

Non-Operational IT Capex Re-opener Submission

January 2023

Classification: Confidential

In this application we have redacted all costs information on the basis that this is commercially sensitive. Other areas have been redacted on the basis that information is considered sensitive.



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Ofgem Requirement

The table below outlines where each chapter of this application relates to Special Condition 3.7 of our Gas Transporter licence as well as Ofgem’s requirements as set out in Special Condition 9.4.

Ofgem requirement	Application chapter / section
GT licence – Special Condition 3.7, Part C: Non-Operational IT Capex re-opener	
Circumstances for applying to Ofgem for re-opener (Para 3.7.5)	Chapter 1.0 – Exec Summary
Application requirements (para 3.7.7 & 3.7.8b)	Chapter 1.0 – Exec Summary Chapter 2.0 – Alignment with our RIIO-GD2 Business Plan Chapter 3.0 – Demonstration of Needs Case Chapter 4.0 – Options Analysis and Preferred Option Chapter 5.0 – Project Delivery and Monitoring Chapter 6.0 – Technical Feasibility and Consumer Benefit Chapter 7.0 – Cost Information
RIIO-2 Re-opener Guidance and Application Requirements Document: Version 2 (Feb 2022)	
Introduction (para 3.1)	Chapter 1.0 – Exec Summary
Gas Distribution Sector (para 3.6)	Chapter 7.2 – Cost Information Breakdown
Appendix 2: Non-Operational IT Capex Re-opener guidance	
Alignment with overall business strategy and commitments (para 1.1 – 1.2)	Chapter 1.0 – Exec Summary Chapter 2.0 – Alignment with our RIIO-GD2 Business Plan
Demonstration of needs case (para 1.3)	Chapter 3.0 – Demonstration of Needs Case Chapter 3.1 – Problem Statement Chapter 3.3 – Benefits from this re-opener Chapter 3.5 – Description of Risks
Options Selection - Consideration of project options and methodology of how preferred project option selected (para 1.5)	Chapter 4.0 – Options Analysis and Preferred Option Chapter 4.1 - Consideration of options and methodology for selection of the preferred option
Options Selection – Preferred project option details (para 1.6, 1.7)	Chapter 3.3 – Benefits from this re-opener Chapter 3.5 – Description of Risks Chapter 4.2 – Preferred Option
Options Selection – Technical feasibility and consumer benefit (para 1.8, 1.9)	Chapter 6.0 – Technical Feasibility and Consumer Benefit
Options selection – Project delivery and monitoring (para 1.10)	Chapter 5.0 – Project Delivery and Monitoring Chapter 5.1 – Project Governance Chapter 5.2 – Project Delivery

Cost Information – Consideration of options (<i>para 1.12</i>)	Chapter 4.0 – Options Analysis and Preferred Option Chapter 7.0 – Cost Information
Cost Information – Breakdown of costs of preferred option (<i>para 1.13-1.15</i>)	Chapter 4.2 – Preferred Option Chapter 7.2 – Cost Information Breakdown Chapter 5.0 – Project Delivery and Monitoring

Point of Contact

Should you wish to discuss any elements of this re-opener or have further questions, please send your question to our mailbox referenced below.

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Chapter 1.0

Exec Summary

This paper is Cadent's application to the Authority requesting an adjustment to our RIIO-GD2 allowances under the Non-Operational IT Capex re-opener mechanism. This modification is necessary to support Cadent's growing maturity against the Data Best Practice Guidance and to ensure that we can comply with our obligations under Part D of Special Licence Condition 9.5 of our Gas Transporter Licence across the RIIO-GD2 period.

Cadent Gas Limited ("**Cadent**") is making this re-opener submission under Special Condition 3.7 Non-Operational IT Capex licence condition, Part C, Para 3.7.5 (c) under the trigger: any changes to statutory or regulatory requirements relating to Non-Operational IT Capex.

Following discussions with Ofgem, only one of Cadent's Non-Operational IT Capex projects identified in our July 2022 re-opener pipeline application log has been put forward for this January 2023 re-opener window, whilst the remainder will be submitted in a summer window (28 August 2023 – 15 September 2023). This re-opener therefore covers the Open Data project.

At the time we submitted our RIIO-GD2 business plan submission the Data Best Practice Guidance had not been formally agreed and the sector was still discussing the best ways and mechanisms to adopt the recommendations of the Energy Data Taskforce Report "A Strategy for a Modern Digitalised Energy System"¹ published in June 2019. During the critical time for the RIIO-GD2 submission, a consensus within the Energy Sector had not been reached regarding the roadmap to adopting the recommendations. Whilst a draft version of the Data Best Practice Guidance was provided to companies a few weeks before the deadline for business plan submission, there was not sufficient opportunity to fully identify, undertake stakeholder engagement and include with RIIO-GD2 business plans the technological investments required to meet the ambition of the new Data Best Practice (DBP) guidance.

Since publishing our RIIO-GD2 business plan, the Data Best Practice Principles have matured our thinking in this space and we are using this re-opener to apply for funding to make the strategy, plans and principles a reality. The initiatives in this re-opener application are structured into three workstreams (Metadata tool, Open Data Portal, and Interoperability) and will allow Cadent to further mature against the Data Best Practice guidance whilst working towards the recommendations included in the subsequent Energy Digitalisation Taskforce Report "Delivering a Digitalised Energy System"².

¹ <https://es.catapult.org.uk/report/energy-data-taskforce-report/>

² <https://es.catapult.org.uk/report/delivering-a-digitalised-energy-system/>

The proposed investment and adjustment size

The investment is constructed in three workstreams to address separate aspects of the Data Best Practice Guidance:

- **Workstream 1: Metadata Management** – to implement the digital **tool** that allows to build out a digital data catalogue of Cadent critical data. This is partially retrospective as Cadent has already commenced this workstream.
- **Workstream 2: Open Data Portal** – to set up a new digital **service** to make Cadent Data Assets discoverable and available to Data Users.
- **Workstream 3: Interoperability** – to develop reusable and secure Application Programming Interfaces and to manage the lifecycle of these digital assets.

The total adjustment requested is [REDACTED] in 18-19 prices.

Adjustment size by workstream in 18-19 prices:

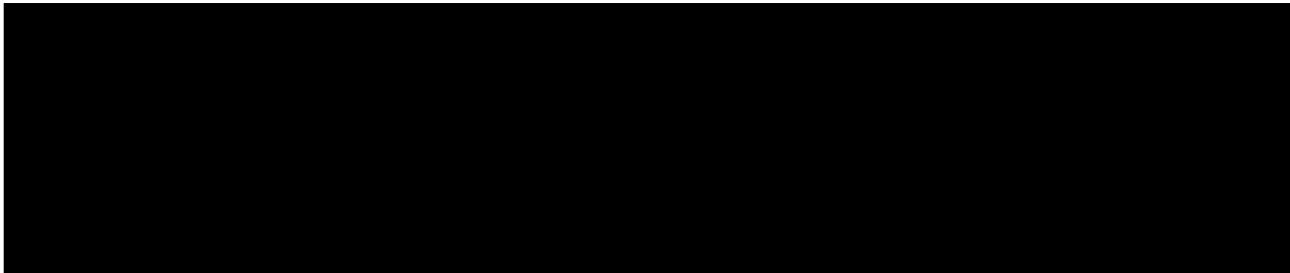


Table 1: Workstream costs

Chapter 2.0

Alignment with our RIIO-GD2 business plan

Overall Business Strategy and Digitalisation Strategy Alignment

Cadent's gas network plays a critical role in delivering affordable, safe, and reliable heating to 11 million homes and businesses, fuelling major industry, homes, businesses, schools, and hospitals in England.

Within Cadent's RIIO-GD2 business plan, we noted our strategic intent with the Data and Digitalisation Strategy (Section 7.2) – most notably to ensure “Data is readily available to all our employees and customers in a format that is suitable for them, reducing time spent producing reports and increasing the quality of our data through continuous use”. We noted on page 67 of our business plan that our Data & Digitalisation Strategy exists to support our Purpose of Delivering a Resilient Network to keep the energy flowing safely and reliably, and providing a Quality experience for our customers, stakeholders, and communities (Figure 1). We also committed on page 68 to build a data driven organisation, engage with users and open our data (Figure 2).

In November 2019, through the Energy Networks Association (ENA), Cadent and other Gas and Electricity Distribution, Transmission and Network Operators, formed a dedicated subgroup whose task is to discuss and collectively define projects, processes, and standards to increase digital maturity of the sector and work collectively, where appropriate, on new processes and solutions for Open Data.

Cadent designed and implemented a dedicated process to Triage Data Sharing requests and communicated internally a 'Presumed Open' principle to enable fulfilment of the data requests utilising current Cadent staff. However, it is recognised that the current process is reactive and manual, primarily due to gaps in technology and the lack of dedicated resources. In the meantime, the consensus has now been reached and the guidance has been disseminated, discussions in the sector have matured and there are more precise expectations defined in areas of requirements and compliance. Cadent has articulated the gaps in a table format to Ofgem (Figure 11) and within this submission and are proposing that the investment will address our weaker levels of maturity against the DBP, as well as providing a digital service that is fulfilling the needs of Data Users.

Any proposed IT solution at Cadent must support the high-level objectives of the business plan³, and this proposed investment supports multiple elements of it – for example “standardising information sought by networks”, continuing to mature our data strategy which helps deliver a “resilient network to keep the energy flowing safely and reliably”, “having whole-system approaches likely to drive forward the industry – including proposals for data sharing”, and maturing our Data and Digitalisation Strategy – all of which helps provide a quality experience to our customers, stakeholders and communities. Additionally, this proposed investment is required to facilitate Cadent in meeting Ofgem’s Data Best Practice Guidance.

Although volumes are low, we are seeing a growing interest and need for availability of Cadent Data Assets to provide:

- greater transparency in relation to Cadent gas assets and their condition and operations to optimise the investments and operations,
- the insight to support new developments, especially in demonstrating technological and operational viability of future gas solutions
- understanding of the gas network in local areas to aid the development of future energy plans.

The proposed investment is directly linked to the Gas Transporter Licence Special Condition 9.5 Digitalisation. Specifically, the licence condition mandates the compliance with the Data Best Practice – which requires Cadent to build a catalogue of Data Assets, ensure interoperability of the Data Assets and to make Data Assets discoverable and available to stakeholders with supporting information, subject to the Open Data Triage Process.

The ambition to provide digital products and services to our community of stakeholders is articulated in our Digitalisation Strategy⁴, describing our view of The Energy Data Community – See Figure 1 below.

