

Appendix 6

Environmental Action Plan

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Executive Summary

Our RIIO-3 Environmental Action Plan (EAP) is even more ambitious and impactful than our existing plan. We have focused on areas where cost-benefit analysis suggests expenditure can have the biggest impact, and where there is the greatest scope for setting an example with transferable initiatives that can be adopted by colleagues, customers, and other organisations.

The development of our EAP has been informed by:

- An assessment of which initiatives are cost-effective and can have the greatest environmental impact, further informed by the views of our customers and stakeholders.
- The research that we have commissioned on best practices and the future of the industry.
- The strategic direction received from policymakers.
- Significant environmental impacts risk rated through the Environmental Management System and Principle Risk Framework
- Detailed optioneering, which we have summarised in this document for all actions where we have requested additional funding

We consider materiality, relevance and impact to prioritise the actions within our EAP and have established an impact hierarchy across our activities. We set this hierarchy using the risk-based approach from our Environmental Management System and Principal Risk Framework to carefully considered the hierarchy of impact that we have on the environment, which is summarised below:

Environmental hierarchy of impacts

- Greenhouse gas emissions due to shrinkage and leakage from the network
- Greenhouse gas emissions from transport and office energy use
- Energy consumption and emissions from offices, depots and projects
- Materials and resource use in operations and projects
- Greenhouse gas emissions from our supply chain
- Biodiversity and habitat management of our sites
- Own use gas for pre-heating the network
- Waste arising from mains replacement
- Fuel consumption for fleet and logistics
- Emissions from business mileage
- Waste arising from direct operations
- Water use in offices and dewatering of works during operations

We have focused on areas where cost-benefit analysis suggests expenditure can have the biggest impact and where there is the greatest scope for setting an example with transferable initiatives that can be adopted by colleagues, customers and other organisations.

Our EAP contains details of all the actions, incentives, and regulatory outputs that sit within the 'infrastructure fit for a low-carbon future' outcome area. However, these are all summarised within the following six areas:

- B1 - Annual Environmental Report
- B2 - Climate and Carbon Commitment
- B3 - Sustainable Use of Resources
- B4 - Biodiversity Management and Natural Capital
- B5 - Reducing Environmental Impacts from Operations
- B6 - Net Zero Transitions in the Energy System

In formulating our environmental plan, we have ensured that our proposed actions to reduce emissions and minimise our impact on our physical environment, are consistent with the potential (and currently uncertain) longer-term scenarios for the industry given the Government's net zero objective. Additionally, our plan takes into account the actions that we need to take now to facilitate the path to decarbonisation, in which our

infrastructure and our close and trusting relationship with end-consumers gives us a platform to make a substantial contribution to a green, responsible and sustainable future.

Our Environmental Action Plan will deliver

- [cost data] investment into leak detection technology, revolutionising how we monitor and manage methane emissions from our network
- A 10% reduction in methane leakage rates through our Advanced Leakage Management Approach (ALMA)
- A 13% reduction in our Business Carbon Footprint (bcf)
- A new Digital Platform for Leakage Analytics (DPLA) to target emission leaks.
- A full roll out of a suite of sophisticated methane detection devices across our network, including vehicle mounted detection technology
- Over 80% of our suppliers meeting Cadent's supplier code for environmental management.
- Increased data management, reporting methodologies, and analysis on the top materiality of products we purchase for Scope 3 emissions.
- Biodiversity improvements of 30% across our key sites
- A reduction in polyethelene (PE) pipe waste by a further 50%.
- Processes that require less than 4% virgin aggregate as a total during backfill and reinstatement works across the networks.
- An increase in biomethane connections to Cadent's networks, supporting our ambition to enable up to 15TWh of energy

Insight to shaping our EAP

The methane gas network will continue to play a key role in the UK energy market for decades to come.

There is an ever-increasing acknowledgment of the need to reduce methane emissions as part of broader climate change targets and to meet net zero by 2050. Methane and greenhouse emission reduction overall will contribute to mitigating global temperature increases and a changing climate. Whilst methane can contribute to deteriorating air quality and impact human health, the methane we transport to homes, businesses, and industries provides the energy we need for power and heat.

Environmental issues remain prominent in the news and political spheres, and we know through extensive customer engagement that when it comes to making significant individual changes to deliver environmental improvements, most (over 75%) of our customers feel powerless, in particular referring to the costs associated with such changes. They therefore expect businesses such as us to lead the way when it comes to supporting them to be more sustainable.

We recognise the need for urgent change, and the EAP explains how we will take responsibility for delivering change across our network and business operations during RIIO-3 to reduce our environmental impact. We have a simple business purpose: to keep people warm, while protecting the planet. Whilst we focus on 'keeping people warm' through our end customers and vulnerability commitments, we ensure that we are 'protecting the planet' through the careful design and implementation of our EAP.

We fully support the UK's ambitious net zero targets and recognise that to achieve this, significant change is required for our business and the sector in which we operate. Whilst there are economic, technical and safety challenges to overcome, the most significant change is how we support our customers. We need to support them in understanding the need for change, how to be able to choose the right course of actions suitable for their circumstance and how these can help support the net zero ambition.

We have focussed on achieving the most impactful improvements in our environmental and sustainable performance throughout this period. This is our second EAP, and we have drawn on lessons learned in developing and delivering our first to create an even more stretching and targeted deliverable plan for RIIO-3.

During the period we will reduce our greenhouse gas emissions through the continuation of our IMRP, and by embedding a new ALMA. The ALMA will see its move from a modelled approach to estimating leakage across our networks, to one using a range of Advanced Leakage Detection (ALD) data which feeds into a sophisticated DPLA, allowing us to prioritise our mains replacement programme in a way that delivers maximum leakage reduction levels. We'll also use the output to plan and deliver an ALMA using a range of traditional and innovative techniques to further reduce leakage across our asset base.

Not only does this proposal deliver a highly positive cost-benefit payback, over only a 10-year period, demonstrating significant social benefits, but it also reflects the views of our customers and a wide range of expert stakeholders that we have engaged with. We have seen the level of public scrutiny and dissatisfaction that has arisen recently from a lack of investment in the water industry, and we believe that our focus on reducing methane leakage in our EAP helps to mitigate this risk being transferred to the energy industry.

Low-carbon gasses such as biomethane and hydrogen will be a vital part of the energy mix, meaning our network will continue to provide energy and heat to most domestic and industrial properties in the UK region for decades to come. Our EAP focuses on actions that will enable this transition, but also reduce our environmental impact in the short and medium term.

Environmental impacts from our network

Environmental impacts from our activities and operations are identified and continuously reviewed through the Environmental management system. New and emerging environmental-related risks are identified and assessed through our horizon scanning process which is routinely undertaken as part of our wider risk review management framework. For example, the risk that we fail to respond to ‘climate change’ is one of our ‘Principal Risks’, overseen by our Executive, Board and Board Committees.

This principal risk has been sub-categorised into the following three elements which are recorded as individual ‘Level 2’ risks, each with a responsible risk owner. Reducing our impact on climate change – The risk we do not appropriately assess and/or mitigate our impact on climate change. Adapting to climate change – The risk that we fail to adequately adapt to potential climate change scenarios that impact our assets and operations for example, heat waves, droughts, floods, storms, and wildfires. Net zero – The risk that the gradual but continual decarbonisation of the energy system, including ensuring an end to the unabated use of fossil fuels such as natural gas may lead to a reduction in the use of gas networks in the future.

If risks, taking into consideration existing controls, do not meet our target appetite, a proactive management response will be taken, most commonly enhancement of existing controls or the addition of new ones. Risks and resulting actions are reviewed and managed operationally via our risk management framework, however, given their importance, environmental risks (or issues) are given a specific focus via our Board Sustainability Committee

By identifying significant environmental impacts from our Environmental Management System (EMS), we have risk-assessed impacts across our operations. We have established a highly efficient environmental management system, along with robust control measures, to proactively prevent or mitigate environmental impacts. This system empowers us to achieve even greater performance throughout RIIO-3.

Hierarchy of impacts	EAP Overview	EAP Initiatives	Cadent long-term strategy
Greenhouse gas emissions due to shrinkage and leakage from the network	B2 - Climate and Carbon Commitment/ B6 - Net Zero Transitions in the Energy System	B2.1 / B2.2 / B2.3 / B2.4 B2.5 / B2.6 / B2.7 / B2.10 B6.1 / B6.2	We plan to reduce our emissions of the existing network by c.66% by 2032 ¹
Greenhouse gas emissions from transport and office energy use	B2 - Climate and Carbon Commitment	B2.8 / B2.10	100% renewable energy across all sites by 2031
Energy consumption and emissions from offices, depots and projects	B2 - Climate and Carbon Commitment	B2.10 / B2.10 / B2.13	100% renewable energy across all sites by 2031
Materials and resource use in operations and projects	B3 - Sustainable use of resources	B3.2 / B3.3 / B3.4 / B5.1 B5.2 / B5.3 / B5.5	Less than 4% recycled material used as backfill/ wider strategy to be defined in RIIO-3 that supports the circular economy approach to resource use
Greenhouse gas emissions from our supply chain (Scope 3)	B2 - Climate and Carbon Commitment	B2.9 / B2.10 / B5.4	Year on year reduction and 100% measured by 2032

¹ 2024 Future-of-the-Gas-Network_vFinal_1.pdf

Biodiversity and habitat management of our sites	B4 - Biodiversity Management and Natural Capital	B4.1 / B4.2 / B4.3 / B4.4	30% Biodiversity Net Gain by 2030
Own use gas for pre-heating the network	B2 - Climate and Carbon Commitment	B2.5 / B2.7 / B2.10	Reductions to support overall c.66% reduction in emissions by 2032
Waste arising from mains replacement	B3 - Sustainable Use of Resources/ B5 - Reducing Environmental Impacts from Operations	B3.1 / B5.2	Zero waste to landfill by 2032
Fuel consumption for fleet and logistics	B2 - Climate and Carbon Commitment	B2.8 / B2.10	100% EV for company cars by 2026, 70% EV for commercial fleet by 2031 and 100% EV (or other renewable fuel) by 2035
Emissions from business mileage	B2 - Climate and Carbon Commitment	B2.9 / B2.10	100% EV for company cars by 2026, 70% EV for commercial fleet by 2031 and 100% EV (or other renewable fuel) by 2035
Waste arisings from direct operations	B3 - Sustainable Use of Resources/ B5 - Reducing Environmental Impacts from Operations	B3.1	Zero waste to landfill by 2032
Water use in offices and dewatering of works during operations	B5 - Reducing Environmental Impacts from Operations	B3.2 / B3.5	To be defined in RIIO-3 that supports the circular economy approach to resource use

Table 1: Environmental Risk and Impact areas supported by the EAP

The environment is intertwined in our wider business planning and governance.

It is incredibly important to the Board, our colleagues and our customers, that we embrace future challenges and embed environmental considerations into our wider business planning processes and decisions. Earlier this year, we published our fifth Sustainability Report which, as well as meeting our current regulatory reporting requirements, considers the relationship between our environmental, societal and resilience goals. We have an embedded Sustainability Committee, which is underpinned by a robust governance model, including a dedicated Sustainability Challenge Group (SCG), which feeds into our Independent Stakeholder Group (ISG).

This governance model ensures that we integrate sustainability and the delivery of short, medium and long-term environmental goals into our business strategy and decision-making activities. The Sustainability Committee is responsible for providing independent assurance to the Board on the scope, adequacy, and effectiveness of the company’s sustainability policies and management systems. The Committee is active in setting out our strategic direction and ambition for sustainability. The membership of the Committee provides a wealth of expertise from a wide range of sectors and international perspectives, including the utilities sector, global business, and Government.

1. EAP engagement

Our EAP considers our customers' views and preferences whilst incorporating wider industry research. In formulating our environmental plan, we have been informed by the views of our customers and stakeholders. We have also benefited from research into best practices adopted by other organisations and put time and energy into our own research and thought leadership on the future of the industry.

We've engaged with our customers through regional deliberative sessions, and national surveys and have used a range of research techniques to forensically assess views, priorities, and ultimately the acceptability of our EAP. There are some very complex areas covered by this plan, not least the extent to which we undertake enhanced leakage detection and reduction; possibly the single biggest variable of our overall Business Plan (in terms of the range of impact on customers' bills).

To ascertain high-quality and reliable insight, we have used various forms of willingness-to-pay assessments and working with the leading economics consultancy Nera. Additionally, we've explored topics that have fed into this EAP using Business Options Testing and ensured that we have considered the differing views of different customer demographics. We have seen emerging trends for younger members of the public (who we refer to as future customers).

Over the last 24 months, we've run 9 separate research projects exploring various attributes about the energy transition and future role of gas. Some were undertaken as part of Cadent's Hydrogen Village proposal, but others, including the Sustainable Energy Diaries series and our exploration of the UK's appetite for change (working with leading academics from across Europe), have directly fed this plan, along with several thought leadership publications.

At a very macro-level, we have noted that, in general, customers feel somewhat more informed about environmental matters than they did when we created our RIIO-2 EAP, but largely their views remain highly consistent between our two plans. We've therefore compared the findings from the 27 separate engagement activities that we completed when developing our RIIO-2 EAP with our new research findings when undertaking our triangulation and data synthesis processes.

Our net zero report was completed following extensive research with academics across four European countries and involved direct engagement with thousands of customers. It sought to assess the conditions necessary to enable change, such as that required to move to low carbon sources of energy in the UK and concluded that several significant (current) barriers need to be removed.

- Leadership: a stable and secure wider context that provides and articulates a clear and inclusive vision.
- Infrastructure: structures, systems and technology that enable uptake of new behaviours, driven by the government, public and private sectors.
- Communication: a clear vision, with a positive and collective call to action, coming from a trusted source.
- Individuals: approaches targeted to individuals that are human-centric and consider diversity in individual circumstances and communities.

The results of this study support our hypothesis that the gas network will continue to play a significant part in the UK's energy mix for decades to come.

1.1. Domestic and Business Customers

We have explored the topic of shrinkage in several ways

- In the context of their energy bills
- In the context of gas security, and
- In the context of environmental impacts

Whilst there is a great deal of detail behind the key findings, there are clear high-level trends that stand out. Firstly, customers are very concerned about the cost of their energy bills and the implication of wasting a commodity that is so expensive (and more and more seen as a luxury item as the cost-of-living pressures

continue to dominate household decision-making) is seen as highly significant. Likewise, and especially since the war in Ukraine, energy security features (behind costs) as customers' second priority for Cadent and, as such they see it critical not to waste gas through any form, including shrinkage.

Whilst over 70% of our customers say that they are concerned about the environment and climate change, most believe that they are doing all that they can afford to do and expect major changes to be delivered by businesses and the Government. Interestingly, when presented with a range of themes, including safety, energy security, customer service, resilience, supporting customers in vulnerable situations, and cyber security, the theme of environmental action features relatively low down in their prioritisation.

