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Atypical EJP

Digital Platform for Leakage Analytics (DPLA) Roll-out

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Contents

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Summary Table

Title Section	AEJP 6: Digitalisation Investment: Open Data Theme – DPLA roll-out
Name of Scheme	Digital Platform for Leakage Analytics Roll-out
Investment Driver	• Gas Leakage Regulatory Reporting – delivery of more accurate annual reports of gas leakage quantity (in comparison to current Shrinkage and Leakage Model, SLM) • Improved understanding of the state of network assets – incorporation of modelling results with in-field technology leakage detection. • Development of an incentive mechanism to reward the reduction of shrinkage/leakage within the network • Reduction of risk to humans and properties via earlier identification, characterisation and localisation of gas leaks • The need to tailor the schedule of the Mains Replacement Programme (MRP) based on insights from DPLA and to optimise maintenance cycles and Above Ground Installations (AGI) replacement
BPDT/Scheme Reference Number	M8.19 and C4.06
Outputs	An Interactive User Interface that enables the exploration of an optimal combination of an Advanced Machine Learning (ML) model and Advanced Leak Detection (ALD) technologies.
Cost	[cost-sensitive data]
Delivery Year	FY26/27 – FY 27/28
Applicable Reporting Tables	N/A
Historic Funding interactions	[cost-sensitive data]
Interactive Projects	Tools& Equipment – BPDT: Tables C5.06 and C5.07 – see Advanced Leakage Detection Asset Management – BPDT: Tables [4.00]

We expect the Spend apportionment table below to be merged with the summary table above but have included it separately for accessibility purposes.

Spend Apportionment (£m)	(£m – 2023/24 prices)
RIIO-2	[cost-sensitive data]
RIIO-3	[cost-sensitive data]
RIIO-4	[cost-sensitive data]

1. Introduction

The DPLA project signifies a collaborative stride towards a safer, more sustainable gas network.

Funded by Ofgem's Strategic Innovation Fund (SIF), this partnership between Cadent, Guidehouse Europe, fellow GDNs, and National Gas Transmission aims to harness data, analytics, and cutting-edge technology to transform leak detection and significantly reduce carbon emissions.

Currently in its final Beta phase, DPLA focuses on developing a functional minimum viable product for Cadent's East of England and North London networks. By June 2025, this platform will provide a dynamic, real-time understanding of network health, enabling Cadent to strategically identify and prioritise repairs, optimise iron mains replacement programmes, and accurately quantify emissions. This represents a significant advancement from the current reactive approach of customer-reported leaks and annual emission estimations based on outdated methodologies.

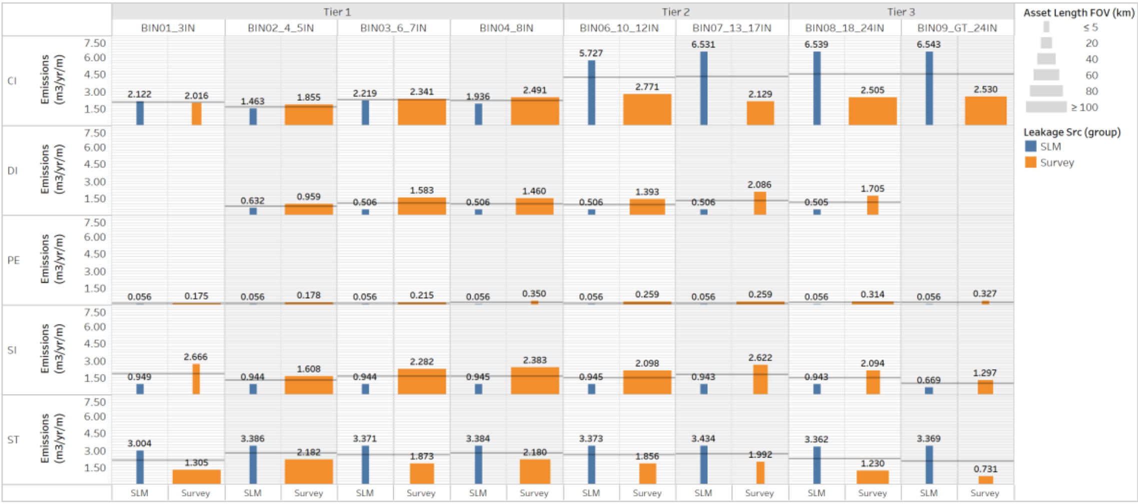

Figure 1: Emissions values per Tier of Asset

At the heart of the Beta phase lies the exploration of an optimal blend of Advanced ML models and ALD technologies, all visualised through an interactive user interface.

