Further development of the **HyNet** project decarbonising industry and heat in the North West
- **Future Billing Methodology Field Trials** commenced to support more diverse gas supplies

In addition to our output commitments we would like to highlight other areas where we have delivered real benefits for our customers and the communities we serve as well as our contribution to the future energy debate.

SUPPORTING OUR COMMUNITIES	SUPPORTING OUR PEOPLE
<p>Collaboration and strategic partnerships have been a fundamental part of delivering our engagement strategy, and we have taken a leading role in sharing smart practice across the industry. This has included:</p> <ul style="list-style-type: none"> • funding and spearheading the 'Dementia – Call 4 Action' initiative, to engage innovators to develop a pipeline of in-home solutions to support people living with dementia; • leading and funding 'Utilities Against Scams', where we developed a best-practice toolkit for utility businesses, customers and colleagues to raise awareness, and reduce the likelihood, of scams; <p>In addition, we have delivered improvements to the Priority Services Register so that we continue to keep our customers safe, warm and independent in their homes. The increased clarity of data on the register will help us to develop new services and drive actions targeted to customers' needs across our networks. To help deliver this we are reviewing our partner strategy so that we take a more strategic approach towards key areas of need.</p>	<p>We have extended our partnership with Alzheimer's Society until March 2021 and as dementia awareness features as one of our partnership commitments we have pledged to take that awareness out into schools in our networks.</p> <p>Our volunteer commitments are a constant demonstration of our value of Community from such activities as decorating a 12 bedroomed homeless accommodation to cleaning Southend Beach for a day. Our commitments also offer the opportunity for personal development to those who lead them, giving our people the chance to build on or develop new leadership skills and qualities as they lead the activity. The teams are united in their motivations to make the communities they serve a better place for those who enjoy them, typically helping organisations who need it the most. Increased engagement over the year has supported 125 employees in giving over 788 hours which has directly benefitted over 41,000 people across our networks ranging from support to those living with dementia to helping in local foodbanks. With finance cuts and charitable donations stretched, our volunteering efforts often deliver where a charity or community group would not be able to.</p>
Working responsibly	Supporting the energy transition
<p>We continue to lead on behalf of all energy networks on the Street Manager project being commissioned by the Department for Transport (DfT) to transform the co-ordination, collaboration, management and communication of street and road works. Cadent's pivotal role in this project reflects the importance, experience and expertise that we were able to bring to this critical project and this has been recognised by Ministers and Senior Civil Servants in the DfT.</p> <p>In our North London network, we have signed up to the TfL Roadworks Charter which shows our commitments to ensure roadworks are carried out safely, support sustainable travel, and be efficient by maximising resources for customers.</p> <p>We have used social media even more this year as our experience so far has found this to be an excellent way to communicate with affected</p>	<p>As a gas transporter we have a significant role in facilitating a move to low and zero carbon gases in the UK. We have led debate with companies across the industry to ensure efficient and coordinated development for the benefit of all consumers.</p> <p>We have been working with both national organisations such as the Energy Networks Association (ENA), the Energy Utilities Alliance (EUA), and the Confederation of British Industry (CBI) to provide a common perspective to government but also with regional and Local Authorities to help plan their energy transition.</p> <p>We understand that the move to Net Zero requires a combined Energy System that makes best use of both electricity and gas infrastructure to achieve its aims and our future plans show how we will work closer with the electricity District Network Operators</p>

<p>residents and proved invaluable in 3 incidents that we experienced during the year at Wirksworth, in Derbyshire, Toddbrook Reservoir at Whaley Bridge and Richmond in London. It has continued to help us reach out to the community, not only from our own Cadent page but by linking in to local pages coordinated by residents. We can reach people when they are away from their homes and it has assisted us with speeding up the process of isolating and restoring the gas supplies at properties. We work hard to keep in touch and support those who may not have access to online services.</p>	<p>to provide solutions that drive value and efficiency for our customers.</p> <p>We have been working across the gas industry to develop a pathway to the transition to hydrogen that makes sense economically, starting with where the demand is the greatest. Industrial decarbonisation is one such opportunity and our HyNet project is supporting the development of this concept as there it fulfils the demand for a gas to fuel industrial process coupled with large-scale decarbonisation being present in the same location.</p>
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2.2 Areas of focus for 2020/21

There are areas where we are currently not delivering the standards we want to set for our services to customers and we know we need to do better. This year we have continued to accelerate our transformation programmes to address performance challenges and will be focussing on these over the coming year to ensure we provide the consistent service that our customers want and expect.

- In the case of **mains replacement**, we are pleased that we are ahead of our primary risk removed target but we are behind the plan for our secondary deliverable of length of main replaced. To ensure we achieve our year eight deliverable we have transformed the way in which we are delivering our repex programme. This includes;
 - further optimisation of our design and delivery processes;
 - improving engagement with stakeholders; and
 - increasing the number of teams delivering work in the field.

The introduction of the new delivery partnership in the North West that we reported last year has been successful and we have replicated these arrangements in our West Midlands network to ensure delivery of our repex programme in this network. We know that there are challenges but our pre-COVID-19 forecast for year eight shows a plan on track to deliver the eight-year RIIO-GD1 length.

- In relation to **unplanned interruption** durations for Multiple Occupancy Buildings (MOBs), London remains behind target due to previous performance issues earlier in RIIO-GD1, but we have seen significant improvements driven by innovation and actions taken as part of the additional commitments we made last year. In this network this has helped us reduce the volumes of MOB unplanned interruptions by 61% and durations from a median of 20.9 days per interruption to 16 days since last year. Similarly, across our other networks, we have seen a reduction in unplanned interruption volumes of circa 20% and we will continue to focus on this over the coming year.
- Although we have met the Ofgem targets for **Customer Satisfaction** in 11 of 12 categories, which is an improvement on previous years, we haven't seen consistent performance in all networks & processes, we know we need improve next year. We did not meet the required standard for London planned work and we have specific focus areas to recover this to ensure that service in this area rises.

2.3 The following table shows our performance to date for our key output measures against both annual and 8 year targets

Output category	Output	Reporting Period	EofE	Lon	NW	WM
Safety	Emergency response - 97% uncontrolled gas escape	annual				
	Emergency response - 97% controlled gas escape	annual				
	12 hour escape repair requirement	annual				
	Repair risk	annual				
	Iron mains reduction (length replaced)	8 year				
	Iron mains reduction (Risk removed)	8 year				
	Sub deduct networks off risk	8 year				
Reliability	Loss of supply - number of unplanned interruptions	8 year				
	Loss of supply - duration of unplanned interruptions	8 year		*		
	Loss of supply - number of planned interruptions	8 year				
	Loss of supply - duration of planned interruptions	8 year				
	Achieving 1 in 20 obligations	annual				
	Maintaining operational performance	8 year				
Connections	Guaranteed Standards of Performance	annual				
	Introduce distributed gas connections	annual				
Customer Service	Planned interruptions survey (Ofgem target 8.09)	annual				
	Emergency response & repair survey (Ofgem target 8.81)	annual				
	Connections survey (Ofgem target 8.04)	annual				
	Complaints metric (below 11)	annual				
	Stakeholder Engagement	annual				
Social obligations	Fuel Poor connections (no.)	8 year				
	Carbon monoxide awareness	annual				
Environmental	Leakage	8 year				
	Biomethane connections information	annual				

RAG Rating	Description
	GDN has successfully achieved an annual output or is on target to meet the eight-year output commitment
	GDN has failed to achieve an annual output or is forecasting to fail an eight-year output commitment
*	<i>Note: Colour coding for London unplanned interruptions durations is reflective of our significant performance improvement in relation to the revised commitments we made.</i>

3. Totex drivers

Cost efficiency benefits for our customers - (excluding COVID-19 impacts)

Our Totex performance in the year was, as expected, higher than our allowances in 3 of our networks reflecting the increased workload profiled to the latter years of the price control, more challenging nature of the work and conditions in the contractor supply market. Overall, our Totex forecast to deliver the eight-year output commitments, is £8,796m for the RIIO-GD1 period; and represents Totex costs which are c.£480m (5.2%) lower than the Totex allowances.

Overall Totex Performance*	CURRENT YEAR		RIIO GD-1 YEAR TO DATE		8 YEAR FORECAST	
Network	Variance to Allowance £m	% Variance	Variance to Allowance £m	% Variance	Variance to Allowance £m	% Variance
East of England	(50)	-14%	105	4%	47	2%
London	(24)	-8%	262	12%	160	6%
North West	(5)	-2%	145	8%	97	5%
West Midlands	26	12%	202	14%	177	11%

* Performance measured against allowances as represented per Ofgem Table 2.2 (i.e. exclusive of Totex adjustments such as IAS19 Pension costs)

This efficiency against allowances is lower than what we reported last year (£636m in 19/20 prices), and is mainly driven by our increased Totex forecast, explained in more detail below. As agreed with Ofgem, our Totex forecast has been compiled on the basis which excludes all COVID-19 impacts upon our operational activities and costs.

Our forecast of Repex spend to deliver the mains decommissioned length output has increased by £73m (6.7%) since last year mainly reflecting further market driven unit cost increases driven by the scarcity/competition in securing the qualified resources and the more challenging nature of the work with shorter projects and an increasing volume of larger mains replacement. This also adds pressure in respect of delivering the Repex cost efficiency levels we embedded into our RIIO-GD2 plans.

Our forecast of Capex spend has increased by £61m (14%) since last year and is largely driven by two factors;

- Firstly, our transformation strategy is now expected to cost c£40m more than originally anticipated. However, this investment in IS, property and vehicles will facilitate a more network aligned, multi-skilled and efficient operating model which will drive long term enduring efficiencies which will benefit consumers well into the future as can be seen in our Opex cost forecast profile in our RIIO-GD2 plan.
- Secondly, a c. £13m increase in projected physical security costs in relation to our Critical National Infrastructure site upgrades.

Our Opex cost in Year 7 (19/20) is in line with what we had forecast in the July 2019 RRP and includes c£24m of one-off costs associated with our business transformation activities which will drive further enduring efficiencies over and above what we have already achieved and towards the ambitious efficiency assumptions embedded within our RIIO-GD2 plan. Whilst our forecast for the final year of RIIO-GD1 has increased slightly by c£5m (0.6%) this still aims to deliver an ambitious 16% (£78m) improvement in annual Opex in our first four years of operating as a standalone business, driving value for our customers through into RIIO-GD2. We have continued to challenge all aspects of our business to identify and commit to deliver

transformational and on-going business improvement efficiencies in real terms and to offset some of the emerging upward Opex cost pressures we face (namely, additional asset health expenditure in relation to non-routine maintenance activities, higher “Software as a Service” IS costs and higher survey workload in respect of Multiple Occupancy Buildings – all of which were also adding upward cost pressure in our RIIO-GD2 plan).

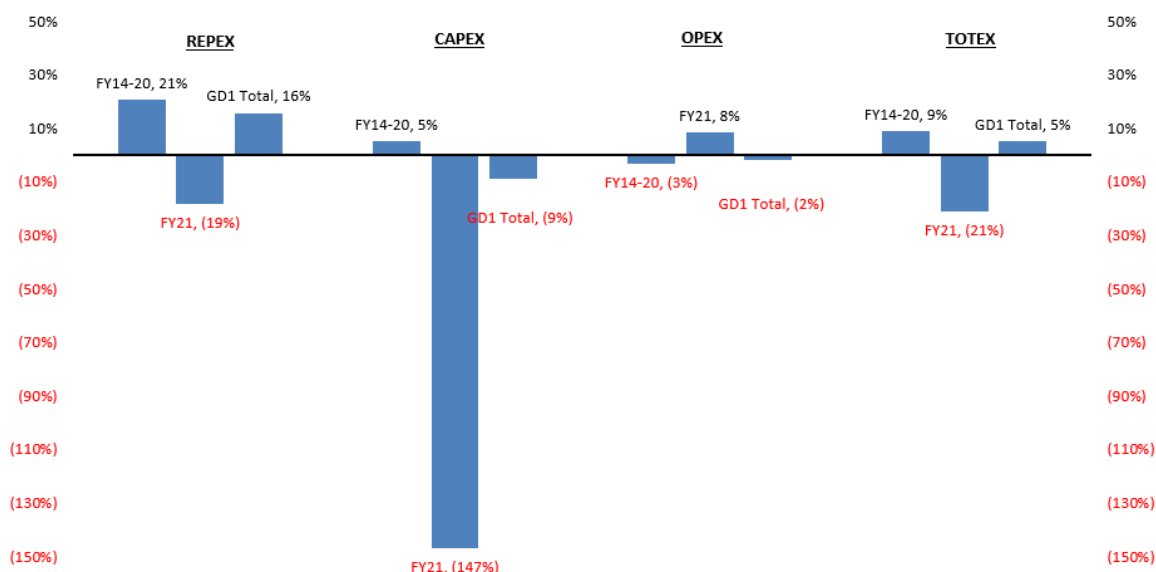
Since last year our allowances have reduced slightly by c£15m (19/20 prices), via the November 2019 Annual Iteration Process – this is as a result of a reduction to our Repex Tier-2A Risk Above Threshold allowances (across all 4 networks) based on our actual spend in FY19.

The following table outlines our expected sources of Totex eight-year efficiencies:

		8 Year Efficiencies* (£m, 19/20 prices)			
		Repex	Capex	Opex	Totex
Innovative long term contracting approach	- More risky contract approach to optimise and crystallise keener prices from 8 year contracts with set work with aligned incentives to customers	110	-15	-85	10
	- Economies of scale (merging 6 contracts to 2, and consolidating locations)				
	- Moving Design into GDSPs (instead of duplication/handoffs in old model)				
	- Single delivery unit for planned work (stranding of resources in opex)				
Improved design and use of best practice	- Cost efficiencies from improved detailed design	245	0	5	250
	- Increased use of best practice / existing techniques improving abandon/lay ratio, level of insertion and live insertion				
Optimal Pipe selection	- GDSPs optimising a fully risk based selection criteria to deliver Primary Output	185	0	0	185
	- Partially offset by more services				
Within Period Innovation	- GDSPs continuous improvement plans to deliver	125	0	145	270
	- New Technology roll-out				
	- Rephasing of workload into last four years to drive more efficient delivery				
	- Direct Opex process improvements, driving end-to-end efficiencies from our new performance excellence initiative				
Optimal network planning	- Driving nominated load requirements for interruption customers down (c.20%)	0	25	0	25
	- Improved network analysis				
	- Underlying capacity demand reducing faster than business plan - slower economy / greater energy efficiency				
Smart	- Rollout of Smart metering. Impacts reduced following working with industry, but still expect significant impact.	0	0	-30	-30
Business Support Costs	- At start of RIIO found to be off pace on this element of Totex.	0	-120	-110	-230
	- Gap to allowance historically - in part due to centralised nature of NG structure plus centralised model benefiting lower operational costs				
	- As a new separate business we are tailoring our business support costs and driving through improvements (including IS) that are reducing costs to below allowances by 2020/21				
8 Year Totex Efficiencies*		665	-110	-75	480
		16%	-9%	-2%	5%

The chart below shows how we have performed against our allowances during the first seven years of RIIO-GD1 and how we expect to perform in the final remaining year.

Cadent - under/(over) Spend vs Allowances (%)



For Repex, the 21% efficiency delivered to date is driven by a combination of our innovative long-term contracting approach and our strategy to optimise selection of pipe based on risk removed. The lower efficiency forecast for future years is reflective of the upward unit cost pressures, as described above, and a catch-up in the phasing of workload, but is further compounded by the complexity of the remaining larger diameter mains replacement workload yet to be delivered in the programme. Despite these higher cost forecasts for the final year we will still strive to deliver efficiencies against our allowances and hence continue to deliver on-going benefits for our customers.

For Capex, the significant overspend against allowances in the final year of RIIO-GD1 reflects increased workload associated with delivering the Asset Health Network Output Measures (NOMs) which form part of the Risk Monetisation targets. By the end of RIIO-GD1 we plan to deliver the NOMs targets in each of our four networks, and in doing so (coupled with non-asset health activities), we plan to spend c. 9% above our allowances. This is partly driven by higher than anticipated spend on transforming our IT systems but also a consequence of the higher unit cost pressures that are materialising in the wider market – the latter is also impacting our performance against allowances in respect of customer Connections, as the majority of these are delivered by our Gas Distribution Strategic Partners (Balfour Beatty and tRIIO).

For Opex, at the start of RIIO-GD1 we were set an efficiency challenge to close the performance gap to our peers. We have delivered significant efficiencies since becoming a standalone company as evidenced in our actual and forecast Opex performance. Furthermore, we are committed to delivering on-going efficiencies in the future via further business transformation initiatives and a continued focus on continuous improvement and challenge over our processes – this is expected to deliver a forecast spend in the final year of RIIO-GD1 which is (for the first time) lower than our Opex allowances. This downward trajectory in Opex spend in the remaining RIIO-GD1 period not only positions us better relative to the other GDNs, but also as we look ahead to the challenges of RIIO-GD2 to allow us to continue to drive benefits for our customers well into the future.

4. Performance Summary

In this section of the report, we summarise performance against RIIO-GD1 measures of success, categorised by the four building blocks of the RIIO framework: Outputs, Incentives, Innovation and Revenue and provides more detail on the performance indicated by the key outputs shown in the Output Summary table in Section 2.

Outputs

4.1 Safety

Keeping our customers, communities and colleagues safe, warm and connected across each of our four networks is our top priority and we have delivered a strong performance across the RIIO-GD1 safety measures and in other measures monitored for example;

- Attending escapes as soon as possible and making safe as required
- Resolving network escapes within 12 hours
- Ensuring that outstanding network escapes were managed in such a way as to ensure they did not expose the public to risk.
- Significant reduction in lost time injuries to our workforce where our Lost Time Injury Frequency Rate has fallen from 1.13 in 2018/19 to 0.7 in 2019/20.

Our performance in relation to the RIIO-GD1 safety outputs is outlined below;

4.1.1 Responding to gas emergencies

- **Measure: 90% of calls answered in 30 seconds**

We operate the National Gas Emergency Service contact centre, taking calls and giving safety advice on behalf of all gas networks. In 2019/20 we answered circa 1.6 million calls of which 92% were answered within 30 seconds.

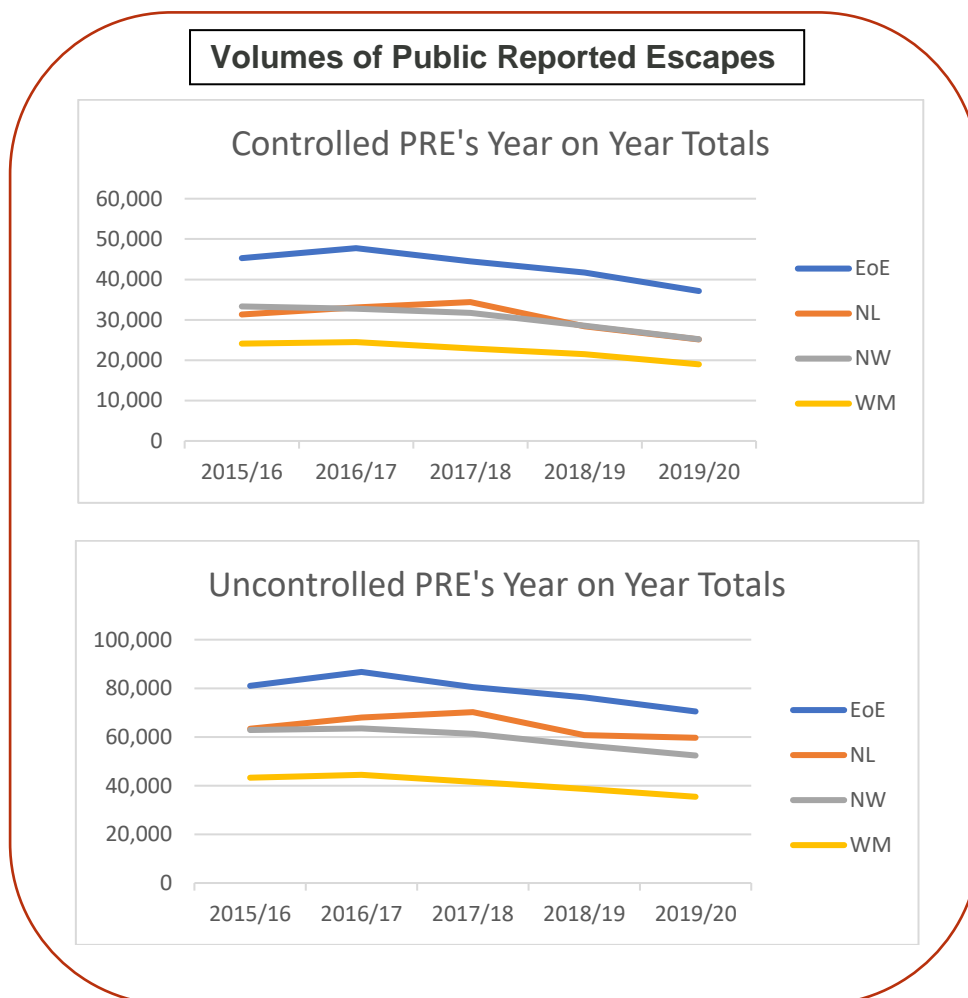
Emergency response

- **Measure: Controlled gas escapes – attendance in 2 hours**
- **Measure: Uncontrolled gas escapes – attendance in 1 hour**

We provide a gas emergency service free at the point of use which keeps people safe and warm in their homes and businesses. We respond to internal and external gas escapes and also to potential cases of carbon monoxide poisoning from appliances.

