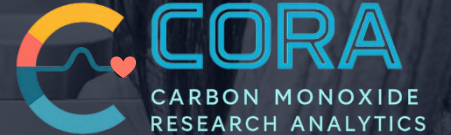


Carbon Monoxide Partner Ecosystem

/ Carbon Monoxide Research
Analytics (CORA) Report

SIA



Report Purpose

This report provides background to the **Carbon Monoxide Research Analytics Platform (CORA)**; covering its development, where it is today, and where it will be in the future.

The report is intended for use by stakeholders that are interested in learning about CORA, are already using it, or are planning to use it in the future.

Table of Contents

Abbreviations and Definitions

Executive Summary

Chapter 1: Introducing COPE

1.1 Background	<u>6</u>
1.2 Stakeholders	<u>7</u>
1.3 COPE Vision and Outcomes	<u>8</u>

Chapter 2: Introducing CORA

2.1 CORA Proof-of-Concept	<u>10</u>
---------------------------	-----------

Chapter 3: Users of CORA

3.1 CORA Persons and Prospective Users	<u>14</u>
--	-----------

Chapter 4: Cora Today Critical Insights

4.1 Overview	<u>19</u>
4.2 Critical Insights in CORA	<u>20</u>

Chapter 5: Demonstrators and Future CORA

5.1 Overview (Demonstrators)	<u>30</u>
5.2 Summary of CORA Benefits and Next Steps	<u>35</u>
5.3 Critical Data Requirements and Recommendations	<u>36</u>

Abbreviations

CO – Carbon Monoxide

COPE – Carbon Monoxide Partner Ecosystem

CORA – Carbon Monoxide Research and Analytics Platform

DSA – Data Sharing Agreement

DPA – Data Protection Agreement

FRS – Fire and Rescue Service

GDN – Gas Distribution Networks

GLA – Greater London Authority

IoT – Internet of Things

LFB – London Fire Brigade

NEA – National Energy Action

NGN – Northern Gas Networks

PoC – Proof-of- Concept

THCH – Tower Hamlets Community Housing

WMFS – West Midlands Fire and Rescue Service

WWU – Wales and West Utilities

Definitions

Demonstrator – a demonstrator is an on the ground pilot that is delivered in partnership with various stakeholders, in select locations and with real customers.

IoT Alarm – Internet of Things CO alarms are smart devices that collect information on CO incidents and send it to a cloud server.

The incident alerts can be remotely accessed by gas emergency response services, such as those provided by the GDNs, and housing associations. IoT alarms enable remote intervention and proactive response to CO incidents, in the event a household does not call the gas emergency helpline.

Executive Summary

The Challenge in CO Data

The true scale of carbon monoxide (CO) risk in the UK remains unclear due to fragmented and inconsistent data held across multiple stakeholders. CO incidents and their health impacts have long been underreported due to difficulties in diagnosis, limited healthcare follow-up, and households not contacting emergency services after an alarm activation. As a result, existing reports on CO events fail to provide a complete picture, limiting opportunities for more personalised and regionally targeted prevention and response measures.

The Need for CORA

To close these gaps, the **Carbon Monoxide Partner Ecosystem (COPE)** created **CORA**, the **Carbon Monoxide Research and Analytics Platform**. CORA combines more than 40 datasets from gas, fire, alarm, housing, and health sectors to deliver the UK's first integrated view of CO incidents, behaviours, and household vulnerabilities — transforming data into more personalised prevention strategies.

What CORA has unlocked (so far)

CORA provides a comprehensive view of CO risk across Great Britain, uncovering major data and behavioural gaps. It highlights difficulties in aggregating regional FRS and GDN data at a national level, due to differences in how CO incidents are recorded and reported across services. **CORA has also unlocked critical behavioural insights around CO alarms.** For example, **it found that nearly 75% of potential CO incidents detected by IoT alarms were never reported to GDNs**, as customers did not call to report the incident. These risky behaviours heighten danger and may indicate a wider problem, beyond IoT households. By making these gaps visible, CORA has enabled stakeholders to deliver initiatives that further reduce risk through targeted and faster intervention.

CORA's insights are already shaping action through: IoT alarm demonstrators with housing providers and GDNs; a cross GDN trial to streamline and standardise CO incident reporting by gas engineers; and tenant protection work (including landlord escalation pathways) to reduce the risk of households remaining unsafe once GDN responsibility ends.

The Potential for CORA going forward

CORA will aim to evolve from reporting CO incidents to anticipating and preventing them. New insights will include analysis of Riddor 'reportable' CO incidents against HSE documents to provide further insights around prevalence; mapping of all GDN recorded CO incidents; and enhanced BAU data capture (e.g., CO sources and symptoms). **Stakeholders are encouraged to shape CORA** by requesting specific insights and sharing critical data, such as CO incidents recorded by healthcare, fire and rescue services, and local authorities. **Linking these datasets with wider data** (e.g., EPC ratings, damp and mould, and weather) **could reveal connections between CO risk, housing conditions, and health.** With improved data quality and richer insights, CORA will continue to develop as the UK's leading tool for identifying, predicting, and preventing CO harm. **Further development may also include** analysis of the IoT demonstrators within CORA, and subject to data readiness, the development of forecasting scenarios in CORA.

Chapter 1: Introducing the Carbon Monoxide Partner Ecosystem

Chapter Summary

The Carbon Monoxide Partner Ecosystem (COPE) is a collaborative multi stakeholder project that aims to reduce CO risk through data collection and analysis. COPE aims to:

- / Move towards CO prevention
- / Reduce cost of CO to society
- / Reduce the time customers are exposed to CO
- / Improve the rates of medical diagnosis
- / Improve the rates of resolving CO spillage at source

To date, COPE has delivered five phases of work, with the first phase centred around stakeholder engagement and problem understanding, to phase 5 (today), focused on demonstrator (on the ground pilot project) delivery and enhanced platform development.

1.1. Background

COPE is a collaborative project designed to reduce CO risks through multi-stakeholder data collection and analysis. It originated from a GDN led effort to understand the prevalence of CO, which has been underreported for over a decade due to many challenges, including difficulties with diagnosis; limited healthcare follow-up; and households not contacting emergency services after alarm activation.

This underreporting limits stakeholder ability to deliver more personalised safety initiatives. Separately, CO data remains siloed and fragmented, making it difficult to understand CO prevalence. **Established in 2023** by Sia under Cadent's leadership, **COPE provides a framework for unifying CO data and developing a more accurate picture of incidents.** It is now co-delivered by Cadent, SGN, and NGN, with support from WWU and other partners.

To date, COPE has progressed through five phases — from stakeholder engagement and the development of the CORA platform Proof of Concept (PoC), to the identification and selection of data led demonstrator opportunities, and more recently, demonstrator delivery and CORA platform enhancements.

The Five Phases of COPE



1.2. COPE Stakeholders

COPE consists of multiple stakeholders from various sectors, including:

- / Fuel
- / Government
- / Charities
- / FRS
- / Health
- / Alarms
- / Housing
- / Marine

COPE stakeholders are continuously evolving, as new organisations are engaged through demonstrators and data sharing.



1.3. COPE Vision & Outcomes

At the inception of the project (Phase 1), Sia interviewed organisations working across sectors in the CO space, to understand their business-as-usual practices, barriers to addressing CO, and how they would benefit from a shared CO platform. During a collaborative workshop, the stakeholders collectively aligned on what the vision and key outcomes of this ecosystem would be.

The following vision was co-developed for COPE:

*“Develop a **data-driven understanding** of the **true prevalence of CO poisoning** from **gas and solid fuel** within **domestic dwellings** (including **non-typical and unregulated dwellings** of all **tenure types**), and the **corresponding impact to society.**”*

It was also agreed that in the long-term, the following outcomes can be achieved:

- / Reduce the time customers are exposed to CO
- / Improve the rates of medical diagnosis
- / Improve the rates of resolving CO spillage at source
- / Move towards CO prevention
- / Reduce cost of CO to society

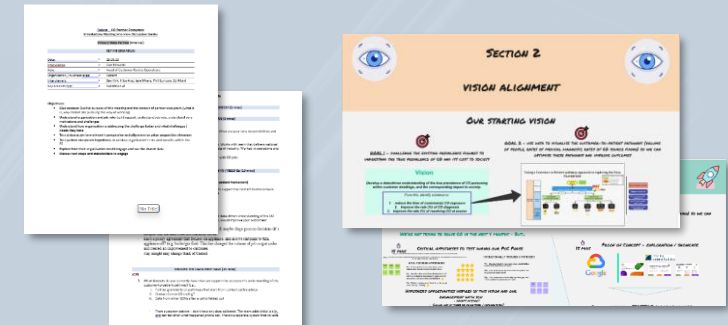
The adjacent stats highlight some of the key outcomes from stakeholder engagements (within Phase 1), which had set the scene for developing CORA in subsequent phases.

20+

Stakeholder interviews on CO challenges and opportunities

16

Stakeholders engaged to develop COPE vision, outcomes and PoC (Proof-of-Concept) model



Chapter 2: Introducing CORA

Chapter Summary

CORA, the Carbon Monoxide Research and Analytics Platform, has evolved significantly since COPE's launch. In Phase 1, stakeholders were engaged to understand their CO data and sharing processes, and in Phase 2 a Dream Data Model was developed, leading to data sharing from Cadent, SGN, NGN, WWU, LFB, Home Office, AICO, MAIB, HomeServe and HETAS. A proof-of-concept model was built in Google Looker Studio, providing stakeholders with access to insights.

Early insights revealed:

- / Inconsistencies in CO incident reporting across GDNs
- / Underreporting of CO incidents within Home Office data
- / Alarm interaction highlighting behaviours that increase risk (e.g., alarm head removals)

These findings (discussed in [Chapter 4](#)) informed data led demonstrators.

2.1 CORA Proof-of-Concept

Since the inception of COPE, CORA has evolved into its current state. In Phase 1, Sia engaged with stakeholders to understand what data they have on CO and the processes for sharing it.

These discussions paved the way for Phase 2, where a ‘Dream Data Model’ was developed to reflect CO data that stakeholders would ideally provide for CORA. Subsequent discussions assessed each stakeholder’s ability to share CO data, which varied in both availability and shareability.

As a result, a tiered approach was developed to obtain data from stakeholders, grouping them in Tiers 1 to 3 (outlined to the right). Each tier was assigned an overall score reflecting the relative ease of data sharing.