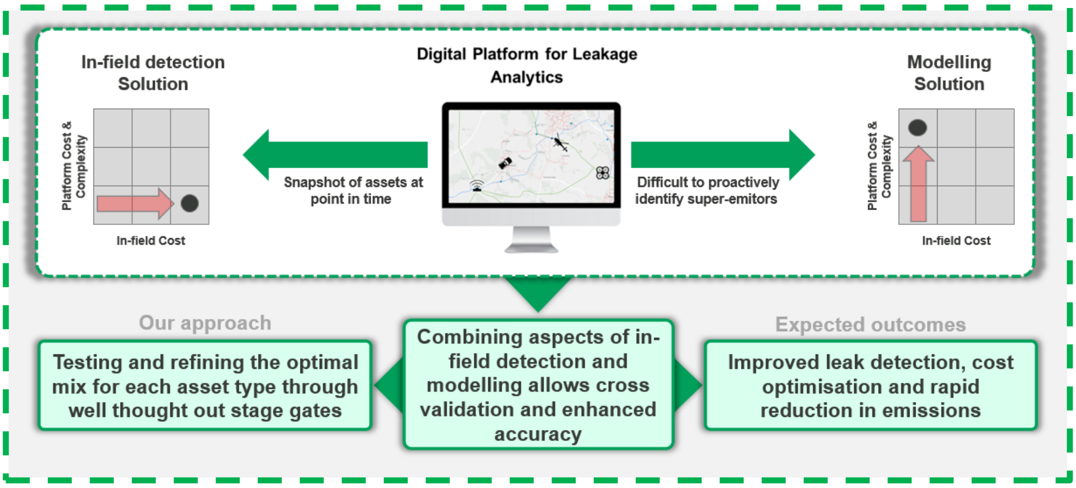

Figure 2: Relationship between Machine Learning, Sensor data and modelling capability

Advanced ML - models leverage the increasing wealth of network data, from flow and pressure sensors to smart meter readings, to power predictive models. While offering significant long-term cost reductions through proactive leak identification and mitigation, the initial investment required for widespread sensor deployment across the vast gas distribution network presents a considerable challenge.

ALD Technologies – utilising a combination of highly accurate methane detection methods (such as vehicle-mounted sensors, satellite imagery, and direct air measurement technology) ALD offers precise location and quantification of emissions. This precision enables targeted interventions. We have included additional detail on ALD roll out in Annex 1 of this document.

2. Background

The UK gas industry has been utilising the Ofgem-approved SLM as the standardised approach to estimating gas losses, commonly referred to as "shrinkage". The SLM meticulously considers a range of factors to calculate these emissions, including diameter, material, and the operating pressure within the system.

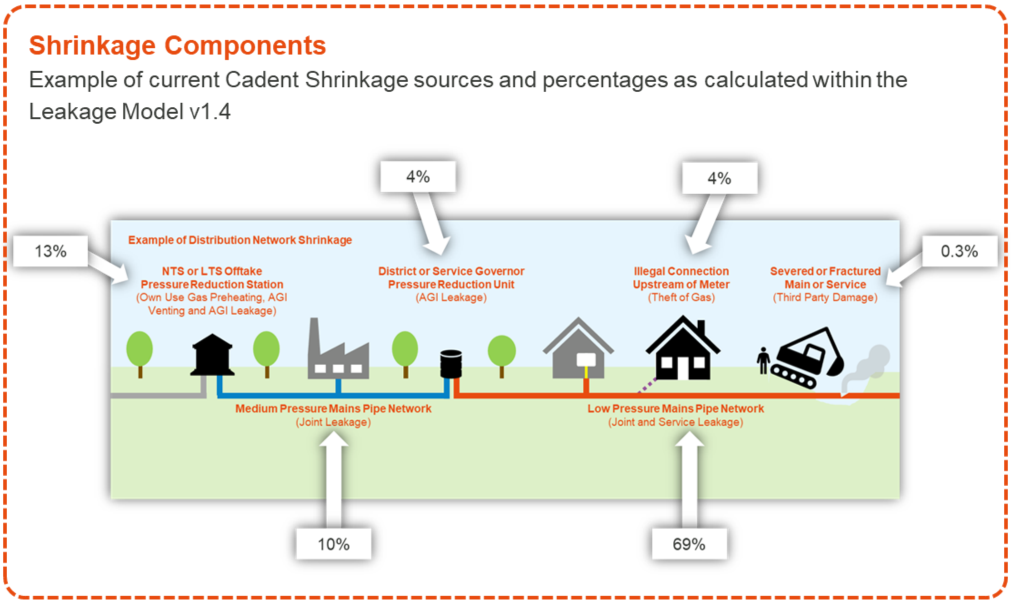

Figure 3: Sources of Shrinkage in the Gas Network

Since its implementation, the SLM has played a pivotal role in driving down methane emissions. This success story is evident in Cadent's performance in reducing emissions during the RIIO-1 period which Cadent has continued to drive in RIIO-2. Through strategic mains replacement programs, pressure management, and the optimisation of gas conditioning technologies, Cadent achieved a 26% reduction in emissions in RIIO-1 and a further 10% reduction in the first three years of RIIO-GD2, exceeding the targets set by the regulator. These initiatives underscore the industry's commitment to environmental responsibility and demonstrate the tangible benefits of a robust, data-driven approach to emissions management.