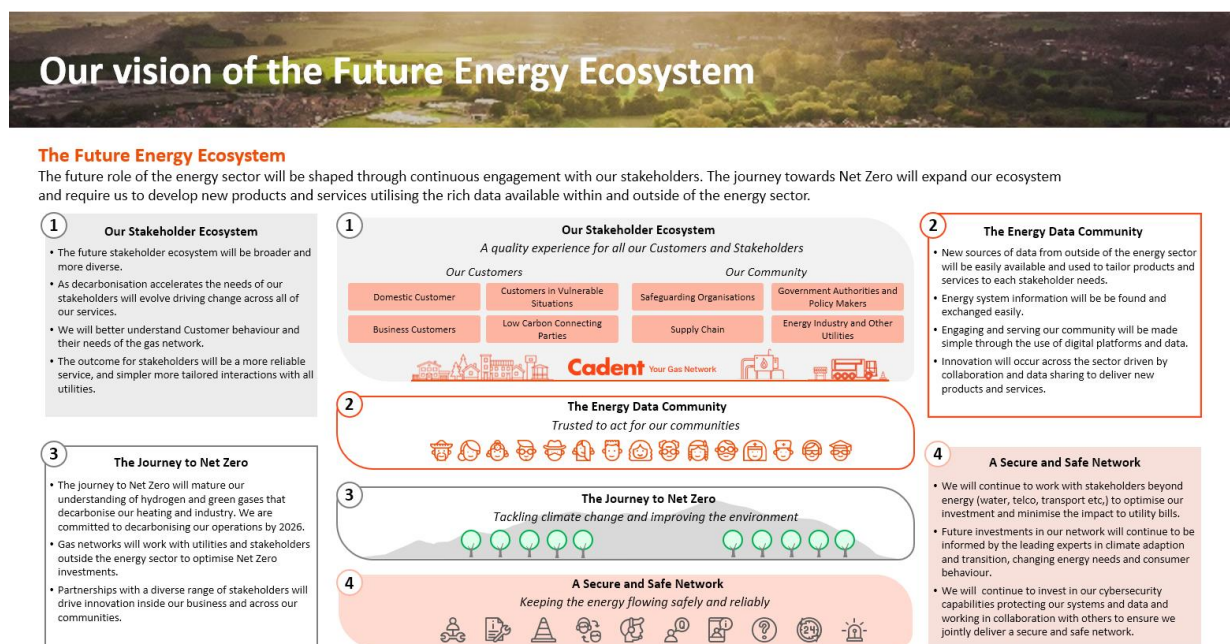


Figure 1: Vision of the Future Energy Ecosystem

³ [Cadent_BusPlan_PART3_May-10-2021.pdf \(cadentgas.com\)](#)

⁴ [Cadent-Digitalisation-Strategy-2022-Update.pdf \(cadentgas.com\)](#)

An offline copy of Figure 1 can be found here: [Cadent-Digitalisation-Strategy-2022-Update.pdf \(cadentgas.com\)](#) on page 9.

Moreover, at a technology level, solutions should conform to IT Architecture standards. Here is an excerpt of relevant Cadent IT Architecture principles that apply to this investment:

- Data is an Asset, Data is Shared, Data is Accessible, Data is Secure
- Applications and Services are easy to use
- Manual processes are reduced and removed
- Reuse, before we rent, buy or build
- Applications and services are robust and fault-tolerant

The capability to ingest and consume information across an ever-increasing number of data points, and interconnect between a myriad of systems and services, cloud or otherwise, as well as manage the corresponding flows efficiently and securely, forms the fundamental bedrock that the modern digitally native organisation is built on.

The success of an organisation in driving greater insight, and therefore its ability to make decisions through the sharing and consumption of quality data, is wholly dependent on the ease of accessibility and interconnectivity to this vast array of datasets which are being collected and consumed on an ever more frequent basis.

Equally, the modern digital organisation requires the ability to adapt to ever more frequent changes enforced from the outside in, whether it be regulatory, legal or some other factor, and to be able to quickly adapt as required with minimum time and cost.

Our vision and planned investments in Data and Digitalisation are also influenced by collaboration with other energy networks as part of Energy Networks Association's Data and Digitalisation Steering Group (ENA DDSG) that was formed in response to recommendations from Energy Catapult Data Taskforce, to provide the platform to discuss the direction, standards and digital solutions that enable the energy sector to mature in digital transformation and lead to creation of interoperable energy system in the future.

Digitalisation Strategy Dependencies

The success of our Digitalisation Strategy depends on growth and investment in our tools, interoperability, and digital skills base to evolve our existing products and develop digital services that meet our stakeholders' needs.

The first 18 months of the RIIO-GD2 period proved that the sector-wide hyper focus on the adoption of digital thinking in the energy sector, with rapid development of data products and services, and the role these products play in delivering a digitalised, net-zero energy system requires a drastic change in the way we traditionally approach the IT project investments. We see a need to keep at the forefront of this rapid revolution, and require an uplift in modern digital skills, capabilities, and solutions to meet Cadent's and the wider sector objectives.

As we continue our digital transformation here at Cadent, it has become apparent that we need to invest significantly in interoperability and to mature our integration capability to be more expedient and more adaptable to the changing internal and external demands. Our current ability to develop reusable and secure interfaces, enabling an open data sharing culture, and to

manage the lifecycle of these critical digital assets, is not sufficient to enable us to progress into and beyond the next price control. There are levels of duplication and inconsistency in the technical quality and standards of Application Programme Interfaces (APIs) across the landscape. This has been compounded by the reality that Cadent are wholly reliant on 3rd parties that are working in isolation and are not being guided by an API strategy that reflects the longer-term needs of Cadent as we transition to the future of Hydrogen and Industry 4.0⁵.

The Open Data Portal initiative has a critical dependency on data integration capabilities to develop and implement the required data pipelines and wider interconnectivity capabilities, in line with the Enterprise Architecture (EA) guiding principles for Cadent and the 'Data Best Practice Guidance' published by Ofgem.

Currently, there is a skills-gap and lack of Subject Matter Experts within Cadent IT to lead on the strategic design thinking and the longer-term investment case related to integration and API. Integration capabilities are a fundamental enabler to the broader digitalisation strategy of Cadent, as well as to the future ecosystem interoperability requirements set out by Ofgem.

⁵ [Deloitte_Review_26_Fourth_Industrial_Revolution](#)

Chapter 3.0

Demonstration of Problem Statement and Needs Case

Chapter 3.1 Problem Statement

The Data Best Practice guidance requires Cadent to learn about and fulfil the needs of potential Data Users in relation to open access to Data Assets where Cadent is a Data Custodian. Our existing processes and partnerships give us a good understanding of data priorities of our stakeholders and currently these are fulfilled on a reactive basis due to limitation in skills and appropriate technology. This means that there are limitations to the discoverability, visibility, and accessibility of our Data Assets. We anticipate that not only will the data requests become more frequent, but also more of our stakeholders will require regular or near-live updates to the data which will be impossible to satisfy without development of more digital and open service.

Cadent’s ambition is to set up and evolve a digital service that makes Cadent Data Assets visible and discoverable for potential Data Users. We want to provide capabilities for our stakeholders to utilise those Data Assets in a self-serve manner and in a format and frequency that they require with accompanying metadata. This will then mature our digital capabilities and allow us to provide a proactive service. This type of approach is a more mature realisation of the Data Best Practice guidance and requires strategic investment that concentrates on the development of digital services and products that will provide a foundation for further development towards a digital energy system. Our current tools and practices limit our ability to scale the service and impacts our ability of timely delivery of the Data Assets. Any requests for on-going access to our most recent data or requests for automatic periodic updates involve distinct IT solution projects which are not cost effective.

Chapter 3.2 Needs and requirements of our Data Community

Our Digitalisation Strategy defines digital personas that guide us in recognising stakeholder types (See Figure 2 below) and allows us to systemise their data needs.



Figure 2: Cadent stakeholder ecosystem.

An offline copy of Figure 2 can be found here: [Cadent-Digitalisation-Strategy-2022-Update.pdf \(cadentgas.com\)](https://www.cadentgas.com/cadent-digitalisation-strategy-2022-update.pdf) on page 9.

These data needs are, in particular:

- 1) Access to
 - Relevant gas network data (Energy Industry and Other Utilities)
 - Gas network updates and changes (Supply Chain)
- 2) Visibility of:
 - Cadent network planning and new connections (Domestic Customers, Business Customers, Low Carbon Connecting Parties, Supply Chain, Energy Industry and Other Utilities)
 - Disruption to service, work that will affect communities or put pressure on other energy networks (Domestic Customers, Government Authorities and Policy Makers, Energy Industry and Other Utilities)
 - Cadent Network capacity (Low Carbon Connecting Parties)
- 3) Collaboration:
 - In defining the needs to enable Net Zero targets (Energy Industry and Other Utilities, Government Authorities and Policy Makers, Low Carbon Connecting Parties)
 - To support inclusivity (Safeguarding Organisations)
- 4) Standardisation of:
 - Processes to deliver services (Low Carbon Connecting Parties)
 - Products to ensure interoperability (Energy Industry and Other Utilities, Government Authorities and Policy Makers)
 - Communication channels to share updates and changes (Supply Chain)

The request for Cadent Data Assets that we have noted since the beginning of the RIIO-GD2 period support our classification of the data needs. Figure 3 summarises the types of Data Assets that are of interest to our stakeholders and shows the requests by type that we have received via our current Data Sharing process up to end of December 2022:

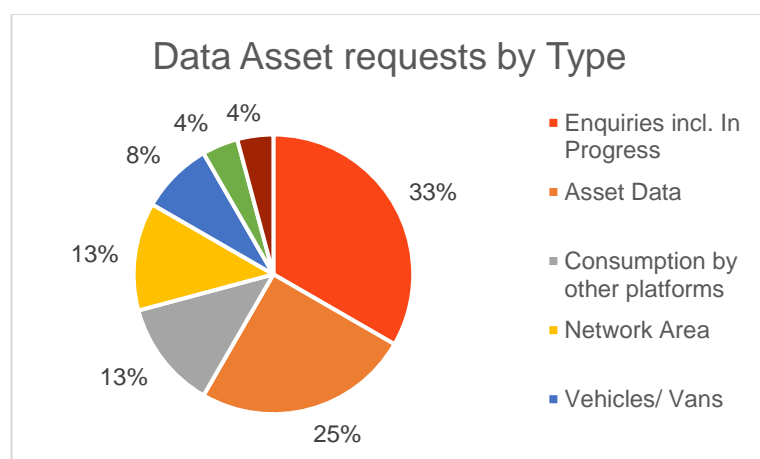


Figure 3: Data Asset requests by type

Chapter 3.3 – Benefits from this re-opener

Description of the capabilities that will be maintained through the investment

The proposed expenditure in Open Data will allow Cadent to develop the following capabilities:

1. The investment in a dedicated Metadata Management Tool will significantly mature our capability in Metadata Management and result in:
 - a. Unification of Data Cataloguing including technical metadata with the ability to publish the relevant catalogues through other digital products.
 - b. Standardisation of the Data Lineage documentation.
 - c. Standardisation of Data Model documentation.

Development of the unified standards to describe our data through a dedicated digital tool will allow us to increase the visibility of our data and our ability to make this information easily available to other products and services. A digitalised Data Catalogue will also optimise the catalogue management process ensuring that any updates to individual data elements that are re-used as part of multiple Data Assets are easy to identify and consistently updated. This line of investment also allows us to onboard additional staff who will concentrate on enriching and evolving the Data Catalogue and work with our subject matter experts to develop the business glossary incorporated within the tool to provide appropriately detailed supporting information about our Data Assets.

2. The investment in an Open Data Portal - To fulfil the needs of Cadent stakeholders defined in our Digitalisation Strategy (access to relevant data), Cadent must provide a digital solution that enables stakeholder groups to access on demand Cadent Data Assets
 - a. Publishing Data Assets in multiple formats addressing varying levels of technology and digital skills of our stakeholders
 - b. Visibility and easy access to Cadent Data assets with appropriate access control mechanisms to account for different sensitivity levels of our Data Assets
 - c. Development of in-house digital skills of configuration and authoring of APIs

Configuration and deployment of an Open Data Portal will allow Cadent to directly simplify stakeholders access to Cadent Data Assets in line with expectations set out in Data Best Practice guidance. Additionally, this product is seen as a mechanism to communicate with stakeholders on new Data Assets and supporting information that are available and seen as an enabler to prepare digitally native Data Assets that can be consumed by other digital products and services within and beyond the energy sector. This investment also allows us to onboard dedicated resources that will evolve our understanding of stakeholder data needs, be responsible for prioritisation and championing the presumed open principle within our organisation.

3. The investment in Interoperability – API Management:

Over the recent years, integration capabilities and API development have become critical in removing the siloes between systems, products and services and simplify exchange of information between digital products.

