Cadent

Your Gas Network

# Appendix 09.27:

## Connections & Unauthorised Connections

## RIIO-2 Spend: XXXX

# Investment Decision Pack Overview

This Engineering Justification Framework outlines the scope, costs and benefits for our new-connections proposals. We have prepared a Major Project Engineering Justification Paper (MPJP) for these assets, as the work is customer driven (not asset-health). No CBA has been produced.

## Overview.

This document covers the investment case for new domestic and industrial connections across Cadent's four distribution networks and replacement of unauthorised connections.

Cadent is obligated in its provision of this service to customers. If a customer wants to connect to the network and will pay their portion of the connection charge, we must connect them.

Forecasting demand for new connections is difficult. Whilst there is a trend between new housing/commerce and new connections, the timing and predictability growth forecasts is less certain with delays in planning applications, dependency on developers making investments and a range of wider economic and societal drivers. Additionally, take up of different options for heating and cooking is difficult to predict.

Looking back at RIIO-1, our actual connection volumes for domestic connection customers is c10% lower than the numbers predicted at the time of our RIIO-GD1 submission.

Rather than develop forecast connection volumes based on uncertain future uptake we have opted to set a base case level of connections across our network based on the lowest observed demand year of RIIO-1. We will then look to a volume driver, as part of the uncertainty mechanism process, to enable us to recoup costs for delivery of connections above this base case level.

This provides a fair mechanism for recovering costs in RIIO-2. It protects our customer from any over stated forecasts we make due the uncertainty in the connections market. It also offers protection for us from any potential uplift in connection workload beyond our base case levels from changing demand.

With regards to costs we have examined benchmarking data for RIIO-1 and applied stretching efficiency challenges to our current unit rates. These rates have also been incorporated into the uncertainty mechanism.

**For new domestic and industrial connections**, our base plan has been summarised below by network. This includes our base plan for customer driven connections with respective contributions.

| | £(m) | | | | | |
|---|---|---|---|---|---|---|
| Network | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | Total |
| **EoE** | | | | | | |
| **Lon** | | | | | | |
| **NW** | | | Redacted due to commercial sensitivity | | | |
| **WM** | | | | | | |
| **Total** | | | | | | |

*Table 1: Net Costs for Connections in Base Plan (18/19 post efficiency)*

**We have also built in costs for addressing issues around unauthorised connections.** The costs for unauthorised connections have been included within the Business Plan Data Tables under the Existing Housing but we have assumed there will be no respective contribution allocated to this area as we are responding to connections that already exist but need us to inspection and authorise or undertake works to carry out service relays. The costs for this are summarised below by Network.

| Network | £(m) 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | Total |
|---|---|---|---|---|---|---|
| EoE | | | | | | |
| Lon | | | | | | |
| NW | | | | | | |
| WM | | | | | | |
| Total | | | | | | |

Redacted due to commercial sensitivity

*Table 2: Net Costs for Unauthorised Connections (18/19 post efficiency)*

# Table of Contents

# 2. Summary Table

| Name of Project | Other Property | | |
|---|---|---|---|
| **Scheme Reference** | Cadent investment lines:<br>29 – New Housing<br>30 - Non-Domestic<br>142 – Existing Housing 33b<br>201 – Existing Housing (Unauthorised Connections) | | |
| **Primary Investment Driver** | Growth, Mandatory<br>Cadent is obligated in its provision of this service to customers. | | |
| **Project Initiation Year** | 2021 | | |
| **Project Close Out Year** | 2026 | | |
| **Total Installed cost estimate (£)** | XXXX net in RIIO-2 base plan across all investment lines above. Further breakdown is included in section | | |
| **Cost Estimate accuracy (%)** | ±5% | | |
| **Project Spend to date (£)** | N/A | | |
| **Current Project Stage Gate** | Rolling delivery | | |
| **Reporting Table Ref** | 3.04 Connections | | |
| **Outputs included in RIIO-1 Business Plan** | N/A | | |
| **Spend apportionment** | **RIIO-1** | **RIIO-2** | **RIIO-3** |
| | XXXX | XXXX | XXXX |

*Table 3: Summary Table for Connections*

This new-connections investment case has been written in the Major Project Justification template, because the template was felt to be more appropriate to describe the customer-led connections work herein (this has a non-asset health driver).