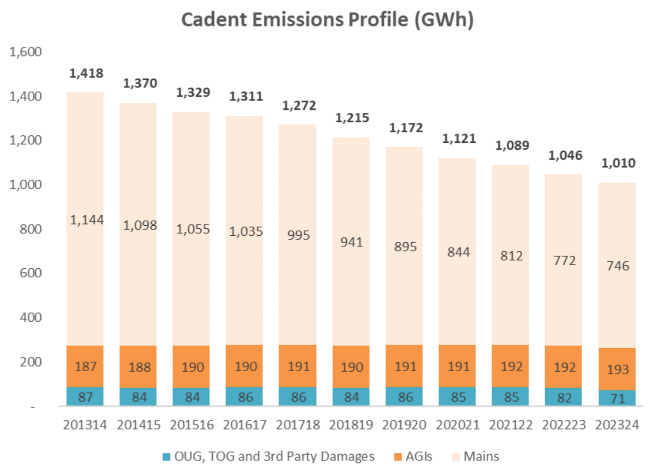

Figure 4: Asset leakage year on year

However, the evolving landscape of the gas industry requires a constant evolution of tools and methodologies. While the SLM has proven invaluable, its reliance on historical leakage rates and broad asset classifications presents limitations in identifying and addressing specific high-emission assets. This prompted gas distribution networks and shippers to call for a more granular, real-time approach to emissions monitoring and reporting.

The industry recognises the need for a paradigm shift, prompting the exploration of innovative solutions, such as the DPLA and trials of ALD technologies. These groundbreaking projects, supported by Ofgem and the Health and Safety Executive (HSE), hold the potential to redefine how the gas industry manages methane emissions. Through harnessing the power of real-time data, advanced sensor technologies, and sophisticated hydraulic modelling, the DPLA promises a future where emissions are not just estimated but precisely pinpointed and proactively addressed. Throughout the RIIO-2 period, Cadent has spearheaded the design, development, and implementation of these innovative solutions that have the potential to pave the way for a greener, safer network as we move into the RIIO-3 period and beyond. We are committed to rolling out ALD technology alongside the DPLA platform across all four of our regulatory networks in RIIO-3, aligning with the HSE mandate for annual asset monitoring using Advanced Emission Detection (AED) equipment by April 2026.

3. Optioneering

The DPLA project, like many innovative endeavours, encountered unforeseen challenges necessitating a shift in approach. The initial goal of developing a fully deterministic hydraulic model of the gas network, reliant on comprehensive pressure and flow data, proved impractical. This was due to a critical data gap: while Cadent possesses robust pressure data across its network, granular flow data, particularly downstream of fiscal metering stations, is sparse. In response, the project has strategically pivoted to a probabilistic modelling approach. This method leverages Cadent's extensive pressure data and utilises both historical and synthetically generated scenarios to "train" the model, effectively operating with limited flow data inputs.

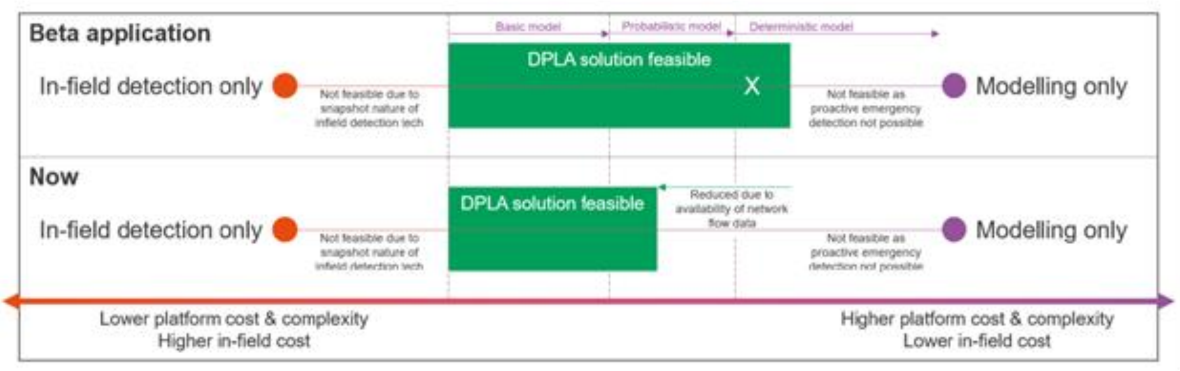

Figure 5: Balancing cost and capability for leakage detection

While probabilistic models offer valuable insights, they inherently introduce an element of uncertainty, providing a likelihood of an event rather than a precise prediction offered by deterministic models.

Recognising the need for a change, we have further refined the approach to utilise a lower complexity probabilistic model. This revised strategy combines probabilistic hydraulic modelling for the upper pressure tiers of the network with in-field detection methods for the medium and low-pressure tiers. This hybrid blended model, optimised for existing data constraints, promises to be more feasible and will enable Cadent to accelerate its emissions reduction efforts.

The DPLA project has been instrumental in expanding Cadent's ALD trials, providing valuable data to refine leak detection assessments and development strategies of the LP & MP network. This technology, with its combination of high-accuracy sensors, data processing tools, algorithms, and machine learning, provides an unprecedented level of detail at the street and asset level, far surpassing traditional emission surveillance methods.