Tier 1 Data Partners



Data shareability

- Anonymised raw data can be shared.
- DSA not needed.



Data quality & format

- Data is digitised and easy to transfer.



Stakeholder

- Stakeholder is engaged and interested in sharing data.

Score ● ● ● ●

Tier 2 Data Partners



Data shareability

- Anonymised aggregated data can be shared. DSA not needed.



Data quality & format

- Quality not defined.
- Data may only be accessible from published reports.



Stakeholder

- Stakeholder hesitant to share data.

Score ● ● ● ●

Tier 3 Data Partners



Data shareability

- DSA required for sharing any data.



Data quality & format

- Not known or defined.



Stakeholder

- Stakeholder less engaged, risk averse/reluctant to share data.

Score ● ● ● ●

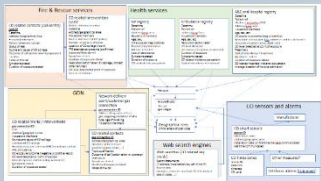
In general, stakeholders needed time to implement data sharing due to internal policies or data maturity. As the project matured, the aim was to move stakeholders from Tiers 2 and 3 to Tier 1, by building confidence in the data sharing process and demonstrating the impact of shared data.

In Phase 2, the Sia team worked with Cadent to define a cloud architecture for the PoC model. Following discussions with stakeholders, it was determined that Google BigQuery + Google Looker Studio, were the most suitable for the PoC.

The data was presented in Google Looker Studio, and contributors were granted access to the platform. An end of phase workshop was held with all stakeholders to present the PoC model and the critical insights [see section 4.2].

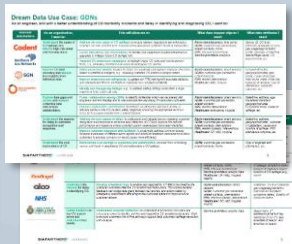
1

Dream Data Model developed to guide stakeholders in providing data for the PoC



10+

Stakeholders engaged on their needs for a PoC model



10

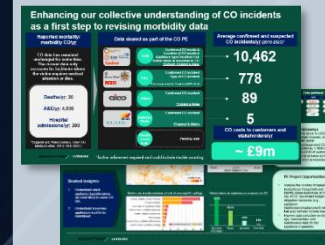
Stakeholders provided their data for the PoC

8

Stakeholders granted access to the PoC model

1

Virtual showcase event of critical insights



10

Data driven opportunities from the PoC were identified as demonstrators in subsequent phases

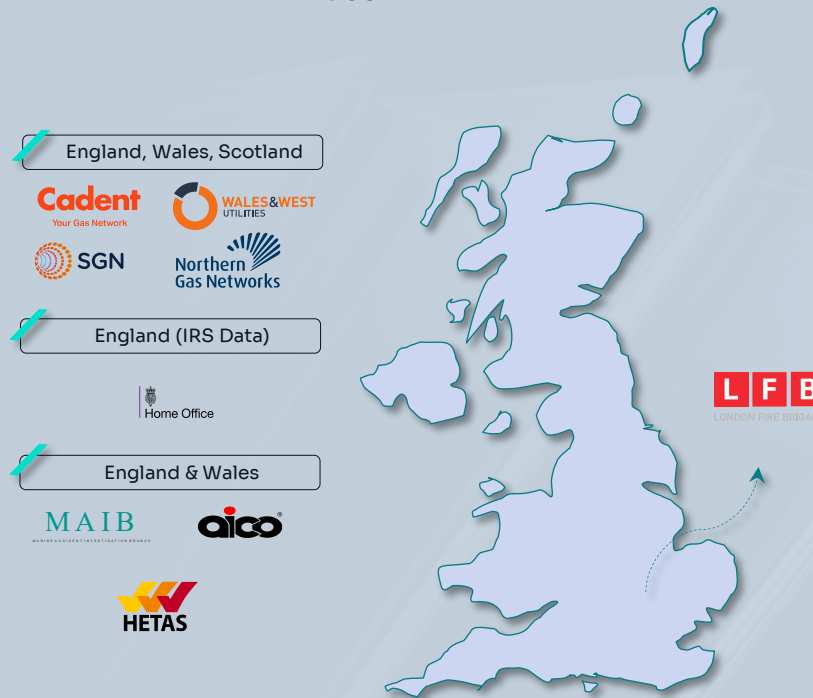
The primary users of the PoC model at its inception were LFB and the GDNs. These stakeholders indicated that the platform could:

- / Inform strategic projects and awareness campaigns based on CO incident (e.g., locations, vulnerabilities).
- / Identify key insights to help Audit and Health and Safety teams prepare annual HSE checks; and help teams monitor the effectiveness of CO initiatives over time.

AICO provided CO incident data from its IoT alarms [smart alarms that automatically share alerts with a cloud server, allowing for remote intervention], covering England and Wales. In addition, the Home Office shared national FRS data submitted by individual FRS through the mandatory Incident Recording System (IRS) reports. No CO data was provided by individual FRS (other than LFB) outside of the IRS.

Critical health service data, such as ambulance callouts, GP records, and hospital admission, were not shared with Sia for the PoC, due to the volume of data that depicts symptoms of CO, but not a confirmed CO diagnosis.

Tier 1 and Tier 2 stakeholders that shared data for the PoC.



Note – HomeServe data was shared, but could not be used for the specific analysis required at the time

Key Insights From the Data

Analysis of data at the PoC stage enabled Sia to provide early insights for stakeholders on CO incidents:

- / **CO data reported by GDNs** highlights opportunities to develop a more in-depth understanding of CO incidents, through improved and new data capture.
- / **CO data reported by LFB and the Home Office** suggests inconsistencies in data capture in the IRS, resulting in underreporting of CO incidents at a national level.
- / **CO data by AICO** demonstrates alarm use behaviours that may be leaving households at risk (e.g., alarm head removals). While these insights may have been suspected, the evidence had not previously been shared with the industry.

These insights paved the way for critical demonstrators to be delivered as part of the ecosystem [see section 4.2].

Chapter 3: Users of CORA

Chapter Summary

CORA is designed for use across sectors, supporting stakeholders with data driven insights. CORA users include (but are not limited to):

- / **Emergency Response Coordinators**
(Fire Rescue Services and Ambulance):
 - Identify gaps in CO incident response, optimise resource allocation, and plan for future incidents
- / **CO Safety Researchers**
(alarm and gas sensing equipment providers):
 - Drive product innovation
- / **Customer Vulnerability Managers:**
 - Implement data driven CO awareness and projects
- / **Housing and Health Managers:**
 - Identify high-risk areas, track landlords not adhering to their regulatory duties

3.1 CORA Personas and Prospective Users

CORA is designed for CO stakeholders including GDNs, FRS, ambulance services, alarm manufacturers, and housing providers, with specific teams benefiting most.

For example, within GDNs, Customer Vulnerability Managers and emergency service leads can use CORA to understand where incidents occur and what situations pose risks to households.

This section provides an overview of the different CORA users, outlining how the platform benefits them, and includes testimonials from current users.

A key component of CORA's development is ongoing feedback from current and prospective users – especially the questions they want CORA to help answer (on CO or related issues). **You can share your feedback on CORA using this [link](#).**

Bespoke insights can then be built into CORA to address these needs and support stakeholders' business as usual (BAU) activities.



Emergency Response Coordinator

/ Sector ▶ FRS, Ambulance

Goals

- / To be supported by the Home Office to use appropriate equipment for CO measurement. This needs to be a national requirement
- / Streamline data sharing, reporting, and training to improve coordinated CO responses and resource allocation
- / Analyse CO data trends to refine response strategies and enhance public education efforts



“
CORA can be a one stop shop for understanding data about Carbon Monoxide within the UK.”

Apollo Gerolymbos,
London Fire Brigade
(to May 2025)

Key Use Cases of CORA

- / Demonstrate pain points in global approach of CO incident response (e.g., missing equipment) to influence policies and push for national requirements
- / Optimise resource allocation based on forecasts and trend analysis
- / Utilise models to plan for future incidents
- / Implement targeted public safety campaigns and initiatives



Bespoke household and vulnerability data can be presented in CORA to help stakeholders answer critical questions.



CO Safety Researcher

/ Sector ▶ Alarm and gas sensing equipment and research

- / Advance CO technology and equipment
- / Foster stakeholder collaboration to enhance data sharing and R&D outcomes
- / Influence policies and suggest updates to improve public protection

Goals

Key Use Cases of CORA

- / Research and analyse incident patterns to address knowledge gaps
- / Develop predictive forecasts and risk assessments based on trends analysis
- / Build evidence to drive innovation for manufacturers



“CORA marks a shift toward collaborative, evidence-based work on CO in the home, helping us close knowledge gaps and deliver data-led outcomes for safer communities.”


Dave Richmond
AICO



“I’m very impressed with the data and insights within CORA. Having been involved in this project from the very beginning, it’s fantastic to see it come together. The collaboration between all GDNs has been truly ground-breaking.”

Mark Wood
AICO

Goals



Customer Vulnerability Manager

/ Sector ▶ GDNs

Develop a proactive, customer-focused support system to prioritise safety and education for vulnerable individuals by:

- / Further strengthening preventative measures and CO risk reduction campaigns
- / Ensuring compliance with evolving regulations



“CORAs been launched because there is a need for it. Everyone has data but it is siloed – CORA is about bringing this data together.”

Phil Burrows
Cadent

Key Use Cases of CORA

- / Update the CO incident risk areas through insight gathering and forecasts
- / Support customers by sharing personalised recommendations and advice (e.g., based on vulnerability profiles)
- / Develop evidence-based CO reduction and prevention campaigns and initiatives to measure impact and increase SROI
- / Facilitate annual and regulatory reporting
- / Inform policy using data on alarm distribution, behavioural risks, and incident trends (gas vs solid fuel)



Dan Edwards
SGN

“CORAs provides a vital repository for CO incident data, helping us better understand CO’s impact. The insights are shaping our current actions and guiding how we work together to reduce CO and raise awareness in GD3.”



Katie Wynd
NGN

“The attribute trial has already revealed valuable insights. Through CORA, we’ll be able to analyse these findings in depth and gain a clearer understanding of how collaborative efforts can reduce CO incidents.”