# 3. Project Status and Request Summary

This document covers the investment case for meeting our customer-obligations to provide gas connections to customers across our four networks.

This “Project” is in fact a rolling programme of new connections driven by the demand for new housing or non-domestic growth. A further demand for connections arises from the need to remediate unauthorised connections to our network.

This investment case therefore covers the necessary investment to design and deliver a 5-year rolling programme of new connections (minimum baseload) for:

- New Housing connections
- New Non-Domestic connections
- New connections due to Existing Housing
- Connections for Existing Housing due to unauthorised connections.

Any connection volumes above the stated scope in this investment case will be covered by a separate uncertainty mechanism, discussed in section 8.

# 4. Problem Statement

Under section 9 of the Gas Act, Cadent is obligated to connect customers to the gas network where it is efficient to do so. Failure to connect customers is not an option and would result in us not meeting the requirements of the Gas Act, a breach of our Gas Licence.

There are further regulatory standards we are required to meet for Connections:

- General Standards of Service – providing customers with quotes, planned dates and completing aspects of the job by set timescales
- Customer satisfaction measures (only applicable on domestic connections) – providing customers with a service that meets an acceptable standard as set by Ofgem (the "CSAT measure") and measured through customer surveys

Failure to meet these standards would be deemed a breach of our Gas Licence.

The Gas Licence Condition 4B outlines that for **domestic customers** who require a gas connection within 23m of a relevant main that the costs incurred in delivering the work for the first 10 metres on public land is paid for by general consumers through transportation charges. This funding comes to Cadent through a regulatory allowance called the domestic load connection allowance.

For industrial connections, Cadent Gas must connect customers to the gas network where it is efficient to do so. There is no regulatory allowance for this work, with customers paying for the whole connection cost. This market is more competitive than the domestic market, and Cadent tends to pick up work as "a supplier of last resort" i.e. work that the rest of the market does not want. Cadent is unable to provide the customer offering wanted in much of this market (e.g. a multi-utility approach).

Connections are generally low-cost, high-volume work being delivered in a rolling programme, with a timescale from initial enquiry to completion of a few weeks (other than where developments stall, leading to a hold on the connections process).

Connections should be undertaken by Gas Distribution Network companies or by companies who are accredited by the Gas Industry Registration Scheme (GIRS) known as Utility Infrastructure Providers (UIPs). There are potentially many connections that have been made without our authorisation and these need to be addressed to formalise connections, but also inspect and potentially disconnect and reconnect the property with a safe and authorised connection. We have estimated our potential workload to continue address this area during RIIO-2.

## Investment drivers

The overall investment drivers are therefore to discharge our obligation to provide customer connections as set out in:

- Section 9 of the Gas Act 1986
- Gas Licence Condition 4B

We aim to delivery this service in a timely, reliable and efficient manner, giving a positive customer experience. The activity will deliver low-cost energy to customers.

## Key challenges

There are no key challenges in delivering this rolling programme of new-connections. This work is low complexity and delivered routinely by our supply chain.

## Key milestone dates

There are no specific project milestones as this is a continuation of our existing rolling programme of customer-driven connection work.

## Understanding project success

Success will result in the delivery of a customer connections in an efficient, timely and cost-effective manner that satisfies our obligations under the Gas Act (1986) and satisfies our gas licence conditions. Thus, delivering our ultimate objective of providing a safe and reliable service to our gas-customers. This is also a driver for our unauthorised connections and further success will be measure through achieving our annual targets to reduce the inspections outstanding and addressing unauthorised connections through relays or other associated works.