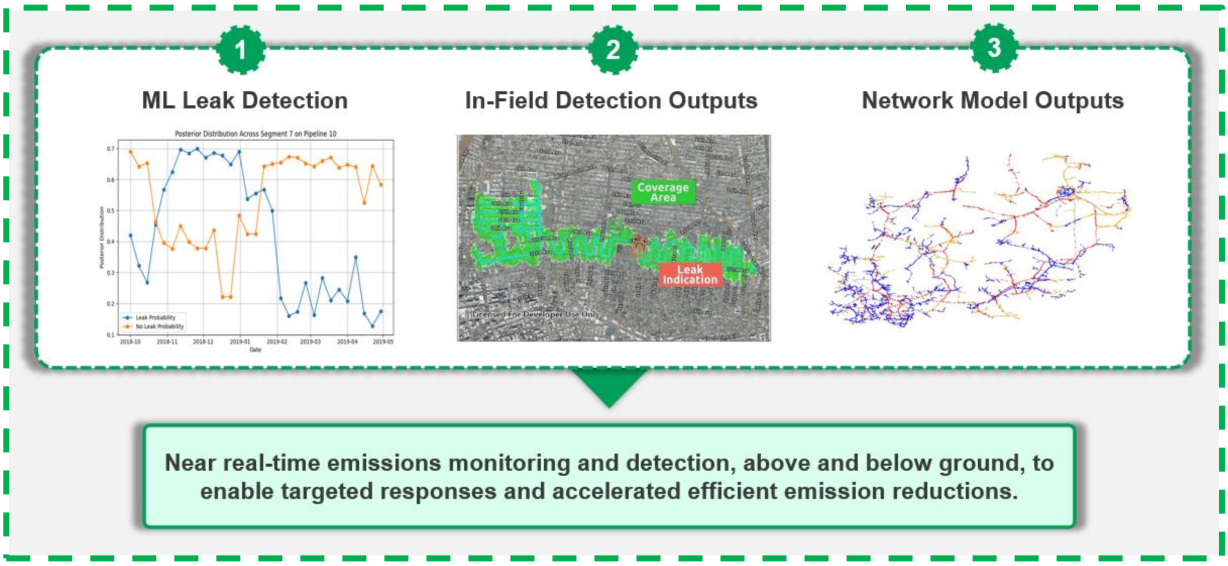

Figure 6: Network leakage modelling outputs

The DPLA project has evolved since its inception, incorporating valuable learnings from in-field ALD trials and probabilistic modelling. With the project milestones extending beyond our RIIO-3 submission, three potential outcomes have been identified:

1. Full Probabilistic Modelling: This approach utilises sophisticated modelling techniques across all pressure tiers (High Pressure (HP), Intermediate Pressure (IP), Medium Pressure (MP), and Low Pressure (LP)) to quantify and pinpoint methane emissions and leakage.
2. Blended Approach: This hybrid method leverages modelling for HP and IP networks, while lower pressure tiers (MP and LP) benefit from in-field sensor data, meticulously normalised for pressure and time of survey.
3. Normalised In-field Detection: This outcome relies on comprehensive in-field sensor surveys to detect network emissions and leakage. Data is then carefully normalised to account for variations in pressure and time of data collection.

With the focus solely on the North London and Eastern networks, the DPLA project is already demonstrating tangible benefits. Both networks are capitalising on promising results from HP and IP probabilistic modelling, alongside ongoing trials of in-field ALD technologies. This data-driven approach empowers the intelligent prioritisation of asset replacement and maintenance, ensuring impactful results from the outset of the RIIO-3 price control period, demonstrating that the Blended Approach being the most viable option to progress and maximise the impact it will have on reducing emissions from the outset of RIIO-3.

4. Cost

Cadent's proposed investment in DPLA and supporting ALD technology represents a total cost of £52.8m for the RIIO-3 period. Of this, the majority £47.7m is dedicated to the roll out of enabling ALD technologies across all five networks (see Annex 1 to this paper), with the remaining £5.12m funding the development of the sophisticated modelling capabilities and the integration of the DPLA into Cadent's existing IT architecture for its remaining three operational networks.

[redacted]

Figure 7: [cost-sensitive data]

In line with Ofgem's guidance set out in the Sector Specific Methodology Decision, these costs are distributed across several areas within Cadent's RIIO-3 baseline business plan. This ensures transparency and accountability in tracking the investment:

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Data & Digitalisation: Encompassing the development, integration, and ongoing running costs associated with the DPLA platform within Cadent's IT infrastructure.

Tools & Equipment: Covering the direct procurement of all necessary ALD technologies.

Asset Management: This includes the operational expenses and resources required to deploy and maintain the in-field sensor technologies integral to the project.

The Data & Digitalisation cost for this investment is driven by:

- Gross Staff cost to support the delivery of the investment
  - Platform and Architecture oversight of the solution delivery
  - Data Science and Subject Matter expertise to ensure correct design, application and interpretation of the model's outputs for the development of operational activities based on insights from the solution.
- Third Party Contactor Cost for development of advanced machine-learning models.
- Training cost – education in the area of operating and interpretation of information available through an interactive user interface
- License and platform compute and maintenance & support costs for the solution throughout the RIIO-3 period.