During the year we attended 356,879 public reported gas escapes (PREs) which is a 9% reduction on 2018/19 volumes and, as shown in the graphs below, continues the downward trend seen in previous years but this is an atypically larger annual reduction. Whilst some of this may be due to the progression of the iron mains replacement programme there are a number of other contributing factors and this year the winter was notably milder than average. February was particularly wet and stormy, and included three named storms, with widespread high rainfall totals and associated impacts. Overall the

Met Office reports that this was the fifth mildest winter in a series from 1884, and the fifth wettest since 1862.



Where we have attended to an emergency call we have exceeded the 97% performance level set by Ofgem for 1-hour and 2-hour emergency response times across all our networks and our average response time has been 34 minutes.

The tables below show our emergency performance across the RIIO period

Network	Uncontrolled – 1hr response time						
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
East of England (EofE)	97.9%	97.6%	97.9%	97.9%	97.1%	98.5%	97.7%
London (Lon)	97.7%	97.39%	98.0%	98.0%	97.4%	98.0%	97.6%
North West (NW)	98.5%	98.2%	98.5%	98.5%	98.0%	98.9%	98.5%
West Midlands (WM)	97.9%	97.52%	98.6%	98.5%	97.3%	98.9%	98.3%

Network	Controlled – 2hr response time						
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
East of England (EofE)	99%	98.47%	98.8%	98.6%	97.7%	99.3%	98.8%
London (Lon)	98.5%	97.73%	98.6%	98.6%	97.8%	98.8%	98.5%
North West (NW)	99.2%	98.93%	99.1%	99.0%	98.9%	99.7%	99.5%
West Midlands (WM)	98.8%	98.29%	99.1%	99.1%	98.2%	99.4%	98.9%

4.1.2 Repairing network escapes

- **Measure: Proportion of Gas Escapes Prevented Within 12 Hours**

In 2019/20 we attended 75,297 emergencies directly related to our network which represents circa 20% of all emergencies that we attend and in line with PREs continues the downward trend from previous years. The majority of our repair work (circa 80%) relates to emergencies involving customer appliances, internal pipes and meters and these are not Cadent's assets.

The comparisons in the table below shows that we have continued to repair a large proportion of our gas escapes within 12 hours, which is ahead of the Final Proposals monitoring target set at the start of the RIIO-GD1 period.

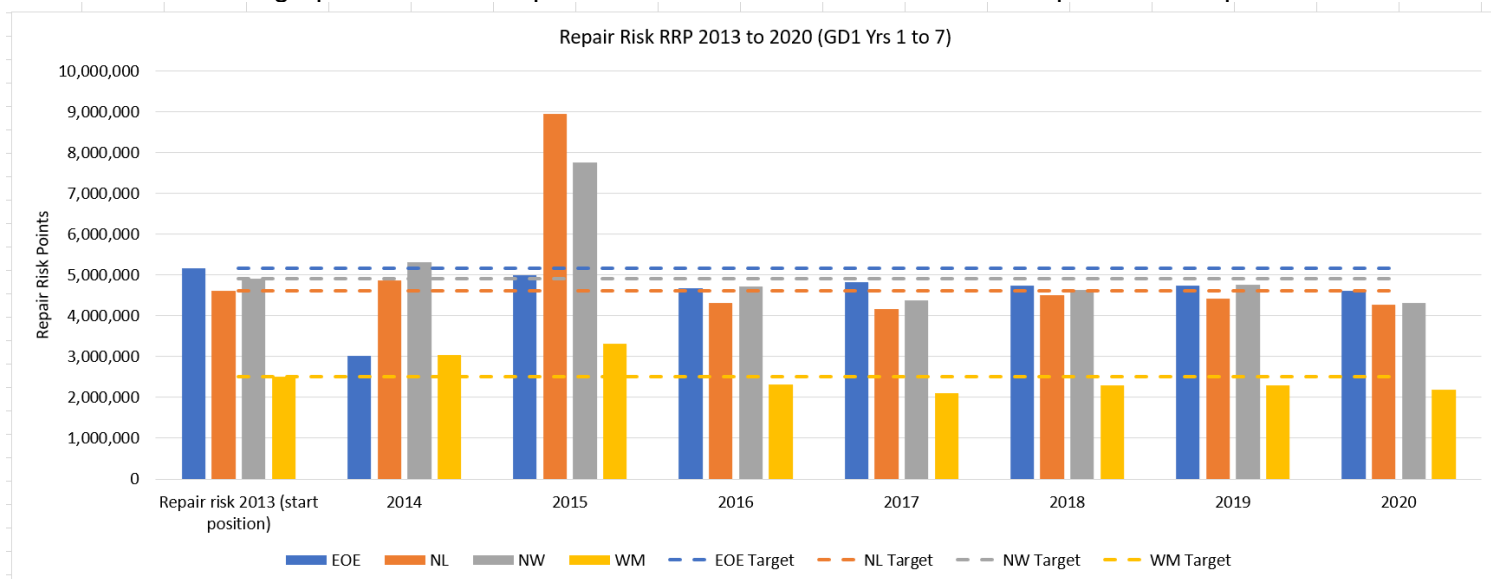
Network	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	RIIO-GD1 Final Proposals
EofE	50%	54%	52%	47%	49%	50%	49%	42%
Lon	44%	48%	52%	46%	45%	46%	45%	43%
NW	45%	48%	51%	50%	50%	49%	48%	34%
WM	43%	50%	51%	49%	48%	49%	45%	36%

Repair risk

We have continued to deliver our network repair risk commitments in all our networks this year as outlined in the table and graph below. Cadent's RIIO-GD1 targets are more stretching than other gas distribution networks and hence we have encountered a greater challenge to manage the cumulative risk to meet them, but despite this all networks have maintained risk scores below those set at the start of the RIIO-GD1 period. Looking forward we support Ofgem's proposal to remove this output measures for RIIO-GD2 as that the resource and cost of achieving this target is not in customers' interests and diverts personnel away from other work that would better support our customers. We are taking this consideration into our plans to restore business as usual following the COVID-19 outbreak as we seek to re-establish our MOBs survey programme and clear a backlog of connection work to ensure our customers remain connected to the network in the forthcoming winter. These other areas will be prioritised over the repair risk targets given the more significant impact and value to our customers.

Network	Network repair risk (millions)							RIIO-GD1 Final Proposals
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	
EofE	3.02	4.99	4.68	4.82	4.74	4.75	4.62	5.17
Lon	4.86	8.95	4.32	4.17	4.50	4.43	4.27	4.62
NW	5.32	7.77	4.71	4.37	4.63	4.76	4.32	4.91
WM	3.04	3.33	2.31	2.11	2.30	2.29	2.19	2.50

The graph below shows performance in our networks across the price control period



Fractures and corrosion

The numbers of fractures and corrosions vary from year to year and are influenced by external forces such as weather and ground movement as well as asset deterioration, hence our investment plans and particularly our mains replacement program, is designed to manage the number of fractures and corrosions.

During 2019/20 we completed 2,234 fractures and corrosion repairs which is 30% fewer than 2018/19 with reductions observed in all networks. This aligns with the reduction we have seen more generally across PREs, and repair risk this year. We are pleased with this outcome but recognise that the trend since the start of the RIIO-GD1 period is broadly flat and hence our focus and our plans remain targeted on activities that contribute to managing this risk.

The table below shows the volume of fractures and corrosion since the start of RIIO-GD1.

Network	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
EofE	999	1,213	983	1,246	1,062	1,223	810
Lon	278	308	308	405	343	399	289
NW	755	909	819	848	798	894	636
WM	561	703	614	666	715	675	499

Gas in buildings (GIBs)

Gas in Buildings (GIBs) is a secondary deliverable and is a measure of the number of gas escapes on a network pipe upstream of the Emergency Control Valve (ECV) which results in gas entering a building. Gas can enter the building in a few ways – along the line of a service, having an open escape near property or an escape within the property.

In 2019/20 we had 1,930 fewer GIBs occurrences compared to 18/19 (25% reduction) which also reflects the reductions seen during the year in both public reported escapes and the amount of repair work needed. We recognise that there are factors not in our control that can contribute to this performance including gas demand, mild weather and favourable ground conditions, and our day to day business activities include analysis of these factors to ensure we understand the trends and impacts on this risk.

Network	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
EofE	1,419	1,688	1,778	1,935	1,744	1,544	1,241
Lon	2,454	2,793	3,140	3,180	3,005	2,838	2,061
NW	1,795	1,710	1,854	1,900	1,727	1,826	1,327
WM	1,116	1,267	1,264	1,388	1,347	1,286	952

4.1.3 Major accident prevention

Our current Gas Safety (Management) Regulations Safety Case is approved by the HSE as required by our Licence. There were no process safety related incidents that resulted in injuries or significant property damage during 2019/20.

4.1.4 Sub-deducts networks off-risk

Sub-deduct networks are located on a network downstream of the gas transporter's primary emergency control valve and are linked to historical asset arrangements that are no longer installed. The work in this area is focussed on determining ownership of the pipework that runs beyond the valve and if necessary either engineer out, refurbish or replace the sub-deduct network in those instances where the premises owner does not wish to retain liability for the asset.

At the start of the RIIO-GD1 period Xoserve provided a list of 955 sites that were required to be taken off risk and to date 835 (87%) of these have been successfully removed. Over the course of the period 74 new sites have been identified (primarily via Xoserve data cleanse/extract processes) which have been incorporated into our programme of works and our total RIIO-GD1 target is now to complete 1029 sites.

As shown in the table below in 2019/20 we completed 55 sites and since the start of the RIIO-GD1 period have completed 872 (85% of the revised population). We had detailed resource and delivery plans in place pre COVID-19 to complete the remaining 157 sites in year eight, however, whilst the full extent of COVID-19 impacts are unknown, we do anticipate that they will constrain performance in 20/21.

Network	Overall progress to completion			
	Revised population	Completed workload 2019/20	Total workload completed to date (Yrs 1-7)	Workload remaining
EofE	181	13	157	24
Lon	234	17	203	31
NW	157	11	130	27
WM	457	14	382	75
Total	1029	55	872	157

4.1.5 Iron mains risk reduction

The Iron Mains Risk Reduction Programme addresses the failure of 'at risk' iron mains within 30 metres of a building and the consequent risk of injuries, fatalities and damage to buildings. Under the RIIO Framework there are two key outputs that measure the delivery of the programme;

- a **primary output** of 'risk removed'; and
- a **secondary deliverable** of 'length of main off risk'.

The following section describes our performance in relation to both of these outputs.

- **Risk removed**

As shown in the table below against the primary output of risk removed all four networks have exceeded the year seven linear target and East of England and North West networks have already delivered the 8-year target.

The table below highlights our progress towards the eight-year target for each network:

Network	Final Proposals Cumulative 8 yr target	Cumulative year 7 performance			Performance vs target (%)	Performance vs Final Proposals (%)
		Yr 7 Target	2019/20 Actual	Variance		
EE	192,567	168,496	220,726	52,230	131	115%
NL	102,281	89,496	90,655	1,159	101	89%
NW	154,428	135,124	177,826	42,702	132	115%
WM	131,394	114,970	124,066	9,097	108	94%
Cadent total	580,670	508,086	613,275	105,189	121	106%

- **Length of main off risk summary of performance**

With regards to the secondary deliverable of length of main off risk we replaced 1,864km of mains (including diversions), which is an increase of 111km from 2018/19, but we recognise that we are 6% behind the eight-year linear target. The following section outlines the actions we are taking to address this shortfall and our performance generally over the year.

To achieve our outputs, we accelerated our delivery programme and in the last quarter our run rate for tier 1 iron mains replacement had risen from 33km per week to 38km per week with further improvements forecast. Unfortunately, the impact of the COVID-19 pandemic since the 16th March meant that in the final few weeks some of these productivity gains could not be sustained.

Following on from the success of the new Construction Services Delivery Model in the North West network, we have grown the model and implemented it across the West Midlands and East of England networks, to secure delivery in 2020/21. This, supplemented by a robust action plan to drive further improvements, gives confidence that both the primary output of risk removed and the secondary deliverable of length off risk are achievable. Our plans included;

- movement of resource from East of England to London, whilst sustaining delivery in the East of England network with the implementation of the new **Construction Services Delivery Model** (April 2020);
 - The new Construction Services Delivery Model commenced work in the West Midlands network in February 2020, with full implementation / output delivery expected by April 2020; whilst the new Construction Services Delivery Model for the East of England network was due to go live in April 2020, with resources expected to move from East of England to London from May 2020, following the full implementation.
- increase in **mains replacement delivered by the Direct Labour workforce**.
 - Cadent Direct Labour deliver replacement works during quieter emergency / repair periods and in 2019/20 delivered 4.7km of mains replacement which is a 20% increase compared to 18/19. The teams were due to commence replacement

activities in the Spring (March 2020) with plans to deliver a further 5% increase in mains replacement.

- further **optimisation of design and delivery processes**.
 - This work was supplemented by the implementation of the new Construction Services Delivery Model and increased Direct Labour Delivery and enabled us to develop a robust programme for 2020/21 to deliver the year eight primary output and secondary deliverable. With a robust programme, We were able to have early engagement with the supply chain and all work within the 2020/21 programme had been let to the appropriate parties by March 2020, in order to secure the necessary resources in advance of the delivery year.
- increased use of **CISBOT** to treat large diameter mains with high levels of leakage across all networks (ongoing);

Whilst we have confidence in our plans and the actions that have delivered and continue to deliver improvements in performance, COVID-19 and current lockdown restrictions has and will continue to materially impact delivery. We are monitoring this impact as we commence re-mobilisation activities and will be able to better understand impacts on productivity and outputs for 2020/21 over the forthcoming weeks.

Mains replacement average unit costs have increased year on year across all networks due to continued market pressures and resource competition, as well as changes in work mix. This is especially significant in London and North West networks, where we have completed a higher proportion of larger diameter work, compared to previous years. Across all networks, difficult market conditions have led to competition for resources, this accompanied by increasing work complexity and work mix within tier, has materialised in a continued increase in sub-contractor rates, that we currently forecast to persist.

Mains and services workload 2019/20

The following section provides more detail regarding our mains replacement performance this year.

In terms of mains replacement workload;

- the East of England network has continued to improve with a further 45km delivered across all tiers since last year. This has been achieved by continued delivery of the recovery plans embedded in 2018, which focus on growing the resource base through additional training and investment in the supply chain.
- London, tier 1 delivery has decreased slightly as we have placed greater focus on replacing the short length, high risk mains to support smooth delivery of the primary output of risk removed in year eight. We have increased replacement of the larger diameter tier 2 and tier 3 works to ensure delivery of outputs across all tiers by the end of the period.
- Tier 1 performance has also increased in the North West and West Midlands networks this year. In the North West 77km has been replaced which is the more than any of our other networks and is reflective of the positive impact that the new Construction Services Delivery Model has had in this network. Replacement of tier 2 and 3 pipes has remained broadly flat compared to 2018/19 performance.

As shown in the services workload table below, in 2019/20 we replaced 172,422 services across our networks which is a 5% increase compared to 2018/19. Service volumes are

generally directly proportional to tier 1 replacement lengths and as shown will fluctuate dependent upon performance with the mains replacement activities.

The table below shows the 2018/19 and 2019/20 **mains replacement** performance by network and tier (including diversions).

Incl Diversions	2018/19					2019/20				
	EoE	Lon	NW	WM	Cadent Total	EoE	Lon	NW	WM	Cadent Total
Actuals										
T1 Iron	595.14	318.53	333.93	262.47	1510.07	597.33	274.81	401.81	276.84	1550.78
T1 Steel & Asbestos	25.19	17.57	33.01	22.61	98.38	48.09	28.64	42.40	19.25	138.38
Total Tier 1	620.33	336.10	366.94	285.08	1608.45	645.42	303.44	444.21	296.09	1689.16
T2 & 3 Iron	26.96	30.38	22.16	16.71	96.21	44.65	47.44	27.96	15.26	135.31
T2 & 3 Steel & Asbestos	7.31	5.23	0.87	4.01	17.42	9.58	6.01	0.42	1.01	17.02
Total Tier 2 & 3	34.27	35.61	23.03	20.73	113.63	54.24	53.45	28.38	16.27	152.34
Total Tier 1, 2 & 3	654.60	371.70	389.97	305.81	1722.08	699.66	356.89	472.59	312.36	1841.50
Other	9.58	5.58	9.69	4.98	29.83	9.27	3.83	6.53	2.96	22.58
Total T1,2,3 & other	664.18	377.28	399.66	310.79	1751.92	708.92	360.72	479.12	315.31	1864.07

The table below includes a count of **all domestic and non-domestic services** replaced including those re-laid after escape, as well as service pipes re-laid in association with mains replacement.

Services Actuals	2018/19					2019/20				
	EoE	Lon	NW	WM	Total	EoE	Lon	NW	WM	Total
MRP Relay	24,985	23,029	22,464	18,702	89,180	30,394	20,826	28,587	18,898	98,705
MRP Transfer	26,585	8,088	11,992	9,193	55,858	25,063	7,175	15,115	9,919	57,272
Total MRP Associated Services	51,570	31,117	34,456	27,895	145,038	55,457	28,001	43,702	28,817	155,977
Services per KM	80	85	90	96		78	78	91	91	
% Relays	48%	74%	65%	67%		55%	74%	65%	66%	
Non-MRP Services (Metallic Replacement)	4,829	4,972	6,295	2,821	18,917	4,333	4,554	5,373	2,185	16,445
Total Services	56,399	36,089	40,751	30,716	163,955	59,790	32,555	49,075	31,002	172,422
Final Proposals	57,274	34,161	44,248	32,614	168,297	57,274	34,161	44,248	32,614	168,297
Variance to Final Proposals	-875	1,928	-3,497	-1,898	-4,342	2,516	-1,606	4,827	-1,612	4,125
% Variance to Final Proposals	-2%	6%	-8%	-6%	-3%	4%	-5%	11%	-5%	2%

CISBOT - (Cast Iron Sealing Robot).



CISBOT is used as a means of joint refurbishment that can be used in locations where there is a high degree of congestion and it is difficult to get approval to undertake road works. The technique allows us to extend the life of the asset by 20 years whilst minimising disruption to the public.



Last year we successfully trialled this technique in our London network, this year we have done more there and extended its use to East of England and North West networks as well. Across these networks we delivered 17.6km using the CISBOT technique and since its introduction last year have delivered circa 21km contribution to the repex programme.

The tables below provide details of the lengths delivered by diameter, number of joints and costs per network as well as the totals delivered in the last two years.