In part this is due to the relatively low level of understanding over how their home heating solution impacts the environment, but we have also seen a growing level of frustration with green policies and a perception that they generate increased costs with unclear associated benefits.

1.2. Shippers and gas suppliers

We engage with gas shippers regularly through a range of business-as-usual interfaces, and at least annually ask them directly how we can improve the service we provide to them. The key topic of interest to shippers and suppliers is shrinkage, with clear commercial consequences from any changes in methodology.

However, their key priority is the accuracy of shrinkage data and as such they are largely very supportive of the ongoing work to move the industry away from a modelled calculation of shrinkage and towards a fully measured one.

1.3. Expert stakeholder engagement

We actively participate in industry forums, working groups and one-to-one meetings with stakeholders. These include:

- Meetings with Local Authorities and regional Mayors to understand their plans and priorities and share our plans for RIIO-3; this includes meeting relevant officials and politicians and attending larger forums and groups arranged by them.
- Meetings with Government and parliamentary groups to understand their emerging policies for the future energy system and the future role of gas.
- Ofgem's working groups to inform preparation for RIIO-3.
- Meetings with wider industry, charities and campaigners to understand their views on the environment and test our plans, and roundtable events to discuss environmental matters with them.
- Regular meetings with our new SCG, who report into our main ISG.

We have also been able to draw upon a range of research by third parties, and to seek their opinions on our plan and identify value for money on our initiatives, including:

- Sia Partners detailed strategic assessment of carbon offsetting options for Cadent.
- Boston Consulting Group's assessment of options to reduce leakage.
- Engagement with Italgas and others using leakage detection technology.
- Led two separate industry innovation forums with extensive engagement with businesses from across a variety of sectors to assess opportunities to drive our environmental performance further.

2. Environmental Action Plan 2026-2031

2.1. Annual Environmental Report (B1)

We will continue to publish an Annual Environmental Report (AER), which will provide an update of our delivery against each of the actions listed within our EAP. This will be produced in line with Ofgem’s regulatory reporting timescales and published clearly on the Cadent website to allow customers and stakeholders (many of whom have informed our plans) to clearly see how we are performing against the targets that we have set. For any targets not being delivered in a given reporting year, we will provide clear explanation of the mitigation plans we have in place to bring the measure back into the target in the following year(s) of the period. Our AER will include performance updates on shrinkage performance, business carbon footprint for Scopes 1, 2 and 3, biodiversity and nature improvements, biomethane key performance indicators (KPIs) as well the EAP actions.

2.1.1. Annual Environmental Report

Excellent progress was made throughout RIIO-2 on our EAP, creating the foundation for driving further benefits in RIIO-3. To share our performance and case studies, we publish an AER, which summarises our delivery against our EAP. Available on our website, they form part of a suite of documentation for Cadent’s sustainability pillars. We will continue to publish an annual report detailing the progress made against our RIIO-3 EAP and key performance indicators.



Figure 1: 2023/24 Annual Environmental Report

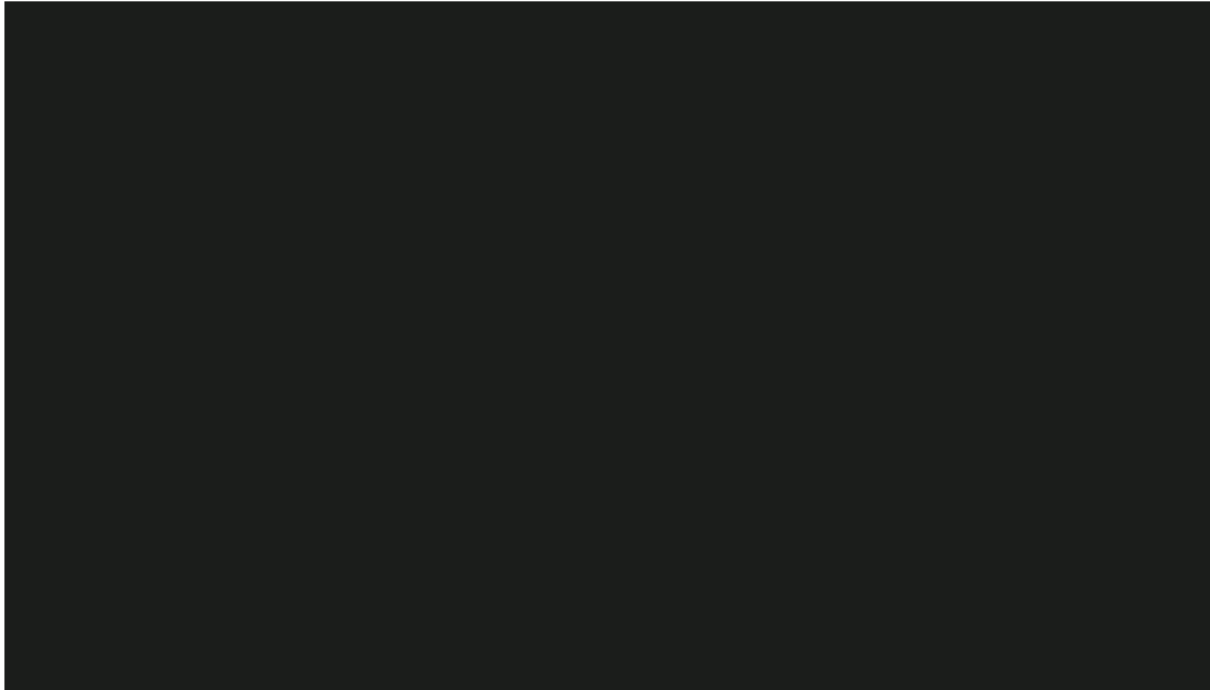


Figure 2: [cost-sensitive data]

The AERs are part of the regulatory reporting requirements across all gas networks. They not only provide a platform for demonstrating how each organisation is performing against its targets but also enable effective benchmarking to be undertaken between businesses. Cadent are proud to note that our EAP (and performance against it) benchmarks very highly against others. The figure below demonstrates how Cadent's plan is more ambitious and extensive (in terms of coverage of issues) than those of others.

Business Carbon Footprint (BCF) – RIIO-2	Cadent Your Gas Network	national gas transmission	SGN Your gas, Our network.	nationalgrid Electricity Transmission	WALES & WEST UTILITIES
Publish a Net-Zero target	X	X	X	X	
Increase the use of renewable energy (on-site or off-site)	X	X	X	X	
Improve energy efficiency	X		X	X	X
Pursue science-based targets validation by SBTi	X	X			
Transition to zero emissions vehicle fleet	X	X	X	X	X
Facilitate incorporation of biomethane in the network	X*			N/A	X
Increase stakeholder engagement to improve on actions towards net-zero	X	X	X		
Increase engagement with local authorities and customers for a hydrogen pathway	X		X	N/A	
Design and construct a hydrogen transformation network	X	X		N/A	

Figure 3: A snapshot of past (high-level) EAP benchmarking

2.1.2. Alignment of our EAP to our Business Plan

We have clear accountability for delivering a wide range of aspects under our EAP. These are coordinated through a monthly performance meeting, with areas of concern being challenged and mitigations in place. This group of accountable individuals has been responsible for creating our new EAP, linking in with key stakeholders (e.g. The Carbon Trust for Science Based Targets and emission reduction trajectory, and Sia Partnership for nature-based solutions) and ensuring that the wide range of customer research and insights generated are appropriately reflected.

Our EAP has been through several stages of approval, ultimately feeding into our Executive Committee and Sustainability Committee. These two committees play a part in ensuring that there is strategic alignment between the actions within the EAP and those sitting elsewhere in our RIIO-3 Business Plan. For example, there is a huge crossover between our safety-mandated mains replacement program and our carbon (and methane)

emissions reduction focus in the EAP. Likewise, there is a clear link between our customer vulnerability strategy, within which we will provide customers in fuel poverty with a wide range of energy efficiency and money management support. It is through this initiative that we will deliver an action to help more than 200,000 homes become more energy efficient.

2.1.3. EAP Assessment Methodology and Options Analysis

Our assessment methodology is grounded in our company's environmental and sustainability governance process. Our environmental policy statement and environmental strategy documents provide robust guidance for conducting a thorough assessment of our business impacts as well as identifying potential future risks. This strategy and internal review and risk management serve as a tool to communicate and advance key environmental goals that contribute to our regulatory targets under RIIO-3, as well as our broader company objectives such as those under our Force for Good strategy. The result of this process was built on our RIIO-2 EAP, and we report on progress to this through our Annual Environmental Plan. For RIIO-3, our assessment options for this EAP have been delivered through several different internal governance committees, such as our Sustainability Committee and our Executive Committee. We have considered our regulatory, compliance commitments, and past environmental performance when assessing our impacts, including external targets adopted in assessing actions for the RIIO-3 EAP.

For example, we have assessed a range of options for the deployment of ALD (Action B2.2) and DPLA (Action B2.3) to determine the right combination of investment in leakage detection (maximising the quantity and quality of data feeding the models) vs. investment in modelling technology (allowing greater analytical capabilities to determine the most effective leakage intervention programme and requiring less data).

For our biodiversity enhancement actions, we have aligned our targets to the external Global Biodiversity Framework agreed at the UN Biodiversity Summit in 2022. Building on the "30 by 30" target, we are working with our Operational, Capital Delivery and Property teams to target 30% net gain by 2030, an ambitious framework designed to halt and reverse the loss of global biodiversity. We have also worked with Sia Partners to review our offsetting strategy which involved engagement with 27 stakeholders and 500 customers (Action B4.4). Their review included a legislative, regulatory and societal lens and recommended that we focus attention on carbon reduction rather than offsetting but noted considerable opportunities to deliver community-focused nature-based solutions working in partnerships with local landowners.

The output from these governance meetings or individual assessment options were reviewed together and grouped by theme to determine their materiality, cost-benefit and potential consequences of delivery during RIIO-3. This culminated in our potential environmental action list; against each area we prepared options where appropriate including engineering justifications and cost-benefit analysis, for the EAP.

Baseline environmental impact

Our EAP and the actions outlined here are aligned with our long-term strategy to reduce carbon emissions, decrease reliance on first-use materials, and manage resources effectively across our networks and operations. We are also committed to enhancing biodiversity on our land. Ofgem has requested that we consider our environmental impacts if no action is taken.

In M8.17 Data Table, we have modelled options and scenarios to show our performance under a 'do nothing' approach regarding our business's carbon footprint, embodied carbon, environmental incident performance, waste management, and biodiversity enhancement. However, we do not consider a 'do nothing' approach to be credible or aligned with our business plan and stakeholder feedback. This approach would also fail to meet the minimum requirements set by Ofgem and would be inconsistent with our Force for Good strategy, building on the work completed during the RIIO-2 period.

Our M8.17 Data Table for Environment illustrates a reduction in our overall business carbon footprint emissions due to the implementation of our actions. We have reduced waste generation, increased landfill diversions, and improved biodiversity net gain scores across all networks. We believe that a significant shift is required as we move beyond the activities implemented during RIIO-2, with ambitious plans to further reduce our environmental impacts as we transition to RIIO-3 and strive toward achieving net zero.

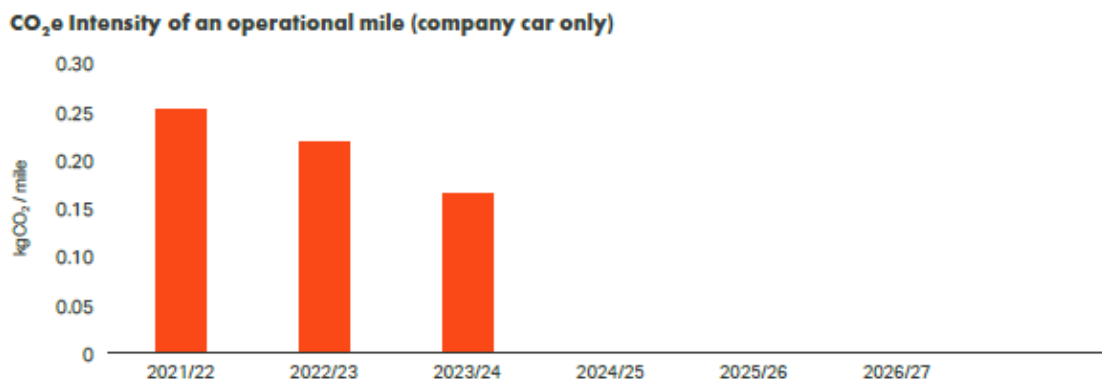
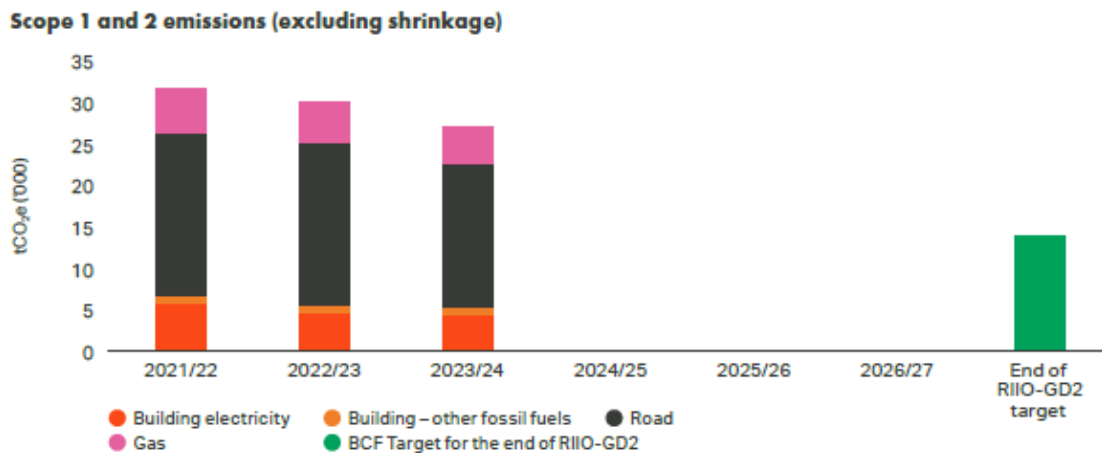
2.2. Climate and Carbon Commitments (B2)

We will significantly reduce our methane leakage emissions during the period, which will be achieved by completing 83% of remaining mains replacement activities (mandated through the Health and Safety Executives (HSE) Iron Mains Risk Replacement Programme (IMRRP)), continuing to optimise pressures across our networks, gas conditioning and retaining our focus on theft of gas and own use gas by implementing our ALMA. This will enable us to achieve our ambition to reduce our emissions footprint by 80% by the end of RIIO-5 (~2040/41) vs. the 2025/26 baseline.