API is the most appropriate and widely adopted mechanism in technology to make data available while not compromising any sensitive details about the system from which the data comes from – it allows us to hide the internal details of how the information system works and filter only the details relevant to Data Users.

The current integration capabilities within Cadent are directly linked to the systems and software interfaces that make up Cadent's infrastructure landscape, ensuring communication within our IT ecosystem.

To prepare Cadent for the growing demand for its information, a change in integration standards is required.

Specifically, the following capabilities will be set up and maintained within our organisation because of fulfilling the proposed investment:

- a) The capability to develop, publish and support APIs to exchange data (both internally/externally) in a secure, reusable and scalable way
- b) The implementation of API access controls and the processes to support them
- c) The capabilities to support Continuous Integration and Continuous Delivery (CI/CD) processes including versioning and testing of APIs
- d) The capabilities to monitor API usage

These capabilities directly allow us to increase our maturity with the Data Best Practice, provide a better experience to potential Data Users regarding access, format and visibility to our Data Assets and increase our contribution in cross sector collaboration towards the digitalised energy system.

The opportunities

The proposed expenditure, in addition to the capabilities listed in the above paragraph, provides Cadent with significant opportunities to grow and upskill our current workforce in data literacy.

Deployment and adoption of a new digital tool for Metadata Management provides the opportunity to standardise the requirements for documenting and articulating the business context and technical information of our data.

A Digital User interface (as opposed to the manual interaction/processes currently) allows for easier understanding of the data lineage, visualise the impact of data change and provide more intelligent capability to identify the data elements of interest. There are opportunities to use the Data Catalogue and Business Glossary to support conversations and influence the designs of other digital solutions and unify the data language between technical and business experts in the organisation.

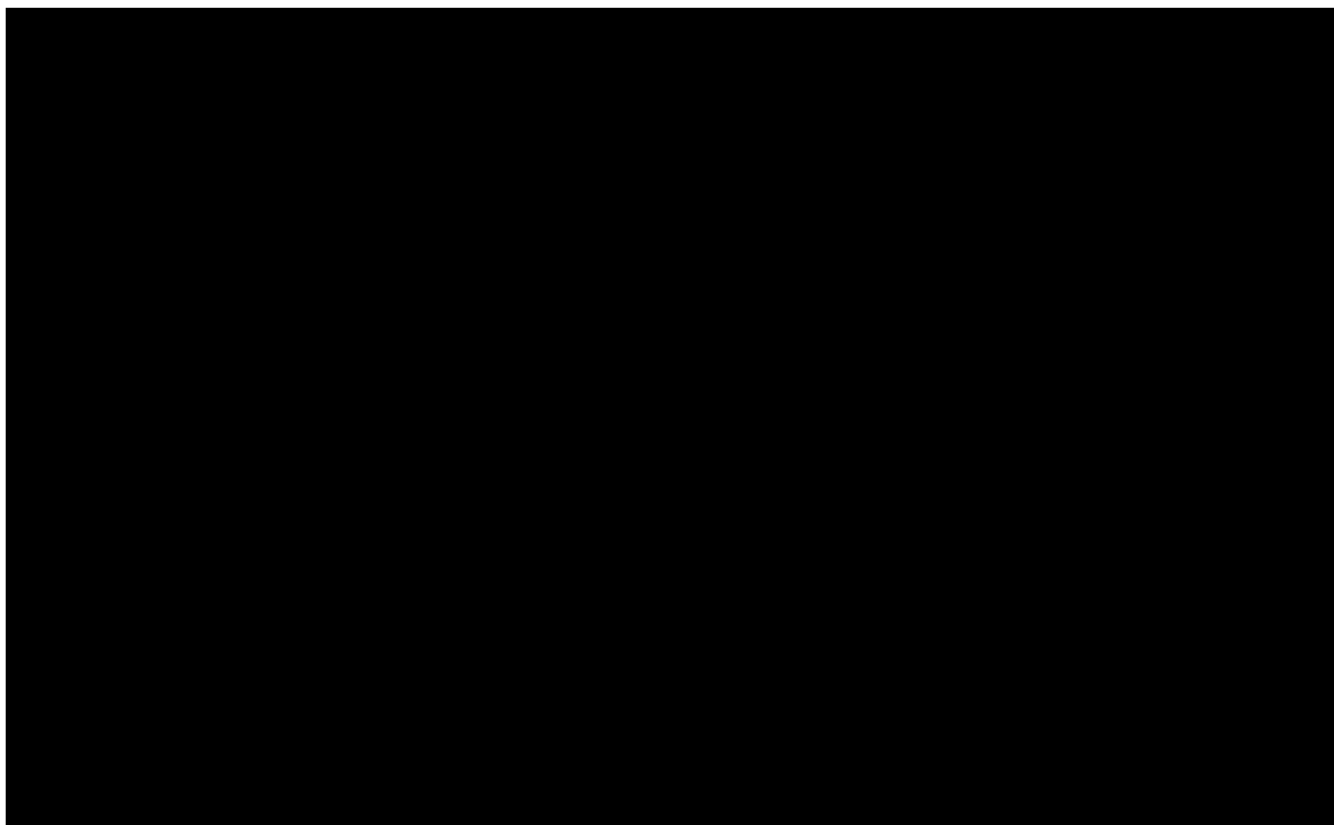
Visualisation of the data lineage can also aid the discovery of any inconsistencies and duplication, indirectly contributing to an increase in the quality of our data and optimisation of our data landscape.

An Open Data Portal opens the opportunity to further develop digital partnerships and collaborate more effectively within the energy sector. It also enables Cadent to formulate a strong proposition for our current and future delivery partners to unify and systemise their access to our information and offer more frequent updates to our network information whilst also satisfying our cyber security principles.

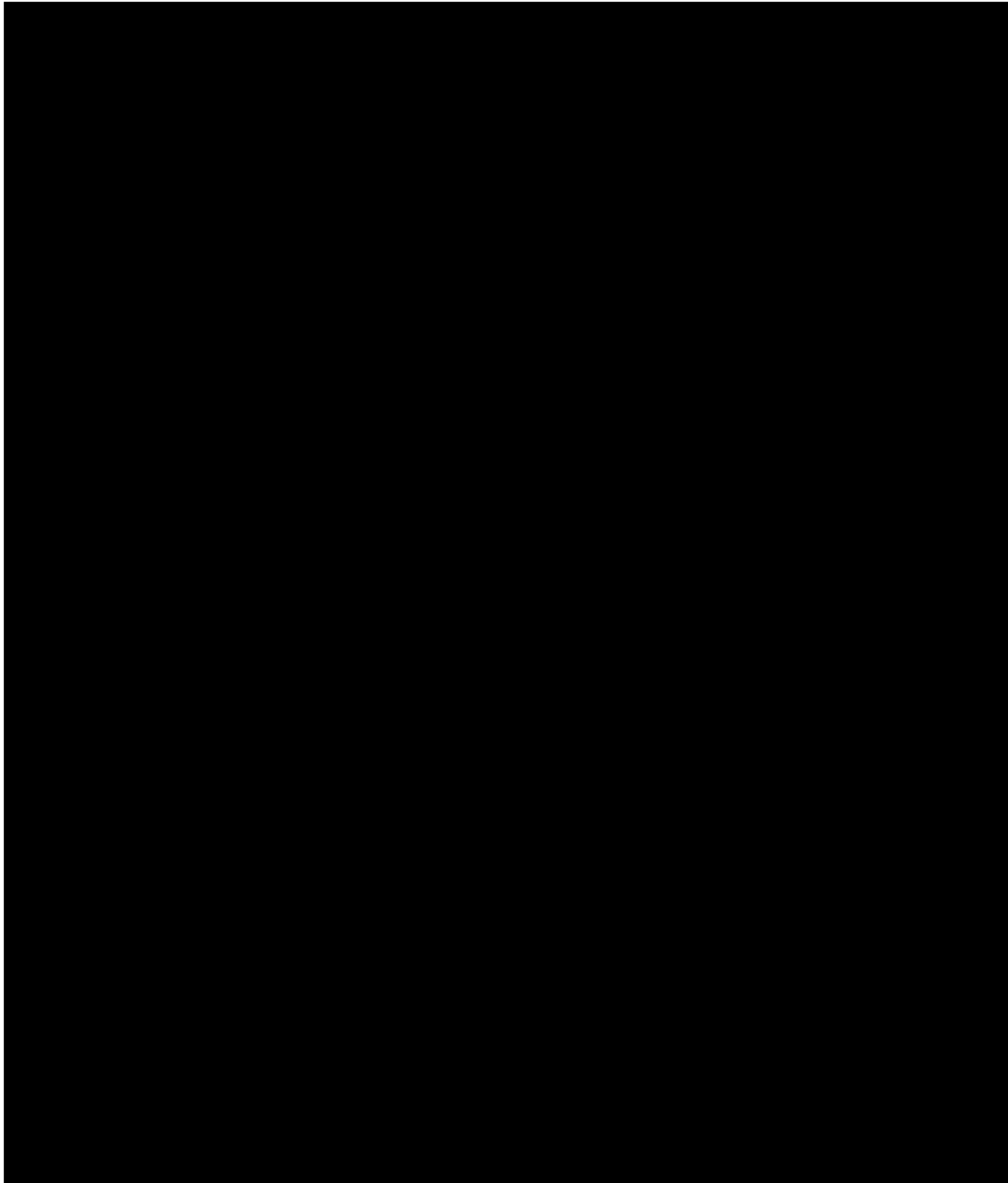
The most prominent opportunities are related to the proposed investment in interoperability and API management, as the initiative is related to the development of a new integration methodology that is fundamental to building any modern data ecosystem. These APIs can be re-used to support other investments in customer facing services and products, and also become a “new norm” for communicating internally, increasing resilience of our internal IT ecosystem. This investment is also seen as a vehicle to implement future recommendations regarding interoperability of the data and any standards that we expect to adopt in the next two years in relation to a Common Information Model for gas data. Developing our API Catalogue will be one of the key deliverables, enabling secure and centralised access management to Cadent data across the ecosystem.