	2019/20 - (Yr 2)							
	EE			NL				NW
	>355-500mm	>500-630mm	Total	>355-500mm	>500-630mm	>630mm	Total	>355-500mm
CISBOT Length (km)	1.1	0.6	1.7	6.5	4.8	3.4	14.7	1.2
CISBOT Joints	314	193	507	1782	1471	945	4198	297
Cost	£770,670	£524,313	£1,294,983	£4,391,191	£3,901,881	£3,305,466	£11,598,539	£338,029
Cost per metre	£690,565	£884,170	£757,743	£680,172	£810,191	£969,629	£790,037	£291,404
Cost per joint	£2,454	£2,717	£2,554	£2,464	£2,652	£3,498	£2,763	£1,138

	2018/19 NL	2019/20 EE/NL/NW
	Total	Combined total
CISBOT Length (km)	3.81	17.6
CISBOT Joints	1134	5002
Cost £	£2,757,627	£13,231,551
Cost per metre	£724	£1,839,184
Cost per joint	£2432	£6,455

Please note: In line with Ofgem's request the mains refurbishment associated with CISBOT has been reported in Table 5.2c (Repex other mains), and for consistency we have also aligned the decommissioning of these pipes to Table 5.8 (Decommissioned summary).

4.2 Reliability

4.2.1 Achieving 1 in 20 peak capacity standard

In 2019/20 we ensured that adequate capacity was available to meet a level of demand that is not likely to recur more often than once in twenty years.

4.2.2 Maintaining Operational Performance

This element of the Reliability output is based upon the following secondary deliverables: *Number & value of offtake meter errors, Duration of telemetered faults, PSSR fault rate, Gas holder demolition and Capacity Utilisation* and the following section provides an update on each of the areas:

- **Duration of telemetered faults**

The trend across the period has shown that our networks have been free of errors in energy throughput and we have welcomed Ofgem's support for our proposed RIIO-GD2 investment to maintain this level of compliance in their recent Draft Determinations.

Following the implementation of our new process in late 2015/16 we have seen continued improvement in the resolution time of faults compared to the 2013 baseline with all four of our networks exceeding the original proposals.

- **PSSR faults**

The methodology for the assessment and reporting of PSSR faults is aligned to the requirements of the HSE for compliance with the Pressure Systems Safety Regulations. In 2016 Cadent adopted a revised approach to the classification of faults which applies a more rigorous assessment than the previous compliant methodology. This change in reporting methodology caused an upturn in fault rate. Therefore, all networks are delivering performance improvements against a much higher fault rate to the range of the original FP. This represents a real improvement in network safety and we remain compliant with the PSSR regulations.

Over the course of the year we have analysed faults in greater detail to identify patterns and trends to help us make targeted interventions and continue to improve our processes. As a result of the actions we have taken we have made significant progress in East of England and London networks compared to last year with both recording circa 5% fault rates. North West had already delivered a step change in performance in 2018/19 and this has been broadly sustained in 2019/20. Opportunities for further development have been identified and these will be implemented in the coming year. Following a high number of faults in 19/20, WM has stabilised its performance and is positioned to deliver the monitoring target.

- **Gas holder demolition**

At the beginning of RIIO-GD1, 214 low pressure gas holders were standing and we committed to decommission and remove 102 of the holders within the RIIO-GD1 price control with the remaining 112 to be demolished in RIIO-GD2.

This year we made good progress with the RIIO-GD1 portfolio and removed 3 sites which leaves 4 for completion in the coming year located at Fulham, Wigan, Crewe and Colchester. These all have their own challenges in that Fulham is a listed structure and the other three have access/site issues. To that end we are planning to substitute holders from the notional RIIO-GD2 portfolio to maintain momentum in meeting our targets.

To utilise resource efficiently during the period we have removed some of the RIIO-GD2 holders. To date we have demolished 39 of these with 18 being completed in 2019/20. We are developing plans to remove the remaining sites and anticipate that we will have removed circa. 50% of these holders by the end of 2020/21.

- **Capacity utilisation**

Intensive validation and investigation into the capacity of each of our Offtakes and Pressure Reduction Installations (PRIs) has shown that although utilisation fluctuates across our sites overall this had minimal impact on our operations. Our networks are configured such that, on the few occasions where there are flows slightly in excess of their design capacity under peak 1:20 demand conditions, they are supported by other installations so that the flows do not exceed booked capacity (this is always below physical capacity). We continually assess our capacity utilisation and our supporting network models are validated on an annual cycle.

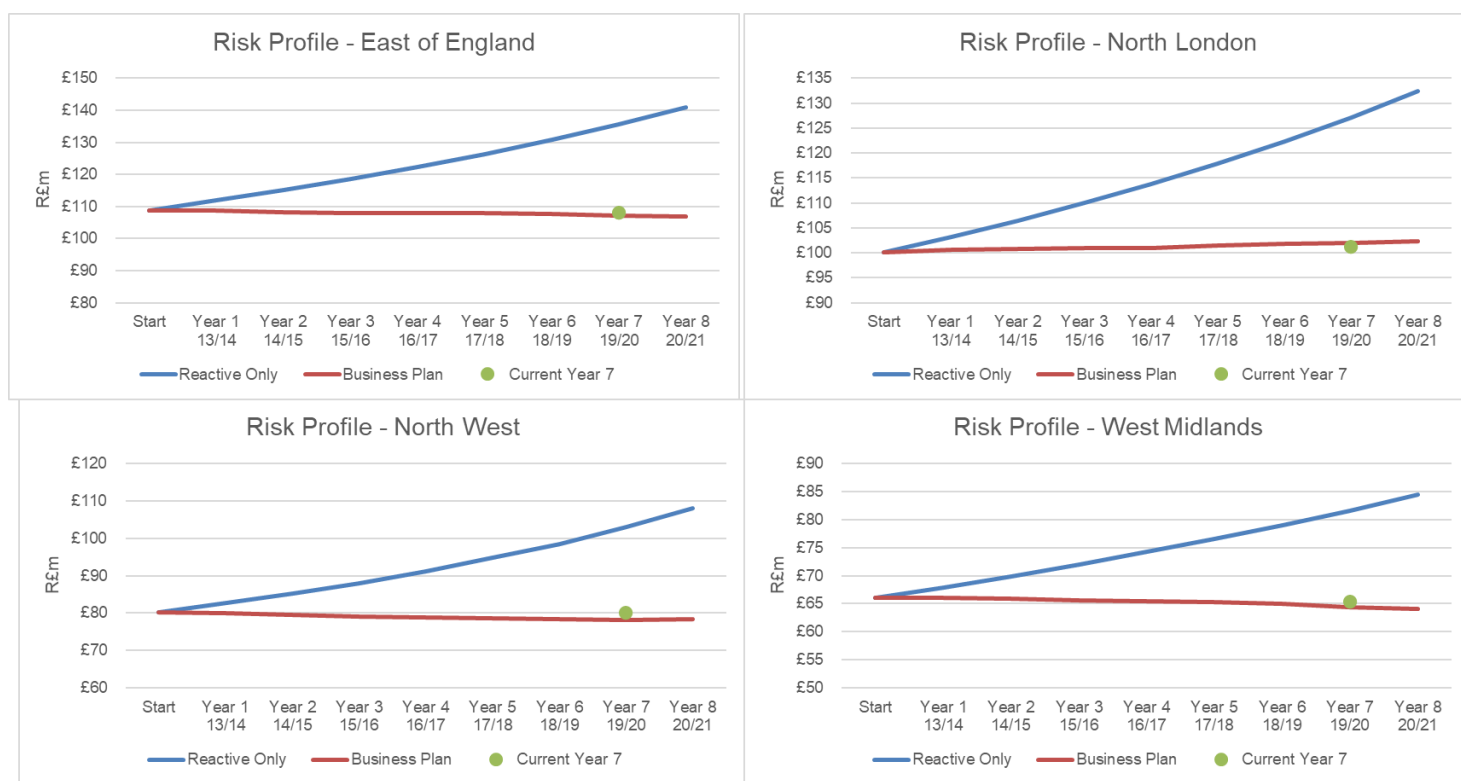
We have also developed investment plans to manage the capacity resilience of these sites through time. Our sites will remain under review as peak day demand is reviewed on an ongoing basis and the effects of Uniform Network Code Modification - gas transmission charging arrangements (678A) are assessed.

4.2.3 Network Output Measures (NOMs - Health, criticality & risk metrics)

The Network Output Measures are an indication of the overall health of our assets across a number of key performance measures and are related to achieving a target level of risk mitigation. On an annual basis we report progress on this risk mitigation both “**with**” and “**without**” interventions with the difference referred to as the *risk delta*. This is an eight-year output target and as such the final position will not be fully realised until the end of the price control period in 2020/21.

In 2019/20 we continued to increase our asset health programme of work and through our asset health investment in the final year of RIIO-GD1 we plan to achieve our combined monetised risk targets across each network. Whilst we anticipate an impact from the COVID-19 pandemic, we cannot yet quantify the magnitude of this impact. Only in year eight (when all investment has been delivered) will absolute progress against the RIIO-GD1 risk delta be measurable.

In last year’s RRP submission we submitted our ‘rebased’ business plan (BP) using the agreed monetised risk methodology to derive equivalent output targets. The charts below incorporate the changes we made last year and show our risk deterioration profile over the RIIO-GD1 period “**with**” and “**without**” intervention (red and blue lines respectively), our risk delta and the year seven risk position for each network.



4.2.4 Network reliability

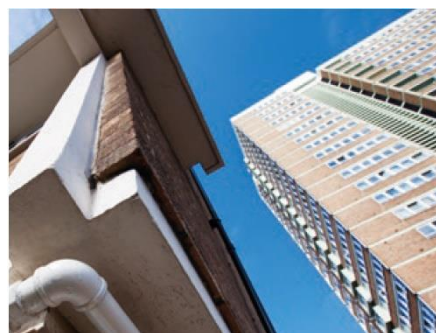
Our network performance is underpinned by a focus on the safety and wellbeing of customers, employees, contractors and members of the public and we are proud to provide **overall network reliability of 99.998%** which delivers a service that our customers can rely on and demonstrates our commitment to improve experiences for all our customers.

Minimising disruption for our customers.

Our customers expect gas to be there when they need it and expect us to respond quickly when it isn't. In 2019/20, we have focused on reducing the number of times customers gas supply is interrupted and increasing the speed at which we get their gas switched back on when there is a problem. This has been underpinned using innovative techniques such as live service transfers and the Microstop bypass system. These techniques have enabled us to keep gas flowing for our customers whilst the repair is carried out and we believe from discussions with others that we are now industry leading in how we are managing experiences for our customers in multi occupancy buildings (MOBs).



The Microstop technique has completely transformed the service we can provide to customers in multi occupancy buildings



This approach has helped us to reduce the duration of **planned interruptions** that occur during work associated with our mains replacement programme, from circa 7 hours to circa 5 hours. The volume of planned interruptions is similar to last year despite an increase in the amount of mains replacement work we have completed. This has resulted in a 4% reduction in the number of interruptions per km of mains replaced from last year and represents the fewest number of interruptions per km of mains replaced that we have recorded since the start of the price control period.

We have also seen a significant reduction in the number of **unplanned interruptions** in 2019/20 due to the increased focus we have placed on this work. The number of times multi-occupancy buildings have experienced an unplanned interruption has more than halved and the number of interruptions to other customer groups has reduced by 10% with most of these supplies being restored within 12 hours. North West network has developed new monitoring and information reporting tools to give greater visibility of daily status of work, which has facilitated more general improvement in capture and quality of interruptions data and the approach is being implemented across all networks.

We remain on track to deliver our number of interruptions targets in all four networks and duration targets in 3 out of 4 of our networks. We have already exceeded our eight-year RIIO-GD1 unplanned durations target in the London network due to our previous performance with MOBs. However, because of the actions we have taken and through the commitments we made with Ofgem we have seen a step change improvement in this regard. London's durations have reduced from an average median of 20.9 days per interruption in 2018/19 to 16 days at year end 2019/20 with their best performance to date being seen in the last quarter of 19/20 where they achieved an average median of 8 days. We have more work to do and will continue to drive performance in all networks to minimise disruption for all our customers.

Our interruptions performance

The following section contains more detail on our progress towards achieving the year eight RIIO-GD1 target for numbers and durations of planned and unplanned interruptions.

Planned interruptions - number and duration

The tables below show that the numbers and durations of interruptions of planned interruptions have fallen in East of England, North London and West Midlands networks this year compared to 2018/19, with the most significant reduction being seen in London. In general, the average duration of a planned interruption for Cadent has reduced from c.7hrs 22minutes in 2013/14 to 5hrs 33mins in 2019/20 and in the last year in London we have managed to reduce the times our customers are without gas by circa 20 minutes.

Average durations in our North West network are higher this year and a contributory factor to this has been from a small number of jobs where we encountered access issues.

Table to show **numbers** of planned interruptions across the price control period

No.s of interruptions	EOE	NL	NW	WM
2013/14	75537	59601	61300	44286
2014/15	74460	55737	48947	30781
2015/16	76135	58032	67426	61702
2016/17	66502	54996	55620	50812
2017/18	66895	51118	52967	43082
2018/19	79302	49989	50985	41622
2019/20	76760	41887	62099	40852
In year variance 19/20 to 18/19	-3%	-16%	22%	-2%
Variance from start of period to date	2%	-30%	1%	-8%
Revised Targets set in 2018 (cumulative 8 year total - number)	585,934	472,436	476,237	377,826
Cumulative Yr7 total	515,591	371,360	399,344	313,137
Year 8 forecast (numbers)	85,064	68,828	94,775	73,692

Table to show **durations** of planned interruptions across the price control period

Durations of interruptions (millions of minutes)	EOE	NL	NW	WM
2013/14	31	32	24	19
2014/15	28	22	19	14
2015/16	27	22	23	22
2016/17	23	22	17	19
2017/18	22	19	16	14
2018/19	23	19	14	16
2019/20	23	15	19	15
Average duration - start of period	6hrs 50mins	8hrs 57mins	6hrs 2mins	7hrs 9mins
Average duration – 2019/20	4 hrs 55mins	5hrs 51mins	5hrs 9mins	6hrs 18mins
Revised Targets set in 2018 (cumulative 8 year total – millions of minutes)	213	191	170	153
Cumulative Yr7 total (millions of minutes)	177	150	132	119
Year 8 forecast (millions minutes)	27	26	29	27

Unplanned interruptions - number and duration

To provide further clarity on our unplanned interruptions performance the following section has been broken down by MOBs and non-MOBs as follows:

1. **Total unplanned interruptions** (including Multi Occupancy Buildings (MOBs) but excluding major incidents) for the period from 2016/17 when new interruptions targets were introduced - including the percentage change to last year;
2. **Individual unplanned interruptions** including average durations;
 - a. Excluding MOBs and major incidents
 - b. MOBs only;
 - c. Major incidents

1. Total unplanned interruptions (including Multi Occupancy Buildings (MOBs) but excluding major incidents) for the period 2016/17 – 2019/20
(N.B performance related to 2013/14 and 2015/16 is outlined later in this section)

There has been renewed focus this year to drive down the numbers of unplanned interruptions and the length of time our customers are without gas in these situations and our plans are designed to facilitate achievement of the revised eight-year RIIO-GD1 loss of supply targets in all networks, with the exception of London durations, which are the subject of their own commitments.

The table below shows that the numbers of unplanned interruptions in 2019/20 has decreased in all networks since last year and durations have followed the same trajectory in 3 out of 4 of our networks. The increase in durations in London and the West Midlands can be specifically attributed to interruptions associated with MOBs and highlights the huge impact that interruptions in these types of buildings can have on the overall average duration and the importance of understanding the mix of assets and different customer types when looking at averages for a network or over time.

	Numbers				Durations (millions of minutes)			
	EOE	NL	NW	WM	EOE	NL	NW	WM
2016/17	11,174	10,498	10,348	6,388	10.2	63.4	9.3	4.7
2017/18	11,763	10,421	11,286	6,089	12.4	116.6	7.3	8.4
2018/19	11,947	10,716	10,126	6,138	10.5	119.1	11.3	5.2
2019/20	10,154	8,606	9,596	5,293	7.1	33.2	8.3	5.7
In year variance 19/20 to 18/19	-15%	-19.7%	-5.2%	-13.8%	-32.4%	-72.1%	-26.7%	11%
Revised Targets set in 2018 (cumulative 8 year total)	99,608	100,083	91,566	60,506	108	428	63	47
Cumulative total to year 7	86,658	81,246	78,105	49,453	78.6	497.3	62.8	46.2
Year 8 forecast	11,260	8,750	9,596	5,293	10	33	6	5

2a. Unplanned interruptions in other customer categories (excluding MOBs and major incidents)

With regards to unplanned interruptions in other customer categories (non-MOBs) we have seen a 10% reduction in the volume compared to 18/19 and as shown in the table below the average duration across all networks indicates that customer supplies are being restored within 12 hours across all networks.

Network	Total Number (Excl MOBs & major incidents)	Total Duration (million mins) (Excl. MOBs & major incidents)	Average Duration (Mins) (Excl. MOBs & major incidents)
EofE	10,022	4.7	472 mins (8hrs)
Lon	7,856	5.5	700 mins (12hrs)
NW	9,393	5.0	529 mins (9hrs)
WM	5,153	2.5	483 mins (8hrs)

North West network has developed new monitoring and information reporting tools to give greater visibility of daily status of work, which has facilitated more general improvement in capture and quality of interruptions data and the approach is being implemented across all networks.

b. Unplanned Interruptions (2019/20) – MOBs

This year we have made a step change in reducing the volume and durations of unplanned interruptions for customers in Multiple Occupancy Buildings (MOBs) and have seen c.50% reduction in volumes and 18% reduction in durations since last year with mean average durations across all networks at c.16 days.

Network	MOBs Unplanned interruptions 2019/20				MOBs Unplanned interruptions 2018/19			
	Total Number	Total Duration (million mins)	Mean Average Duration (Hrs)	Mean Average Duration (Days)	Total Number 2018/19	Total Duration (million mins)	Average Duration (Hrs)	Average Duration (Days)
EofE	132	2.4	299	12	195	4.8	409	17
Lon	750	27.7	617	26	1943	111.9	960	40
NW	203	3.3	275	11	288	5.2	353	15
WM	140	3.3	387	16	125	1.9	259	11

London durations remain behind the RIIO-GD1 target due to previous performance, but they have their own median performance target as part of their MOB improvement plan and through these actions their MOB interruptions reduced from an average median of 20.9 days per interruption in 2018/19 to 16 days at year end 2019/20. Their best performance to date was seen in the last quarter of 19/20 where they achieved an average median of 8 days.

c. Unplanned Interruptions (2019/20) – major incidents

During 2019/20 there were 2 major incidents of >250 customers, these are recorded separately to the unplanned interruptions described above. These incidents involved water entering our pipes in Matlock and Richmond in London following failure of adjacent water mains in these areas.

Network	Incident Name	Number of customers interrupted	Average duration of each interruption (minutes)	Total interruption duration (minutes)
EofE	Matlock	831	4,150	3,449,002
Lon	Richmond	2311	12,595	29,108,100

Energy exchange programme

To support our energy exchange programme we have multi-occupancy managers in place who are focused on communicating effectively with customers, building owners and local authorities to deliver a successful result for customers which can also include removal of gas from high rise buildings. Through this programme we financially support authorities and building owners who proactively contact us requesting that their gas supply be removed from their high rise building where the supply is cooking load only. In 2019/20 we completed 22 such exchanges exceeding the target of 12 that we had originally envisaged.

Prior year review

Over the course of the RIIO-GD1 period and as reporting requirements have developed we have been improving and refining our verification and assurance processes for unplanned interruptions. Since 2015/16 we have systemised many of these improvements applying clear business rules and logic so that we have a consistent approach to:

- System time stamp validation
- Removal of duplicate records
- Identifying sub divided (multiple) work order types/categories
- Identifying records without Suppliers

As we reported last year, and as this system validation was not in place for the first two years of RIIO-GD1, we have reviewed 2013/14 and 2014/15 using this same methodology. In addition, we have completed a line by line review of each record to validate;

- interruption durations longer than 24hours
- durations recorded as zero minute/very short interruptions
- clock stopping has been applied for the correct reasons (e.g. No access, empty properties, planning consent/3rd party delays)

The table below shows the reductions made to the volumes and durations for 2013/14, 2014/15, as well as the cumulative position, using the revised methodology. These adjustments have been made to years 1&2 in table 2.5 of our RRP submission as discussed with Ofgem at our bilateral on the 2nd July.