We will also build on the excellent progress in reducing our BCF in RIIO-2, largely eliminating all controllable emissions. Our RIIO-3 EAP includes actions designed to remove the difficult to abate emissions that remain. Actions in this area include even further steps to replace the diesel fleet with green alternatives and additional steps to modernise our building portfolio. We aim to reduce our direct emissions and set methodologies and targets to reduce indirect emissions in line with science-based targets to mitigate our impact on a changing climate.

2.2.1. Business Carbon Footprint

In 2023/24, Shrinkage made up 95% of our overall BCF. The tables below provide a breakdown of our latest shrinkage figures, which we forecast will be 20% lower by the end of the current price control period than at the start of RIIO-2. This represents an outperformance of 3% enabled through more targeted mains replacement activities, whilst continuing to optimise system pressures across our network. Figure 4 below summarise our BCF, and the breakdown of scope emissions.



Based on business mileage only, the graph above details the carbon intensity on miles driven during RIIO-GD2.

Figure 4: Business carbon footprint performance

GWh	2021/22	2022/23	2023/24
Low-Pressure Mains	620.19	594.41	583.05
Medium Pressure Mains	106.52	104.94	102.78
Services	85.25	72.51	60.35
AGIs	191.74	192.38	192.68
Interference	3.37	5.17	2.03
Total	1007.07	969.41	940.89
Target Total	1,038.94	1,035.03	997.10
Conversion factor: 1,226.42 tCO ₂ e/GWh			

Table 2: Leakage volumes

tCO ₂ e	2021/22	2022/23	2023/24
Total	1,235,091.50	1,188,907.30	1,153,925.37
Target Total	1,274,180.04	1,269,379.20	1,222,866.36

Table 3: Leakage emissions

GWh	2021/22	2022/23	2023/24
Own Use	29.55	27.57	25.01
Theft	52.30	48.80	44.27
Total	81.85	76.37	69.28

Table 4: Other shrinkage volumes

With leakage being by far the most significant component of shrinkage, this is where our focus is for RIIO-3 and is mission-critical.

2.2.2. Measuring and Reporting our Leakage Reduction through the IMRP

Whilst our EAP includes a range of actions that will see us introduce technology that will enable accurate measurement of our leakage levels, this will not be available and fully tested and embedded across our four networks at the start of the RIIO-3 period. We will therefore continue to calculate leakage levels using the industry Shrinkage and Leakage Model (SLM), reporting annually against leakage levels by both energy lost (TWh) and carbon emitted (tCO₂e/y), along with reporting our average system pressures and gas conditioning across all four networks.

Using the SLM to measure emissions, by the end of RIIO-2, we continue to reduce leakage emissions through our IMRP replacement programme, PAST and CBA work of 10km/year per network. In RIIO-3, the continuation of this programme of work will deliver a further 16.2% reduction (with a final 3% reduction during the first year of RIIO-4, as the programme is completed).

Advanced Leakage Management Approach

Whilst we will achieve material methane leakage reductions through the IMRP, emissions from our other mains (T2/T3 Iron and non-IMRRP T1 such as steel), account for ~60% in terms of mains emissions on our 2021/22 baseline (or 66% vs. our 2025/26 baseline) which are largely unaddressed by the IMRRP. We are therefore proposing to reduce methane leakage further through our ALMA.

We have developed an **Advanced Leakage Management** approach that utilises new technology to proactively manage leakage on our network

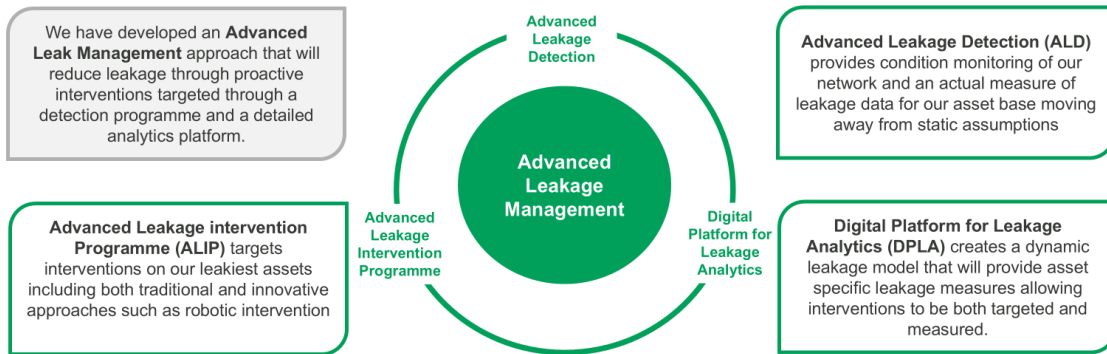


Figure 5: Advanced Leakage Management Approach

The ALMA is made up of three core activities; ALD (B2.2), a DPLA (B2.3) and an Advanced Leakage Intervention Programme (ALIP) (B2.4), which we have captured as specific actions within our EAP.

During the period, the ALMA will replace the SLM, which all gas distribution networks (GDNs) currently use to estimate shrinkage and leakage volumes. The enhanced accuracy of data and analysis facility will allow us to optimally phase all of our mains replacement activities, to prioritise the leakiest assets earlier in the programme. We will also use this to target the most effective interventions through our ALIP, which will run throughout the period. By using a combination of data obtained through ALD trials during RIIO-2 and new data obtained and analysed, as new techniques are rolled out and become embedded during RIIO-3, as shown in the timeline below:

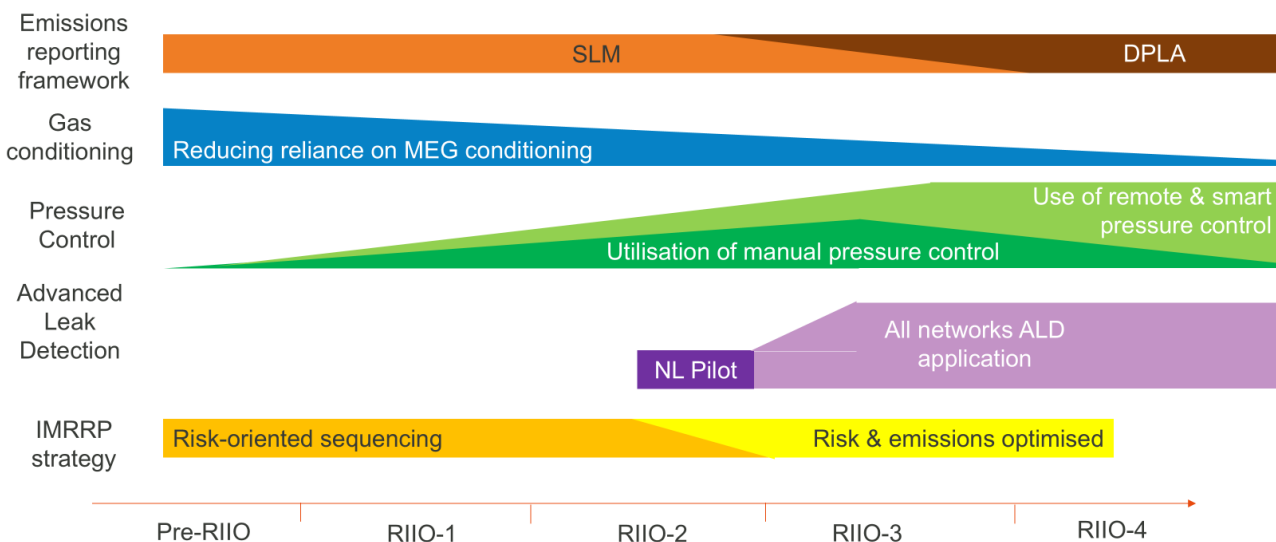


Figure 6: ALMA timeline

2.2.3. Advanced Leakage Detection

In line with the HSE mandate for annual asset monitoring using ALD equipment by April 2026, Cadent is proactively investing in cutting-edge sensor technologies to enable this.

Perhaps the most advanced technology we have deployed across our networks is Picarro; a highly sophisticated methane detection device that is mounted to a vehicle. There are other systems available that we are exploring, but our trials using Picarro technology have demonstrated that roughly 50% of the emissions from our network originate from 5% of our pipeline.

This will enable targeted intervention through both repair and replacement activities. The technology has been widely deployed in Italgas (Italy) and some US gas networks enabling a significant reduction in carbon emissions, and we have developed excellent working relationships with these companies to capitalise on their experience and development planning.

We anticipate a total cost of [cost-sensitive data] to purchase and operate the chosen ALD technologies during RIIO-3.

2.2.4. Digital Platform for Leakage Analytics

The current approach to calculating emissions relies on the Ofgem-approved SLM. However, the SLM is based on data from over 20 years ago and lacks the granularity needed to pinpoint leaks and strategically target asset interventions for optimal emissions reduction. Recognising this limitation, we have embarked on a pioneering Strategic Innovation Fund (SIF) project, the DPLA, in collaboration with Guidehouse Europe, other GDNs, and National Gas Transmission.



Figure 7: DPLA benefits

The DPLA project aims to revolutionise how we monitor and manage methane emissions from our network. The DPLA platform strives to deliver real-time, granular insights into leakage across our entire asset base by leveraging cutting-edge sensor technologies, machine learning, and advanced hydraulic modelling techniques. This information empowers us to strategically repair leaks and prioritise Iron Mains replacement, expediting emissions reductions and improving network safety.

The final phase of the DPLA project, the Beta Phase, commenced in 2023 and has focussed on developing a probabilistic hydraulic model, leveraging machine learning to analyse a range of data sources, including Advanced Emission Detection data, operational data, and network makeup. This approach, while requiring less data processing and systems integration, still delivers significant benefits by enabling:

- Improved emissions reporting accuracy: Providing Ofgem with more precise annual reports on gas leakage quantities.
- Enhanced network safety: Proactively identifying and localising leaks, facilitating faster response times and reducing potential risks.
- Strategic asset management: Targeting interventions to specific assets based on individual emissions profiles, optimising maintenance and replacement programs.
- Reduced customer bills: Minimising unnecessary gas losses, leading to cost savings that can be passed on to consumers.

The full rollout of DPLA is projected to take up to two years, however, tangible benefits will be realised from the first year of RIIO-3. The initial focus will be on our North London and Eastern networks, which will have operational DPLA models and be actively gathering emissions data from the outset. This data will be instrumental in prioritising asset replacement and maintenance, allowing us to begin strategically reducing emissions and demonstrating value from the start of the RIIO-3 price control.

The total cost for establishing and operating the DPLA over the period is [cost-sensitive data].

2.2.5. Assessment options for the deployment of ALD and DPLA

Whilst we are looking at different technology platforms for both aspects of the ALMA, another critical decision is to determine the right combination of investment in leakage detection (maximising the quantity and quality of data feeding the models) vs. investment in modelling technology (allowing greater analytical capabilities to determine the most effective leakage intervention programme and requiring fewer data sets).

	Benefit	Blocker
Investing primarily in Leakage Detection (ALD)	Are proven technology and do not need updating to reflect changes to the network	For mobile sensors, they only provide a snapshot in time when the survey took place, which may need to be 'normalised' for the network pressures at the time of survey
Investing primarily in Modelling (DPLA)	Offer near continuous, near real-time analysis of networks and offer the chance to reduce the costs of buying and operating a fleet of sensors	Only achievable and accurate with sufficient data inputs and difficult and time-consuming to create, requiring updates and on-going maintenance as networks change

Table 5: Investing in ALD vs DPLA

Through our trials to data, we have worked to determine the optimum mix of both technologies. Simultaneously, modelling efforts were initiated to analyse data sourced from our network to pinpoint areas of concern related to leakages within the system. A key component in our modelling approach was the integration of pressure and flow data. We found that while we possess detailed pressure data across nearly all segments of the network—primarily due to regulatory requirements for pressure monitoring—the flow data remains considerably sparse. This lack of comprehensive flow data downstream presented significant challenges.

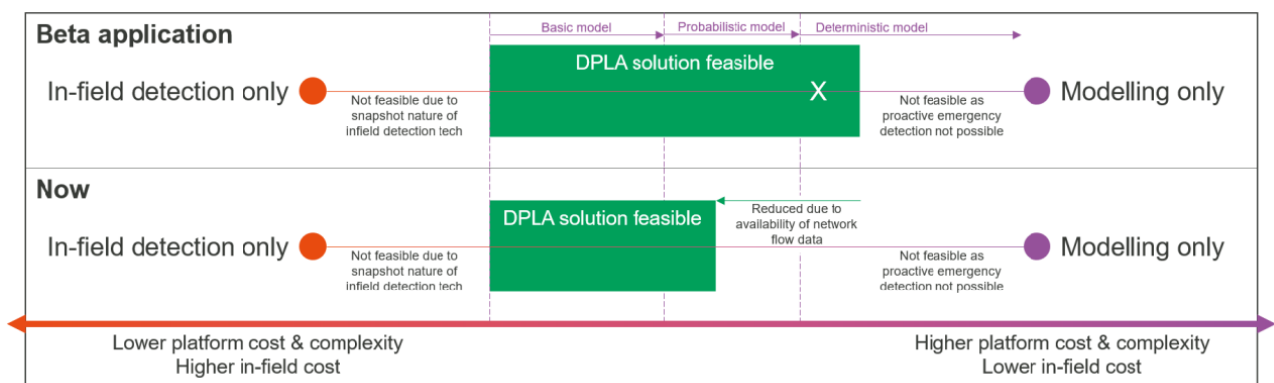


Figure 8: Beta application and November 2024

By November 2024 and based on the Beta-phase findings of our trials, we took a blended approach using modelling techniques used on high-pressure tiers (HP, IP) with lower pressure tiers (MP, LP) assessed using in-field sensor data, normalised for the point in time (and the pressure) of survey.

We have also considered the cost implications in our optioneering.

There were three core components to the costs considered for each network:

1. DPLA Platform Development: Focuses on data extraction and model development for GDNs. The project aims to create transferable tools for accelerating similar processes in other networks post-Beta phase, with a goal of significantly reducing costs, particularly for non-Cadent networks. The success of this task depends on data quality and format.
2. ALD (In-field Sensorisation): Involves using both mobile and fixed sensors and includes associated costs like vehicles and fuel. This component represents the bulk of implementation costs, with estimates based on the length of pipe networks and the number of Above Ground Installations (AGIs). Picarro technology is assumed to be utilized, and a survey of the entire Medium Pressure (MP) and Low Pressure (LP) networks is planned annually, a cautious approach compared to more frequent surveys by other networks.
3. IT Integration: Involves costs related to incorporating the DPLA platform into GDN IT architecture. A single estimate was provided for non-Cadent networks, with no costs accounted for beta-scope networks

(North London and Eastern) and low costs assumed for Cadent's other networks. Overall, the plan emphasizes cost efficiency, data management, and the gradual implementation of new technologies.