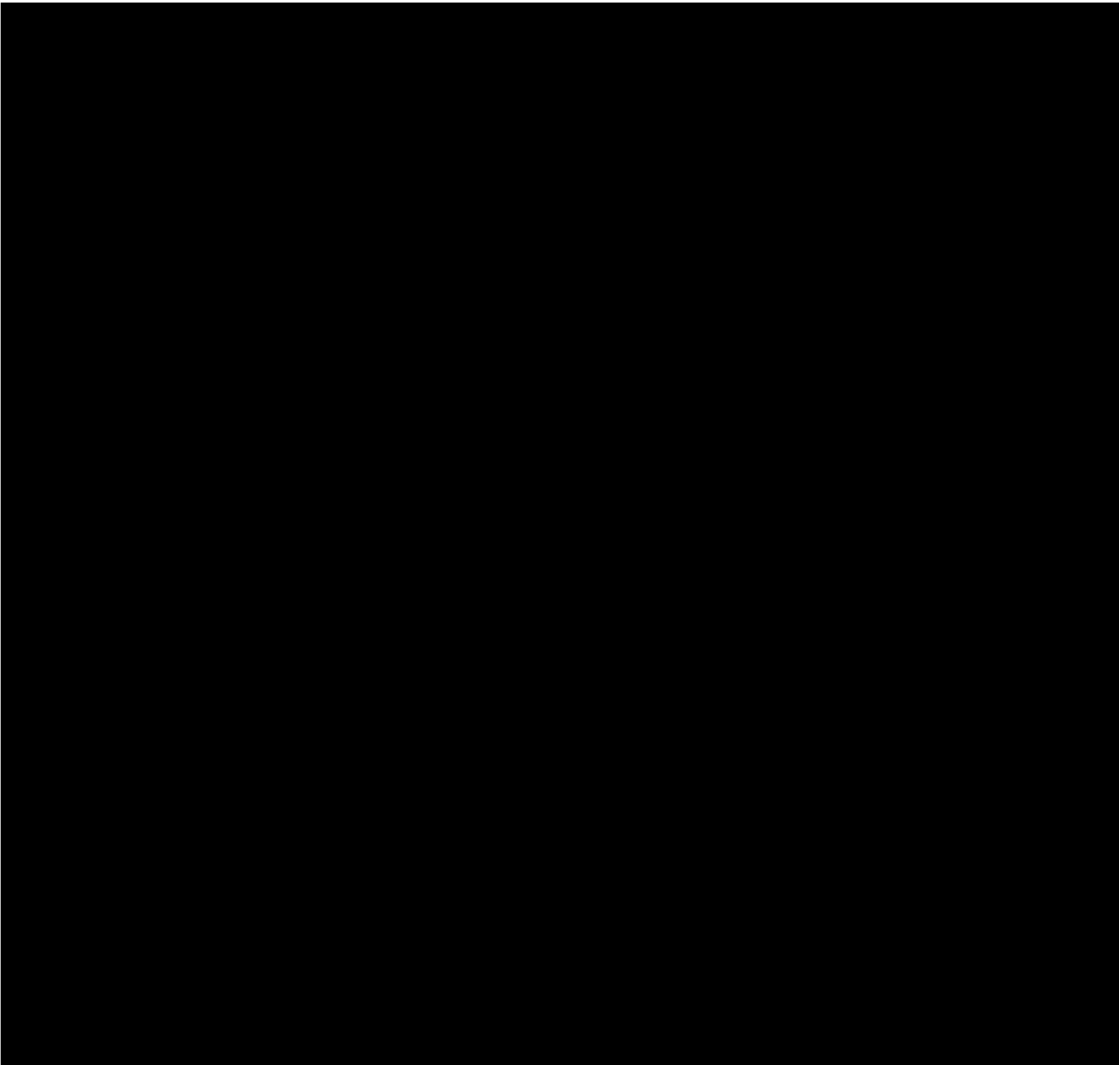
Chapter 3.4 – Description of Maturity

Cadent has defined and implemented to date a dedicated Data Sharing Process (Appendix 01) with an associated Open Data Triage process (Appendix 02), this is operated by current staff who ensure that requests for Cadent Data Assets are recorded in the log and risk assessed in line with our internal Data Governance Model (Appendix 03). Communication with Requests from Data Users for access to Cadent Data Assets is conducted mainly through e-mail channel, and Data Assets with relevant supporting information are made available for download through a secured file exchange system upon completion of a data sharing agreement signed by Cadent and the Data User.



The end-to-end process varies in duration, depending on the nature of the request and communication pace with the Data Users requesting access to Cadent Data Assets.





Chapter 4.0

Options Analysis and Preferred Option

Chapter 4.1 – Consideration of options and methodology for selection of the preferred option

The methodology used to select the preferred option has included a compliance option and an architectural assessment, which are outlined in the sections below.

Compliance Option Analysis

The analysis (Appendix 08) has been constructed by considering different options of maturing our compliance with the Data Best Practice guidance within the remainder of the RIIO-GD2 period. Seven different options were identified for the purpose of this analysis, and these are labelled in Figure 6.

Option number	Option name	Definition
1	Do nothing	our current position and processes adopted within the first 18 months of RIIO-2 period.
2	People & Process	investment in additional resources that would expand our capacity and capability to progress improvements to our processes and artefacts required for the compliance with regulation.
3	Metadata Management Tool	the areas where a dedicated tool for collecting, describing, and updating metadata would increase compliance with regulation.
4	Open Data Portal	the areas of Data Best Practice guidance that require a solution to make Data Assets visible, discoverable, and accessible to potential Data Users.
5	Interoperability	development of new integration methodology that is fundamental in building any modern data ecosystem is required to fulfil the requirements of Data Best Practice.
6	All 3 Digital Investments	collective impact of Metadata Tool, Open Data Portal, and Interoperability on our overall compliance.
7	People & Process + Digital Investments	combination of investment in additional staff and three digital products. The main justification of including this option in the analysis is the assumption that Presumed Open principle requires Cadent to modify the current way of managing Data Assets and the new digital tools and services will require ownership and ongoing management as a set of products with appropriate standards, processes and become a new norm for Cadent.

Figure 6. Compliance Options considered (Compliance options tab in Appendix 08)

Each of these options were analysed from the perspective of how they contributed to our ambition of embedding the principles of Data Best Practice and evolving our digitalisation ambition.

Figure 7 presents the assessment of the seven options we considered to understand which of these is the most appropriate to close the gaps we identified and mature our compliance with the Data Best Practice guidance recommendations.

Principle no	Principle name	Improvement Options						
		Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
		Do nothing	People & Process	Metadata Management Tool	Open Data Portal	Interoperability	All 3 Digital Investments	People & Process + Digital Investments
1	Identify the roles of stakeholders of Data Assets	partial	full	no	no	no	no	full
2	Use common terms within Data Assets, Metadata and supporting information	no	partial	partial	no	no	partial	full
3	Describe data accurately using industry standard Metadata	partial	partial	partial	no	no	partial	full
4	Enable potential Data Users to understand Data Assets by providing supporting information	no	partial	no	partial	no	partial	full
5	Make Data Assets discoverable for potential Data Users	no	partial	no	partial	no	partial	full
6	Learn and deliver to the needs of current and prospective Data Users	partial	partial	no	partial	no	partial	full
7	Ensure data quality maintenance and improvement is prioritised by Data User needs	no	partial	no	partial	no	partial	full
8	Ensure Data Assets are interoperable with Data Assets from other data and digital services	no	no	no	partial	partial	partial	full
9	Protect Data Assets and systems in accordance with Security, Privacy and Resilience best practice	partial	partial	partial	partial	partial	full	full
10	Store, archive and provide access to Data Assets in ways that ensure sustained benefits	no	no	no	partial	partial	full	full
11	Treat all Data Assets, their associated Metadata and Software Scripts used to process Data Assets as Presumed Open	partial	partial	partial	partial	partial	partial	full

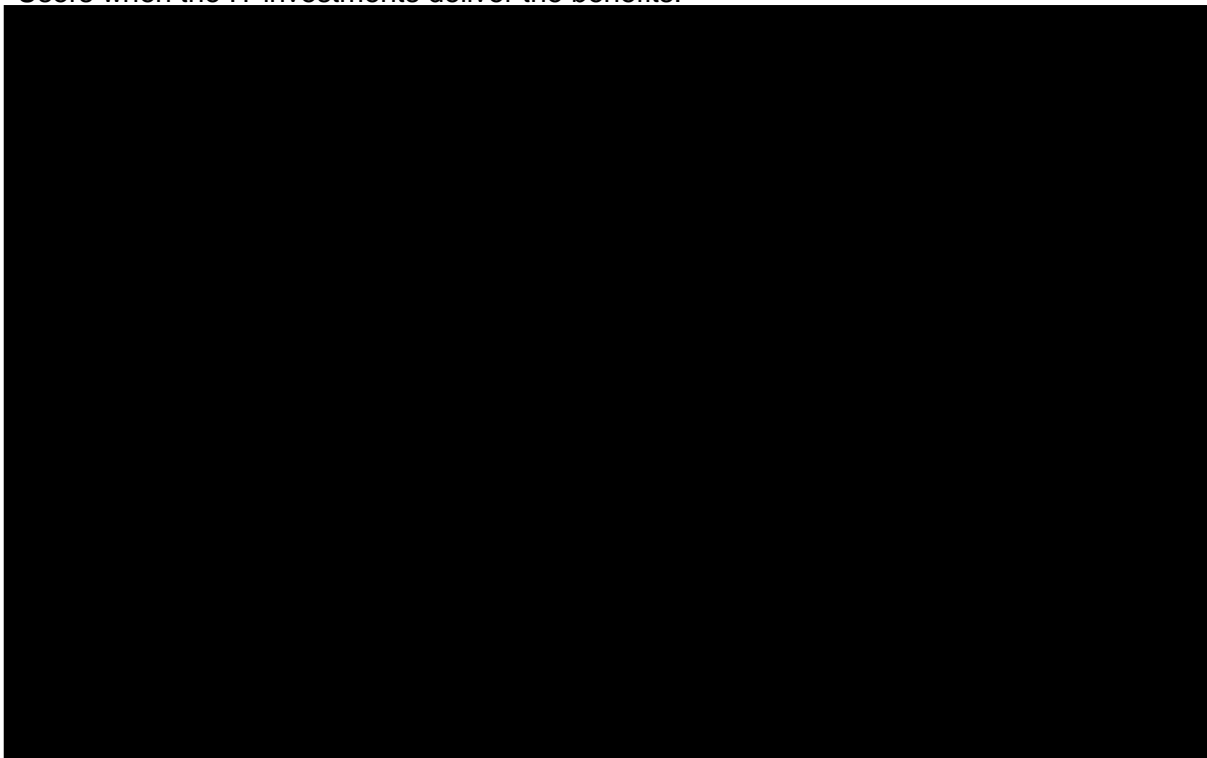
Legend:

no	no significant contribution towards increase in maturity
partial	partial contribution towards increase in maturity but with some gaps outstanding
full	comprehensive contribution towards increase in maturity

Figure 7. Options Matrix (Options Matrix tab in Appendix 08)

The observations from the option analysis identified that:

- There is a need to invest both in digital technology as well as transformation of Cadent ways of working to comprehensively mature Cadent’s position in light of the Data Best Practice Recommendations. This means investment in appropriate digital tools and personnel who ensure adoption of tools and related processes and standards across Cadent to meet ongoing requirements to make Cadent Data Assets available to Data Users when the IT investments deliver the benefits.



