

# Appendix 07.03.10 Carbon Monoxide (CO) awareness

**This output case describes our overall approach to reducing the potential harm to customers from Carbon Monoxide (CO) through a customer awareness programme, alarm distribution and additional work beyond the meter to repair or replace faulty appliances following a CO incident.**

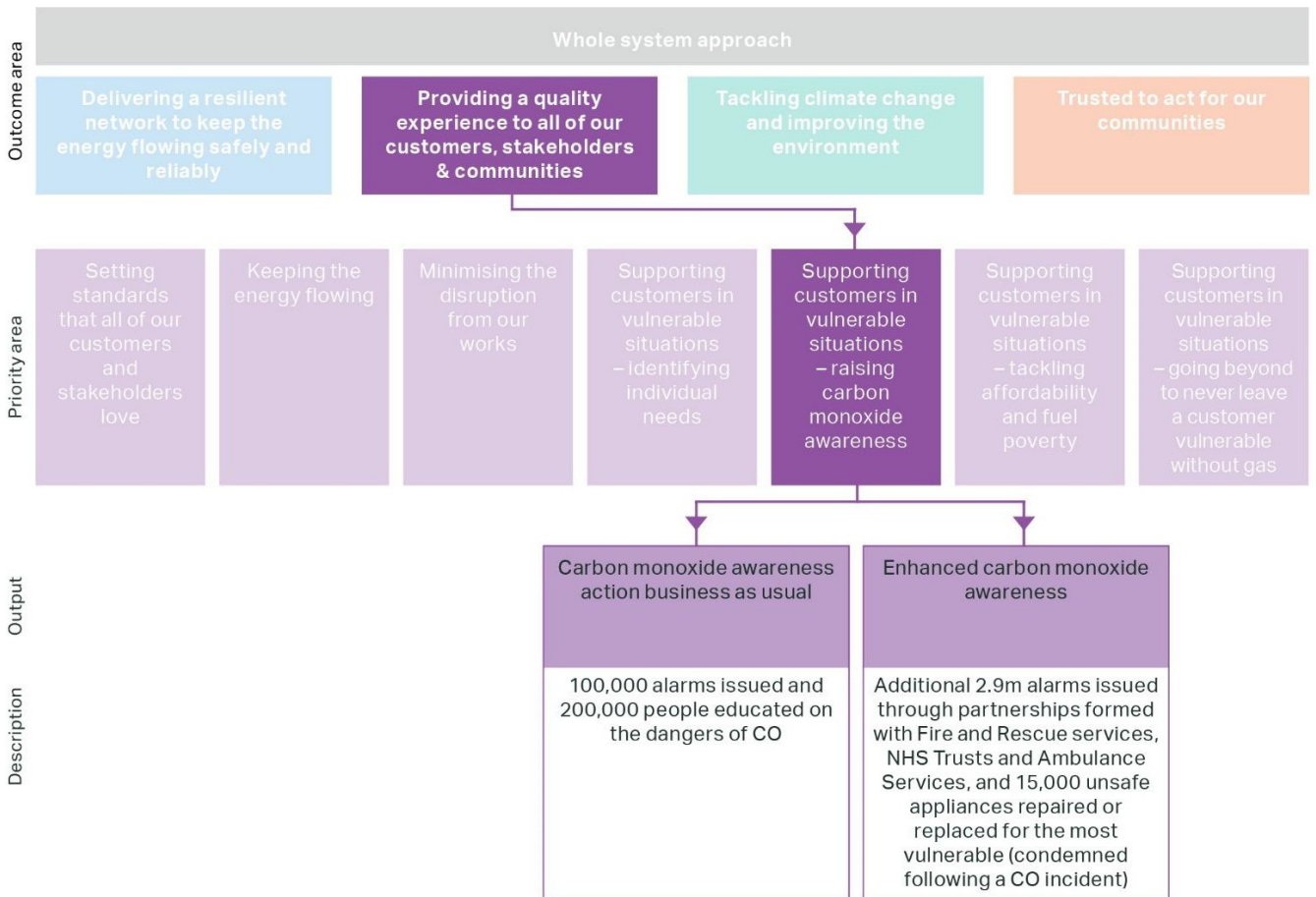
**In RIIO-1 we held ourselves to account for the following reputational commitments for CO awareness:**

- Deliver 2.1m CO service contacts (via CO incident visits and CO awareness surveys).
- Distribution of 105,000 CO alarms.

**During RIIO-2 we will continue our work to raise the awareness of the dangers of CO and want to stretch ourselves by delivering the following commitments based on customer and stakeholder feedback:**

- Distribute 3 million CO alarms to customers who do not have one, predominantly through strategic partnerships which we will form to increase our reach.
- Educate 200,000 customers of the potential risks associated with CO through face-to-face, classroom based educational sessions, building on the strong foundations we have set in RIIO-1.
- Repair or replace 15,000 faulty appliances that we identify when responding to a CO emergency job. We will train our engineers to be able to identify potential vulnerability, which could be that the customer is living in fuel poverty, so that they can refer certain cases to a strategic partner. This partner that we appoint will have the ability to assess the customer's eligibility for a repair/replacement based on those who could not otherwise easily arrange or pay for the repair/replacement. This partner will then arrange for a qualified gas fitter and any materials to enable the repair/replacement to be made.

**We will deliver:**



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## How we have developed our proposals

- We started with the aim of our customer vulnerability strategy** – We aim to keep our customers warm, independent and safe in their homes. Therefore, it is important that we continue to raise awareness of the dangers of Carbon Monoxide (CO) poisoning and intervene to prevent harm from this colourless, odourless toxic gas that can escape from poorly maintained flues and appliances.
- We reviewed how we currently measure the delivery of our CO awareness activities** – We currently aim to reach those customers who are most vulnerable by carrying out an awareness survey and issuing an alarm, but this does not capture the full extent of our CO awareness work.
- We understand the scale of the problem** – Around 50 people die every year from CO poisoning, 4,000 people go to Accident and Emergency and 200 are hospitalised. We believe this is just the tip of the iceberg and have mapped the hotspots across our footprint so that we understand the areas at greatest risk of CO poisoning.
- This provided us with a clear problem statement** – CO is the ‘Silent Killer’ that continues to put families at risk. We want to do more, working with our partners, to help educate customers on the dangers of CO and help to keep our customers and the public safe.
- We have applied our own lessons learnt from RIIO-1** – It is not just those who are most vulnerable who are at risk from CO poisoning. We must continue to innovate to deliver solutions to help reach all customer groups and provide them with the knowledge they need to protect themselves from the dangers of CO.
- We gathered insights from targeted engagement** – There is low awareness of the dangers of CO across the customer groups surveyed. However, during engagement they prioritise CO awareness and believe that Cadent should build on the positive work already done to reach wider audiences.
- We have looked at what others are doing to achieve this challenge** – We have taken learning from the Fire and Rescue Service targeting reduction in smoke/fire related deaths. GDNs are following Cadent’s lead in rolling out successful CO education programmes such as Safety Seymour in schools.
- We assessed how far the current measures and Ofgem’s proposed measures take us against the good practice identified** – The current CO regulatory measures are narrow and only allow for limited customer groups to be reached. We want new measures to provide the flexibility for us to reach wider audiences and satisfy the needs of our customers and stakeholders.
- We have developed and considered a number of options** - Based on these insights and best practice, we have developed five options: (1) continuing with the existing Ofgem CO requirements, (2) locating the source of CO, and, where possible, isolating the appliance, (3) repairing or replacing the CO emitting appliance, (4) providing alarms to any customer on an emergency visit who requires one, or (5) all options combined.
- We tested these options with our customers** – Given the overwhelming support from across our customer and stakeholder community, we will continue our work to keep customers and the public safe from the dangers of CO and increase the scale of our work to satisfy customer needs.
- Our commitments** - We are proposing a common output commitment across GDNs that will see us continue to educate and issue alarms to the most vulnerable. To reflect the desires of our customers and stakeholders, we also want to introduce a bespoke measure that would see us issue a further 2.9m alarms, create further partnerships with NHS Trusts and Ambulance Services and widen our existing

- partnerships with the Fire and Rescue Services. We also want to offer an appliance repair or replacement service to customers who are most vulnerable.
12. **We are seeking £34.1m in funding to deliver this** – However, we calculate a net benefit of £22.5m in delivering these commitments.
  13. **We have already started delivering** - We have strong partnerships in place with the Fire and Rescue Service and have begun reaching out to NHS Trusts and Ambulance services. This will provide us with the platform to reach more customers than ever before in RIIO-2.
  14. **What will the future look like after we embed our RIIO-2 commitments?** – Our approach in RIIO-2 will significantly reduce the prospects of people being harmed by Carbon Monoxide and sets in train the removal of incorrect diagnosis of symptoms. By the end of RIIO-3 we envisage that every home in our footprint will have a lifesaving CO alarm installed and no one is being harmed by Carbon Monoxide in their home. We have legislation supporting the installation of alarms in all rented accommodation and all new builds.

The tables below summarise our commitments in this area:

*Table 1 Summary of our commitments*

CO education	
<b>Common / Bespoke</b>	Common
<b>Output type</b>	Price Control Deliverable
<b>Comment</b>	Directly educating school children about the dangers, signs, and symptoms of CO poisoning
<b>Target</b>	Educating 200,000 of the dangers of carbon monoxide over RIIO-2
<b>Cost implications (annual)</b>	£0.42m
<b>Incentive range</b>	N/A
<b>CVP</b>	-£0.9m, but positive over RIIO-3

Carbon monoxide alarms (base level)	
<b>Common / Bespoke</b>	Common
<b>Output type</b>	Reputational
<b>Comment</b>	Alarm provision to customers at risk
<b>Target</b>	100,000 alarms issued over RIIO-2
<b>Cost implications (annual)</b>	£0.16m
<b>Incentive range</b>	N/A
<b>CVP</b>	N/A

<b>Carbon monoxide alarms (incremental)</b>	
<b>Common / Bespoke</b>	Bespoke
<b>Output type</b>	Price Control Deliverable
<b>Comment</b>	Additional alarms issued, through effective partnerships, to all customers who don't own one
<b>Target</b>	2,900,000 alarms issued over RIIO-2
<b>Cost implications (annual)</b>	£4.44m
<b>Incentive range</b>	N/A
<b>CVP</b>	-£5m, but positive over RIIO-3

<b>CO partnerships</b>	
<b>Common / Bespoke</b>	Bespoke
<b>Output type</b>	Price Control Deliverable
<b>Comment</b>	Partnerships with all F&RS, NHS trusts, and ambulance services on our footprint
<b>Target</b>	100% partnerships with all F&RS, NHS trusts, and ambulance services by the end of RIIO-2
<b>Cost implications (annual)</b>	£0.08m
<b>Incentive range</b>	N/A
<b>CVP</b>	CVP combined with CO alarms

<b>Repair or replace appliances following CO visit</b>	
<b>Common / Bespoke</b>	Bespoke
<b>Output type</b>	Price Control Deliverable
<b>Comment</b>	Working with experts to offer customers in vulnerable situations (CIVS) appliance repair or replacement if it is condemned during a CO visit
<b>Target</b>	15,000 unsafe appliances repaired or replaced over RIIO-2
<b>Cost implications (annual)</b>	£1.72m
<b>Incentive range</b>	N/A
<b>CVP</b>	£28.5m

## 1. Defining our customers' needs



### 1.1. What is the area?

Our customer vulnerability strategy has been established with the aim to keep all our customers warm, independent and safe in their homes. It is important to keep customers safe from the dangers of Carbon Monoxide (CO) poisoning by raising awareness and increasing knowledge through education, providing CO alarms and offering additional services for those who are at most risk.

Carbon monoxide is a colourless, odourless, tasteless, poisonous gas produced by the incomplete burning of carbon-based fuels, including gas, oil, wood and coal, commonly referred to as 'The Silent Killer'. Carbon-based fuels are usually safe to use; however, when the fuel does not burn correctly, excess CO is produced, which is poisonous. When CO enters the body, it prevents blood from bringing oxygen to cells, tissues, the brain and other organs.

Around 50 people die every year from CO poisoning caused by gas, oil and solid fuel appliances (such as BBQs) and flues that have not been properly installed or maintained or that are poorly ventilated. Around 4000 people go to their GPs or Accident and Emergency, and 200 are hospitalised.

Gas networks and the wider industry has made significant progress in raising awareness of the dangers of CO and providing safeguarding services to the most vulnerable, including the provision of CO alarms. This has supported the downward trend in CO related fatalities over the years. However, there continues to be health related issues due to low CO alarm ownership and low awareness and knowledge about the dangers associated with CO.