Paisley Carpenter
WWU

“CORAs looking great and there is so much data on there that I can foresee being of great use to us when we come into GD3, to reforecast some of our projects and investment needs.”



Housing / Environmental Health Manager

/ Sector ▶ Housing association, local authority

Goals

Support vulnerable households by improving CO safety and reduce CO spillage through:

- / Educating residents on safe practices
- / Serving notices to landlords for necessary maintenance

“This project embraces the true meaning of wellbeing at home, by gathering data on indoor conditions, helping us act and minimise risks for households.”

Thomas Donnelly
Tower Hamlets Community Housing
(to October 2025)

Key Use Cases of CORA

- / Identify high-risk households, rogue landlords, and hot spot areas to enable targeted interventions and facilitate adherence to policies
- / Provide real-time alerts during CO incidents, helping managers respond quickly
- / Provide historical and real-time evidence on damp and mould issues; track remediation work and any ongoing issues
- / Track appliance performance, predict potential failures, and schedule preventive maintenance
- / Generate insights to guide housing and environmental teams' training
- / Integrate with social prescribing pathways for timely remediation and prevention of long-term illness associated with CO and damp and mould
- / Monitor low-level CO exposure in high-risk settings (e.g., residences above commercial services)



Chapter 4: Cora Today Critical Insights

Want to access the CORA platform? click [here](#)

Chapter Summary

Since the proof of concept, CORA has evolved into a comprehensive platform integrating ~40 datasets from GDNs, FRS, AICO, and other partners, providing the CO sector with an unprecedented view of incident trends, risks, and behaviours.

Our analysis suggests potential gaps in how GDN and FRS data are collected and highlights high numbers of false alarms (raising questions about how alerts are classified).

Risky household behaviours such as alarm head removals, lack of testing, and failure to report incidents were also identified in CORA.

These insights have driven key demonstrators, including IoT alarm trials to improve early detection; standardised data collection across GDNs and FRS; and Cadent's tenant follow-up pilot, which confirmed ongoing risks for households outside a GDN's responsibility (see chapter 5).

N.b. data received from the Home Office is up to the year 2024, whereas data from the GDNs is up to 2025/2026.

4.1. Overview

Since the PoC, CORA has expanded with new data and an improved interface. This chapter describes the platform, its features and key insights.

4.1.1 Navigating CORA and Its Data

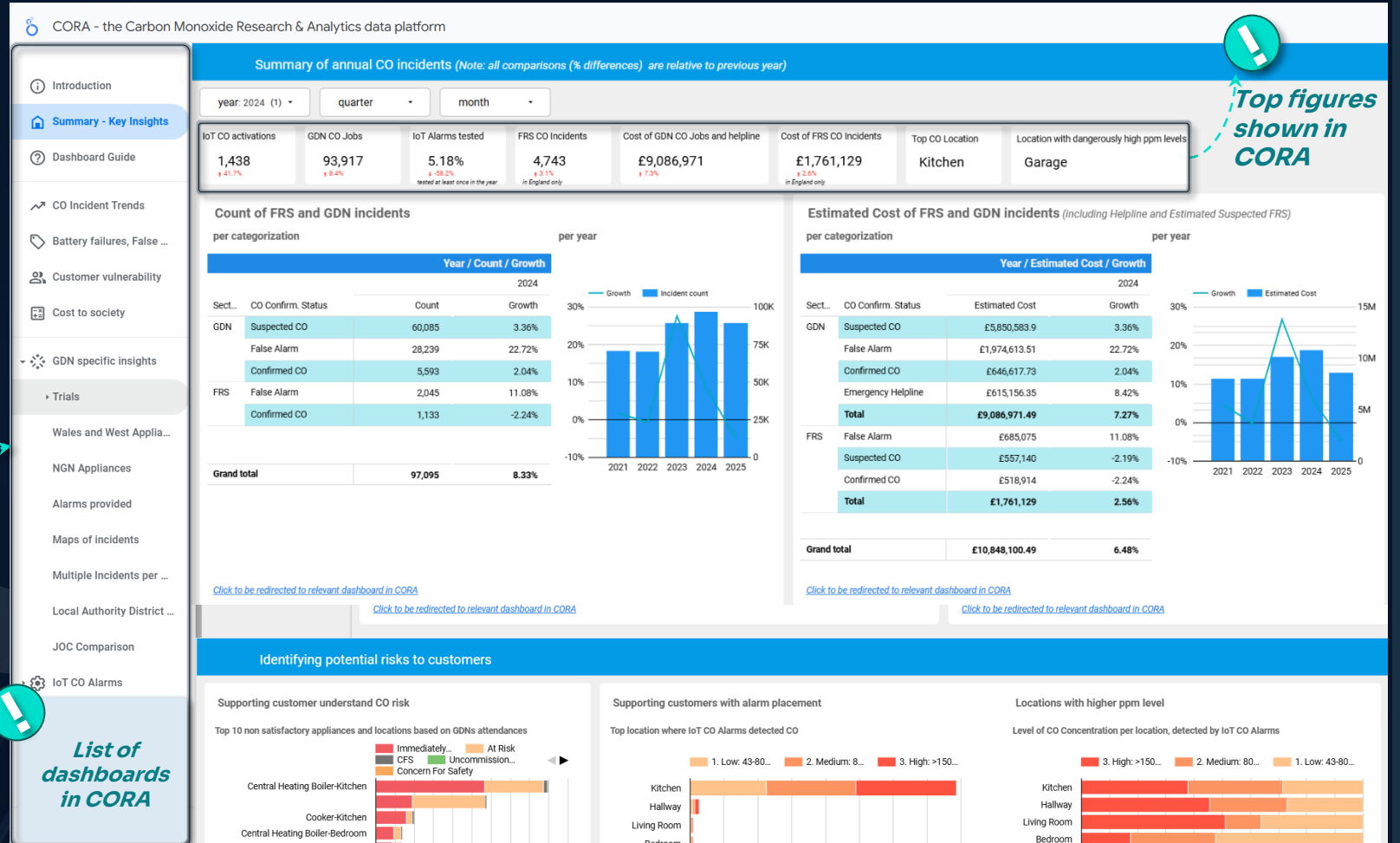
CORA contains ~40 external datasets, covering IoT alarms, CO incidents, emergency call centre logs, and gas incidents causing injury or death, from these stakeholders:

- / **GDNS:** Cadent, SGN, WWU and NGN
- / **FRS:** LFB, West Midlands and Home Office
- / **Alarms:** AICO
- / **Other:** HETAS, MAIB, RIDDOR reports
- / **NHS:** Birmingham Hospital

The adjacent image shows CORA, with the dashboard list (i.e., specific sheets). A summary of the dashboards is on [page 20](#).

4.1.2 Accessing CORA

For the latest insights, please refer to [CORA](#) and request access. Please note, a Google account is required to use CORA.



Top figures shown in CORA

List of dashboards in CORA

Sample snapshot of the Summary Insights page in CORA (filtered on 2024 data), and the various dashboards of specific data that can be accessed in CORA



Are there specific insights you'd like to see? Reach out to cope@sia-partners.com

Dashboard	Description
Introduction	Opening page
Summary – Key Insights	Summary of key data
Dashboard Guide	Instructions for CORA & definitions
CO Incident Trends	CO incident data by sector, stakeholder and year (<i>n.b. only for Home Office and GDNs</i>)
Battery Failures, False Alarm	False alarm recorded incidents by FRS and Home Office
Customer Vulnerability	Risks to customers as captured by GDNs
Cost to Society	Initial costs of attending CO incidents
GDN Specific Insights	Unique data collected by GDNs, including alarm distribution, vulnerability, and geographic distribution of CO incidents
IoT CO Alarms	Unique data captured from IoT alarms
Health	Initial data captured from public NHS data (<i>n.b. high level</i>)
FRS Incidents	Data by individual FRS (<i>n.b. currently LFB and West Midlands</i>)
Other Insights	Data from MAIB, HETAS
Riddor	Riddor reports submitted to HSE
Regional Insights	GDN and FRS correlations for London and West Midlands

An overview of the dashboards in CORA, and a summary of data they contain

4.2 Critical Insights in CORA

Insights in CORA have supported stakeholders in refining their CO awareness messaging, delivering targeted initiatives, and improving CO reporting by helping address CO data gaps.

The following pages present a **deep-dive into some of CORA's critical insights**, focusing on: CO incident trends, behaviours associated with IoT alarms, geographic distribution of CO incidents, FRS underreporting within the Home Office statistics, and GDN data collection inconsistencies.

Figures cited in this report reflect the data available at the time of writing (March 2026) and may have changed since then. The most recent Home Office dataset available in CORA covers up to 2024; and the GDN data is up to 2025/2026. As a result, the total incidents used in this report (across GDNs and the Home Office) are based on 2024 figures.