We have considered all three factors in determining our recommended programme, delivering the lowest life cost option when recognising both fixed startup costs (e.g. purchasing hardware) and running costs (e.g. labour, software licenses).

2.2.6. Advanced Leakage Intervention Programme

Targeting our interventions has been historically challenging as we did not have the ability to identify our leakiest pipes proactively. SLM, the standard industry-wide methodology for calculating emissions, widely estimates emissions at the 'cohort' level. However, in RIIO-3, we will have the tools to be targeted in our interventions, via the roll-out of DPLA and the deployment of monitoring and detection technologies, allowing us to transition from fully modelled to fully observed leakage reporting. We have already started to use a 'hybrid SLM' measure that uses available observed emissions data from North London to identify characteristics of the leakiest pipes across the entire network and target them for interventions.

A targeted proactive repair, replacement and remediation intervention programme will allow us to maximise our emissions reductions at the lowest cost, while at the same time reduce the amount of more expensive reactive interventions.

Our proposed repair, replacement and remediation programme

During RIIO-3, we propose to increase the amount of proactive asset replacements and remediations, from 10km/year/ Local Distribution Zone (LDZ) of CBA work in RIIO-2, to ~30km/year/LDZ in RIIO-3 with a focus on highest-emitting assets. This proposed programme is:

- Impactful: Reducing carbon emissions by 10%, in addition to the reduction achieved from the IMRP baseline, and provide positive net benefits to Cadent and society of ~£428m by 2050
- Feasible: Includes average work volume of ~30 km/yr per network, a ~1.05X overall vs. RIIO-2 when combined with other proposed programmes, but a ~2.2X increase in Tier 2 work volume; we have a plan to ramp-up our workforce and supply chain readiness to deliver this
- Affordable: Requires [cost-sensitive data] in Repex to deliver, requiring a ~0.1% increase in overall annual gas bills (or a ~1.0% of the network charge part) over the life of the asset.

Options Analysis and decision-making criteria

To design the optimal intervention programme for non-IMRRP mains, we considered all the interventions that deliver positive Whole Life Net Benefits by 2050 and built out options based on different volumes of work delivered over the RIIO-3 period. Where technically and economically viable, we will be using remediations enabled via robotic interventions as opposed to full replacements of assets to keep the cost of interventions low.

These 'options' include:

- Limiting each LDZ to delivering up to 10km of non-IMRRP work per year
- Limiting each LDZ to 20km per year
- Limiting each LDZ to 30km per year, while focusing on works that would be net positive by 2040
- Limiting each LDZ to 75km per year
- Unconstrained delivery of non-IMRRP work, which means each LDZ needs to deliver ~103 km of non-IMRRP works per year on average.

Options for non-IMRRP ¹ work programme	Impact			Affordability			Feasibility	
	Whole Life Net Benefit ² to 2050 £m	GD3 abatement vs. GD2 end (Hybrid SLM) CO ₂ e kt and %Δ	Repex £m	Net marginal abatement cost £/t CO ₂ e ³	Impact on HH gas bills £/yr and %Δ ⁴	Total mains work volume km	Avg. volume of work per year km/yr/LDZ	
Baseline: Reactive + PAST + IMRRP + Greys MP + North West Asbestos	327	243 (25%)	2,838	246	12.63 (1.0% 8.3%)	8,235	329	
+ 10 km/yr/LDZ non-IMRRP	302	60 (5%)	118	61 (118)	0.43 (0.03% 0.3%)	231	9	
+ 20 km/yr/LDZ non-IMRRP	462	100 (9%)	263	111	0.96 (0.07% 0.6%)	479	19	
+ 30 km/yr/LDZ non-IMRRP, WLN>0 by 2040	428	104 (10%)	391	162	1.50 (0.1% 1.0%)	750	30	
+ 75 km/yr/LDZ non-IMRRP	641	175 (18%)	862	226	3.15 (0.2% 2.1%)	1,872	75	
+ All non-IMRRP WLN>0 by 2050	721	206 (22%)	1,129	260	4.00 (0.3% 2.6%)	2,572	103	

1. For T1 steel, T2 and T3 pipes not due for replacement under IMRRP. 2. WLN>0 - Whole Life Net benefit, defined as total private benefits (net of costs of interventions) to Cadent and benefits to society. Calculated including Social Cost of Carbon (SCC), defined as the net present value of climate change impacts over the next 100 years of one additional tonne of carbon emitted to the atmosphere today, based on central HMT estimations. Currently calculated assuming programme delivered over 6 years, scaled back to 5 years of RIIO-GD3 based on lengths replaced. 3. Based on Whole Life Private Net Cost to 2050, divided by discounted incremental emissions abated to 2050 vs. the 'Reactive only' scenario. Estimated on programme over 6 years. 4. Vs. 2023 average domestic gas bill of £1,304 (based on 13,600 kWh of gas consumed in the year) and Cadent portion of ~£152, with 100% of Repex capitalised over 45 years. | Source: Cadent/ICS AIM Model

Figure 9: Assessment of options for non-IMRRP work programme based on impact, feasibility and affordability

We have aligned on a programme that is beneficial for our consumers, communities, and the environment. With these criteria in mind, our proposal to deliver 30km of non-IMRRP Mains replacement and remediations per year in each LDZ through RIIO-3 generates the optimal balance of impact, affordability, and feasibility.

Impact

The programme is expected to deliver a reduction in yearly carbon emissions of ~104kt, or 10% against our 2025/26 baseline (hybrid SLM). It will also deliver additional safety benefits, estimated at £4.8m. The programme’s broader benefits delivered to society are estimated at ~£428m in Whole Life Net Benefit to 2050 and includes benefits to customers of Cadent of £366m and social benefits (primarily from carbon abatement) valued at £887m, net of discounted Repex of [cost-sensitive data].

Which of the Future Energy Scenario pathways is likely to play out will become clearer during RIIO-3. However, given that the proposed program will be net positive by 2040, it will be 'no regrets' regardless of the future of the gas network.

Affordability

We estimate that the programme will require an additional [cost-sensitive data] in Repex to deliver over RIIO-3. This corresponds to a net cost of abatement of [cost-sensitive data] per ton of CO₂e abated. By comparison, decarbonising heating in existing homes primarily via heat pumps (accounting for ~75% of homes) and energy efficiency measures has a marginal cost of [cost-sensitive data] per ton of CO₂e abated.

Feasibility

Given the constraints expected on the supply chain and labour in the UK with large programmes of work across many utilities and infrastructure players, we also ensured the deliverability of this programme. Deliverability considerations are particularly important for Tier 2 and 3 assets replacement, which are more complex than those for our Tier 1 assets. This is because 40% of all Tier 2 assets and 70% of Tier 3 assets lie within a roadway, as opposed to 25% of Tier 1 assets. Road works typically require greater amounts of re-instatement (of, e.g., potholes) and require more permits to carry out. Further, larger diameter assets require different components (e.g., fittings).

The selected programme includes works of ~30 km/yr per network on average, which represents ~1.05X increase in the overall volume of work vs. RIIO-2 when combined with other proposed programmes and a ~2.2X increase in Tier 2 work volume. This implies a need to maintain our RIIO-2 workforce across the RIIO-3 period while ramping-up our capabilities in delivering Tier 2 works. Figure 10 lays out the comparative workloads under each option during RIIO-3 and the change vs. the workload during RIIO-2.

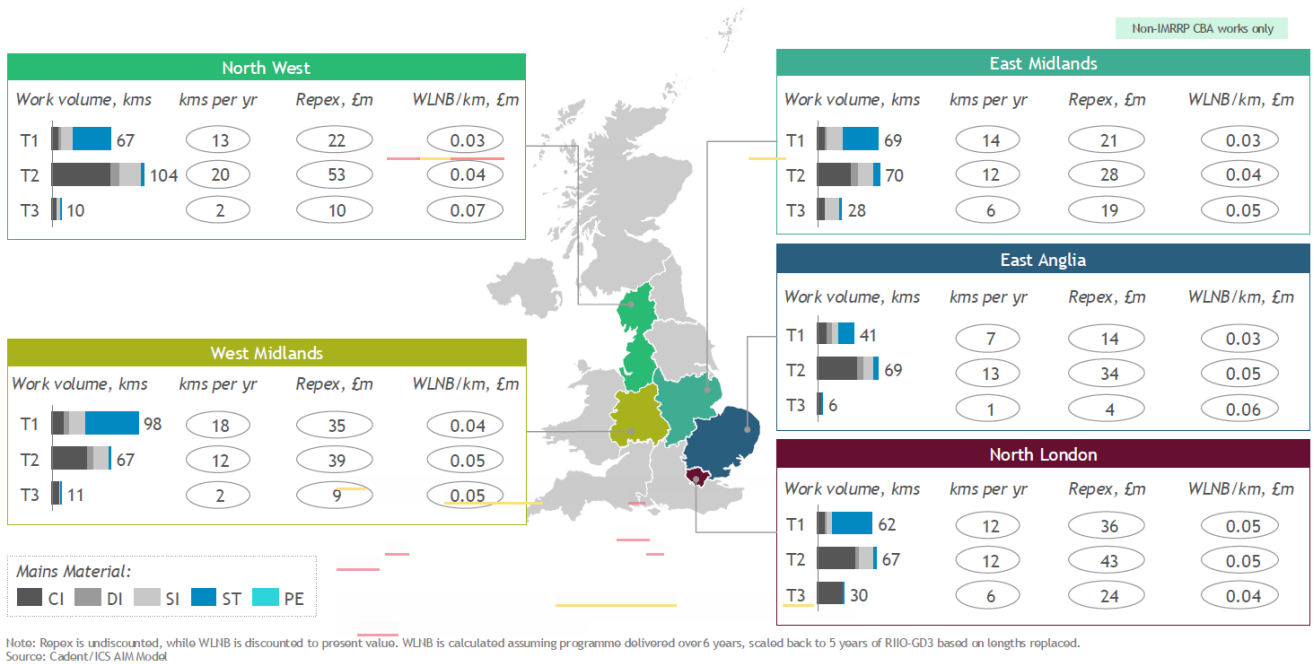


Figure 10: Selected programme prioritises T1 steel and T2 CI works

2.2.7. Shrinkage (SLM) 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 before pressure reduction (own use gas) and gas that is stolen upstream of the meter (theft of gas). We have reported shrinkage performance under the RIIO-3 scenario in the M8.17 Data Table – Environment which includes the projected total shrinkage emissions during this period and the amount of leakage through main and service pipes, demonstrating the projected reduction in leakage when actions from the EAP are implement.

Whilst we are placing significant emphasis on leakage, we note that overall gas shrinkage is driven by a combination of factors including theft of gas and our own use of gas. We will continue to focus on these additional areas, maintaining low levels of gas waste and driving improvements over the period.

We will continue to work alongside stakeholders and ISGs to establish our stretching target to reduce shrinkage by 10% at the end of RIIO-3. As the SLM is owned by the GDNs, we will continue to work together to ensure a consistent approach in the processes or target setting and reporting data comparability.

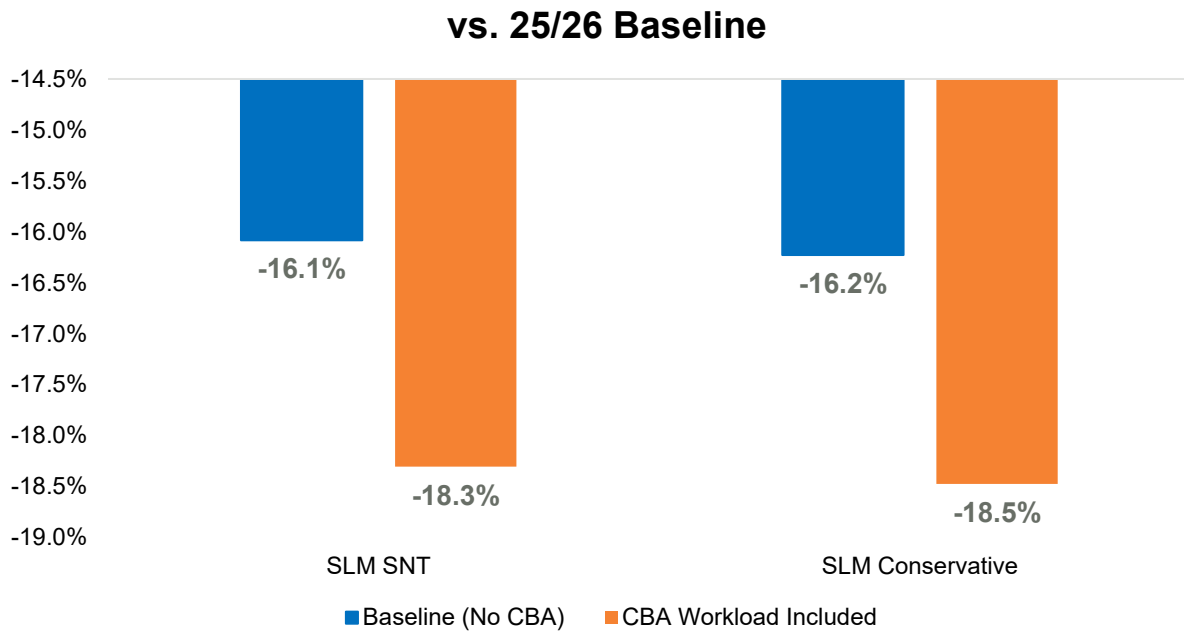


Figure 11: Shrinkage reduction vs. 2025/25

We will continue to measure and report our total shrinkage levels, based on total Shrinkage (GWh), average pressure (mbar), average monoethylene glycol injections and based on both energy levels (TWh), modelled mains and mains/ service leakage at in-year pressure, including carbon emissions (tCO₂e/y). We will report on these KPIs against our forecasts and activities undertaken to mitigate shrinkage in our AER.

Whilst this action captures our commitment to be transparent and report on these figures and deliver an overall shrinkage reduction of 16% at the end of RIIO-3, the actions below describe how the various components that makeup leakage will be delivered in more detail.

2.2.8. Purging and Venting Operational Advancements

During RIIO-2, we continued to trial new technologies and engineering techniques that reduce or eliminate methane leakage during the commissioning of new pipes and other engineering work. In RIIO-3, we expect a number of the new techniques to be proven and implemented, for example, by using a Vacuum Purge which removes all air before gas is introduced to the newly commissioned pipeline, removing the need to purge and ultimately leaking methane into the atmosphere. We are targeting a >5 ktCO₂e reduction in leakage emissions from these innovations. These projects will be funded through the net zero use it or lose it allowance.