# 4.1. Related Projects

The number of connections has a direct link to capacity draw on our network and the need to reinforce areas as necessary to react to customer growth. As reinforcement and connections have such an interdependency on one another, the reinforcement investment cases are also subject to an uncertainty mechanism.

# 4.2. Project Boundaries

This work will carry out any customer-driven connection requests within Cadent's four gas networks around new housing connections, existing housing connections and non-domestic connections. It covers connection to the gas main, the installation of a service pipe and the final connection to the customer meter (this step is shown on the front cover of the document).

Fuel poor connections are not covered by this investment case but are covered within the Output Case under Chapter 7.3 Providing a quality experience to all our customers, stakeholders and communities - Appendix 07.03.11 Tackling Affordability & Fuel Poverty.

# 5. Project Definition

## 5.1. Supply and Demand Scenario Discussion and Selection

This investment case is driven by the needs of individual properties to connect to the gas network. It is not impacted by wider changes in gas demand.

## 5.2. Project Scope Summary

This work will carry out any customer-driven connection requests within Cadent's four gas networks around new housing connections, existing housing connections and non-domestic connections. It covers connection to the gas main, the installation of a service pipe and the final connection to the customer meter.

This investment case includes an allowance for a minimum number of new connections from any of the following categories:

- New housing connections
- Non-domestic new connections
- New connections from existing housings
- New-connections driven by unauthorised connections

The Gas Licence Condition 4B outlines that for **domestic customers** who require a gas connection within 23m of a relevant main that the costs incurred in delivering the work for the first 10 metres on public land is paid for by general consumers through transportation charges.

As discussed previously, any volumes of connections in excess of the volumes quoted in this document will be included in a separate uncertainty mechanism, discussed in Section 8.

# 6. Options Considered

Forecasting demand for new connections is difficult. Whilst there is a trend between new housing and new connections, the timing and predictability of housing forecasts is less certain with delays in planning applications and dependency on developers making investments. Additionally, take up of different options for heating and cooking is difficult to predict. There are also large economic and societal factors which make connection numbers hard to predict.

The trends in industrial connections are more volatile and tend to react more to political triggers and movements in the economy.

There is much uncertainty in forecasting an accurate number of connections in each of our networks due to the differing guidance available on housing growth and the expansion of the economic regions of the country that contribute to a driver in this forecasting.

We have developed only one *programme-option* for this investment case, we believe that all work we are funded for will almost certainly be required. At the programme level, we have assessed the overall volume and cost of new connections diversions that may be required in RIIO-2. We are proposing to use information on the workload and average costs in RIIO-1 as the basis for our forecast in RIIO-2.

We have chosen a ***conservative approach*** to estimate the minimum workload to include in our RIIO-2 plan using the ***minimum-workload per connection-type delivered in RIIO-1*** within each network. Our internal models forecast that connection volumes will increase through RIIO-2. We are therefore confident that they will not be lower than the lowest year in GD1.

Our RIIO-1 connection cost-trends are shown in the following figures:

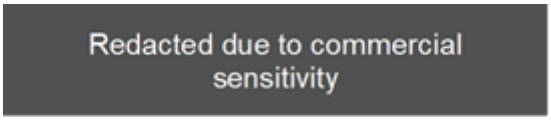


*Figure 1: RIIO-1 Cost Trends for new connections*

Due to the uncertainty, an uncertainty mechanism is proposed, which will be used to address any variations beyond this minimum level. **If the uncertainty mechanism is not accepted by Ofgem we will have to review the base case forecast for connections.**

For each new-connection, we look to use innovative construction methods, including non-dig technology to minimise unit costs. The work is however low-complexity and low cost, with limited solution options available.