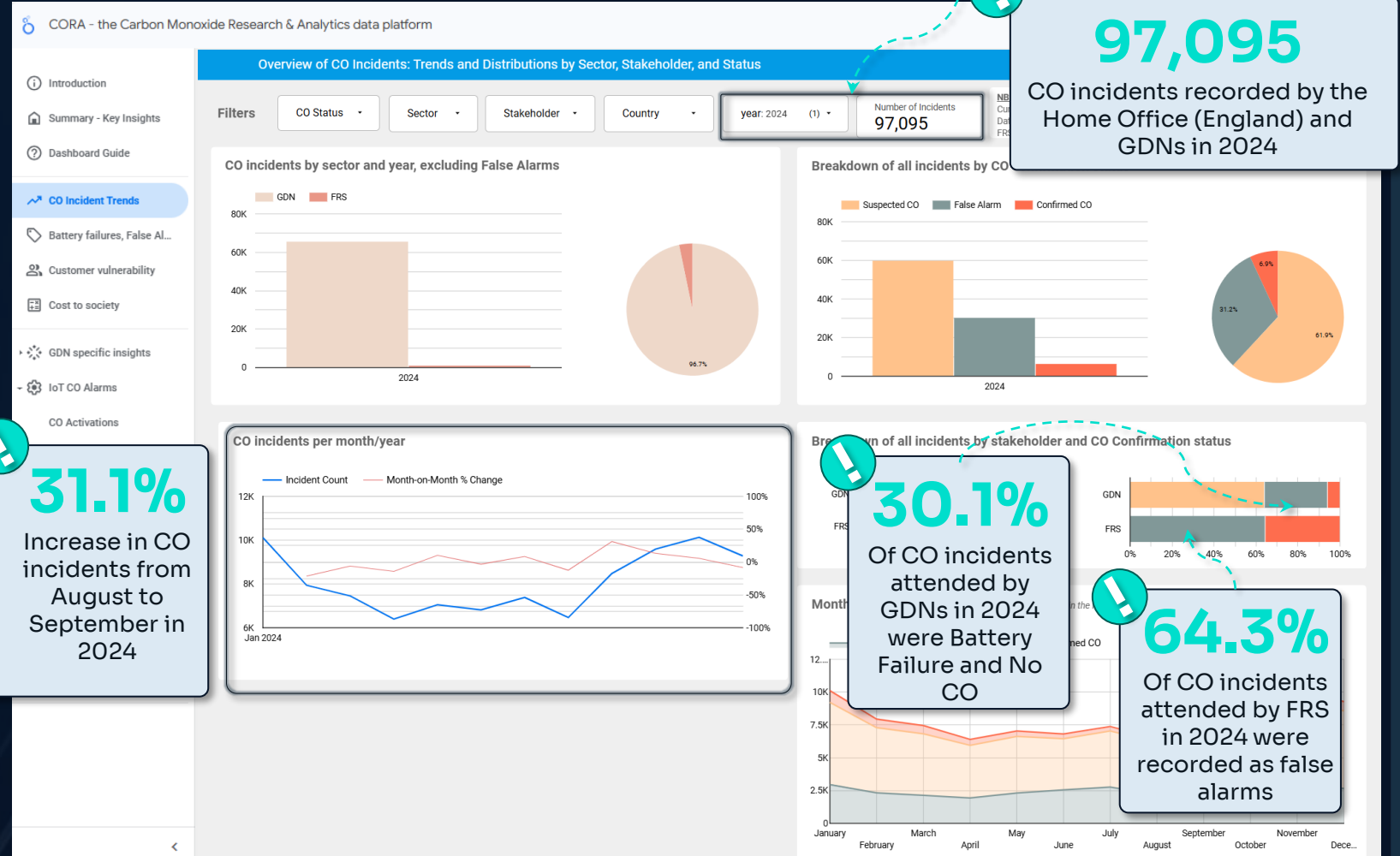


4.2.1 CO Incident Trends

CORA has provided CO stakeholders with their first view of incident patterns, covering annual and monthly counts, incident types, and costs of attendance, using data from GDNs, AICO and the Home Office (for national FRS in England).

Key Findings

- Annual CO incidents** show high counts in GDN and Home Office data, suggesting that current figures for deaths, hospitalisations, and injuries, are underreported. To provide a truer estimate of prevalence, GDNs collected symptoms data during the standardised data collection trial.
- Monthly CO incidents** show a sharp increase from August to September, with IoT alarm data indicating that ~53% of September incidents had dangerous CO levels. The cause is unclear and warrants further investigation.
- Incident numbers** show that a large share of recorded CO incidents are classified 'battery failure and no CO evident' (for GDNs) and 'false alarm' (for FRS), indicating possible inefficiencies for emergency services or inaccurate recording.



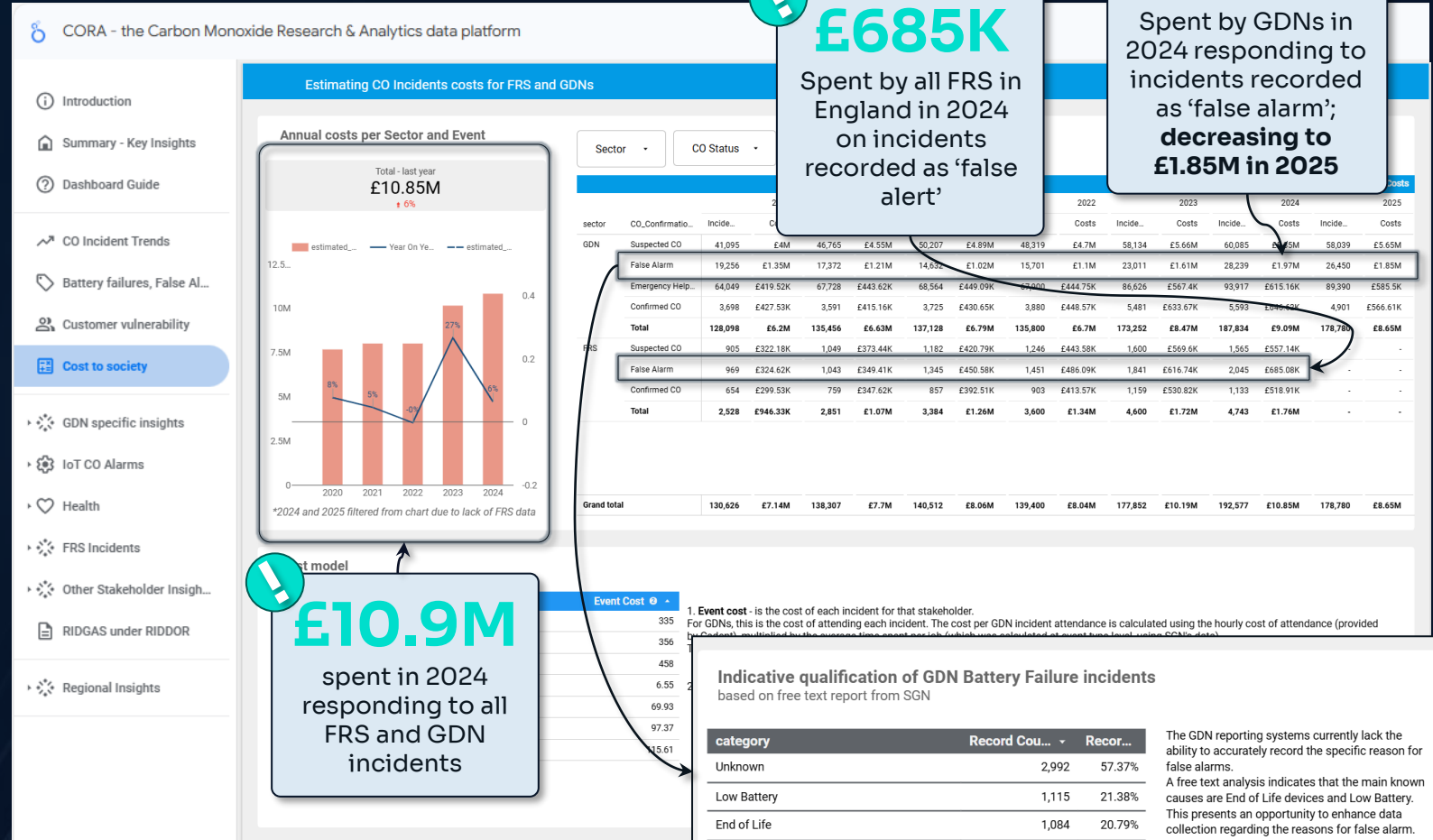
Snapshot of the CO Incident Trends page in CORA (showing 2024 data)

Data indicates that GDN and FRS incur greater costs responding to false alarm incidents than to confirmed CO incidents.

Existing CO incident recording systems used by GDNs do not consistently capture the underlying reasons for a false alarm activation. To gain a better understanding of the true reasons behind these incidents, we analysed free text notes captured by SGN's gas engineers for incidents recorded as 'battery failure and no CO evident' (*re-labelled as false alarms in CORA*), and found that when reasons were stated, the most commonly reported are 'low battery' and 'end of life'.

This suggests that incident classifications across GDNs could be improved to reflect the reasons behind a false alarm. Increased household awareness is also required to help people distinguish low battery notifications from a true CO incident.

N.b. Costs for this analysis were modelled using Cadent's hourly attendance rates, GDN job times, and LFB's notional cost per incident, aggregated by incident type.



£685K
Spent by all FRS in England in 2024 on incidents recorded as 'false alert'

£1.97M
Spent by GDNs in 2024 responding to incidents recorded as 'false alarm'; decreasing to **£1.85M** in 2025

£10.9M
spent in 2024 responding to all FRS and GDN incidents

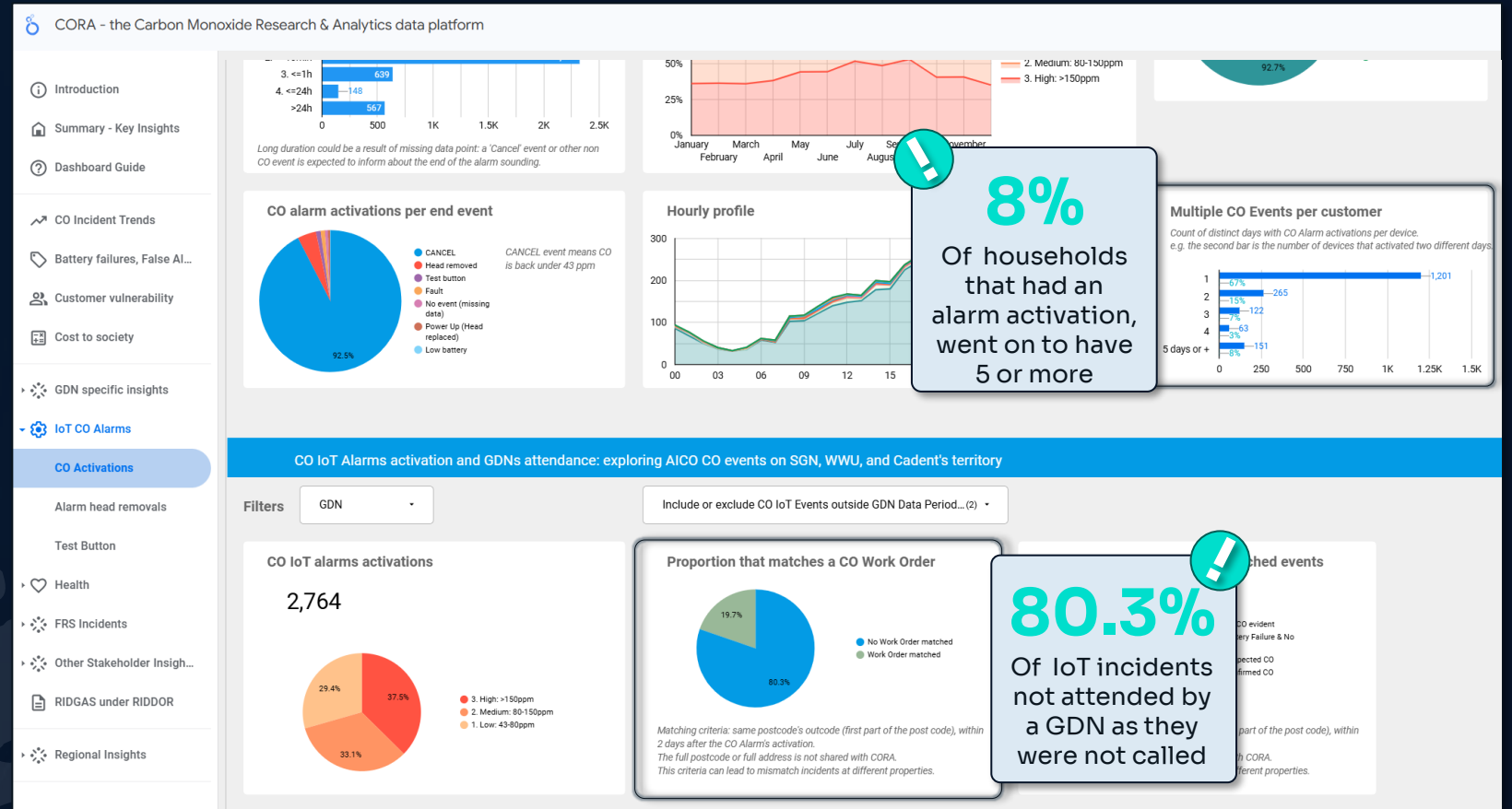
Snapshot of the CO costs dashboard in CORA, from which these insights can be found (showing data from 2019 to December 2025 (for GDNs) and to December 2024 (for FRS))