2.2.9. Optimising Pressure Management

We will continue to manage network pressures to achieve the optimal balance that delivers outstanding network reliability and minimised leakage.

A comparison of our pressure performance in our four networks is shown in the table below, which is demonstrating the equivalent pressure profile our forecast years are utilising.

Average system pressure	Eastern	North London	North West	West Midlands
2023/24 average system pressure (mbar)	29.0	26.3	26.9	26.3
Future year equivalent pressure (mbar)	29.9	27.1	27.7	27.1
Increase / (decrease)	0.9	0.75	0.8	0.75

Table 6: Average system pressure

This will be reinforced through continual improvement initiatives such as the SIF-funded 'Intelligent Gas Grid' project, which allows networks to minimise excess pressures, identify network anomalies (e.g. leaks/water ingress), and can support biomethane injection projects through network optimisation. There is the potential to deliver >1 ktCO₂e reduction in leakage emissions from the state without these innovations.

2.2.10. Reducing our business carbon footprint

We have made significant progress in reducing these emissions during RIIO-2, reducing Scopes 1 and 2² (excluding shrinkage) from 31,623 tCO₂e to 26,972 tCO₂e after the first three years. We will reduce this further in the remaining two years, delivering a minimum of a 30% total business carbon footprint (Scope 1, 2, and 3 including shrinkage) reduction in 5 years.

Our business carbon footprint data has successfully been verified for the last three years by The Carbon Trust. Our Greenhouse Gas (GHG) emissions for these financial periods have been verified in accordance with ISO 14064-3. The scope of works included Scope 1: natural gas, diesel, and petrol for vehicles, mileage by cars for business use, gaseous fuels, and gas oil. Scope 2: purchased electricity and Scope 3: Business Travel only. Having good quality, accurate data, which is verified to criteria defined in the GHG Protocol will help support us to deliver reductions each year.

In RIIO-3, we will continue to drive this number down further through additional electrification or alternative-fuelled vehicles in the fleet. This builds on the current 472 EV vehicles and 330 charging points delivered in RIIO-2. Our company car scheme will continue to offer electric vehicles, and hybrid working options support our employees to reduce their emissions from business miles. We will continue to upgrade our property portfolio and put in additional measures to reduce energy usage in operational activities and through office and depot management, our supply chain, and embodied carbon through mains replacement.

2.2.11. Encouraging our supply chain and customers to reduce emissions

By measuring and monitoring our Scope 3 emissions, we can decarbonise and reduce embodied carbon from our supply chain and in materials we purchase. Through work with The Carbon Trust and reviewing their recommendations on our Scope 3 emissions, we are working closely with our supply chain and suppliers to increase data management, reporting methodologies and analysis on the top materiality of products we purchase. We have increased our categorisation of Scope 3 emissions and increased reporting frequency in this area.

Working with the other GDNs, our Supply Chain and from baselining our Scope 3 emissions at the end of 2025/26 we will look to target a 10% reduction in Scope 3 emissions associated with embodied carbon in projects over a certain value threshold (for example [cost-sensitive data]; once agreed with the other GDNs). This will follow setting a materiality threshold in any new projects that require reporting of embodied carbon emissions.

During RIIO-2, we started working with our Supply Chain to report on embodied carbon in key products and services, such as PE pipe and contractors delivering our mains replacement work. We will aim to expand our monitoring, reporting, and target setting through collaboration with suppliers identified based on spend.

Collaboration in our supply chain is critical to driving down emissions and maintaining a high standard of environmental management. Our Supplier Code of Conduct will be made available and adopted by our suppliers, with a target of 80% or more of suppliers (by value) meeting this code by the end of RIIO-3. We will expand on reporting and measuring Scope 3 emissions beyond RIIO-2 based on value and using a suitable reporting portal.

2.2.12. Measuring and reporting our carbon emissions

In RIIO-2, we aligned our business carbon footprint reduction to a Well-Below 2°C scenario reduction pathway. If SBTi develops and publishes a methodology that can be applied to oil and gas companies, we will seek accreditation do so in RIIO-3

However, to assess Cadent's emission reduction trajectory, before the start of RIIO-3, we will evaluate and assess our business carbon footprint against climate science-based targets and review targets to keep global

² Scope 1 covers direct emissions from owned or controlled by Cadent. Scope 2 covers indirect emissions from the purchase and use of electricity, steam, heating and cooling. Scope 3 includes all other indirect emissions that occur in the upstream and downstream activities by Cadent

temperatures increase below 2°C and aim to below 1.5°C trajectory. We will publish our targets and business carbon footprint performance against this emission reduction annually through the AER.

2.2.13. Net Zero Construction site and embodied carbon

During RIIO-2 Cadent has worked with its construction partners to trial and embed numerous measures to reduce the carbon footprint of construction projects. These initiatives will continue throughout RIIO-3, adopting new technologies and techniques as they become available and seeking to innovate using the various innovation allowances available to us. We look to our suppliers to support us in meeting our environmental policy objectives and to take a proactive approach in reducing our environmental impact. It is a collaborative effort in which we all need to play a part. We expect our Supply Chain to collaborate with Cadent in addressing challenges to reduce embodied carbon in products and materials purchased.

Case study: Burwell net zero project

As our large construction projects utilise and use many different services and materials, we are keen to fully understand the embodied carbon of strategic projects.

We worked at the Feasibility Design Study Stage with Murphy Applied Engineering and Mace Group Ltd to conduct a Carbon Life Cycle Assessment (LCA) on our Burwell Net Zero project, to establish a baseline carbon impact for the project.

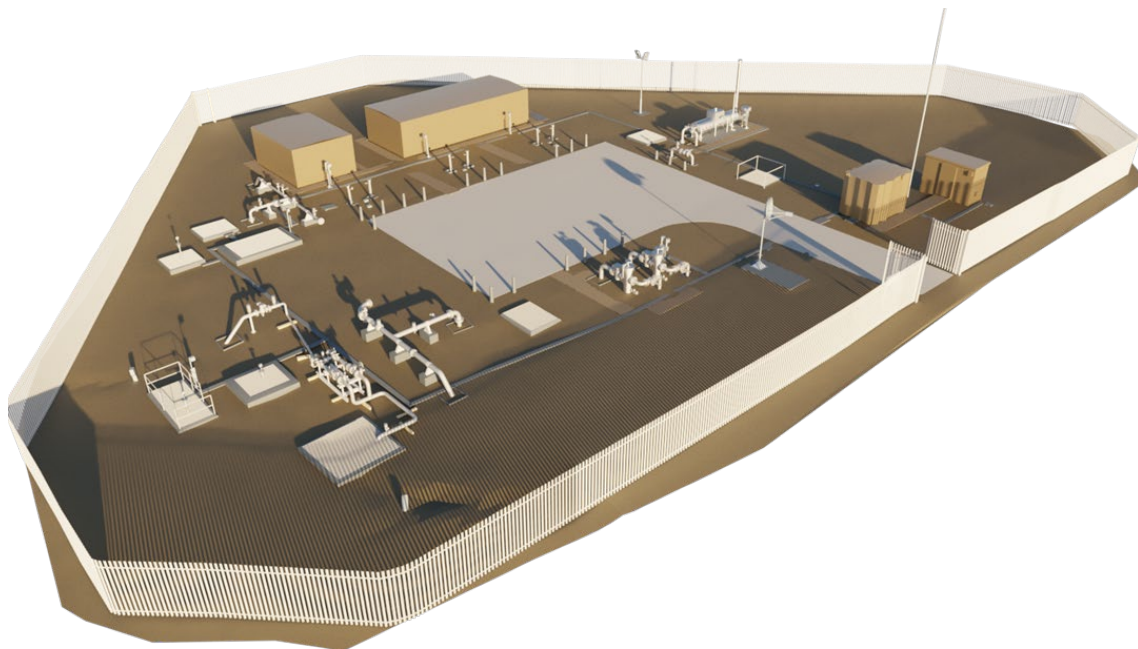


Figure 12: Design stage of Burwell

An LCA is an analysis of the environmental impacts associated with a project or asset over its entire life cycle including from raw material extraction, manufacturing, transportation, operation, and eventual disposal or recycling of the assets. The LCA findings provided essential insights into the carbon hotspots within the asset life cycle. This has enabled the project team to determine which areas needed the most attention to achieve significant carbon reductions.

This approach allowed for informed decision-making throughout the design process. Upon consideration of the various design changes, the Feasibility Design Study identified up to 77.5% carbon reductions could be achieved if all solutions identified within the study were to be implemented.

2.2.14. Energy Efficiency of our Customers

In addition, we will extend our customer vulnerability programme to provide even more energy efficiency support to our customers. Whilst the primary advantage of this work is to reduce energy costs, especially for customers living in or close to fuel poverty, the secondary benefit is less carbon emissions from lower energy usage. In RIIO-3, we will provide at least 200,000 of our customers with an in-home energy efficiency assessment, recommending improvements, of which over 30,000 will be funded by the Cadent Foundation.

2.2.15. Carbon Pricing

Carbon pricing is an instrument that captures the cost of greenhouse gas emissions and is used as an approach to reduce emissions through market mechanisms and decision-making when a cost is applied to the emissions. By setting an internal carbon price, we can use the monetary value in key investment decisions. Cadent will explore setting an internal carbon price for projects or investments over an agreed value.

Action	Description	Benefit
B2.1 - Leakage	We will continue to calculate leakage levels using the industry Shrinkage and Leakage Model (SLM), reporting annually against leakage levels by both energy lost (TWh) and carbon emitted (tCO ₂ e/y), along with reporting our average system pressures and gas conditioning across all four networks	Calculation of leakage from the network in terms of energy lost (TWh) and carbon emitted (tCO ₂ e/y) We will deliver a 16% reduction in our leakage emissions through our IMRP.
B2.2 Advanced Leakage Detection	We will roll out a fleet of vehicle mounted leakage detection sensors across all four networks by 2027	Real time, accurate, methane leakage data
B2.3 Digital Platform for Leakage Analytics	We will embed a new digital platform to capture and analyse an increasing level of real time leakage data points, enabling a far more targeted leakage reduction programme through mains replacement and other asset management interventions	Sophisticated modelling capabilities to deliver optimised leakage reduction decisions
B2.4 Advanced leakage Intervention Programme	We will deliver 30km of non-IMRRP Mains replacement and remediations per year in each LDZ through RIIO-3, in addition to our planned IMRRP work and other Major Projects.	A reduction in yearly carbon emissions of ~104kt, or 10% against our 2025/26 baseline (hybrid SLM). The programme's broader benefits delivered to society are estimated at ~£428m in Whole Life Net Benefit to 2050 ³
B2.5 Shrinkage (SLM) Reduction	We will continue to measure and report our shrinkage levels, based on both energy levels (TWh) and carbon emissions (tCO ₂ e/y) and include these figures, against our forecasts in our Annual Environmental Report. We will maintain our focus on minimising our own use gas and working collaboratively across the industry to reduce theft of gas levels	Continuous reporting of shrinkage emissions against forecast in the Annual Environmental Report, including activities undertaken to help mitigate shrinkage Estimated reduction of Shrinkage by 158,800 tCO ₂ e at the end of RIIO-3
B2.6 Purging and Venting Operational Advancements	In RIIO-3, we expect a number of the new techniques to be proven and implemented, for example, by using a Vacuum Purge which removes all air before gas is introduced to the newly commissioned pipeline, removing the need to purge and ultimately leaking methane into the atmosphere. We are targeting a >5 ktCO ₂ e reduction in leakage emissions from these innovations. These projects will be funded through the net zero use it or lose it allowance.	>5 ktCO ₂ e reduction in leakage emissions
B2.7 Optimising Pressure	We will continue to manage network pressures to achieve the optimal balance that delivers outstanding network reliability and minimised leakage. This will be reinforced through continual improvement initiatives such as the SIF funded 'Intelligent Gas Grid' project, which allows networks to minimise excess pressures, identify network anomalies (e.g. leaks/water ingress) and can support biomethane injection projects though network optimisation.	>1 ktCO ₂ e reduction in leakage emissions

³ WLNB = Whole Life Net benefit, defined as total private benefits (net of costs of interventions) to Cadent and benefits to society. Calculated including Social Cost of Carbon, defined as the net present value of climate change impacts over the next 100 years of one additional tonne of carbon emitted to the atmosphere today, based on central HMT estimations. Currently calculated assuming programme delivered over 6 years, scaled back to 5 years of RIIO-3 based on lengths replaced.

<p>B2.8 Reducing our Business Carbon Footprint</p>	<p>During RIIO-2 Cadent reduced its BCF⁴ through several initiatives including renewable energy procurement in our offices and depot, to electrifying our commercial fleet and option for EV company cars. During RIIO-3, we will reduce this further by 13%:</p> <ul style="list-style-type: none"> • Maintain our EV first responder fleet of 50% • Explore Hybrid options should they be suitable for our 3.5 tonnes vehicle replacement • Review feasibility options to install solar panels at sites where they are not in place and it is viable to do so • Continue to refurbish and enhance our sites with a key focus on sustainable savings <p>Continue to work with our suppliers to expanding on scope 3 category reporting</p>	<p>Aligned to our science-based target trajectory, Cadent will reduce our Scope 1 and 2 emissions, excluding shrinkage by 13% over RIIO-3.</p> <p>Report BCF (Scope 1, 2 and 3) in the Annual Environmental Report against target</p>
<p>B2.9 Scope 3 emissions</p>	<p>Our Supplier Code of Conduct will be made available and adopted by our suppliers, with a target of 80% or above of suppliers (by value) meeting this code by the end of RIIO-3. We will expand on the reporting and measuring of Scope 3 emissions beyond RIIO-2 based on value and using a suitable reporting portal</p>	<p>Supplier Code of Conduct adopted by 80% or more of suppliers (by value). The net reduction in scope 3 emissions over the RIIO-3 period. Baseline to be established and progress against it during the period. Report on scope 3 emissions based on the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard.</p>
<p>B2.10 Measuring and reporting our carbon emissions</p>	<p>In our RIIO-2 EAP, we committed to becoming accredited through the SBTi in our measurement of carbon emissions. If SBTi develops a methodology that can be applied to oil and gas companies, we will do so in RIIO-3. However, to assess Cadent's emission reduction trajectory, during RIIO-3, we will evaluate and assess our business carbon footprint against climate science and review targets to keep global temperatures increase below 2°C and an aim to below 1.5°C trajectory. We will publish our targets and performance against this emission reduction. In the meantime, we will continue to gain external accreditation and during the price control period to support Cadent through the net zero pathway by conducting carbon data verification annually.</p>	<p>Visibility, comparability, transparency and a key enabler to deliver many of the benefits listed above. Report on BCF scopes 1 and 2, and progress towards science-based targets and net zero, using the GHG Protocol Corporate Accounting and Reporting Standard; and external data verification.</p>
<p>B2.11 Net z Net zero Construction Sites and Embodied Carbon</p>	<p>During RIIO-2 Cadent has worked with its construction partners to trial and embed numerous measures to reduce the carbon footprint of construction projects. These initiatives will continue throughout RIIO-3, adopting new technologies and techniques as they become available and seeking to innovate using the various innovation allowances available to us. This will include our ongoing work to support the development of new products, such as cement-free alternatives to concrete and tar-free road surfacing using recycled tyres. For these to become commercially viable, both the economic and safety cases for such</p>	<p>2 ktCO₂e reduction in emissions</p>

⁴ This includes Scope 1, 2 and 3 carbon emissions, excluding Scope 1 emissions related to shrinkage

	products require additional support, which we will provide.	
B2.12 Energy Efficiency of our customers	We will provide at least 200,000 of our customers with an in-home energy efficiency assessment recommending improvements with direct funding being made available from the Cadent Foundation to deliver energy efficiency improvements in the homes of those most in need.	Downstream customer emission saving of 60,000 t/CO ₂ e ⁵
B2.13 Carbon Pricing	Carbon pricing is an instrument that captures the cost of greenhouse gas emissions and is used as an approach to reduce emissions through market mechanisms and decision-making when a cost is applied to the emissions. By setting an internal carbon price, we can use the monetary value in key investment decisions. Cadent will explore setting an internal carbon price for projects or investments over an agreed value.	Visibility, comparability, transparency, and a key enabler in decision-making using carbon pricing to help deliver savings listed above.