We have used our RIIO-1 costs and contributions by network to estimate our RIIO-2 base-plan. Refer to section 6.5 for more details. We have applied efficiencies to our costs based on delivery improvements we are forecasting. EoE is consistent with unit prices and efficiency for all years at around 15%. The remaining networks have incremental steps where efficiency varies the unit costs and contributions each year. Refer to section 9.3 for further details on efficiencies applied.

We have not used CBA to justify this investment case.

The following section sets out the calculations for our preferred programme option for each connection-type.

## 6.1 New Housing Connections

The new connection volumes delivered in RIIO-1 are set out below. The minimum year of RIIO-1 is highlighted and has formed the basis for our RIIO-2 forecast volumes.

| | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 |
|---|---|---|---|---|---|---|
| EoE | Redacted due to commercial sensitivity | | | | | |
| Lon | | | | | | |
| NW | | | | | | |
| WM | | | | | | |

*Table 4: New Housing Connections RIIO-1*

Using this minimum year as the basis for our RIIO-2 forecast volumes, our RIIO-2 volumes for this base plan are summarised below.

| | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| EoE | 2,005 | 2,005 | 2,005 | 2,005 | 2,005 |
| Lon | 705 | 705 | 705 | 705 | 705 |
| NW | 621 | 621 | 621 | 621 | 621 |
| WM | 719 | 719 | 719 | 719 | 719 |

*Table 5: RIIO-2 forecast volumes for New Housing Connections (Base Plan)*

We have calculated the average unit cost and average contribution for each new connection based on RIIO-1 data. The unit costs and contributions are outlined in Option Cost Estimate Details (Section 6.5). Efficiencies have then been applied, as discussed in section 8.3.

| | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| EoE | Redacted due to commercial sensitivity | | | | |
| Lon | | | | | |
| NW | | | | | |
| WM | | | | | |

*Table 6: RIIO-2: Net costs to deliver new housing connections (base plan) £m*

## 6.2 Non-Domestic Connection

The non-domestic connection volumes delivered in RIIO-1 are set out below. The minimum year of RIIO-1 is highlighted and has formed the basis for our RIIO-2 forecast volumes.

| | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 |
|---|---|---|---|---|---|---|
| EoE | 136 | 135 | 188 | 262 | 222 | 308 |
| Lon | 107 | 170 | 141 | 177 | 171 | 283 |
| NW | 75 | 80 | 107 | 92 | 176 | 228 |
| WM | 75 | 80 | 107 | 92 | 176 | 228 |

*Table 7: Non-Domestic new connections RIIO-1*

Using this minimum year as the basis for our RIIO-2 forecast volumes, our RIIO-2 volumes for this base plan are summarised below.

| | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| **EoE** | 135 | 135 | 135 | 135 | 135 |
| **Lon** | 107 | 107 | 107 | 107 | 107 |
| **NW** | 75 | 75 | 75 | 75 | 75 |
| **WM** | 75 | 75 | 75 | 75 | 75 |

*Table 8: RIIO-1 forecast volumes for Non-domestic connections (Base Plan)*

We have calculated the average unit cost and average contribution for each new connection based on RIIO-1 data. The unit costs and contributions are outlined in Option Cost Estimate Details (Section 6.5). Efficiencies have then been applied, as discussed in section 8.3.

| | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| **EoE** | | | | | |
| **Lon** | | Redacted due to commercial sensitivity | | | |
| **NW** | | | | | |
| **WM** | | | | | |

*Table 9: Net costs to deliver non-domestic connections (base plan) £m*

## 6.3 Existing housing new-connections

The existing housing new-connection volumes delivered in RIIO-1 are set out below. The minimum year of RIIO-1 is highlighted and has formed the basis for our RIIO-2 forecast volumes.

| | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 |
|---|---|---|---|---|---|---|
| **EoE** | 4,748 | 4,206 | 4,734 | 4,212 | 3,712 | 4,382 |
| **Lon** | 1,329 | 1,450 | 1,984 | 1,951 | 1,715 | 2,041 |
| **NW** | 1,804 | 1,742 | 1,959 | 1,649 | 1,554 | 2,060 |
| **WM** | 1,549 | 1,396 | 1,640 | 1,427 | 1,514 | 1,608 |

*Table 10: Existing housing new connections RIIO-1*

Using this minimum year as the basis for our RIIO-2 forecast volumes, our RIIO-2 volumes for this base plan are summarised below.

| | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| **EoE** | 3,712 | 3,712 | 3,712 | 3,712 | 3,712 |
| **Lon** | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 |
| **NW** | 1,554 | 1,554 | 1,554 | 1,554 | 1,554 |
| **WM** | 1,396 | 1,396 | 1,396 | 1,396 | 1,396 |

*Table 11: RIIO-1 forecast volumes for existing housing new-connections (Base Plan)*

We have calculated the average unit cost and average contribution for each new connection based on RIIO-1 data. The unit costs and contributions are outlined in Option Cost Estimate Details (Section 6.5). The resulting cost profile is summarised below. Efficiencies have then been applied, as discussed in section 8.3.

| | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| **EoE** | | | | | |
| **Lon** | | Redacted due to commercial sensitivity | | | |
| **NW** | | | | | |
| **WM** | | | | | |

*Table 12: Net costs to deliver existing housing new-connections (base plan) £m*

## 6.4 Unauthorised connections

Our unauthorised connection numbers have been based upon the number of applications made to us for connections between 1998 to 2003. We cannot assume that all these applications were unauthorised but based on previous experience have assumed that 30% of these applications will require an inspection to be undertaken by us. We have then assumed that 15% of this 30% will require a service connection relay or other associated work to ensure the connection is safe and subsequently authorised and recorded.

| Network | No. of Unauthorised Connections | | | | | |
|---|---|---|---|---|---|---|
| | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | Total |
| EoE | 226 | 226 | 226 | 226 | 226 | 1,131 |
| Lon | 359 | 359 | 359 | 359 | 359 | 1,795 |
| NW | 192 | 192 | 192 | 192 | 192 | 961 |
| WM | 123 | 123 | 123 | 123 | 123 | 613 |
| **Total** | 900 | 900 | 900 | 900 | 900 | 4,500 |

*Table 13: RIIO-2 forecast volumes of unauthorised connections*

We have calculated the average unit cost and average contribution for each new connection based on RIIO-1 data. The unit costs and contributions are outlined in Option Cost Estimate Details (Section 6.5). The resulting cost profile is summarised below. Efficiencies have then been applied, as discussed in section 8.3.

| | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| **EoE** | | | | | |
| **Lon** | | Redacted due to commercial sensitivity | | | |
| **NW** | | | | | |
| **WM** | | | | | |

*Table 14: Net costs to deliver unauthorised connections (base plan) £m*

## 6.5 Option Cost estimate details

We have used our RIIO-1 connection unit costs & contributions to inform our RIIO-2 forecasts.

The following RIIO-1 costs per km of new-connections delivered, is summarised below.

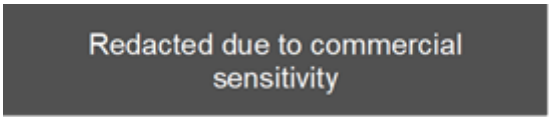


*Figure 2: Costs per km for new-connections (RIIO-1) £m*

We have applied efficiencies to our costs based on delivery improvements we are forecasting. EoE is consistent with unit prices and efficiency for all years at around 15%. The remaining networks have incremental steps where efficiency varies the unit costs and contributions each year (refer to section 9.3 for further details).