Indicative qualification of GDN Battery Failure incidents
based on free text report from SGN

The GDN reporting systems currently lack the ability to accurately record the specific reason for false alarms. A free text analysis indicates that the main known causes are End of Life devices and Low Battery. This presents an opportunity to enhance data collection regarding the reasons for false alarm.

To improve efficiencies, better recording of false alarm incidents and awareness on CO alarm notifications is needed.

- / **IoT CO activations show** that 8% of households that had an initial alarm activation, went on to have 5 or more activations within a set period (August 31, 2019 to March 6, 2025).
- / **IoT incident data** shows that 80.3% of IoT alerts were not attended by a GDN, as the national gas emergency line was not called, despite most alerts indicating high levels of CO (>150ppm as defined by IoT alarms). This highlights the risk of households not contacting gas emergency services, and the potential value of IoT in enabling remote detection and automatic escalation to GDN emergency services.
 - **Limitations:** As full postcodes were not shared, the matching of IoT and GDN incidents was based on partial postcodes, within two days of activation. This limits accuracy, potentially causing mismatches, and underestimates the proportion of incidents not attended by GDNs.



Snapshot of the CO Activations page in CORA (showing data from 2019 to March 2025)

4.2.3 Customer Vulnerability

CORA underpins existing sector knowledge with data, confirming patterns such as dangerous appliance types and common CO symptoms. This section presents these insights.

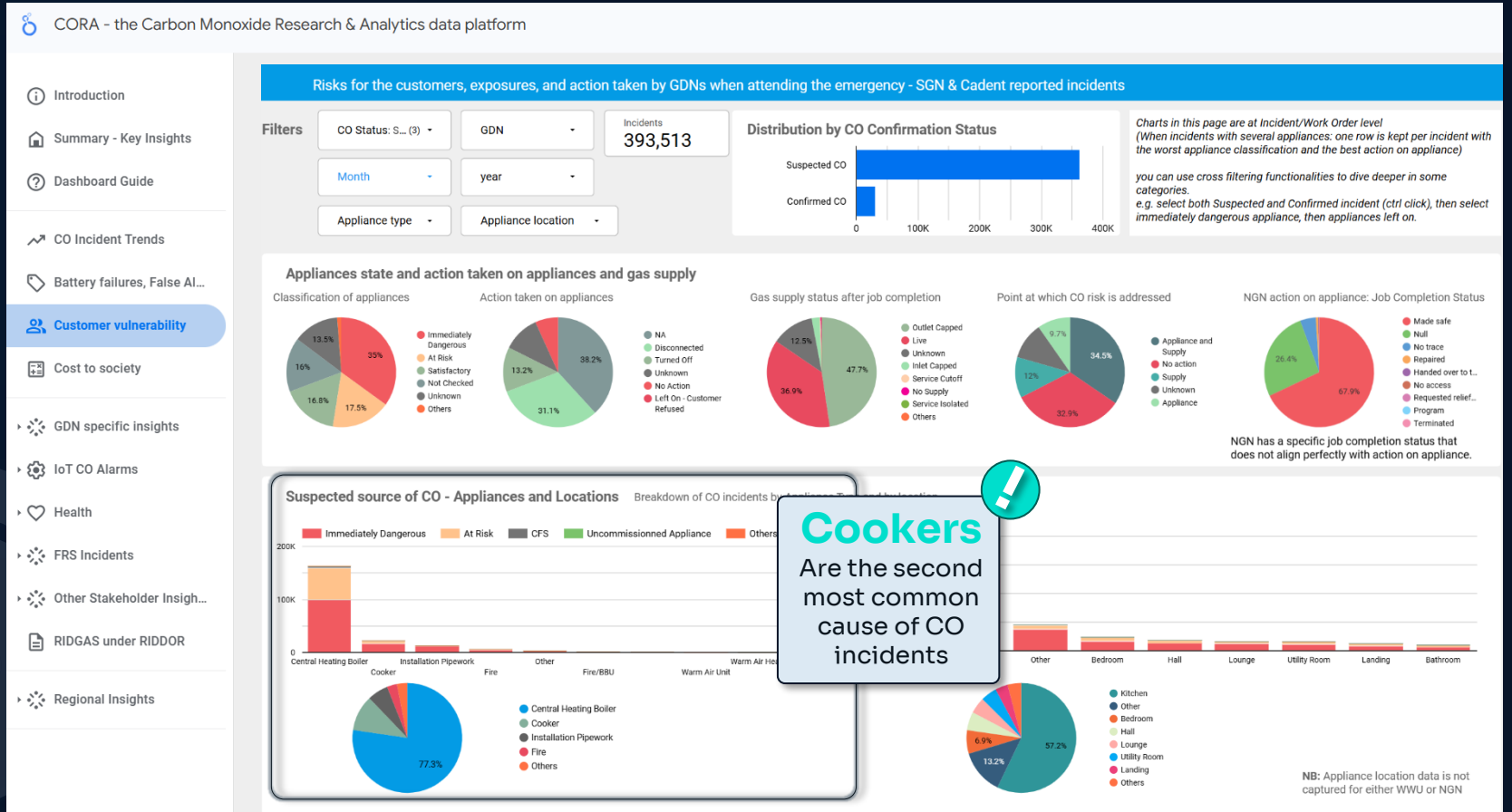
Key Findings

Free text analysis of SGN CO incident reports shows that 77.3% of CO incidents were attributed to boilers and 10.6% to cookers, making cookers the second most common appliance type to result in a CO incident requiring an emergency gas engineer response.

Free text analysis of SGN CO incident reports highlights headaches as the most reported CO symptom.

Free text analysis of Cadent emergency call centre dispatch notes shows ‘symptoms’ as the third most recorded reason for a call, after ‘CO alarm activation’ (first) and ‘other’* (second).

*Could not be standardised from the free text.

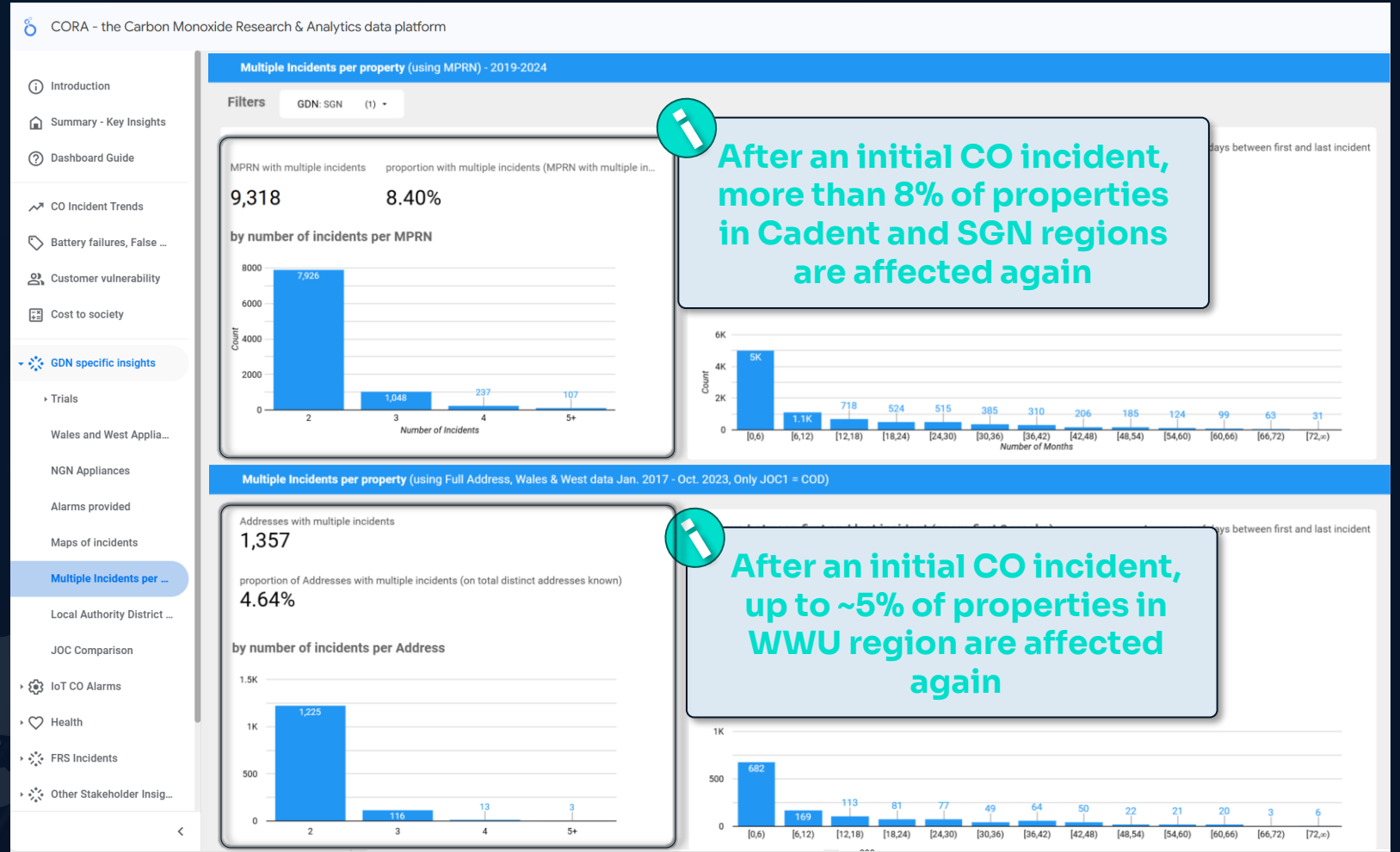


Snapshot of the Customer Vulnerability page in CORA (showing data from 2019 to December 2025)

Multiple incidents per property data shows that, among households with an initial CO incident, over 8% in SGN and Cadent and nearly 5% in WWU, experienced further incidents. This suggests that some households may be more prone to repeat incidents, although the underlying causes remain unclear and warrant further investigation.

