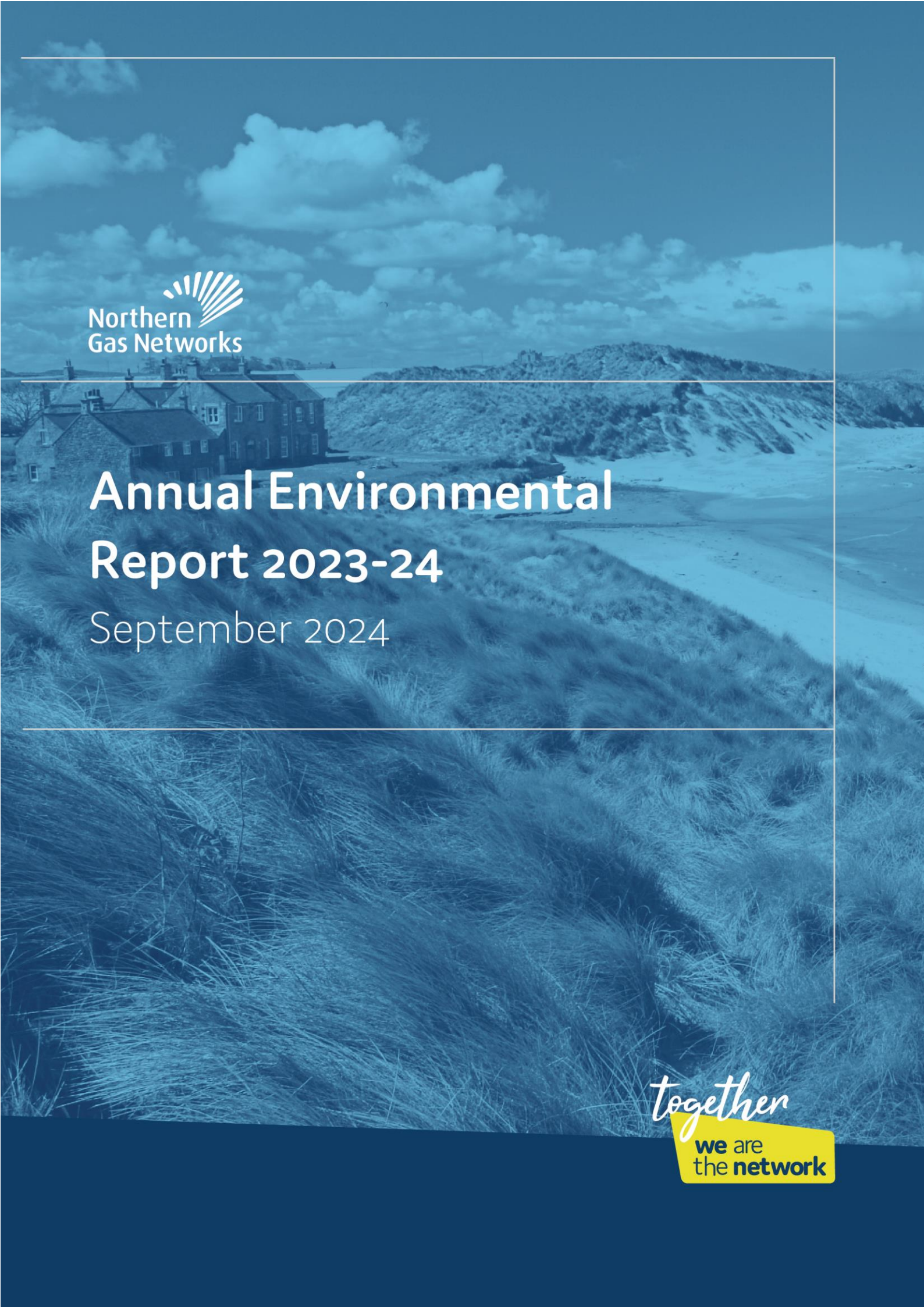


Northern Gas Networks

Annual Environmental Report 2023-24

September 2024

together we are the network

Contents

Report approved by:	Greg Dodd Regulation & Strategic Planning Director Northern Gas Networks
Date:	24 September 2024

A word from our CEO, Mark Horsley and our Head of Environment and Sustainability, Neil Whalley

I am delighted to introduce our third Annual Environment Report. As the gas distribution network for the North of England, we have a key role to play in enhancing and protecting our environment, in the short, medium and long term. Customers and stakeholders tell us that they expect energy networks to deliver ambitious decarbonisation plans to contribute to achieving net zero. They want us to enable sustainable and affordable forms of energy while taking real action now to reduce the impacts of our business operations on the environment and the communities that we serve, by making sustainable investment decisions which will deliver value for the long term. This is a responsibility that we take incredibly seriously – it's one that is deeply engrained in our business, and one which we're passionate about delivering.

Our Environmental Action Plan contains tangible commitments and actions that we are putting into practice to make our region cleaner and greener. Over the past year we have continued to work closely with our local delivery partners to significantly reduce gas leakage from our network, diverting our waste from landfill, planting over 22,000 trees to improve air quality in some of the most polluted towns and cities in our region, and embed sustainability principles in our supply chain. Meanwhile, our work to progress hydrogen as an alternative fuel to natural gas for powering electricity generation and critical industry continues, and we remain committed to progressing sustainable solutions to help to achieve net zero.

As we share our performance for 2023/24, sustainable thinking and action remains more important than ever to the delivery of our overarching objectives: providing a safe and reliable gas service that our customers can depend on; supporting the transition to net zero and continuing to modernise our operations to drive efficiencies that ensure that we can deliver a value for money service for our customers, meanwhile ensuring that customers on the lowest incomes and in our most disadvantaged areas, experience a fair and equitable energy transition.

Our strong performance would not be possible without our amazing people and wonderful partners and supply chain and I'd like to thank everyone who has played a part in the helping to build on our achievements from previous years and deliver our environmental and sustainability improvements this year.

Mark Horsley

Chief Executive Officer, NGN

During 2023/24 we have continued to deliver on our Environmental Action Plan commitments, with specific focus on tackling our most significant environmental impacts. We have achieved excellent performance in gas leakage reduction, our biggest single greenhouse gas emission, and diverting waste from landfill. Our tree planting programme to tackle poor urban air quality in our region is also providing particularly pleasing results.

Our Environmental Action Plan was informed by our stakeholders and is consciously ambitious. Achieving our commitments remains challenging but we believe they can be achieved through innovation, collaboration and long-term thinking to the long-term benefit our stakeholders and region.

Our customers tell us that environmental performance remains a high priority to them, despite the cost-of-living crisis and other pressures. In collaboration with our partners we work hard every day to meet this expectation.

Neil Whalley

Head of Environment and Sustainability, NGN

1 Introduction

1.1 About us

We are Northern Gas Networks (NGN), the gas distributor for the North of England. We keep 2.9 million homes and businesses cooking on gas, through our vast underground pipe network.

We are committed to providing a safe, reliable and great value service to our customers and stakeholders, while exploring the potential for new technologies to deliver low carbon energy, such as hydrogen, through our network to support a greener future. Innovation underpins everything we do – whether we are replacing pipes, fixing leaks, developing low carbon energy solutions or supporting our most vulnerable customers.

By thinking differently, listening to our colleagues and stakeholders, working closely with our partners and considering our communities, we are pushing the boundaries of what a utility company is capable of.

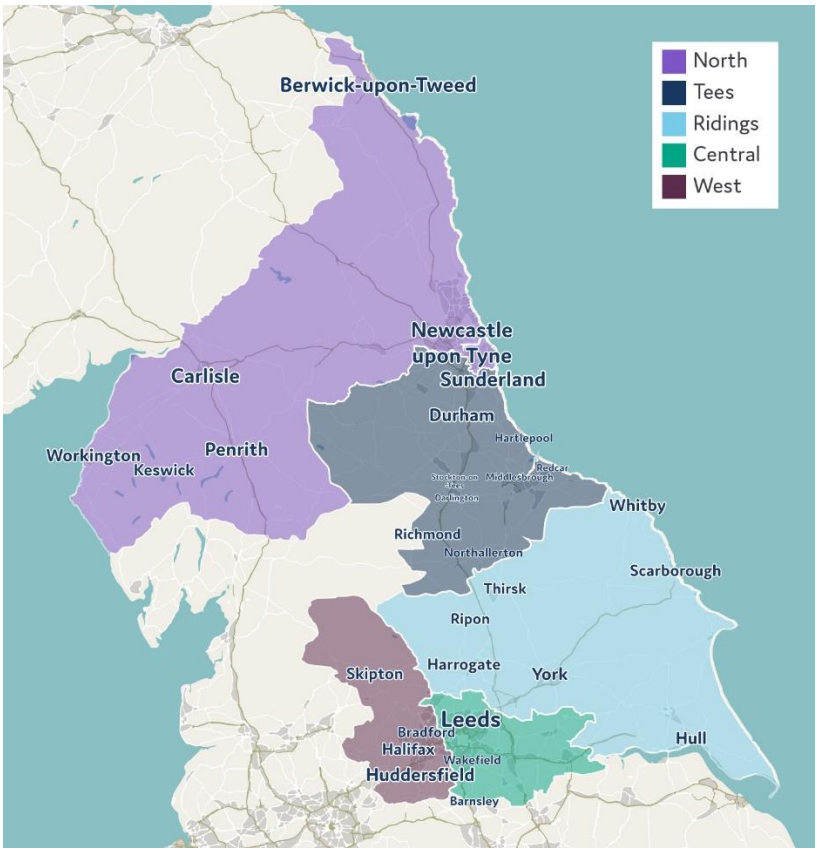


Figure 1 – Our network region

1.2 About this document

This document constitutes NGN's Annual Environmental Report for the period 1 April 2023 to 31 March 2024, publication of which is a licence obligation for the RIIO-2 gas distribution price control. This document has been completed in accordance with RIIO-2 Environmental Reporting Guidance,

Version 1.0, Ofgem, 2 March 2021[1] ('reporting guidelines' herein) and should be read in conjunction with our RIIO-2 Environmental Action Plan (EAP)[2].

Like other gas distribution networks in Great Britain, NGN is a regulated business and operates under a licence issued by the Office of Gas and Electricity Markets (Ofgem) and is also subject to common statutory requirements which are overseen by the Department for Business, Energy and Industrial Strategy (BEIS), the Health and Safety Executive (HSE) and the Environment Agency (EA). Allowed revenues for NGN, including for environmental protection, decarbonisation and adaptation to climate change, are currently set by Ofgem in periodic price reviews and require submission of a detailed business plan. Between 1 April 2021 and 31 March 2026 we are operating under the RIIO-Gas Distribution 2[3] ('RIIO-2' herein) price control framework. Prior to this we operated under the RIIO-Gas Distribution 1 ('RIIO-1' herein) price control framework between 1 April 2013 and 31 March 2021.

Our latest business plan included commitments to deliver an environmentally sustainable network[4], including an Environment Action Plan (EAP) which committed us to a series of actions to reduce the environmental impacts of our business operations, decarbonise our business, and support a net zero carbon future aligned to the United Nations Sustainable Development Goals (UN SDGs). Our EAP was built on strong stakeholder engagement evidence to ensure that we met the needs and expectations of our stakeholders. A summary of our RIIO-2 EAP commitments is provided in Figure 2.

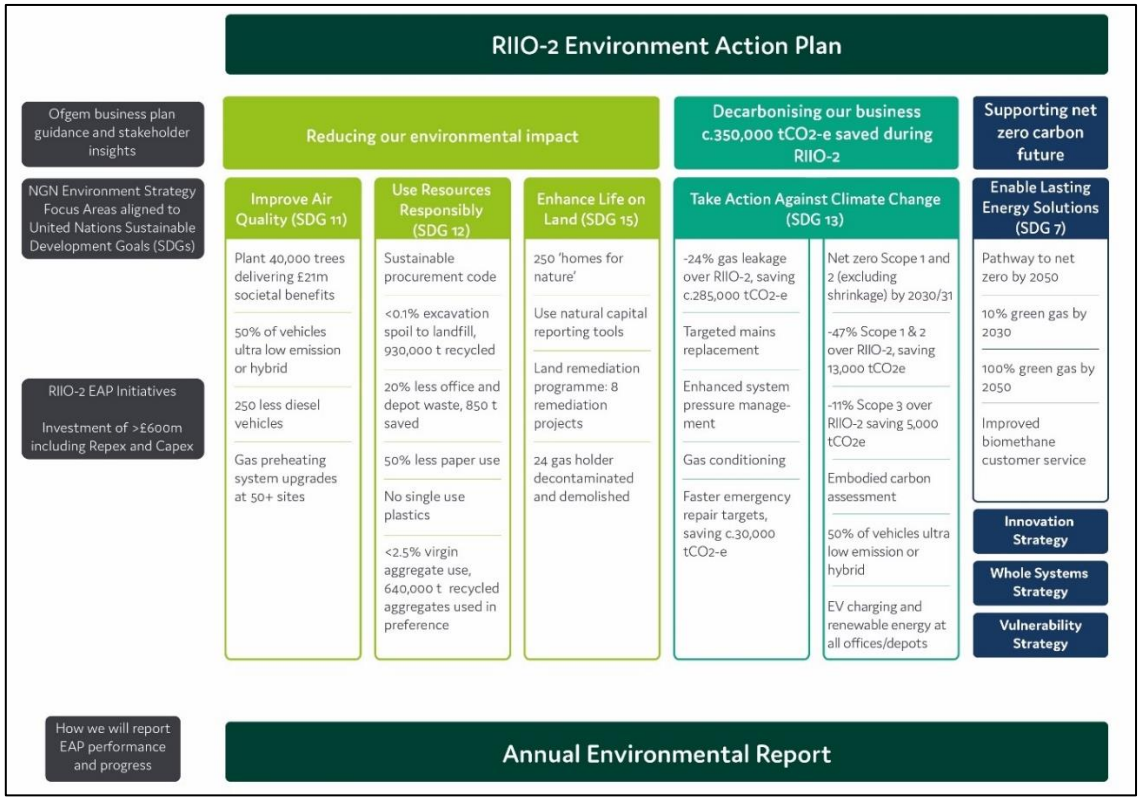


Figure 2 – Summary of our Environment Action Plan for 2021 to 2026 (RIIO-2)

[1] https://www.ofgem.gov.uk/publications/riio-2-environmental-reporting-guidance
[2] https://www.northerngasnetworks.co.uk/wp-content/uploads/2019/12/A8-NGN-RIIO-2-Enviromental-Action-Plan.pdf
[3] https://www.ofgem.gov.uk/energy-policy-and-regulation/policy-and-regulatory-programmes/network-price-controls-2021-2028-riio-2
[4] See Section 4.4 of our RIIO-2 business plan: https://www.northerngasnetworks.co.uk/wp-content/uploads/2019/12/NGN-RIIO-GD2-Business-Plan-2021-2026.pdf

We have established a long-term sustainability agenda for ourselves and our supply chain as demonstrated in our People and Planet Strategy[5] launched in November 2021. The purpose of this strategy is to set a universal sustainable direction for our decision making and wider business strategy so that together with our colleagues, partners and supply chain we can deliver positive changes. Our People and Planet Strategy includes a roadmap of short-term goals (to 2026) that are aligned to our RIIO-2 regulatory commitments (including our EAP commitments), medium-term (to 2030) goals that are aligned with the UN SDGs, and longer term commitments that stretch out to 2050 and beyond in some instances. A summary of our People and Planet Strategy commitments is provided in Figure 3. These commitments are confirmed in our Sustainability Policy[6].

Figure 3 – Summary of our People and Planet Strategy commitments

1.3 Our environmental responsibilities

1.3.1 Assessing our environmental impact

Since achieving ISO14001 accreditation for our environmental management system (EMS) in 2000[7], we have continually analysed and monitored our performance to understand, mitigate and reduce the adverse environmental impacts of our business. This process starts with understanding the context of our business as a regional gas distribution network (GDN) with core activities of operating and maintaining our infrastructure, responding to gas emergencies, providing new gas connections and replacing metallic gas mains. A summary of the key aspects of our business is provided in Table 1 below.