Network	13/14 adjustment (reduction)		14/15 adjustment (reduction)		Overall adjustment (reduction)	
	Volume	Duration	Volume	Duration	Volume	Duration
EofE	5,746	6.9	1,190	1.9	6,936	8.8
Lon	4,298	7.1	528	0.8	4,826	7.9
NW	2,732	4.5	114	1.0	2,846	5.5
WM	3,089	4.2	914	0.1	4,003	4.3

This translates in to the following revised cumulative year seven position that will be shown in RRP data table 2.5;

Network	Volume		Durations (millions of minutes)	
	Cumulative Yr 7 Total 2019/20	Cumulative 8 year Target	Cumulative Yr 7 Total 2019/20	Cumulative 8 year Target
EofE	79,722	99,608	69.8	108.0
Lon	76,420	100,083	489.4	428.0
NW	75,259	91,566	57.3	63.0
WM	45,450	60,506	41.8	47.0

Developments in interruptions reporting

As reported in last year's RRP and as we move towards RIIO-GD2 and new output commitments it will be increasingly important to establish clarity and consistency on definitions and systems and processes for reporting interruptions as this will help Ofgem carry out comparative reporting and benchmarking of performance. It has become increasingly apparent in recent years that different GDN systems, processes and interpretation of RIGs has led to inconsistencies in reporting that may flatter performance for some in comparison to others. In some respects this will be inevitable, but it is important that Ofgem understands this and takes account of such discrepancies in its benchmarking, analysis and reporting. We welcome the opportunity to input into the RIIO-GD2 RIGs working groups scheduled over the summer where this can be discussed more fully.

4.3 Connections

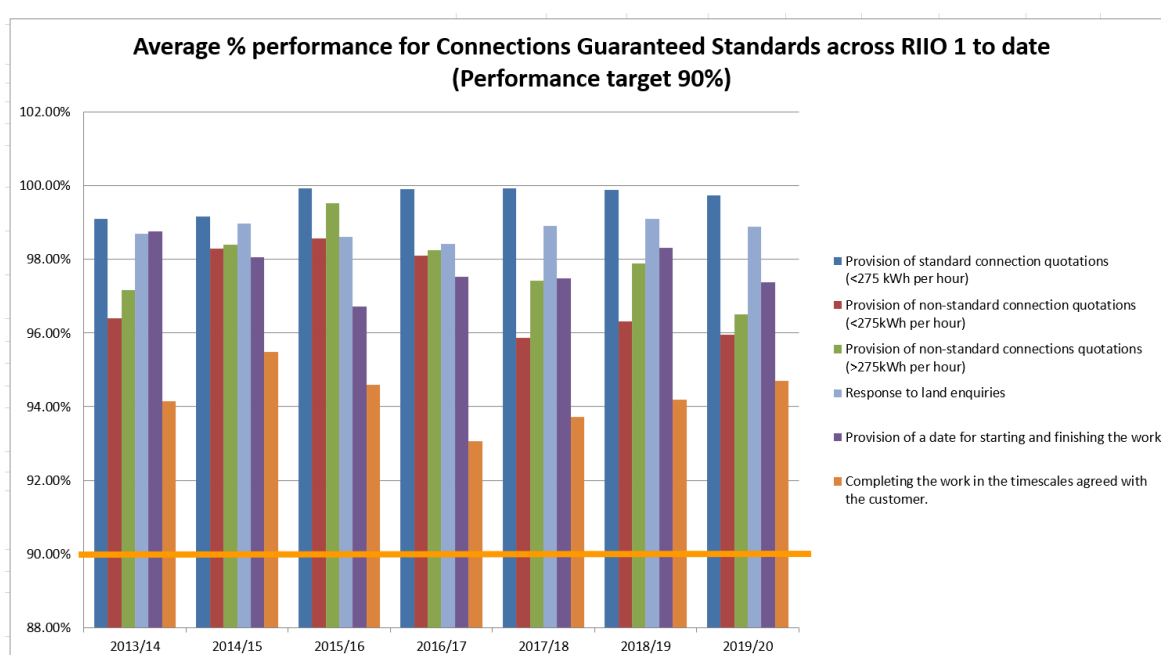
Guaranteed standards of performance

We provide a range of connections services and we continue to encourage competition to promote customer choice reducing costs and enhancing customer service. Over the course of the year we have developed a strategic initiative to transform our connections operations to ensure that we deliver excellence across all standards well into future years.

During 2019/20 in all networks we exceeded the 90% guaranteed standard set in our licence again for each connection performance standard and paid compensation as required to those individual customers who did not receive the required level of service.

The table below shows our performance in 2019/20 and the graph shows our average performance by year and highlights that we have met the connections performance standards each year since the start of the period, however we know that our customers expect more than ever before if we are to meet their needs and our plans are designed to ensure that we deliver what is expected not just the minimum required.

Activity	Performance 2019/20			
	EofE	NL	NW	WM
Providing quotations				
Provision of standard connection quotations - (<275 kWh per hour)	99.70%	99.70%	99.80%	99.80%
Provision of non-standard connection quotations - (<275kWh per hour)	97.00%	94.10%	97.90%	94.80%
Provision of non-standard connections quotations - (>275kWh per hour)	98.40%	96.80%	93.70%	97.10%
Supporting customers				
Response to land enquiries	98.80%	98.90%	98.90%	99.00%
Connections work				
Provision of a date for starting and finishing the work	97.50%	97.20%	98.50%	96.30%
Completing the work in the timescales agreed with the customer.	95.60%	95.10%	95.50%	92.60%



Introduce distributed gas entry standards connections

Bio-methane is a renewable gas made from biodegradable matter such as food waste, sewage or energy crops. It has a key role to play in a low carbon economy and this year we are pleased to report that we have connected another 3 new biomethane plants despite the continued uncertainty with the Renewable Heat Incentive. These plants are all located in the West Midlands network and brings our total number of total number of connections in the first seven years of RIIO-GD1 to 35 with a combined input of 27,653 standard cubic metres an hour (scmh) of biomethane (the equivalent of 2.52 TWh of energy) being delivered to the Cadent network per annum.

The cumulative profile of connections across the period is outlined below

RIIO-GD1 Plan	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Cumulative no. projects connected	1	10	22	29	29	32	35
Volume of green gas (TWh actual)	0.07	0.64	1.44	1.78	2.03	2.38	2.52

The preferred choice of feedstock has been food waste again this year and we see this increasing in future. There is strong support from the public and from local authorities for separate food waste collections across England, which has been supported with the target to implement weekly segregated domestic and commercial food waste collections from 2023 across England. In terms of connection requests this may manifest itself either;

- in existing AD plants expanding and requiring additional injection capacity; or
- new larger AD plants being constructed.

In either instance diversion of food waste to AD will be a valuable contribution to meeting the requirements of the energy transition to 2050 and we will continue to work proactively with the community to maximise biomethane connections and the volume of green gas into our network.

We continue to encourage increased biomethane injection into the network, demonstrated not only by new connections but also adaptability to offer connections with variable flow rates where plants may be in capacity restricted areas.

The table below shows the breakdown of the types of connections we have made since the start of the price control.

PRESSURE TIER	Previous Years	19/20	Total
Below 7 barg	21	2	23
Above 7 barg (Cadent lay)	1	0	1
Above 7 barg (Self lay)	10	1	11

We're striving to unlock capacity in our East of England network as this is where we have most challenges due to less dense population and less gas demand. Through an innovation funded project "Optinet", we are aiming to optimise network pressures through in-grid compression and smarter pressure control. The purpose of the Optinet project is to prove the concept of a network solution that can then be replicated in capacity restricted areas. We are in the early stages but if successful this approach will also be used to facilitate injection of unconventional sources of green gas into our network.

Biomethane will play a vital part in the transition to a sustainable future, endorsed by the government and fully supported by the Anaerobic Digestion (AD), industry. We will build on the experience that we have gained to date delivering the 35 biomethane plants and continue to work collaboratively with the AD community to drive further innovation to maximise the full potential of injecting green gas into our network.

Going forwards to support a step change in distributed green gas entering the gas system, it will be necessary reinforce the gas network to provide the capacity where it is required. To determine the appropriate treatment for such costs, Cadent have initiated a review of entry network pricing and access arrangements. We have committed to pursue this review in our RIIO-GD2 business plan submission, alongside establishing a new entry gas forum to improve transparency and standardisation, and to give customers and stakeholders a stronger voice and influence over the improvements required to the regulatory framework to support green gas.

4.4 Customer Service

We have been working hard to identify and understand the needs of all our customers and stakeholders and continue to set high standards and benchmarks to add value and improve their experiences. Our customer strategy remains focussed on embedding a network orientated operating model with local accountability for customer outcomes, supported by greater levels of data insights and use of technology to improve accessibility to the services we offer to customers.

The aggregate Cadent customer satisfaction (CSAT) score across all 3 core processes has improved since last year (from 8.58 to 8.67) and we remain confident that our strategy will deliver positive results in year eight for all processes. The recent changes in our operating model are designed to improve the services we provide across all networks.

However, we haven't seen consistent improvements in all networks and processes, although we have met the industry targets in 11 of 12 categories. We are pleased that the actions we took over the year have resulted in significant improvements in the annual targets for West Midlands planned work and London connections.

The following sections detail our performance levels in 2019/20 for the three service lines we measure customer satisfaction against, showing the level of improvement made over RIIO-GD1.

4.4.1 Measure: Emergency response and repair survey Planned interruptions survey Connections survey

Emergency Response and Repair

Within the Emergency Response and Repair process, all networks have continued to meet customers' expectations, with the combined aggregate score for all four networks increasing again since last year from 9.35 to 9.38. We have embedded a real-time feedback and recovery mechanism to help identify and rectify when we are failing to deliver a good customer service. This more real time feedback process has allowed us to proactively identify dissatisfaction and has also allowed us to reach different customer segments to help build greater understanding of our customers.

The table below summarises the CSAT scores over GD-1 period.

Emergency Resp. & Repair	Target score	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
EofE	8.81	9.18	9.29	9.38	9.41	9.44	9.45	9.49
Lon		8.84	8.87	9.03	9.06	9.05	9.12	9.08
North West		9.21	9.20	9.38	9.38	9.38	9.35	9.49
West Midlands		9.06	9.15	9.26	9.27	9.29	9.39	9.47

Planned works

We are pleased that the actions we took last year in West Midlands have improved the service to our customers and we are committed to maintaining and improving this performance to deliver positive customer outcomes.

We are disappointed that we have not met the required standard for London planned work where we have seen a decrease from 8.22 to 7.97 and we know that this needs to improve. Our commitment and focus to improve customer experience remains and we have

improvement plans and associated actions in place driven through the end-to-end process and accompanying supply chain. The specific focus areas to recover this include:

- completion of pre-construction assessments;
- improved on-site communications; and
- improvements from our service transformation programme.

The table below summarises the CSAT scores over RIIO-GD1 period.

Planned Works	Target score	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
EofE	8.09	8.17	8.03	8.07	8.24	8.46	8.62	8.47
Lon		7.90	7.91	7.96	7.82	8.25	8.22	7.97
NW		7.68	7.89	7.97	7.64	8.11	8.26	8.41
WM		7.96	7.86	7.73	7.80	7.75	7.75	8.11

Connections

As part of a strategic initiative across our connections work, we have prioritised our North London network to implement change due to historically lower customer satisfaction scores. Underpinning our customers experience are a few key principles:

- **Getting first customer touch point right:** this is about providing a quotation for customers efficiently during first contact, giving them clarity and certainty on next steps and expected timelines;
- **Site survey within three days:** the commitment we are working towards is that within three days of accepting a quotation, a site manager will visit the customer to discuss the details of their work; and
- **'Door step planning':** as part of the site survey from newly defined Site Manager role, dates will be offered for physical works completion allowing customer flexibility around when works are undertaken.

Whilst initial focus of this initiative has been in our North London network, the next phase of this will be to take the successful elements of the rollout to align our operational delivery and planning into the networks.

In this network, our overall customer satisfaction levels in connections has moved to the best performing network, the single biggest improvement in score that any Gas Distribution Network (GDN) has delivered within a twelve-month period.

The table below summarises the average CSAT scores over RIIO-GD1 period.

Connections	Target score	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
EofE	8.04	7.59	7.73	8.13	8.41	8.44	8.22	8.46
Lon		6.61	6.55	6.88	7.49	7.17	7.50	8.73
NW		8.03	8.30	8.67	8.44	8.69	8.69	8.34
WM		7.52	7.95	7.83	7.69	7.85	8.35	8.05

Minimum returns (Connections only)

We have a target for the minimum number of survey returns we need to representatively inform how our customers perceive the level of service we provide. We have been unable to meet the target for North London Connections despite surveying 100% of the available sample, supported by post-work completion calls to customers highlighting the importance of returning the surveys. We continue to work collaboratively with the other

GDNs in readiness for RIIO-GD2, collectively trialling alternative including electronic and telephone survey methods with a view to reducing the time between job completion and customer feedback and increasing engagement with a broader range of customer groups.

The table below shows the overall volumes for connection survey responses in 2019/20.

Connections	East of England	North London	North West	West Midlands
No. of responses	621	187	203	221
Min Return Target	200			

4.4.2 Complaints metric

We have continued to refine our processes to find the optimum balance between central oversight and expertise with local performance drive and accountability. There is still more that we need to do to drive consistency across our networks, but we have seen marked improvements because of the actions we have taken so far. As shown in the table below a much larger proportion of our complaints are now being resolved within D+1, this is a significant improvement when compared to the beginning of the price control period when we were only resolving circa 20% in D+1.

D+1 resolution performance

Network	2018/19	2019/20
EofE	76.58%	73.92%
Lon	73.10%	73.03%
NW	74.97%	78.65%
WM	66.76%	79.08%

The introduction of SMS real time feedback across the ER&R and Connections processes has helped us to proactively identify customer dissatisfaction and act promptly to resolve their issues. In addition, we have trialled the use of machine learning and sentiment analysis to help us understand our customers more by recognising their frustrations and ensuring we use this to improve the customer experience in future.

The table below shows how our complaint performance has improved across the RIIO-GD1 period to date. All networks continue to be well below the 11.57 RIIO-GD1 target.

Network	Target complaint metric	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
EofE	11.57	10.41	9.90	9.46	9.32	5.71	2.80	3.06
Lon		11.45	11.45	11.45	11.03	7.52	3.50	3.15
NW		10.30	10.08	10.08	9.39	7.79	3.20	2.35
WM		10.70	9.88	9.88	10.20	7.62	4.43	2.25

4.4.3 Stakeholder engagement

Our engagement strategy is structured against the important principle of being centrally defined and regionally delivered, empowering our local delivery teams to engage with their stakeholders in tailored and valuable ways. It is fully aligned with other key strategies which each support our vision of *'setting standards all our customers love and others aspire to.'* This approach is essential to us providing better outcomes and is supported by robust governance and leadership.

Following the positive feedback received from the panel and the increased score for our 2018/19 Stakeholder Engagement Incentive (SEI) submission, we have continued to build on our strengths, embedding engagement into our day-to-day operations. During 2019/20 we experienced another year of transformation, underpinned by unprecedented levels of engagement across our organisation, which have been comprehensively documented in this year's SEI submission. Our excellent score of 6.93, which saw us just shy of second place in the leader board, demonstrates our engagement strategy is maturing and directly supports colleagues to deliver continuously improving standards for our customers and communities.

Delivering a service our customers love

We have gone even further to engage with, and listen to, hard-to-reach groups and customers in vulnerable situations, through working closely with partners who have greater access to these groups, and commissioning bespoke research to better understand the impact of compounded vulnerability on our customers

As well as using traditional methods of engagement, such as surveys, focus groups and interviews, we took our engagement on tour across our networks via our **#Cadentvoices** bus campaign. Colleagues from across the business were involved and circa. 300,000 people had the opportunity to engage with us directly in five city centre locations, enabling us to access a wide range of customers.

These insights have helped increase our understanding and have enabled us to take a leading role in supporting customers and stakeholders during the current price control period and beyond.

Our aim is to provide **services for all** and we have developed strategic partnerships which enable us to support those who are most in need. Through these relationships, we have been able to identify opportunities to tailor our services to customer needs, as well as effectively distribute our gas safety information, locking cooker valves, CO alarms, heated seat covers and increase sign-ups to our Priority Services Register (PSR) by 6%.

We are continuing to work with electricity networks and water companies to develop a **universal PSR** with needs codes that drive smarter actions and have updated our systems and processes to reflect this collaborative and improved approach.

Committed to creating a better future

In the last 12 months we have continued to be at the forefront of engaging with a wide range of stakeholders to address the urgent challenges of **climate change**. We have developed practical pathways for clean gases and are meeting regularly with national and local government, regulators and businesses, to ensure we strike the appropriate balance between delivering the critical long-term needs of future customers with affordability for existing customers.

Our External Affairs Managers and Network Directors have been working closely with the relevant Combined Authorities to inform the development of energy and **net zero transition strategies**, including seconding Cadent colleagues into their organisations.

To increase engagement with future generations, we were a principal sponsor at the British Science Festival, Europe's longest-established science festival. This allowed us to raise awareness of the steps we are taking to tackle climate change with a new audience of 16-19 year olds interested in energy and engineering.

Continuous review and improvement

We have reviewed our enhanced **engagement strategy** with a series of stakeholders and customers, including the Customer Engagement Group (CEG), to ensure it is in line with our stakeholders’ expectations and the insights are delivering better outcomes that benefit our customers and our business. We have identified good practice in the Accountability Stakeholder Engagement AA1000 Standard, which we have built into our toolkit and are using in our daily activities.

External recognition

Our robust approach to stakeholder engagement was also recognised in the feedback received from auditors in two ISO accreditations year.

- ISO 14001: Our approach to stakeholder engagement was recognised as a key strength during our ISO 14001 audit.
- ISO 55001: The auditors highlighted the embeddedness of our strategy, with a particular focus on our commitment to ensuring stakeholders are kept informed and we respond to their feedback in timely and appropriate ways.

<p>“Cadent continue to be a valued partner and a key stakeholder within the West Midlands. Their expertise, combined with their collaborative approach to working, is helping us to shape our plans to make the West Midlands carbon neutral.” <i>Andy Street CBE, West Midlands Metro Mayor</i></p>	<p>It is fantastic that Cadent is embracing an all-inclusive approach to work and it is hoped this will act as a catalyst for others to follow.” <i>Michael Barratt MBE, Development Impact Assessment Manager, Network Management, Transport for London</i></p>	<p>“Cadent has genuinely broken boundaries with their strategy for keeping their customers safe, warm and independent in their own homes.” <i>David Turner-Bennett EngTech AIGEM, Innovation Engineer, EIC Ltd</i></p>
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4.5 Social outputs

4.5.1 Fuel Poor connections

We continue to play a key role in helping people to access affordable energy. In 2019/20 we have delivered a total of 2,252 fuel poor connections across our networks. 1,281 of these were carried out as part of community schemes, 971 were one-off connections in fuel poor areas and we have made 30,383 connections since the start of the RIIO-GD1 period (94% compared to our cumulative year 7 forecast last year). Ofgem's change to the qualifying criteria for fuel poor customers in 2018 has created a shortfall in eligible customers and this is particularly challenging for networks in England (as customers in Scotland and Wales eligibility still is able to be linked with other devolved Government schemes). We have therefore had to change our operating model and seek novel ways of determining eligibility and finding fuel poor qualifying customers to address the shortfall and strive to continue to meet the original RIIO-GD1 target.

A significant challenge was in London and we rolled out additional approaches including an increased focus on park homes where relatively large schemes could qualify. These initiatives proved successful and we have recovered the deficit in London. We have rolled these out across all our Networks, as well as several other initiatives, and East of England is now also on target with West Midlands and North West progressing well.

Additional strategies to close the gap have included:

- working with stakeholders to identify community schemes;
- developing an action plan consisting of a diverse set of initiatives including utilising the warm home fund; and
- signing over 230 contracts with Local Authorities, councils and Registered Social Landlords (RSLs).

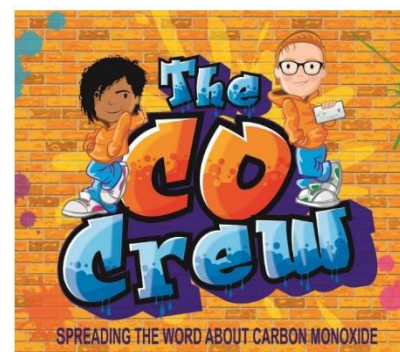
At the end of 2019/20 we had a high level of confidence that the recovery plan would identify sufficient additional schemes to bridge the gap. However, this has come under significant risk due to the COVID-19 pandemic which has impacted our ability both to complete planned connections and engage to identify additional connections for a number of months.