Figure 1 Natural Gas CO fatalities in the UK

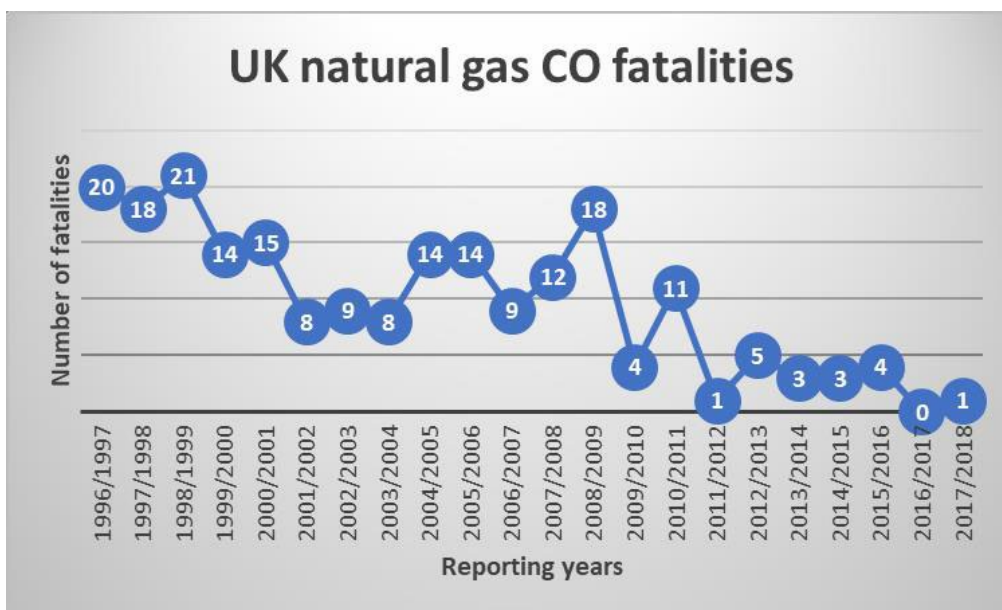


Figure 2 UK CO fatalities (all fuel types)

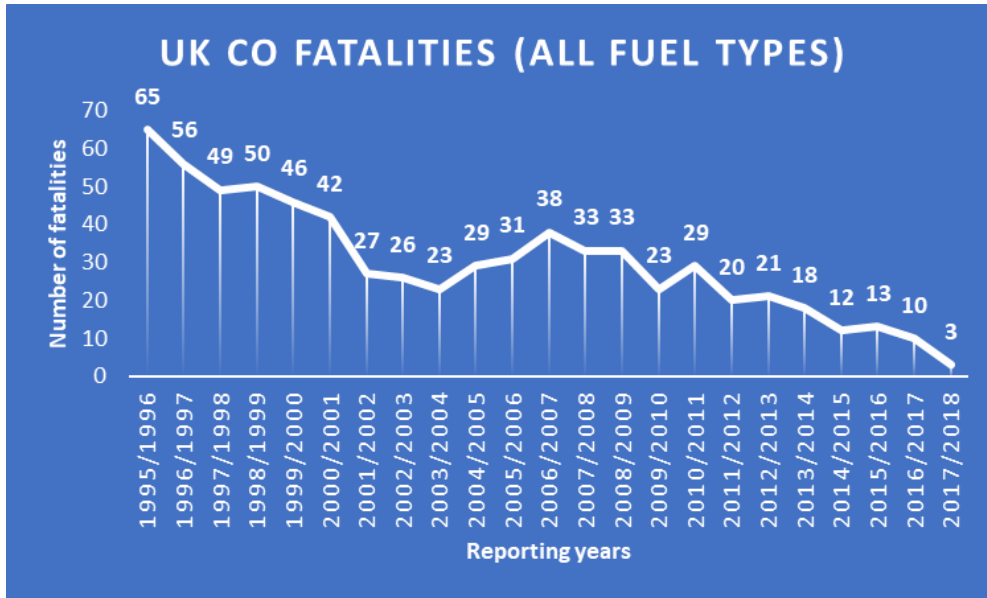
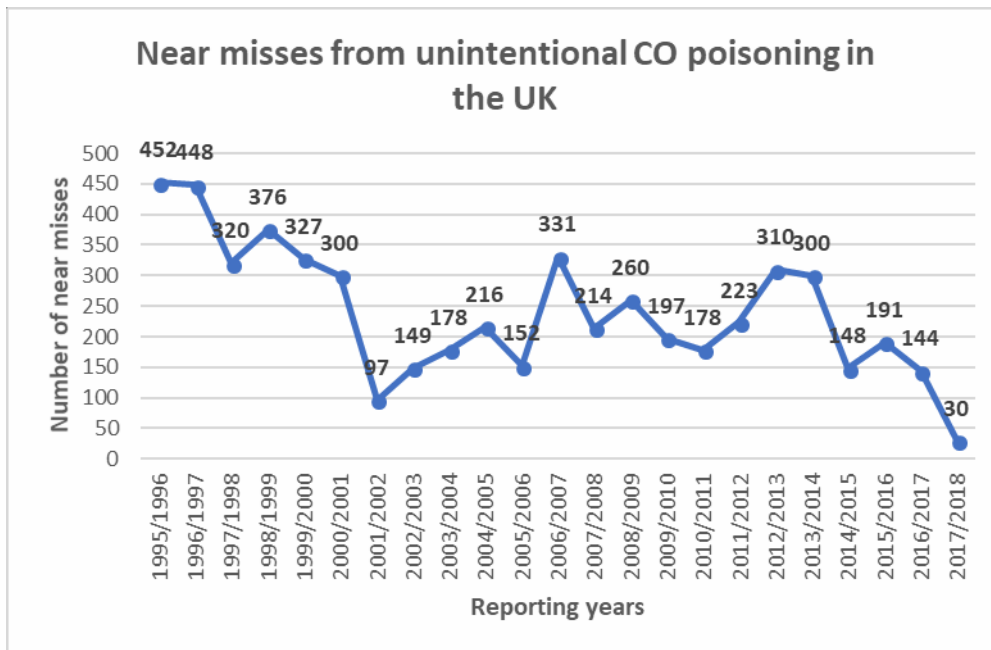


Figure 3 Near misses from unintentional CO poisoning in the UK



All data sourced from [CO-gassafety.co.uk](http://CO-gassafety.co.uk)

Of the 5,541 near-misses from unintentional CO poisoning in the UK (from 1995 to 2018), more than 2,350 required hospital treatment and over 450 had lost consciousness.

### 1.2. Why is it important to customers and stakeholders?

Our customers prioritise safety above all other priorities and have highlighted the importance of safeguarding the most vulnerable in society. CO safety is a core part of our expertise and customers expect us to continue to respond to CO related emergency incidents and raise awareness of the associated dangers through education in addition to the provision of CO alarms.

Research from Energy UK's 'CO Be Alarmed!' campaign reveals that one in three Britons (over 17 million people) are at risk from CO poisoning as they do not have a CO alarm in their home – despite nine in ten (94%) saying they are aware of the risk. Although this survey suggests awareness of CO is high, the evidence from our surveys on the ground during RIIO-1 suggests that knowledge is low. Cadent CO survey data from 5010 respondents rated their knowledge as 5.07/10 on average. The key difference between awareness and knowledge is that the latter allows the individual to identify the signs of CO and take the required action. The research also reveals that people in Liverpool are most at risk, with almost half (47%) saying that they did not have a CO alarm. Norwich and Manchester are also among the top ten cities most at risk, with over 40% saying they do not have a CO alarm.

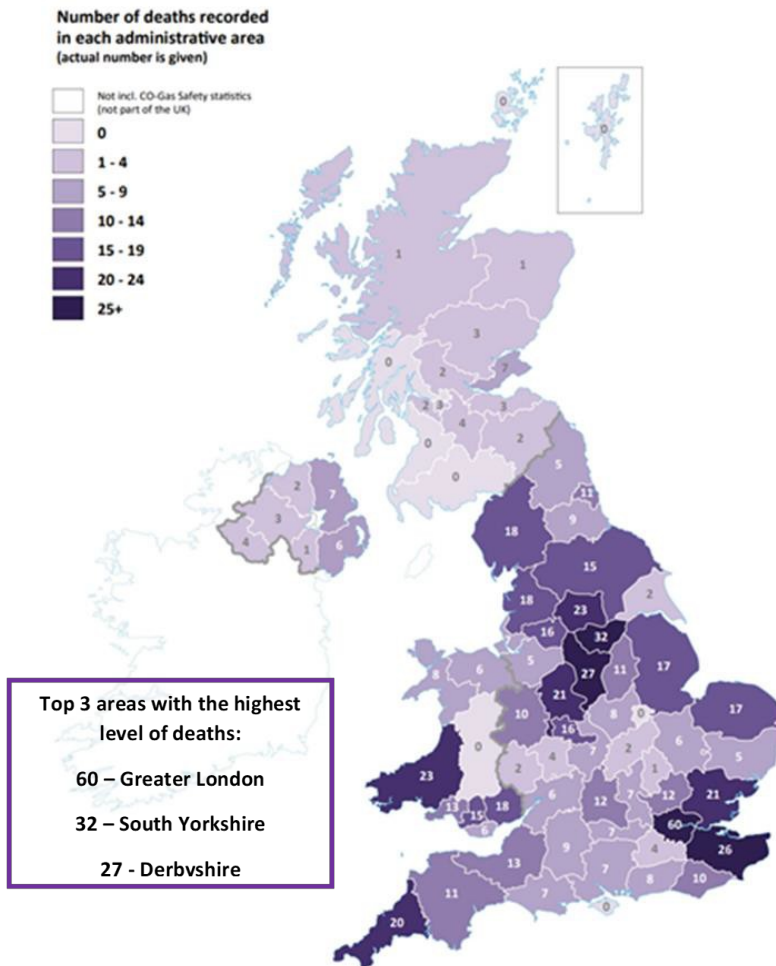
*Table 2 Energy UK's 'CO Be Alarmed' data on cities most at risk from CO poisoning*

<b>Top 10 cities most at risk from CO poisoning</b>	<b>Percentage of people saying they did not have a CO alarm</b>
<b>Liverpool</b>	47%
<b>Norwich</b>	44%
<b>Manchester</b>	42%
Leeds	42%
<b>Nottingham</b>	39%
Belfast	39%
Plymouth	38%
<b>Birmingham</b>	37%
Newcastle	36%
Bristol	35%



Figure 4 UK deaths from unintentional CO poisoning

**LOCATION OF INCIDENT** relating to UK deaths from unintentional carbon monoxide poisoning from 01.09.1995 to 31.08.2018



Four out of the top five cities most at risk from CO poisoning are in Cadent's footprint (highlighted in the table 2), which equates to around 7.26m homes. These statistics sit alongside the location of incidents relating to UK deaths from unintentional CO poisoning from 1995 to 2018 (see figure 4 from CO-Gas Safety). The top three areas with the highest level of deaths are all within Cadent's networks. This reinforces the need for Cadent to lead the national debate on CO safety and to continue promoting awareness.

**1.3. What insights are shaping our thinking?**

**Sources of insight**

 <b>12,607</b> Stakeholders and customers engaged	 <b>27</b> Sources of insight	 <b>25</b> Tailored RIIO-2 engagement activities
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We engaged with the following customers and stakeholders across a range of methods about their viewpoints on how we currently keep customers safe from the dangers of CO and what we should deliver through the RIIO-2 period.

*Table 3 Customers and stakeholders engaged*

Customers	Partners
<ul style="list-style-type: none"> <li>• Domestic customers</li> <li>• CIVS</li> <li>• Small businesses</li> <li>• Future customers</li> <li>• Fuel Poor customers</li> <li>• English as a second language customers</li> <li>• Non-English-speaking customers</li> <li>• Employees</li> </ul>	<ul style="list-style-type: none"> <li>• Fire and Rescue Service</li> <li>• Local Authorities and Councils</li> <li>• Referral partners including Social Services</li> <li>• GP surgeries</li> <li>• Schools</li> <li>• Fun Kids Radio</li> </ul>
Industry and influencers	Charities and Expert Stakeholders
<ul style="list-style-type: none"> <li>• Gas Distribution Networks</li> <li>• All Party Parliamentary CO Group</li> <li>• Ofgem</li> <li>• Energy UK</li> <li>• Policy Connect</li> <li>• Coventry University</li> <li>• Members of the public</li> </ul>	<ul style="list-style-type: none"> <li>• National Energy Action</li> <li>• CO Gas Safety</li> <li>• Katie Haines Trust</li> <li>• Dominic Rodgers Trust</li> <li>• Sustainability First</li> <li>• Citizens Advice</li> <li>• Disabled Living</li> <li>• Age UK</li> <li>• Hackney Playbus</li> <li>• Alzheimer's UK</li> <li>• Part-sight</li> <li>• Sense</li> <li>• Royal Association for Deaf</li> <li>• Islington Chinese Association</li> </ul>

Insights were gathered through historical engagement, BAU insights, and our RIIO-2 engagement programme. We have summarised each activity, the questions asked (where applicable), the numbers involved, and a robustness score based on the following criteria:

Criteria	Robustness		Relevance
The score shown is based on a combination of the robustness of the source information (judged on whether it was recent, direct and representative) and the relevance to this area.	<1.5	One or zero criteria met	Limited relevance
	1.5-2.0	Two criteria met	Significantly relevant and contributory
	>2.0	All criteria met	Highly relevant and contributory

Table 4 Engagement activities

Phase	Date	Source name	Source description	Questions asked	# of stakeholders	Score
Historical Engagement	2018	London Collaboration forum - SGN & National Grid	We held a workshop with stakeholders in our London Network, including other utilities, charities, Local Authorities and Emergency Services. The purpose was to share the work we are doing on street works and customers and community and take feedback from stakeholders.	Attendees were shown our plans for street works such as no-dig techniques and asked to discuss the outcomes we should try to deliver. Following this, they were introduced to our plans for supporting those who need help the most and those in fuel poverty and asked to comment.	47	0.5
	May-19	Research by Balisha Attalia, Coventry University	A Coventry University student performed some primary research, aimed at 18 - 24 year olds, to explore services that Cadent could provide to customers both in the home and the community and services that would attract 18-24 year olds.	Participants were asked if they knew what proportion of their gas bill went towards the provision of Cadent's services. Participants were also told of additional services that Cadent provides such as carbon monoxide alarms and other support for vulnerable customers and asked how important they felt they were an whether Cadent was the appropriate organisation to provide them. Finally, participants were asked if there were any other free services that they would like Cadent to provide to customers in the home and community.	75	1.0
Discovery	Nov-17	2017 regional stakeholder workshops	We held four workshops in different regions to seek feedback from key stakeholders on the early development of our business plan. Each workshop began with a short presentation, followed by roundtable discussions. Electronic voting was also used to ask stakeholders about preferred options.	The workshops explored a number of topics, including safeguarding (e.g. PSR awareness, partnerships and innovation opportunities); the future role of gas and the decarbonisation of home heating. Cadent's general approach to its business plan was also discussed, for example the importance and coverage of the four outcome areas identified, the extent to which the plan should respond to the needs of specific customer groups or regions.	127	2.5