[5] See pages 11 and 12 and Appendix A in our 2023 Annual Sustainability Report for further details.
[6] https://www.northerngasnetworks.co.uk/wp-content/uploads/2022/06/Sustainability-Policy.pdf
[7] https://www.northerngasnetworks.co.uk/wp-content/uploads/2021/04/NGN-ISO-14001-2015-Certificate-V9-2020-2024.pdf

Key Aspects of Our Network and Business Operations			
Our Customers, Colleagues and Region	**Our Network**	**What We Do**	**Environment Performance and Innovation**
Deliver gas to 2.9m homes and businesses	c.36,000 km of pipe	>99% of uncontrolled gas escapes attended within 1 hour	c.0.5% of gas throughput lost as shrinkage per year
Varied network area – cities, towns and National Parks.	c.650 company vehicles – including cars, vans and heavy goods vehicles (HGVs)	18,835 repairs to our gas pipes completed annually	21 biomethane production sites connected to our network enabling supply of green gas
c.1600 full time employees across 13 offices and depots	No gas holders connected to network, 44 decontaminated and demolished since 2013	>500km of iron mains replaced per year	Award winning hydrogen research and development projects, including H21 and HyDeploy.
51% of our domestic customers are reporting experiencing financial difficulties paying their energy bills during 2023/24, down from 55% in 2022/23^	c.150 asset sites built on known former gasworks sites	Over £240m of goods and services purchased per year	c.235,000t of waste generated per year; less than 0.00% disposed to landfill
Based on figures to end 2023/24. ^ Page 26: **https://together.northerngasnetworks.co.uk/wp-content/uploads/2024/03/Customer-Perceptions-2024-Wave-4.pdf**			

Table 1- Summary of key environmental aspects of NGN business

With the help of our stakeholders, we identify aspects of our business that result in environmental impacts and then assign significance ratings to each based on a structured hazard-severity matrix. A summary of our current significant environmental aspects and impacts is provided in Table 2.

Business Aspect	**Environmental Impact**								**NGN RIIO-2 Mitigation**
	Depletion of resources	**Air pollution**	**Greenhouse gas emissions**	**Nuisance (eg odour, noise)**	Water pollution	**Land Pollution**	**Waste disposal to landfill**	**Ecosystem/habitat damage**	
Use of Virgin Aggregate in reinstatement	✓								EAP
Plastic gas pipe production	✓		✓						EAP
Use of Gas	✓		✓						EAP
Venting Gas			✓	✓					IS

Business Aspect	Environmental Impact								NGN RIIO-2 Mitigation
	Depletion of resources	Air pollution	Greenhouse gas emissions	Nuisance (eg odour, noise)	Water pollution	Land Pollution	Waste disposal to landfill	Ecosystem/habitat damage	
Use of Electricity	✓		✓						EAP
Use of Fuel	✓	✓	✓						EAP
Gas Transportation (upstream production, NGN losses, and downstream use)			✓	✓					EAP, WS & IS
Roadworks		✓	✓	✓					EAP, WS & IS
Contaminated Land				✓	✓	✓		✓	EAP
Disposal of Waste (excluding excavation spoil)							✓		EAP
Purchase of good and services	✓	✓	✓	✓	✓	✓	✓	✓	EAP

Significant aspects are those identified to have a significance of 15 out of 25 or greater on a 5 x 5 hazard-severity matrix.

Environmental impacts represents principal direct environmental impacts associated with the aspect, other secondary impacts may occur.

EAP = NGN RIIO-2 Environmental Action Plan. WS = NGN RIIO-2 Whole Systems Strategy. IS = NGN RIIO-2 Innovation Strategy.

Table 2 – Summary of NGN's most significant current environmental aspects and impacts

1.3.2 Incorporating stakeholder views

As detailed in our EAP (see Sections 5 and 6.1), we engaged with our stakeholders to inform the development of our EAP commitments to ensure they met their needs, priorities and expectations. Since then we have continued our stakeholder engagement as business as usual to ensure that we approach our environmental commitments in the most appropriate and effective manner, taking into account the values and priorities of our stakeholders. This has included:

- Annual customer perceptions survey incorporating environmental priorities research (2020/21[8], 2021/22[9], 2022/23[10] and 2023/24[11]).

[8] https://together.northerngasnetworks.co.uk/wp-content/uploads/2021/03/Customer-Perceptions-Research-Presentation-Final-Report-Outcomes-Customer-Facing-v1.pdf

[9] https://together.northerngasnetworks.co.uk/wp-content/uploads/2022/03/Customer-Perceptions-Research-Presentation-2021-Wave-2-SHORT-SUMMARY-.pdf

[10] https://together.northerngasnetworks.co.uk/wp-content/uploads/2023/01/NGN-Customer-Perceptions-tracker-report-Wave-3.pdf

[11] https://together.northerngasnetworks.co.uk/wp-content/uploads/2024/03/Customer-Perceptions-2024-Wave-4.pdf

- Regular engagement with the NGN Customer Engagement Group (now referred to as Independent Stakeholder Group)[12] to provide a forum for challenge and review of EAP performance.
- Participation in the Energy Networks Association Gas Environment Group and Climate Change Resilience Working Group where we work with the other energy networks of the UK to align reporting standards and metrics (notably Scope 3 emissions reporting), and share best practice.
- Participation in several regional sustainability focussed forums where we work with our fellow locally based organisations to share best practice and knowledge and identify synergies, including: Yorkshire and Humber Climate Commission[13], where NGN provide core funding; West Yorkshire Combined Authority Climate, Energy and Environment Committee[14]; and Leeds Anchors Network[15].

Our latest customer research from 2023/24[16] identified that sustainability and environmental actions remain high priorities to our customers after providing a reliable and safe service and keeping bills as low as possible. When reviewing our sustainability commitments from our People and Planet Strategy, customers continue to prioritise providing access to affordable energy solutions, ensuring our infrastructure is resilient, and enabling affordable decarbonised heat, power and transport solutions. Additionally, an increased focus on prioritising net zero has been recorded. We will continue to consider these priorities when delivering our EAP commitments during RIIO-2 and monitor how these priorities change for consideration when preparing subsequent business plans.

Our research identified that customers prioritise seeing sustainability performance data regarding waste reduction and recycling performance and actions to promote low carbon energy and clean up soil and water pollution on NGN land.

1.3.3 Our strategic governance approach to delivering an environmentally sustainable network

As detailed in Section 1.2, our People and Planet Strategy sets a universal direction for our sustainable decision making and wider business strategy to ensure we deliver positive changes. Our People and Planet Strategy includes 9 commitments, of which four are related to protection of the environment and mirror the objectives of our RIIO-2 EAP.

Our shareholders pay close attention to our sustainability performance and activities, including delivery of our EAP commitments, and require regular performance and activity reporting. To formalise this, an NGN Board Committee on Environment, Social and Governance (ESG) was established in 2022/23 to provide oversight and scrutiny of the company performance against our People and Planet Strategy, including our EAP commitments, and other material sustainability items. This Committee meets four times per year.

Performance against our EAP commitments is measured and reported monthly to our senior management team to ensure that performance is kept on track, with progress updates regarding our medium- and long-term targets provided regularly, and also reviewed at our Sustainability Working

[12] https://ngnceg.co.uk/
[13] https://yorksandhumberclimate.org.uk/
[14] https://westyorkshire.moderngov.co.uk/mgCommitteeDetails.aspx?ID=222
[15] https://news.leeds.gov.uk/leeds-spotlight/leeds-inclusive-anchors-network
[16] Page 24: https://together.northerngasnetworks.co.uk/wp-content/uploads/2024/03/Customer-Perceptions-2024-Wave-4.pdf

Group. Our Sustainability Working Group comprises relevant senior managers to enable the identification and discussion of material sustainability related business aspects, and provide monitoring and oversight of business sustainability performance, including the performance of key individual sustainability initiatives/projects.

Corporate bonuses paid to NGN executives and colleagues include company environmental performance elements, most notably performance against our carbon reduction targets. This responsible approach further emphasises to our colleagues the importance of achieving our EAP commitments and contributed to us receiving full marks for climate action governance in the Responsible Business Tracker 2023 assessment by Business in the Community[17]. This assessment identified an overall responsible business score of 86% for NGN, up from 74% in 2021, well above the cohort average of 48%. Of note, we scored 100% with respect to climate action on the following criteria: governance, strategy and risk, measurement and disclosure.

[17] See page 13 here: https://www.northerngasnetworks.co.uk/wp-content/uploads/2024/08/Northern-Gas-Networks-2023-In2-RBT-Feedback-Report.pdf

2 Environmental performance dashboard

In accordance with the reporting guidelines, our performance against a series of identified key environmental performance indicators during the period 1 April 2023 to 31 March 2024 is presented below.

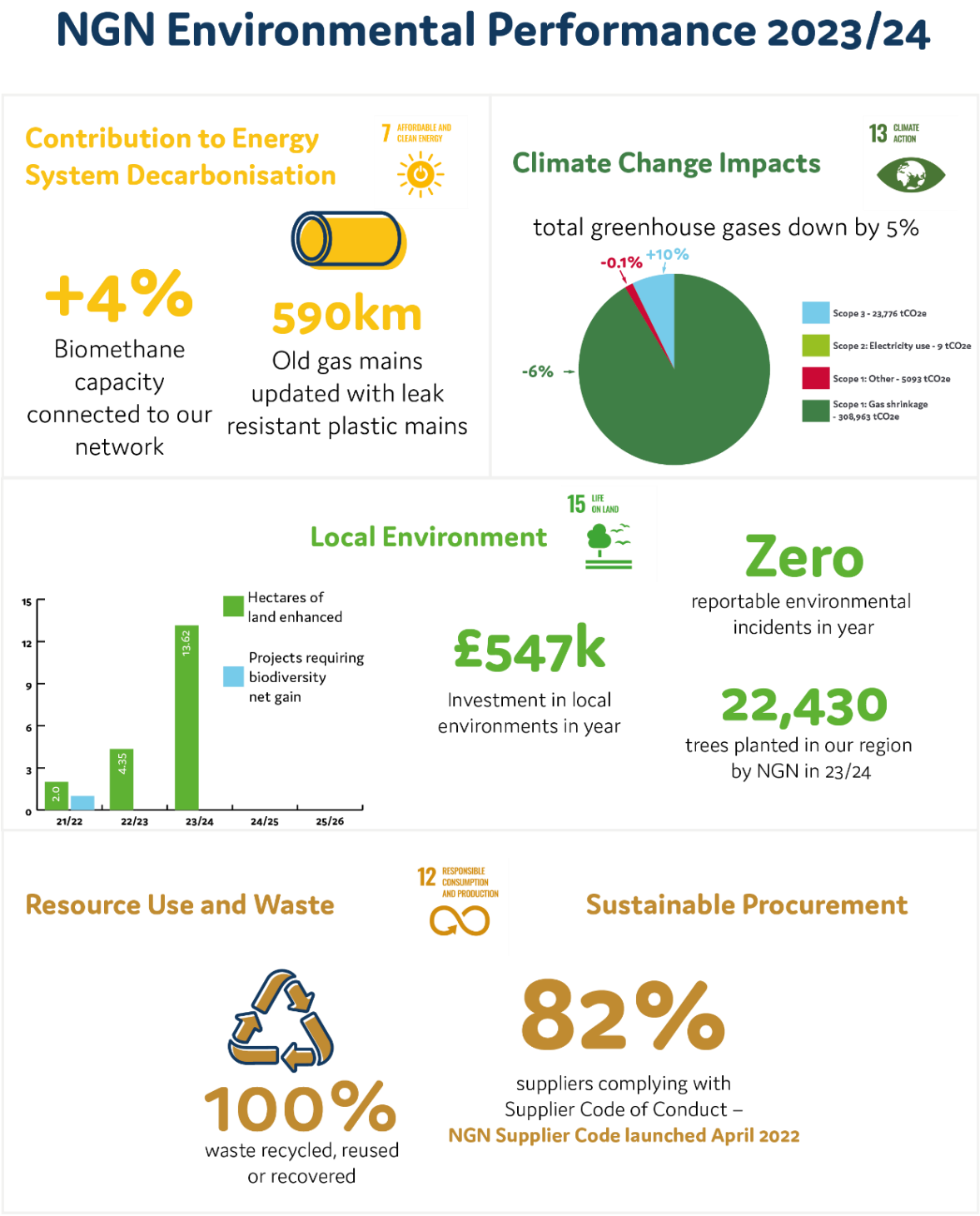


Figure 4 – Environmental performance dashboard for 2023/24.

3 Environmental Action Plan commitments performance

Table 3 contains a progress summary for each of our RIIO-2 EAP commitments as of 31 March 2024.

RIIO-2 EAP Commitment Performance Rating to 31 March 2024		
11% (2No.)	11% (3No.)	78% (21No.)

EAP Commitment	Description and Expected Benefit^	Target Year	Implementation Milestones	RAG Indicator*	RIIO-2 Status Update
Commitments to Reduce Our Environmental Impact					
Plant 40,000 trees in our region	>£21m of cumulative benefits over 50 years including reduced air pollution, carbon sequestration (2,450 tCO2e), biodiversity gain, flood alleviation and amenity gain	2026	n/a	Green	During 23/24 we planted 22,430 trees, bringing our cumulative total to 45,497 trees planted across West and East Yorkshire. This means we have already achieved and exceeded our target of planting 40,000 trees during RIIO-2. Our programme will continue throughout the remainder of RIIO-2.
50% of vehicle fleet ultra low emission or hybrid (25% of commercial vehicles and 100% of company cars)	Vehicle fleet changes delivering reduced air pollutant and carbon emissions (4230 tCO2e saving); 250 diesel vehicles removed from NGN fleet	2026	n/a	Red	Total NGN vehicle fleet comprises 7% ultra low emission or hybrid vehicles, with 100% of company cars being ultra low emission or hybrid. NGN continue to search the market for a fit for purpose battery electric van. During 2024/25 we are aiming to purchase a batch of 10 battery electric medium-sized vans to fully trial across the network within the First Call Operative emergency response role. Delivery dates are subject to worldwide supply chain issues that are still being experienced by fleet operators. We anticipate this trial to start January 2025.
Gas preheating system upgrades at 50+ sites	Asset upgrades delivering reduced air pollution and carbon emissions (1890 tCO2e)	2026	n/a	Amber	22 units completed in 2021/22, 2022/23 and 23/24 with a further 44 underway which is behind the forecast in our business plan but recoverable. We have adequate resources in replace to deliver our business plan commitments.
80% compliance with new	Development and	2026	n/a	Green	Supplier Code of Conduct development and launched April 2022:

EAP Commitment	Description and Expected Benefit^	Target Year	Implementation Milestones	RAG Indicator*	RIIO-2 Status Update
Supplier Code of Conduct	implementation of Supplier Code of Conduct embedding sustainability in supply chain				https://www.northerngasnetworks.co.uk/wp-content/uploads/2022/04/Supplier-Code-of-Conduct_FINAL_compiled.pdf 82% compliance achieved for 2023/24
<0.1% excavation spoil to landfill	c.930,000 t of excavation spoil recycled saving 10 tCO2e	2026	n/a	Green	0.0% spoil to landfill performance in 2023/24. We have been working with our supply chain to ensure we achieve our RIIO-2 target and have overcome location based constraints regarding access to recycling facilities.
20% less office/depot waste (vs 2017/18)	850t waste reduction 4,800t waste diverted from landfill 480tCO2e saving	2026	n/a	Green	17% reduction in office and depot waste tonnage in 2023/24 compared to 2017/18 baseline. This remained similar to 2022/23. We plan to carry out waste surveys at our premises in 24/25 to ensure we remain on target.
0% office and depot waste to landfill		2026	n/a	Green	0.25% office and depot waste sent to landfill in 2023/24 down from 1.3% in 2022/23 following a proactive change in waste management service providers
50% less paper use	30t of paper use avoided; 30tCO2e saving	2026	n/a	Green	Paper use in 2023/24 was 77% less than 2018.
Eliminate avoidable single use plastics from offices and depots	Reduced carbon emissions, resource use and waste	2026	n/a	Green	Strategy to achieve this developed. Changes made already including phasing out plastic milk bottles at our head office, changing our bin bags to ensure they are biodegradable or recyclable and replacing singles use water bottles for operational colleagues with reusable alternatives.
<2.5% virgin aggregate use in reinstatement	640,000 t of recycled aggregate preferentially used, saving 80 tCO2e	2026	n/a	Green	2.7% virgin aggregate used in 23/24 compared to 9.5% in 2022/23. We have been working with our supply chain to ensure we achieve RIIO-2 target despite work location based constraints accessing recycling facilities.
250 homes for nature	250 positive interventions to enhance biodiversity	2026	n/a	Amber	Interventions made at 96 sites to end 2023/24 since 2018. Strategy to deliver 250 sites by 2026 created and trialled new methods to achieve this during 2023/24.