4.5.2 Carbon Monoxide awareness

Collaboration and strategic partnerships have been a fundamental part of delivering our engagement strategy, and we have taken a leading role in sharing smart practice across the industry including part-funding the All-Party Parliamentary Carbon Monoxide (CO) Group, where we share best practice and continue to lobby for change to legislation relating to mandating CO alarms in all private and public rental properties.



Through our Safety Seymour programme, we have educated over 17,000 school children on the dangers of Carbon Monoxide (CO). The launch of CO crew in March 2020 allows us to educate older children on CO through videos and interactive learning modules.





We have partnered with Hazard Alley, a children's safety centre in Milton Keynes to help deliver Safety Seymour sessions and have worked collaboratively on ensuring CO messaging is delivered as part of their home safety session at the safety centre. We are also working with Queen Alexandra college in Birmingham and tailor making a Safety Seymour session targeting young adults with learning difficulties to raise awareness of CO, especially those going into independent living.

In addition to these initiatives we have distributed over 19,000 CO alarms and led joint GDN billboard campaigns on CO awareness and the Priority Service Register to ensure our customers are well informed and remain safe in their homes.

4.6 Environmental

4.6.1 Shrinkage (Leakage) % reduction

Shrinkage is gas that leaves our network without passing through a meter. While not physically measured, it is modelled and estimated using an Ofgem approved methodology. Shrinkage includes gas that leaks or is vented from our system (leakage), gas that is used for our operational purposes, for example, preheating gas prior to pressure reduction (own use gas) and gas that is stolen upstream of the meter (theft of gas).

Leakage is the largest contributing factor of greenhouse gas emissions from operating the gas transportation network. The costs of buying the gas to replace that lost also contributes to customers' bills and so our continued drive to decrease the environmental impact of shrinkage also delivers customer savings.

In 2019/20 our shrinkage volume across all networks reduced by 41GWh (3.4%) through our mains replacement programme and system pressure management and deployment of gas conditioning. This reduction equates to the gas usage of approximately 3,300 domestic houses (assuming typical annual consumption is 12,500 kWh). Since the start of the RIIO GD-1 period we have reduced shrinkage volumes overall by 339.0GWh (22.4%) which is equivalent to the gas consumption of over 27,000 homes and demonstrates that the actions we have taken across the control period are having a positive impact.

2019/20 shrinkage performance by network

2019/20 PERFORMANCE	EAST OF ENGLAND	LONDON	NORTH WEST	WEST MIDLANDS	CADENT
2018/19 SHRINKAGE OUTTURN (GWH)	421.8	214.5	306.9	271.1	1,214.3
LP / MP MAINS REPLACEMENT	(9.0)	(6.3)	(8.1)	(5.7)	(29.1)
SERVICE RELAYS	(5.4)	(1.9)	(4.0)	(2.5)	(13.8)
AVERAGE SYSTEM PRESSURE	2.4	1.8	0.7	(0.4)	4.5
MONOETHYLENE GLYCOL SATURATION	0.8	(2.3)	(1.0)	(3.5)	(6.0)
INTERFERENCE DAMAGES	(0.2)	(0.1)	0.1	(0.1)	(0.3)
OWN USE GAS	0.4	0.2	0.1	0.2	1.0
THEFT OF GAS	0.7	0.4	0.2	0.4	1.7
AGI ASSET NUMBERS	0.3	0.3	0.4	(0.4)	0.7
2019/20 SHRINKAGE OUTTURN (GWH)	411.8	206.6	295.4	259.0	1,172.8
YEAR ON YEAR REDUCTION (GWH)	(10.0)	(7.9)	(11.4)	(12.1)	(41.4)
% REDUCTION	(2.4%)	(3.7%)	(3.7%)	(4.5%)	(3.4%)
NETWORK PERFORMANCE RANKING	4	3	2	1	

Cumulative performance by network up to year seven

CUMULATIVE SHRINKAGE VOLUME REDUCTION	EAST OF ENGLAND	LONDON	NORTH WEST	WEST MIDLANDS	CADENT
OPENING SHRINKAGE VOLUME (GWH)	517.4	272.3	394.1	328.0	1,511.8
2019/20 SHRINKAGE OUTTURN (GWH)	411.8	206.6	295.4	259.0	1,172.8
CUMULATIVE REDUCTION	(105.5)	(65.7)	(98.7)	(69.0)	(339.0)
% DIFFERENCE	(20.4%)	(24.1%)	(25.0%)	(21.0%)	(22.4%)

Average system pressures (ASP) and Monoethylene Glycol (MEG) Saturation

We continue to make incremental improvements to our operating processes, for example, we are reviewing our pressure management strategy with particular focus this year on optimising benefits between customers who require appropriate gas pressure to operate their appliances and our environmental emissions. We are also focusing on leakage reduction through maximising the effectiveness of our mono-ethylene-glycol (MEG) fogging equipment and the investigation of new technologies.

We experienced higher average system pressure (ASP) in 2019/20 when compared with 2018/19 and this contributed a 4.5 GWh increase in shrinkage. Gas demand can influence operating pressures and impacts our automated control systems which raise pressures to achieve required flow rates. Gas demand was 6% higher in 2019/20 compared with 2018/19. Whilst the impact that COVID-19 will have on system pressures remains unclear, it could have the potential to shift customer demand patterns considerably which could make system pressure management more complex. We may require novel operating strategies to cope with this change. We will continue to monitor pressures closely during 2020/21 and understand the impact of COVID-19 on ASP in greater detail.

Within each of our networks we still have a significant amount of low pressure iron mains that have lead and yarn joints. These joints are treated using MEG which reduces the rate at which gas leaks from them (the spread of MEG in the pipes is referred to as the “zone of influence”). A proportion of lead yarn jointed pipe is replaced annually with polyethylene pipe as part of our Mains Replacement programme. We are committed to the ongoing treatment of lead and yarn joints as this positively impacts gas leakage and contributes to keeping our customers safe.

In 2019/20:

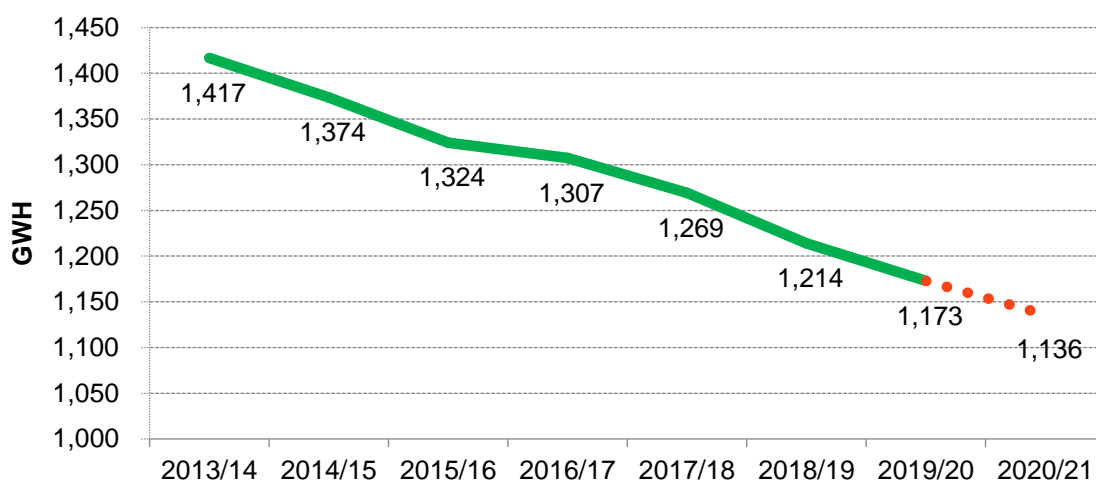
- overall MEG saturation increased from 34% to 36%
- MEG treatment contributed a 6.0GWh reduction in shrinkage from last year
- MEG zone of influence has increased by 10%

We believe that we are leading the industry in our performance in this regard and will continue to review the capability of our MEG related equipment to maximise output and drive saturation improvements.

Forecast

Our 2020/21 forecast does not include any impacts associated with the disruption caused by the COVID-19 pandemic. Without the impacts of COVID-19 we would have anticipated further reductions in Shrinkage volumes in 2020/21. As shown in the graph and table below our forecast for the total RIIO-GD1 period shows that annual shrinkage would be reduced by more than 24%. We will remain focused on driving improvements and performance in this area whilst managing COVID-19 related impacts in an efficient way; and will continue to strive to meet this forecast.

Forecast Shrinkage Volume Reduction



RIIO GD-1 SHRINKAGE VOLUME FORECAST

NETWORK	OPENING	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	8 YEAR TOTAL
EAST OF ENGLAND	517	478	465	449	450	440	422	412	397	(23.2%)
LONDON	272	257	250	244	239	228	215	207	200	(26.5%)
NORTH WEST	394	370	356	341	331	322	307	295	287	(27.2%)
WEST MIDLANDS	328	313	303	290	287	280	271	259	253	(22.8%)
TOTAL	1,512	1,417	1,374	1,324	1,307	1,269	1,214	1,173	1,136	(24.9%)
SHRINKAGE BASELINES (FP)		1,540	1,498	1,460	1,422	1,386	1,348	1,313	1,277	
% DIFFERENCE		(8.0%)	(8.3%)	(9.3%)	(8.1%)	(8.4%)	(9.9%)	(10.7%)	(11.0%)	

4.6.2 Business Carbon Footprint (BCF)

Whilst the majority of our greenhouse gas emissions are from shrinkage, other significant sources are energy consumption in offices and other business premises, along with fleet vehicles, primarily vans and company cars. In our larger office buildings, we have systems that help us control and monitor the efficient use of electricity and water.

In 2019, we completed the Phase 2 Energy Saving Opportunity Scheme assessment, further understanding our energy use in buildings and transport to help identify further cost-effective energy saving measures. This has helped us to identify short, medium- and long-term action plans to reduce energy consumption across our depots, operational sites and fuel use in fleet transportation. We have been working to ensure that we procure efficient vehicles for our fleet and we have placed a cap on company car emissions and offered 'green' incentives to company car users.

For 2019/20 our **Scope 1** emissions (excluding Shrinkage) decreased by 0.6% compared to 2018/19, driven by a reduction in Commercial fleet emissions. The emissions for business mileage (company cars) were 9% higher, and we continue to focus on reducing business mileage and increasing the uptake of low/ no emission company cars. Direct (Cadent-owned) commercial vehicles emissions are 2% lower than for the previous year. This reflects higher activity across our networks and increasing numbers of Euro VI (or better) compliant vehicles. The Scope 1 emissions target is to reduce emissions in scope by 5% by the end of the RIIO-GD1 period and our level of 19,012 tCO₂e this year shows that we are already 5% lower than the year eight target of 20,873 tCO₂e

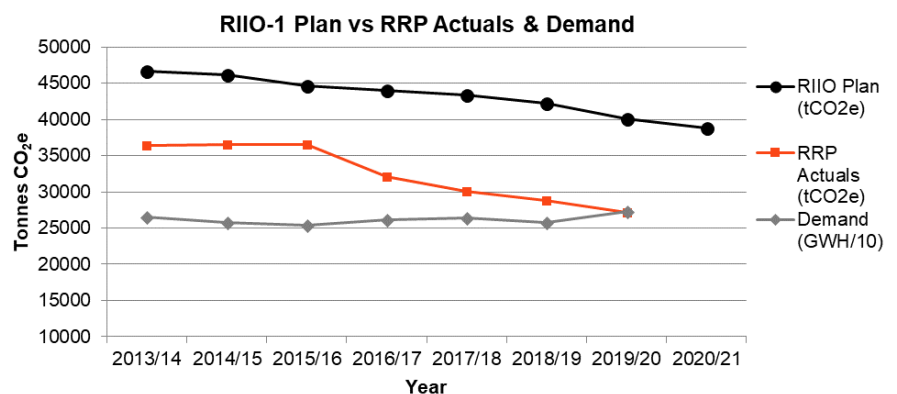
Scope 2 emissions are those related to electricity consumption across operational and non-operational sites and this has decreased in 2019/20 by over 27%. Most of this, however is accounted for by a reduction in the published DEFRA conversion factor. We procure a high proportion of renewable electricity through our energy provider. This year we reported 7,381 tCO₂e, for scope 2 emissions which is 59% lower than our end of RIIO-GD1 target of 17,996 tCO₂e.

The table below shows our performance against the Scope 1&2 targets (in tCO₂e) across the RIIO-GD1 period.

			13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	Target %
Plan	Scope 1	Company Cars	3,120	3,073	3,027	2,982	2,937	2,893	2,580	2,807	
		Commercial Vehicles	18,711	18,617	18,524	18,432	18,340	18,248	18,517	18,066	
		Sub-Totals	21,831	21,690	21,551	21,414	21,277	21,141	21,097	20,873	-4%
	Scope 2	Operational	7,429	7,429	7,092	6,924	6,755	6,419	5,745	5,408	
		Non Operational	17,349	17,002	15,983	15,643	15,304	14,625	13,267	12,588	
		Sub-Totals	24,778	24,431	23,075	22,567	22,059	21,044	19,012	17,996	-27%
	Planned Totals	46,609	46,121	44,626	43,981	43,336	42,185	40,109	38,869		
			13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	
Actuals	Scope 1	Company Cars	2,570	2,674	2,674	2,483	1,945	1,918	2,087		
		Commercial Vehicles	16,107	16,479	16,479	17,148	16,116	18,159	17,754		
		Sub-Totals	18,676	19,153	19,153	19,631	18,061	20,077	19,841	0	
		Variance against 2020/21 Target	-11%	-8%	-8%	-6%	-13%	-4%	-5%		
	Scope 2	Operational	7,955	9,022	9,022	7,250	12,002	8,668	7,319		
		Non Operational	9,726	8,383	8,383	5,234	0	0	0		
	Sub-Totals	17,681	17,405	17,405	12,484	12,002	8,668	7,319	0		
	Variance against 2020/21 Target	-2%	-3%	-3%	-31%	-33%	-52%	-59%			
	Actual Totals	36,357	36,558	36,558	32,115	30,063	28,745	27,160	0		
	Actuals vs 2020/21 Target	-6%	-6%	-6%	-17%	-23%	-26%	-30%			

Our **Scope 3 emissions** increased by 26% compared to 2018/19. This was due to an increase in tCO₂e emissions associated with polyethylene (PE) pipe procurement through this reporting year and reflects the higher rate of mains laying and replacement that has taken place in 2019/20. Emissions associated with travel (including air, rail, and car hire) decreased by 82% compared to 2018/19. The main contribution to this was due to air travel decreasing by 85%, reflecting our business focus on reducing business mileage and increased use in alternative virtual meeting options.

As shown in the graph, collectively we are continuing to make real progress in **reducing our BCF** as measured in tCO₂e against continuing demand on our networks and we are ahead of our year eight business carbon footprint for Scope 1 and 2. Innovation



5. Innovation

Our innovation strategy is driven by our company purpose to “Keep the energy flowing” and our vision to “set standards that all our customers love and others aspire to”. Our approach has been to foster a culture of innovation and learning to improve the service we offer to all our customers delivering benefits through reduced disruption, lower operational costs and innovations to support the energy systems transition to Net Zero.

2019/20 is the seventh year of Network Innovation Allowance (NIA) funding under RIIO. Over the seven years we have invested over £46 million across 193 NIA projects. This year we have spent £6.1 million on an additional 21 projects.

We are committed to playing our part in the delivery of whole system decarbonisation and the achievement of net-zero aims. It is now widely accepted that the only way the UK can reach the 2050 targets is by including hydrogen in its future energy choices. Our research shows that an intelligent, co-ordinated repurposing of our gas network – which serves homes, industry and transport - can deliver low carbon benefits much more cost-effectively than many other options.

5.1 Our contribution to Net Zero

Across the country, local authorities, large energy users, home and businesses are considering what this means for them in outlining their own transition plans. And we are doing the same in two main ways. How we operate a low carbon business in the way we serve our customers but also how we lead the decarbonisation of the UK energy system by supporting the use of low and zero carbon gases such as Biogas and hydrogen.

We strongly believe that in the future there will be a more diverse energy system which will both provide customer choice and drive the pace of emissions reductions. We see a continued need for a gas distribution system to provide future green gases for industrial use, power generation, balancing of energy supply, heavy transport, and heating for homes and buildings (particularly to meet peak demands).

In the last twelve months we have continued to be at the forefront of developing practical pathways for clean gasses such as biomethane, BioSNG and hydrogen through landmark innovation projects and in the following section we provide an update on the progress we have made so far in this important area.

HyDeploy

On **Wednesday October 30th 2019** at 1:15 pm, Keele University became the first gas network in the UK to transport hydrogen since the conversion from town gas was completed in 1977.

This small physical step of blending was only at 2 vol% and supplied hydrogen to

- **100 homes and**
- **30 university buildings,**

HyDeploy has been all about making those first steps on the road to Net Zero using hydrogen. The project aims to prove that up to 20% hydrogen can be safely blended with natural gas to reduce domestic heat CO2 emissions by 6 million tonnes – that’s the equivalent of taking 2.5m cars off the road. Often these first small steps are the hardest, but nonetheless an initial pathway has been cleared. Keele has represented a

firststep in demonstrating blending at scale and a giant conceptual leap in the decarbonisation of natural gas.



HyNet

HyNet is an integrated hydrogen / CCUS (Carbon capture utilisation and storage) project in the North West which will decarbonise heavy industry in the Cheshire, Liverpool and Manchester regions and provide hydrogen to decarbonise domestic heat, heavy transport and flexible power generation. As the project has moved from feasibility into engineering design, several industrial consortia have been formed to progress the different elements of the HyNet project chain which has seen investment to date of £18.7m from the private sector and £14.5m from Government.

Initial CO2 capture will serve several major industrial emitters in the region and will be followed by the supply of low carbon hydrogen via a new dedicated hydrogen pipeline to industry, transport, power and into the existing gas network as a blend by 2026.

Creating the first hydrogen economy will bring inward investment both into the North West and the UK and provide a platform to provide clean gas to a diverse set of consumers.

HyNet: Delivering a blueprint for the UK hydrogen economy



HyNet Motion

Optimising Network Delivery of Hydrogen for Vehicle Transport

HyMotion has considered how networks can be used to support hydrogen fuelled transport in the North West as part of the wider HyNet vision. The project is progressing well and a HyMotion report was launched in June 2019 to coincide with a major hydrogen-related regional event in the North West. This provided information on the state of readiness of hydrogen fuel cell vehicles and a roadmap of actions required locally and nationally to deploy hydrogen for transport. With an increasingly low carbon, futureproofed gas network, we fully believe that we can help to supply heavy duty transport fleet requirements, and to fuel the flexible electricity generation needed to support electric vehicle charging infrastructure.

In support of this all the HGVs in our own operational fleet are powered by renewable biomethane. By using this fuel, we expect to avoid more than 5,000 tonnes of greenhouse gas emissions each year. We've also added electric vans and cars to our fleet in London with plans to make every one of the 1,100 vans used by our emergency engineers zero emission by 2026.



Hydrogen Grid to Vehicle (HG2V)

Network purity for Transport

HG2V is a project that looks specifically at the contamination issues that may be faced from repurposing the gas network to distribute hydrogen for use in fuel cell powered vehicles through hydrogen refuelling stations. The project is progressing well and, through laboratory experiments and "real life" testing in our HyDeploy project, we now have much greater understanding about gas quality achieved several milestones in helping us understand more about the general gas quality in a hydrogen fuelled network.

Future phases of the project will be assessing the economic impact of deploying purification technology, as well as the development of a test-rig that will

- simulate and test hydrogen contamination in the gas network; and
- facilitate validation and development of purification and separation technology under a variety of representative network conditions.

Test Rig construction



Supporting a gas refuelling infrastructure

We are supporting the connection of more and more CNG refuelling stations to the gas grid, so fleet operators can benefit from the carbon reductions of using gas to power heavy transport. This year we have also been a partner in the development of a refuelling station at Warrington which is Europe's largest refuelling station for low carbon biomethane in trucks. More widely we are working with CNG station developers to deliver their ambitious program of refuelling stations.