Recommendations for Improving Insights

- Statistical analysis to define correlation between CO and socio-economic metrics
- Achieve full incident mapping (FRS and GDNs) to identify impact areas
- Map repeat incidents per property; and research underlying causes



Snapshot of the Multiple Incidents per Property dashboard in CORA (showing data from 2017/2019 to 2023/2024)

i An estimated ~20k properties (2019-2024) across WWU, Cadent, and SGN had multiple CO incidents, following an initial one.

4.2.4 National FRS Data Capture

Analysis of FRS CO incidents (Home Office, WMFS and LFB), highlights gaps in national reporting, driven by how the Incident Reporting System (IRS) captures CO data.

Key Findings

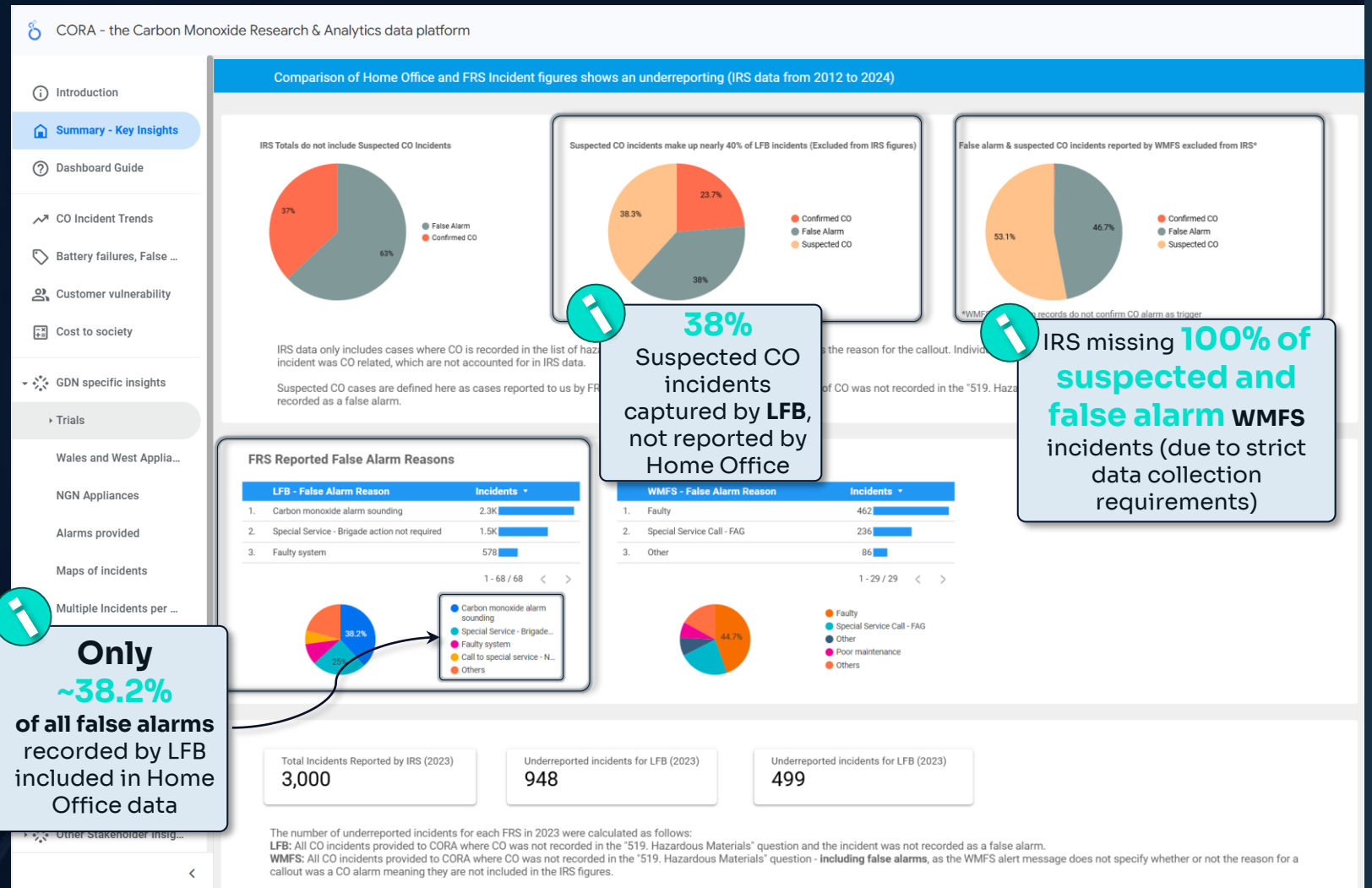
In the IRS, CO is captured through two data fields which appear sufficient:

- **Question 5.19:** “What hazardous materials were involved?” (CO is recorded if selected)
- **Question 3.4:** “Reason for false alarm?” (CO is recorded only when a CO alarm sounds)

However, ~38% of LFB and ~53% of WMFS CO incidents were recorded as ‘suspected CO’ rather than ‘hazardous materials’ and were therefore excluded from the IRS. Only 38.2% of LFB false alarm incidents, and none from WMFS, were included in the IRS, as they were not related to a CO alarm sounding. These omissions limit a true understanding of CO prevalence.

Recommendations for Improving Insights

Discussions have been held with the Home Office, who support further research in this area, and investigations are underway to assess the value of adding missing questions in the IRS, to reduce underreporting and costs to FRS.



Snapshot of the Summary - Key Insights dashboard, focusing on FRS incidents (showing data IRS data from 2012-2024; LFB data from 2009 to 2023; WMFS data from 2019 to 2025)

4.2.5 GDN CO Work Orders Insights

Analysis of GDN recorded CO incidents (since 2019), highlights subtle differences in data collection across GDNs, limiting granular national assessments of CO incidents and risks.

Key Findings

- / **Certain data fields are not typically captured and not mandatory**, limiting in-depth understanding of CO incidents. Key gaps, include whether follow-up by another stakeholder is required once GDN responsibility ends; and information on the source of CO.
- / **'Battery failure & no co evident' incidents show misclassification**, as text analysis of SGN battery failure incidents found ~20.7% were end of life, ~21% low battery, and ~57.4% not qualified. More standardised classifications are needed to strengthen reporting, prevent potential misreporting, and ensure risks are identified and addressed.
- / Analysis of NGN's data shows that **'No CO evident' incidents may still involve a suspected source of CO**, even when a gas engineer detects no CO during their visit.



Recommendations for Improving Insights

Three core actions are needed to strengthen GDN data presented in CORA:

- / Improve CO data collection by gas engineers
- / Standardise critical data fields across GDNs
- / Collect additional data not currently captured by GDNs

To deliver these, a list of attributes were co-developed with the GDNs for standardisation or new collection (see adjacent table). These proposed amendments aim to close gaps in CO incident recording and maximise the impact of reducing risks associated with incomplete data. As a result of this work, a CO standardisation demonstrator with all the GDNs has been delivered (see [section 5.1.2b](#) for details).

Main	Action Required	Priority
Link reference code (or superior reference code)	New data	Medium priority
Job Qualification		
Job Outcome 1 = trigger of the Call (CO Alarm, ...)	Standardisation	Medium priority
Improve data quality for attributes used in JOC2 and reduce errors in insights and risk to customers.	Standardisation	High priority
CO reading	New field	High priority
Causalities		
Further follow-up requirement	New field	High priority
CO symptoms described	New field	High priority
Advised to seek medical assistance (y/n)	New field	Medium priority
Presence of CO alarm		
Presence of working CO Alarm: Yes / No	New field	High priority
Location of CO Alarm	New field	High priority
End of life/expiry date of CO alarm?	New field	High priority
Privately owned / Privately rented / Social Housing	New field	High priority
Distributed CO alarm		
CO Detector left?	New field	High priority
End of life/expiry date of CO alarm?	New field	High priority
Make/model of CO alarm?	New field	High priority
Why did You Leave detector? / Why did You Not Leave detector	New field	High priority
Appliances or action taken		
Appliance check (y/n)	Gas Engineer Training	
Type of appliance	Standardisation	Medium priority
State of appliance	Gas Engineer Training	High priority
Reason for appliance at risk/immediately dangerous	Gas Engineer Training	High priority
Appliance serviced / last appliance service date	New field	Medium priority
Location of appliance	New field	Medium priority
Action taken on appliance	TBC	High priority
Tenant or landlord appliance owner?	New field	Medium priority
Supply		
Supply status	Standardisation	High priority

Proposed CO work order improvements to standardise GDN data (as of September 2025)

Chapter 5: Demonstrators and Future CORA

Chapter Summary

CORA's insights have driven the design and delivery of two key demonstrators, which are already generating meaningful outcomes.

IoT demonstrators: GDNs are partnering with housing associations to trial IoT alarms in vulnerable households, enabling direct responses to CO incidents. Installations have been completed in THCH homes with Cadent, with further deployments planned across L&Q, Eden Homes and Setting the Standards, in collaboration with SGN, Cadent, NGN and the West London Alliance.