EAP Commitment	Description and Expected Benefit^	Target Year	Implementation Milestones	RAG Indicator*	RIIO-2 Status Update
Development of natural capital assessment	Report natural capital valuation of ecosystem services provided at up to 50 NGN sites during 2021, 2023 and 2025.	2026	n/a	Green	Ecosystem services screening completed, bespoke natural capital valuation tool developed and utilised on baseline assessments at 32 infrastructure sites in 2021/22. Repeat assessments taken place in 2023/24 as per EAP commitment.
Land remediation programme	Management programme including 8 remediation projects – reduced risk of pollution	2026	n/a	Green	Continuation of inspection, monitoring and investigation programme. No new remediation projects started, completion of existing remediation project from 2021/22.
Gas holder decontamination and demolition programme	Decontaminate and demolish 23 gas holders – reduced risk of pollution	2026	n/a	Green	A further 5 gas holders were decontaminated and demolished in 2023/24, bringing us to a total of 20. This means we are ahead of schedule in achieving our RIIO-2 target.
Commitments to Decarbonise Our Business					
Reduce gas leakage by 24%	Carbon savings of c.285,000 tCO2e	2026	n/a	Green	Gas leakage reduced by a further 6% (16 Gwh) in 2023/24 vs 2022/23. 23/24 gas leakage was 16% less than 2020/21 meaning we are still on track to achieve our RIIO-2 commitments.
Repairing gas leaks faster – 89% within 7 days and 98% within 28 days	Carbon savings of c. 30,000 tCO2e	2026	n/a	Green	Targets achieved in 2023/24; repairs within 7 days = 91% and repairs within 28 days = 98%
Reduce Scope 1 and 2 emissions by 47% (excluding shrinkage)	Carbon savings of c.13,000 tCO2e	2026	n/a	Red	2023/24 emissions were 0.1% higher than 2022/23 and 27% greater than our annual target. Our performance is impacted by the constraints we are experiencing with decarbonising our vehicle fleet and a larger operational workforce.
Reduce key Scope 3 emissions by 11%**	Carbon savings of c.5,000 tCO2e	2026	n/a	Red	2023/24 emissions were 13.9% greater than 2022/23 and 17.9% greater than our annual target.

EAP Commitment	Description and Expected Benefit^	Target Year	Implementation Milestones	RAG Indicator*	RIIO-2 Status Update
					This is the result of increased mains replacement workload which is unlikely to substantially change until the end of our Repex programme in 2032.
Development of embodied carbon assessment	Development of assessment methodology and metric	2026	2022	Green	Methodology developed and reporting completed for 2021/22, 2022/23 and 2023/24 and reduction targets established for 2025/26.
Purchase of 100% zero carbon electricity	Only zero carbon electricity to be consumed at NGN premises from 2023, carbon savings of 7100 tCO2e	2023	2023	Green	Achieved in 2021/22 ahead of schedule and continued into 2022/23 and 2023/24. 100% of electricity consumption at NGN offices, depots and infrastructure sites from certified zero carbon sources.
Purchase of 100% renewable gas for metered use	Only green gas to be consumed at NGN premises from 2024, carbon savings of 530 tCO2e	2024	2024	Amber	This is scheduled to be reviewed in 2025/26 when our current gas supply contract expires. This long-term contract was entered during the energy crisis to secure a competitive gas tariff to minimise costs.
Install electric vehicle charging at all offices and depots	Enabler to achieve vehicle fleet decarbonisation and Scope 1 and 2 emissions reduction targets	2026	n/a	Green	The COVID-19 pandemic initially delayed the preparatory work needed to deliver this commitment, however we have now installed 43 charging points across 8 of our operational depots and offices.
Install renewable energy production at all offices and depots	Carbon savings of 280 tCO2e	2026	n/a	Green	Design and procurement phase completed in 2023/24 with solar photovoltaic (PV) infrastructure installation to commence in 2024/25 on all offices depots where installation is deemed viable.
Gas network infrastructure capital investments	Carbon savings of 22,480 tCO2e	2026	n/a	Green	Our overall 2023/24 expenditure in this area was lower than the allowance. We expect costs and workload to increase in the next two years so that we are in line with our Business Plan over the five years of RIIO-2. We expect to outperform the final allowance.

EAP Commitment	Description and Expected Benefit^	Target Year	Implementation Milestones	RAG Indicator*	RIIO-2 Status Update
Commitments to Support a Net Zero Future					
Increased green gas capacity connected to network	Aspiration for 10% green gas flowing through network by 2030, 100% by 2050	2026	n/a	Green	One additional biomethane production sites connected to NGN network during 2023/24. Total capacity connected increased by 4% to 18257 scmh from 21 sites.
Improved customer service for biomethane providers	Green gas connection initial capacity studies within <=5 working days and detailed capacity studies within <=20 working days compared to <=15 and <=30 working days during RIIO-1	2026	2026	Green	During 2023/24 95% of initial capacity studies were issued within our <=5 working days voluntary target time and 100% of detailed capacity studies for new connections within our voluntary target of <=20 working days.
Whole Systems thinking	Enable the achievement of net zero greenhouse emissions in the UK by 2050	2050	n/a	Green	We have an active portfolio of innovation projects to support the net zero transition. Please refer to our Network Innovation Annual Summary Report for 2023/24 for full details of our innovation work:

^ Reference: RIIO-2 EAP. Carbon savings reflect cumulative savings over RIIO-2.

***In accordance with the reporting guidance: Red = progress against milestones is at significant risk and highly likely to be missed; Amber = progress is delayed but likely to be achievable before the end of RIIO-2 price control period; Green = progress against the implementation milestones is on track.**

**** Contractor vehicles; production and transportation of polyethylene gas pipe and fittings; upstream emissions and transmission and distribution losses for electricity consumed; business travel via air and rail.**

Table 3 – Summary of progress against RIIO-2 EAP commitments

We continue to perform strongly against our RIIO-2 EAP commitments and are confident of our ability to deliver these where there are in our direct control. It is of note that significant global socio-economic and political changes have occurred since we prepared our EAP, most notably the COVID-19 pandemic, energy crisis, and cost of living crisis. These events have impacted the business operations, and associated environmental impacts, of ourselves and our supply chain and continue to do so. The environmental impacts of these changes have been observed to present both opportunities (such as reduced avoidable business travel) and challenges (longer lead times for capital investment items, such as new vehicles), and both temporary and longer term. We will closely monitor our

environmental performance against our EAP commitments throughout RIIO-2, including reviewing our commitments to ensure they remain relevant, valuable to our stakeholders, and feasible in the prevailing operating conditions we face.

4 Environmental impacts performance

4.1 Decarbonisation

Key annual performance summary:

- ***Connected biomethane capacity up 4%***
- ***Biomethane injection remains stable***
- ***Wide ranging stakeholder engagement to increase biomethane injection***

This section provides a performance summary of our actions to deliver decarbonisation of the energy system.

4.1.1 Biomethane and Other Low Carbon Gas Connections

We recognise the value that biomethane and other low carbon gas sources can make now to the net zero transition and work hard to enable their connection to our network. In addition, our engineers work closely with producers to enable them to maximise their gas injection volumes and minimise down time.

Throughout RIIO-1 we worked hard to develop our connection procedures for biomethane and other non-conventional gas producers, including development of a dedicated website[18], and we have continued this work into RIIO-2. Our time sequence of biomethane capacity connected is shown in Figure 5. During 2023/24 we connected a further biomethane production site to our network, with a maximum production capacity of 18,257 standard cubic metres of gas per hour (SCMH). Between 2022/23 and 2023/24 annual biomethane injection into NGN's network remained stable at 0.71 TWh, enough for approximately, 59,000 typical UK homes (0.73 TWh was injected during 2022/23). Biomethane comprised 1.2% of network gas throughput in 2023/24.

It is of note that the development of new connection sites is typically significantly influenced by the availability of government subsidies / incentives.

[18] https://biomethane.northerngasnetworks.co.uk/

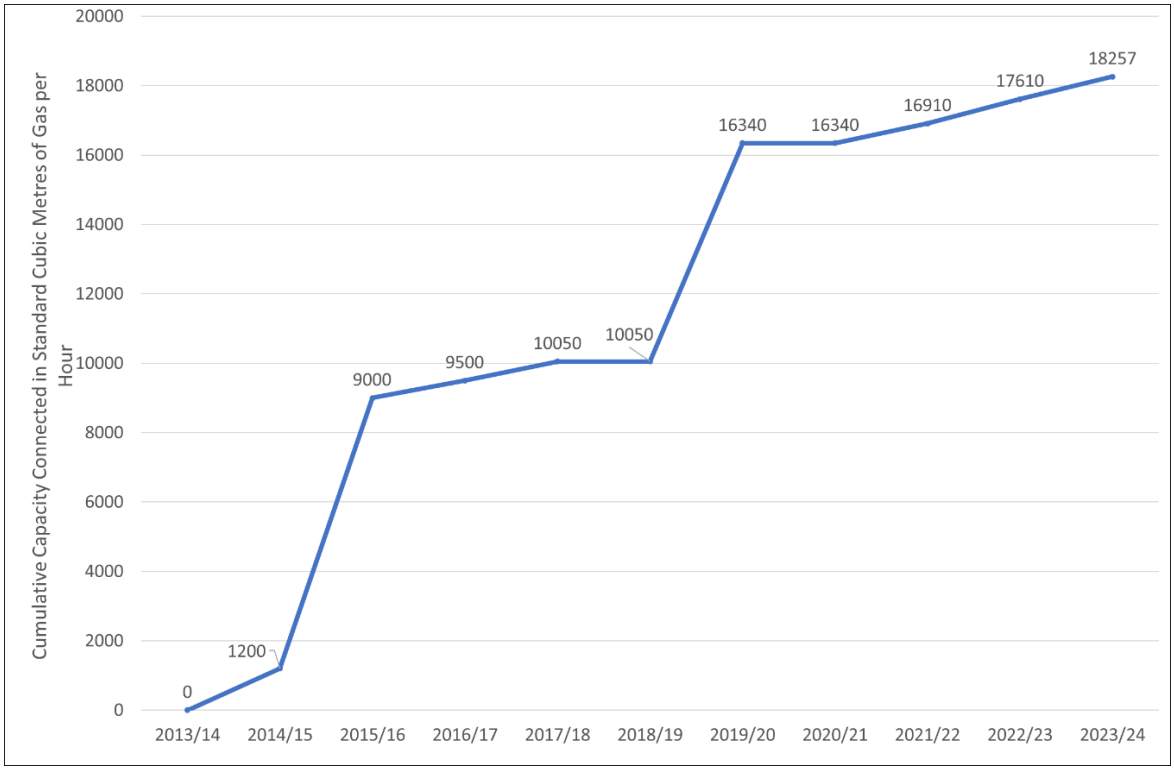


Figure 5 – Capacity of biomethane and low carbon gas injection capacity connected to NGN network

A summary of our RIIO-2 biomethane and low carbon gas connection workload is provided in Table 4.

	Unit	2021/22	2022/23	2023/24	2024/25	2025/26
Biomethane Connections						
Enquiries	Number	51	40	54		
Connection studies	Number	7	9	12		
Capacity of connection studies	SCMH	7,800	8,755	17,600		
Connections	Number	1	1	1		
Capacity connected	SCMH	570	700	647		
Volume (energy value) of biomethane injected in year	Gwh	683	727	711		
Average monthly flow rate (all connections)	SCMH	5,177,255	5,595,934	5,471,511		

	Unit	2021/22	2022/23	2023/24	2024/25	2025/26
Other Green Gas Connections						
Enquiries	Number	3^	0	1		
Connection studies	Number	1^	0	0		
Capacity of connection studies	SCMH	1,000	0	0		
Connections	Number	0	0	0		
Capacity connected	SCMH	0	0	0		
Volume (energy value) of green gas injected	Gwh	0	0	0		
Average monthly flow rate (all connections)	SCMH	0	0	0		
^ All landfill gas sources.						

Table 4 – Biomethane and green gas connection performance

Improving Our Green Gas Connection Customer Performance

Our green gas connection process is detailed in our Biomethane Handbook, this includes:

- A description of the key stages involved in connecting a biomethane plant to our network;
- An overview of how a connection is designed, and the personnel involved;
- An explanation of how to reserve a connection point on the network;
- An overview of the construction process; and
- Details of the inspection process for a completed project.

Ofgem have set us a target of a 7 day turnaround for initial capacity studies for biomethane connection customers. In our RIIO-2 Business Plan we committed to an internal target of <5 days so that customers know quickly if the selected location is suitable for their project. We met the Ofgem target in 2023/24 on 98% of studies, with only 1 out of 55 studies delivered outside the time frame, and 52 (95%) completed within our internal 5 day target.

In our business plan we also committed to produce detailed capacity studies within 20 working days, compared with 30 working days in RIIO-1. In 2023/24 we completed all 13 customer detailed studies within 20 days.

Stakeholders Engagement

Representatives from NGN attend the Energy Networks Association (ENA) hosted Entry Customer Forum (EnCF), along with the other gas networks and stakeholders. The EnCF exists to:

- ensure entry connections processes, standards and associated commercial arrangements are kept under review to promote standardisation across the networks. This encompasses the whole connection process, including initial application, assessment, building, commissioning of initial connection, operation and decommissioning. The EnCF also looks to remove barriers, share best practice, enable efficiencies and improvements, and respond to industry developments.
- provide a forum for gas networks, biomethane customers and other relevant stakeholders to raise identified issues; and establish and maintain an activity schedule of improvements and required framework changes to action with associated deliverables and timescales. There is an EnCF Action Plan to assign responsibility of actions and monitor updates.

As well as the EnCF, we attend the Entry Technical Working Group (ETWG) with other gas network representatives. This ETWG supports in addressing the issues identified via the EnCF and those raised directly from our connected sites.

We are also actively engage with Uniform Network Code Workgroups where there is an impact to new biomethane projects and existing operational biomethane sites.

During 2023/24 we further strengthened our working relationships with our connected sites with the continuation of the annual operating meetings which this year, mostly took place on site. The meetings provide an opportunity for site owners and operators to share successes and challenges and help us identify where we can provide support. We also use it as a platform to address any operational or technical updates which can impact the site.

NGN issue a quarterly dashboard showing individual site performance against all connected biomethane sites.

Site Specific Operational Challenges

Due to the positive support, we have received from site operators, during 2023/24 we continued with our strategy of adjusting down network pressures where possible to facilitate increased biomethane entry flow.

In our North Local Distribution Zone, we have scoped and initiated a calorific value (CV) trial where we provide our connected biomethane sites with a fixed CV target to reduce barriers to biomethane network injection. The background of the trial was to reduce CV capping. The trial commenced in April 2024 and to date has successfully resulted in no network capping from biomethane sites and there has also been positive feedback received from the sites. Further details regarding the outcomes of this trial will be provided in our 2024/25 AER.

Propane is blended with biomethane to increase the CV to the required level to enable network injection. Through our operational meetings with sites and discussions with other networks via the ETWG, we identified an issue relating to propane quality. The issue relates to hydrocarbons ‘dropping out’ of the propane and contaminating meters and equipment on biomethane sites. This in an ongoing

discussion within the wider industry. NZERO are working on a report to the wider industry which is hoped will help identify solutions to manage the issue.

4.1.2 Innovating for Decarbonisation and Environmental Protection

We have an active portfolio of innovation projects to support the net zero transition and protect the environment. Please refer to our Network Innovation Annual Summary Report for 2023/24[19] for full details of our innovation work.

4.2 Climate Change

Key annual performance summary:

- ***Total carbon emissions down by 5% saving 17,000 tCO2e***
- ***Gas shrinkage and leakage down 6%***
- ***Scope 1 and 2 business carbon emissions up by 0.1%***

This section provides a performance summary of our actions to reduce the carbon emissions associated with our business. As detailed in our RIIO-2 EAP, NGN commit to achieving net zero greenhouse gas emissions by 2050.

4.2.1 Shrinkage and Leakage

Shrinkage is a Scope 1 emission and comprises (based on 2023/24 values) gas leakage (92.9%), gas illegally taken by third parties (4.5%) and own use gas primarily for pre-heating gas at locations where the gas changes from one pressure tier to the next (2.6%). Shrinkage is measured in Gwh using the Shrinkage and Leakage Model agreed with Ofgem. Natural gas is principally composed of methane which is a potent greenhouse gas, and produces carbon dioxide (also a greenhouse gas) on combustion. Shrinkage comprises both combusted and uncombusted natural gas and is our primary greenhouse gas emissions source, contributing 91% of our total measured greenhouse gas emissions in 2023/24.

Our RIIO-2 EAP identified reduction targets to be achieved over RIIO-2 for both shrinkage (-23%) and leakage (-24%) compared to the values we had forecast for end of 2020/21 in our EAP.

Our shrinkage and leakage volumes and emissions are summarised in Tables 5 to 8 as specified in the reporting guidelines.