<b>Discovery</b>	Jun-18	Feedback on Cadent CO awareness - Safety Seymour questionnaire and feedback from Derbyshire Fire & Rescue (memory diaries)	We developed an activity pack for young children to provide information about the dangers of carbon monoxide and what safety precautions families can take. 496 parents of children that had used the Safety Seymour activity pack were surveyed about their experience with the pack and whether it had changed their knowledge or behaviours. The feedback received was very positive, with many families taking further safety precautions as a result.	The parents were asked for their family's thoughts about the activity pack: whether it was clear, understandable and useful; whether the programme had encouraged them to take further safety precautions at home; and whether the child had enjoyed and engaged in the activities. Suggestions for improvements were sought as well as specific feedback on the Safety Seymour character.	496	1.5
	Sep-18	Deliberative workshops	We delivered full day deliberative workshops in each of our regions to discuss what services customers find important, find our customer expectations of GDNs and gather feedback on our (at the time) four draft customer outcomes. The sessions began with information-giving and building knowledge of Cadent, then eliciting participants' views of services and priorities.	Participants were asked about their awareness of Cadent and expectations of a GDN. Participants were also asked for their views on the four draft outcomes in Cadent's business plan: keeping your energy flowing safely, reliably and hassle free; protecting the environment and creating a sustainable energy future; working for you and your community safeguarding those that need it most; value for money and customer satisfaction at the heart of all our services. The aim of the discussions was to shape these draft outcomes and identify any gaps.	206	2.5
	Oct-18	Domestic survey	We ran an online survey of a representative sample of our domestic customers (and non-customers). This aimed to test the findings of the earlier deliberative workshops and focus groups.	Participants were asked closed questions on 14 topics we could cover in the business plan (e.g. minimising leaks, affordability) and asked to rate how important they are. They were then asked more open questions about the level of importance and whether anything was missing from the list of 14. Finally, they were asked a multiple-choice question on their preferred engagement methods for the future.	2,332	2.5

<b>Discovery</b>	Oct-18	Focus groups with hard to reach groups	We held focus groups with individuals considered 'hard to reach' in each of our regions. Each group contained 8-10 participants and lasted two hours. Participants covered three groups: urban customers with English as a Second Language, Future Generations and Non-Customers (predominantly from rural areas). These built on our previous deliberative workshops, whose voices could otherwise become 'lost within the crowd'.	Participants were asked what they expected of Cadent. The four draft outcomes for the business plan were shared with participants and they were asked for their views on these, what they wanted to see from Cadent and whether there were additional outcomes that Cadent should include.	57	2.5
	Feb-19	ENA and Accent RIIO-2 stakeholder engagement (decarbonisation)	A broad range of stakeholders from across the country, across different areas of the sector and representing a range of organisations were brought together by all GDNs to understand their views of how the gas networks should individually and collectively support the decarbonisation of heat through their RIIO-2 business planning. Most stakeholders preferred taking a broad definition of 'whole systems' and wanted future-proofed assets and decision-making with the longer-term end goal in mind. But they emphasised the need for urgency in putting the stepping stones in place to reach decarbonisation targets.	Stakeholders were asked what a whole energy system approach should look like, and what gas network RIIO-2 business plans should focus on in the context of decarbonising the gas system. The impact on CIVS, collaboration between gas networks and the funding of, and barriers to, decarbonisation were also discussed.	37	1.5

Discovery	May-19	WWU regional community workshops	Wales & West Utilities (WWU) hosted a series of regional workshops to seek feedback from stakeholders on its current and future business activities. These deliberative workshops explored: stakeholder priorities, value for money, mains replacement and the theft of gas, future energy solutions and social obligations.	These deliberative workshops explored: stakeholder priorities, value for money, mains replacement and the theft of gas, future energy solutions and social obligations.	52	1.0
	May-19	RIO-2 employee engagement, May 2019	We engaged with 783 of our employees through a survey to test the latest RIO-2 business plan proposals to ensure that the plan was robust, fit for purpose and accurately represented what our customers want from us. Employees were asked for their views both as customers and as subject matter experts. Participants were asked for their priorities from their perspective as customers. Then, as subject matter experts, they were asked to rate, and provide their views, on different service offerings (Customer Contact, Emergency Response and Repair, Domestic Connections, Commercial Connections and Mains Replacement).	Employees were asked for their views both as customers and as subject matter experts. Participants were asked for their priorities from their perspective as customers. Then, as subject matter experts, they were asked to rate, and provide their views, on different service offerings (Customer Contact, Emergency Response and Repair, Domestic Connections, Commercial Connections and Mains Replacement).	783	1.0
Targeted	Feb-19	Cadent Customer Forum (February 2019) Safeguarding	The first round of customer forums was held at three locations (London, Manchester, Birmingham) involving 96 customers. The forums are designed to be ongoing conversations with customers, with engaged discussions around the role of Cadent within society. The first customer forum focused on safeguarding and supporting CIVS to inform these sections of the RIO-2 business plan. Within these themes we explored customer expectations and priorities.	Customers were asked what they expected from Cadent in relation to safeguarding, how Cadent should help CIVS. The forums also sought to explore customer priorities for safeguarding and the reasons for that prioritisation.	96	2.5

<b>Targeted</b>	Mar-19	Cadent Customer Forum (March 2019) Carbon Monoxide and Fuel Poverty	The second round of customer forums was held at four locations (Ipswich, London, Manchester, Birmingham) involving 110 customers. The forums are designed to be ongoing conversations with customers, with engaged discussions around the role of Cadent within society. The second customer forum focused on fuel poverty and carbon monoxide safety to inform these sections of the RIIO-2 business plan. Within these themes, we investigated customer expectations and appetite. Overall, customers did not automatically think that addressing fuel poverty and CO is Cadent's responsibility, nonetheless, the majority supported the highest level of Cadent investment.	Customers were asked how Cadent fitted into the picture of cause and responsibility with respect to CO and fuel poverty. They were encouraged to consider Cadent's responsibility for safeguarding and its responsibility as a private, regional monopoly. Participants were presented with four or five (costed / quantified) options for actions that Cadent could take to address CO / fuel poverty and voted and provided the reasons for their choice. This was followed by a group discussion where additional options could be suggested.	110	3.0
	Jun-19	CIVS, Phase 2	We commissioned Traverse to engage with 37 CIVS and professionals working with such customers to understand their needs and preferences to support our business planning process. The overarching key finding was that CIVS are individuals and, as such, have individual needs and preferences and should be approached on a need's basis.	The interviews sought to understand the needs and expectations of Cadent to safeguard CIVS and accommodate their circumstances. Topics covered included identification, the PSR, partnerships, alternative cooking and heating solutions during interruptions, safety in the home, tailored services, engagement and communication.	37	3.0

<b>Business Options Testing</b>	Jun-19	Cadent customer forum, round 4, Traverse	<p>We held our fourth customer forum in Ipswich, London, Birmingham and Manchester to get customers' views on their priorities on a range of issues. This cross section of customers discussed with us various options (some proposed by us, some suggested by them) in a deliberative style session. Key topics discussed included: customer service, replacing pipes, reinstatement, interruptions, fuel poverty, carbon monoxide, decarbonising energy and becoming carbon neutral.</p>	<p>Participants were asked questions about a range of topics. On customer service, we explored what "great" looks like. We also asked about timeliness and communication with respect to reinstatements. We also tried to understand the level and type of service customers want during an unplanned interruption, including views on provisions, length of time without gas, and timeslots for getting the gas turned back on. We also asked for views on our options for addressing fuel poverty and carbon monoxide.</p>	200	3.0
	Aug-19	Workshops with ESL and non-English speakers, Traverse	<p>We commissioned Traverse to hold three workshops with ESL and non-English speaking customers: 22 Polish-speaking participants with English as a second language and 9 Bengali speaking participants. During this session we asked customers to tell us what role they thought that we should play in relation to carbon monoxide safety, provisions during an interruption and responding to climate change. They agreed that communication was critical with respect to interruptions. For provisions, all agreed oil filled radiators were important, but there were interesting differences too: the Bengali group prioritised hot meal vouchers &amp; kettles, both given low priority by the Polish group which favoured shower access &amp; hot plates. They confirmed that they believed, we as other big businesses should be acting responsibly and seeking to reduce our carbon footprint. The specific intention of this session was to ascertain the views of a different (typically hard to reach) group of customers to check if their views were consistent with other customer segments.</p>	<p>Customers were asked about their priorities. We also sought to understand their views on our business options in relation to carbon monoxide, provisions during interruptions, and decarbonisation.</p>	31	2.5



<b>Business Options Testing</b>	Aug-19	Workshops with customers in fuel poverty, Traverse	<p>We commissioned Traverse to engage with 83 customers in fuel poverty at deliberative workshops in Wolverhampton and Peterborough to understand their views on options for our business plan in relation to a number of areas of relevance to customers in fuel poverty or vulnerable situations. The option with the highest delivery targets (option 3) was chosen for each of CO awareness &amp; action, priority safety checks and fuel poor solutions (including income &amp; energy advice). The specific intention of this session was to ascertain the views of a different (typically hard to reach) group of customers to check if their views were consistent with other customer segments.</p>	<p>Customers were asked about their priorities. We also sought to understand their views on our business options in relation to carbon monoxide, proactive safety checks, addressing fuel poverty, PSR awareness, the length of, and provisions during interruptions.</p>	85	2.5
	Aug-19	Domestic and business surveys, quantitative phase, Traverse	<p>We commissioned Traverse to conduct a survey of more than 2000 domestic customers and more than 500 business customers to understand preferences between the different business options under consideration across 14 different service areas. The options presented combined service provisions e.g. educate 50,000 customers most at risk of CO poisoning and a monetary impact on the customer's annual bill. Across both the domestic and business surveys, the highest weighted average scores, supporting the options with the highest target delivery levels, were achieved in areas relating to safety and protection of vulnerable customers: responding to carbon monoxide incidents, repairing and replacing faulty appliances, helping vulnerable customers without gas and carbon monoxide safety.</p>	<p>Domestic and business customers were asked their preferred options (with varying target delivery levels/ cost) for 14 commitments:</p> <ol style="list-style-type: none"> <li>1. Carbon Monoxide Safety</li> <li>2. Responding to Carbon Monoxide incidents</li> <li>3. Repairing and replacing faulty appliances</li> <li>4. Helping vulnerable customers without gas</li> <li>5. Helping all customers without gas</li> <li>6. Getting customers back on gas</li> <li>7. Carrying out safety checks</li> <li>8. Minimising disruption from our works</li> <li>9. Tackling Fuel Poverty</li> <li>10. Awareness of Priority Services Register</li> <li>11. Priority Services Register training</li> <li>12. Becoming a Carbon neutral business</li> <li>13. Communities not currently connected to gas</li> <li>14. Keeping the energy flowing reliably and safely</li> </ol>	2,547	3.0

<b>Acceptability Testing</b>	Oct-19	Phase 4 - Business interviews and surveys	We commissioned Traverse to test the acceptability and affordability of Cadent's proposed plan amongst business customers. This consisted of an on-line / face to face survey of 504 business customers and in-depth qualitative telephone interviews with 45 business customers. This showed that the plan had achieved high levels of acceptability and affordability from a business customer perspective.	Business customers were asked about the acceptability and affordability of Cadent's overall plan. If they said that the plan was unacceptable, they were asked to explain their response. If they said that it was neither acceptable nor unacceptable, they were asked what they would like to see in order to find it acceptable. Business customers were also asked to rate the acceptability of the outcome areas (environment, quality experience and resilience). Then, having learnt about the outcome areas, customers were asked as "informed customers" to rate the overall acceptability and affordability of the plan.	549	2.0
	Oct-19	Acceptability testing - final survey report on domestic customers	We commissioned Traverse to test the acceptability and affordability of Cadent's proposed plan amongst domestic customers. This consisted of surveying 4,446 domestic customers through on-line and face to face methods. This showed that the plan had achieved high levels of acceptability and affordability amongst domestic customers, including those who are fuel poor.	Customers were asked about the acceptability and affordability of Cadent's overall plan. If they said that the plan was unacceptable, they were asked to explain their response. If they said that it was neither acceptable nor unacceptable, they were asked what they would like to see in order to find it acceptable. Customers were also asked to rate the acceptability of the outcome areas (environment, quality experience and resilience). Then, having learnt about the outcome areas, customers were asked as "informed customers" to rate the overall acceptability and affordability of the plan.	4,446	2.0
	Oct-19	Acceptability testing - focus groups with the general population	We commissioned Traverse to explore the acceptability of our plans and commitments in each of the three outcome areas (environment, quality experience and resilience) with 79 members of the public in regional focus groups. Participants were supportive of our plans for quality experience and resilience, but no consensus was reach on our environmental plans.	A group discussion was facilitated to discuss views on Cadent's plans in each of the three outcome areas and participants were also asked to complete a survey to rank levels of acceptability and affordability.	79	2.5