CO Incident Standardisation: GDNs are trialling improvements to CO incident data collection. Early insight shows that 68% of households visited by WWU had faulty or no alarms present.

An offshoot demonstrator, **Cadent Follow-up Calls**, found that 17.7% of households did not receive the required third-party support following job completion by a GDN, resulting in some households being left vulnerable.

The chapter concludes with recommendations to enhance CORA through improved data sharing, integration of non-CO datasets, and clearer insights.

5.1 Overview

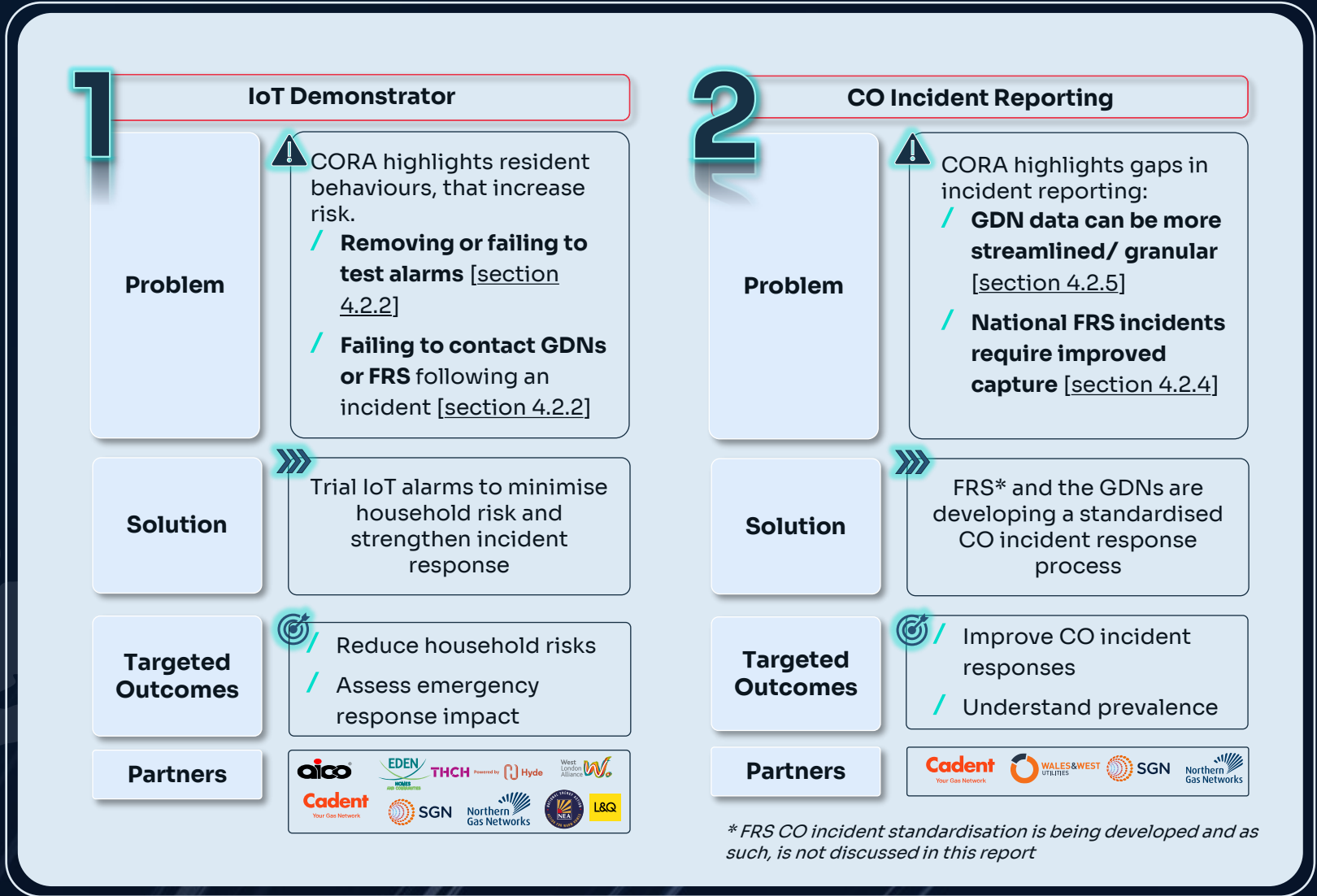
This chapter introduces the real-life demonstrators that were developed and are being delivered using key insights from CORA. It also outlines the next steps for enhancing CORA, including critical data requirements from stakeholders.

5.1.1 CORA Demonstrators

This section provides an overview of the CORA demonstrators (listed below), including their objectives, progress to date, and expected future benefits:

- / Four IoT demonstrators with housing associations and GDNs
- / CO incident reporting standardisation

In addition to these, an off-shoot demonstrator, ‘Cadent Follow-up Calls’, was also delivered.



5.1.2a IoT Demonstrator

Four IoT demonstrators, informed by the CORA insights, are being delivered with GDNs and housing associations. The THCH demonstrator is live with installations complete (insights pending); the other three are undergoing installations.

The demonstrators will address the following questions:

- / How does remote access affect emergency response efficiency?
 - / Are multiple engineers dispatched when households call alongside an IoT alert?
 - / Does remote access to IoT alerts increase GDN callouts?
- / What share of IoT alerts are confirmed as true CO events by engineers?
- / What share of households do not contact GDNs after a CO incident?

Outcomes Achieved to Date

- / 151 IoT CO alarms & 57 environmental sensors funded by Cadent, were installed in THCH homes.

~151

IoT CO alarms installed

~57

IoT environmental sensors installed

- / A feedback form was shared with recipients to capture user benefits and help assess the social value of IoT alarms.
- / Cadent's Emergency Call Centre was set up to receive direct IoT alerts, enabling timely intervention.

Expected Outcomes

- / 231 IoT alarms and sensors will be installed in L&Q and Eden Homes housing, with additional planned for low quality rental housing and temporary accommodation with Setting the Standards (a West London Alliance initiative).
- / Findings will be added in CORA, providing insights on household risks, and IoT efficiencies.

What is an IoT alarm?



AICO's IoT alarms enable remote monitoring, allowing essential services to intervene without solely relying on household action. Data from the alarms is sent to the cloud, via a device called the 'Gateway'.



Cadent IoT Trials

Three demonstrators – THCH (running), L&Q (underway), Setting the Standards (underway)

Status: Running/planning

SGN IoT Trials

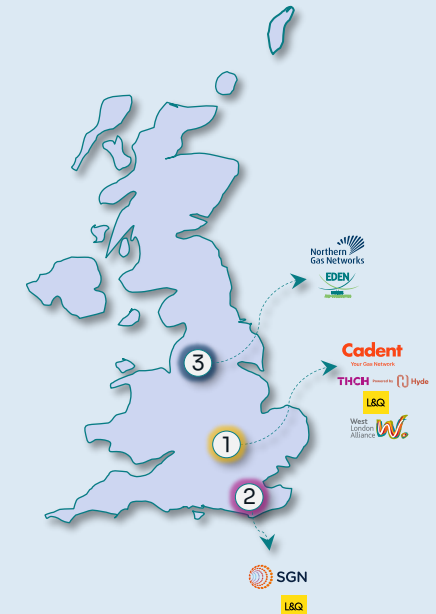
IoT to be installed in L&Q housing in Kent and other SGN areas

Status: Installations scheduled

NGN IoT Trials

IoT to be installed in Eden Homes housing (areas to be defined)

Status: Installations scheduled



5.1.2b CO Incident Reporting Demonstrator

Analysis of GDN CO incident data shows that reporting can be streamlined. This section summarises the outcomes of the GDN demonstrator that tested potential improvements to CO incident data capture.

GDN CO Incident Attribute Trial

Gas engineers across GDNs trialled the collection of new and improved, non-mandatory data fields, and the streamlining of existing data fields, to strengthen insights and reporting. The results were analysed to identify high-value attributes and those difficult to capture. The GDNs reviewed the findings and agreed the priority changes for potential BAU integration.

Outcomes Achieved to Date

- / Cadent, SGN, NGN and WWU completed attribute trials
- / NGN collected 600+ responses; WWU 1,001+ responses; Cadent 455+ responses
- / **Priority attributes are being discussed for potential BAU integration**

Cadent
Your Gas Network

- / Are referrals required to partner organisations to ensure customer is safe following completion of GDN responsibilities?
- / Appliance servicing within the last 12 months?

Trial Status: Complete

WALES & WEST UTILITIES

- / Is there a working CO alarm in the property?
- / Location of working CO alarm?
- / Expiry date of working CO alarm?
- / Reason for CO alarm being provided?

Trial Status: Complete

Northern Gas Networks

- / Appliance location
- / Appliance type
- / Appliance fuel type
- / Housing tenure type
- / Symptoms
- / PPM level
- / Source of CO reading
- / Source of CO

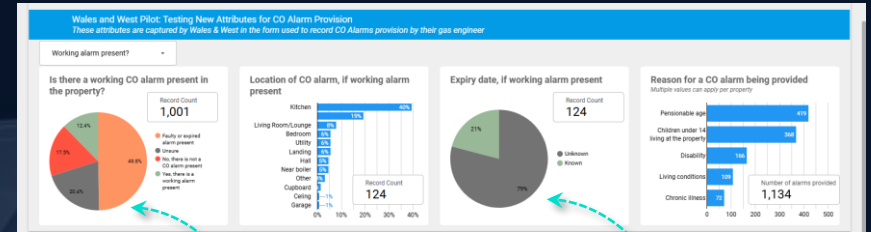
Trial Status: Complete

SGN

- / Was an alarm provided?
- / Reason for alarm being provided
- / How many alarms are required?
- / Expiry date of alarm provided?

Trial Status: Complete

Snapshot of the WWU attribute trial outcomes, provided in CORA



~%67

Of 1,001 households had a faulty alarm, or no alarm

This can inform the English Housing Standard Survey, which currently estimates alarm presence but not whether the alarm is working

~%79

Of existing alarms, an expiry date was not recorded (difficulty in capturing data)

The successful collection of this data can help GDNs/ FRS assess when a customer is likely to become vulnerable due to their alarm no longer working

CO incident trial attribute data recorded by GDNs

5.1.3 Cadent Follow-up Calls (an off-shoot demonstrator)

Analysis of CO incident data showed that it was unclear whether households were back on gas following a CO incident, where the appliance was isolated or gas supply was capped.