Gas Leakage Volumes in Gwh	2021/22	2022/23	2023/24	2024/25	2025/26
Low pressure mains	171	148	137		
Medium pressure mains	25	25	25		
Services	37	31	27		
AGIs	59	59	59		

[19] https://www.northerngasnetworks.co.uk/wp-content/uploads/2024/07/Innovation-report-2024.pdf

Gas Leakage Volumes in Gwh	2021/22	2022/23	2023/24	2024/25	2025/26
Interference	1	2	1		
Total	293	265	249		
Target total	283	273	257		
Targets were forecasts prepared at the end of the previous reporting year, e.g. 2021/22 forecast prepared at end of 2020/21.					

Table 5 – Gas leakage volumes performance

Gas Leakage in tCO2e	2021/22	2022/23	2023/24	2024/25	2025/26
Total	359,482	324,874	305,488		
Target total	346,689	334,217	315,300		
Volumes of gas leakage in Gwh converted into tCO2e using conversion factor of 1,226.42 tCO2e/Gwh as per reporting guidelines (page 24) Targets were forecasts prepared at the end of the previous reporting year, eg 2021/22 forecast prepared at end of 2020/21.					

Table 6 – Gas leakage in tCO2e performance

Other Gas Shrinkage Volumes in Gwh	2021/22	2022/23	2023/24	2024/25	2025/26
Own use	7.6	6.7	6.9		
Theft	13.4	11.8	12.2		
Total	21.0	18.5	19.1		

Table 7 – Other gas shrinkage volumes performance

Other Gas Shrinkage in tCO2e	2021/22	2022/23	2023/24	2024/25	2025/26
Own use	1,394	1,219	1,261		
Theft	2,468	2,157	2,232		
Total	3,863	3,376	3,493		
Volumes of gas leakage in Gwh converted into tCO2e using conversion factor of 182.93 tCO2e/Gwh as 2023 UK Government Greenhouse Gas Conversion Factors					

Table 8 – Other gas shrinkage in tCO2e performance

Our long-term shrinkage and leakage reduction performance is summarised in Figure 6, demonstrating that between 2013 and 2024 NGN's annual gas leakage reduced by 39%. Cumulatively this represents a saving of 934 GWh of natural gas over the period compared to our baseline position, equivalent to approximately 1,145,500 tCO2e[20] of Scope 1 NGN emissions.

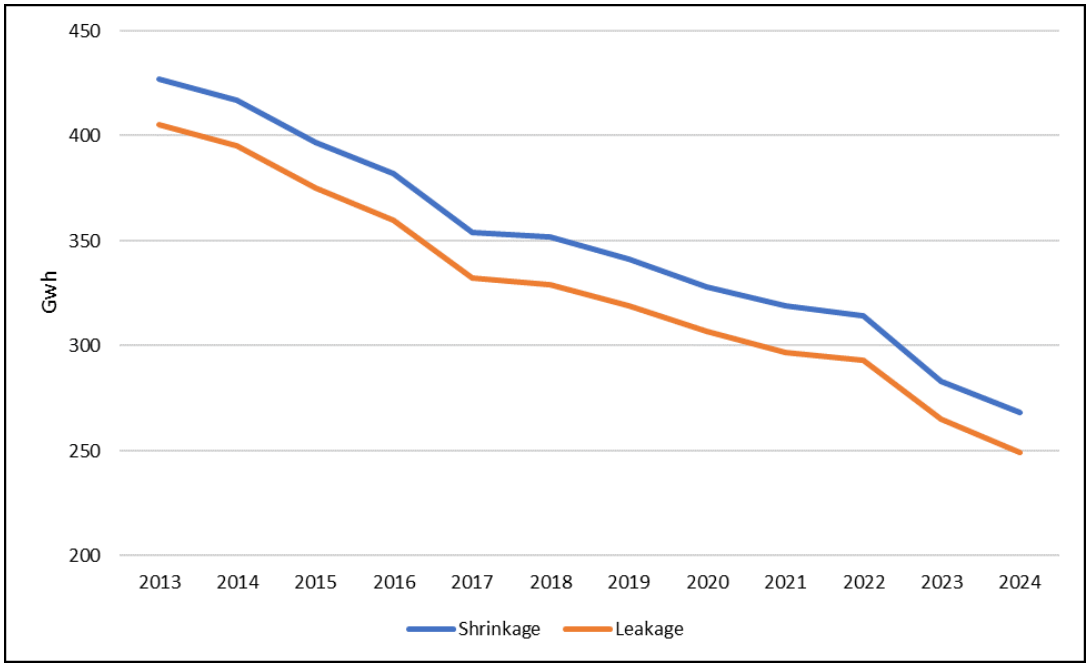


Figure 6 – Shrinkage and leakage performance since start of RIIO-1

Performance Summary

During 2023/24 we have continued our shrinkage reduction strategy which includes our optimised mains replacement programme which prioritises the leakiest metallic pipes, the installation of equipment to enable proactive system pressure management and conditioning our gas with Monoethylene Glycol (MEG) to saturate and swell metallic joints which might otherwise leak gas. Our gas shrinkage and leakage volumes reduced by 15 Gwh (5%) and 16 Gwh (6%) respectively compared to 2022/23, saving 19,269 tCO2e. Our shrinkage gas volume continues to comprise less than 0.5% of the gas transported through our network annually.

We have reduced both our annual shrinkage and leakage volumes by 16% since the end of RIIO-1 (2021) and as such are on track to achieve our RIIO-2 reduction targets.

In 2023/24 we have achieved a decrease in average system pressure. In 2024/25, we are conservatively forecasting no outperformance in average system pressure on the basis that the winter and operation conditions may be more severe than experienced in 2023/24, but we will show a continued outperformance in MEG Saturation.

[20] 934 Gwh at 1226.42tCO2e/Gwh.

Repairing Gas Leaks Faster

Whilst not included within the Shrinkage and Leakage Model, it is recognised that gas escapes result in emissions of natural gas to the atmosphere. As detailed in Part 4.2.2 of our RIIO-2 business plan document, we voluntarily committed to repairing emergency gas escapes quicker during RIIO-2. These commitments will reduce the amount of gas lost to atmosphere and deliver real-world carbon emission savings that whilst difficult to estimate, could amount to 30,000 tCO2-e over RIIO-2. During 2023/24 we have continued to exceed or meet our end RIIO-2 performance targets for the third consecutive year as shown in Table 9.

	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2025/26 Target
Outstanding gas emergency repairs completed within 7 days (%)	86%	91%	90%	91%			>89%
Outstanding gas emergency repairs completed within 28 days (%)	95%	98%	98%	98%			>98%

Table 9 – Gas emergency repair performance

4.2.2 Business Carbon Footprint - Scope 1 and 2

Scope 1 (direct) and Scope 2 (indirect) business carbon emissions (excluding shrinkage) comprised approximately 1.5% of our total reported greenhouse gas emissions during 2023/24. Despite this imbalance, our stakeholders have told us that they expect us to reduce all elements of our carbon emissions, not just gas shrinkage[21], and we agree with this view.

Working with the Carbon Trust in 2018/19 we were the first UK gas network to establish and adopt science-based aligned carbon reduction targets for a well below 2 degree warming scenario in 2050[22]. This analysis also informed the targets that we set for key Scope 3 emissions. As detailed in our RIIO-2 EAP, after developing and adopting our carbon reduction targets, we subsequently adopted more ambitious short and long-term targets following the UK's commitment to achieving net zero greenhouse gas emissions by 2050. These targets, underpinned by our EAP initiatives and coupled with anticipated developments in technology, mean we are targeting the achievement of:

- 47% reduction in Scope 1 and 2 non-shrinkage business carbon emissions by 2025/26 vs 2017/18 baseline[23]; and
- net zero non-shrinkage Scope 1 and 2 business carbon emissions by the end of the 2030/31.

These targets directly support the achievement of net zero emissions in our network regions and the UK. Our business carbon footprint reduction targets are presented in Appendix A. It should be noted that our carbon reduction targets are unable to be approved by the Science Based Targets Initiative (SBTi) as there is currently no approved target development methodology for the oil and gas sector.

[21] Customer Insight 43, RIIO-2 EAP.
[22] As defined by the International Energy Agency for a global emissions trajectory that represents a 50% chance of limiting average future temperature increases to 1.75^{o}C above pre-industrial levels. Our 2017/18 non-shrinkage carbon emissions form the baseline of this modelling.
[23] 7,494 tCO2e.

Further, the SBTi are not currently accepting commitments from oil and gas sector companies such as NGN. Our Scope 1 and 2 business carbon emissions are summarised in Table 10 and Figure 7.

Emissions in tCO2e	Specific Area	2021/22	2022/23	2023/24	2024/25	2025/26
Building energy use	Building – electricity*	0	0	0		
	Building – natural gas	317	322	319		
	Substation electricity	0	0	0		
Operational transport	Road**	4,468	4,777	4,783		
	Sea	0	0	0		
	Air	0	0	0		
Fugitive emissions	IIGs^	n/a	n/a	n/a	n/a	n/a
	F-gases	Not measured	0	0		
Fuel combustion	Diesel	0^^				
	Gas	Included in gas shrinkage^^^				
Gas shrinkage		363,344	328,250	308,963		
Total excluding shrinkage						
Target		4,943	4,527	4,011	3,688	3,612
Emissions		4,785	5,099	5,102		
Certified carbon offsets purchased		0	572	0		
Net emissions		4,785	4,527	5,102		
Total including shrinkage		368,129	333,350	314,065		
Total including shrinkage per £m turnover (tCO2e/£m – market based)		874	661	584		
Total including shrinkage per Gwh gas transported (tCO2e/Gwh – market based)		5.48	5.64	5.15		

^ Insulation and interruption gas - not relevant to gas distribution networks

^^ Fuel combustion in stationary and mobile plant included in Operational Transport – Road category as it cannot be distinguished from vehicle fuel consumption in source data (fuel card sales receipts).

^^^ Own use gas emissions included in shrinkage emissions: 2021/22 = 1394 tCO2e; 2022/23 = 1,219 tCO2e; 2023/24 = 1,261 tCO2e

Emissions in tCO2e	Specific Area	2021/22	2022/23	2023/24	2024/25	2025/26
* Value reported in table is as per marked based methodology. Value for location based methodology: 2021/22 = 951 tCO2e; 2022/23 = 714 tCO2e; 2023/24 = 919 tCO2e ** Including electricity used to charge electric vehicles Full details of our business carbon reduction targets for the period 2021 to 2026 are contained in Appendix A.						

Table 10 – Scope 1 and 2 greenhouse gas emissions

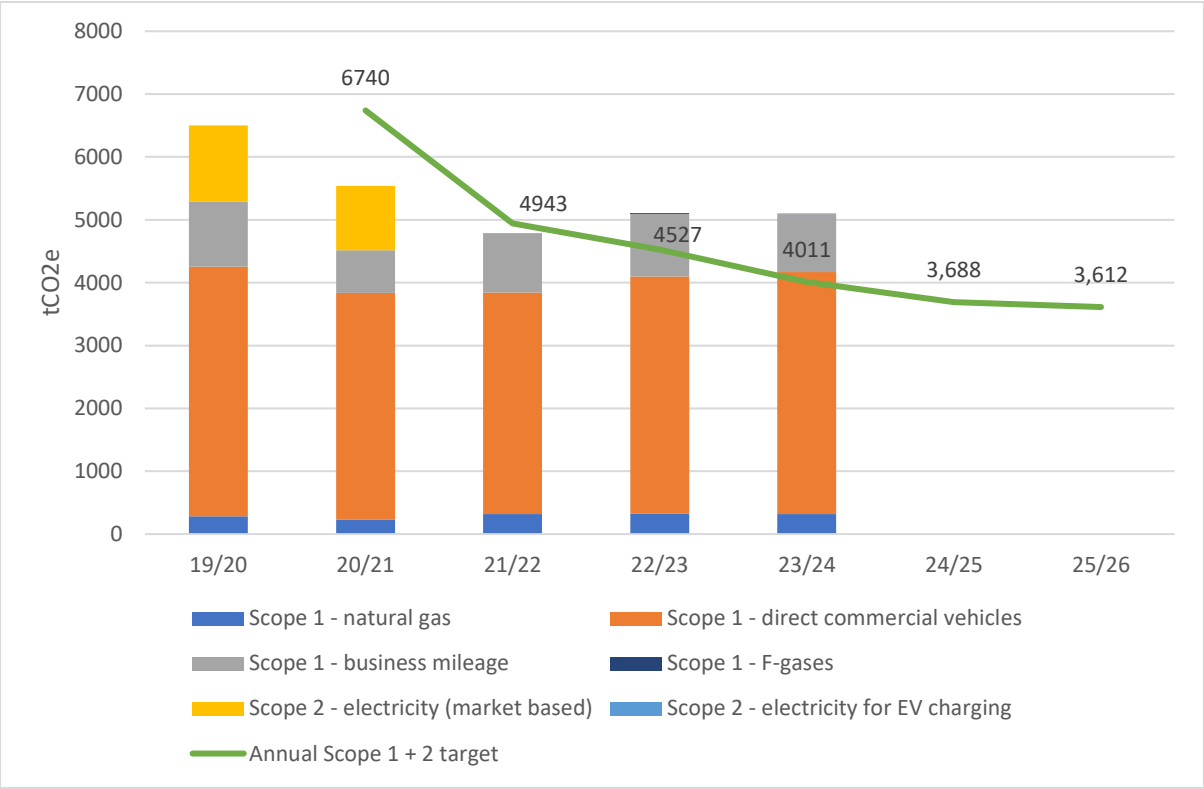


Figure 7 – Composition of Scope 1 and 2 greenhouse gas emissions excluding shrinkage and carbon offsets.

The EAP reporting guidelines request networks report the CO2e intensity of an operational mile travelled over the duration of RIIO-2. This data is presented in Figure 8 based on NGN fuel purchasing records and travel data from our vehicle telematics system. It is noted that NGN's commercial vehicle fleet are fuelled using company fuel cards which provide total fuel consumption data in litres for all fuel purchases, including that purchased for use in vehicles and portable field equipment (such as generators), with fuel consumption purpose being indistinguishable in the purchasing data. In addition, our larger commercial vehicles often directly power field equipment (such as hydraulic breakers) and thus consume fuel whilst stationary.

Figure 8 demonstrates that the carbon intensity of our operational vehicle fleet has decreased by 12% since 2020/21 and stable over the last three years. This change may be associated with our new vehicle purchases, but we will continue to report this data to capture the benefits of our vehicle fleet transformation.

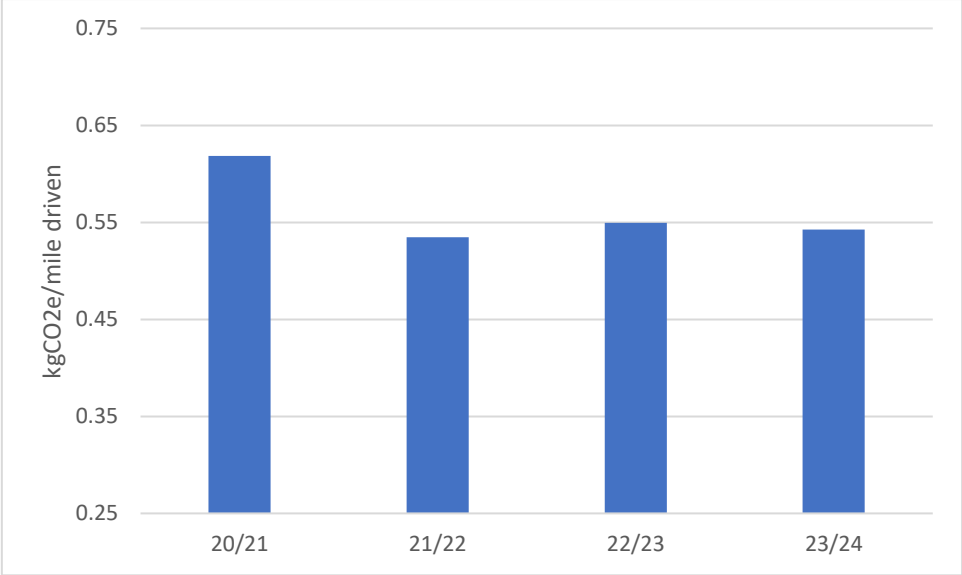


Figure 8 – Carbon intensity of operational vehicle travel (kgCO2e/mile driven)

Performance Summary

The impacts of the Covid-19 pandemic temporarily influenced our Scope 1 and 2 BCF during 2020/21 and 2021/22 as our business travel habits changed and energy consumption fell. Our Scope 1 and 2 BCF (market-based excluding shrinkage) has since stabilised and during 2023/24 was 1400 tCO2e (21%) below our pre-COVID value from 2019/20 (location-based), and 2392 tCO2e (32%) below our 2017/18 baseline. In pursuance of our end of RIIO-2 Scope 1 and 2 BCF target we were 27% in excess of our annual target for 2023/24.