<b>Acceptability Testing</b>	Oct-19	Acceptability testing - customer forum	We commissioned Traverse to explore the acceptability of our plans and commitments in each of the three outcome areas (environment, quality experience and resilience) with 109 customers who had attended previous customer forums. Overall, participants found our plans to be both acceptable and affordable.	A group discussion was facilitated to discuss views on Cadent's plans in each of the three outcome areas and participants were also asked to complete a survey to rank levels of acceptability and affordability.	109	3.0
	Oct-19	Acceptability testing - focus groups with future customers	We commissioned Traverse to explore the acceptability of our plans and commitments in each of the three outcome areas (environment, quality experience and resilience) with 20 "future customers" (16-18 year olds) in 2 focus groups. Participants were supportive of our plans for the environment and resilience but questioned whether helping vulnerable customers was part our remit.	A group discussion was facilitated to discuss views on Cadent's plans in each of the three outcome areas and participants were also asked to complete a survey to rank levels of acceptability and affordability.	20	3.0
	Oct-19	Acceptability testing - interviews with CIVs	We commissioned Traverse to explore the acceptability of our plans and commitments in each of the three outcome areas (environment, quality experience and resilience) by interviewing 20 CIVs. Overall, our plans were supported, and all found the plans affordable.	Throughout the interviews the CIVs were explained the elements of the plan, asked to comment on whether they found each outcome acceptable, which particular elements were important to them, and whether they had any additional comments. They were also asked whether the new business plan was affordable.	20	3.0
	Oct-19	Acceptability testing - fuel poor focus groups	We commissioned Traverse to explore the acceptability of our plans and commitments in each of the three outcome areas (environment, quality experience and resilience) with 35 customers in fuel poverty in regional focus groups. Overall, participants were supportive of our plans in all three areas.	A group discussion was facilitated to discuss views on Cadent's plans in each of the three outcome areas and participants were also asked to complete a survey to rank levels of acceptability and affordability.	35	3.0

<b>Acceptability Testing</b>	Oct-19	Verve business plan consultation	We commissioned Verve to gather views on our plans to reduce our carbon footprint from 25 customers. We did this through an online forum with customers and stakeholders to discuss the key components that we shared on our EAP. This included our intentions to support our employees to make a positive difference to tackling climate change.	Participants were asked about their awareness of cadent, discussed the three outcome areas (environment, quality experience and resilience), discussed the bill impact breakdown (both at present and as a result of the plan), risks and uncertainties and innovation funding.	25	2.5
	Nov-19	Feedback from Policy Connect on our CO plan	We asked Policy Connect to provide feedback on our proposals for CO.	We asked Policy Connect about each element of our CO plan, whether they supported them, and what further action we should consider.	1	3.0
	Nov-19	Verve acceptability testing stakeholder interviews	We asked Verve to interview a small number of expert stakeholders and ask for feedback on our plan.	We shared a summary of our October plan with stakeholders and asked them for feedback.	5	2.5

## 1.4. Engagement feedback and insights

### *Importance of CO risk mitigation*

Our engagement with customers and stakeholders, as well as qualitative and quantitative research, clearly demonstrates that our activities around CO risk, and preventing gas disruptions for vulnerable customers, are highly valuable and are expected by our customers.

Participants at our deliberative workshops, focus groups, and our domestic survey were consistently supportive of us raising awareness of CO and providing CO alarms to customers, particularly those in vulnerable situations. Participants in our focus groups were concerned that customer awareness of the full dangers of CO is low. Participants across all these events highlighted that the safety of employees and the public is their highest or joint-highest priority.

Our employees highlighted the importance of CO awareness, ranking this as the fifth-highest priority (4.43 out of 5). They further commented that Cadent should offer free CO detectors with every new visit to a property, to show customers that we care about their safety.

CO awareness varied a lot among the 31 participants at our ESL and non-English speakers' workshop. There was a strong view that Cadent should do more to raise awareness and make CO alarms mandatory or install and test them for everyone, even if that means bills would be raised.

Stakeholders at our regional workshop in Manchester gave very positive feedback on their experiences working with Cadent to fit CO alarms. One stakeholder at the Energy Networks Association (ENA) stakeholder workshop said that some of the work that has been undertaken on CO awareness has been very important and that such work should continue.

The vulnerability interview series jointly conducted with Traverse revealed that CIVS may be more at risk from the dangers of CO than the general public are, given that they may already be struggling with day-to-day life, may forget to service appliances, may have insufficient funds to service and maintain appliances, or have insufficient mobility. Since accessible equipment is available, alarms should be provided according to the sensory needs of the individual. Awareness raising should also be made more accessible, for example, to the deaf community.

At the Wales and West Utilities stakeholder workshops in May 2019, with 52 participants, there was support for the idea of visually impaired people being given a CO alarm as a priority. There was also praise for the idea of vibrating CO alarms being given to the hard of hearing.

### *Positive feedback on CO programmes*

Cadent has a number of initiatives to promote CO awareness. One such initiative is that Cadent sponsors memory diaries (which include information on CO prevention), produced by Derbyshire Fire and Rescue and distributed by Alzheimer's Society. Kay Simcox of Derbyshire Fire and Rescue Service said:

*"We are delighted to be working with Cadent for the second year on this fantastic project. Their sponsorship and ongoing support have made it possible for us to continue working with local charities that work with vulnerable members of our community, helping to make sure they stay safe from the risk of fire and CO poisoning."*

Cadent also promotes CO awareness with children through its Safety Seymour character. 496 responses were received from parents surveyed in 2018 about the effectiveness of Cadent's Safety Seymour activity pack. The response was overwhelmingly positive with the consensus being that it was both informative and fun. When asked if the programme had encouraged them to take further safety precautions at home, approximately 75% said "yes", with many of the remainder stating that they already had the necessary precautions in place.

### *Responsibilities of Cadent and other parties*

The customer forum on CO revealed that customers do not automatically think that addressing CO is Cadent's responsibility and instead pointed to the Government and individuals as responsible parties. However, some participants thought Cadent should take action and redirect profits towards helping people within their network.

However, when considering what actions Cadent should take in this area, across all locations, the majority of participants chose the most extensive and expensive investment option. This was justified by the relatively low cost and the seriousness of the issue at hand. Most participants stated that they wanted larger-scale action and would be willing to pay more.

It was noted that Cadent, as a regional monopoly, was uniquely placed to address CO poisoning as everyone at risk in a given region will be a Cadent customer. There was agreement that customers on the Priority Services Register (PSR) and those with low income should be targeted for alarm distribution. However, they also thought that non-PSR customers may be the hardest to reach and so want Cadent to do more and provide more free CO alarms. Some also thought that the Government should require CO detectors in all homes.

*Suggestions for improvement*

Our customers and stakeholders provided several recommendations regarding how we should improve our activities aimed at mitigating CO risk. Stakeholders participating in our regional workshops suggested expanding our work with partner agencies to fit CO alarms and wanted us to ensure we offer these to customers on the PSR when we visit them.

Participants in our focus groups with hard-to-reach customers suggested that we could offer annual CO risk inspections and requested more information on how they could be sure that the gas pipes and appliances in their homes are safe.

Ideas for promoting alarms to vulnerable groups included working with trusted networks such as care providers and support workers, partnering with community organisations or large-scale public services such as councils and fire services. It was noted that any explanations should be clear and done in such a way that does not create fear.

To promote information on CO and receiving an alarm in general, customers suggested working with the fire service, council or NHS, approaching family members, talking to customers while in their homes, leaflets, post and emails, social media, working with community groups and promoting through schools.

*Table 5 Summary of insights*

Feedback/insight	How we have addressed this
Customers indicated through various forums that they believed all homes should be required to have a CO alarm and our employees supported the idea of ensuring all new visits to a property should include the offer of a CO alarm to those who don't own one.	Early engagement revealed that customers unanimously agreed that CO alarms should be provided to all customers. Therefore, our proposals were very ambitious from the start. Following customer testing of costed options this trend consistently remained amongst customers and has led us to our commitment to distribute 3 million alarms over RIIO-2.
Customers indicated that alarms should be provided according to the sensory needs of the individuals e.g. vibrating CO alarms being given to the hard of hearing.	Our holistic delivery model joins together our four core focus areas (CO awareness, fuel poverty, raising awareness of the PSR and going beyond to ensure we never leave a customer vulnerable without gas), with an integrated delivery approach involving Cadent employees and partners working across multiple areas. This allows us to focus our efforts on areas and customers with the greatest risk, noting that in many cases there is significant crossover between these areas.  Specifically, we will continue to explore the innovative options for CO alarms to ensure every customer is provided one which caters to their needs and keeps them safe. Smart bespoke alarms will make up a proportion of our 3 million alarms.

<p>Customers and stakeholders highlighted the importance of working with trusted partners and charities such as care providers, fire services, and NHS trusts to ensure we can reach the most vulnerable and use existing relationships to ensure customers feel at ease.</p>	<p>Our CO awareness proposals in RIIO-2 is very much underpinned by developing and working with effective and trusted partnerships across our regions e.g, we will build on the relationships we have built with NHS midwives who provide CO information and alarms on our behalf. We commit to partner with all fire and rescue service, NHS trusts and ambulance services across our footprint. We will also develop more than 80 strategic partnerships with charities and industry experts to identify the needs of our customer. See Appendix '07.03.09 Identifying your needs and joining up support services' for more information.</p>
<p>Our education initiatives in RIIO-1 (e.g. Safety Seymour) has received significant praise from customers and industry stakeholders as being very informative and fun.</p>	<p>We will continue to deliver education programmes throughout RIIO-2 and build on the success of Safety Seymour by developing similar programmes for children in later stages of education to ensure learning is reinforced. Through RIIO-2 we will directly educate 200,000 people.</p>
<p>Some customers thought that addressing CO wasn't our responsibility but something government and individuals should be responsible for. However, others believed our position as a regional monopoly, made us uniquely placed to address CO poisoning as everyone at risk in our region will be our long-term customer.</p>	<p>Although some customers did not automatically believe CO awareness was our responsibility the majority of customers and stakeholders believe we are uniquely placed to tackle this societal issue. Firstly, we have a direct long-term relationship with all homes on our network, whilst other organisations such as supplier don't. Secondly, we are the biggest provider of heat in England and therefore we have an obligation to lead.</p>
<p>Hard to reach customers suggested that we offer annual CO risk inspections and more information to ensure gas pipes and appliances in their homes are safe.</p>	<p>As part of our RIIO-2 business plan proposals we explored the delivery of annual proactive safety checks for CIVS. However, through customer testing a number of safety and privacy concerns were raised leading to us dropping these proposals. We will, however, continue to explore this area in RIIO-2 including how we could mitigate some of these concerns. See Appendix 07.03.12 'Going beyond to never leave a customer vulnerable without gas' for more information.</p>
<p>Findings from vulnerability interviews with professionals suggested that CIVS may be more at risk of the dangers of CO given that they may be struggling with day to day life, may forget to service appliances, may have insufficient funds to service and maintain appliances, or have insufficient mobility.</p>	<p>Our vulnerability strategy brings together all the work we do in this area, including tackling fuel poverty, raising awareness of the PSR and CO awareness. This alignment allows us to target those most in need and tailor services appropriately. As part of our CO offering for RIIO-2 we are exploring offering appliance repair or replacement following a condemnation of an appliance after CO has been detected for CIVS. This is something we have already trialled in RIIO-1 and seen successful results for CIVS.</p>
<p>Most customers at regional forums chose the most extensive and expensive CO options for RIIO-2. Most participants stated that they wanted larger-scale action and would be willing to pay more.</p>	<p>We are delighted that customers see real value in our CO awareness work and keeping customers and the public safe. When developing our commitments for CO in RIIO-2, we will be looking to balance customer benefit, deliverability and value for money to ensure we stretch ourselves but don't over commit for customers.</p>

## 2. Assessing the measurement options



### 2.1. How is it currently measured?

In RIIO-1, we committed to delivering 2.1 million service contacts through responding to CO incidents and issuing 105,000 CO alarms to those deemed especially vulnerable, in conjunction with an awareness survey to assess the impacts of the contacts.

The measure is reputational only.

#### How do current measures deliver against customer outcome/priority?

The current RIIO-1 measure was bespoke to Cadent and provided the platform for us to be pioneering and innovative in our approach to raising awareness of the dangers of CO and sharing across the industry.

*Strengths* – Customers living in vulnerable situations have benefited from receiving an alarm and we have formed strong partnerships with the Fire and Rescue Service. The level of awareness of the dangers of CO has increased via our survey but there is still work to do.

*Weaknesses* – There is currently a narrow scope for issuing alarms to customers. The scale of this activity is not as ambitious as it could be. The current approach targets only a narrow set of customers. In RIIO-2, we want to broaden the reach to customers across our regions, targeting CO hotspots. CO is a risk to anyone; all customers are at risk, so we need to reach everyone.

We currently do not measure and/or carry out the following activities:

- Number of partnerships (do not measure externally).
- Locate and isolate (currently do not carry out this work).
- Repair or replace unsafe appliances (currently do not carry out this work).

### 2.2. Assessing good practice

#### Gas networks

Gas Distribution Networks (GDNs) collaborate to share best practice regarding raising the awareness of the dangers of CO:

- The GDN CO working group has been expanded to include other industry partners, such as Energy UK, and suppliers such as Npower and Gas Network of Ireland, to ensure that we are communicating to all across the industry.
- The National CO safety competition for children aged 5-11 has received ten times more entries from young people since it was expanded and relaunched three years ago.
- Following the incredible success of Safety Seymour across our footprint, we have passed it to other GDNs and the success has continued across their areas with over 14,000 children reached.
- Following the success of Northern Gas Networks game 'ICOP', in protecting festival goers from the dangers of CO, iFest was developed by all the GDNs.
  - iFest is an entertaining and innovative game which warns of the specific CO dangers present at festivals and lets visitors search through tips and learn about the risks of CO poisoning and how to stay safe.
- GDNs sponsor the All-Party-Parliamentary Carbon Monoxide Group (APPCOG), which exists to raise awareness within Parliament of the threat of CO poisoning, to inform policy making and help improve safety measures across the UK.