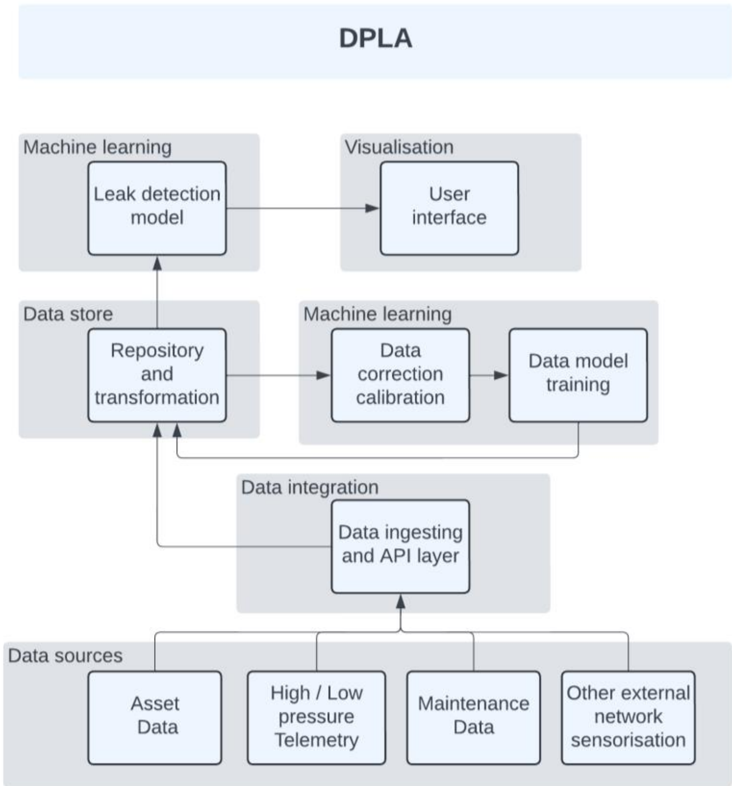

Figure 8: Conceptual model of DPLA

Cost driver	Cost (£m – 2023/24 prices)
Gross Staff Cost	[cost-sensitive data]
Contractor Cost	[cost-sensitive data]
Training Cost	[cost-sensitive data]
Licence & Platform compute and Support Cost	[cost-sensitive data]

Table 1: DPLA cost drivers

5. Scope Overview

The transition to a DPLA-driven approach represents a significant undertaking, requiring careful planning and phased implementation to ensure smooth and effective integration across all gas distribution networks. We are committed to rolling out ALD technology alongside the DPLA platform across all four networks in RIIO-3, aligning with the HSE mandate for annual asset monitoring using AED equipment by April 2026. This ambitious rollout underscores our commitment to observing its extensive network and proactively addressing methane emissions.

With the successful trials of ALD technology and probabilistic modelling of the higher-pressure networks, it is all but certain that a Blended Approach is the recommended approach for deployment across all Cadent and other UK gas distribution networks (GDNs). Accordingly, this is the approach in our business plan. The DPLA project team have made a consistent assessment of the estimated costs in collaboration with the other UK GDNs, based on each network's size and scale of asset base.

Within this cost assessment, we have proposed three core cost components for each network, providing this information and insight to the partnered GDNs to support their business plan submissions. The following components are considered:

- DPLA platform development – Looking at the data extraction and model/platform development for each GDN, along with tuning/testing the models.
- In-field Sensorisation – Procurement of both mobile and fixed sensors, associated operational costs for deployment (vehicles, drivers, fuel etc.)
- IT integration – Associated costs with integrating the platform and data feeds into an existing GDN IT Infrastructure.

The anticipated benefits from this investment are:

- Gas Leakage Regulatory Reporting – delivery of more accurate annual reports of gas leakage quantity in comparison to current SLM
- Improved understanding of the state of network assets – incorporation of modelling results with in-filed technology leakage detection
- Development of a fair incentive mechanism to reward for the reduction of shrinkage/leakage within the network
- Reduction of risk to humans and properties via earlier identification, characterisation and localisation of gas leaks
- Tailor the schedule of the MRP based on insights from DPLA and optimise maintenance cycles and AGI replacement

Methane emission reduction within the Cadent network, as estimated in the SIF Beta application, is projected to be up to 58% from pipes and AGIs between 2020 and 2030.

6. Deliverability

The Beta phase of this project focuses on Cadent's Eastern and North London networks, delivering a functional DPLA solution for both, complemented with a limited rollout of ALD technology, procured through this project. To facilitate a successful Blended Approach from the start of RIIO-3, the remaining ALD technology needs for the Eastern and North London networks will be grouped with those of our other three operational networks in a single procurement process. This is estimated to take 18-24 months.

While the full deployment of the DPLA is projected within 18-24 months, it's crucial to highlight that valuable emission observations will be available much sooner. A phased rollout of this ALD technology across all five networks will begin within the first year. This approach will establish a vital baseline for asset emissions and leak detection, providing actionable insights from the outset.

Digitalisation RIIO-3 Roadmap	FY26/27	FY27/28	FY28/29	FY29/30	FY30/31
DPLA Roll-out	[cost-sensitive data]	[cost-sensitive data]	[cost-sensitive data]	[cost-sensitive data]	[cost-sensitive data]

Table 2: Initiative timeline

7. Conclusion

The roll-out of the DPLA represents a significant step forward in our efforts to enhance operational efficiency and customer satisfaction. By leveraging advanced analytics and real-time data, we can proactively identify and address leakage issues, ultimately reducing gas loss and improving service reliability. This underscores our commitment to innovation and excellence. As we move forward, continuous monitoring and feedback will be essential to ensure the platform's success and to drive further improvements.