Using our RIIO-1 costs and applying the above efficiencies, we have derived the following average unit costs for each network per connection. We have also analysed our contribution costs for each connection-type by network.

| | | EoE | Lon | NW | WM |
|---|---|---|---|---|---|
| **New Housing connections** | Cost | Redacted due to commercial sensitivity | | | |
| | Contribution | | | | |
| | **Net-cost** | | | | |
| **Non-domestic connections** | Cost | | | | |
| | Contribution | | | | |
| | **Net-cost** | | | | |
| **Existing housing connections** | Cost | | | | |
| | Contribution | | | | |
| | **Net-cost** | | | | |
| **Unauthorised connections** | Cost | | | | |
| | Contribution | | | | |
| | **Net-cost** | | | | |

*Table 15: Unit costs and contributions for all connection-types (£k)*

These unit costs have been quoted pre-efficiency in 18/19 price base. Efficiency has been applied in the resulting spend profiles for RIIO-2 for each delivery-year.

For Connections our cost confidence is defined as being within Construction phase with a range of +/-5%.

The above table includes elements of unauthorised connections within both existing housing connections and non-domestic connections. These are detailed further in tables 15a and 15b.

| | | EoE | Lon | NW | WM |
|---|---|---|---|---|---|
| **Existing Housing connections – Unauthorised connections** | Cost | Redacted due to commercial sensitivity | | | |
| | Contribution | | | | |
| | **Net-cost** | | | | |

*Table 16a: Unit costs Existing Housing connections – Unauthorised connections (£k)*

| | | EoE | Lon | NW | WM |
|---|---|---|---|---|---|
| **New Housing connections – Unauthorised connections** | Cost | Redacted due to commercial sensitivity | | | |
| | Contribution | | | | |
| | **Net-cost** | | | | |

*Table 17b: Unit New Housing connections – Unauthorised connections (£k)*

## 6.6 Options Summary

As discussed previously we have only considered one programme-level option for this investment case, which has used a conservative minimum workload in RIIO-1 to inform RIIO-2 forecasts.

For this reason, we have used this option summary to present a summary of all different connection types described above. These are not-comparative.

| | | New Housing new connections | Non-domestic new connections | Existing housing new connections | Unauthorised connections |
|---|---|---|---|---|---|
| **Preferred solution-option** | | To install a new connection | To install a new connection | To install a new connection | To install a new connection |
| **Start / End date** | | Rolling 5-year programme | Rolling 5-year programme | Rolling 5-year programme | Rolling 5-year programme |
| **Volumes of connections per year** | **EoE** | 2005 | 135 | 3712 | 226 |
| | **Lon** | 705 | 107 | 1329 | 359 |
| | **NW** | 621 | 75 | 1554 | 192 |
| | **WM** | 719 | 75 | 1396 | 123 |
| **Design Life** | | Circa 40yrs | Circa 40yrs | Circa 40yrs | Circa 40yrs |
| **Total installed cost (net of contributions)** | | Redacted due to commercial sensitivity | | | |
| **Cost estimate accuracy** | | + or – 5% | + or – 5% | + or – 5% | + or – 5% |

*Table 18: Options Summary*

The resulting net capex-profile for our new connections base-plan, by year is summarised below:

| | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | Total |
|---|---|---|---|---|---|---|
| **New Housing** | | | | | | |
| **Non-domestic**<br>**Existing housing** | Redacted due to commercial sensitivity | | | | | |
| **Unauthorised connections** | | | | | | |

*Table 19: RIIO-2 Capex profile for all new connections (Base Plan) £m*

# 7. Business Case Outline and Discussion

## 7.1. Key Business Case Drivers Description

This programme of work covers our obligation under section 9 of the Gas Act, to connect customers to the gas network where it is efficient to do so. It also seeks to satisfy our Gas Licence Condition 4B, for domestic customers who require a gas connection within 23m of a relevant main.

## 7.2. Supply and Demand Scenario Sensitivities

This investment case is a base case and will not impacted by any changes to the supply-demand scenario. Where annual workloads exceed the base case, these will be dealt with through the volume driver submitted as part of the uncertainty mechanisms.