Table 7: B2 Summary of Actions

2.2.16. Carbon Reduction Impacts Across Our Investment Decision Packs

Ofgem's guidance sets out a requirement on us to draw together the direct carbon impacts we claim across our Investment Decision Packs (IDPs) where these investments are the main driver of the proposal, and where carbon reductions represent a substantial benefit by the project. We have summarised this information in the table below:

IDP designation	IDP name	Level of carbon reduction driving investment
EJP09	Cost Beneficial Mains Replacement	Main driver
EJP03	Filters on Offtakes & PRS	Substantial carbon benefit
EJP04	Governor interventions	Substantial carbon benefit
EJP08	Mains IMRRP	Substantial carbon benefit
EJP17	Pressure Reduction on Offtakes & PRS	Substantial carbon benefit
MJP07	Grays Medium Pressure	Substantial carbon benefit

Table 8: IDP designations

In addition to those IDPs mentioned in this table, there will be further carbon reductions driven by our investment programme, however, these are currently unaccounted for in our modelling (and hence not attributable via the table above). Specifically, we are pursuing opportunities to reduce venting, either by eliminating the need to take equipment out of line (vent a system of gas so we can physically remove it from the system) for maintenance and inspection (FWACV programme) and introducing non-venting technology which reduces venting of gas during normal operation.

2.3. Sustainable use of resources (B3)

This part of our EAP considers the impact of our business operations on our physical environment under the following headings:

- Spoil and other waste associated with excavations
- Resource use of materials and environmental impacts associated with their use
- Direct waste generated through our operations and the maintenance of the network

This waste reduction releases financial benefits in addition to environmental improvements. We have set a target of zero avoidable waste to landfill. Achieving and maintaining this goal requires behavioural change amongst our employees as well as changes in facilities managing incoming materials. We have implemented wide-ranging

⁵ Based on reducing carbon emissions by 5% at 30,000 UK households, with the average household currently emitting 8.1 tCO₂e per year. Not included in Cadent's Business Carbon Footprint reporting

improvements at our sites to promote the segregation of waste, which we continue to learn from and improve. This is enabling increased recovery and recycling of a wider range of materials.

In 2018 the UK Government signed the Plastic Pact committing to eliminate problematic plastics in the environment. Plastic is a hugely important commodity in view of its resilience, strength and flexibility and for many uses it remains an ideal material, including the use of PE pipe and fittings as replacement gas distribution materials.

As a responsible business, it is incumbent on us to become more resource-productive, manage our consumption of finite natural resources and reduce the amount of waste material that we dispose of. We have embedded a highly effective environmental management system and supporting control measures to avoid or mitigate environmental impacts and have used the system to show how we can drive even greater performance through the RIIO-3 period.

We have made significant strides in the management of waste as a result of our direct activities. We have reduced the amount of single-use plastic waste by 95% since the start of RIIO-2 and less than 3% of all waste is now sent to landfill. Network-wide engagement on waste segregation and resource efficiency has resulted in a reduction in general waste of 33.6% over the RIIO-2 period.

Through the AER, Cadent will report updates on progress to our commitments and data on actual waste to landfill, recycling and reuse as a percentage of total waste generated.

2.3.1. Waste Reduction

Whilst we aim to divert all excavated waste from landfill, we cannot control what we find during excavation and there are some problematic categories of waste, such as asbestos-containing materials or other types of hazardous contamination, for which landfill remains the most appropriate solution.

Hazardous spoils or those found contaminated with other materials such as asbestos, glass-reinforced plastics, hydrocarbons, and some types of glass are all examples of wastes for which landfill is currently the most viable option although subject to additional testing and disposal costs this may create. We are committed to going even further than we have in RIIO-2 ensuring that at least 97% of excavated spoil from our mains replacement programme. Changes in regulatory requirements to assess and classify wastes from utility excavations may, however, drive more waste to landfills and incur greater costs to Cadent in the short term due to uncertainty in implementation.

Achieving these targets will support a more circular approach to the management of a high-volume waste stream. It will also help to promote effective management of spoil, especially segregation of wastes. Similarly setting challenging targets for waste management supports further innovation to reduce spoil arisings from no- or low-dig approaches to mains replacement and repair. Cadent will adopt targets of zero waste to landfill by 2032 at the latest.

2.3.2. Resource Reduction

We aim not to import any first-use aggregate to backfill our excavations, however, the economic, and environmental costs of transportation, and sometimes geographical locations of works mean that this is not always appropriate. We will report on the recycled and reuse materials as a percentage of total measurable materials where feasible by 2027.

2.3.3. PE Pipe and Fittings Reuse

During RIIO-2, Cadent will have purchased around 2,200km of PE plastic pipes (or varying diameters) per year for our mains replacement programme, with the potential to generate high levels of waste.

In RIIO-3, we will significantly reduce this level of waste through:

- Improved design of schemes
- Updated logistics and commercial arrangements
- Greater measurement and reporting
- Reuse of fittings whilst ensuring engineering integrity remains

We have trialled alternatives to plastics for packaging and transport of fittings and we are working with our suppliers to address the use of plastics in our supply chain, particularly the delivery of the large volumes of PPE that we use, demonstrating that they drive positive economic and environmental solutions. We have introduced

greater weighting for environmental and sustainability criteria in procurement exercises – for instance, requiring the development of a closed-loop supply of plastic barriers, cones, and other street furniture and will report on how we have included environmental and sustainability factors in our procurement processes. These good practices will be maintained and reported to ensure the strong foundations set in the current price control period remain intact as we seek further improvements in RIIO-3. An element of waste is unavoidable, but we will reduce this by 50% over the period.

2.3.4. Eliminating Single-Use Plastics

At present the total tonnage of single-use plastic incoming from our supply chain stands at 65,067 kg per year. Through initiatives designed and implemented during RIIO-2, we have ensured that 90% of this is converted into recycled plastic. During RIIO-3, we will continue to focus on commercial, operational, communication, and supply chain initiatives to increase this up to 100%.

2.3.5. Water Management

Cadent operates across the North West, West Midlands, Eastern, and North London, and due to their geographical locations, there is a variation between those in water stress areas and those with a more regular surplus of water.

Whilst water use is primarily in our offices and depots for kitchen, toilet and washing facilities measure and baseline water use from our office, and buildings and used in operations. We will set a baseline of water consumption, develop an action plan and review any investment requirements to reduce our water consumption by an agreed target at the end of RIIO-3.

Action	Description	Benefit
B3.1 Waste reduction	<p>Whilst spoil generation from the mains replacement programme is our largest volume of waste generated by source, we have made excellent progress with spoil management during RIIO-2, with less than 3% of all waste being sent to landfill across the networks. Further, work across the networks to divert all spoil waste (where regulatory practicable) from landfill</p> <p>We will continue to work internally and across our supply chain and contract partners to reduce waste through reduction, recycling, and reuse initiatives to deliver an incremental 2% reduction in spoil to landfill year on year through the regulatory period, with an aim of zero waste to landfill where regulatory possible.</p>	Up to 13,200 tonnes of spoil diverted from landfills.
B3.2 Resource Reduction	<p>To continue with our performance in resource management and minimising the need for virgin materials, we aim to use less than 4% virgin aggregate as a total during backfill and reinstatement works across the networks.</p> <p>Achieving these targets will support a more circular approach to the management of high-volume resource use. It will also help to promote effective management of aggregates and material management.</p>	92,600 tonne reduction virgin material during the RIIO-3 period
B3.3 PE Pipe and fittings Reuse	<p>During RIIO-2, Cadent purchased around 2,200km of PE plastic pipes (or varying diameters) per year) for our mains replacement programme</p> <p>In RIIO-3, we will significantly reduce this level of waste through:</p> <ul style="list-style-type: none"> • Improved design of schemes • Updated logistics and commercial arrangements • Greater measurement and reporting • Reuse of fittings whilst ensuring engineering integrity remains <p>An element of waste is unavoidable, but we will reduce this by 50% over the period.</p>	Reduction of over 1,000km of PE pipe waste during the RIIO-3 period, weighing 2,250,000kg.
B3.4 Eliminating single-use plastics	At present the total tonnage of single-use plastic incoming from our supply chain stands at 65,067kg per year. Through initiatives designed and implemented during RIIO-2, we have ensured that 90% of this is converted into recycled plastic.	Reducing a baseline of 32.5 tonnes of single-use plastic waste by at least a further 50% - thus a reduction of 16.25 tonnes in the period,

	<p>During RIIO-3, we will continue to focus on commercial, operational, communication, and supply chain initiatives to increase this to 100% whilst reducing the volume of plastic packaging required for products.</p>	
<p>B3.5 Water</p>	<p>Cadent operates across the North West, West Midlands, East Midlands, East of England and London and due to the geographical locations there is a variation of those in water stress areas and those with a more regular surplus amount of water We will set a baseline of water consumption, develop an action plan and review any investment requirements to reduce our water consumption by an agreed target at the end of RIIO-3.</p>	<p>To develop a water management plan to improve network waste efficiency, use and drive down consumption through behaviour change</p>

Table 9: B3 Summary of Actions

2.4. Biodiversity Management and Natural Capital (B4)

Cadent’s land ownership supports the range of network and operational needs required to distribute gas to where it’s needed. This includes land that consists of office and depot buildings, operational assets, car parks, and often other built-over, hard-standing surfaces on our Pressure Reduction Stations.

As well as office and operational land footprint, Cadent also impacts on land and biodiversity through the installation of new pipelines, pipeline diversions or other new projects. Each location will host a wide variety of biodiversity opportunities, whether small and local at a depot to large scale and offering net-gain opportunities on new pipelines projects. We can positively impact the biodiversity and habitat value in our local communities, supporting local ecosystems and services.

2.4.1. Biodiversity Surveying

In RIIO-2, we committed to surveying all our ‘key site’ land holdings, to understand our biodiversity baseline units and developing action plans for net gain and ecological improvements on such sites. By using the DEFRA biodiversity metric, we have surveyed 84 sites during the first three years of RIIO-2. Of these, just over 30 will not provide any net gain or benefit from any action plans that we could implement, and as such, we will not seek to develop or enhance these sites.

We will continue to use the DEFRA Biodiversity metric tool to assess net changes in biodiversity from projects where a survey was conducted. Any new projects or connections that meeting the Schedule 7A of the Town and Country Planning Act 1990 (as inserted by Schedule 14 of the Environment Act 2021) for reporting on Biodiversity Net Gain will have a survey and report on the findings. This will include any surveys and biodiversity benchmarking as part of the local planning process required by legislation. We will report on the number of surveys per year through the AER.

Of the remaining sites, we have started to create action plans for five sites during the remaining 2-years of RIIO-2 and will undergo an external biodiversity benchmark assessment. Enhancing these five sites will also contribute to achieving a 30% biodiversity net gain target. We worked with Carbon Trust and other key stakeholders to assess if 30% was the right target. We considered a range of options confirmed that, given our relatively low land ownership, there was likely to be a disproportionately higher cost for making relatively marginal further improvements. This was backed up through our assessment of impact (in our hierarchy of impact) which supports further investment on more impactful initiatives, such as methane leakage reduction.

2.4.2. Biodiversity Benchmarking

We are working with a third-party consultant to fully review our biodiversity and habitat management systems, creating a standalone biodiversity policy and creating bespoke site action plans to deliver key biodiversity enhancement. This positions Cadent to become aligned to an external biodiversity benchmark and recognise the dedication and management we have on biodiversity aspects across our networks.

Building on biodiversity net gain, we will continue to create and improve natural habitats on the existing key sites. During RIIO-3, we will seek to implement biodiversity action plans at a further of the 15 surveyed sites. Again, this will help us achieve the 30% net gain improvement across our entire land ownership before 2030; an ambitious target we set ourselves in 2021, when setting out our sustainability and social targets in ‘Our Social Purpose’, which is published on our website.

Additionally, we will regularly report through our AER, changes in natural capital and ecosystem service provisions following on-site surveys and where this data is available. Building on our land awareness and longer-term development of our biodiversity policy and strategy, Cadent will also regularly report on actions taken to assess and remedy the impacts of any applicable activities conducted within National Parks.

2.4.3. Nature-based Improvements in Local Communities

During 2023, we worked with the leading sustainability consultancy, Sia Partners to undertake a thorough assessment of our carbon offset strategy. This involved engaging with 27 expert organisations specialising in sustainability and hundreds of Cadent’s customers to explore options. Following several detailed discussions with the Cadent Board (through its Sustainability Committee) we concluded that we would not seek to invest in carbon offsetting initiatives where the key driver was carbon abatement; at least until all unavoidable emissions are tackled directly first.

An example of this has been a project we’ve led at Parliament Hill in London. The partnership project has helped to lower the risk of flooding through the creation of a new rain garden that will capture rainwater and ease the pressure on the local Thames Water sewer network during periods of intense rainfall. It involved collaboration with the Greater London Authority, Morrison Energy Services, Camden Metis (for the SuDS design), and the Environment Agency. Landscapes and drainage systems support diverse habitats, and the associated ecosystems provide a healthy and stimulating environment that can add value to urban living.

The work was undertaken with minimal disruption saving 21 days of possible additional road closures and public impact. During RIIO-3 we will deliver at least one such scheme in each of our four Networks.