The DPLA platform offers an opportunity to identify new data users (DBP Principle 6) and share new types of data assets (DBP Principle 5) under the Presumed Open principle (Principle 11) of Data Best Practice guidelines. It will facilitate the reduction of methane emissions and enable a targeted approach to asset interventions by combining leak detection and probabilistic modelling techniques.

The roll-out of the DPLA will utilise the data architecture capabilities established in RIIO-2 and build upon the foundational capabilities in modelling and analytics to drive a step change in our contribution to Net Zero.

8. Glossary

Acronym	Definition
AED	Advanced Emission Detection
AGI	Above Ground Installations
ALD	Advanced Leak Detection
DPLA	Digital Platform for Leakage Analytics
HP	High Pressure
HSE	Health and Safety Executive
IP	Intermediate Pressure
LP	Low Pressure
ML	Advanced Machine Learning
MP	Medium Pressure
MRP	Mains Replacement Programme
SIF	Strategic Innovation Fund
SLM	Shrinkage and Leakage Model

Annex 1: Advanced leak detection roll-out

Advanced Leak Detection Roll Out

The deployment of advanced leak detection (ALD) technology across our networks is a key enabler in delivering the material benefits identified as part of the DPLA programme. ALD has also been identified by the HSE as an important technology to allow gas networks to manage our main risk as part of our Iron Mains Risk Reduction Programme. We have included funding for the role out of ALD within our RIIO-3 plan (as requested by Ofgem) but are also applying to the Net Zero and Small Projects (NZASP) reopener in January 2025. There is some overlap in the rollout costs across these 2 submissions however it is included in both for completeness. In the reopener, we will set out clearly where the overlap occurs to ensure funding requests are clear and transparent. This appendix provides additional context on ALD, the technology choices, survey frequency and options we have considered.

Industry context and the problem we're trying to solve

Natural gas is a widely used fuel that supplies vast numbers of customers and industrial users. However, there are well-documented environmental challenges associated with both CO_2 (as a product arising from the combustion of natural gas) and from the release of methane (i.e. unburned gas) to the atmosphere from the network before it reaches customers.

Methane emissions are a major contributor to climate change. The Intergovernmental Panel on Climate Change (IPCC) has indicated a GWP (i.e. it's relative contribution to a warming climate, per kilogram, compared to CO_2) for methane between 84-87 when considering its impact over a 20-year timeframe and between 28-36 when considering its impact over a 100-year timeframe. It is estimated that about 30% of global warming to-date, since preindustrial times, is attributable to methane.

The reduction of methane emissions is regarded as a highly effective strategy to limit global warming. This position has been turned into the 'Global methane pledge' signed by 158 countries, including the UK, to cut methane emissions by 30% below 2020 levels, by 2030.

In the UK gas industry, the combined leakage from transmission and distribution in 2020 was approximately 133KtCO2e, with 127Kt coming from the distribution networks. Of the large distribution emissions about 75% of these are estimated to be leakage from our low and medium-pressure mains and services. Of all the many and varied components and processes within the UK gas industry, tackling mains and services leakage is critical.

In the UK there are a range of approaches for reducing emissions; in relation to mains and services these include: the Iron mains replacement program (IMRRP), pressure management and control, and gas conditioning. The primary driver for the IMRRP is safety whereas for the other two, leakage reduction is the main objective. These tactics continue to be improved to increase their effectiveness, for instance with the development of 'smart' pressure control to refine the benefits further.

What is new to the industry are modern technologies for identifying and localising the emissions from the network, by measurement/ survey. The three prevailing tactics noted above are and will remain important, but they cannot be targeted confidently at 'hot spots' for leakage (and leakage risk), because information about location and volume, until recently, has not been possible to determine with any level of accuracy.

A range of new technologies (named 'advanced leak detection') for identifying and quantifying gas leaks now exist, and some of them operate at a level of granularity that is relevant and useful to the gas mains and services context. Furthermore, technologies for identifying, quantifying and localising emissions from pipelines and above-ground installations are also available. In combination, this covers nearly all the assets we own and operate.

Cadent has used these technologies both in the London network, since late 2020 and further through a much broader innovation study named the 'Digital platform for leakage analytics' in our East of England and London networks (discussed earlier in this paper). Our objective in this work has been to understand the technologies in detail and create a plan that targets the right combination of technologies such that future emissions reduction work can be far more targeted and ambitious, at the same time as delivering great value to customers through avoiding over-use or investment in technology, and; by optimising our intervention decisions (i.e. replacement, repair, remediation).

This paper outlines the technologies available, our conclusions about which are most appropriate for us, and some of the components of Cadent's plan relating to survey frequency, timing and the technology marketplace.

Introduction to ALD Technologies

Advanced Leak Detection is a term attributed to technologies which represent a step change in how methane leaks are detected in the gas industry. The key data output that ensures ALD stands out from traditional technologies, is its ability to quantify methane emissions from a leak, meaning that a leak flow rate into the atmosphere can be estimated.