## 7.3. Business Case Summary

The following table summarises the single programme option included. We have not completed a CBA for this investment case, because the work comprises mandatory investment to comply with key Gas Licence and Gas Act obligations. This investment case is based on the installation of a new connection – no other solution-options have been considered.

| | | Option 1: Connections Base Case |
|---|---|---|
| **Supply and Demand Scenario Description** | | Not impacted by supply demand scenario. |
| **Project commissioning date** | | 2021/22 |
| **Total Installed cost** | ALL connection types | Redacted due to commercial sensitivity |
| | New Housing connection | |
| | New Non-Domestic connections | |
| | New connections for existing housing | |
| | New connections for unauthorised connection | |
| **Total Capex in RIIO-2** | | |
| **Cost estimate accuracy (%)** | | + or – 5% |
| **Project operating lifespan** | | 45 years + |
| **Project NPV** | | Not applicable |

*Table 20: Business Case Summary Table*

Any volumes of connections in excess of the volumes quoted in this document will be included in a separate uncertainty mechanism. The Uncertainty Mechanism is detailed in Chapter 10 - Managing risk and uncertainty, Appendix 10.00 - Our approach to managing risk and uncertainty, and Appendix 10.11 Connections.

# 8. Preferred Option Scope and Project Plan

## 8.1. Preferred Option for this Request

**Our preferred option is Option 1** (the only option we have considered at programme level)

Due to the uncertainty surrounding the scale of non-chargeable diversions, our preferred option (at a programme level) is to include in the base plan only the *minimum workload* that can reasonably be expected, along with an uncertainty mechanism to address workload in excess of this minimum level. We have used 100% of RIIO-1 connection volumes and average costs & contributions as reported in the RRP. Our forecasts show that connection volumes are likely to increase above RIIO-1 levels. This options therefore provides a baseline that we can be confident will almost certainly be required, ensuring customers won't be impacted through over payment.

In conjunction with this approach, **we are also proposing an uncertainty mechanism**. The uncertainty mechanism (described in section 9.3 below) is designed protect customers, and the business, against volatility in workloads. If the uncertainty mechanism is not accepted by Ofgem we will have to revise our base case and the associated costs.

These two elements, working together, protect customers and the company.

## 8.2. Project Spend Profile

The following tables summarise the spend-profiles for different connection work-types:

| | £(m) | | | | | |
|---|---|---|---|---|---|---|
| Network | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | Total |
| EoE | | | | | | |
| Lon | | | | | | |
| NW | | | | | | |
| WM | | | | | | |
| Total | | | | | | |

Redacted due to commercial sensitivity

*Table 21: Net costs for new & existing housing and non-domestic connections*

| | £(m) | | | | | |
|---|---|---|---|---|---|---|
| Network | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | Total |
| EoE | | | | | | |
| Lon | | | | | | |
| NW | | | | | | |
| WM | | | | | | |
| Total | | | | | | |

Redacted due to commercial sensitivity

*Table 22: Net Costs for Unauthorised Connections (18/19 post efficiency)*

| | £(m) | | | | | |
|---|---|---|---|---|---|---|
| | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 | Total |
| EoE | Redacted due to commercial sensitivity | | | | | |
| Lon | | | | | | |
| NW | | | | | | |
| WM | | | | | | |
| Total | | | | | | |

*Table 23: RIIO-2 cost profile (Net costs in £m): All connections, including unauthorised*

The costs are in 2018/19 Price Base post efficiency.

## 8.3. Efficient Cost

We are assuming that our Service Transformation programme will deliver efficiency savings during RIIO-2 through the improvement of processes to reduce cost and improve the service provision to the customer.

Based on this learning we have chosen to apply efficiencies to this new-connections investment case discussed below.