We continue to purchase only 100% certified renewable electricity for our premises. In 2023/24 we completed the design, structural assessments and procurement to enable delivery of our EAP commitment to install rooftop solar photovoltaics (PV) at our offices and depots with installation planned to commence during 2024/25. Emissions from natural gas consumption in our premises remained stable and we are exploring options to purchase certified green gas from 2025/26 onwards when our current supply tariff expires. Our RIIO-2 EAP assumed we would purchase green gas from 2024 onwards but to minimise costs during the energy crisis we entered into a longer than typical supply tariff which extends until 2025.

During 2023/24 we have continued to transform our company car fleet and have achieved our end of RIIO-2 target to have 100% hybrid, plug-in hybrid or battery electric vehicles in our fleet. In late 2022/23 we also launched a new electric and hybrid vehicle leasing salary sacrifice scheme to enable colleagues to make sustainable vehicle choices and continued this into 2023/24. Non-operational business mileage has also received focus from the NGN Senior Management Team to encourage sustainable business travel practices.

The main influences on our Scope 1 and 2 BCF performance are the external constraints we have experienced with delivery of our commercial vehicle fleet investment plans, most notably delayed delivery of new (Euro-6 engine) diesel vehicles that we have ordered during RIIO-2, and the limited availability of suitable zero emission commercial vehicles. As a consequence, our operational vehicle

fleet emissions intensity remained stable between 2022/23 and 2023/24 as shown in Figure 8. This area remains challenging for us to reduce emissions, and our performance in this area will significantly influence our ability to achieve our end RIIO-2 Scope 1 and 2 BCF target. Further discussion of this, the challenges we face, and the implications are provided below.

Vehicle Fleet Decarbonisation Programme Progress Summary

Our RIIO-2 vehicle replacement strategy included replacing 146 small and medium diesel vans with electric vehicles (EV) and installing 182 EV charging points. These figures have since been revised due to the constraints and challenges with implementing a full electric emergency response fleet. Throughout RIIO-2 we now aim to replace 52 small and medium-sized vehicles with EVs and install 161 charge points.

Our plan was to begin installing the EV charging points in the first year of RIIO-2 and to purchase 2 EVs to fully trial and understand the impact on operations of adopting EVs. However, the Covid-19 pandemic delayed the preparatory work needed to deliver this. A successful tender exercise was completed in 2022, where we appointed an EV charger supplier. Once we completed all the required surveys to ensure our offices and depots had the necessary electrical capacity to support the EV charging points, along with securing local electricity distribution network operator (DNO) approval, we installed 43 EV charge points across eight of our operational depots and offices during 2023/24. These EV charge points will support charging of battery electric vans and encourage more colleagues to make the switch from an internal combustion engine to a plug-in hybrid or full battery electric car for both personal and business travel.

NGN continued to search the market for a fit for purpose battery electric van. We are aiming to purchase a batch of 10 battery electric medium-sized vans to fully trial across the network within the First Call Operative emergency response role. Delivery dates are subject to worldwide supply chain issues that are still being experienced by fleet operators, and we anticipate this trial to start January 2025.

Case Study – Enabling Our Colleagues to Drive Down Their Emissions	
To enable our colleagues to reduce the environmental impact of their driving we have: • Changed our company policy to include only electric, plug-in hybrid and hybrid vehicles only. By March 2024 our company lease car fleet was made up of 100% ultra low emission or hybrid cars. • In late 2022/23 partnered with a specialist provider to offer our colleagues a new electric and hybrid vehicle leasing salary sacrifice scheme. This scheme makes it more affordable for our colleagues to make sustainable vehicle choices whilst also helping reduce NGN's business travel carbon emissions. As of March 2024, 29 NGN colleagues are taking part in this scheme.	

4.2.3 Total Scope 1 and 2 Emissions

As shown in Table 10, our total Scope 1 and 2 emissions decreased by 5.8% between 2022/23 and 2023/24, and 15% between 2021/22 and 2023/24. Whilst our Scope 1 and 2 BCF emissions increased slightly during 2023/24, our out-performance in shrinkage reduction meant our 2023/24 total Scope 1 and 2 emissions were 2.7% (8,700 tCO2e) under our emissions target for the year.

4.2.4 Business Carbon Footprint - Scope 3

Scope 3 greenhouse gas emissions are those associated with an organisation's value chain across 15 defined categories, including goods and services purchased, leased assets and waste disposal. As reported in our 2021/22 AER[24], our screening assessment identified that Scope 3 emissions categories 1 to 7 are considered to be relevant and material to our business operations. This assessment identified that Scope 3 emissions typically comprise approximately 15% of NGN's total greenhouse gas emissions (Scope 1 = c.85% and Scope 2 = <0.5%).

Reporting Improvement Programme

Following expansion of our Scope 3 emissions reporting in 2022/23 our 2023/24 reporting included the same emissions source. All Scope 3 emissions reported by NGN during 2023/24 are based on actual consumption data (such as tonnes of product purchased or litres of fuel consumed) multiplied by the relevant published carbon conversion factor, with none estimated from financial spend based factors/indices. This is the same approach as applied for our 2022/23 AER.

Throughout RIIO-2 we will continue to work to expand the range of our Category 1 (goods and services) and Category 2 (capital goods) reporting as supply contracts are renewed. Engagement with our supply chain to date has identified a general absence of carbon/environmental data availability for many of the capital products that we purchase, hence we are currently reporting the emissions from our consumption of uniform materials (such as polyethylene, copper and steel pipes) for which published carbon conversion factors are available and emissions can be readily calculated based on mass of product purchased.

[24] See Appendix B: https://www.northerngasnetworks.co.uk/wp-content/uploads/2022/09/NGN-21-22-AER_final.pdf

Performance Summary

Table 11 and Figure 9 identify the Scope 3 categories identified as material to NGN and their emissions for 2023/24.

Scope 3 Category	Data Content	Approx. Data Coverage in 2023/24 (%)	Emissions tCO2e 2021/22	2022/23	2023/24	2024/25	2025/26
1 – Goods and services	Gas mains replacement and helicopter survey contractor fuel emissions; Contractor reinstatement material; Landscape maintenance contractor vehicle emissions; batteries; and electrical consumables (WTW)	44%*	14,590	12,233	13,169		
2 – Capital goods	Polyethylene gas pipe and fittings^^; steel pipe; copper pipe		6,163	6,490	7,197		
3 – fuel and energy related activity not included in Scope 1 and 2	WTT emissions and transmission and distribution losses for Scope 1 and 2 emissions (fuel use in direct commercial vehicles and company owned/controlled cars; metered natural gas use; electricity use)**.	100%^	1,154	1,215	1,231		
4 – upstream transportation and distribution	Logistics contractor emissions	100%^	102	99	84		
5 – waste generated in operations	Office and depot waste, excavation spoil and polyethylene pipe waste	100%^	314	297	350		
6 – business travel	Business travel via air, rail, hire cars and in personal cars ***New for 2022/23***: hotel stays	100%^	83	155	532		
7 – employee commuting and homeworking	***New for 2022/23***: Employee commuting and homeworking emissions	100%^	Not available	1,141	1,215		
Total Emissions **Certified carbon offsets purchased (see Appendix B)** **Net emissions**		39%*	22,406 0 22,406	21,630 203 21,427	23,776 0 23,776		
Total per £m turnover (gross tCO2e/£m)			53	43	44		
Total per Gwh gas transported (gross tCO2e/Gwh)			0.33	0.37	0.39		

Scope 3 Category	Data Content	Approx. Data Coverage in 2023/24 (%)	Emissions tCO2e				
			2021/22	2022/23	2023/24	2024/25	2025/26

*** 2023/24 emissions for data content shown divided by estimated emissions for 2020/21.**

**** WTT emissions for gas shrinkage excluded as per Ofgem Table 11.06 format. 2023/24 gas shrinkage WTT emissions = 268.18 Gwh x 30.21 tCO2e/GWh = 8,102 tCO2e.**

^ Source data available and included in emissions calculation for all relevant emissions sources.

^^ Polyethylene pipe and fittings emissions based on carbon conversion factor for high density polyethylene published by UK government and includes manufacture and transportation of products. Pipe manufacturer's bespoke emissions calculations may vary.

Emissions from Downstream Customer Gas Consumption

It is of note that NGN do not own or control the gas that we transport and as such downstream emissions associated with customer gas combustion are not attributable to NGN as a Scope 3 emission. For completeness these emissions have been estimated as 12.6m tCO2e on the assumption that all gas transported through NGN network and not lost to shrinkage is subject to combustion by customers with carbon emissions generated as per carbon conversion factors published by UK Government Department of Business, Energy and Industrial Strategy for 2023:

Gas consumption by NGN customers = 61,002 Gwh (NGN throughput) – 268 Gwh (NGN shrinkage) = 60,734 Gwh

Gas consumption = 60,734 Gwh x (182.93 + 30.21) tCO2e/Gwh = 12.9m tCO2e

Table 11 – Scope 3 greenhouse gas emissions

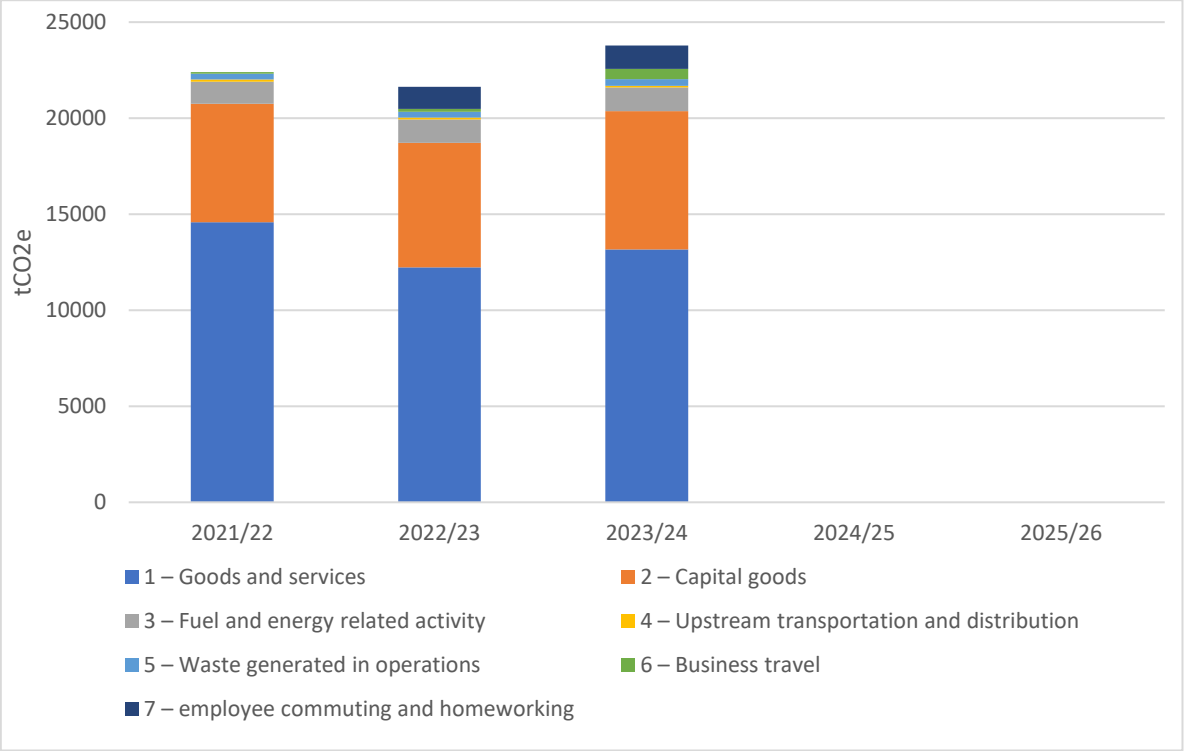


Figure 9 – Scope 3 greenhouse gas emissions by Scope 3 category

As referenced above, we continuously expand the range of Scope 3 emissions that we measure and report as a matter of best practice. This makes gross Scope 3 emissions performance comparisons with previous reporting years problematic as we are not always comparing like with like.

Our RIIO-2 EAP included reduction targets for a consistent set of key Scope 3 emissions sources as measured during RIIO-1. Our performance against these targets is shown in Table 12 and identifies that our emissions increased compared to 2022/23 (+14%) and exceed our annual target (+18%). This was principally influenced by completion of a greater mains replacement workload during 2023/24 (+12% compared to 2022/23[25]) which directly increased emissions associated with mains replacement contractor vehicles and purchased polyethylene pipe and fittings. In addition, air travel emissions increased significantly as we returned to typical business travel habits after the COVID-19 period.

Scope 3 Emissions (tCO2e)		2021/22	2022/23	2023/24	2024/25	2025/26
Contractor Vehicles – Mains Replacement Contractors Vehicle Emissions (Category 1 – Goods and Services)	Emissions	9,062	8,821	9,893		
	Target	8,490	8,260	8,029	7,799	7,568
Contractor Vehicles – Helicopter Surveys (Category 1 – Goods and Services)	Emissions	53	35	40		
	Target	77	77	77	77	77
Polyethylene gas pipe and fittings (Category 2 – Capital Goods)	Emissions	6,084	6,368	7052		
	Target	6,470	6,436	6,402	6,367	6,334
Electricity Generation and Transmission and Distribution Losses (Category 3 – fuel and energy related activity not included in Scope 1 and 2)	Emissions	0	0	0		
	Target	41	38	0	0	0
Business travel – air (Category 6 – business travel)	Emissions	0	1	357		
	Target	198	196	194	192	190
Business travel – rail (Category 6 – business travel)	Emissions	2	8	12		
	Target	22	22	22	22	22
Total	Emissions	15,200	15,233	17,355		
	Certified carbon offsets purchased	0	203	0		
	Net emissions	15,200	15,030	17,355		
	Target	15,298	15,030	14,724	14,457	14,191

Table 12 – Scope 3 emissions reduction targets and performance

[25] 590km of mains abandoned in 2023/24 compared to 528.7km in 2022/23. See page 13 of our 2023/24 Annual Report.

4.2.5 Total Scope 1, 2 and key Scope 3 emissions

As shown in Tables 10 and 12, our total Scope 1, 2 and key Scope 3 emissions decreased by 4.9% between 2022/23 and 2023/24, and 13.5% between 2021/22 and 2023/24. Our 2023/24 Scope 1, 2 and key Scope 3 emissions were 1.8% (6,100 tCO2e) under our emissions target for the year.

4.2.6 Embodied Carbon

As identified in the reporting guidelines, embodied carbon (EC) is commonly defined as the whole life ('cradle to grave') total greenhouse gas emissions generated to produce a built asset, including emissions associated with extraction, manufacture/processing, transportation, assembly and end of life decommissioning.

As detailed in our 2021/22 AER, we have completed a scoping assessment of the embodied carbon (EC) associated with our principal areas of work expenditure, namely: gas mains replacement, diversions and reinforcements (<7 barg); new connections; and gas emergency repair. This assessment was aligned to PAS2080[26] and included consideration of asset lifecycles.

Process mapping of our work projects was completed to identify sources of EC associated with our works for inclusion in our EC calculation based on assessment of their materiality and source data quality, resulting in c.90% of identified emissions sources being included based on 2020/21 data. A summary of our EC assessment methodology is included in Appendix C of our 2021/22 AER[27].

Using our methodology, estimated baseline total and normalised 'as built' EC values for 2020/21 have been calculated for our principal workload, in addition to actual performance values for 2021/22, 2022/23 and 2023/24 (normalised to 2020/21 cost basis for consistency to remove inflationary effects). An EC intensity target to be achieved by the end of RIIO-2 has also been developed based on our relevant EAP commitments (such as our excavation spoil recycling and vehicle fleet decarbonisation targets) and 2020/21 waste and material consumption volumes. This information is shown in Figures 10 and 11. We will continue to review our EC data collection throughout RIIO-2 to identify areas to improve this new area of reporting.