The ALD market has matured significantly in the past few years and there are currently several options on the market that possess the ability to quantify methane emissions, however, these options are subject to differing costs, sensitivities, and scale. At Cadent we have been working with our global network of technology partners and gas network operators to bring this technology to bear in the UK gas industry.

Why ALD?

Via DPLA, we have assessed the available technology on the market and their sensitivities, scalability, track record, and cost and moved towards selecting the most appropriate technology for measuring the emissions from each part of our network. The details of these assessments are captured through the Strategic Innovation Fund (SIF) process and shared with stakeholders. The SIF submission also details the wider benefits case for this technology which is driven by the ability to target and remove leakage on mains and services.

In summary, the technology selection by asset type, is:

Asset category	Appropriate technology
Pipelines	Modelling tools
Above Ground Installations	Fixed and hand-held sensors
Mains & Services	Vehicle-mounted sensors

Table 3: Technology selection by asset type

The table below provides a high-level summary of the various technologies explored, evaluating sensitivity, false positives, data output, cost, FTE impacts, practicality/ scalability and others.

Technology	Pros	Cons
Vehicle mounted ALD	Methane/ethane analyser, anemometer and GPS module, installed on a car that drives around the LP/MP network systematically.	
	+ Very high **sensitivity** + **Scalable** across the network for mains and services with modest FTE impact (less so for pipelines and AGIs) + **Very low false positives** (typically 95% of significant detections are located on the ground) + **Track record**: widely used for LP/MP networks globally + Some providers have highly developed algorithms and **data outputs**	– **Data outputs** are a discrete snapshot in time, not continuous – upfront **capital cost** is required
Fixed and Handheld sensors	Handheld device capable of measuring leak flowrate, used by operators on the ground proactively to find and quantify leaks from the LP/MP network.	
	+ **Track record**: familiar to process industries and upstream gas installations. + **Good sensitivity** and suitability for measuring individual leaks or assets: well suited to above ground sites + Simple and easy to use: **practical and clear data outputs** + **Data outputs** are instantaneous + Effectively zero **false positives**	– **Data outputs** are a discrete snapshot in time, not continuous – Circa **2.5x more expensive** than vehicle-based ALD (if used for mains and services) – Requires a **significant increase in human resources** (if used for mains and services) – Consistent data collection at a network scale is **practically challenging** due to the manual nature (not well suited to mains/ services)
Helicopter/ fixed wing	Concentration sensor fixed to aircraft that fly a designated route over the LP/MP network. Typically uses generic wind data or an anemometer on site to calculate leak flowrate.	
	+ Good for **surveying** long, continuous assets (e.g. rural pipelines)	– **Data outputs** are a discrete snapshot in time, not continuous

	+ Has **co-benefit** of assessing encroachment near assets, as well as emissions.	– Operational **practicality** of aircraft ownership, ground teams, flight paths, weather conditions are doubtful. – **Poor sensitivity** for smaller leaks. Likely to detect <1% of leakage on the LM/MP network compared to best available technology. – Notable **concerns around cost** and environmental impact(s) of such aircraft fleet. – LP/MP network is **not practical** to fly overhead
Drones	Concentration sensors fixed to drones that fly a designated route over the LP/MP network. Typically uses generic wind data or an anemometer on site to calculate leak flow rate.	
	Lower environmental impact than aircraft	– **Data outputs** are a discrete snapshot in time, not continuous – **Limited practicality** due to Civil Aviation Authority regulations – A large number of units and people would be required means solution can be **high cost** – Market readiness and on-board hardware is still immature
Satellite	Sensors attached to satellites detect and quantify emissions from space.	
	+ **Easily scalable** + Well suited to finding very large emission sources + Can provide some **co-benefit** through satellite algorithms not related to methane detection (e.g. regards encroachment detection and vegetation coverage near assets).	– **Data outputs** are a discrete snapshot in time, not continuous. Albeit the frequency of measurement can be high compared to other technologies (e.g. monthly, but at significant cost). – High number of **false positives**; only 20/30% of findings located by Cadent operational teams in DPLA trials, (vs 95% for vehicle based). There are resource implications (additional cost and lower productivity) associated with a low find rate. – **Very low sensitivity** – 1kg/hr is the best available (and most expensive). About 99.9% of our leakages are below this threshold and are not identifiable using current satellite technology. – **Practical constraints** associated with cloud cover in the UK
Modelling tools	Probabilistic models have been developed within the DPLA project to identify, localise and estimate the size of leaks on HP & IP pipelines.	
	+ **Highly scalable** across pipeline networks + Near continuous **data outputs** providing clear + **Running costs are very low** once models have been developed and tuned. + Approach to this technology has been **practised and demonstrated** through the DPLA SIF project.	– Uncertain **sensitivity** and **false positive rate** as the outputs are subject to levels of sensorisation on network (i.e. data inputs to model) and tuning of the model. – Limited ability of the **data products** to accurately quantify emissions.

Table 4: Technologies explored

The table above points to different use cases for the respective technology types, with each having a place in a suite of tools to address network leakage. Vehicle-mounted ALD is the clear choice for addressing leakage on our mains and service population with the benefit of accuracy, scalability and efficiency. This is also evidenced by its widespread use in this context across multiple international jurisdictions.