- Our Fire and Rescue partnerships are the first of their kind in the industry and allow us to reach hard-to-reach customers using Cadent leaflets and issuing of alarms.

*Fire and Rescue Services*

Fire and Rescue services raise awareness of the dangers associated with CO and share important information through their websites. Examples include:

- Humberside has a detailed graphic showing is the best place to put a CO alarm in your property.
- North Wales offers a similar leaflet that shows you how to choose a CO alarm and where to put it in your property.
- East Sussex includes a leaflet on how to stay safe from CO on boats. It also has a survey on its CO webpage to allow users to rate the usefulness of the page.

*Water companies*

Water companies typically run education programmes around the use of water, with a view to reducing per capita levels of consumption. This has some read across to gas network CO education programmes:

- Severn Trent Water has included a financial incentive in its business plan, based on the number of people who have committed to behavioural change as a result of its ‘using water wisely’ education programme.
- Thames Water has included a reputational incentive in its business plan around the number of proactive customer engagement activities it completes, including smarter home visits, smarter business visits, Local Authority and housing association water efficiency visits and school water audits.

*Summary*

External best practice informs us that collaboration and sharing learning is the key to raising awareness of the dangers of CO through education partnerships that allow us to reach wider demographics using existing interactions and various channels that can be used to increase awareness and education. This learning, along with our insights from engagement, has helped define objectives for developing our proposals.

**2.3. What options have we considered for RIIO-2?**

**Defining objectives**

Reflecting on the insights we have received from our customers and stakeholders and best practice across the industry, we have defined the objectives the outputs on CO awareness should deliver in RIIO-2.

*Table 6 Defining the objectives*

Objective	Business insights	Customer and stakeholder insight/feedback	Best practice	Strategy / policy
<b>Reduce the risk of harm by CO as a result of gas conveyed through our network.</b>	On a daily basis, our front-line emergency engineers are seeing the negative impacts CO can have.	Customers and stakeholders recognise the dangers that CO presents in the home and they want Cadent to educate and protect against the dangers.	Fire Safety awareness is paramount in society. The Fire Service has a big drive on smoke alarm installation and use. Similar principles apply to CO.	A drive from the Parliamentary Working group to eradicate the dangers of CO across all areas of society.

Objective	Business insights	Customer and stakeholder insight/feedback	Best practice	Strategy / policy
<b>Forming strategic partnerships with organisations that reach our targeted demographics to keep customers safe and warm in their homes.</b>	Partnership working has proved extremely successful in RIIO-1 and allows Cadent to target a broad range of hard-to-reach customers in CO hotspots for education and issuing alarms.	Customers recognise the importance of partnership working in order to allow Cadent to access harder-to-reach groups.	Using existing organisations and partners that are already established ensures that effort is not wasted.	Working in partnership with other GDN's, utilities and interested parties through the GDN best practice group, allows a louder voice to be heard by policy makers.
<b>Going the extra mile to safeguard CIVS.</b>	Through established partnerships we are able to reach customers that we would never reach that may not even be connected to our network. Also allows promotion of other business activities e.g. LCV and PSR.	Stakeholders recognise the value of Cadent's work on CO and want to see networks adopt innovative new approaches in order to eradicate the dangers E.g. targeting dangerous appliances, repairing / replacing where appropriate.		Ofgem/Industry bodies want to see networks go above and beyond the minimum level of service and deliver services with a strong social return on investment in order to protect the most vulnerable.

Table 7 Options we considered

<b>Option 1: Continue to satisfy Ofgem requirements (deliver our existing safeguarding services)</b>	
<ul style="list-style-type: none"> <li>• <b>Issuing alarms to CIVS only</b> – Via emergency visits, including the CO awareness survey.</li> <li>• <b>Delivery CO awareness contacts via a range of methods</b> – Safety Seymour CO awareness programme in schools, partnerships with Fire and Rescue Services.</li> </ul>	
<b>Assessing the merits and drawbacks</b>	
<b>Pros</b>	<b>Cons</b>
<ul style="list-style-type: none"> <li>• Continues to raise awareness of the dangers of CO.</li> <li>• Minimal cost to the customer in maintaining the existing approach.</li> <li>• Makes homes and families safer from CO.</li> </ul>	<ul style="list-style-type: none"> <li>• Limited to only supporting those who are in vulnerable situations.</li> <li>• Approach would not deliver a step-change in performance.</li> <li>• Would not leverage the full potential of partnership working.</li> <li>• Alarms only being issued to those who are most vulnerable therefore there is a risk that not every home will have a CO alarm.</li> </ul>
<b>Potential unintended consequences</b>	
<ul style="list-style-type: none"> <li>• The understanding of CO, its symptoms and potential impacts, does not reach a wide enough audience and therefore prevention and detection rates do not improve.</li> <li>• The gas industry would not be seen as leaders in this area as the approach lacks ambition for RIIO-2 and beyond.</li> <li>• Customers may be unsure of what action to take at the end of an alarm battery's life.</li> </ul>	

Option 2: Locating the source of CO, and, where possible, isolating the appliance	
<ul style="list-style-type: none"> <li>All elements of Option 1.</li> <li><b>Locating and isolating the appliance emitting CO</b> – Service would target customers who are most vulnerable. At present, the entire gas supply to the home is isolated when CO is detected. For this approach, only the appliance emitting CO would be isolated, leaving the customer free to safely use any other gas appliance in the home.</li> </ul>	
Assessing the merits and drawbacks	
Pros	Cons
<ul style="list-style-type: none"> <li>The customer is immediately safe from the dangers of CO in their household .</li> </ul>	<ul style="list-style-type: none"> <li>Deliverability risk as we currently do not provide this service.</li> <li>(Not necessarily a con) Additional training and equipment would be required for all front-line engineers in order to deliver this service (at a cost to the customer).</li> </ul>
Potential unintended consequences	
<ul style="list-style-type: none"> <li>Risk of re-occurrences of CO from other household appliances that have not been isolated as part of this process (as the gas supply is still maintained at the house).</li> <li>If referral channels were to breakdown, the customer could be left unable to use an isolated appliance for a period of time.</li> </ul>	

Option 3: Repairing or replacing CO emitting appliances	
<ul style="list-style-type: none"> <li>All elements of Option 1.</li> <li><b>Repair or replace appliances emitting CO, through partnerships with industry experts</b> – If there is an appliance that is not working or beyond economical repair, we would replace it, like-for-like through our commercial partnerships. For consistency, fairness and deliverability, customers will be assessed against a common set of criteria that we will define and keep relevant. This service would target customers who are most vulnerable including those who are unable to afford to repair or replace their appliances.</li> </ul>	
Assessing the merits and drawbacks	
Pros	Cons
<ul style="list-style-type: none"> <li>This option delivers a firmly customer focussed outcome, sensitive to vulnerability issues.</li> <li>Stops customers attempting to 'self-reconnect' appliances due to affordability of a repair. Where CO dangers have been found, the consequences of these actions can be very severe for customers, and for the neighbours of customers.</li> </ul>	<ul style="list-style-type: none"> <li>Would require significant coordination of partnerships on a large scale to ensure the service is available for all CIVS.</li> <li>Still limited to those living in vulnerable situations.</li> </ul>
Potential unintended consequences	
<ul style="list-style-type: none"> <li>Regulated funds used for forming partnerships with experts carries the risk of impacting the competitive market. There need to be clear guidelines associated with these services and ensure it does not drive the wrong behaviour from companies and consumers.</li> <li>Could create incentives for customers to damage appliances themselves to receive a replacement from Cadent, creating a safety risk for them and a cost risk to customer bills.</li> </ul>	

Option 4: Providing CO alarms to all customers who need one	
<ul style="list-style-type: none"> <li>All elements of Option 1.</li> <li><b>Gas engineers would provide a CO alarm to any customer who does not already have one and we would significantly increase our partnerships with the Fire &amp; Rescue Service, NHS trusts and Ambulances services to increase distribution of alarms</b> – This service would target all customers, not just those who are most vulnerable. The Cadent engineer and our partners would offer to install and explain how the alarm works.</li> </ul>	
Assessing the merits and drawbacks	
Pros	Cons
<ul style="list-style-type: none"> <li>This option would gradually increase alarm ownership and help to move towards eradicating the dangers of CO.</li> <li>The alarm would be issued by an engineer, so it could be guaranteed that it is being used (and not left in a drawer).</li> </ul>	<ul style="list-style-type: none"> <li>Costs to fund this approach would be shared across all customers (even those who already own an alarm).</li> </ul>
Potential unintended consequences	
<ul style="list-style-type: none"> <li>This option would result in Cadent becoming the UK's biggest supplier of CO alarms, and therefore may risk to supply issues if CO alarm providers are not able to meet the demand.</li> </ul>	

Option 5: All options combined	
<ul style="list-style-type: none"> <li><b>Continuing our existing RIIO-1 safeguarding options</b> – issuing alarms to the most vulnerable, CO awareness survey, Safety Seymour and Fire and Rescue Partnerships.</li> <li><b>Locating and isolating the appliance emitting CO for the most vulnerable.</b></li> <li><b>Repairing and/or replacing unsafe appliances for the most vulnerable.</b></li> <li><b>Providing alarms to all customers on emergency visits who do not already have one.</b></li> <li><b>Forming partnerships with the Ambulance Service and NHS Trusts.</b></li> </ul>	
Assessing the merits and drawbacks	
Pros	Cons
<ul style="list-style-type: none"> <li>A comprehensive service for all aspects.</li> <li>This option would gradually increase alarm ownership and help to move towards eradicating the dangers of CO.</li> <li>Alarms would be issued to all customers, not just those who are most vulnerable.</li> <li>Aligns with our objective of wanting to ensure that no-one is harmed by CO as a result of gas conveyed through our network.</li> <li>Leaves customers in a more positive position.</li> <li>Greatest impact for all types of customers.</li> </ul>	<ul style="list-style-type: none"> <li>This option would be the most expensive and therefore come at the greatest additional cost to the customer.</li> </ul>
Potential unintended consequences	
<ul style="list-style-type: none"> <li>This option would be very ambitious for Cadent and require a significant increase in focus on CO across the business, therefore creating a risk that we lose focus on our core services.</li> </ul>	

## 2.4. Why are these the options

We have considered a range of options in line with our strategy, from rolling over our existing RIIO-1 commitment that primarily focuses on serving the most vulnerable, through to delivering a full package of CO safety measures for all customers.

Options 2 to 4 build on the existing offering, which is Option 1. They look to provide services on top of what we already offer, based on customer needs. Any proposed elements of options that are new have been piloted within our networks, so we have the base data to show that there is customer demand for the services.

Combining this with the findings from our customer and stakeholder engagement has allowed us to build what we believe is a robust set of options.

*Table 8 Options appraisal against objectives*

	<b>Option 1:</b> Continue to satisfy Ofgem requirements (deliver our existing safeguarding service)	<b>Option 2:</b> Option 1 plus locating the source of CO and isolating the appliance	<b>Option 3:</b> Option 1 and 2 plus either repairing or replacing the relevant appliance	<b>Option 4:</b> Option 1 plus providing alarms to all customers	<b>Option 5:</b> All options combined
<b>Objective 1:</b> Reduce the risk of harm by CO as a result of gas conveyed through our network	Yellow	Yellow	Light Green	Light Green	Dark Green
<b>Objective 2:</b> Forming strategic partnerships with organisations that reach our targeted demographics to keep customers safe in warm in their homes	Yellow	Yellow	Yellow	Light Green	Dark Green
<b>Objective 3:</b> Going the extra mile to safeguard CIVS	Red	Yellow	Light Green	Yellow	Dark Green

No delivery	Weak delivery	Some delivery	Delivery	Strong delivery
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## 2.5. Customer and stakeholder preference

Based on business insights and findings from our qualitative engagement, the preference is Option 5. This best aligns with the wants and needs of customers and our vulnerability strategy. This option also gained the most support from customers at our customer forums.

In summary, based on customer and stakeholder insights, our key areas of focus will be:

- Continuing to raise awareness of the dangers of CO via a number of innovative methods (e.g. education in schools, partnership working and doorstep engagement).
- Continuing to issue CO alarms, but at a greater scale utilising a network of trusted partners targeting all customers including those who are most vulnerable.
- Supporting customers by only isolating the appliance emitting CO rather than switching off the full gas supply to the property. This allows the customer to continue to use their gas supply for any other appliances in the house that are not emitting CO.
- Reducing the risk of CO poisoning via the repair and/or replacement of appliances, prioritising CIVS.

### 3. Assessing performance levels



#### 3.1. How we performed in RIIO-1

During the early years of RIIO-1 we established the CO awareness survey and began to form partnerships with the Fire and Rescue Service, working collaboratively to raise the awareness of CO, reaching a broader range of customers. Over the RIIO-1 period we have surveyed over 49,000 customers. Based on our CO awareness survey results, on average our customers have demonstrated a 40% increase in their awareness of the dangers of CO. We are forecast to issue over 155,000 CO alarms to the most vulnerable via our emergency visits (we carry out c. 400,000 emergency visits a year across our networks), education and through partnership working. This is above our commitment to deliver 105,000 CO alarms with no additional funding used.