Our RIIO-2 forecasts, as well as adjusting for workload and work mix factors, also include ongoing efficiencies flowing from our transformation activities and from updating and renewing our contracting strategies. Our initiatives are outlined in Appendix 09.20 Resolving our benchmark performance gap. For Capex activities this seeks a 2.9% efficiency improvement by 2025/26 on the end of RIIO-1 cost efficiency level.

We have applied efficiencies to our costs based on delivery improvements we are forecasting. We have however applied a greater level of efficiency into East of England network in respect of Connections, where the bottom-up regression identified that this network was expensive compared to all other networks. On this basis an efficiency for all years of approximately 15 % has been applied to East of England.

The remaining networks have incremental steps where efficiency varies the unit costs and contributions each year.

These efficiencies are included within the costs quoted in the tables within this investment paper and are summarised below.

| Network | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| EoE | 15% | | | | |
| Lon | 2.0% | 2.3% | 2.6% | 2.9% | 3.2% |
| NW | | | | | |
| WM | | | | | |

*Table 24: Base Case Capex profile for RIIO-2: Connections*

For further details on Cadent's identification of efficiencies please refer to Appendix 09.20 Resolving our benchmarked performance gap – section 6.

## 8.4. Project Plan

The base case has forecast annual workloads of connections for each of our networks throughout RIIO-2.

## 8.5. Key Business Risks and Opportunities

Delivery of connections is a business as usual activity. The primary challenge will be to efficiently deliver this large programme of property refurbishment.

A higher number of unauthorised connections above the 15% predicted are discovered through the inspection process.

| Reference | Risk Description | Impact | Likelihood | Mitigation /Control |
|---|---|---|---|---|
| **09.27 - 001** | Supply & Demand deliverability risk of Resource availability within the Gas industry | Potential cost increases in labour / commodity markets as demand is greater than supply | Low | Intelligent procurement and market testing. Apprenticeship and Training programmes to fill skills gaps |
| **09.27 - 002** | Stretching efficiency targets may not be deliverable (unit costs increase) | Outturn costs are not met increasing overall programme costs. | Low | Established market place - ability to manage the known commodity market |
| **09.27 - 003** | Unforeseen outages and failures restrict access for planned work | Programme and delivery slippage due to delay of planned outages and or site access | Low | Proactive asset management with ongoing condition surveys and response plans to prevent failures |
| **09.27 - 004** | Unseasonal weather in 'shoulder months', Autumn and Spring reduce site access/outage windows | Increased demands affecting access to sites and planned outages delay and cost increases | Low | Controlled forecasting and maintenance of flexibility to react to unforeseen events. Detailed design solutions to minimise outages and reduce exposure. |
| **09.27 - 005** | Unexpected / uncommunicated obsolescence during RIIO-2 period of equipment components | Inability to maintain equipment at full capacity with risk of impact upon supply | Low | Maintain a close relationship with equipment supply chain and manage a proactive early warning system where spares / replacements become at risk. |
| **09.27 - 006** | Legislative change - There is a risk that legislative change will impact the delivery of our work. | Potential increase in the amount of consultation and information exchange required and require us to align our plans with the safety | Med | We have established management teams to address these issues. We have also identified UMs for key areas. |

| Reference | Risk Description | Impact | Likelihood | Mitigation /Control |
|---|---|---|---|---|
| | | management processes operated by 3rd Party landowner / asset owners. The potential impact is more engagement and slower delivery | | |

*Table 25: Risk Register*

## 8.6. Outputs Included in RIIO-1 Plans

No defined outputs for connections were included in the RIIO-1 plan.

## 8.7. Regulatory Treatment

Cost variance for low materiality specific projects such as this will be managed through the Totex Incentive Mechanism (TIM)

Additional work will be funded through the Uncertainty Mechanism in Appendix 10.11 Connections, however, if this is not accepted we will need to revise this base case for connections.

This investment is accounted for in the Business Plan Data Table 3.04 Connections across the New Housing, Existing Housing and Non-Domestic Sub Tables.