5.2 Our innovation progress on other projects in 2019/20



Our RIIO-GD1 strategy has already seen us achieve significant progress in collaborating with our innovation supply chain to utilise new ideas, through a concentration on research and development investment. We have worked with other network operators within and outside our sector (e.g. the creation of the Energy Innovation Centre) and leveraged the skills and ideas of our employees to drive continuous improvements in the service we offer to customers. We recognise that there is more to be done as we build towards RIIO-GD2. We've learned some key lessons which we are building into our refreshed innovation strategy as part of our wider business plan. With the support of Ofgem's NIA, NIC and our other partners, we will continue to innovate so that we can create real value for customers across the UK.

In addition to the use of innovation that we have described in earlier sections of our report the following is an update on some of the projects we either started last year or are new this year to reduce costs and improve the service we provide to customers.

Update on projects from 2018/19

- For **automated pipeline BIM modelling and cost estimating tool**, we have now completed user acceptance testing for this project and will be rolling out the web-based tool to our Capital Delivery teams. The tool will be used in the initial design phase of new pipelines and pipeline diversions. This will result reduce the costs involved to produce the initial design report, improve the quality of the cost estimate as well as increasing our response time to customers.
- A commercial agreement is now in place for our **Bonded Saddle project**, the technique has been rolled out in all 4 of our networks, with an estimated £3k saving per installation.
- Field trials were carried out relating to **above ground crossing inspection mapping**, initial feedback was positive, but our evaluation highlighted that final safety sign off still required a physical site visit. In our view this would result in additional cost and time and hence we saw limited benefit to the consumer, therefore the project is currently not being pursued.
- We successfully completed the final test phase for our **composite repairs for complex geometries project** and are initiating the implementation phase where we will start to realise the successes of the project. This phase will provide sufficient evidence to facilitate incorporate of this technology into business as usual activity in the coming year.

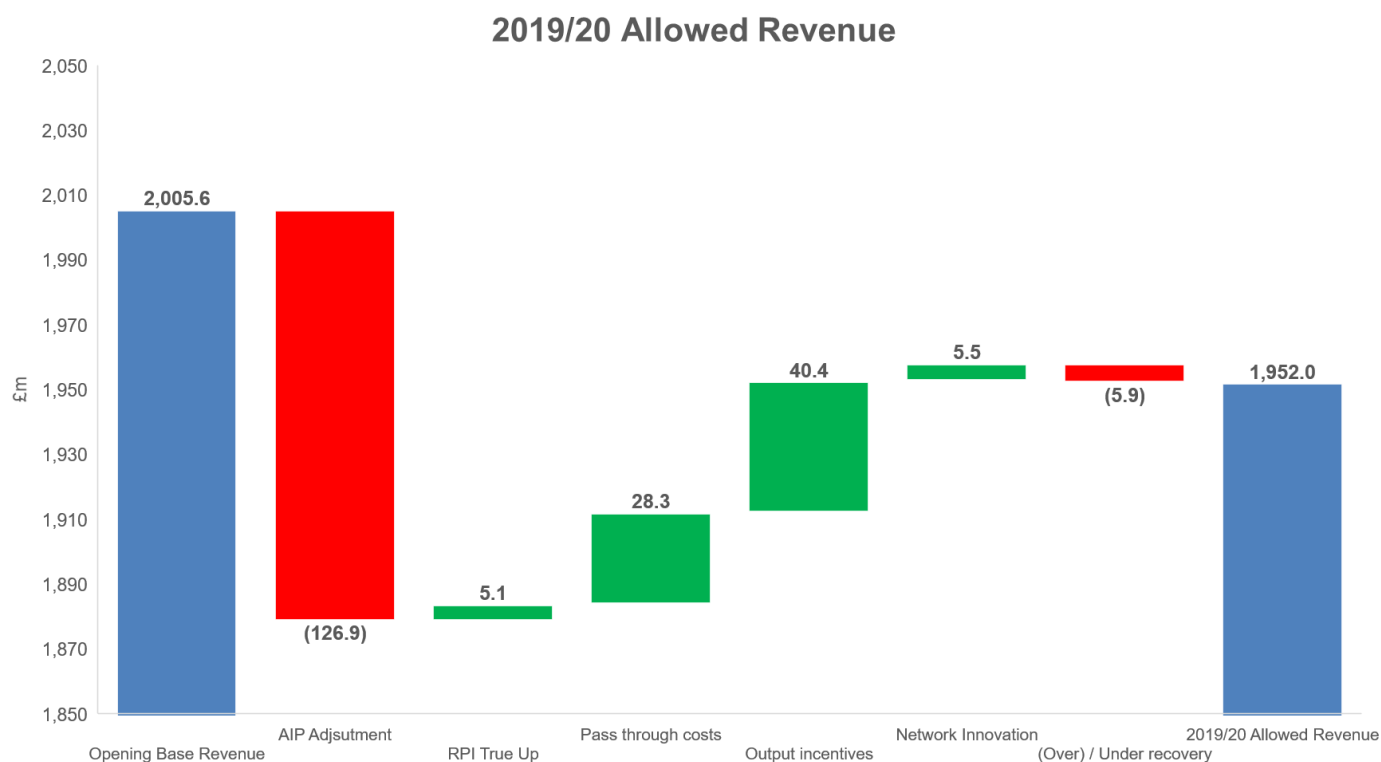
New projects for 2019/20

<p>Making life easier for our customers</p> <p>Easy Assist ECV We have identified a large population of our customers to be on the Priority Services Register (PSR) who would find it difficult to turn off their gas supply in the event of an emergency due to poor mobility or hand movement.</p> <p>The objective of this project is to develop a simpler mode of operation to switch off the ECV when required and the development of appropriate software to aid field force staff locating the ECV.</p> <p>Benefits include:</p> <ul style="list-style-type: none"> • Improved safety – increased ease of operation for the customer • Improved clarity on whether the gas is off or on • Reduction in uncontrolled gas escapes <p>Latest update: <i>Research phase and the initial design concept completed, First stage of Alpha prototypes created and tested.</i></p>	
<p>Creating a safer network</p> <p>Mechanical Purge End: The Mechanical Purge End equipment is designed to be fitted onto the end of a section of polyethylene pipe to facilitate easier use during testing and purging of the pipe prior to installation.</p> <p>Benefits</p> <ul style="list-style-type: none"> • Reduced wastage through re-use of equipment • Reduction in time to install <p>Latest update: <i>Project successfully closed in March 2020 and all fittings are now suitable to be used on Low Pressure mains. Implementation of the fittings expected in the Autumn of 2020.</i></p> <p>Duraseal Repair Where existing methods approved for the repair of leaking mains and services on the Low and Medium Pressure Gas Distribution Network are applied there are several instances where the initial repair technique is unsuccessful.</p> <p>Benefits</p> <ul style="list-style-type: none"> ✓ Increase life cycle of the asset ✓ Reduce disturbance by completing the repair on first visit <p>Latest update: <i>Phase 1 of the project, covering Failure Modes and Effects Analysis (FMEA) has been successfully completed. Phase 2 is in progress with component level testing of the repair system.</i></p>	

6. Financial Performance

6.1.1 Transportation Revenue - Allowed Revenue

Final 2019/20 Allowed Revenue for Cadent's networks was £1,952.0m. A high level summary is shown in the chart and table below:



Allowed Revenue Summary (2019/20 Prices)	East of England	London	North West	West Midlands	Cadent
Opening base revenue	672.6	472.2	490.9	369.8	2,005.6
Annual Iteration Adjustment	(29.2)	(36.1)	(34.6)	(26.9)	(126.9)
RPI True Up	1.7	1.2	1.2	0.9	5.1
2019/20 Base Revenue	645.2	437.3	457.5	343.8	1,883.8
Pass through costs	(12.1)	20.2	11.7	8.6	28.3
Exit Capacity incentive	9.9	4.6	5.8	2.3	22.6
Shrinkage incentive	0.4	0.4	0.3	0.3	1.4
Environmental Emissions incentive	2.1	2.2	1.5	1.6	7.4
Broad Measure of Customer Satisfaction	4.2	1.1	2.4	0.7	8.5
Discretionary Reward Scheme	0.2	0.1	0.1	0.1	0.6
Network Innovation Allowance	2.0	1.1	1.3	1.0	5.5
(Over) / Under Recovery brought forwards	(1.8)	(1.3)	(0.6)	(2.1)	(5.9)
2019/20 Allowed Revenue	650.1	465.7	480.1	356.2	1,952.0

6.1.2 Annual Iteration Adjustment

The reduction to Base Revenue arising from the November 2018 Annual Iteration Process was £126.9m in 2019/20 prices.

Annual Iteration Adjustment (2019/20 Prices)	East of England	London	North West	West Midlands	Cadent
Cost of Debt indexation	(31.8)	(23.6)	(22.5)	(17.2)	(95.2)
Pension deficit funding	8.6	4.6	5.5	4.1	22.9
Totex Incentive Mechanism	(2.1)	(7.5)	(8.1)	(6.4)	(24.2)
Shrinkage allowance reduction	(4.8)	(2.0)	(3.6)	(2.4)	(12.8)
Tax adjustments	(3.3)	(2.4)	(2.4)	(1.9)	(9.9)
Reduction to Xoserve costs	(4.7)	(2.7)	(3.2)	(2.6)	(13.2)
Enhanced site security uncertainty adj	(1.9)	(0.7)	0.3	-	(2.4)
Fuel poor network connection uncertainty adj	0.4	-	1.1	1.0	2.4
Specified streetworks uncertainty adj	10.6	0.7	0.5	-	11.8
Tier 2a repex revenue driver	(0.1)	(1.7)	(1.4)	(0.9)	(4.2)
Other PCFM adjustments	(0.1)	(0.8)	(0.8)	(0.5)	(2.2)
Total Annual Iteration Adjustment (2019/20 Prices)	(29.2)	(36.1)	(34.6)	(26.9)	(126.9)
Total Annual Iteration Adjustment (2009/10 prices)	(21.5)	(26.6)	(25.5)	(19.8)	(93.4)

As shown in the table above 75% of this reduction was driven by cost of debt indexation, with the allowed percentage for the year determined at 1.58%, relative to the opening position of 2.92% in the RIIO-1 Final Proposals, which demonstrates how this mechanism has continued to drive tangible savings for customers.

The next largest contributor to the reduction was totex performance, representing £24.2m or 19% of the total. This is in part due to increased unit cost pressures in delivering the Mains Replacement Programme as well as additional investment costs to achieve our Transformational Strategy & planned FY21 Critical National Infrastructure site upgrades.

Following separation from National Grid, Cadent's pensions liabilities were sectionalised, with ongoing funding being set exclusively through base revenue, removing the element previously paid to National Grid via pass through costs in the longer term. This change equates to +£23m of the 2019/20 Annual Iteration Adjustment total.

The adjustment also includes £12.8m of the Shrinkage cost allowance representing around 10% of the total. This is a result of fewer gas losses and decreased unit gas prices.

The RIIO-1 Price Control Financial Model includes detailed tax calculations, which adjust annually for material changes. Around 8% of the Annual Iteration Adjustment total relates to a reduction in Corporation Tax rates relative to the opening assumption included in the Final Proposals, the actual Corporation Tax rate for the year being 19%, versus the 21% originally assumed.

The November 2018 Annual Iteration Adjustment included the effect of agreed adjustment to allowances for items subject to Uncertainty Mechanisms namely RAT Tier 2A Replacement Expenditure.

6.1.3 Revenue Collection

Revenue collection in 2019/20 was £8.5m or 0.4% higher than final allowed revenue.

Just over half of the variance arose from in-year changes to allowed revenue relative to the positions assumed when setting prices as shown in the table below:

Revenue Collection	East of England	London	North West	West Midlands	Cadent
2019/20 Allowed Revenue	650.1	465.7	480.1	356.2	1,952.0
2019/20 Collected Revenue	651.8	468.2	480.9	359.7	1,960.5
(Over) / Under Recovery of Revenue	(1.7)	(2.5)	(0.8)	(3.5)	(8.5)
% (Over) / Under Recovery of Revenue	(0.3%)	(0.5%)	(0.2%)	(1.0%)	(0.4%)
(Over) / Under Recovery of Revenue represented by:					
<i>Reduction in Network Innovation expenditure</i>	(1.3)	(0.7)	(0.9)	(0.6)	(3.5)
<i>Net theft of gas recoveries</i>	(0.3)	(0.7)	(0.1)	(0.3)	(1.5)
<i>Variance in chargeable volumes</i>	(0.1)	(1.1)	0.2	(2.5)	(3.5)

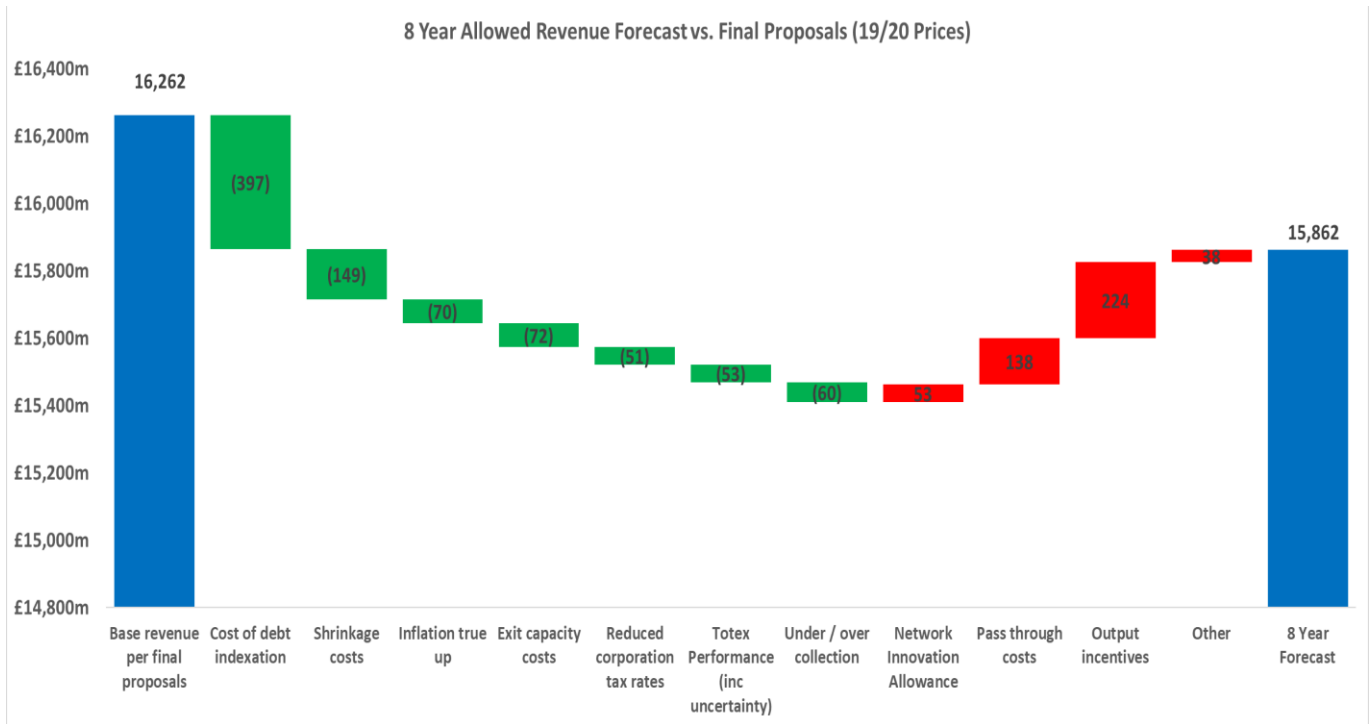
- Reductions to Network Innovation expenditure resulted in £3.5m of the over recovery
- Net theft of gas recoveries in 2019/20 (which cannot be estimated prospectively) contributed £1.5m of the difference
- The remainder was the consequence of changes to chargeable volumes:
 - Commodity driven revenue, which represents around 3% of the total, turned out to be largely in line with expectations. The prolonged good weather followed by a mild winter would intuitively point towards the expectation of under collection, however we conclude that the relationship between weather and common holiday periods had a bearing, and the degree of downward swing in temperatures from unusually clement to more normal level also affected consumption patterns (i.e. the degree of temperature change made it feel colder)
 - When setting the year ahead transportation prices, we need to make an assumption about how supply point volumes & overall customer numbers might change during the year. If the outturn position is lower than this assumption, this drives an under recovery, and conversely if higher, this drives an over recovery. In 2019/20 the change in customer numbers drove an £3.5m / 0.2% over recovery.

6.1.4 Allowed Revenue Forecast

We anticipate continued reduction in Allowed Revenue forecasts in real terms across the remainder of RIIO-GD1, with closing revenue currently forecast to be 9.9% lower than opening positions.

Relative to the RIIO-GD1 Final Proposals, we expect total allowed revenue for the price control period to be around £399m lower in 2019/20 prices.

The chart below summarises our current allowed revenue projections for RIIO-GD1 in 2019/20 prices.



6.2 Output Incentives

With the exception of exit capacity, which isn't referenced elsewhere in the strategic narrative, the following section describes our performance against our incentives. Further details to accompany this narrative are provided in our **"Output performance summaries"** in section 4. The tables below show our performance for 2019/20 versus the RIIO-GD1 target, cumulative performance to date and eight-year forecast including incentive revenue and RORE impact.

Exit Capacity

Our primary consideration when assessing our capacity booking strategy is to ensure that we meet our 1 in 20 reliability obligation, Supply Offtake Quantity [SOQ]. Incentive performance is driven by our ability to meet this obligation, while at the same time reducing our capacity bookings in absolute terms relative to the RIIO-GD1 volume targets. This is done by closely monitoring background demand conditions, and by maximising bookings at the cheapest offtakes wherever possible, however, going forwards this approach will not be possible as network code modification 0678A, termed 'Postage Stamp' will mean that all offtakes will be priced equally.

We minimise our reliance on NTS capacity by utilising the intrinsic flexibility of our networks, and the introduction of green gas through new biomethane entry connections. This benefits consumers by avoiding exit capacity costs that would otherwise be charged by National Grid. We do not at this stage anticipate any material departure from the eight-year forecast positions shown in the table below:

Exit Capacity Incentive Performance Summary

Exit Capacity	Current Year				RIIO-GD1 to Date			8 Year Forecast			
	Performance vs. Target	Change to Prior Yr	Incentive Revenue £m	RORE Impact	Performance vs. Target	Incentive Revenue £m	RORE Impact	Performance vs. Target	Incentive Revenue £m	RORE Impact	Direction of Travel
East Of England	(30.2%)	(22.9%)	7.3	0.51%	(25.1%)	56.5	0.57%	(25.7%)	62.0	0.54%	▲
London	(19.1%)	(21.0%)	3.3	0.32%	(16.6%)	25.1	0.37%	(16.8%)	27.6	0.35%	▲
North West	(15.3%)	3.4%	5.3	0.53%	(10.9%)	28.8	0.42%	(11.3%)	32.7	0.41%	▲
West Midlands	(9.6%)	(17.9%)	1.8	0.23%	(9.17%)	13.2	0.25%	(9.18%)	14.6	0.24%	▲

All values are expressed in £m & 2019/20 prices unless stated and exclude lagged revenue impacts.

Shrinkage & Environmental Emissions

These two factors contribute to the overall shrinkage incentive. The Environmental Emissions Incentive rewards networks for reductions in the carbon impact of fugitive emissions against a baseline target. The underlying data to derive incentive performance is the same as used for the Shrinkage incentive (the difference being that Shrinkage includes the assumed impact of own use gas, and theft of gas), therefore the drivers of incentive performance are largely the same, although the underlying rationale of the incentive mechanism is on environmental impact.

Shrinkage

The focus of the Shrinkage Incentive is on cost reduction, given that shrinkage costs are passed through to customers via transportation charges. Across our four networks shrinkage gas losses were reduced by 41GWh (3.4%). Our shrinkage incentive performance is shown in the table below. Our current forecast anticipates that we will deliver a further 3% aggregate reduction in Shrinkage volumes over the remainder of RIIO-GD1, and overall reductions of 25% for the eight-year period. These forecast assumptions are based on latest available data

for the future mains replacement programme. We also anticipate that our focussed MEG strategy will drive further improvements to nonethylene glycol saturation, along with year on year system pressure management improvements from the levels observed in 2018/19.