Why a survey frequency of once per year?

Best Practice

To date, normal practice from around the world dictates a vehicle-based frequency of once per year. Both Pacific Gas and Electric (PG&E) and Italgas, the biggest users of this technology started off surveying their entire networks at a once-per-year frequency. As emissions are reduced by tackling larger leaks, some companies have increased the frequency of survey to further accelerate reductions in fugitive emissions which, of course, could go many months without repair on an annual survey frequency.

Academic studies have explored how to effectively apply ALD and follow-on intervention programs, and they have concluded that leakage reduces as survey frequency increases (see, Ravikumar et.al, 2017[1]). Italgas, the European pioneers with ALD, now survey at least twice annually to reduce emissions and to continue to reduce their ‘odour calls’ / public reported escapes.

The recently launched EU Regulation on the reduction of methane emissions in the energy sector[2] that require the use or ALD in gas industries has specific survey frequencies. Annex 1 of those laws sets the requirements out in detail. A subset that’s relevant to mains and services is summarised below:

Pipe material	Survey frequency
Cast iron	6 monthly
Ductile iron	12 monthly
Unprotected steel	24 monthly
Polyethylene	36 monthly

Table 5: Survey frequency of various pipe materials

When companies invest in ALD, it should be noted that the technology is best applied in a combination of three applications: annual networks surveys, targeted follow-on surveys post intervention, and, assurance surveys (e.g. of work quality post Repex). To satisfy this mix and get the full benefits of the technology, some capacity for these targeted and assurance surveys is appropriate.

Based on the information above and our experience to date we have proposed a once-annual survey frequency which will allow us to address mains leakage and risk across our networks.

Asset Management

To truly understand the emissions from an asset, several data points over time are required to understand emissions demographics and deterioration. Once this is established, it is likely that the frequency of survey across the network is adjusted, and likely not consistent in all areas of the network - targeting areas with more emissions and more risk with higher frequency of survey. An initial frequency of once per year balances the need for regular monitoring with an efficient use of resources and creates a data set for interventions and future surveillance plans.

Regulatory

A frequency of once per year aligns with emissions reporting, allowing an actual emission rate from every asset in the network to be reported.

Timelines

As discussed, we plan on submitting an application under the Net Zero Pre-construction Work and Small Net Zero Projects (NZASP) reopener in January 2025 that, if accepted, would allow us to start rolling out vehicle-based ALD beyond North London and across our networks. From our experience mobilising the four units in London, we know that the processes of procurement, business change, recruiting drivers, training people etc. takes time. Progressing this mobilisation during RIIO-2 supports our aim to implement a network-wide survey of mains and services once per year during the first year of RIIO-3. This will allow us to start optimising our RIIO-3 mains replacement workstacks using the technology, alongside setting up proactive intervention processes and aligns with the HSE ambition in this area which requested application of ALD technology from April 2026.

Given the timing of the NZASP re-opener window and assessment process in relation to the RIIO-3 process timelines we have for completeness included the roll out costs in our RIIO-3 business plan (this was requested as it forms part of the DPLA roll out). This includes [cost-sensitive data] baseline plan, to cover the full period costs of vehicle mounted ALD (tech, vehicles, fuel, drivers etc), Please refer to Table C5.07, Other Capex.

[1] Ravikumar et.al, 2017

[2] Regulation (EU) 2024/1787 on the reduction of methane emissions in the energy sector

Through the NZASP reopener we will set out the incremental benefits of earlier implementation, identified through modelling the CBA. Upon the successful outcome of our NZASP application we will work with Ofgem to ensure the funding across the NZASP and RIIO-3 plan is aligned, clear and transparent.

Technology partners and asset refresh

Through a tender event in 2022, we identified Picarro as the best in market to provide us with vehicle mounted ALD technology. The procurement event identified other technologies available that identify gas-readings, but the software and data-analytics offered by Picarro, which enable the data it produces to be used with confidence, were significantly ahead of other providers identified at the time. Before a wider roll out, we are planning another tender event to test this again, and to re-assess the market for value and capability.

Asset Refresh

As with all technology ALD requires maintenance and refresh. We are planning on a worst-case scenario which requires an annual running cost of circa [cost-sensitive data] per network with an approximate lifespan of 5 years for the associated software and hardware. This includes any asset refresh, ongoing maintenance and maintenance of data analytics tools and technology. This is based on the latest market rates for this technology.

Conclusion

In summary:

- We have included [cost-sensitive data] in our plan for roll out of technology to support DPLA – the majority of this being associated with vehicle mounted ALD.
- These costs and the survey frequencies are based on our experience to date (and our work with international partners to understand best practive in this area).
- The roll out of ALD is aligned with the request to include DPLA roll out costs and also aligns with the HSE requirements for the IMRRP.
- The cost data associated with this is based on the know current costs to deliver proven technology available on the market today and has been market tested as part of our ongoing procurement processes.
- We intend to submit an application under the NZASP reopener in January 2025 in which we will set out clearly the overlaps in funding (to avoid any risk of double count) and the benefits of moving earlier with this technology.