The Solution

To validate this problem, and capture evidence that demonstrates this gap, Cadent contacted 176 households, selected at random and had been advised to take external action following a GDN visit (96 successfully reached).

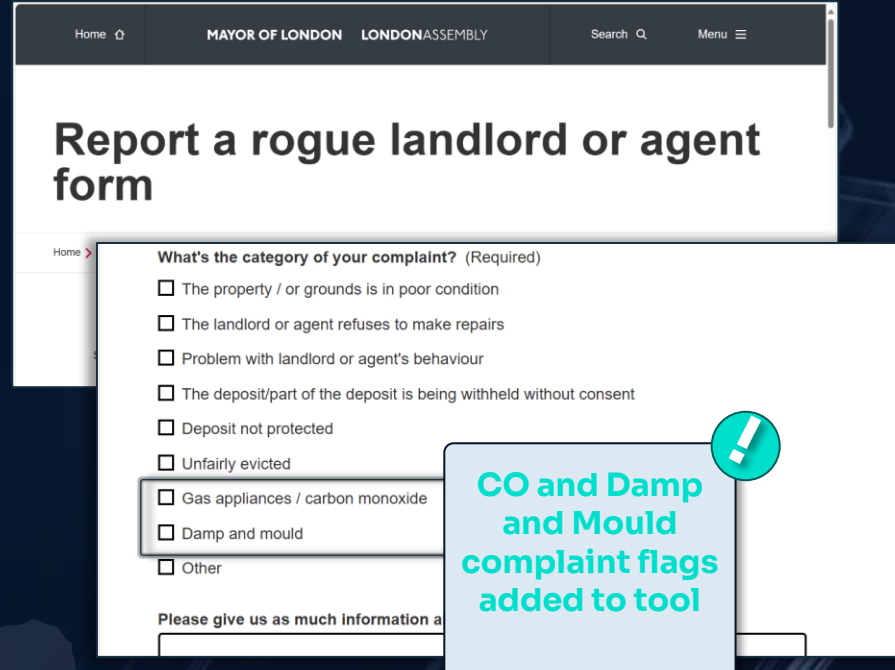
Key Outcomes

17.7% of households required further support—appliance servicing, repair, replacement or alarm provision—for up to five months after the initial emergency call, indicating ongoing risk. **Most were tenants** (~59% private rented; ~24% social housing) and were **not eligible for GDN-funded services**.



Snapshot of the Cadent Follow-up Calls dashboard in CORA

- / Cadent filed 8 complaints via the Greater London Authority (GLA) landlord tool, however no status updates were received, so tenant risk remained unclear. **In the interim, Cadent supported cases that would not normally be eligible – one owner occupier and four tenanted properties**– with either a new appliance or a CO alarm.
- / Following engagement with the GLA, the reporting tool has been updated to include a specific CO flag (to support sharing of CO complaint data) and a damp and mould flag.
- / Cadent trialled the collection of a new data attribute, to flag incidents requiring external intervention (e.g., Environmental Health Officers for rented properties) after a gas emergency service visit. This aims to improve stakeholder communication and help ensure landlords meet their duties. A feedback process will be developed with partner organisations to confirm tenant support.



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Report a rogue landlord or agent form

Home ➤

What's the category of your complaint? (Required)

- The property / or grounds is in poor condition
- The landlord or agent refuses to make repairs
- Problem with landlord or agent's behaviour
- The deposit/part of the deposit is being withheld without consent
- Deposit not protected
- Unfairly evicted
- Gas appliances / carbon monoxide
- Damp and mould
- Other

Please give us as much information as you can

CO and Damp and Mould complaint flags added to tool

Snapshot of the GLA Landlord Tool with new amendments

Critical Next Steps

The trial confirmed that households not eligible for further GDN services (e.g., renters) may remain at risk after a CO incident, highlighting gaps in tenant protection. Two key issues were identified:

- / Current tenant support processes lack clarity, and stronger communication between stakeholders is critical.
- / Accessing the status of landlord complaints submitted via the GLA tool is difficult, as such, data sharing between local authorities and GDNs is recommended to ensure tenants are not left vulnerable.



In the long-term, it is not viable for GDNs to follow-up with every household advised to seek external support. **A potential solution is to link the GLA Landlord Tool with GDNs, so resolution updates on GDN complaints can be shared.**



To ensure tenant safety, automatic resolution updates from the GLA Landlord Tool should be sent to GDNs.

5.2 Summary of CORA Benefits & Next Steps

The following table outlines an initial view of the added value of CORA, through the provision of new data and generation of critical insights. The table also shows the next steps required to improve the data and insights.

Baseline	Cora Added Value via New Data 	Critical Next Steps 
Official CO poisoning figures have barely changed for 15+ years (ref. Cross Government Group on gas safety and CO)	<ul style="list-style-type: none"> / Total number of CO incidents reported by FRS and GDNs (outside of healthcare records) / Injuries and deaths from Riddor reports (reported by GDNs) / Insights on symptoms and CO exposure levels 	<ul style="list-style-type: none"> / Analyse incidents and Riddor reports to compare against published injuries / Utilise EDCO study to develop estimates and understand gaps in evidence / Onboard further data on incidents / New data collection by GDN on CO exposure (e.g., symptoms) / Analyse FRS data for non gas CO incidents
No publicly shared data on risky household behaviours	<ul style="list-style-type: none"> / IoT insights on alarm head removals and testing / Insights on incidents where GDN nor FRS are contacted / Insights on households with more than one incident 	Further analysis and onboarding data from demonstrators
No data on landlords breaching duties	Data on landlords leaving households at risk	New data collection by GDN to flag onward stakeholder support
No evidence to understand various meanings for a false alarm incident	/ Insights on reasons behind the recording of 'battery failure' or 'false alarm' incidents in emergency response data	New data collection by GDN to improve insights and analysis
No public facing data on CO incident locations	<ul style="list-style-type: none"> / Mapping of CO incidents by locality, rates per 1000 inhabitants and rates per 1000 accommodation / Rooms with highest number of CO incidents and highest levels (ppm) / Incidents by housing tenure 	Mapping all GDNs to better understand CO incident distribution
No forecasting CO incidents data	<i>No data in CORA yet</i>	Initial forecasting scenarios to be developed for future modelling in CORA

 **New data within CORA provides CO stakeholders with novel insights derived from real-world figures.**

5.3 Critical Data Requirements and Recommendations

Several actions can be taken by current and prospective users of CORA to strengthen the accuracy and long-term value of the platform. These are listed below, and summarised in the adjacent figure:

/ Identify and share key questions that CORA should answer: Without understanding what insights stakeholders seek, CORA cannot be tailored to specific stakeholder priorities. For instance, the gas industry and government may want to know *‘How many CO incidents are responded to by GDNs and FRS, that involve unregistered engineers?’*

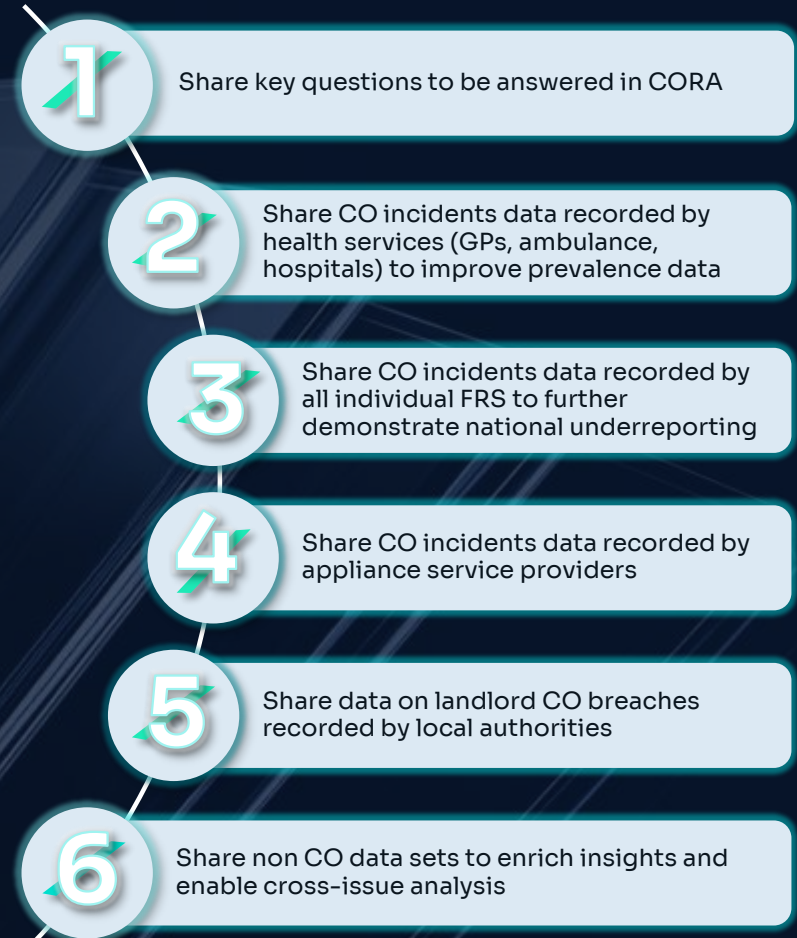
/ Share stakeholder data to close critical gaps:

- **CO incidents in health services (ambulance, GPs)** to build a clearer picture of prevalence
- **Individual FRS CO incidents** to better understand national underreporting

- **CO incidents recorded by appliance service providers** to capture incidents beyond GDN responsibility
- **CO breaches by landlords (as recorded by local authorities)** to confirm tenant safety where GDN responsibility ends

/ Share relevant non-CO datasets to enrich insights and enable cross-issue analysis. Data such as EPC ratings, damp and mould reports, and property condition records can create bespoke dashboards, and help stakeholders explore how CO risks intersect with wider household safety and vulnerability issues.

Stakeholders can also support CORA’s ongoing development as the single platform delivering actionable intelligence on CO (and other metrics) by sharing data and feedback for insight development.



Priority data recommended for sharing by stakeholders



Help us improve CORA, by sharing critical data, and feedback (via this short online [form](#)).

Thank you

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