In the early to mid-years of RIIO-1 we developed our innovative education programme, primarily targeting children via the Safety Seymour interactive classroom initiative. Safety Seymour went live in 2016 and we plan to have educated over 44,000 children by the end of RIIO-1. We are keen to see how much of the messaging the child retains through their school years. To demonstrate the consolidation of their learning we are trialling a new project 'CO Crew' aimed at children in their final year of primary school to test and further enhance their knowledge of CO as they move into secondary education. Before the end of 2019/20, we hope to have completed 25 CO Crew classes, educating 750 children as part of the trial.

#### Additional initiatives in 2018/19

##### Fun Kids Radio

12 audio features based on the adventures of Safety Seymour were broadcast on Fun Kids Radio. The aim of the series was to introduce children to CO and to promote each house having a CO alarm. Since the launch in February, there have been 80 broadcasts and 425,000 listeners who have heard the series to date.

##### Billboard poster campaign

To broaden our reach to customers and the public on the signs and symptoms of CO poisoning and the importance of owning a CO alarm, we used CO hot spot reports to identify key areas that would most benefit from an awareness advertising campaign. Following adverts in magazines, to broaden the reach we had 4 billboard posters up in hot spot areas across our networks that have high volumes of passing traffic. The locations were:

*Table 9 Billboard locations*

Location	Passing cars per week
Tinsley Roundabout, Sheffield	350,000
Imperial Road, Fulham	105,000
Chancellor Lane, Manchester	462,000
Kingstanding Road, Birmingham	350,000

For the 12-week period the four billboard posters cost us £6,720.

Measures of success from the campaign:

- Total number of people that saw the boards: 14.5 million.
- Website traffic to our Cadent CO awareness webpage increased by 300%.

**Other GDNs:**

Northern Gas Networks:

- Delivered around 7,500 doorstop awareness surveys.
- Continued to offer formal training related to CO to diverse and difficult to reach customer groups through the delivery of sessions at Bradford University and a Somalian centre in Bradford.

Wales and West Utilities:

- Issued more than 4,830 CO alarms to CIVS.
- Developed and piloted CO safety awareness for older and BAME groups.

RIIO-1 performance summary:

So far, we have delivered good performance in the area of CO awareness during RIIO-1. Alarms have been issued to those who are most vulnerable via our emergency workforce and partnerships which include the Fire and Rescue Service. Awareness levels have increased as a result of this and our education work. Our Safety Seymour school programme is a key example of where we have innovated to target at an at-risk group. This programme has been successfully shared with, and rolled out by, other GDNs. Our ambition is to ensure that no one is harmed by CO as a result of gas conveyed in our network, and our work to achieve this will continue into RIIO-2 and beyond.

**3.2. What performance levels have we considered for RIIO-2**

We are targeting three areas to raise the awareness of the dangers of CO and support those who are most at risk from potential exposure to CO.

*Carbon monoxide safety*

*Table 10 CO safety target range and cost to achieve*

	<b>Low</b>	<b>Medium</b>	<b>High</b>
<b>Target</b>	<ul style="list-style-type: none"> <li>• Educate 50,000 of those most at risk via our education package over RIIO-2</li> <li>• Issue 200,000 CO alarms per year</li> <li>• Partner with every fire and rescue service and 40% of NHS Trusts and Ambulance Services</li> </ul>	<ul style="list-style-type: none"> <li>• Educate 100,000 of those most at risk via our education package over RIIO-2</li> <li>• Issue 400,000 CO alarms per year</li> <li>• Partner with every fire and rescue service and 60% of NHS Trusts and Ambulance Services</li> </ul>	<ul style="list-style-type: none"> <li>• Educate 200,000 of those most at risk via our education package over RIIO-2</li> <li>• Issue 600,000 CO alarms per year</li> <li>• Partner with every fire and rescue service and all NHS Trusts and Ambulance Services</li> </ul>
<b>Cost to achieve (RIIO-2 period)</b>	<b>£8,400,000</b>	<b>£16,590,000</b>	<b>£25,330,000</b>
<b>Cost assumptions/ calculation</b>	<ul style="list-style-type: none"> <li>• Education: £10 per person educated <ul style="list-style-type: none"> <li>○ Day rate for Safety Seymour= £240/30 children = £8</li> <li>○ Resources: £60 resource box/30 children = £2</li> </ul> </li> <li>• CO alarms: £7.64 per alarm</li> <li>• Partnerships for RIIO-2 period: <ul style="list-style-type: none"> <li>○ 100% F&amp;RS - £160,000</li> <li>○ 100% NHS and Ambulance service - £250,000</li> </ul> </li> </ul>		
<b>Annual bill impact (average Cadent customer)</b>	<b>£0.13</b>	<b>£0.25</b>	<b>£0.39</b>



Locating and isolating appliances emitting CO

Table 11 Locating and isolating appliance emitting CO (targets and costs used in July BOT)

	Low	Medium	High
<b>Target</b>	Isolate the appliance that produces CO for 15,000 customers per year	Isolate the appliance that produces CO for 22,500 customers per year	Isolate the appliance that produces CO for 30,000 customers per year
<b>Cost to achieve (RIIO2 period)</b>	<b>£2,250,000</b>	<b>£3,375,000</b>	<b>£4,500,000</b>
<b>Cost assumptions/calculation</b>	Additional £30 per job to deliver this service (Taken from customer forum info)	Additional £30 per job to deliver this service (Taken from customer forum info)	Additional £30 per job to deliver this service (Taken from customer forum info)
<b>Annual bill impact (average Cadent customer)</b>	<b>£0.03</b>	<b>£0.05</b>	<b>£0.07</b>

Table 12 Updated costs and targets for locate and isolate post BOT

	Low	Medium	High
<b>Target</b>	Isolate the appliance that produces CO for 10,000 customers per year	Isolate the appliance that produces CO for 15,500 customers per year	Isolate the appliance that produces CO for 22,500 customers per year
<b>Cost to achieve (RIIO-2 period)</b>	<b>£3,500,000</b>	<b>£4,900,000</b>	<b>£6,675,000</b>
<b>Cost assumptions/calculation</b>	1 hour (additional to initial call) on each job - £50. £180,000 per year training. Literature £100,000 (one off)	1 hour (additional to initial call) on each job - £50. £180,000 per year training. Literature £100,000 (one off)	1 hour (additional to initial call) on each job - £50. £180,000 per year training. Literature £150,000 (one-off)
<b>Annual bill impact (average Cadent customer)</b>	<b>£0.05</b>	<b>£0.07</b>	<b>£0.10</b>

Repairing and replacing faulty appliances

Table 13 Repairing and replacing faulty appliances

	Low	Medium	High
<b>Target</b>	<ul style="list-style-type: none"> <li>600 faulty appliances repaired per year</li> <li>200 faulty appliances replaced per year</li> </ul>	<ul style="list-style-type: none"> <li>1,200 faulty appliances repaired per year</li> <li>600 faulty appliances replaced per year</li> </ul>	<ul style="list-style-type: none"> <li>1,800 faulty appliances repaired per year</li> <li>1,200 faulty appliances replaced per year</li> </ul>
<b>Cost to achieve (RIIO-2 period)</b>	<b>£2,613,160</b>	<b>£5,329,610</b>	<b>£8,804,529</b>
<b>Cost assumptions/calculation</b>	<b>Average unit cost of intervention (service, repair or replace):</b> £525.79 (breakdown below*)  <b>Additional time cost per intervention (Hourly cost x time taken):</b> £70 x 0.25 = £17.50		

	<b>Additional training cost (cost of training per engineer x no. of engineers trained):</b> £125 x 1200 = £30,000 p.a.		
	<b>Literature cost:</b> £58,000 p.a.		
<b>Annual bill impact (average Cadent customer)</b>	<b>£0.03</b>	<b>£0.07</b>	<b>£0.13</b>

Table 14 Average unit cost of intervention (service, repair or replace)

Activity	Appliance	Unit cost	Likelihood of activity required	Appliance proportion	Combined percentage	Expected cost per repair/replacement
Replacement	Boiler	£1,750	30%	60%	18.0%	£315.00
	Fire	£250		30%	9.0%	£22.50
	Hob	£150		5%	1.5%	£2.25
	Cooker	£400		5%	1.5%	£6.00
Repair	Boiler	£300	45%	80%	36.0%	£108.00
	Fire	£0		N/A	N/A	N/A
	Hob	£0		N/A	N/A	N/A
	Cooker	£200		20%	9.0%	£18.00
Service	Boiler	£82	70%	60%	42.00%	£34.44
	Fire	£70		30%	21.00%	£14.70
	Hob	£60		5%	3.50%	£2.10
	Cooker	£80		5%	3.50%	£2.80
					Average unit cost of an intervention	<b>£525.79</b>

These ranges have been set based on customer and stakeholder feedback together with insights from our CO heat maps and existing partnerships and trials working with the industry to keep customers safe from the dangers of CO. Ultimately there is overwhelming support from across our customer and stakeholder community to continue our work to keep customers and the public safe from the dangers of CO, and even to increase the scale of what we do to reach a broader range of customers.

The current RIIO-1 measures for CO are reasonably narrow but have provided scope to innovate for those who are most vulnerable. Increasing the level of our ambition in RIIO-2 will allow us to ensure those who are most vulnerable continue to be best served while also reaching a wider audience.

## 4. Customer testing



We have tested our commitments in a variety of ways to ensure we have both quantitative and qualitative responses across a broad segmentation of customers and stakeholders. We have tested the output measures that we are proposing and gathered feedback where options exist. This phase was called business options testing. Alongside customer testing, we have targeted specific groups such as hard-to-reach, seldom heard, future generations, those in fuel poverty and businesses such as micro-businesses. We especially wanted to understand if had heard correctly what our customers and stakeholders wanted and needed from us.

During options testing, we shared the bill impacts to ensure our customers and stakeholders were fully informed before making choices.

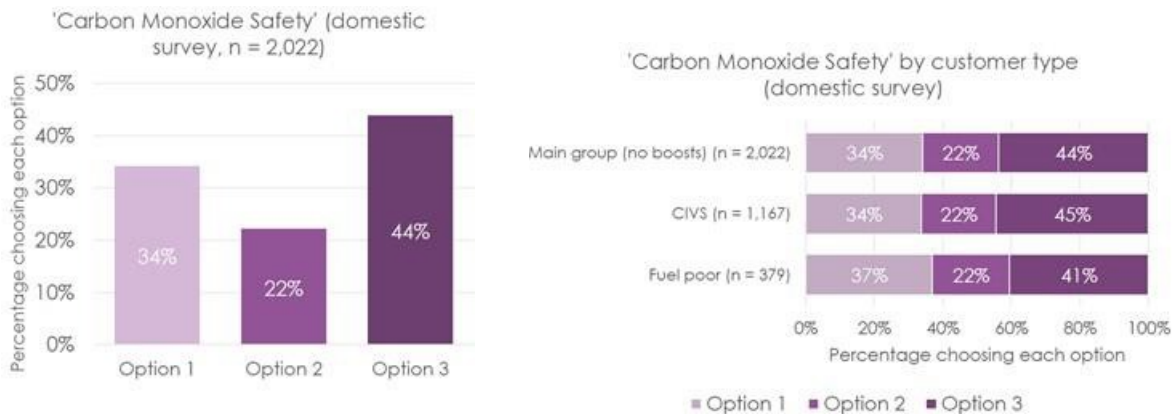
Once we had gathered all the feedback from the options testing phase, we conducted acceptability testing to test our plan in readiness for our final plan submission in December.

### 4.1. Business options testing (BOT) and Triangulation

#### Carbon monoxide safety

During BOT, we asked customers about CO safety. The favoured option in the July 2019 domestic BOT survey had the highest delivery targets (Option 3); to educate 200,000 of those most at risk, issue 600,000 CO alarms per year, partner with every fire and rescue service and all NHS Trusts, with 44% of the votes. The option with the lowest delivery targets (Option 1) received 34% of the votes and the mid-range Option 2 received 22% of the votes. CIVS and fuel poor customers also voted for the Option with the highest delivery targets with 45% and 41% of the votes respectively. Option 3 was also favoured by small business customers, with 47% voting for Option 3.

Figure 5 CO results from BOT survey



Preference analysis shows that those who supported Option 3 had the greatest strength of preference at 8.37 out of 10 (the higher the number the stronger the strength of preference). Option 1 received the lowest strength of preference at 6.58 out of 10.

#### Triangulation

Customers and stakeholders across all our quantitative and qualitative research have been consistently supportive of Cadent raising awareness of the dangers of CO and providing alarms to customers, particularly those in vulnerable situations.

Customers have reinforced their support for our ambitions around CO safety commitments in RIIO-2 by voting for the commitment with the highest delivery targets when cost options were presented to them during BOT (44% of customers surveyed wanted to see us commit to high delivery targets).

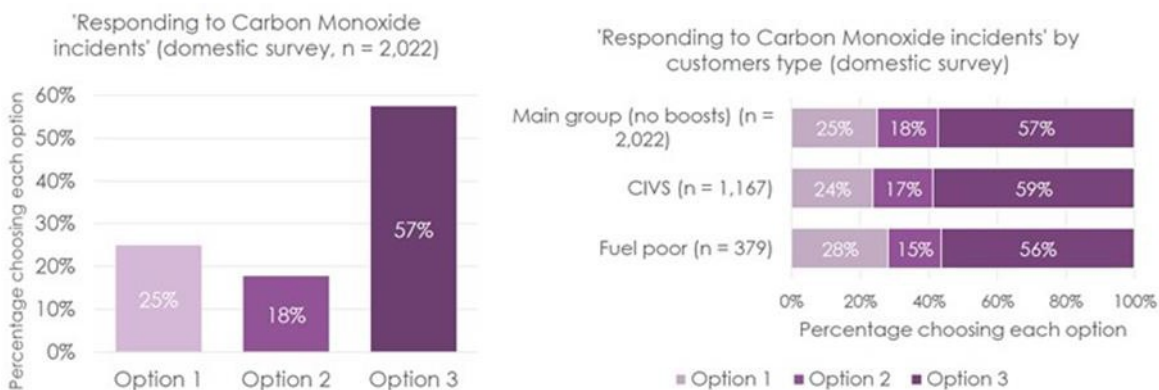
Ultimately there is overwhelming support from across our customer and stakeholder community to continue our work to keep customers and the public safe from the dangers of CO, and even increase the scale of what we do to reach a broader range of customers.

