

# Guidance

## RIIO-GD2 Investment Decision Pack guidance

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As part of their RIIO-2 Business Plan submissions, gas distribution companies are required to provide Investment Decision Packs (IDPs) which outline the needs case, scope, costs and benefits for major projects or aggregated investment programmes. These packs provide both quantitative and qualitative assessments of the proposed investments and provide an insight into the investment decision-making processes and governance undertaken within each company. This document sets out what constitutes an IDP and where they should be submitted, as well as outlining key guidance for the Cost Benefit Analysis (CBA) template.

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## 1. Introduction

The purpose of this guidance note is to:

- (i) Explain the concept of Investment Decision Packs (IDPs) and the interaction between the Engineering Justification Paper (EJP) and Cost Benefit Analysis (CBA) template;
- (ii) Ensure that companies adopt a common CBA framework to facilitate cross-company comparisons of asset investment plans, and;
- (iii) Employ a framework consistent with latest thinking on how to conduct CBA in a regulated context.

## 2. What is an Investment Decision Pack (IDP)?

Ofgem is seeking to improve the visibility and transparency of each company's investment decision-making process and assess the justification and viability of these investments through an IDP. An IDP consists of an EJP and a CBA template. The purpose and scope of each document is summarised below:

**EJP:** sets out frameworks for both major engineering projects and ongoing network asset health investments. The EJP outlines the problem that the investment seeks to solve and sets out the different options that have been considered. The purpose of the paper is to communicate the key factors that have influenced the investment decision and provide summary engineering detail on the options considered. The EJP guidance document sets out two frameworks: one for major engineering projects and another for network asset health investments. The EJP is primarily intended to be read by engineering professionals within Ofgem and any subject matter experts / consultants we engage.

**CBA template:** is applicable to both major engineering projects and ongoing network asset health investments. The template sets out a quantitative assessment of the main options under consideration and demonstrates the value that each of these options would bring. The main purpose of the CBA is to demonstrate the relative value of the preferred investment option, clearly articulating any assumptions and key economic drivers underpinning the investment decision. The template also includes qualitative summaries that allow the companies to link proposed investments back to their engineering justification and stakeholder engagement. Our assessment will look to all these elements to substantiate viability and justification of investments in RIIO-2.

The IDP documents are designed to be consistent with the HM Treasury Green Book<sup>1</sup> approach to appraising and evaluating major infrastructure investments. The principle of the IDPs is to provide all information required to allow Ofgem to understand and interrogate the investment decision-making processes and internal governance procedures of each company. Our expectations on when we expect to see IDP submissions supporting proposed expenditure within the Business Plan are outlined in more detail below. In addition, Ofgem and the RIIO-2 Challenge Group reserve the right to ask companies to provide an IDP for a specific investment at relatively short notice (i.e. 2-5 working days) after the October revised draft Business Plan and December final Business Plan submission deadlines, where deemed necessary. This approach reflects the expectation that all investments included in the revised draft and final Business Plan submissions have been through an internal review process and the information to justify the investment is readily available.

Our expectation is that the final versions of the IDP documents, published in September 2019, will be integrated into the final December Business Plan submission.

Our latest thinking on the CBA framework for RIIO-GD2 is contained within this guidance note.

The frameworks for EJP are set out in the *Engineering Justification Paper Frameworks for RIIO-GD2 and RIIO-GT2 V2* document, published alongside this paper on Ofgem's website.

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<sup>1</sup> HM Treasury - The Green Book;  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685903/The\\_Green\\_Book.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf)

### 3. When do we expect to see an Investment Decision Pack (IDP)?

We expect to see IDPs for investments that are financially material and/or require significant engineering and/or economic scrutiny by Ofgem because of the risks associated with the investment. In practice, this means that the majority of capex and repex spend should be supported by IDPs. While it remains at the discretion of each company to consider the appropriate level of aggregation for each IDP submission, we have indicated our expected minimum thresholds below.

The submission requirements and guidance outlined below apply to both proposed baseline and ambition/uncertain expenditure. Where companies are proposing significant investments that will be funded through uncertainty mechanisms, they are expected to have followed a comparable engineering and economic evaluation process as was used to justify baseline expenditure.

For each company, Ofgem will look to review a number of these IDPs as part of the Business Plan assessment process. The sample reviewed will include financially material investments, investments where the requirement or costs are subject to a high degree of uncertainty, including around the future usage of the network. In addition, a random audit sample across a range of investment types will also be completed to ensure consistency.

#### 3.1. IDP groupings

Broadly, across RIIO-GD2, companies may choose to carry out CBA at the following levels:

- Asset category/class
- Project level
- Programme of works

For gas distribution, IDPs submitted at an asset category/asset class level (e.g. one network-level pack for service governor replacement during RIIO-GD2) are likely to be appropriate, given the relatively high volume, low value nature of the investment work at an individual asset level. In particular, where projects within a particular asset category/class are reasonably homogenous in terms of the costs and benefits involved or where sub-dividing workloads would result in the overall costs for each pack becoming relatively immaterial, we would expect these projects to be considered as part of a single IDP.

In some instances, it may be more appropriate for companies to submit packs for a specific programme of works within a particular asset category/asset class. For example, where a certain element of an investment programme has unique costs and/or benefits that differentiate it from the rest of the interventions on that asset class (e.g. CISBOT repairs to larger diameter iron mains). We do not intend to prescribe which programmes of works should be subject to a separate pack and will leave this to the judgement of each company. However, where packs are submitted for a specific programme of works, we expect the accompanying commentary to outline why the programme of works has been considered separately from the rest of the asset category/asset class.

Where there are any large, standalone investment projects that form part of the Business Plan, we expect these to be supported by a separate IDP in order to provide investment justification and demonstrate value for money for customers.