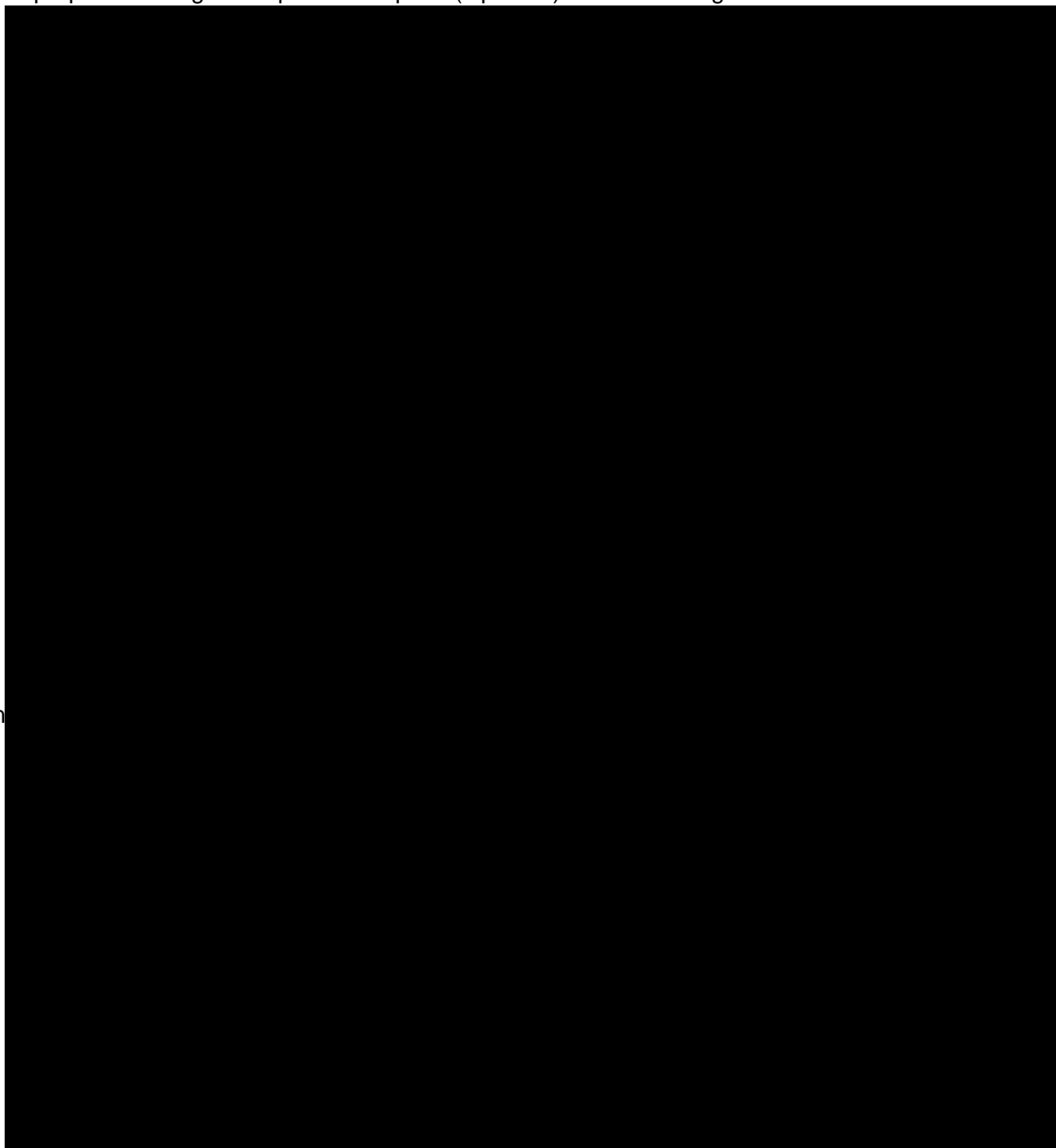
Compliance analysis concluded that the **most optimal investment** is to progress with **Option 7**. This includes investments in all three digital solutions and additional staff to embed the benefits delivered by these into company-wide processes;

- Digital tools for cataloguing the Data Assets;
- Ability to make the assets discoverable and available to potential Data Users through a Data Portal; and
- Ensure interoperability of Cadent Data Assets.

Chapter 4.2 - Preferred Option

Proposed timing and option to delay

The proposed timing of the preferred option (Option 7) is the following:



In summary the option to delay is not recommended for the investment in Open Data.

Architectural Assessment

As Options 3 through to Option 7 have one or more technological component, the assessment of the best technical option has been derived based on Architectural Assessment. This

assessment uses The Open Group Architecture Framework (TOGAF)⁶ to drive the architecture approach and takes the following into consideration:

- Functional and non-functional requirements for Open Data – these were collated from the business colleagues currently operating the Data Sharing process who, outlined the expectation of the future digital product and service Cadent should provide based on correspondence and direct conversation with the Data Users.
- Solution Capability Requirements – technical capabilities were prepared by our Solution Architect to organise the business requirements in the set of Epics (both available in Appendix 09)
- The Target Architecture (Figure 8) is used to depict and articulate the required technical capabilities. This can be found on page 16 of Appendix 04

- The technical gap analysis has been completed to give visibility where our existing systems and solutions do not meet the requirements and there is a need for additional technical solutions (details in Appendix 10). The outcomes of the technical gap analysis are presented within the Figure 9. where capabilities are absent these are shown in red, partial capabilities are colour coded in yellow (source: page 15 of Appendix 04).

⁶ <https://www.opengroup.org/togaf>
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Figure 9– Gap Analysis Summary

The proposed Solutions that address the technical gaps have been verified to be in accordance with Cadent Data Architecture Principles to ensure that the proposed options conform to IT Architecture standards. The following is an outline of our relevant IT principles that apply to this investment:

- Data is an Asset, Data is Shared, Data is Accessible, Data is Secure;
- Applications and Services are easy to use;
- Manual processes are reduced and removed ;
- Reuse, before we rent, before we buy, before we build; and
- Applications and services are robust and fault tolerant.

Summary of cost benefit analysis

The Preferred Option (Option 7) matures Cadent’s compliance with regulation (i.e. our ability to demonstrate best endeavours in adopting the principles of Data Best Practice) in a comprehensive way and can be achieved within the RII0-GD2 period, becoming a foundation for further investments in digitalisation of energy sector for the next price control and beyond. The preferred option:

- expands the current team to allow dedicated focus on Open Data principles and the way our organisation embeds the new standards and process into our ways of working;
- it delivers two digital solutions: a metadata management tool that can be used for both internal and support provision and publication of technical metadata for external Data Users; and a Data Portal to make Cadent Data Assets discoverable and available to potential Data Users; and
- modernises Cadent integration approach setting up a new architectural capability.

Alignment to future operating model

The future operating model for Cadent is predicated on partnering with a few core strategic partners for our 'Digital Spine' capabilities, accelerating the digitalisation journey and maturity in the most efficient way. The architecture and development capabilities will be predicated on Open Data and Open API principles. This will enable a decoupling from the technology choices we will make over time and set the foundations for building a more composable landscape over RIIO-3 and beyond.

The below illustration (Figure 10) sets out the vision for how Cadent will operate with a foundation of Digital Spine at the end of RIIO-GD2 period (full reference: Appendix 11).

All technical artefacts: Data Assets, APIs and Metadata are produced based on agreed standards:

- Conceptual Common Information Model is defined in the Metadata Management Tool by a Data Architect; and
- Metadata Standards (Business Metadata and Technical Metadata) are defined with use of Metadata Management Tool by a Metadata Analyst.

The above standards are derived from the Presumed Open Principle. The Metadata Management tool becomes a reference library for development of any physical data models.

It is then a responsibility of our technical developers to adhere to those standards when preparing any Data Assets (regardless of classification of the Data Asset) in any of Cadent core systems and ensure that any physical data models conform with the standards.



Figure 10 - Future operation Model – foundation of Digital Spine (Appendix 11)

Chapter 5.0

Project Delivery and Monitoring

Chapter 5.1 – Project Governance

Within Cadent IT there is strict project governance which is applied to all projects whether they are waterfall or agile. For the purposes of simplicity, we will use the terminology of “Project” within this section regardless of whether it’s Agile (Initiative, Feature) or Waterfall (project).

Please see Appendix 12 to understand the Cadent IT Governance that is applied to all IT Change.

Chapter 5.2 – Project Delivery

As explained within this document, this re-opener will be broken down into three workstreams:

- 1) Metadata Tool
- 2) Open Data Portal
- 3) Interoperability

Description of the Project and Scope

The Preferred Option (Option 7 “Project”) is based on 3 recommendations made by the Architecture team and addresses 3 main technological gaps in our IT estate. Each recommendation is related to a different capability and skillset therefore for a transparency of delivery of the Project, the project is split into 3 workstreams in line with the technical feasibility assessment endorsed by the Architecture Department in IT.

Key Features that address the Problem Statement

The below Figure 11 lists key features that address the main gaps in compliance with Data Best Practice. The list of key features is organised by Data Best Practice Principles and contains the information on which workstream takes the leading role in delivering the feature.

While this list has been developed with a view of regulatory compliance, it delivers direct benefits to our stakeholders by offering a digital service to discover and access Cadent Data Assets.

Meeting our stakeholders' needs

The Project will allow us to meet the stakeholders' needs identified as part of our Digitalisation Strategy in the following ways:

- **Access:** The Open Data Portal and APIs created to support integration with our GIS solution will allow our stakeholders to access relevant gas network data and updates to our network.
- **Visibility:** The Open Data Portal will allow our stakeholders to understand the Data Assets that are available, as the investment in Metadata will allow us to prepare the appropriate information about Cadent Data Assets. The Open Data Portal will also serve as the main medium in communicating the expectations about plans for future Data Assets to be made available.

- Collaboration: We anticipate that the Open Data Portal will be used not only to publish Open Data Assets, but also with the use of access control will be our mechanism to make Data Assets available to partners for restricted use.
- Interoperability: The main deliverables of this workstream are enterprise-wide APIs that standardise the information exchange and are the major component of our contribution towards sector interoperability.

Figure 11 - Key Features of the Project (Appendix 13)

Project Prioritisation

Figure 12 shows the Prioritisation Matrix we have used to inform our decision on the Business Priority of the proposed investments. We have assigned the priority categories in this project as:

- A2 – Regulatory (as it relates to regulatory obligation); and
- B1 – Strategic (as it proposes realisation of a strategic change in our Integration Strategy and Introduces products that will be adopted across the organisation).

Prioritisation Matrix

Priority #	Priority	Description
A1	Critical	Immediate. Critical key regulatory / safety driver. Effecting the safety of operations and/or impact to our License to operate
A2	Regulatory	Regulatory must do – imminent impact to our license to operate
B1	Strategic	Business Strategic - deliverers key customer/ business outcomes and value with a direct link to the company Business Plan
B2	Tactical	Business Tactical - fixes critical pain points, efficiency focused - key to business operations
C1	Discretionary	Discretionary, nice to do, identified improvements to process, efficiency, ways of working

Figure 12 - Prioritisation Matrix

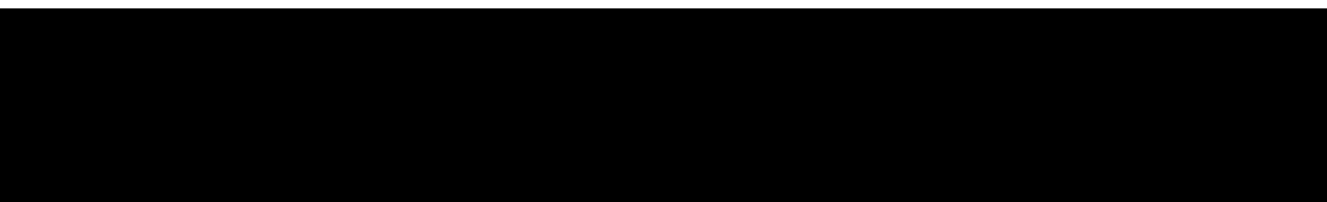
Improvement of Network Operational Capability

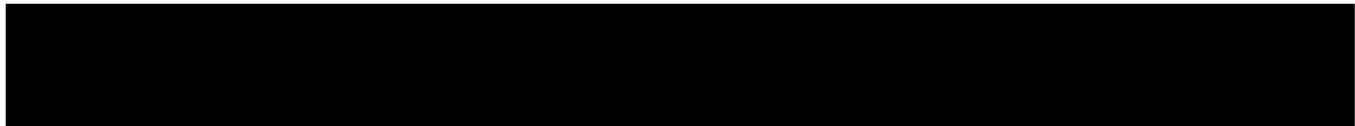
The Project will increase the Data Literacy at Cadent. The introduction of a standardised approach to manage Metadata in our organisation will allow internal Data Users to search and discover data through a Data Catalogue. The staff who will use the Metadata Tool are Business Analysts and Data Analysts in IT and local reporting teams. It will help them to understand where data elements are used and how they relate to each other, improving the time and effort required to complete business analysis or report development for other solutions that use our key Data Assets. The tool will also promote the use of common terms internally allowing to bridge the gap between technical and business staff.

The publication of chosen Data Assets required by our delivery partners will ensure that the work our partners conduct on our behalf is based on the most recent information in our Asset Register. This will help to minimise any delays or errors that they may be experiencing with our current data extracts.

The interoperability workstream will systemise the integration approach allowing for re-use of API assets, that is expected to translate into lower effort and time to integrate other product and services in our landscape in the future.