**Decision: Over the RIIO-2 period we will educate 200,000 about the dangers, signs and symptoms of CO, issue 3 million CO alarms and partner with every fire and rescue service and all NHS Trusts.**

*Locating and isolating appliances emitting CO*

We also asked customers about how they would like us to respond to CO incidents. The Option with the highest delivery targets (Option 3) to isolate the appliance emitting CO for 30,000 customers per year received the most votes (57%). Preference analysis also showed that those who supported this Option had the greatest strength of preference at 8.36 out of 10. The Option with the lowest delivery targets received 25% of the votes and the mid-range Option received 18% of the votes. As with CO safety, both CIVS and fuel poor customers voted strongly for Option 3, 59% and 56% respectively. Option 3 was also favoured by business customers, with 58% of those surveyed choosing it.

*Figure 6 Locate and isolate results from BOT survey*



*Triangulation*

Quantitative and qualitative research, together with our engagement with customers and stakeholders clearly demonstrate that our activities around CO risk, and preventing gas disruptions for vulnerable customers, are highly valuable.

The current process around responding to CO incidents involves the engineer isolating the entire gas supply to the property in order to make it safe if CO is detected. The option presented to customers here was something that we had not done before. Locating and isolating the appliance emitting CO only would allow the customer to continue to use any other gas appliances within their property.

Once we developed costed options during BOT, voters were strongly in favour (57%) of us committing to high delivery targets in the number of customers we help with locating and isolating impacted appliances. What is particularly important here is that CIVS and fuel poor customers voted strongly in favour of the highest delivery targets.

The original preference was to offer mid-range (medium) delivery targets for our response to CO. This would be a considerable step up as we currently do not provide this service and would require additional training of our engineers plus some additional equipment. However, this is something we wanted to test with customers as we believe it would provide additional safety benefits and reduce overall disruption to customers during a CO incident.

Due to this being a new activity for us, the validation of costs has been important to ensure we accurately reflect the resources and equipment required and are not over stretching ourselves in terms of the number of customers who we hope would benefit from this service.

In the period between BOT (July 2019) and October 2019 draft business plan submission, targets and costs for responding to CO incidents were reviewed, challenged and validated. We revised the targets for each target delivery level based on updated data as well as ensuring that the costs accurately reflected the delivery of the new activity. Costs went up slightly following this validation. The refreshed targets, associated costs and their effect on customer bills are shown below.

*Table 15 Refreshed targets and costs for responding to CO incidents*

Responding to CO incidents	Option 1	Option 2	Option 3
What Cadent could do	<ul style="list-style-type: none"> <li>Isolate the appliance emitting CO for <b>10,000</b> customers per year</li> </ul>	<ul style="list-style-type: none"> <li>Isolate the appliance emitting CO for <b>15,500</b> customers per year</li> </ul>	<ul style="list-style-type: none"> <li>Isolate the appliance emitting CO for <b>22,500</b> customers per year</li> </ul>
Average additional customer bill impact	£0.03 ( <b>£0.05, an increase of 2p on the bill</b> )	£0.05 ( <b>£0.07, an increase of 2p on the bill</b> )	£0.07 ( <b>£0.10, an increase of 3p on the bill</b> )

While we have revised our target delivery numbers down, the overall costs and the subsequent bill impacts have gone up. These revisions were clearly stated to customers in our acceptability testing and were open to challenge. Nevertheless, the Plan, was accepted by over 95% of the customers and stakeholders; the customer vulnerability strategy which this sits in was one of the most positively commented on aspects of the plan.

This was one of seven commitments requiring a focussed session with the four RIIO Directors due to it being a new area and bringing potential challenges in delivery. Following a thorough deliverability assessment, we have made the decision to not offer the locate and isolate commitment for CO in RIIO-2.

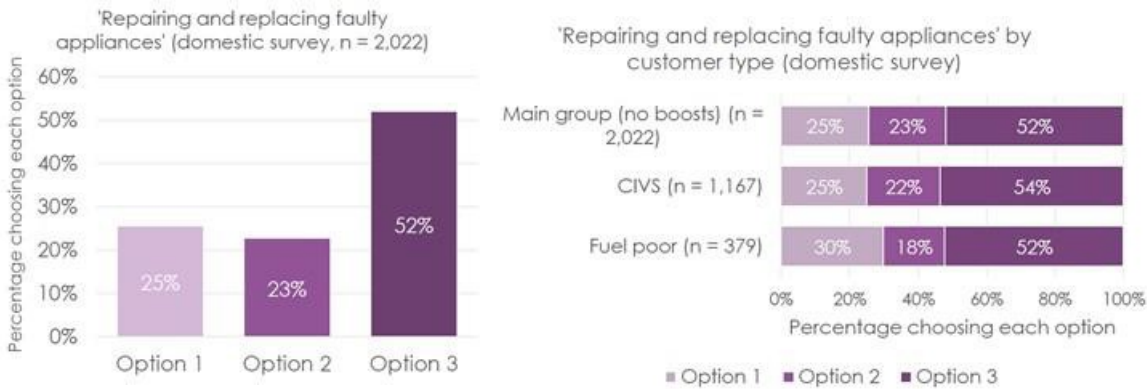
We looked at two ways of delivering this commitment, via our direct-labour emergency workforce and via partnership working. The costed options that we tested assumed that our direct labour would undertake the isolations. However, in early Autumn, our operational business experts re-evaluated how this could be delivered, especially in light of other additional requirements that we are committing to in the plan and the underlying efficiencies that we are seeking to deliver. When factoring training (and the additional training pre-requisites), workforce capacity implications, policy changes and a likelihood of potential competition concerns, we decided that this commitment was not appropriate to pursue via our direct workforce. We therefore considered delivering via partnership working after our field force had safely isolated the customer impacted by CO issues. However, this could increase the total costs and when mapping potential customer journeys, the practical reality is that this involves one engineer capping a supply and passing it to a third party who reconnects *only some* appliances in the property, leaving the customer with a further problem to solve for themselves, this would likely reduce the customer experience rather than improve it.

**Final Decision: We will remove the commitment to locate and isolate appliances emitting CO. We will explore the deliverability of this service in RIIO-2, with no firm commitments. If we are able to demonstrate effective delivery this could be a potential commitment in RIIO-3 subject to customer wants and needs. This is an area that we may seek to prioritise some use of the Cadent Foundation to fund a working trial to allow us to upscale at a later date if successful.**

### *Repairing and replacing faulty appliances*

The third area in which we asked customers what they would like us to do in RIIO-2 was around repairing and/or replacing faulty appliances. During the quantitative BOT survey, customers supported the highest delivery option (Option 3) to repair 1,800 faulty appliances per year and replace 1,200 faulty appliances per year (52% of the votes). Preference analysis also showed that those who supported the highest delivery Option 3 had the greatest strength of preference at 8.17 out of 10. Options 1 and 2 both received a similar number of votes, 25% and 23% respectively. As with other areas of CO safety, CIVS and fuel poor customers also voted heavily in favour of Option 3, with 54% and 52% of the vote respectively. Option 3 was also favoured by business customers, with 53% of those surveyed choosing it as their preference.

Figure 7 Repair and replace results from BOT survey



### Triangulation

Customers and stakeholders recognise the dangers that CO presents to everyone in society and understand the seriousness of the issue. Participants at focus groups were keen to understand more information on how they could be sure that gas pipes and appliances in their homes are safe. Our offering of repairing and/or replacing appliances for the most vulnerable aligns with the safety wants and needs of our customers.

Offering a repair on an appliance or a complete replacement at a large scale would be a new activity for Cadent. Therefore, we have been conservative in terms of the numbers of repair/replace appliances we would want to deliver for customers in RIIO-2. Depending on the success of any commitment we did implement in this area could mean we ramp up the numbers mid-way through or at the end of RIIO-2 and into RIIO-3.

Once we developed costed options for repairing and replacing appliances during BOT, voters were strongly in favour (52%) of us targeting the highest delivery levels for repairing and replacing appliances. As with how we respond to CO incidents, once again, CIVS and fuel poor customers voted strongly in favour of us targeting the highest delivery levels.

The original preference was to offer mid range (medium) delivery targets for repairing and replacing appliances. Although we offer a similar service in RIIO-1 through our partnership with National Energy Action, this is limited to West Midlands and would be a brand-new service offering for our other networks. Therefore, additional training would be required over and above the cost to repair or replace appliances (whether by Cadent or via a contractor). However, we particularly wanted to test this with customers as we believe it would provide additional safety benefits and support CIVS.

Due to this being a new activity for us, the validation of costs has been important to ensure we accurately reflect the resources and equipment we would need and are not over-stretching ourselves in terms of the number of customers who we'd hope would benefit from an appliance repair or replacement.

In the period between BOT (July 2019) and October 2019 draft business plan submission, targets and costs for repair and replacement of appliances were reviewed, challenged and validated. We ensured that the costs accurately reflected the delivery of the new activity. Costs went up slightly following this validation. The refreshed costs and the customer bill impacted are shown below.

*Table 16 Refreshed costs for repairing and replacing faulty appliances*

Repairing and replacing faulty appliances	Option 1	Option 2	Option 3
What Cadent could do	<ul style="list-style-type: none"> <li>600 faulty appliances repaired per year</li> <li>200 faulty appliances replaced per year</li> </ul>	<ul style="list-style-type: none"> <li>1,200 faulty appliances repaired per year</li> <li>600 faulty appliances replaced per year</li> </ul>	<ul style="list-style-type: none"> <li>1,800 faulty appliances repaired per year</li> <li>1,200 faulty appliances replaced per year</li> </ul>
Average additional customer bill impact	£0.02 (£0.03, an increase of 1p on the bill)	£0.05 (£0.06, and increase of 1p on the bill)	£0.09 (£0.12, an increase of 3p on the bill)

While delivery targets have remained the same, overall costs and the subsequent bill impacts have gone up. These revisions were clearly stated to customers within our acceptability testing and did not shift customer preferences. The consensus was that the changes were very minor.

**Decision: Repair 1800 and replace 1200 faulty appliances every year.**

**What conflicts did we need to manage?**

Our Social Return on Investment (SROI) analysis shows that providing CO alarms and education has a relatively small social return. However, assumptions used for these calculations does not take into account the significant number of illnesses and deaths related to CO that are not recognised or misdiagnosed due to low awareness of the symptoms. Testing for CO is often not carried out by the Emergency Services or GPs.

Locating and isolating CO emitting appliances will require a significant investment and increased time for visits if our own engineers are to carry this out directly. Therefore, using partnerships will be a more efficient approach and will also ensure that greater experience is procured.

**4.2. Acceptability testing of our Quality Experience customer outcome**

In our acceptability testing, the quality experience aspects of our business plan, including protecting CIVS, were generally found to be acceptable:

- Of domestic customers, 83% of those surveyed found the quality experience section of the plan acceptable, and only 1% found it unacceptable. When asked what would make it acceptable, those who answered that they found it neither acceptable nor unacceptable suggested a further reduction in prices (14%) or wanted more detail on how it would be implemented (6%). This was broadly consistent across the regions.
- 49% of Cadent business customers said that they found the quality customer experience aspects of Cadent’s business plan “very important” and 37% “fairly important” (86% in total). The breakdown across business sizes was broadly consistent, but overall acceptability increased with business size, with the percentages finding the plan either very acceptable or acceptable being 79%, 87% and 90% for sole traders, businesses with 1-9 employees and business with 10-49 employees respectively. Customers said that a quality experience was an essential element of delivering a service. However, some customers questioned the feasibility of the plan and some terms used (such as fuel poverty or PSR) were not understood. Many business customers said that the proposals around fuel poverty and supporting those in vulnerable situations demonstrated that Cadent were making efforts to go above and beyond their remit.

Our commitments relating to CO awareness were supported in most qualitative acceptability testing:

- At our acceptability testing focus groups with the general population, the CO commitments were popular; it was very clear to participants that they fell within Cadent’s remit. They supported this aspect of the plan.

- Customers at our acceptability testing with CIVS agreed that it is important to educate people on CO. Although, there were some queries about who would qualify for a CO alarm. One customer noted that the costs of a CO alarm could be an issue that stretches beyond only CIVS. Across proposed initiatives, including appliance replacement and carbon monoxide education, some customers questioned whether the number of those supported represents a high enough proportion of Cadent's customers.
- Almost all participants in our acceptability testing focus group with future customers felt that CO was an urgent priority that, although not currently the case for all properties, CO alarms should be legal requirements. While some felt that Cadent was not focusing enough on raising awareness of CO, others believed that suppliers should take responsibility for this. In Peterborough, participants were happy with the commitment to deliver 3 million CO alarms, while in Liverpool it was seen as far too small a figure, given the size of area and population Cadent cover.
- All customers at our acceptability testing focus groups with those in fuel poverty felt that it was acceptable that Cadent takes responsibility for offering support to those at risk of CO poisoning including distributing meters. They felt that it suggested that Cadent cared about their customers. Some customers felt that this should be offered to more people.