Shrinkage Incentive Performance Summary

Shrinkage	Current Year				RIIO-GD1 to Date			8 Year Forecast			
	Performance vs. Target	Change to Prior Yr	Incentive Revenue £m	RORE Impact	Performance vs. Baseline	Incentive Revenue £m	RORE Impact	Performance vs. Baseline	Incentive Revenue £m	RORE Impact	Direction of Travel
East Of England	(9.5%)	(2.4%)	0.4	0.03%	(20.3%)	4.2	0.04%	(23.2%)	4.7	0.04%	▲
London	(15.7%)	(3.7%)	0.3	0.04%	(24.1%)	3.4	0.05%	(26.5%)	3.7	0.05%	▲
North West	(8.8%)	(3.7%)	0.4	0.03%	(25.0%)	2.5	0.04%	(27.2%)	2.7	0.04%	▲
West Midlands	(10.4%)	(4.5%)	1.5	0.03%	(21.0%)	2.4	0.04%	(22.9%)	2.6	0.04%	▲

All £ values are expressed in 2019/20 prices and exclude lagged revenue impacts.

Environmental Emissions

Across our four networks, leakage losses were reduced by 44GWh (4%) in the year against 2018/19. This was 11% better than RIIO-GD1 baseline targets for the year. Cumulatively, we have achieved leakage reductions of 23%, and forecast that this will increase to 26% by the end of the price control period.

Environmental Emissions Incentive Performance Summary

Environmental Emissions	Current Year				RIIO-GD1 to Date			8 Year Forecast			
	Performance vs. Target	Change to Prior Yr	Incentive Revenue £m	RORE Impact	Performance vs. Baseline	Incentive Revenue £m	RORE Impact	Performance vs. Baseline	Incentive Revenue £m	RORE Impact	Direction of Travel
East Of England	(10.1%)	(2.8%)	3.1	0.21%	(21.1%)	20.8	0.20%	(24.3%)	26.5	0.23%	▲
London	(16.4%)	(4.3%)	3.8	0.36%	(24.6%)	17.2	0.25%	(27.7%)	22.0	0.27%	▲
North West	(9.4%)	(4.1%)	2.8	0.28%	(25.8%)	13.2	0.19%	(28.4%)	15.8	0.19%	▲
West Midlands	(11.3%)	(4.9%)	3.9	0.51%	(21.6%)	13.7	0.26%	(23.7%)	16.9	0.28%	▲

All £ values are expressed in 2019/20 prices and exclude lagged revenue impacts.

Customer Satisfaction: Planned Work

As shown in the table below performance in the Current Year (2019/20) reflects our continuing journey in this area of Customer Satisfaction and whilst three out of four networks have exceeded the target levels set by Ofgem we know that this needs to improve. The table below shows the associated reward/penalty for 2019/20, RIIO-GD1 to date and our eight year forecast based upon average scores achieved.

Customer Satisfaction: Planned Work Incentive Performance Summary

CSAT: Planned Work	Current Year				RIIO-GD1 to Date			8 Year Forecast			
	Performance vs. Target	Change to Prior Yr	Incentive Revenue £m	RORE Impact	Performance vs. Target	Incentive Revenue £m	RORE Impact	Performance vs. Target	Incentive Revenue £m	RORE Impact	Direction of Travel
East Of England	0.38	(0.15)	1.0	0.07%	0.20	3.5	0.04%	0.23	4.5	0.04%	▲
London	(0.12)	(0.25)	(0.2)	-0.01%	(0.09)	(0.6)	-0.01%	(0.02)	0.2	0.00%	▲
North West	0.32	0.15	0.6	0.06%	(0.10)	(0.5)	-0.01%	(0.03)	0.2	0.00%	▲
West Midlands	0.02	0.36	0.0	0.00%	(0.24)	(1.6)	-0.03%	(0.16)	(1.0)	-0.02%	▲

All £ values are expressed in 2019/20 prices and exclude lagged revenue impacts.

Customer Satisfaction: Unplanned work

We have achieved another year of strong performance in the Unplanned Work category, with prior year performance broadly maintained and our forecast reflects our ambition to continue to drive year on year performance through to the end of RIIO-GD1.

Customer Satisfaction: Unplanned Work Incentive Performance Summary

CSAT: Unplanned Work	Current Year				RIIO-GD1 to Date			8 Year Forecast			
	Performance vs. Target	Change to Prior Yr	Incentive Revenue £m	RORE Impact	Performance vs. Target	Incentive Revenue £m	RORE Impact	Performance vs. Target	Incentive Revenue £m	RORE Impact	Direction of Travel
East Of England	0.68	0.04	1.1	0.08%	0.57	7.3	0.08%	0.58	8.4	0.08%	▲
London	0.27	(0.04)	0.7	0.07%	0.20	4.0	0.06%	0.21	4.8	0.06%	▲
North West	0.68	0.14	0.8	0.08%	0.53	5.3	0.08%	0.55	6.1	0.08%	▲
West Midlands	0.66	0.08	0.6	0.08%	0.46	3.9	0.08%	0.48	4.5	0.08%	▲

All £ values are expressed in 2019/20 prices and exclude lagged revenue impacts.

Customer Satisfaction: Connections

As outlined in our Outputs section whist we have exceeded the Ofgem target in all of our networks we have implemented a strategic initiative across our connections work, prioritising our North London network due to historically lower customer satisfaction scores. We have achieved above target scores in all four networks in 2019/20, an improvement on 2018/19, but year on year, only North West & West Midlands achieved higher scores than the prior year. We acknowledge that further work is required to see improved consistent Customer Satisfaction performance, especially in the London and West Midlands networks.

Customer Satisfaction: Connections Incentive Performance Summary

CSAT: Connections	Current Year				RIIO-GD1 to Date			8 Year Forecast			
	Performance vs. Target	Change to Prior Yr	Incentive Revenue £m	RORE Impact	Performance vs. Target	Incentive Revenue £m	RORE Impact	Performance vs. Target	Incentive Revenue £m	RORE Impact	Direction of Travel
East Of England	0.42	0.24	1.1	0.08%	0.10	2.9	0.03%	0.13	4.0	0.04%	▲
London	0.69	1.23	0.7	0.07%	(0.76)	(3.2)	-0.05%	(0.62)	(2.5)	-0.04%	▲
North West	0.30	(0.35)	0.6	0.07%	0.41	4.2	0.06%	0.41	5.0	0.07%	▲
West Midlands	0.01	(0.30)	0.0	0.00%	(0.15)	(0.5)	-0.01%	(0.09)	0.1	0.00%	▲

All £ values are expressed in 2019/20 prices and exclude lagged revenue impacts.

Complaints Handling

Our forecast assumes continued improvements in this area, and an expectation of continued performance well above target and consequently no impact to revenues or RORE for this penalty only incentive.

Complaints Handling Incentive Performance Summary

Complaints Handling	Current Year				RIIO-GD1 to Date			8 Year Forecast			
	Performance vs. Target	Change to Prior Yr	Incentive Revenue £m	RORE Impact	Performance vs. Target	Incentive Revenue £m	RORE Impact	Performance vs. Target	Incentive Revenue £m	RORE Impact	Direction of Travel
East Of England	8.51	(0.26)	-	0.00%	4.86	-	0.00%	5.47	-	0.00%	▲
London	8.42	0.35	-	0.00%	3.70	-	0.00%	4.35	-	0.00%	▲
North West	9.22	0.85	-	0.00%	4.47	-	0.00%	5.06	-	0.00%	▲
West Midlands	9.32	2.17	-	0.00%	4.25	-	0.00%	4.69	-	0.00%	▲

All £ values are expressed in 2019/20 prices and exclude lagged revenue impacts.

Stakeholder Engagement

Our excellent score of 6.93 demonstrates our engagement strategy is maturing and directly supports colleagues to deliver continuously improving standards for our customers and communities. Given the nature of the incentive, the forecast for the final year of RIIO-GD1 is difficult to predict, therefore the assumption in the table below reflects achieving the same annual scores of 6.93 for the period 2020/21.

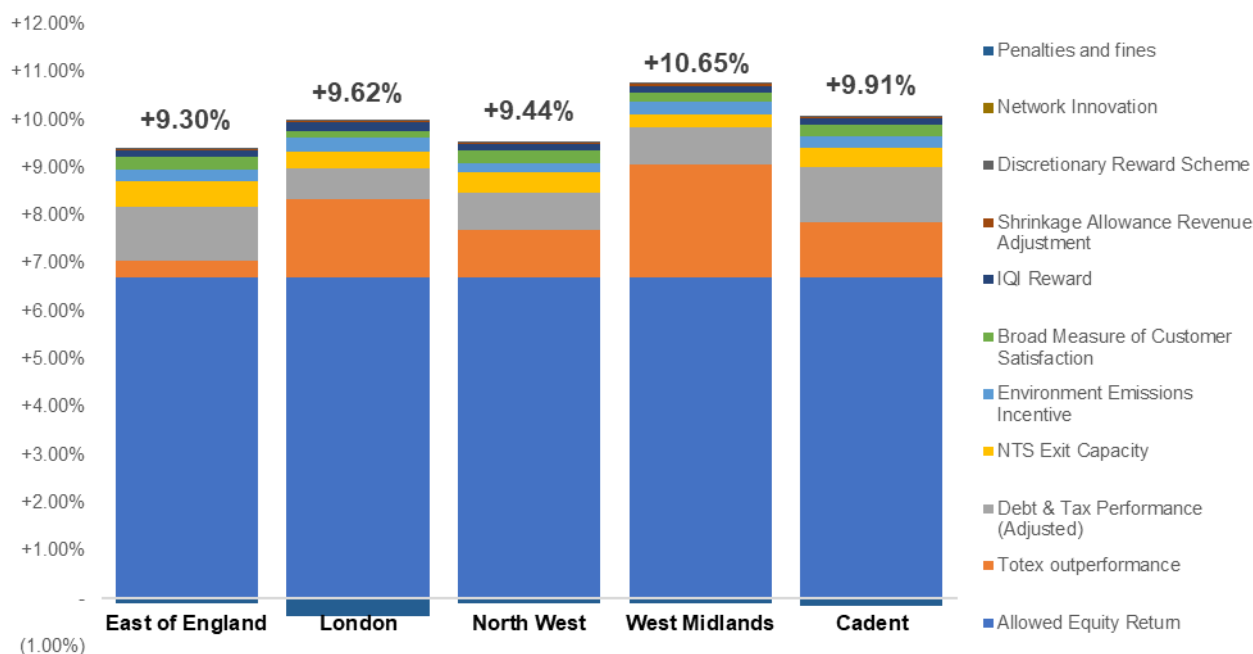
Stakeholder Engagement Incentive Performance Summary

Stakeholder Engagement	Current Year				RIIO-GD1 to Date			8 Year Forecast			
	Network	Performance vs. Target	Change to Prior Yr	Incentive Revenue £m	RORE Impact	Performance vs. Target	Incentive Revenue £m	RORE Impact	Performance vs. Target	Incentive Revenue £m	RORE Impact
East Of England	6.93	0.60	1.9	0.09%	6.49	0.5	0.12%	6.56	0.5	0.11%	▲
London	6.93	0.60	1.3	0.09%	6.49	0.4	0.12%	6.56	0.4	0.11%	▲
North West	6.93	0.60	1.3	0.09%	6.49	0.4	0.12%	6.56	0.4	0.12%	▲
West Midlands	6.93	0.60	1.0	0.09%	6.49	0.3	0.12%	6.56	0.3	0.11%	▲

All £ values are expressed in 2019/20 prices and exclude lagged revenue impacts.

6.3 Return on Regulatory Equity (RORE)

Our current eight year RORE forecast is summarised in chart and table below. Our method of RORE calculation is aligned to the approach used within the RFPR templates. We have endeavoured to ensure that the forecast reflects our best available view of eight-year RORE performance, reflecting the revised totex positions submitted in the 2020 RRP, inclusive of the expected consequential effect to RAV balances.



RORE Performance		RIIO GD-1				
Category	East of England	London	North West	West Midlands	Cadent	
Allowed Equity Return	+6.70%	+6.70%	+6.70%	+6.70%	+6.70%	
Totex outperformance	+0.35%	+1.64%	+0.99%	+2.36%	+1.17%	
IQI Reward	+0.13%	+0.17%	+0.14%	+0.14%	+0.14%	
Broad Measure of Customer Satisfaction	+0.27%	+0.14%	+0.27%	+0.18%	+0.22%	
Shrinkage Allowance Revenue Adjustment	+0.04%	+0.05%	+0.03%	+0.04%	+0.04%	
Environment Emissions Incentive	+0.23%	+0.28%	+0.20%	+0.28%	+0.25%	
Discretionary Reward Scheme	+0.00%	+0.00%	+0.00%	+0.00%	+0.00%	
NTS Exit Capacity	+0.55%	+0.35%	+0.42%	+0.24%	+0.41%	
Network Innovation	(0.03%)	(0.03%)	(0.03%)	(0.03%)	(0.03%)	
Penalties and fines	(0.06%)	(0.34%)	(0.06%)	(0.07%)	(0.13%)	
Operational RORE Performance	+8.18%	+8.97%	+8.65%	+9.85%	+8.78%	
Debt performance - at notional gearing	+2.54%	+2.22%	+2.23%	+2.13%	+2.27%	
Tax performance - at notional gearing	+0.02%	(0.08%)	(0.01%)	+0.11%	+0.32%	
Total RORE Performance	+10.73%	+11.11%	+10.88%	+12.10%	+11.36%	
Adjustment to Reflect the Economic Costs of Our Debt	(1.44%)	(1.49%)	(1.44%)	(1.45%)	(1.45%)	
Total RORE Performance (Adjusted)	+9.30%	+9.62%	+9.44%	+10.65%	+9.91%	

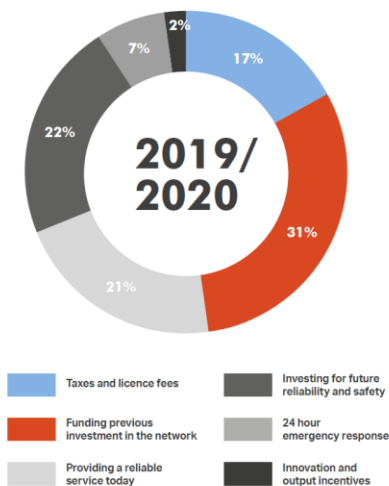
(All RORE numbers quoted above are based on notional gearing)

6.4 Customer Bill Impact

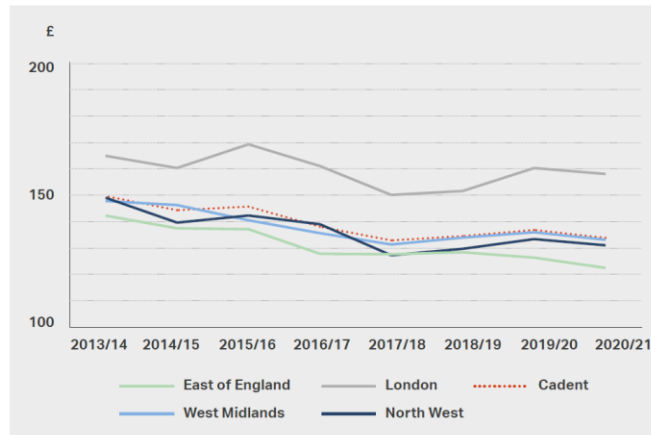
2019/20 contribution to domestic energy bills

In support of our 2015/16 Annual Performance report, Cadent led on an initiative to develop a common methodology across GDNs for articulating domestic bill composition in a way that is meaningful for Customers. An updated position for 2019/20 is shown below:

Average domestic bill breakdown Average domestic bill – 2019/20 prices

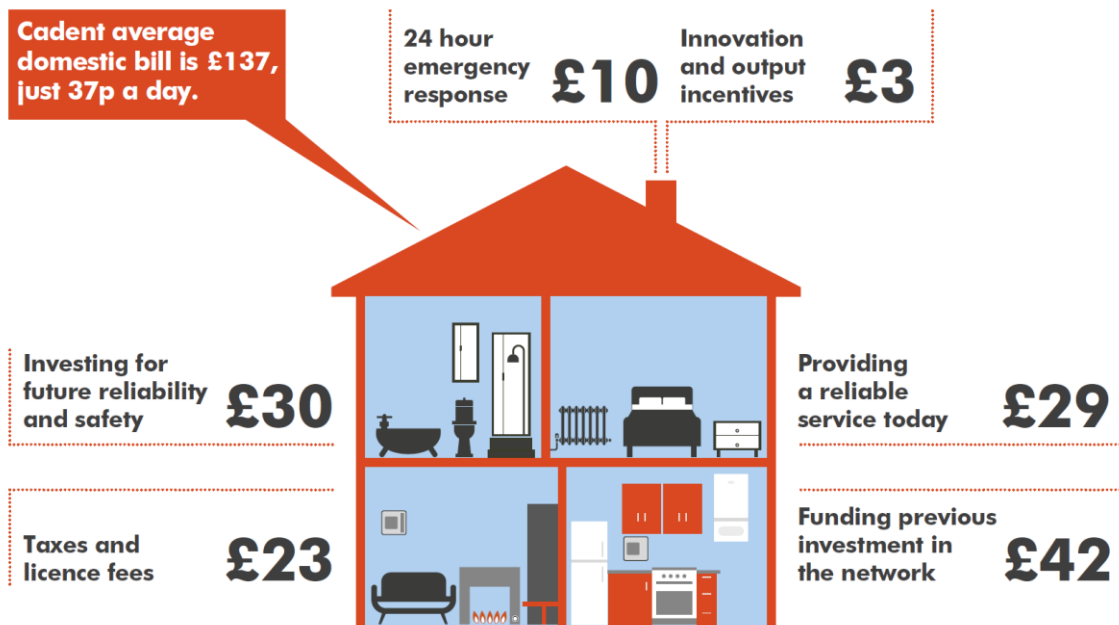


Overall, we anticipate that our contribution to average domestic energy bills will reduce by £16 per annum in real terms across RIIO GD-1.