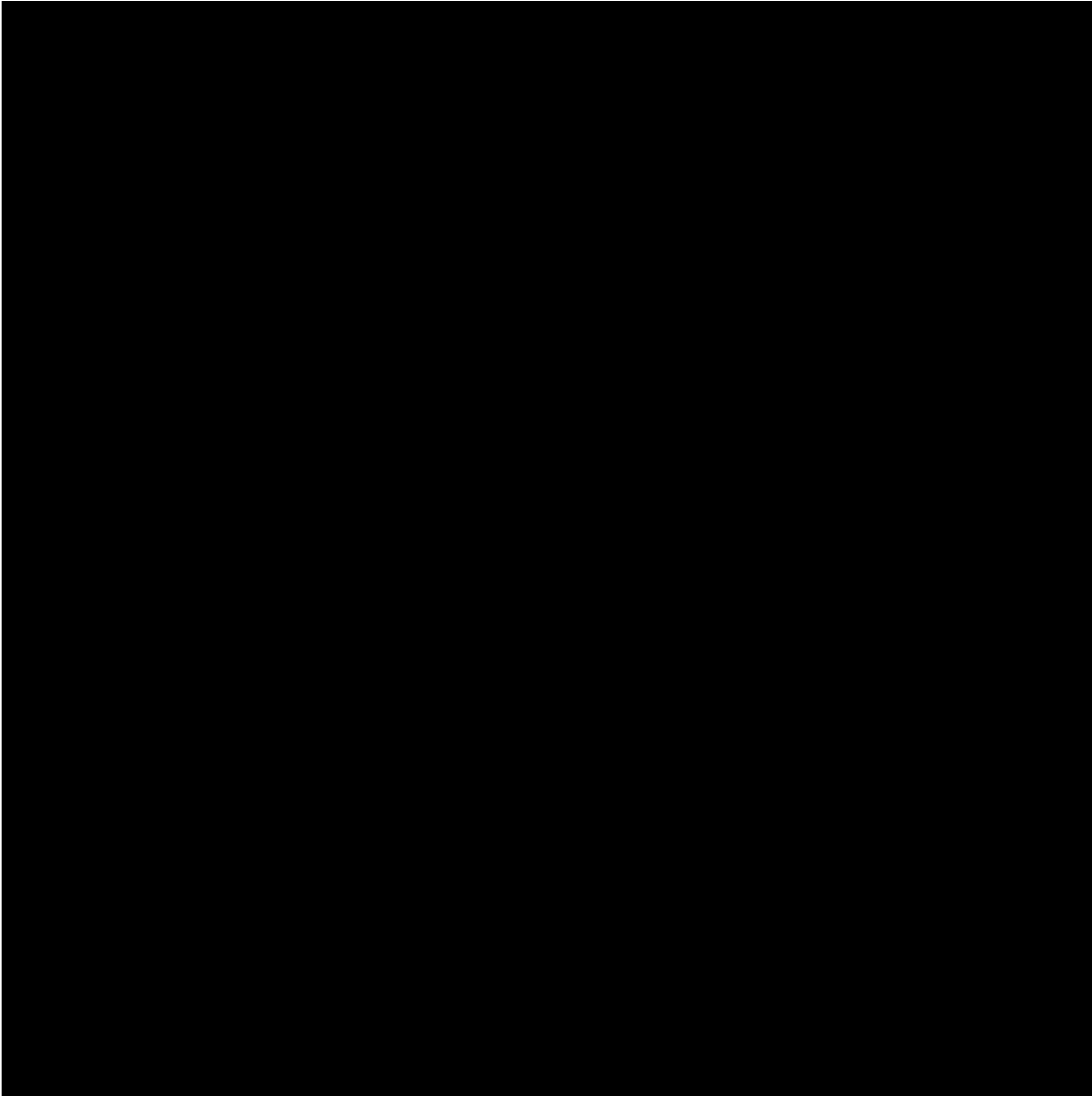
Risk Reduction





Project schedule

Below in Figures 13-15 is the Gantt view of project plan. Details project plan is available in Appendix 14.



Monitoring and tracking of lessons learnt, improvements

In Agile ways of working, Monitoring becomes a regular and transparent ‘demonstration’ of the journey of working software/added business value through

- (i) Sprint and/or
- (ii) Planning Increment “demonstration meetings” to stakeholders – including but not limited to the Product Manager/PMO.

“Lessons learnt” - normally at the end of projects will become regular/formal

- (i) Sprint and
- (ii) Planning Increment “Retrospectives” where actions can be quickly fed back into the following increment(s) - allowing for quick course-correction/improvement.

Performance, constraints, dependencies, risk management

Focusing on/around ‘working software’ as per underlying Agile principles,

- performance will be monitored,
- constraints/dependencies and risks will be managed transparently using standard tools and the regular Agile ceremonies (daily stand-up meetings; sprint planning, demos and retrospectives).
- Constraints, dependencies and risk will be captured (and risk owners assigned) through PI (Program Increment) planning and managed/visualised throughout the implementation via standard tooling (e.g. JIRA) and PMO reporting.

Key Performance Indicators

Metadata:

“Time-to-Reliable-Insights” KPI (sub KPIs (Key Performance Indicators))

- Time-to-Query Underlying/Presentation Technologies e.g., a memory database maybe the best place to surface the Data Source
- Contribution to Data Quality Maturity Score (over time)

Open Data:

“Time-to-Reliable-Delivery of Open Data sets” KPI (Key Performance Indicators) made up of/amongst others:

- Time-to-Understand/Clear the-request – e.g., clarity gained/risks understood
- Time-to-Query Underlying/Presentation Technologies e.g., a memory database maybe the best place to surface the Data Source
- Contribution to Data Quality Maturity Score (over time)

Interoperability:

Ingestion KPI – as above plus:

- Time-to-Lag-to-Analyse: How quickly the data from the source is made available
- Time-to-Evolve: How quickly the data portal can accommodate changes in the data sources
- Contribution to Data Quality Maturity Score (over time)

Chapter 5.3 – Stakeholder Engagement

Cadent conducted comprehensive stakeholder engagement as part of preparation to RIIO-GD2 which was the base for our Digitalisation Strategy.

Our Digitalisation Strategy development has been conducted with input from all Cadent business areas working with stakeholders and in recognition of the wider stakeholder group described in the Digitalisation Strategy.

We consulted with our Customer Engagement Group on our Digitalisation Strategy to ensure direct feedback from stakeholders on our proposals.

We have also established Digital Personas⁷ to help us understand and organise their data needs.

Since the start of the RIIO-GD2 period we have created a dedicated business process “Data Sharing Process” (Appendix 01). Data requests can be made directly to Cadent or through the ENA. The centralisation of the enquiries through the ENA allows the visibility of the sharing requests across electricity and gas to understand the trends in the sector. The data requests submitted through the ENA are made available to all participants of DDSG (Data & Digitalisation Steering Group) group at regular intervals.

⁷ Cadent Digitalisation Strategy <https://cadentgas.com/nggdwsdev/media/Reports/Cadent-Digitalisation-Strategy-2022-Update.pdf>, page 12-17

The current Cadent Data Sharing process is manual and reactive; however, it provides an opportunity to directly discuss the request with stakeholders. The communication with the stakeholders is conducted electronically or via virtual meetings where Cadent can learn the details of the request but also ask the wider questions about usability and demand for other Data Assets. The request for Cadent Data is logged and captured in a Data Sharing Log.

The discussions on the appropriate investments and mechanisms towards the compliance with the Data Best Practice are at the core of the ENA Data & Digitalisation Steering Group (ENA DDSG). This group comprises representatives from all electricity and gas network operators to ensure collaboration in relation to Digitalisation where appropriate.

This collaboration ensures that adoption, development and new capabilities in Data and Digitalisation are discussed and aligned between all networks. This is especially important in terms of whole system approach, as digitalisation and data are deemed to act as enablers for developing a modern digitised energy system and require targeted collaboration to ensure interoperability of digital services and solutions. An example of specific collaboration dedicated to gas networks is the common proposal developed by SGN Gas Distribution Network to collectively engage a third party to support the discovery work on a Common Information Model for Gas.

ENA DDSG has also developed a proposal for collection of workstreams where all networks can collaborate on maturing the standards and defining a common approach towards maturing the compliance with Data Best Practice (Appendix 15).

Chapter 6.0

Technical Feasibility, Consumer Benefit

There are two dimensions of risk that have been considered when formulating the Project. The first one being the risk of not fulfilling the expectations set out in the Data Best Practice guidance. This completion of this Project is our principal means of mitigating the capacity and capability gap and demonstrating our ambition to mature our regulatory compliance.

Secondly, in line with our Solution Delivery Framework and Agile ways of working Cadent will continue to document and track the projects' risks and opportunities throughout the life of the Project ensuring that these are reviewed and managed appropriately.

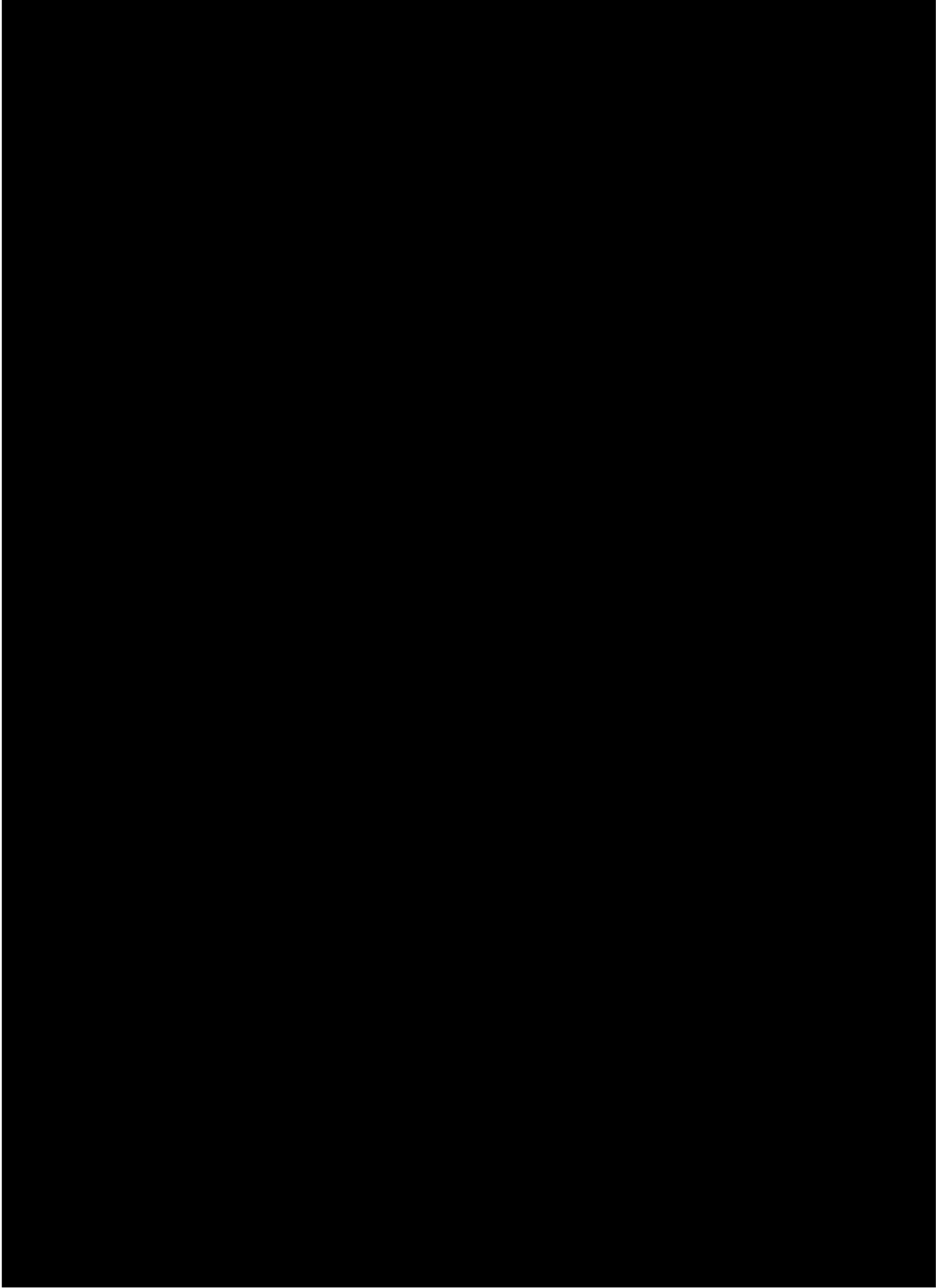
The below Table 3 presents risks identified at the time of submission that may affect delivery of the Project.