[26] PAS2080 Carbon Management in Infrastructure Verification: https://www.bsigroup.com/en-GB/our-services/product-certification/product-certification-schemes/pas-2080-carbon-management-in-infrastructure-verification/
[27] https://www.northerngasnetworks.co.uk/wp-content/uploads/2022/09/NGN-21-22-AER_final.pdf

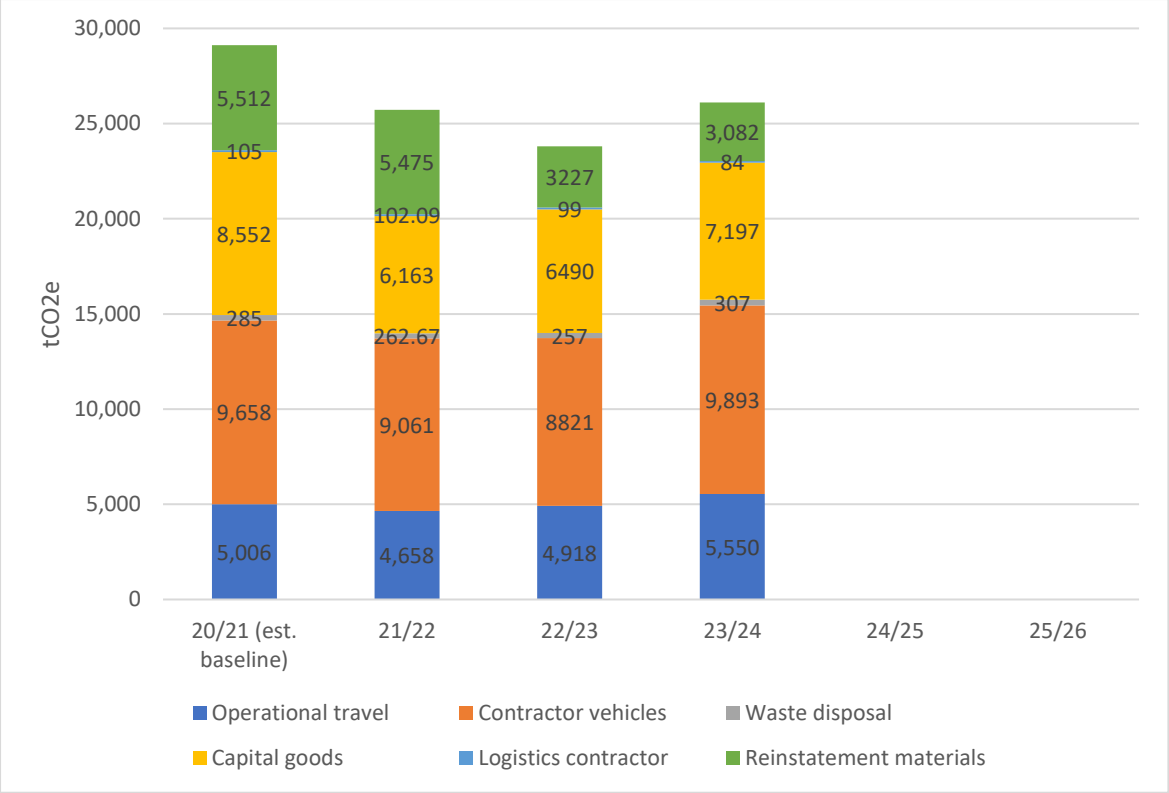


Figure 10 – Embodied carbon emissions for gas mains replacement, diversions and reinforcements (<7 barg), new connections and emergency repair work

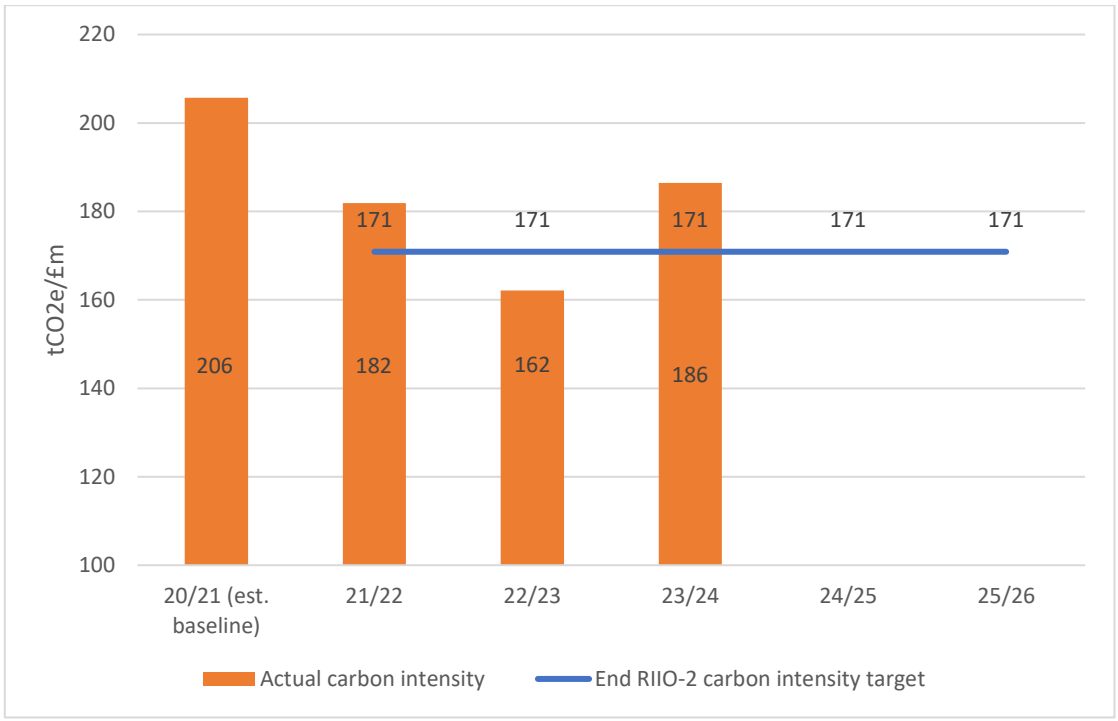


Figure 11 – Estimated embodied carbon emissions intensity for gas mains replacement, diversions and reinforcements (<7 barg), new connections and emergency repair work in 2020/21 prices.

As shown in Figure 10, total EC increased by c.10% (2,300 tCO2e) between 2022/23 and 2023/24 for a 12% increase in workload[28].

Figure 11 demonstrates that the EC for our main work types was 186 tCO2e/£m during 2023/24, a c.15% increase compared to 2022/23, similar to 2021/22, and a 10% reduction compared to our estimated baseline for 2020/21. Based on our RIIO-2 EAP commitments we are targeting a 17% reduction in this value by end 2025/26 compared to our baseline, which we achieved during 2022/23 but slightly exceeded in 2023/24. We will continue to monitor our performance against this target throughout RIIO-2 whilst delivering our EAP commitments.

The workload included in our EC calculation is varied and includes repair of gas leaks, installation of new gas connections, replacement of gas mains and associated services for a wide range of diameters, and network reinforcement (<7 barg). Estimated emissions for mains replacement, diversions and reinforcements workload based on expenditure identified that the carbon intensity of this work reduced from approximately 50 tCO2e per km of pipe installed in 2020/21 to approximately 35 tCO2e per km in 2021/22 and 2022/23 and 34 tCO2e per km in 2023/24, thereby indicating consistent performance. Equivalent comparison values from other utility works are difficult to establish, however these values are similar to (but substantially less than) those reported from the water industry (approximately 90-190 tCO2e per km for new polyethylene mains laid in roads[29]), with the difference anticipated to be due to NGN gas mains replacement being predominantly done by insertion techniques utilising the existing gas mains rather than traditional open trench methods anticipated to be utilised for new water mains.

We are looking to expand the scope of our embodied carbon data capture during RIIO-2 to include capital projects such as fixed asset site upgrades and diversions undertaken for third parties to enable a wider scope of EC reporting in the future.

4.3 Sustainable procurement, resource use and waste

Key annual performance summary:

- ***82% expenditure with Supplier Code of Conduct compliant suppliers***
- ***100% waste recycled, reused or recovered;***
- ***0% excavation spoil to landfill***
- ***Office and depot waste disposal to landfill down by 80%***
- ***Virgin aggregate use decreased to 2.7%***

4.3.1 Supply Chain and Sustainable Procurement

Our EAP recognised the need for us to develop a sustainable approach to procurement and resource consumption to reduce the environmental impact of our business operations.

During 2023/24 we spent £244m on goods and services from nearly 500 suppliers, 65% of which were known to be small and medium sized enterprises (SMEs). Our principal area of expenditure was mains

[28] 2020/21 = 29,118 tCO2e; 2021/22 = 25,722 tCO2e; 2022/23 = 23,813 tCO2e; 2023/24 = 26,113 tCO2e

[29] Carbon curves for the assessment of embodied carbon in the wastewater industry; Smyth, Davison and Brow; *Water and Environment Journal* **31** (2017) 4-11.

replacement and reinstatement contractors which accounted for 41% of expenditure on goods and services.

For core business procurement events we preferentially engage suppliers who have been approved via the Achilles Utilities Vendor Database, an independent supply chain assurance assessment. In addition, potential suppliers for procurement events are typically required to complete a pre-qualification questionnaire (PQQ) which as standard includes questions regarding their environmental management systems, past environmental performance, corporate environmental objectives, how they meet our EAP objectives and their sustainable business practices, and are awarded scores accordingly. It is of note that we are aware that many of our suppliers have set their own sustainability metrics and targets but we do not have access to data regarding the proportion of suppliers that have these and as such cannot provide performance data on this.

During 2021/22 we worked with our stakeholders[30] to finalise our Supplier Code of Conduct ('supplier code') and associated compliance process. Our supplier code is aligned to the UN SDGs and requires our suppliers to operate to high standards of environmental management and sustainable business practices. We expect the implementation of our supplier code to ensure delivery of our RIIO-2 commitments in the most sustainable manner for both our stakeholders and the planet, including with respect to ethical working practices and reducing greenhouse gas emissions. We have an EAP commitment to achieve at least 80% of our suppliers (by value) meeting complying with our supplier code by the end of RIIO-2.

Performance Summary

Following launch in April 2022[31], our supplier code has subsequently been communicated with existing and potential suppliers and compliance tracked by our Procurement Team. Our performance can be seen in Table 13 and identifies during 2023/24 82% of our expenditure was with suppliers who have agreed to our supplier code, a total of 204 suppliers, up from 79% in 2022/23 and thereby achieving our target set for end RIIO-2.

Supply Chain		2021/22	2022/23	2023/24	2024/25	2025/26
Percentage of suppliers (by value) meeting NGN's supplier code	%	n/a	79	82		

Table 13 – Sustainable procurement performance

During 2022 we joined the Supply Chain Sustainability School to help improve the sustainability performance of our supply chain. Of note this will involve sharing of best practice amongst members via discussion groups and by providing our suppliers with access to free to use training materials to help them develop their awareness of sustainability issues and how they can improve their own sustainability performance.

[30] [30] https://together.northerngasnetworks.co.uk/wp-content/uploads/2021/11/Supplier-code-of-conduct-Workshop-12-January-2022-v2.pdf

[31] https://www.northerngasnetworks.co.uk/wp-content/uploads/2022/04/Supplier-Code-of-Conduct_FINAL_compiled.pdf

Case Study – Upskilling our supply chain	
In November 2023 we held a webinar for our largest suppliers to raise awareness of the UN SDGs and share how they can demonstrate their support. We also wanted to encourage our suppliers to commit to supporting the UN SDGs and share knowledge and resources with them around how they can demonstrate this. Representatives from 10 of our largest suppliers attended the webinar and the resources were subsequently shared with the suppliers representing the top 80% of our annual expenditure. Further information about the event is available here.	

4.3.2 Efficient Resource Use and Waste

Our business operations inherently involve consumption of resources and generation of waste by ourselves and our contractors.

A summary of our primary material/resource consumption types by volume/mass is presented in Table 14 including data from ourselves and our main contractors.

Material/Resource Type	Unit	2021/22	2022/23	2023/24	2024/25	2025/26
Secondary (recycled) aggregates	tonnes	107,344	114,439	130,976		
Asphalt	tonnes	98,149	39,743	39,991		
Primary (virgin) aggregates*	tonnes	31,744	28,095	32,214		
Soil	tonnes	11,492	4,372	4,209		
Concrete and concrete products (eg kerbstones)	tonnes	7,782	7,316	6,383		
Polyethylene pipe and fittings	tonnes	1,861	1,947	2,157		
Diesel**	Litres	3,746,881	4,256,051	4,641,547		
Red diesel (gas oil)	Litres	463,358	1,191	218		
Petrol**	Litres	65,370	76,487	97,336		
Materials/resources presented are those with annual consumption >1000 tonnes or litres.						

Material/Resource Type	Unit	2021/22	2022/23	2023/24	2024/25	2025/26
Data represents consumption for NGN, gas main replacement contractors and reinstatement contractors. * All aggregates including sand; not just stone as required in Ofgem reporting definition for 'virgin aggregate' for Table 11.07. ** Excludes consumption associated with travel in cars claimed as mileage as actual fuel consumption unknown.						

Table 14 – Primary material/consumption volumes for NGN and contractors

In addition to the information provided in Table 14, we have an EAP commitment to use less than 2.5% primary (virgin) aggregate (crushed stone) in reinstatement by 2025/26. During 2023/24 our virgin aggregate consumption substantially decreased to 2.7% compared to 9.5% in 2022/23. We have achieved this by working with our supply chain to identify solutions regarding location-based constraints which were previously being experienced. We will continue to work with our supply chain to achieve our target.

We typically generate c.200,000 t of waste annually, >99% of which is excavation spoil. During 2023/24 100% of our waste was recycled, reused or recovered. A summary of waste production and disposal performance to the best available detail is provided in Table 15 below.

Waste Type	Unit	2021/22	2022/23	2023/24	2024/25	2025/26	2025/26 Target
Waste Production							
Excavation spoil	tonnes	201,061	196,887	235,897			n/a
Mixed recycling and recovered waste	tonnes	57	60	182			n/a
General waste	tonnes	583	526	411			n/a
Metals	tonnes	53	73	54			n/a
Wood	tonnes	39	47	66			n/a
Plastics (inc gas pipe waste)	tonnes	206	191	210			n/a
Green waste	tonnes	13	8	7			n/a
Hazardous	tonnes	3	3	1			n/a
Other**	tonnes	38	32	82			n/a
Total	tonnes	202,053	197,828	236,909			n/a
Total office and depot waste^	tonnes	981	936	946			916*
Total waste per £m turnover	Tonnes/£m	480	392	440			n/a

Waste Type	Unit	2021/22	2022/23	2023/24	2024/25	2025/26	2025/26 Target
Waste Disposal Performance							
Total waste: **disposed to landfill** **recycled/reused** **recovered**	%	 0.12 99.88*** 0	 0.22 99.52 0.26	 0 99.89 0.11			 n/a
Excavation spoil: **disposed to landfill** **recycled/reused** **recovered**	%	 0.11 99.89*** 0	 0.21 99.79 0	 0.00 100 0			 <0.1% n/a
Office and depot waste: **disposed to landfill** **recycled** **recovered**	%	 2.48 97.52*** 0	 1.34 44.03 54.63	 0.25 74 25.89			 0% n/a
*** Equates to 20% reduction compared to 2018 baseline (1145 t)** **** Includes batteries, sanitary waste,and oil.** *****2021/22 data only available as disposal to landfill and diversion from landfill (recycled or recovered).** **^ Waste disposed at office and depot sites only (excludes waste generated at infrastructure sites and temporary work sites).** **Waste data from our leased office at Doxford Park, Sunderland could not be obtained from our landlords. In response the waste data for our head office at Thorpe Park, Leeds has been duplicated as a proxy for the missing Doxford Park data as the offices typically have similar numbers of colleagues working there.**							

Table 15 – Waste disposal performance

During 2023/24 the amount of excavation spoil we sent to landfill decreased from 0.21% in 2022/23 to 0.00%. Our long-term performance since the start of RIIO-1 remains excellent and we have significantly improved from our outset performance of 37% excavation spoil to landfill in 2013/14.

In addition, during 2023/24 we achieved 0.25% office and depot waste to landfill, down c.80% compared to 2022/23, and achieved a 17% reduction in office and depot waste mass compared to our 2018 baseline. As such we remain on track to achieve our end of RIIO-2 targets as shown in Table 14 and are working with our supply chain to achieve these at the earliest opportunity. During 2023/24 we proactively changed our office and depot waste management service providers to only 100% diversion from landfill suppliers.

We communicate our EAP waste and material targets with our colleagues via digital signage in our offices and depots, in addition to sharing them with our contractors. Our contractors are required to submit a detailed monthly waste, materials and fuel consumption report which identifies their

performance against our EAP commitments. The performance data is subject to challenge and scrutiny at contractor performance review and meetings, and since April 2022 is included as scored criteria in our financially incentivised contractor 'Champions League' with similar weightings to health and safety and customer service performance.

NGN's paper consumption remains low at approximately 0.7 million sheets per year compared to a 2018 baseline of 3 million, comfortably on track to achieve our target to halve our consumption by 2026. Our paper usage decreased between 2022/23 and 2023/24 by approximately 17%.