A number of participants across acceptability groups felt that delivery quantities could be higher:

- Participants at our acceptability testing customer forum felt that Cadent was 'filling a gap' in the legal framework by making an ethical decision to provide CO detectors, which they supported. Some participants found the plan acceptable, but felt the quantities could be higher, and that Cadent could do more. The majority of discussion on this outcome area focussed on how Cadent would ensure that their efforts were targeted at those who needed support most. Concerns raised included:
  - Those most in need would have difficulty accessing provisions.
  - Some customers might try to take advantage of Cadent's more philanthropic initiatives e.g. repairing and replacing a boiler for free. They want Cadent to explain how robust needs assessments will be conducted.
  - The working poor would be missing out on these initiatives.

Policy Connect were *"Very supportive of the CO alarm programme and we strongly encourage the use of partnerships to deliver these alarms, as this will facilitate efficient implementation"*.

They also said that *"The proposal to repair or replace broken appliances for low-income customers is an excellent proposal and addresses a key barrier to GDNs protecting households from CO; fear of disconnection. As with the above, we recommend Cadent uses its network of partnerships to raise awareness of this programme and make referrals."*

As part of the Verve business plan consultation, a quality experience was seen as critical obligation for any organisation. Most customers saw this as a hygiene factor and it surprised a few that it was part of the plan, although many welcomed it being spelt out. Many expected the commitments to be manageable, though no customers had any real experience of Cadent's services. Providing detail of what the commitments should entail provides comfort, though failure to deliver will quickly harm trust. Reliability and reassurance in relation to safety and service delivery stood out. Some customers had issues with jargon e.g. PSR and some commitments felt hard to achieve. Despite Cadent admitting that direct contact with their customers is rare, the promise that they are available, if needed, was reassuring. Issuing CO alarms to, and educating households showed Cadent is going above and beyond in its service. This service stood out to customers as a positive and proactive service.



## 5. Our commitments



### 5.1. Our commitments for CO awareness in RIIO-2

Given the overwhelming support from across our customer and stakeholder community to continue our work to keep customers and the public safe from the dangers of CO. Over the RIIO-2 period we will measure and report on the following commitments leading to benefits to our current and future customers.

*Table 17 Our commitments for RIIO-2*

Output commitment	Measure definition	Benefits to current customers	Benefits to future customers	Net CVP over RIIO-2 period
Issue 3 million alarms.	Number of CO alarms issued.	<ul style="list-style-type: none"> <li>Vulnerable and non-vulnerable customers immediately protected from CO dangers in the home.</li> </ul>	<ul style="list-style-type: none"> <li>Children protected in the home.</li> <li>Alarms fitted owned and rented properties, so people are still protected when they move house.</li> </ul>	-£5.1m
Partner with every fire and rescue service, every ambulance service and every NHS Trust across our footprint.	% of partnerships with F&RS, Ambulance services, and NHS trusts.	<ul style="list-style-type: none"> <li>A broader range of customers made aware of the dangers, signs and symptoms.</li> <li>Strain reduced on public services as awareness levels increase.</li> </ul>	<ul style="list-style-type: none"> <li>More awareness across the adult population that is passed on to children.</li> </ul>	
Educate 200,000 of those most at risk via our education package .	Number of people educated about the dangers of CO through our education package.	<ul style="list-style-type: none"> <li>Increased awareness of the dangers, signs and symptoms therefore customers can take action faster.</li> </ul>	<ul style="list-style-type: none"> <li>The younger generation being taught of the dangers in school and can pass on knowledge to siblings and other family members.</li> <li>Knowledge retained and passed on to new generations.</li> </ul>	-£0.9m
Repair or replace 15,000 unsafe appliances	Number of unsafe CO emitting appliances serviced, repaired or replaced	<ul style="list-style-type: none"> <li>The risk of CO poisoning reduces as appliances are</li> </ul>	<ul style="list-style-type: none"> <li>Families (including children) are protected from</li> </ul>	£28.5m

condemned during CO incidents.	for those who are most vulnerable following appliance condemnation after a CO incident. For consistency, fairness and deliverability, customers will be assessed against a common set of criteria that we will define and keep relevant.	repaired or replaced in advance of any potential incident of CO.	the risks of having an unsafe appliance in the home.	
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**What would the future look like (RIIO-3 and beyond) as a result of embedding our commitments?**

*Our approach in RIIO-2 significantly reduces the prospects of people being harmed by Carbon Monoxide and sets in train the removal of incorrect diagnosis of symptoms. By the end of RIIO-3 we envisage that every home in our footprint will have a lifesaving CO alarm installed and no one is being harmed by Carbon Monoxide in the home. We have legislation supporting the installation of alarms in all rented accommodation and all new builds.*

**5.2. Assessment of how to treat commitments**

We have undertaken an assessment of these outputs against Ofgem’s criteria to understand the best form of regulatory treatment.

*Table 18 Regulatory treatment assessment*

Regulatory treatment	Criteria	Rating	Further explanation of assessment
<b>Reputational ODI</b>	Demonstrate this is important to customers and/or stakeholders	Green	Our preferred option for this output has strong support from our customer forums.
	Funded elsewhere in our plan, or inappropriate for funding	Red	Only a portion of CO activities we are delivering now is funded elsewhere. We are proposing to deliver over and above this level and this is appropriate for funding in line with Ofgem’s proposals.
	Can robustly measure performance improvement	Light Green	Elements of this output (e.g. CO alarms and awareness) can be easily measured. Other elements such as education programmes are more subjective and not well suited to quantitative measure.
<b>Financial ODI</b>	Demonstrate this is important to customers and/or stakeholders and they are willing to pay	Green	Our preferred option for this output has strong support from our recent customer forums.
	Not funded elsewhere in our plan	Green	Only a portion of CO activities we are delivering now is funded elsewhere. We are proposing to deliver over and above this level and this is

			appropriate for funding in line with Ofgem's proposals.
	Can robustly measure performance improvement		As described for Reputational ODI.
<b>Price control deliverable</b>	Specific deliverable with a clear timeline and targets		Our preferred option for this output contains elements of specific work programmes to widen our protections beyond offering CO alarms to vulnerable customers in RIIO-2.
	Demonstrable benefit to customers which they support		Our preferred option for this output will deliver greater protections to customers in relation to CO in line with what they have told us through our enhanced engagement.
<b>Licence obligation</b>	Absolute minimum, with significant customer harm if we do not deliver it		This output does not relate to meeting a minimum standard. It involves going beyond our existing safeguarding obligations and extending the protections we offer to a greater number of customers.
	Applicable to all GDNs		For this output, we have undertaken work specifically to understand the challenges and needs of customers in our area.
<b>Business Plan Incentive</b>	Adds to the quality of our plan, but not a specific deliverable or performance measure		Our preferred option for this output includes specific programmes of work and performance targets.
	Funded elsewhere in our plan, or inappropriate for funding		This output is not funded elsewhere in the plan and is appropriate for funding in line with Ofgem's proposals.

Doesn't meet criteria	Weakly meets criteria	Partially meets criteria	Meets criteria	Strongly meets criteria
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We are proposing a common reputational ODI under the 'use-it-or-lose-it' (UIOLI) allowance and a bespoke PCD to allow Cadent to deliver an enhanced CO package for customers. The bespoke measure will allow Cadent to go beyond offering alarms to those in vulnerable situations and expand the support package in line with customer wants and needs.

### Common output

Table 19 Measure proposal: a common reputational ODI across GDNs

Output	East of England	North London	North West	West Midlands	Cadent	Comparison to RIIO-1	Cost
Alarms (base level)	38,000	19,000	25,000	18,000	100,000	Targeting 105k alarms in RIIO-1	£0.8m

### Bespoke output

Table 20 Measure proposal: PCD to allow Cadent to deliver an enhanced CO package for customers

Output	East of England	North London	North West	West Midlands	Cadent	Comparison to RIIO-1	Cost
Education	76,000	38,000	50,000	36,000	<b>200,000</b>	Not measured – only awareness surveys	£2.1m
Alarms	1,202,000	551,000	725,000	522,000	<b>2,900,000</b>	Targeting 105k alarms in RIIO-1	£22.2m
Fire & Rescue partnerships	100%	100%	100%	100%	<b>100%</b>	New measure	£0.4m
NHS Trust partnerships	100%	100%	100%	100%	<b>100%</b>	New measure	
Ambulance service partnerships	100%	100%	100%	100%	<b>100%</b>	New measure	
Repair or replace appliances (condemned following CO incident)	5,700	2,850	3,750	2,700	<b>15,000</b>	New measure	£8.6m

## 5.3. Funding our commitments

We propose to fund our commitments through the use it or lose it (UIOLI) allowance and bespoke PCDs. We recognise that our costs associated with proposals on vulnerability go beyond the £30m joint fund proposed by Ofgem, of which approximately £11.5m will be allocated to Cadent.

However, our evidence suggests that customers are willing to pay for enhanced services related to CO safety and that they deliver a positive social return on investment.

Therefore, we propose that those initiatives which deliver the greatest net social value (i.e. SROI considered with delivery costs) are prioritised first through the common UIOLI allowance, and then bespoke PCDs set for initiatives beyond this.

In Chapter 7.3 we have shown a ranking of the benefits of all the vulnerable initiatives in terms of overall value and by value per pound invested which could be used to prioritise against the Ofgem mechanism.

## 6. Delivering our commitments



### 6.1. How we will deliver our commitments

Table 21 Delivering our commitments

Area	What we will do to deliver commitments
<b>Customer communications</b>	<ul style="list-style-type: none"> <li>We will continue to raise awareness of the dangers of CO through our existing interactions on the doorstep via our emergency work and when customers contact us over the phone. All 200,000 educational conversations will be delivered in a classroom-based environment, mainly with key stage 2 children, recognising the great success rate of this in RIIO-1 (over 75% resulting in direct positive action).</li> <li>We will also share vital information on CO safety through our website, social media channels, radio adverts and bespoke flyers/leaflets.</li> <li>We will build on our Safety Seymour programme in schools to increase the scale and develop similar programmes to ensure learning is retained in later school years.</li> </ul>
<b>Processes/ systems</b>	<ul style="list-style-type: none"> <li>We will enhance the usage of data from our core systems and publicly available data to build our understanding of vulnerability in our regions in order to target our enhanced CO services to those who need it most.</li> <li>For consistency, fairness and deliverability when we offer to repair or replace unsafe appliances, we will ensure customers are assessed against a common set of criteria that we will define and keep relevant.</li> </ul>
<b>Partnerships</b>	<ul style="list-style-type: none"> <li>Building on the success of our existing partnerships with the Fire and Rescue service will see us increase our reach with the NHS and ambulance services. Building this network of partnerships will be key in helping us raise awareness of the dangers of CO and distribute CO alarms at a greater scale. We will be able to reach a greater number of customers and ensure they continue to feel safe and in trusted hands.</li> <li>We will develop relationships with leading CO alarm suppliers to ensure we are able to deliver on ambitious commitments and secure bespoke smart alarms for customers who may have specific sensory needs.</li> <li>We will develop partnerships with industry experts and charities to deliver our commitments to repair/replace dangerous appliances for the most vulnerable in our networks.</li> </ul>
<b>Engagement</b>	<ul style="list-style-type: none"> <li>We will continue to work with the All-Party Parliamentary Group to discuss ways of tackling CO poisoning and raising awareness of the dangers.</li> <li>We will continue to work with the wider utilities industry to share learning and best practice, so all customers are able to benefit and contribute to the annual showcase event to exhibit our CO safety initiatives and share best practice.</li> <li>We will continue to engage with expert stakeholders to ensure that we leverage good practice noted elsewhere and continually raise the bar of our service levels.</li> </ul>
<b>Governance</b>	<ul style="list-style-type: none"> <li>All commitments will be governed internally under Director of Customer Strategy, with reporting into the Sustainability Board sub-group.</li> </ul>

**6.2. How we will protect against non-delivery**

*Table 22 Protecting against non-delivery*

Regulatory tool	How it will help in protecting customers from non-delivery
<b>Price control deliverables</b>	Funding for CO activities has been allowed by Ofgem in a UIOLI format. Any funding not used by GDNs will be returned in full to customers. The same principle will apply to the bespoke PCDs we propose beyond the Ofgem set UIOLI allowance.
<b>Reputational</b>	Non-delivery against the reputational output delivery incentives proposed against proposed partnership targets will have a negative reputational impact.

**Annex – Case study: Safety Seymour success story**

**Caerphilly girl, 7, saves family from carbon monoxide poisoning**

[June 2019 article from the BBC](#)



“A seven-year-old girl saved the lives of her family after recalling a gas safety lesson in school. Jaydee-Lee Dummett of Fochriw, Caerphilly, recognised the deadly signs of carbon monoxide poisoning when her four-year-old brother Laylan awoke disorientated in the night.

She remembered the gas emergency phone number after spotting the detector alarm had turned from green to red. Mother Lindy Burke said: “I couldn’t be prouder – she saved our lives.” She added: “from being involved in a simple lesson on gas safety, she knew exactly what to look for. Looking back, without this lesson I genuinely do not think we’d still be alive.”

“After seeing her brother so confused, [she] quickly looked for other tell-tale signs of CO poisoning and then, like it was second nature, she reeled off the gas emergency number. I couldn’t believe it.”

Jaydee-Lee’s quick thinking has been praised by engineers who arrived at the family home on 6 March to make the gas supply safe.

Sean Ward, a Wales and West Utilities emergency engineer, said “The actions of Jaydee-Lee have saved her family’s lives and she should be commended. From speaking to her that night it was clear that she took such a lot of vital information from the gas safety session which is fantastic.”

Jaydee-Lee’s school, Fochriw Primary, said she had become a “role-model” for other pupils.