Ref	Risk Description	Approach to Risk
PR01	Depending on current Covid-19 outbreak rates, some or all of the previously imposed "lockdown" restrictions could be re-introduced and impact on being able to collaborate in shared workspaces	Additional time and planning may be required to mitigate impact. Transition to fully remote working might be appropriate option. A health and safety assessment has already been carried out and all staff will adhere to social distancing regulations and be equipped with full PPE if presence in the office is required
PR02	Changes to Data Best Practice Guidance	Respond to consultations on changes to Data Best Practice and continue collaboration and discussion on the guidance with Ofgem and through ENA's Data and Digitalisation Steering Group (DDSG).
PR03	Changes to the Needs of our stakeholders	The Project delivery will be executing work based on priorities backlog of the features. The funnel to capture new demand will remain open to ensure that the highest priority Data Assets are prioritised for delivery.
PR04	Inability to recruit for the roles required for the Project	Utilise our Delivery Framework partners to augment the delivery teams.

Table 3 – Project Risks

Technical feasibility of the Preferred Option

The recommendations made based on the technical gaps identified in the Architecture Assessment were fundamental to the development of the preferred option as we have set out below:



The above recommendations support our decision for the preferred option - Option 7: investment in 3 digital solutions and personnel, that we have explained in section 5.1.

The full assessment is available in Appendix 04.

Chapter 7.0

Cost Information

Chapter 7.1 – Benchmarking



Chapter 7.2 – Cost Information Breakdown



⁸ [NPg Our business plan for 2023 28.pdf \(northernpowergrid.com\)](#)

⁹ [UKPN RIIO-ED2 \(ukpowernetworks.co.uk\) Page 151 of BP](#)

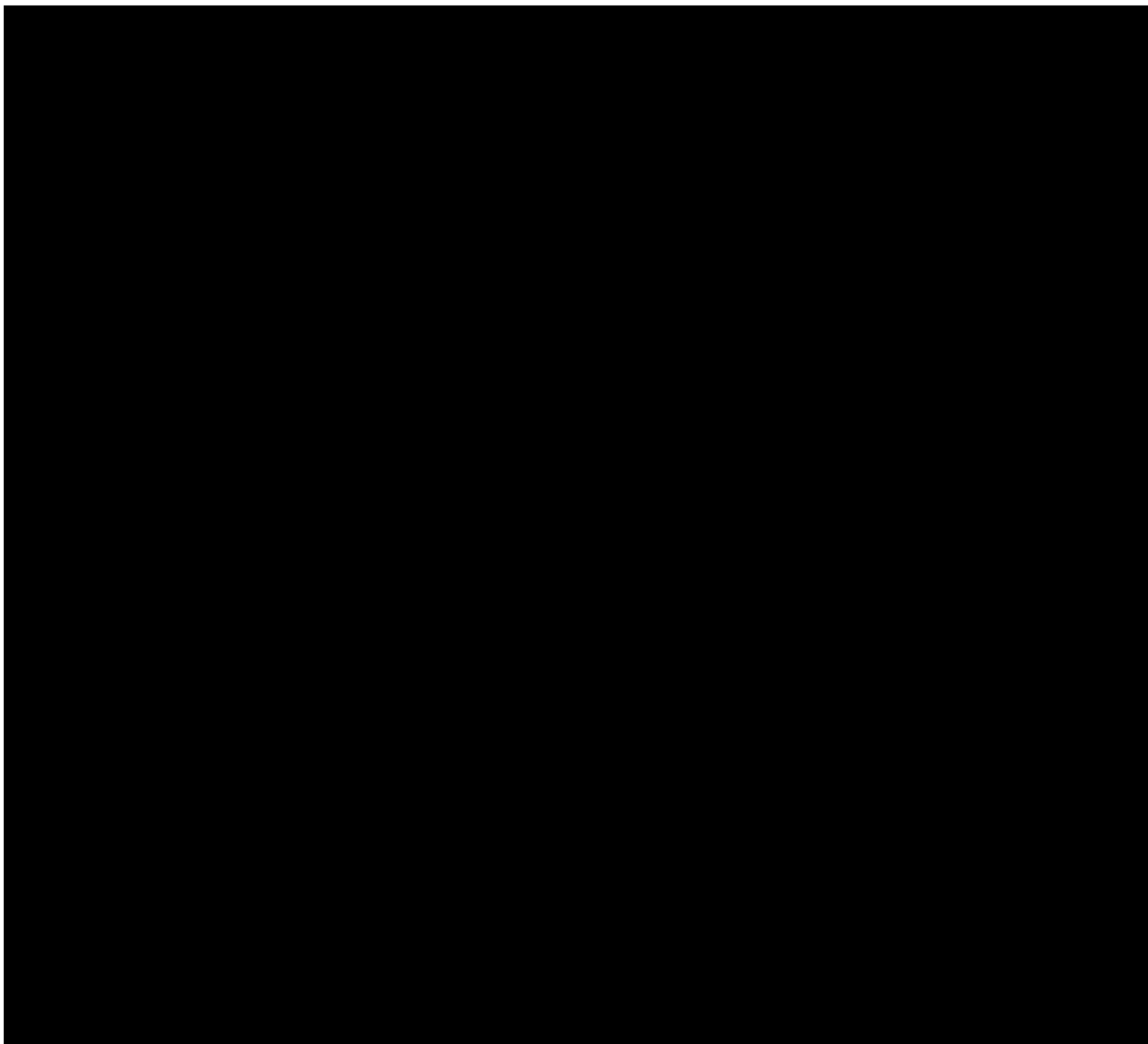


Figure 16 – Project cost breakdown by workstream

Financial Work Breakdown Structure

All projects in our IT investment plan have an initial Financial Work Breakdown Structure (WBS) developed.

A standard template is used for IT projects (see Table 4 below). Resources complete [REDACTED] timesheets and Purchase Orders are raised in [REDACTED] for external purchases against the appropriate WBS codes as per the table below. This information is then used to track Forecasts vs Actuals.

Chapter 7.3 - Network Costs Split by Workstream, in 18-19 prices:

Due to these costs being central across all Cadent's network we have provided a breakdown of what the costs would look like at a network level by applying an apportionment calculation using customer numbers in accordance with the principles we follow for other regulatory reporting (e.g., RRP).

This is split by workstream for simplicity below in Figures 17-19, as well as in Appendix 23.

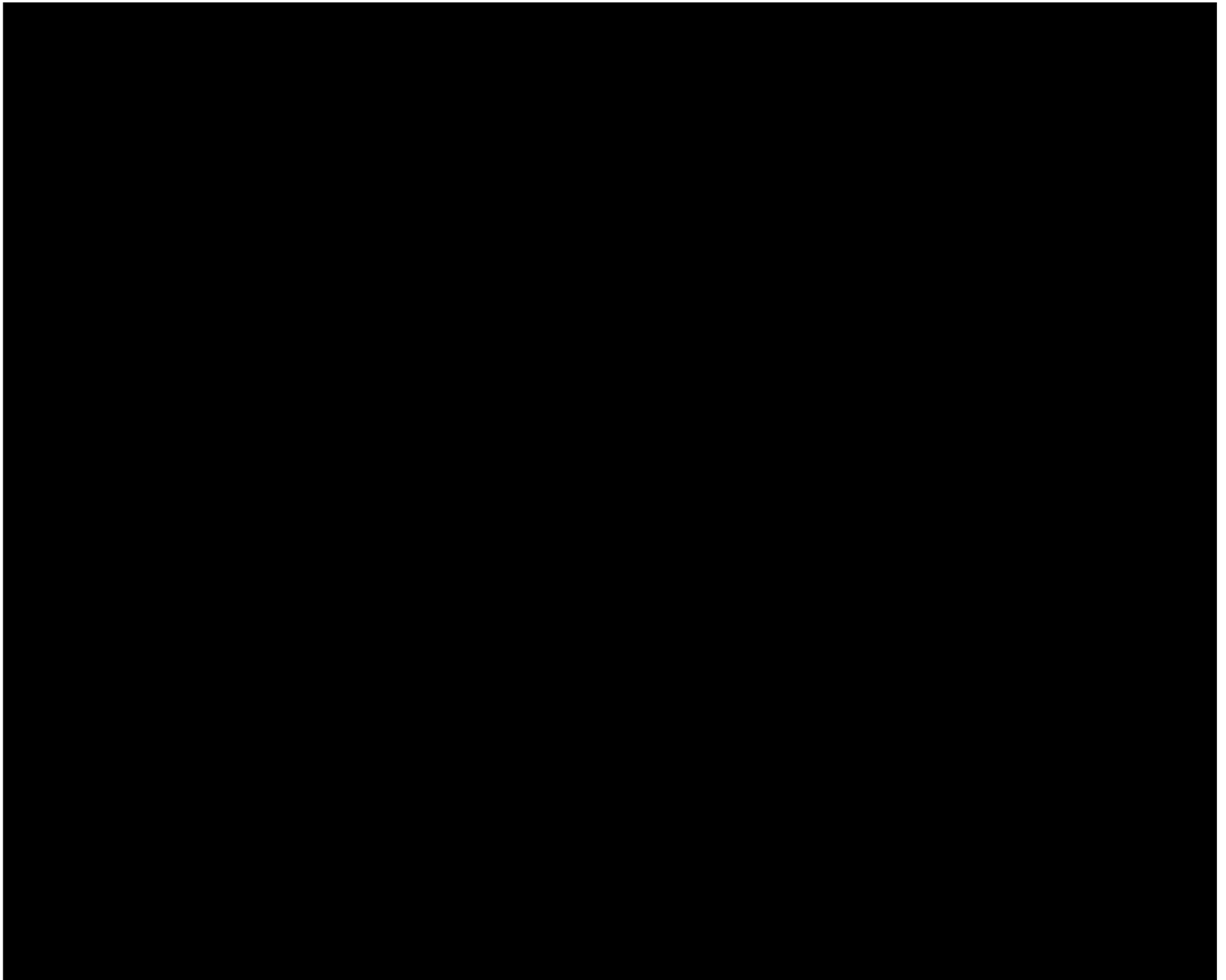


Figure 17 – Metadata cost split by network

Open Data Portal:

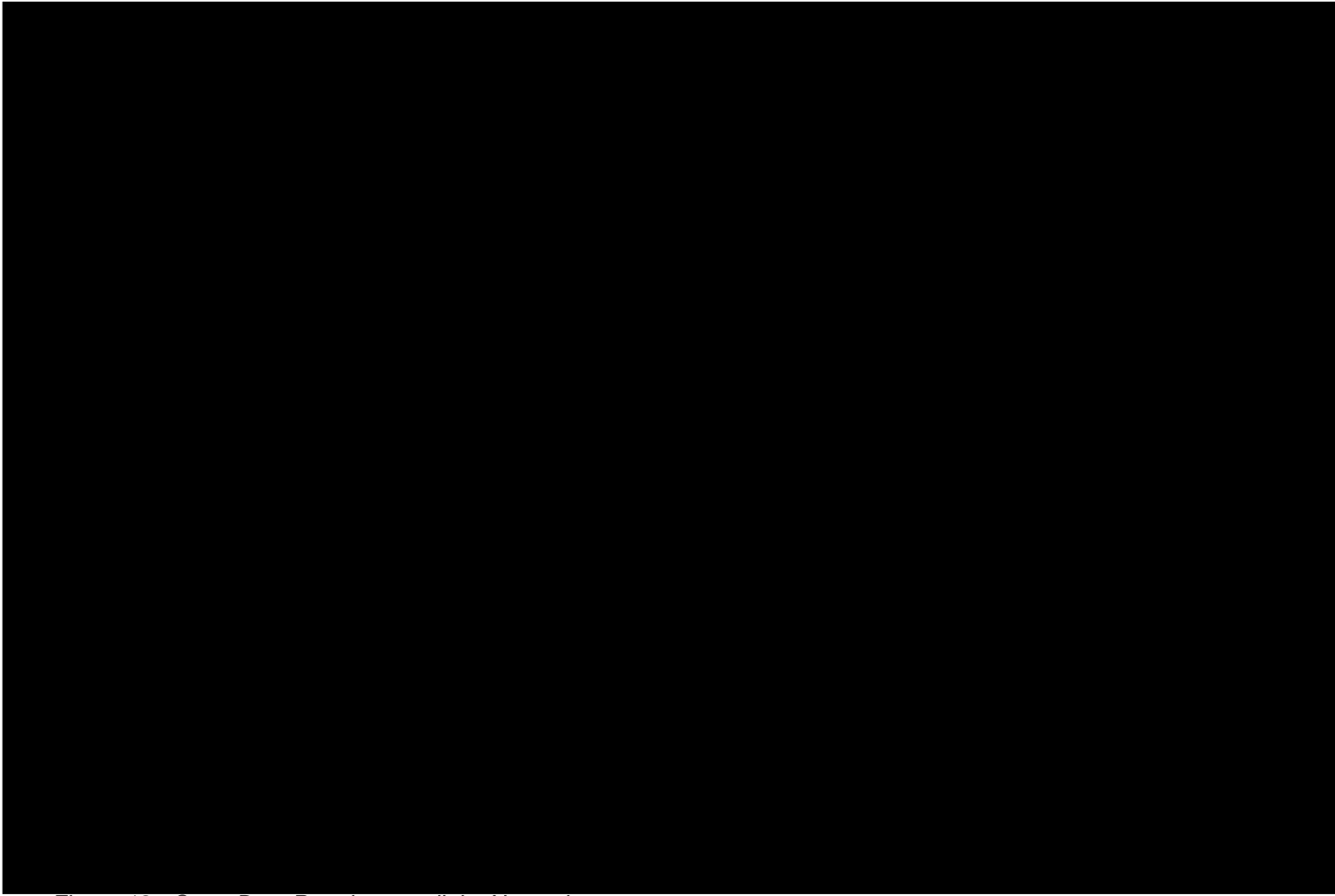


Figure 18 - Open Data Portal cost split by Network

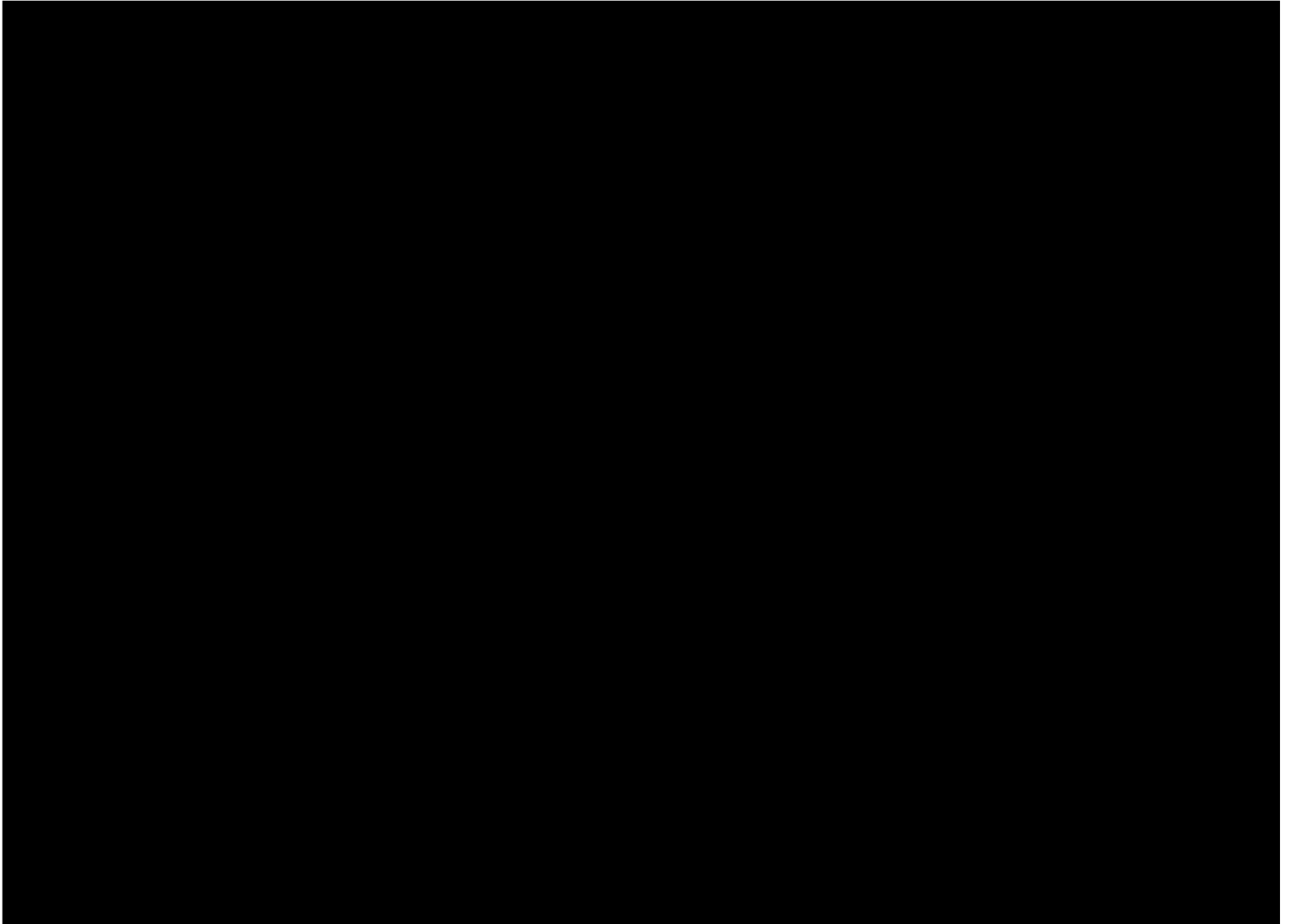
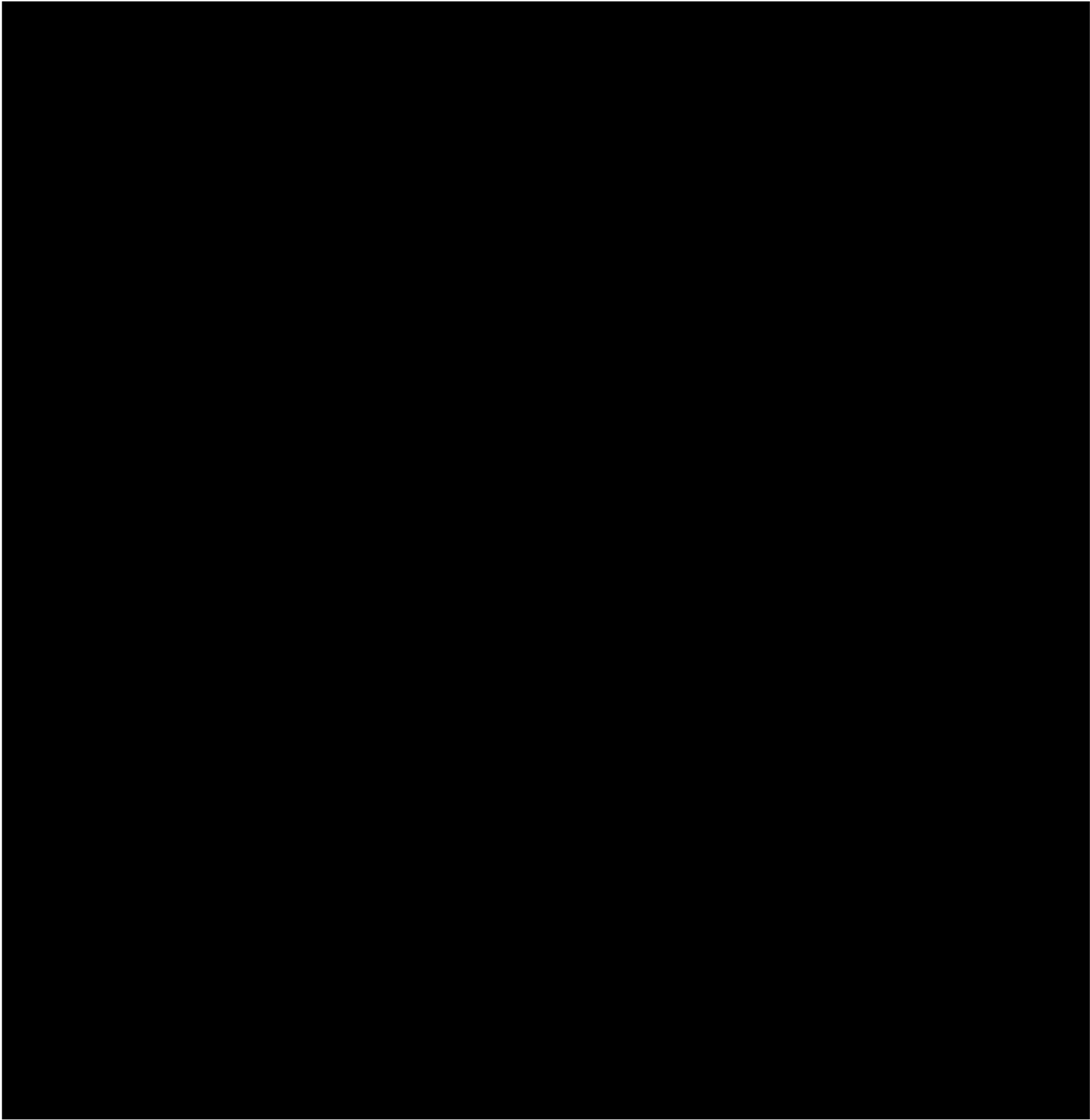


Figure 19 - Interoperability cost split by Network

Chapter 8.0

Appendices

The documents noted can be found in the accompanying Zip folder.



Chapter 9.0

Glossary of Terms

Acronym	Description
API	Application Programming Interface
CD	Continuous Delivery
CI	Continuous Integration
DAMA	Data Management Association
DBP	Data Best Practice
DDSG	Data & Digitalisation Steering Group
DSAP	Digitalisation Strategy and Action Plan
EA	Enterprise Architecture
ENA	Energy Networks Association
GIS	Geographical Information System
IT	Information Technology
KPI	Key Performance Indicator
PI	Program Increment
PMO	Programme Management Office
PPE	Personal Protective Equipment
ROM	Rough Order of Magnitude
TOGAF	The Open Group Architecture Framework
WBS	Work Breakdown Structure