2.4.4. Nature-based solutions and partnerships

Cadent will partner with a project developer or landowner (such as The Woodland Trust) to develop and protect a bank of CO₂ which is vital for the UK’s net zero targets and biodiversity targets. Through such a partnership, Cadent, who does not have a significant land portfolio will deliver long-term carbon removal, significant social co-benefits, and an expansion of urban green space. The partnership will track and report on carbon credits generated biodiversity, and social and ecological benefits to meet wider commitments.

We worked with the Sia Partners to consider a range of options ranging from traditionally carbon offsetting to local nature based partnerships (and considerations in between). The options considered are summarised in the figure below:

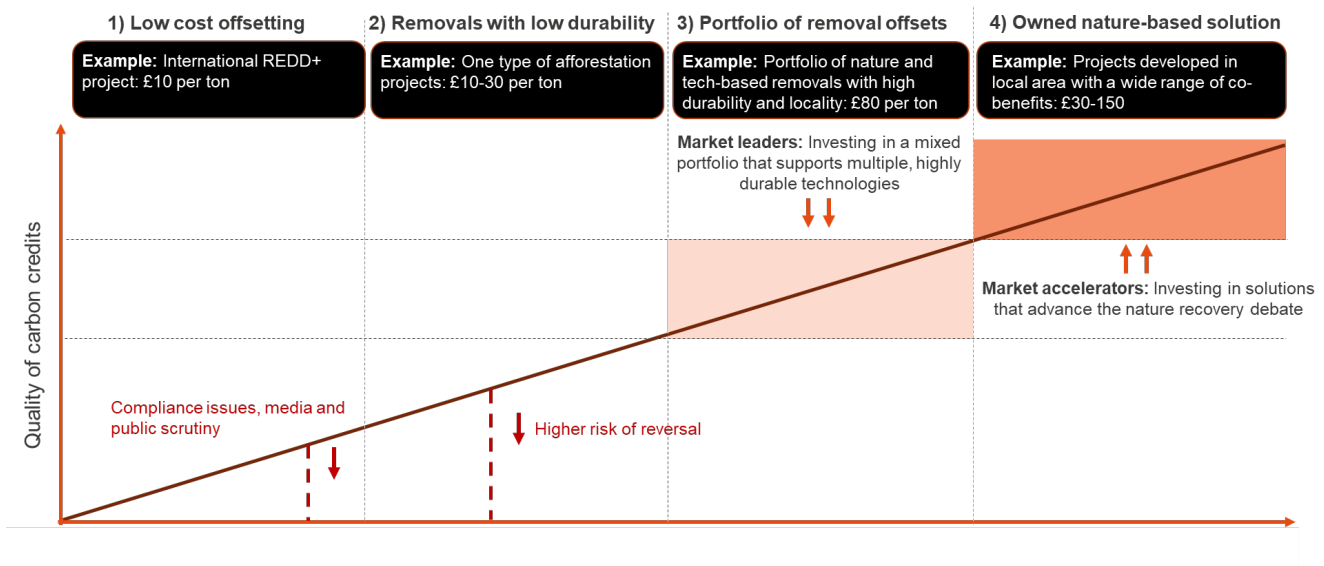


Figure 13: Nature-based solutions and partnership options

We engaged with our ISG, SCG, and considered views of customers, and expert stakeholders and overlaid an assessment of current market sentiments and the latest regulatory pressures in determining our preferred option. A more detailed assessment of these options can be provided on request.

Action	Description	Benefit
B4.1 Biodiversity surveying	<p>During RIIO-2 we have surveyed 84 of our key sites, consisting of AGIs and Depots, to baseline units and complete feasibility reports. From this we will implement action plans with a re-survey on approximately 70% of sites. We have an ambition to achieve at least a 30% biodiversity DEFRA Unit increase by 2030 through the creation of Biodiversity Action Plans.</p> <p>At certain sites we will partner with local or national conservational charities, such as RSBP (Royal Society for the Protection of Birds or the Local Forestry Commission) to develop location specific habitat and nature improvements.</p>	External biodiversity recognition at key site locations and the implementation of action plans for resurveying
B4.2 Biodiversity Benchmarking	<p>During RIIO-2, we have conducted and assessed 5 key sites for their biodiversity management, potential and areas of risks to create action plans. We aim to have these assessed externally.</p> <p>During RIIO-3, we aim to expand on these learnings and assess further sites in the networks, identifying biodiversity improvements and implementing action plans to increase the biodiversity potential score by 30%</p>	Biodiversity Net Gain of 30%
B4.3 Nature-based improvements in local communities	<p>During RIIO-2, we have identified a small number of sites in which we have been able to work with local communities to support targeted nature-based solutions as land has been repurposed following our mains replacement activities.</p> <p>During RIIO-3 we will deliver at least one such scheme in each of our four Networks.</p> <p>A key example in RIIO-2 is the site at Parliament Hill, described above.</p>	Each Network will benefit from a Nature-based solutions, supporting climate change sequester carbon, reduce urban temperatures, prevent floods, and increase community resilience.
B4.4 Nature based solutions and partnership	<p>Cadent will partner with a project developer or landowner (such as The Woodland Trust) to develop and protect a bank of CO₂ which is vital for the UK's net zero targets and biodiversity targets. Through such a partnership, Cadent, who does not have a significant land portfolio will deliver long-term carbon removal, significant social co-benefits and an expansion of urban green space. The partnership will track and report on carbon credits generated and biodiversity, and social and ecological benefits to meet wider commitments.</p>	20,000 tCO ₂ e removed (offset), equating to a range of £700k-£2.7m, using the range of carbon costs in the UK Gov's Green Book

Table 10: B4 summary of actions

2.5. Reducing environmental impacts from operations and projects (B5)

We have made significant improvements in environmental awareness and reporting in our supply chain. At the start of RIIO-2, we became a member of the Supply Chain Sustainability School (SCSS) to further embed sustainability into our business and across our supply chain. Being a partner of the SCSS has enabled us to broaden our understanding, and including that of our suppliers, of the impact we had on the environment. With the School's help and the platform provided, we have built on our knowledge to meet our sustainability goals and continue our journey to net zero emissions.

Using a reporting tool, our delivery partners, suppliers, and Construction projects can report the carbon associated with activities undertaken. This supports Cadent in the reporting of our Scope 3 emissions, but also in understanding the embodied carbon of goods and services.

2.5.1. Embed circular economy principles

The circular procurement framework provides an overview Cadent can use in making purchasing decisions. The circular economy is based on three principles: designing out waste and pollution, keeping products and materials in use at the highest possible value, and regenerating natural systems. During RIIO-3, Cadent will review and

update our procurement process to embed circular economy principles with our top suppliers, and to identify and pilot further opportunities to implement and refine this framework with our top suppliers based on spend.

2.5.2. A lifecycle assessment of street works

Cadent's Capital Delivery team are responsible for large construction projects worked to develop our first Net Zero construction site trial to eliminate carbon through design. An LCA is an analysis of the environmental impacts associated with a project or asset over its entire life cycle, including raw material extraction, manufacturing, transportation, operation, and eventual disposal or recycling of the assets. By taking sustainability as its core design principle, the project team conducted our first ever Carbon LCA to establish a baseline carbon impact for the project.

The LCA findings provided essential insights into the carbon hotspots within the asset life cycle at the site. This enabled the project team to determine which areas needed the most attention to achieve significant carbon reductions. This approach allowed for informed decision-making throughout the whole design process, such as aspects of the Preheating Systems, Renewable Energy Integration, Greener Construction Methods, and Low Carbon Materials.

Upon consideration of the various design changes, the Feasibility Design Study identified up to 77.5% carbon reductions could be achieved if all solutions identified within the study were to be implemented.

Cadent is now looking to engage a Construction Main Works contractor to move onto an innovative construction methodology stage, where the proposal will be developed to reduce embodied carbon further. We aim to take these learnings and those of circular economy and move from built assets and move this towards our street works, waste generation, and management and exploring the environmental impact from mains replacement broader than spoil management and fuel use.

Cadent will complete its first life cycle assessment of a street works mains replacement project and take the outputs from the assessment to analysis the environmental impacts from materials and services to develop a baseline and action plan to reduce overall environmental impact. Create an action plan for RIIO-GD4

2.5.3. ISO 20400

Procurement and embedding a sustainable approach are a powerful process for Cadent to use to support our alignment to United Nations Sustainable Development Goals and enabling communication between purchasers, suppliers and all stakeholders, and by encouraging innovation. Cadent will align our procurement strategy to ISO 20400 Sustainable Source Standard.

2.5.4. Mapping of emissions within our supply chain

During RIIO-2, Cadent implemented a new reporting system to record embodied carbon for our mains replacement contract, PE pipe suppliers and Capital Delivery key projects. By setting a baseline from data in 2025/26, Cadent will continue to report on embodied carbon in projects (based on a materiality threshold) across our network in delivering a safe and reliable energy network. Following a review with The Carbon Trust and by screening the Scope 3 categories, we have an applicability matrix that has been used to determine on both quantitative and a qualitative basis Cadent's Scope 3 hotspots and will help us deliver improved insight into our emissions.

2.5.5. Supply chain meeting our Supplier Code of Conduct

Our Supplier Code of Conduct outlines expectations of how our suppliers, and their supply chain partners should act when providing us with goods or services. We look to our suppliers to support us in meeting our environmental policy objectives and to take a proactive approach in reducing our environmental impact. It is a collaborative effort which we all need to play a part. We expect our Supply Chain to collaborate with Cadent in addressing challenges to reduce embodied carbon in products and materials purchased. We also require that all suppliers become a member of the SCSS to drive Cadent's environmental commitments and reporting. Adopt a target of more than 80% of suppliers (by value) meeting the supplier code and we will report on the progress through the Annual Environmental Report.

Action	Description	Benefit
B5.1 Embed circular economy principles	The circular procurement framework provides an overview Cadent can use in making purchasing decisions. We will identify and pilot further opportunities to implement and refine this framework with our top suppliers based on spend.	A shift to more reliable materials and services that can be reused, upgraded and repaired would reduce the amount of waste
B5.2 Life Cycle Assessment of Street Works	Cadent will complete its first life cycle assessment of a street works mains replacement project and take the outputs from the assessment to analysis the environmental impacts from materials and services to develop a baseline and action plan to reduce overall environmental impact. Create an action plan for RIIO-GD4	A life cycle assessment (LCA) will identify environmental hotspots within a street works lifecycle, allowing potential improvements to be identified and implemented. This can lead to a reduction in the product's overall environmental impact.
B5.3 ISO 20400	Procurement and embedding sustainable approach are a powerful process for Cadent to use to support our alignment to United Nations Sustainable Development Goals and enabling communication between purchasers, suppliers and all stakeholders, and by encouraging innovation. Cadent will align our procurement strategy to ISO 20400 Sustainable Source Standard.	Embedding sustainable procurement process and standards into Cadent's ways of working, improving the innovation and carbon data reporting with suppliers
B5.4 Mapping of emissions in the supply chain	Working with our supply chain to identify high-impact activities and commit to a reduction in our scope 3 BCF based on 2025/26 baseline. Record and embed reporting/ based on value.	Expanding Scope 3 emissions reporting following the Greenhouse Gas Protocol Scope 3 emission categorisation
B5.5 Supply Chain meeting the Cadent Supplier Code	We look to our suppliers to support us in meeting our environmental policy objectives and to take a proactive approach in reducing our environmental impact. It is a collaborative effort which we all need to play a part. We expect our Supply Chain to collaborate with Cadent in addressing challenges to reduce embodied carbon in products and materials purchased.	Adopt a target of more than 80% of suppliers (by value) meeting the supplier code

Table 11: B5 summary of actions

2.6. Net Zero emissions in the Energy System (B6)

This part of our EAP explains how we propose to support the transition to an environmentally friendly, flexible, low carbon, and low emissions energy system. We are proud of the work we have done through RIIO-2 on thought leadership and demonstrations to illustrate and support policymakers on how the gas network could be decarbonised and play a critical role in the transition to net zero. We have learned a lot from our flagship hydrogen industrial cluster project (HyNet) our experiences through our hydrogen village trial project in Ellesmere Port and the work we have led on hydrogen blending.

We will continue to support the transition to an environmentally friendly, and flexible, low carbon and low emissions energy system, with a focus on biomethane and the establishment of a dedicated team of specialists across network design, scenario planning (and modelling) and stakeholder engagement.

We recognise that initiatives directly relating to the repurposing of our network for hydrogen sit outside of the scope of this Plan. However, we have included a series of actions that will help enable future decarbonisation of the gas network, in whatever shape and pace policy decisions direct the energy transition.

2.6.1. Connecting Low Carbon and Green Resources

In October 2024, there are 45 biomethane plants connected to our network, with the capacity to deliver enough energy to heat over 300,000 homes each year. Biomethane has around 84% lower carbon emissions than natural gas and hence can play a significant role in the transition to net zero alternatives, with the materials ultimately being used to make the gas having absorbed carbon dioxide throughout its lifecycle, or where feedstock is waste, and its uses prevent being methane releases into the atmosphere from degradation.

The Renewable Energy Association (REA) has set out that they believe there is a potential for up to 297 TWh of biomethane production by 2032⁶. We have analysed the enablers and barriers which could facilitate or prevent the achievement of this potential. From this analysis, we have developed a roadmap that could enable us to help facilitate as much of this as possible across our networks. Given the REA's prediction, this could mean the

⁶ [REA-Bioenergy-Strategy-Phase-2-A-Vision-to-2032-and-Beyond.pdf](#)

potential to heat c.2-million homes with biomethane across our footprint, but we recognise that elements of this roadmap (or plan) sit outside of our control, especially where policy changes are required.