Our EAP included a commitment to eliminate avoidable single use plastics from our offices and depots by the end of RIIO-2. During 2022-23 we undertook a baseline assessment of our single use plastics consumption across our facilities and identified areas for improvement. We have since made improvements including:

- successfully switched single use plastic milk containers to glass milk bottles at our head offices (saving >1000 bottles and c.40kg of plastic waste per year);
- changing our office bin liners to recyclable or biodegradable bags;
- ensuring we have recycling facilities for used printer ink and toner cartridges; and
- providing our operational colleagues with refillable water bottles as a sustainable alternative to ready bottled drinking water which will save c.80,000 single use plastic bottles weighing approximately three to four tonnes annually.

Next we are targeting to remove single use plastic items from our stationery supplier catalogues.

Case Study – Reusable Water bottles

Our operational team typically consumed approximately 1,500 large single use plastic bottles containing drinking water each week. These bottles were further packed and delivered to us in plastic shrink film. Whilst these bottles are recyclable, they are an avoidable single use plastic item.

To proactively avoid this waste we have worked with our operational team to make the switch to reusable water bottles and containers.

This permanent change will save approximately 80,000 single use plastic bottles, weighing 3-4 tonnes, annually.

4.4 Local environment

Key annual performance summary:

- ***Continuous review of severe weather management procedures***
- ***Completion of land remediation works at one former gasworks site***
- ***Planting of more than 22,400 trees in our community to improve air quality***
- ***'Homes for natures' at a further 7 NGN sites***
- ***Zero reportable environmental incidents***

4.4.1 Climate Change Resilience

NGN is designated as a reporting authority under the Climate Change Act (2008). During December 2021 we published our latest climate change adaptation and risk assessment report in response to the third round of the Climate Change Adaptation Reporting Power (CCARP)[32]. Our report details the climate change scenario analysis that we have completed collaboratively with the other energy networks of Great Britain and how we have used this to complete climate change risk assessments for our operations and assets in 2021 and 2050. Our assessments did not identify high risks in either 2021 or 2050. In addition, our report includes a case study of a riverbed erosion remediation project completed in summer 2021 to protect and improve the resilience of a high pressure pipe crossing. The UK Climate Change Committee noted that the third round submissions from gas network operators consistently demonstrated monitoring and evaluation and consideration of actions in the context of risks[33]. Our Round 3 report includes a Climate Change Adaptation Action Plan which we have worked on during 2022/23 and into 2023/24 and we will provide an update on our activities in our Round 4 report to be prepared in late 2024.

During 2021/22 our network area was subject to the effects of several significant storms, including Storm Arwen and Storm Malik. Whilst these events did not substantially negatively impact the operation of our network we have since undertaken a formal review of our severe weather operational management procedure to ensure it remains robust and appropriate, reviewed our back-up power provision requirements at our critical infrastructure sites and instigated an upgrade programme, and developed an infrastructure site access risk assessment to ensure we can continue to serve our customers and meet our regulatory obligations regardless of the weather conditions. We continue to review our severe weather resilience processes and preparedness to ensure they remain appropriately robust.

4.4.2 Enhancing the Local Environment

A summary of our principal schemes to enhance the local environment during RIIO-2 is provided in Table 16 with commentary provided below.

[32] Report available here: https://www.northerngasnetworks.co.uk/wp-content/uploads/2021/12/NGN-CCA-Rnd-3-Report-FINAL-DECEMBER-2021.pdf

[33] See page 41: https://www.theccc.org.uk/wp-content/uploads/2022/07/Understanding-climate-risks-to-UK-infrastructure-Evaluation-of-the-third-round-of-the-Adaptation-Reporting-Power.pdf

Scheme Name	Location	Description	Environmental Benefit	Timescales
Land remediation programme	Knottingley AGI, West Yorkshire	In situ remediation of former gasholder tank	Recovery of c.1,900 litres of hazardous coal tar for disposal	2017 to January 2023 (complete)
	Howdon Holder Station, Tyne and Wear	In situ remediation of former gasholder tank	Recovery of c.58,000 litres of hazardous coal tar and contaminated water for disposal	March 2020 to November 2023 (complete)
Tree planting scheme	West Yorkshire and East Yorkshire	Planting of >40,000 trees	Air quality, carbon sequestration, water retention and biodiversity	April 2021 to date (on-going)
Homes for Nature	Various NGN asset sites	Creation of habitat and changing vegetation management to encourage biodiversity	Changes made at 84 sites	2017 to date (on-going)

Table 16 – Schemes to enhance the local environment during RIIO-2

Land Remediation

As detailed in our EAP, our stakeholders were strongly of the view that NGN should be doing more in relation to land remediation. During RIIO-2 we committed to continuing our award winning land remediation programme which was initiated in RIIO-1 to proactively manage our portfolio of approximately 150 asset sites built on former gasworks. This programme involves targeted inspection, investigation and monitoring works, with bespoke remediation where necessary, to ensure our sites are maintained in statutory compliant conditions, posing no significant pollution risks.

Our land remediation workload for RIIO-2 is summarised in Table 17.

Land Remediation Monitoring and Maintenance Works at Gasholder and Non-Gasholder sites		Statutory Land Remediation at Gasholder and Non-Gasholder Sites
On-going periodic site condition reviews for all sites within the portfolio (currently 148) to ensure conditions remain stable and existing environmental risk assessments regarding site pollution potential remain valid.	Environmental monitoring works at up to nine sites, and intrusive survey works at up to a further seven sites, to confirm site conditions and refine the existing site environmental risk assessment.	Remediation works at up to eight sites where RIIO-GD1 intrusive survey and monitoring works have identified potentially non-compliant conditions, or where remediation would deliver environmental betterment to reduce the long-term contamination risks associated with the sites to ensure compliance.

Table 17 – RIIO-2 land remediation workload summary

During 2023/24 we continued our programme of managing our portfolio of sites with potential for land contamination, and land remediation monitoring and maintenance works were completed across 55 sites. This included desk top assessments at two sites, intrusive land contamination survey at four sites, and environmental sampling at a further 13 sites to provide an updated assessment of the

environmental risk and potential liability associated with each site. In addition, site inspections were completed at a further 37 former gasworks sites to ensure their conditions remain stable and their existing environmental risk assessments remain valid. It is of note that some sites had more than one work activity undertaken. Total expenditure on our land remediation programme during 2023/24 in current year prices was £439,000 (in 2023/24 values).

During 2023/24 we completed long-term remediation works at Howdon Gas Holder Station with a total of c.58,000 litres of hazardous liquid coal tar, sludge and contaminated water recovered from inside an infilled below-ground former gas holder tank.

Case Study – Land Remediation at Howdon Lane

NGN own a former gasworks and gas storage site at Howdon Lane, Newcastle which currently houses an operational governor. The site previously contained three gasholders. Gasholder No.2 and No.3 were above ground gasholders and demolished in 2016. Gasholder No.1 was a below ground gasholder that was demolished and infilled between 1989 to 1993. Ground investigation within Gasholder 1 identified that the tank was 9.7 m deep in the annulus and contained significant volumes of hazardous coal tar towards the base which could leak in future and impact local groundwater. Coal tar ranging up to 2.0 m thick accumulated in monitoring wells installed inside the former holder tank during the investigation works.

In 2020 a remediation project to recover coal tar from within the gasholder tank commenced to deliver long-term environmental benefit. Specialist solar powered pumps were installed within boreholes drilled into the former tank with the objective to recover as much of the coal tar as possible for an initial 12 month period. After 12 months the system was still recovering significant volumes of tar and the period of recovery was therefore extended. The system was operated until November 2023 by which time c.58,00 litres of coal tar and contaminated water was successfully recovered and sent for specialist off-site disposal.

Figure 1 - Solar power coal tar recovery system at Howdon Lane, Newcastle.

Figure 2 - Pump removed from a borehole for inspection and maintenance that was covered in viscous coal tar.

We also completed remediation feasibility assessments for 10 sites and commenced detailed design works to enable completion of our scheduled land remediation projects during 2024/25 and 2025/26.

We remain on target to achieve our RIIO-2 land remediation commitments.

In addition to our strategic land contamination remediation programme, we are decontaminating and dismantling all of our gas holders which are now redundant and no longer required for gas network operation. This permanently removes the maintenance cost and safety and environmental liability

associated with these historic structures. We committed to remove all of our 23 gas holders by the end of RIIO-2 and are ahead of schedule to achieve this commitment, with 20 having been decontaminated and dismantled during 2021/22, 2022/23 and 2023/24.

Tree Planting in Our Communities

Our EAP and 2021/22 AER describe how our shareholders are funding the planting of 40,000 trees in our region during RIIO-2 to help tackle air pollution. To enable this we have established a bespoke partnership with the Community Forest Trust[34], White Rose Forest[35] and Humber Forest[36] to deliver the tree planting and after care maintenance, including funding the appointment of a dedicated Project Officer for a five-year period. The Project Officer also supports our partners in enabling other tree planting activities, such as completing planting funding applications to other third party sources. NGN have valued the societal and environmental benefits delivered by the planting scheme at over £22m over 50 years[37].

During 2023/24 we directly funded the planting of 22,430 trees across 25 sites in East and West Yorkshire. The total net area of land planted during 2023/24 was 13.03 hectares. Since the programme started in 2021 we have planted 45,497 trees[38] meaning we have already exceeded our RIIO-2 tree planting commitments.

As detailed in Section 1.3.2 of our 2021/22 AER, we engaged with our stakeholders during the design of the site selection methodology for the planting scheme and took on board their feedback by expanding it to include hedgerow creation to deliver broader environmental benefits. During 2023/24 our scheme directly funded the planting of 1,178m of new hedgerow across five sites in East and West Yorkshire, covering 0.59 hectares.

In addition to the direct outputs of our own tree planting scheme, the project officer funded by NGN has also secured £200,000 funding for further urban tree planting in West Yorkshire following a successful application to the West Yorkshire Combined Authority.

The cost to NGN shareholders of our tree planting during 2023/24 was £108,000.

[34] https://www.communityforest-trust.org/
[35] https://whiteroseforest.org/
[36] https://www.humberforest.org/
[37] CV6: https://www.northerngasnetworks.co.uk/wp-content/uploads/2019/12/A13-NGN-RIIO-2-Customer-Value-Proposition.pdf
[38] Our 2021/22 planting numbers have been revised since production of our 2021/22 AER.

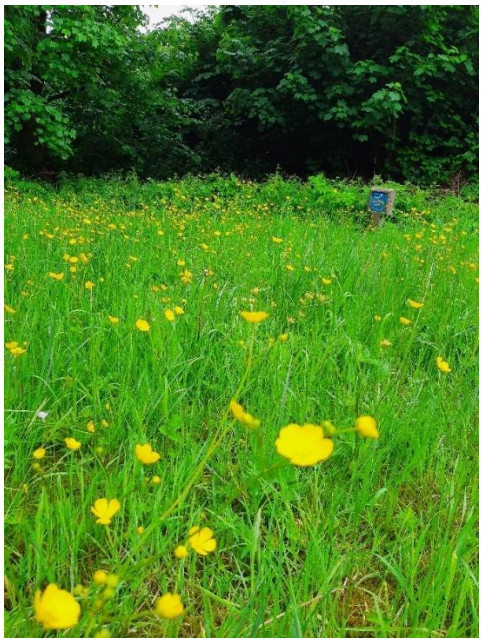
Figure 12: NGN tree planting scheme outputs – new hedgerow in Hull, East Yorkshire

Homes for Nature

It is well established that biodiversity in the UK and worldwide is facing significant threats as a result of land use and climate changes. Our 'Homes for Nature' commitment involves making positive changes at 250 of our fixed asset sites by the end of RIIO-2 to encourage biodiversity, all at no additional cost to gas customers. These changes could include installing habitats or changing vegetation management techniques to promote conditions in which biodiversity can increase. To support this, we have developed a catalogue of biodiversity enhancement methods suitable for our infrastructure sites and shared this with our landscape management team to enable implementation.

By the end of 2023/24 we had made positive changes to create 'Homes for Nature' at a further 7 of our asset sites, bringing our total to 96. In addition, we successfully trialled an expanded 'No Mow May' programme during 2023 at 10 of our gas infrastructure sites, an additional 5 sites compared to 2022/23. The learning from this will be applied in the delivery of our end of RIIO-2 target.

We remain on target to achieve our RIIO-2 commitments.

Case Study – No Mow May, 2022 and 2023	
NGN's landscape management procedures for operational gas sites currently include a prescriptive regime of regular grass cutting to maintain safe site access and egress, minimise fire risks, and maintain a 'tidy' appearance. To help biodiversity, most notably pollinators, during May 2022 NGN trialled consciously not cutting the grass at five of our infrastructure sites for the duration of the month ('No Mow May'). The outcomes were successful and pretty to see, with the growth of wildflowers visible on site without practical detriment to operational safety. The trial was widened to 10 sites during May 2023 and specific focus given to leaving the grass uncut at the site margins, with the intention to apply these principles across our larger gas infrastructure site portfolio thereafter.	 *Cooper Bridge AGI, West Yorkshire, May 2022*

<u>Ecosystem Services and Natural Capital Evaluation</u>

As described in our 2021/22 AER, we developed a bespoke natural capital evaluation methodology and conducted baseline assessments at 32 of our infrastructure sites during 2021/22. The second round of natural capital assessment took place in 2023/24 at the same sites (note one site had been divested by NGN in the intervening period) and included a review and update of our assessment methodology to ensure it remained in line with best practice.

The 2023/24 assessments covered a combined area of 40 hectares and identified that our sites typically deliver multiple ecosystem service benefits including sequestration of 2.7t of carbon per hectare per year, an increase from 1.6t in 2021/22 and 4.6 biodiversity units per hectare, which remained similar to 2021/22. In total our infrastructure sites provide natural capital valued at an average of £1700 per hectare per year in 2021 prices, a 13% increase from 2021/22. Full details of the findings and valuation are provided in Appendix B. We will complete repeat assessments of the same sites (where still in NGN ownership) during 2025 and analyse how we can use this methodology and information to optimise our future asset management investments to maximise delivered value.

4.4.3 Biodiversity Net Gain

We have not undertaken further projects requiring biodiversity net gain calculation during 2023/24 beyond those included in our 2021/22 AER.

4.4.4 Environmental Incidents

Neither NGN nor contractors working on behalf of NGN experienced any environmental incidents which necessitated reporting to the Environment Agency or local authorities during 2023/24. In addition, we did not receive any enforcement action from environmental regulators (such as warning letters, enforcement notices, financial penalties or prosecutions) during 2023/24.

	2021/22	2022/23	2023/24	2024/25	2025/26
Number of reportable environmental incidents	0	0	0		
Enforcement action received from environmental regulators	0	0	0		

Table 18 – Reportable environmental incidents by NGN and contractors

5 Statement on scope and quality of data

The data contained in this report is presented to the best of our knowledge and capabilities in accordance with RIIO-2 Environmental Reporting Guidance, Version 1.0, Ofgem, 2 March 2021. All data contained in this report is subject to our own data assurance procedures prepared in accordance with the Ofgem Data Assurance Guidelines[39]. It is recognised that this is our second Annual Environmental Report prepared under the requirements of RIIO-2 and reporting may evolve in subsequent publications.

The scope of the environmental data presented (such as fuel consumption, tonnages of waste etc) is limited to that associated with our principal typical network workload activities, namely gas mains replacement, network reinforcements (<7 barg) and diversions, gas connections, and emergency repair. NGN do not currently hold data associated with abnormal workload activities such as infrastructure site capital installation / upgrades, gas holder demolition or land remediation projects, however we are looking to improve our collection of this data during RIIO-2. Any other additional exclusions associated with each data set is identified in the relevant section of the report. Wherever possible reported values are based on actual consumption data.

Greenhouse gas emissions reported have been calculated using conversion factors published by the UK Government for 2023[40], with the exception of gas leakage which utilises a bespoke conversion factor provided by Ofgem. Gas shrinkage and leakage volumes are calculated using the industry standard Shrinkage and Leakage Model approved by Ofgem.

The process followed in the preparation of this report has been subject to audit by NGN's independent Internal Audit team. NGN's greenhouse gas emissions as contained in this document are also replicated in the Annual Report and Accounts of Northern Gas Networks Holdings Limited and as such are subject to independent third party audit[41] (by Deloitte for the period 1 April 2023 to 31 March 2024).