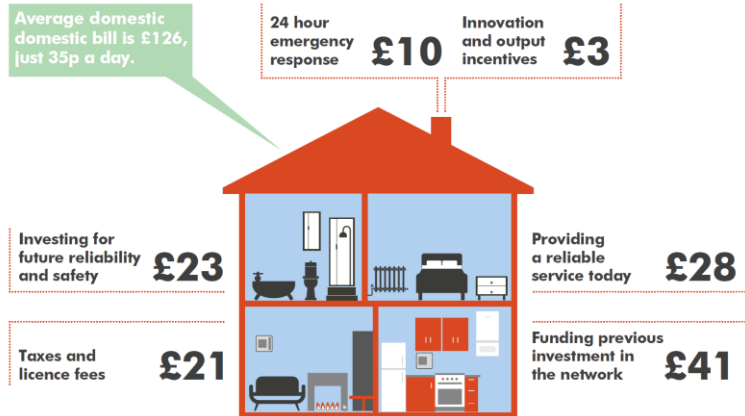
Taxes and licence fees	Funding previous investment in the network	Providing a reliable service today	Investing for future reliability and safety	24 hour emergency response	Innovation and output incentives
Taxes and business rates paid to central and local government. Also includes the licence fee for industry regulation	Repaying the costs of past investments to construct today's network, like a mortgage	Operating and maintaining equipment to transport gas to you safely and reliably	Replacement of old assets and extensions to the network to meet future needs	Taking your calls, attending gas emergencies and making safe	Innovation and incentive reward for improving customer experience and reducing carbon emissions

Cadent customer bill breakdown 2019/20

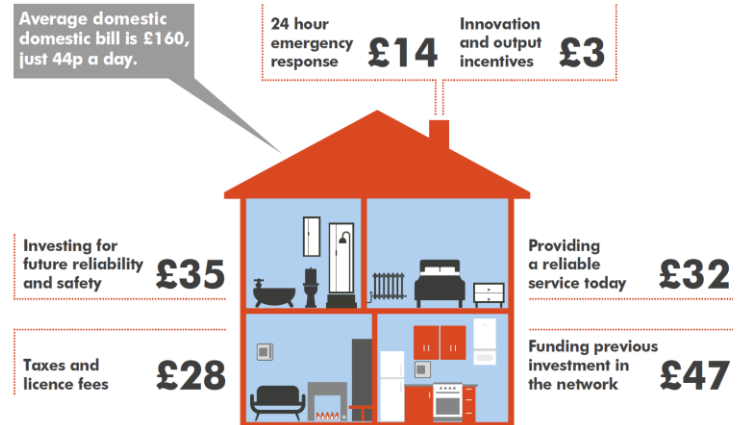
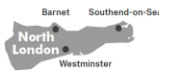


Customer bill breakdown by network

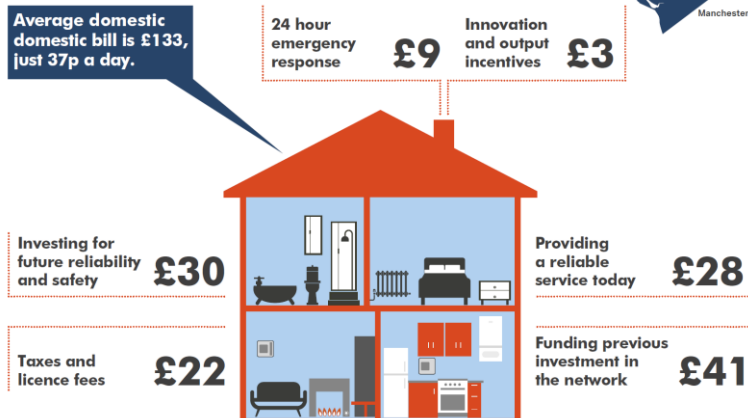
Customer bill breakdown 2019/20 – East of England



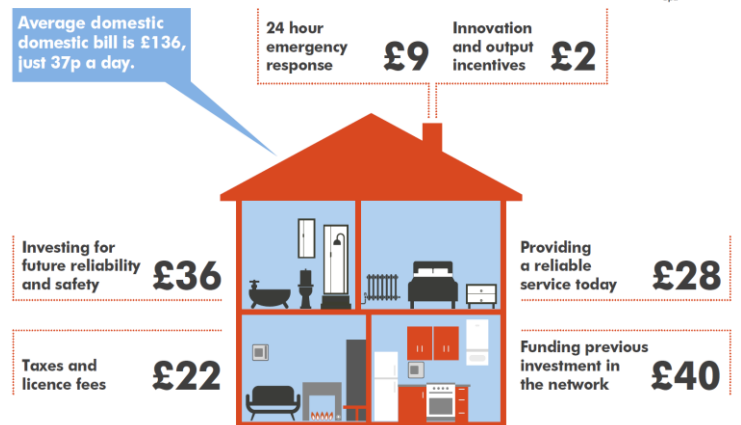
Customer bill breakdown 2019/20 – London



Customer bill breakdown 2019/20 – North West

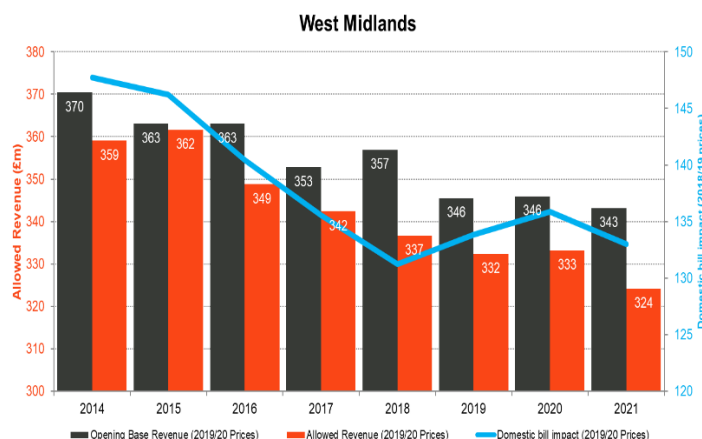
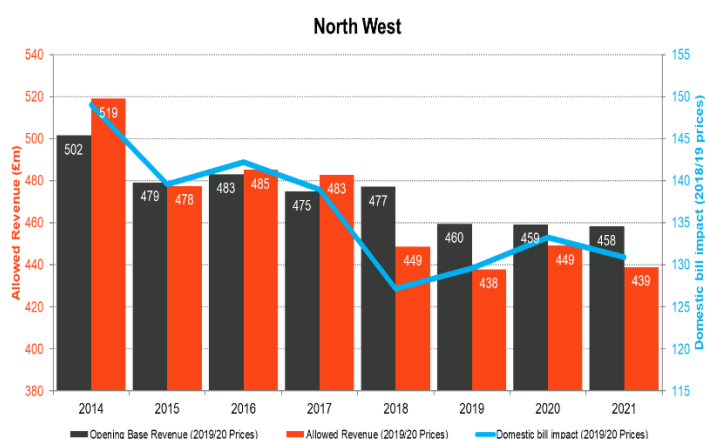
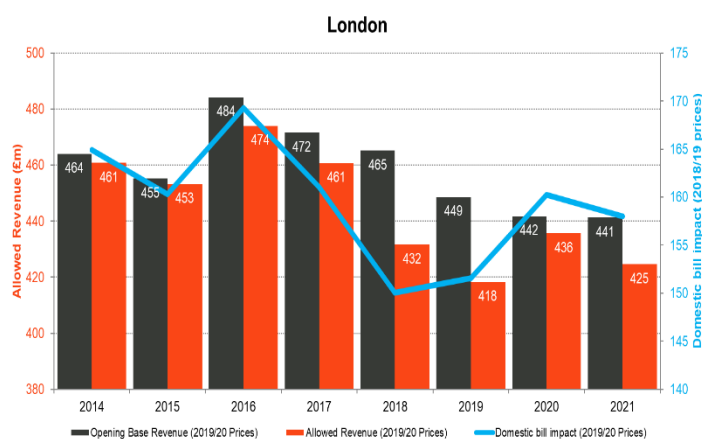
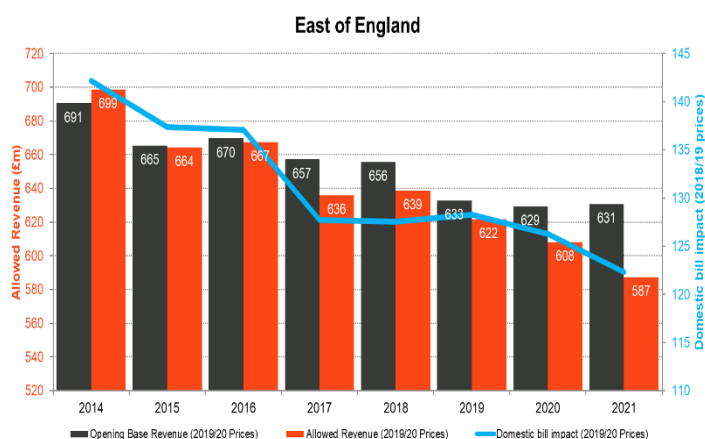


Customer bill breakdown 2019/20 – West Midlands

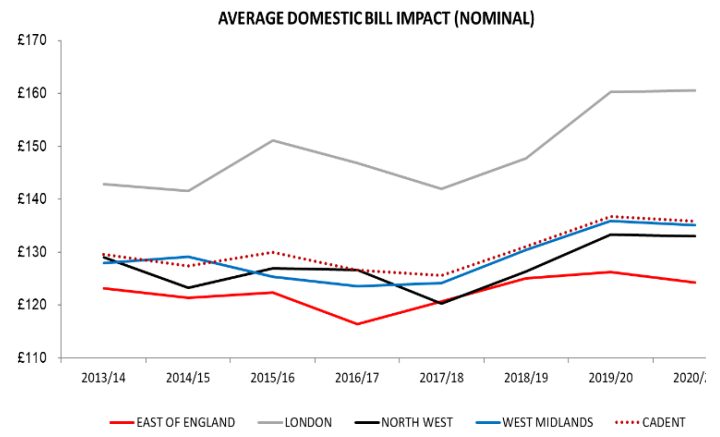
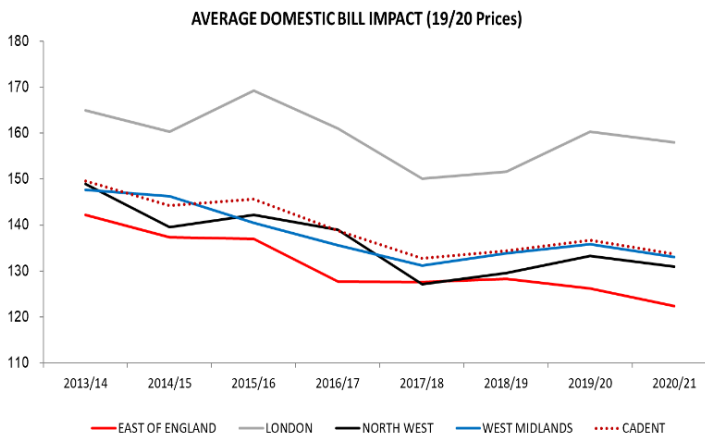


RIIO-GD1 Forecast

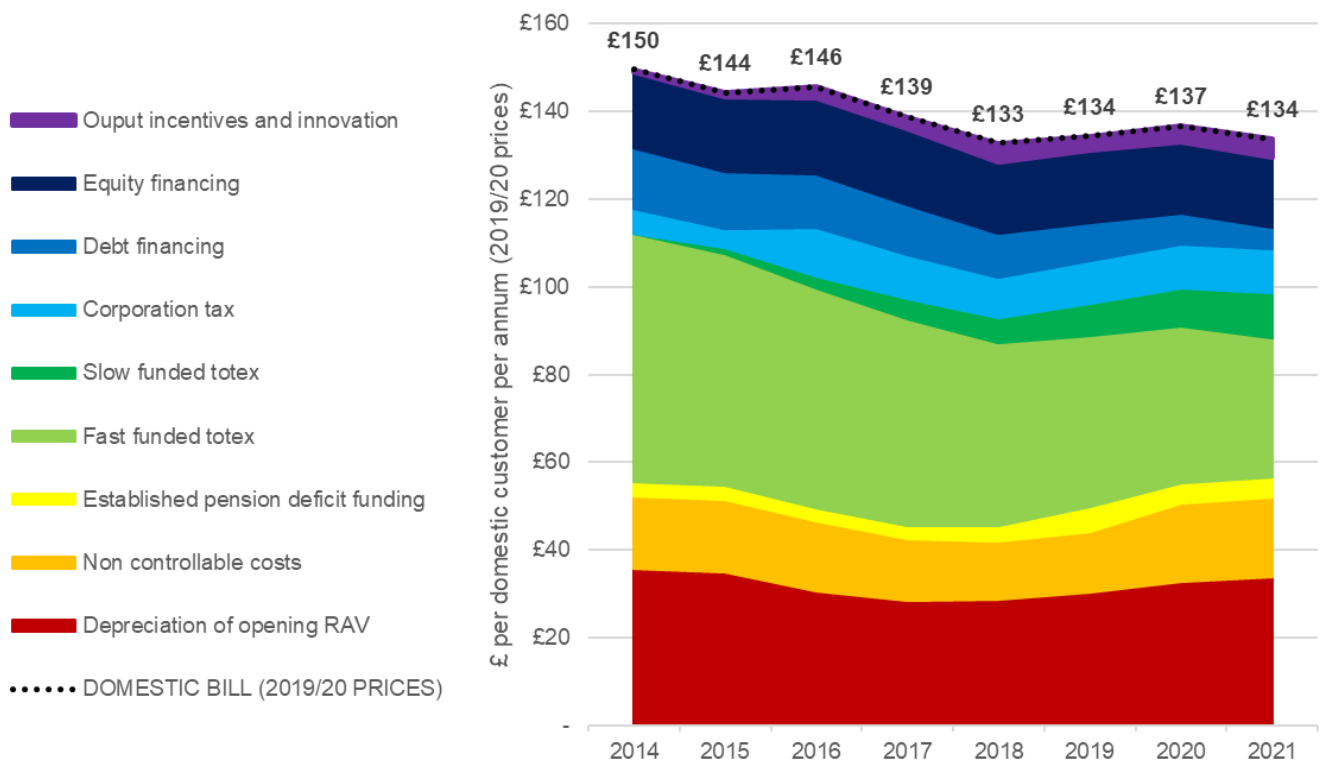
Overall, we anticipate that our contribution to average domestic energy bills will reduce by £16 per annum (or 11%) in real terms across RIIO-GD1. The following graphs illustrate actual and forecast revenue against opening allowances per the RIIO-GD1 final proposals, and forecasts for average domestic bill over the eight-year period:



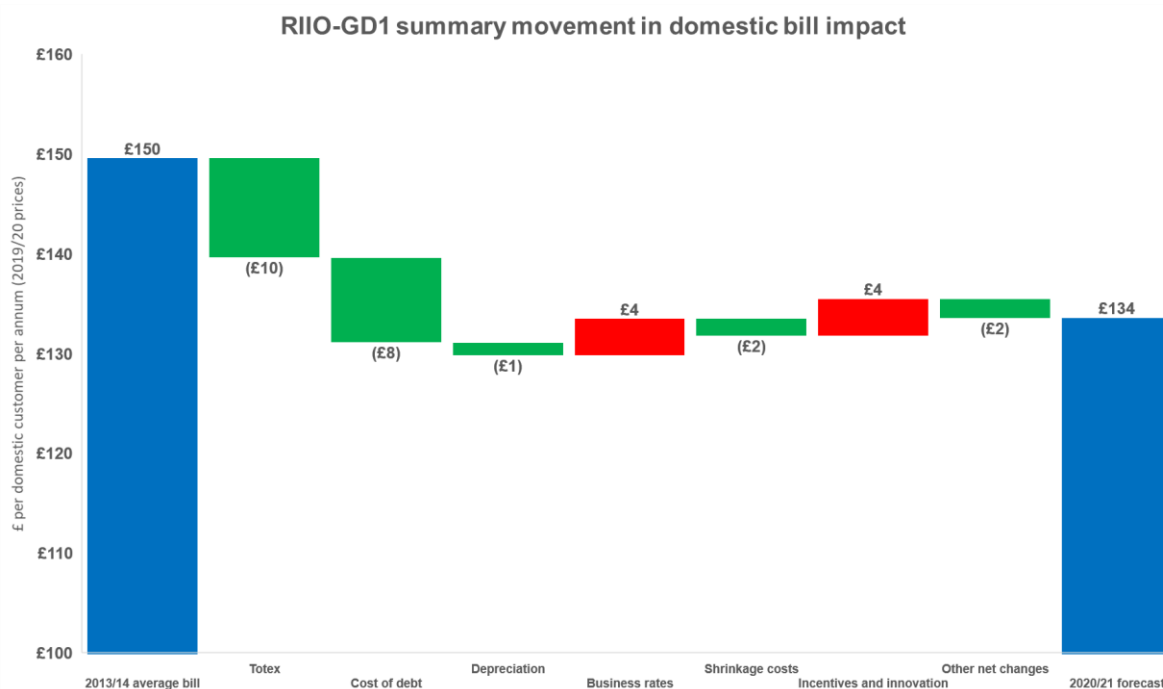
AVERAGE DOMESTIC BILL (19/20 Prices)	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
EAST OF ENGLAND	£142.20	£137.39	£137.05	£127.70	£127.54	£128.28	£126.25	£122.33
LONDON	£164.91	£160.29	£169.30	£161.05	£150.06	£151.56	£160.27	£158.03
NORTH WEST	£149.00	£139.54	£142.24	£138.94	£127.14	£129.59	£133.28	£130.92
WEST MIDLANDS	£147.73	£146.22	£140.44	£135.54	£131.24	£133.84	£135.88	£133.02
CADENT	£149.61	£144.27	£145.64	£138.80	£132.78	£134.42	£136.75	£133.74
AVERAGE DOMESTIC BILL (NOMINAL)	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
EAST OF ENGLAND	£123.16	£121.33	£122.33	£116.43	£120.64	£125.04	£126.25	£124.26
LONDON	£142.83	£141.55	£151.12	£146.84	£141.94	£147.74	£160.27	£160.52
NORTH WEST	£129.05	£123.23	£126.97	£126.68	£120.26	£126.32	£133.28	£132.99
WEST MIDLANDS	£127.95	£129.13	£125.36	£123.58	£124.14	£130.46	£135.88	£135.12
CADENT	£129.58	£127.41	£130.00	£126.55	£125.59	£131.03	£136.75	£135.85



The graph below shows our average domestic bill forecast for RIIO-GD1 by Allowed Revenue category. Going into RIIO-GD2, we have found that such analysis provides an additional useful tool in helping our customers to understand the composition of our share of energy bills, how these might vary over time, and in helping to set expectations around the potential degree of movement by category across the next price control, and the sensitivity of bills to different funding options.



We have summarised the key drivers of expected movement across the price control in the following waterfall chart:



A note on our methodology for average bill calculation:

We have maintained the methodology for calculation of average domestic bills in line with that adopted in our last RRP submission. The key difference to the approach adopted by Ofgem in their 2018/19 Annual Report is the volume assumption used. Ofgem uses the Typical Domestic Consumption Value (TDCV) which is based on median average values, where as we adopted the mean average consumption by supply point in the 0 to 73,200 kWh per annum load band. Given that our transportation unit prices are driven by both changes to allowed revenues and average demand, we consider that this approach best emulates true network level variability. Additionally, we have presented numbers in 2019/20 prices for the most part in order to isolate the real price impacts of the RIIO framework.

7. Appendix

In this section we have outlined particular anomalies and data methodology changes.

7.1 Data methodology

Carryover of Repex workload from previous years

In accordance with existing data assurance process and timings, approximately 23.9km of work completed in previous years was not included in previous RRP submissions as these records were not completed in time for inclusion. During 2019/20 these mains have been fully data captured and validated for inclusion in the latest RRP submission, in a similar way there will be a small volume of work will transfer to 2020/21.

Methodology for leakage model

To estimate leakage from our gas distribution system we use an Ofgem approved methodology and model that includes;

- an assessment of emissions from mains, services and above ground assets; and
- an estimate of leakage associated with specific mains interference damage incidents.

The model applies pre-determined leakage rates but is updated annually for a number of activity-based factors. The most significant of these being the changes to asset lengths associated with our mains replacement programme, and the management of the system pressures.

Postcode realignment in London and East of England

In readiness for RIIO-GD2 and as part of the organisational changes outlined below we will be reviewing our network assets and improving our data systems to ensure they are representative of our network boundaries and appropriately aligned to our customer and asset needs to support our RIIO-GD2 plan. This review could largely impact our East of England and North London networks where we have historically applied a manual adjustment to align how the work is managed between them but there may be instances in other networks as well. Any updates to network assets will be formally updated as part of the 2020/21 RRP submission.

Offtake meter error review

A recent audit has been carried out and identified potential issues at two sites that are currently being investigated. If any impact is found there may be a need to amend the 2019/20 data in next year's RRP report.

7.2 Organisational changes

In September this year our new chief executive officer (CEO), Steve Fraser took up his position with Steve Hurrell returning to his role as chief financial officer (CFO). Steve Fraser brings a wealth of experience in leading and transforming infrastructure businesses, including in his previous role as chief operating officer at United Utilities. His ambitious vision includes delivering operational improvements, transforming the experience for customers and leading on the future of gas. The Board is supporting him and his leadership team fully to realise this vision.

Under Steve's leadership significant changes have been made to the Cadent management team with focus on decentralising the business and creating a management structure centred on the networks and customers.

As reported last year our chief operating officer (COO), Howard Forster, and four new network directors are part of a leadership structure that is designed to support accountability and decision-making by bringing operational planning closer to the customer and network directors closer to the board. Under their leadership we have made significant progress against our business transformation programme establishing an operating model based on 28 areas, each with clear accountability for delivering its customer, regulatory, safety and financial targets. Investment Planning, Customer Operations – (Connections and Reinstatement) and Asset Management activities now under the network aligned arrangement.

We have been working on developing local supply chain partnerships and are in the process of sourcing the Construction Management Organisations' that will manage the delivery of most investment work in our networks.

We've also welcomed some new teams from Balfour Beatty and tRiIO, which will increase the knowledge and experience within our business as well as our capacity to deliver our commitments. We're now entering the next phase of our transformation which is aiming to refocus our remaining teams to support our new contracting strategy.

The new operating model will allow each network to create and build capability to make balanced Totex decisions on network investments, including the management of the network's replacement programme and will work within a central policy and control framework supported by clear asset strategy. Our support functions will continue to play a critical role in supporting and sustaining our operations.

With National Grid having fully divested from the business in 2019, we now have a smaller, more dynamic Board and final separation of our IT infrastructure has now been completed.