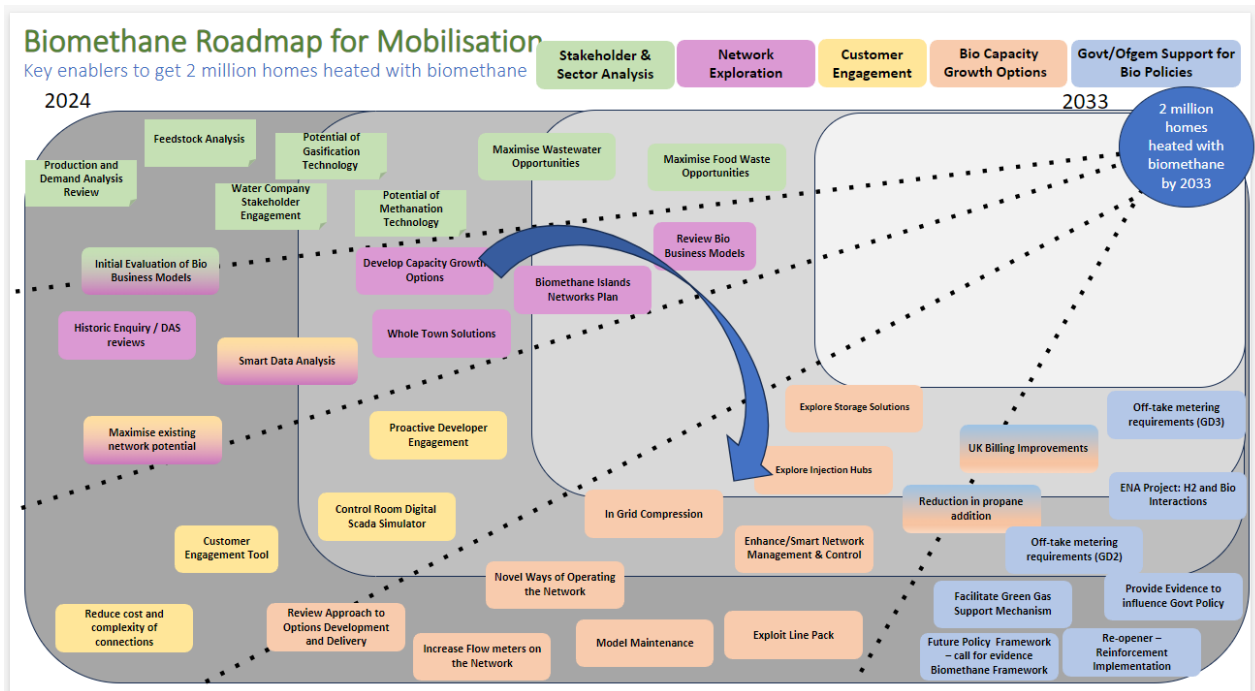


Figure 14: Biomethane roadmap

Our RIIO-3 plan sets out the commitments in our control to enable a major expansion of biomethane and greener generation to connect to our networks to reduce the UK’s carbon footprint significantly.

- We have proposed connection charging changes designed to remove barriers to accessing the network and which would help create a level playing field for biomethane developers compared with equivalent producers in the electricity system.
- In parallel, we have asked Ofgem to create a flexible funding route to support the consequential socialised interventions to enable capacity for the biomethane connections.
- We are making greater use of digital tools to support clearer information and a more efficient connection process for new developers and to identify the right interventions to make capacity available. For example, we are proposing to upgrade our network models and analysis and using an improved digital product/twin for analysing connections requests and where we have capacity.
- We are also creating a ‘bio-bot’ tool that will enable customers to see where it is easier to connect versus where it’s harder/ more expensive.
- We are reviewing our processes to look at how we can standardise requirements and use third-party competition to support a smoother and more efficient connection process.

We have a dedicated entry gas team supporting biomethane who are working to deliver the various initiatives that sit within the overall roadmap.

The focus to facilitate connections is on finding efficient ways to create capacity for the biomethane to flow. Options that are considered include:

- Expanded use of flow meters on the network to inform the network model and enable monitoring of flows
- Using smart-grid type control technology and novel operating philosophies to ensure we can maximise gas entry to the network as far as possible, thus improving access rates and the economics of their plants
- Using compression for reverse flow up to higher pressure tiers, or pipe reinforcements or reconfigurations
- Considering market or commercial solutions

Utilising these new technologies on our network coupled with the charging changes discussed above we aim to always accept green gas onto our network. We believe it is imperative that we ensure we connect green energy sources whenever we can to support both national and our own net zero ambitions.

The costs associated with facilitating the biomethane potential are uncertain. There are three types of cost.

1. Some costs are directly attributable to the connection of particular projects or groups of projects.
2. Some costs are associated with unlocking general network capacity or enabling access to that capacity.
3. There are ongoing costs to manage the connection process and commercial and technical frameworks.

Under the current charging arrangements, all of these costs are recovered from the connecting parties. Under our proposed entry charging change, items 2 and 3 would be socialised across all consumers and the cost apportionment for item 1 would be subject to a high-cost cap test where below the cap, costs would be socialised. Hence, we have included a range of forecast costs in the uncertain costs data table, and these are not in our Totex submission at this point. Subject to the charging change, we would need a mechanism to fund these costs in RIIO-3. We are currently discussing this issue through the heat policy reopener and we anticipate the solution for RIIO-2 could be rolled into RIIO-3.

2.6.2. Net Zero transition planning (including supporting national and regional whole system planning)

Resources are needed to support the activities associated with net zero transition, irrespective of future Heat Policy Decisions. In addition, resources will be required for planning and engagement with the National Energy System Operator (NESO) and Regional Energy Strategic Plans (RESPs) across our regions to support local area energy plans and whole system solutions.

Four areas have been identified where these external drivers create certainty that additional capability will be required on an enduring long-term basis:

- Engineering policy development and assurance
- Network modelling
- Market Framework development
- Customer and stakeholder Support

In some of these areas, work has already commenced using uncertainty mechanisms but given the longer-term confidence that this resourcing will be required, baseline funding is now appropriate. The incremental headcount resourcing we are requesting is summarised below.

Area	FTEs	Activities
Engineering policy development and assurance	[CNI- sensitive data]	Engineering guidance, policies, procedures and assurance to enable decommissioning, hydrogen blending and hydrogen pipelines for industrial clusters
Network modelling	[CNI- sensitive data]	<ul style="list-style-type: none"> • RESP Development and support • Local area energy plan (LAEP) Development and support • Local Authority engagement and meetings • Network modelling – Hydrogen/Blending/Biomethane/Heat Networks/Decommissioning NESO/RESP Information management and access
Market Framework development	[CNI- sensitive data]	<ul style="list-style-type: none"> • Developing and implementing changes to the methane framework for decline/decommissioning • Developing and implementing new hydrogen framework for GTs New Licences, Codes, Contracts, Entry/Exit Agreements
Net Zero Transition Customer and Stakeholder Management	[CNI- sensitive data]	<ul style="list-style-type: none"> • Relationship managers with Local Authorities and all large customers transitioning from methane • Lead customer/stakeholder accountability for RESP/LAEPs and other NESO strategic planning activities Support and guidance for our transitioning customers/stakeholders

Table 12: Headcount

During RIIO-3, new strategic planning organisations will be key interfaces in creating national and regional whole system energy plans. Though we may not have certainty on the exact final destination for heat policy and the current gas system’s end state, we do know that our customers will be transitioning away from fossil methane. Whether this is to hydrogen, biomethane, electricity, or to another system, work will be required to plan and deliver the changes, and to inform, support and protect our customers as they consider their options, and ultimately commence their conversion.

This work also includes the technical, safety and commercial aspects of planning the transition with expertise required to model the changes and identify the engineering and regulatory framework issues. The Subject Matter Experts will then develop and deploy the solutions and advise and support the Government and Regulators with any enabling legislation or regulation.

This work is starting but will be continuing over the coming decades and we therefore believe incremental baseline funding is required so that a long-term resourcing plan can be implemented with confidence. Failing to have the necessary skills and capabilities in place would be a barrier to meeting the UK’s decarbonisation timetable.

In the July 2024 SSMD, Ofgem confirmed they expected the GDNs to collaborate with the NESO, and other relevant stakeholders, to enable the implementation of the Regional Energy Strategic Planning Function. For Cadent this involves supporting place-based planning with customers and Local Authority Stakeholders across 8 or the 9 RESP areas in England.

As the largest Gas Distribution company, we will have the greatest number of regional interfaces to support and our plan will put in place the resources and open data investment to support local area energy plans and to support the NESO to develop industrial heat decarbonisation plans. The criticality of gas solutions being properly considered can be seen in our work with the Greater Manchester combined authority, which identified hydrogen as a key enabler to net zero in the region as full electrification was not the optimal or practicable route.

We are partnering with the NESO and Electricity Distribution Operators in innovation projects to explore the practical implications of delivering peak heat.

Our proposed project would explore, for a model town, the practical implications of meeting the peak heat requirement solely from electrification in terms of the scale and time to provide the required electricity infrastructure. It will also explore the benefits that might be provided by delivering a hybrid solution where peak heat might be provided to an extent by the gas network. This will provide vital information to the NESO in considering how it develops the processes for Regional Strategic Energy Plans.

The project would also inform practicalities when developing a gas network decommissioning plan e.g. timetable, management, process etc.

- We will continue to drive innovation on creating the option for the network to be used to transport hydrogen to our consumers and preparing for the impacts of greater electrification of heat
- We will continue our thought leadership role in capturing value for future consumers in supporting the development of the hydrogen economy. Specifically, our plan enables hydrogen blending to drive carbon benefits. We note that a practical funding solution to our proposed charging change could also benefit hydrogen injections for blending in the future.
- We continue to progress the UK’s first hydrogen industrial cluster HyNet in our North West network which will start construction during RIIO-3 and we expect this to be followed by other industrial clusters (East Coast hydrogen, Capital Hydrogen and Hydrogen Valley in the West Midlands).
- As well as new infrastructure where needed, the creation of a low cost and resilient plastic network also enable future option value for repurposing these assets to meet industrial and those domestic consumers who are unable to consider alternatives.
- Our plan seeks to innovate around preparing for potential requirements to disconnect and decommission parts of the networks as well as exploring other non-hydrogen repurposing opportunities. Our RIIO-2 support for the GasNet New Project is an example of our encouragement for new idea.
- We will continue to support Innovation in customer research and trials into new low carbon heating solutions and utilise our vulnerability strategy to help policymakers support customers through the transition.

Action	Description	Benefit	Cost (£m, if additional from base case)
B6.1 Connecting Low Carbon and Green Resources	We have proposed a set of actions to deliver a fast-paced and efficient process to create capacity to facilitate the connection of a potential step change in biomethane production. There is potential demand for production to heat up to 2m homes across our networks (currently c.300k homes) by 2033. This will require significant reform across the	A step change in biomethane connections to Cadent’s networks contributing to the GB potential of up to 30TWh of biomethane production driving	[cost data] (We’ve included this in asset management base plan) NB: £ range shown in uncertainty costs table

	industry, along with direct actions that Cadent can take	carbon emission savings.
<p>B6.2 Net Zero transition planning (including supporting national and regional whole system planning)</p>	<p>Going into RII0-3 there is a requirement to ensure that we set out networks up for the future whilst meeting the strategic needs of our customers and stakeholders. This will require the recruitment, training and embedding of additional skills and capabilities into the company. The new capabilities will include:</p> <ul style="list-style-type: none"> • Reporting, analysis and modelling of our emissions and environmental impact • Designing networks of the future and the enabling market frameworks • Supporting and advising our transitioning customers and stakeholders • Supporting the NESO and Regional Energy Strategic Planners <p>All four encompass significant data analysis and insights to inform our strategic decisions, support our customers, and ensure we accurately report, with significant enhancements to create a comparable benchmark with electricity Distribution Network Operators (DNOs) who are leading in this area currently.</p>	<p>[cost-sensitive data] (We've included this in base allowance for asset management)</p> <p>Fundamental enabler to achieving net zero</p> <p>Given the high degree of confidence around need of those resources, we anticipate funding should be within our baseline allowance.</p> <p>However, should Ofgem disagree, then we would expect this work to be funded through the NZARD UIOLI and we would therefore seek our allowance to be adjusted upwards to accommodate this additional cost [cost-sensitive data].</p>

Table 13: B6 summary of actions

3. Environmental and sustainable management

As a responsible business, our environmental and sustainability management approach aims to deliver compliance with management standards, by regularly reporting on our Sustainable performance against external benchmarks and identifying and managing environmental risks.

3.1. Environmental, Social, and Governance Benchmarking

Each year we complete three internationally recognised sustainability benchmarking exercises to better understand, benchmark, and assess where we are today and use these results to develop learnings and continuously improve our performance across the three areas of sustainability – environment, social impact, and governance in Sustainability. Using such internally recognised benchmarks like Global Real Estate Sustainability Benchmark, Sustainalytics, and Morgan Stanley Reports and Insights we are driving improvement in these to ensure we continue to be ranked number one utility (nationally) in two of the above benchmarks and are positioned in the upper quartile for the third.

3.2. UN Sustainable Development Goals

The Sustainable Development Goals (SDGs) are the blueprint for achieving a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, peace, and justice. We have reviewed the SDGs and understand how they relate to what we do and how we can make the biggest contribution. We believe that under ‘environment,’ the following goals are aligned with our EAP:

- SDG 7: Affordable and clean energy
 - Ensure access to affordable, reliable, sustainable and modern energy for all
- SDG 12: Responsible consumption and production
 - Ensure sustainable consumption and production patterns.
- SDG 13: Climate Action
 - Take urgent action to combat climate change and its impacts.
- SDG 15: Life on land
 - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss.
- SDG 17: Partnerships for the Goals
 - Strengthen the means of implementation and revitalize the Global partnership for Sustainable Development

3.3. Environmental Management System

Cadent’s EMS is certified to the ISO14001:2015 standards and is designed and structured to be proactive in its approach to identifying environmental risk, setting plans to reduce this risk whilst combining many elements of good practice, compliance and continuous environmental improvement:

The EMS aims to:

- Ensure a holistic approach to our significant environmental risks.
- Of those significant environmental risks that have the potential to impact the environment. These are collated, ranked and assessed within a business wide Environmental Impacts and Aspects register, incorporated into our business risk system.
- Identify KPIs and data metrics that can be used to drive performance and reduce risk.
- Monitor emerging compliance obligations, current legislative requirements and business risk.
- Drive continuous training and competency of our colleagues.

- Identifies opportunities to embed more sustainable practices and drive environmental benefits.
- Communicate both internally and externally key environmental messages, impacts and reports.
- Regular review our performance, management standards and processes against strategic plans, and with support from the Board complete a review of the EMS

These practices enable us to identify risks and potential impacts, improve our performance and continue to minimise environmental harm, and we routinely assess and horizon scan to continuously improve our systems, procedures, and ways of working.

4. Glossary

Term	Definition
AER	Annual environmental report
AGI	Above ground installation
ALD	Advanced leakage detection
ALIP	Advanced leakage intervention programme
ALMA	Advanced leakage management approach
BCF	Business carbon footprint
DPLA	Digital Platform for Leakage Analytics
EAP	Environmental action plan
EMS	Environmental management system
GDN	Gas distribution network
GHG	Greenhouse gas emissions
HSE	Health and Safety Executive
IMRRP	Iron mains risk replacement programme
IDP	Investment decision pack
ISG	Independent stakeholder group
KPI	Key performance indicator
LAEP	Local area energy plan
LCA	Life cycle assessment
LDZ	Local distribution zone
NESO	National energy system operator
REA	Renewable energy association
RESP	Regional energy strategic plan
SCG	Sustainability challenge group
SCSS	Supply chain sustainability school
SDG	Sustainable development goals
SIF	Strategic innovation fund
SLM	Shrinkage and leakage model