[39] https://www.ofgem.gov.uk/publications/data-assurance-guidance.
[40] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023
[41] See Statutory Accounts for period 1 April 2023 to 31 March 2024 here: https://www.northerngasnetworks.co.uk/wp-content/uploads/2024/09/Northern-Gas-Networks-Holdings-Limited-Mar-2024-FINAL-signed-1.pdf

Appendix A – RIIO-2 carbon reduction targets

Scope	Item	2017/18 (baseline)	RIIO-2 Target (tCO2e)				
			21/22	22/23	23/24	24/25	25/26
1	Metered gas use	285	220	205	191	0	0
1	Operational vehicles	3,935	3,441	3,156	2,917	2,795	2,729
1	Business mileage	1255	1013	797	588	579	570
2	Electricity use – offices, depots and gas sites (market based)	2,019	165	158	0	0	0
2	Electricity use – electric vehicle charging (operational vehicles – market based)	0	80	162	242	242	242
2	Electricity use – electric vehicle charging (business mileage – market based)	0	24	49	73	72	71
3	Contractor vehicles - road vehicles	9,573	8,490	8,260	8,029	7,799	7,568
3	Contractor vehicles - helicopter	77	77	77	77	77	77
3	PE Pipe	6,847	6,470	6,436	6,402	6,367	6,334
3	Rail	22	22	22	22	22	22
3	Air	422	198	196	194	192	190
3	Transmission and distribution losses	538	41	38	0	0	0
Total Scope 1		**5,475**	**4,674**	**4,158**	**3,696**	**3,374**	**3,299**
Total Scope 2 (market based)		**2,019**	**269**	**369**	**315**	**314**	**313**
Total Scope 1 & 2 (market based)		**7,494**	**4,943**	**4,527**	**4011**	**3,688**	**3,612**
Total Scope 3		**17,479**	**15,298**	**15,030**	**14,724**	**14,457**	**14,191**
Total Scope 1, 2 & 3 (market based)		**24,973**	**20,241**	**19,557**	**18,735**	**18,145**	**17,803**

Appendix B – 2023 Natural capital survey findings

		Annual Physical Benefits by Ecosystem Service									Annual Financial Benefits by Ecosystem Service						Total Financial Benefits over 15 years in 2021 prices (Discounted)	Total Financial Benefits over 15 years in 2021 prices (non-discounted)	Total Financial Benefits over 15 years in 2021 prices (Discounted) 2021 v 2024	Total Financial Benefits over 15 years in 2021 prices (non-discounted) 2021 v 2024
			Air Pollutant Removal																	
	Site Area	Carbon Sequestration Benefits	NOx	SO2	PM	Total	Water Regulation	Local Temperature Regulation	Pollination	Biodiversity	Carbon Sequestration	Air Pollutant Removal	Local Temperature Regulation	Water Regulation	Biodiversity	Total				
Site Name	*ha*	*(tCO2e)/year*	*kg/year*	*kg/year*	*kg/year*	*kg/year*	*m3/year retained on habitats*	*°C temperature reduction*	*Relative suitability index for pollinators*	*Biodiversity Units*	*£/year*	*£/year*	*£/year*	*£/year*	*£/year*	*£/year*	*£*	*£*		
Outgang Lane, Pickering	5.1	26.44	134.022	39.747	73.094	246.863	1258	-0.000061	0.54	23.70	£6,767.96	£2,763.30	£836.64	£2,409.99	£2,210.05	£14,987.95	£138,889.20	£224,819.19	£20,629.64	£33,393.08
Low Thornley	5.9	15.65	100.208	30.969	53.371	184.548	1010	-0.000038	0.56	31.02	£4,006.49	£2,448.10	£464.69	£1,946.57	£1,590.82	£10,456.67	£96,899.07	£156,849.99	£25,806.31	£41,772.54
Harrogate	0.7	1.44	3.451	3.925	2.482	9.858	17	0.000000	0.31	1.34	£369.24	£379.22	£4.06	£48.58	£166.51	£967.62	£8,966.68	£14,514.32	£2,621.01	£4,242.61
Kirkburton	0.3	2.34	7.085	2.003	4.246	13.335	111	-0.000004	0.57	1.74	£599.92	£91.83	£76.55	£214.92	£210.28	£1,193.49	£11,059.78	£17,902.40	£3,061.70	£4,955.95
Halifax	0.9	2.78	23.045	8.672	11.313	43.030	120	-0.000008	0.48	5.77	£710.59	£660.12	£75.56	£245.43	£229.76	£1,921.46	£17,805.61	£28,821.85	-£89.90	-£145.52
Selby	0.6	0.73	9.494	2.670	5.203	17.368	80	-0.000002	0.63	3.76	£186.04	£169.30	£18.61	£153.24	£145.42	£672.63	£6,233.05	£10,089.41	-£584.86	-£946.71
Rawcliffe	1.3	0.35	21.525	5.923	10.383	37.831	54	-0.000007	0.53	5.80	£90.01	£656.75	£12.46	£116.81	£13.05	£889.07	£8,238.79	£13,336.08	-£3,769.80	-£6,102.15
Cooper Bridge	0.6	6.37	18.632	8.374	11.032	38.038	238	-0.000010	0.48	5.00	£1,631.49	£581.16	£167.12	£460.88	£577.52	£3,418.16	£31,675.16	£51,272.40	£8,685.39	£14,058.99
Burley Bank	1.1	1.51	21.470	10.304	9.311	41.085	42	-0.000006	0.45	8.36	£385.47	£953.69	£11.37	£87.75	£126.23	£1,564.50	£14,497.84	£23,467.57	-£1,140.22	-£1,845.67
Baldersby	0.6	2.71	10.694	3.377	6.795	20.866	105	-0.000005	0.64	5.36	£692.98	£354.57	£64.41	£210.96	£243.41	£1,566.33	£14,514.79	£23,495.01	£3,317.56	£5,370.12
Melkinthorpe	0.6	2.16	11.160	3.136	6.027	20.323	104	-0.000006	0.58	2.93	£553.40	£250.90	£71.05	£210.20	£177.96	£1,263.51	£11,708.59	£18,952.64	£3,315.55	£5,366.86
Newby	0.6	2.60	12.522	3.518	6.786	22.826	125	-0.000007	0.51	2.47	£666.71	£279.46	£86.43	£245.07	£214.51	£1,492.18	£13,827.65	£22,382.73	£2,765.21	£4,476.03
Thorner	0.3	4.21	10.346	2.920	6.264	19.530	256	-0.000008	0.52	2.52	£1,077.30	£140.67	£139.53	£491.13	£359.20	£2,207.84	£20,459.44	£33,117.58	£6,961.81	£11,269.04
Hopton Top	0.4	0.95	9.885	4.401	3.069	17.355	14	-0.000002	0.48	2.77	£242.15	£515.54	£3.75	£27.08	£58.29	£846.81	£7,847.11	£12,702.08	£321.45	£520.34
West Edmonsley	0.8	0.20	12.798	3.570	6.152	22.520	28	-0.000004	0.50	4.39	£50.62	£395.90	£7.51	£57.01	£7.00	£518.03	£4,800.46	£7,770.47	-£2,264.31	-£3,665.22
River Tyne NBV	1.0	0.46	16.962	4.740	8.404	30.106	56	-0.000004	0.54	4.39	£117.85	£407.86	£14.00	£118.72	£64.30	£722.75	£6,697.48	£10,841.18	-£3,496.68	-£5,660.05
Scremerston	0.5	0.65	7.186	3.243	3.341	13.770	35	-0.000002	0.54	2.19	£166.09	£280.45	£8.64	£73.28	£83.95	£612.40	£5,674.95	£9,186.00	-£280.01	-£453.25
South gosforth	1.1	3.57	17.634	12.315	10.610	40.558	25	-0.000004	0.35	4.90	£915.04	£1,249.95	£6.86	£53.86	£364.76	£2,590.47	£24,005.21	£38,857.11	-£1,093.92	-£1,770.73
Shipley	0.5	0.51	5.068	2.016	2.622	9.706	41	-0.000001	0.48	1.91	£131.16	£133.81	£9.72	£82.25	£88.56	£445.51	£4,128.39	£6,682.61	-£349.52	-£565.77
Kirkleatham	0.5	0.17	6.999	1.954	3.419	12.372	22	-0.000002	0.45	0.76	£44.07	£208.72	£5.62	£46.06	£18.80	£323.27	£2,995.62	£4,848.99	-£1,109.76	-£1,796.36
Wakefield	1.0	0.84	15.576	4.366	8.155	28.097	95	-0.000004	0.48	6.88	£216.21	£323.29	£22.81	£190.09	£157.68	£910.08	£8,433.48	£13,651.23	-£2,582.99	-£4,181.07
Alberto Street	0.8	0.81	11.773	3.306	6.344	21.423	90	-0.000003	0.63	2.72	£207.96	£223.21	£21.35	£181.83	£159.87	£794.22	£7,359.83	£11,913.32	-£1,649.63	-£2,670.24
Garforth	0.4	3.80	10.407	3.892	6.017	20.316	162	-0.000007	0.57	2.25	£973.87	£199.57	£117.01	£314.32	£332.34	£1,937.11	£17,950.65	£29,056.62	£5,322.80	£8,615.98
Keighley	0.9	1.40	7.752	2.174	4.602	14.529	58	-0.000003	0.49	3.02	£359.46	£207.44	£38.80	£126.76	£122.47	£854.93	£7,922.43	£12,824.00	£954.14	£1,544.46
Low Moor	0.9	5.61	26.325	7.408	14.676	48.409	262	-0.000013	0.48	5.94	£1,435.08	£441.73	£185.51	£508.46	£467.94	£3,038.72	£28,158.97	£45,580.78	£5,731.62	£9,277.75
Kidacre Street	1.9	1.77	13.324	3.770	8.061	25.155	191	-0.000003	0.65	4.98	£453.04	£149.32	£44.22	£391.84	£379.75	£1,418.17	£13,141.75	£21,272.48	-£4,902.30	-£7,935.32
Pudsey	0.3	2.57	9.996	2.828	5.982	18.805	138	-0.000005	0.48	1.29	£657.54	£118.95	£81.30	£264.67	£264.62	£1,387.08	£12,853.67	£20,806.17	£2,340.04	£3,787.81
Howdon	1.6	0.84	24.098	6.740	12.131	42.968	99	-0.000006	0.56	7.25	£214.50	£557.11	£24.23	£189.34	£134.35	£1,119.53	£10,374.38	£16,792.96	-£5,091.02	-£8,240.81
Hendon	2.8	1.06	10.765	5.236	5.087	21.087	61	-0.000002	0.45	1.91	£270.78	£381.43	£14.55	£129.76	£151.24	£947.76	£8,782.59	£14,216.33	-£4,682.47	-£7,579.49
Elton Offtake	2.7	11.54	44.057	16.130	23.091	83.277	478	-0.000024	0.54	12.24	£2,953.46	£1,238.93	£338.50	£963.78	£968.41	£6,463.07	£59,891.49	£96,946.03	£15,195.83	£24,597.40
Towton Offtake	2.2	2.06	22.130	9.792	10.441	42.363	42	-0.000006	0.65	5.95	£526.40	£1,049.15	£11.34	£130.88	£180.69	£1,898.47	£17,592.59	£28,477.03	£349.31	£565.43
Asselby	1.3	0.48	9.904	2.671	5.288	17.863	40	-0.000003	0.60	9.34	£121.61	£324.19	£5.32	£109.28	£39.64	£600.04	£5,560.41	£9,000.61	-£990.86	-£1,603.90
Total	**40.2**	**108.57**	**666.290**	**226.090**	**353.800**	**1246.180**	**5454**	**-0.000261**	**16.69**	**184.87**	**£27,794.51**	**£18,135.59**	**£2,989.55**	**£10,800.80**	**£10,309.36**	**£70,029.81**	**£648,947.13**	**£1,050,447.16**	£73,301.12	£118,652.12
Mean benefit per hectare	-	2.70	16.593	5.630	8.811	31.034	136	-0.000006	0.42	4.60	£692.18	£451.64	£74.45	£268.98	£256.74	£1,743.97	£16,160.93	£26,159.61	£1,825.44	£2,954.83

Glossary of Terms

Biomethane	Renewable or low carbon gas that is a gas mixture predominantly comprising methane and is sourced from organic material (biomass). This gas has similar thermal characteristics to natural gas and may be cleaned and injected into the natural gas network.
Carbon offset	An activity that compensates for the emission of carbon dioxide or other greenhouse gases by providing for an emissions reduction elsewhere. As greenhouse gases are widespread in the Earth's atmosphere the wider global climate benefits from emissions reductions regardless of where the emissions and reductions actually occurred.
Calorific value (CV)	A measure of the energy contained within a gas and is dependent on the composition of the gas. The CV is used to calculate the energy that may be released when a known volume of gas is completely combusted under specified conditions.
Capital expenditure (capex)	Expenditure on investment in long-lived assets, for example gas pressure reduction infrastructure.
Carbon footprint	Total amount of greenhouse gas emissions caused directly and indirectly by a business or activity.
Diversion (gas)	Diverting part of the gas pipeline away from its current route in order to facilitate safe working, for example in association with an infrastructure scheme such as a new road construction.
Ecosystem services	The direct and indirect contributions of ecosystems to human wellbeing which have an impact on our survival and quality of life. There are four types of ecosystem services: provisioning (for example provision of food), regulating (for example noise mitigation), cultural (for example enabling recreation) and supporting services (for example biodiversity and maintenance of genetic diversity).
Gas distribution networks	Eight individually licenced gas network areas in Great Britain, known as East of England, North West, West Midlands, London, Northern, Scotland, Southern, and Wales & West.
Gas Transporter	The holder of a Gas Transporter's Licence in accordance with the provisions of the Gas Act 1986.
Gigawatt Hours (Gwh)	Equal to one million Kilowatt Hours.
The Health and Safety Executive (HSE)	A public body responsible for regulating health and safety in Great Britain with the primary function to secure the health, safety and welfare of people at work and to protect others from risks to health and safety from work activity.
Kilowatt Hours (Kwh)	A unit of energy equal to the work done by the power of 1000 watts operating for one hour.
Land remediation	Work activity which reduces the degree of soil and water contamination at a site to a point whereby the site no longer presents significant risks to human health, controlled waters and the wider environment.
Licence Condition (obligation)	An obligation placed on the network companies to meet certain standards of performance. The authority (see Ofgem) has the power to take appropriate enforcement action in the case of failure to meet these obligations.
Natural capital	The world's stocks of natural assets which include geology, soil, air, water and all living things. It is from this natural capital that humans derive a wide range of services, often called ecosystem services, which make human life possible.
Northern Gas Networks (NGN)	The gas transporter licence holder for the Northern gas distribution network.
Ofgem	The Office of Gas and Electric Markets, which supports the Gas and Electricity Markets Authority (GEMA), the body established by Section 1 of the Utilities Act 2000 to regulate the gas and electricity markets in Great Britain
Operating expenditure (opex)	The costs of the day to day operation of the network such as staff costs, repairs and maintenance expenditures, and overhead.
Price control	The control developed by the regulator (see Ofgem) to set targets and allowed revenues for network companies over a defined duration.
Price Control Deliverable	A specific investment for which funding has been provided to a network by Ofgem under a price control period (such as RIIO-2) and must be delivered or the funding returned to Ofgem. Examples could include purchase of a specified number of electric vehicles.
Reinforcement (gas)	The installation of new assets to accommodate changes in the level or pattern of gas supply and demand.
Replacement (gas)	The replacement or refurbishment of assets which are at the end of their useful life due to their age or condition, or need to be replaced on safety or environmental grounds. For gas distribution networks the primary component of replacement work is the HSE enforced iron gas mains replacement programme.
Replacement expenditure (Repex)	Expenditure related to the replacement or decommissioning of gas assets, in practice predominantly iron gas mains for gas distribution networks.
RIIO	Revenue = Incentives + Innovation + Outputs Ofgem's regulatory framework for gas and electricity networks.
Shrinkage	A term used to describe gas either consumed within or lost from a transporter's system. For gas distribution networks this comprises gas lost via leakage (c.95%), gas illegally taken by third parties (c.3-4%) and gas used in the operation of the network infrastructure, for example pre-heating prior to pressure reduction (c.1-2%).
Stakeholder	Those parties that are affected by, or represent those affected by, decisions made by network companies and Ofgem. As well as consumers, this would for example include Government and environmental groups.

Tank to wheel (TTW)	The greenhouse emissions arising from the use of a specified fuel from the point of purchase by the consumer.
Total expenditure (Totex)	All expenditure related to a licensee's regulated activities but with the exception of some specified expenditure items.
United Nations Sustainable Development Goals (UN SDGs)	17 goals which aim to end poverty and other deprivations, improve health and education, reduce inequality, and spur economic growth, all while tackling climate change and working to preserve our oceans and forests. https://sdgs.un.org/
Well to tank (WTT)	The greenhouse emissions arising from the extraction, production, refining and transportation (including any losses during transportation) of a specified fuel prior to the purchase and consumption by the consumer.
Well to wheel (WTW)	The sum total of well to tank and tank to wheel greenhouse gas emissions for a specified fuel thereby providing the whole life emissions for the use of this fuel.