Companies should also submit IDPs in support of any proposed anticipatory investments within their Business Plans. It is crucial that companies undertake full sensitivity analysis of

any anticipatory investments and outline how such investments are justified under a range of potential future energy pathways (further discussion of this is provided in Section 4.7).

### 3.2. Minimum submission requirements for the December Business Plan submission

We have updated our guidance on expectations for CBA submissions in the Business Plan. The table below presents an overview of the asset classes for which we expect to see CBAs and EJPs submitted, subject to the conditions set out below. These asset classes are consistent with the GD NARM methodology.

***Table 1.1: GD asset classes to be supported by CBAs***

Primary asset level	Primary sub-level	Secondary asset level	Tertiary asset level	
Mains		Iron	Tier 1 (inc. <=2" steel); Tier 2B; Tier 3	
		PE		
		Steel		
		Other		
Services		Services		
MOB Risers		Risers		
LTS Pipelines		Piggable		
		Non-piggable		
Offtakes & PRS	Odorant & Metering	Offtake metering system		
		Offtake odorisation system		
	Pre-heating	Offtake pre-heating		
		PRS pre-heating		
	Filters and pressure control	Offtake filters		
		Slam shut & regulators		
		PRS filters		
		PRS slam shut & regulators		
	Governors		District	
			I&C	
Service				

We expect GDNs to submit CBAs for each asset type at the secondary asset level, with the exception of iron mains, where companies should submit CBAs for each asset type identified at the tertiary asset level. Companies may submit EJPs at the primary asset level, however, these must cover in detail each of the secondary or tertiary asset types within that category, providing all of the required information for each type of asset and must follow the section numbering criteria set out in the EJP guidance.

#### Materiality thresholds

In some instances, it may be the case that a GDN does not intend to undertake significant investment in a particular asset category during RIIO-GD2. Hence, companies should apply the following materiality threshold guidance when submitting CBAs:

- For asset health investments covered within the NARM methodology (i.e. the above list), CBAs should be submitted where investment exceeds £2m across the whole of

the RIIO-GD2 period. The £2m figure does not include ongoing maintenance & repair costs.

- For asset health investments not covered by the NARM methodology, CBAs should be submitted where investment exceeds £5m across the whole of the RIIO-GD2 period.
- For major projects, we do not intend to set an explicit materiality threshold as companies may treat the distinction between a programme of works and a major project differently. However, we expect the majority of capex and repex expenditure within the BPDT to be supported by CBAs, whether as part of a programme of works or as major projects. We reserve the right to ask for CBAs for major projects following the submission of the Business Plans in December.

### **Combining assets within CBAs**

- We expect that services associated with mains replacement will be included within the relevant mains-level CBA. This reflects the fact that mains replacement is the primary driver of service workloads. Companies should clearly outline how environmental, safety and other benefits are attributable between mains interventions and service interventions. Service interventions not associated with mains replacement should be presented in a separate CBA.
- Companies may combine piggable and non-piggable LTS pipelines within a single CBA. However, any significant differences in benefits between these two categories should be clearly identified, including the relative impacts on ongoing opex costs.

### **Additional considerations**

- Table 1.1 above outlines the minimum expectation regarding the level at which EJPs and CBAs should be submitted, but companies should consider further breakdowns where necessary, based on distinctions between size, usage, costs and consequences of failure for different asset types within an asset class. In some instances, it may be appropriate to provide multiple EJPs and CBAs for a given secondary asset class, where the equipment capacity can vary widely, resulting in very different applicable unit costs and benefits.
- Repex assets should be categorised on the basis of the material of the mains being decommissioned, rather than the mains being commissioned. Therefore, CBAs for PE mains are only required if a company expects to undertake a significant amount of replacement, reinforcement or diversion work on existing PE mains that is not predominantly customer-funded.
- Workloads that are driven and majority paid for by third parties do not require justification through CBA. Companies should however consider whether it is appropriate to submit an EJP in support of these investments, to demonstrate the engineering judgements that have been made to define the scope or preferred option and cost estimates for these projects, particularly where they are of significant materiality.
- GDNs should provide a summary overview table detailing whether a CBA/EJP has been submitted and which asset classes it covers.

Ofgem and/or the RIIO-2 Challenge Group reserve the right to ask for IDPs for areas of notable investment at short notice following the submission of the October revised draft Business Plan and the December final Business Plan, should they not already be included.

### **3.3. Minimum submission requirements for the October Business Plan submission**

For the October draft Business Plan submissions, companies have the choice of using either v2 of the CBA template, which was published in May and used for the July submissions, or v3.1 or v3.5 which have subsequently been shared for comment. We have not placed a specific requirement on companies mandating the version of the template they need to use for the October submission. However, we have shared a table for logging changes made to

the CBA template and companies are encouraged to complete this to keep track of any updates they make.

## 4. CBA-specific guidance

### 4.1. Sheet-by-sheet overview of the CBA template

This section provides an overview of the main purpose of each sheet within the CBA guidance document and our expectations with respect to how these should be completed.

- **Cover** – provides publication date and contact details for sector-specific CBA lead within Ofgem.
- **Version history** – provides a log of the version history of the CBA template file and outlines the key changes that were made between each subsequent version.
- **Changes Log** – provides an area for companies to log any structural changes they make to the workbook or changes to key assumptions.
- **Guidance** – provides specific guidance around the inputs expected in each sheet of the CBA template. Acts as a quick reference for analysts completing the template.
- **Summary** – presents a summary view of the headline figures from the CBA table and allows for a high-level assessment of the relative net benefits of each option compared to the baseline.
- **Summary (High CO2 price)** – this is a supplementary summary view of the heading figures from the CBA table but assumes a high case for CO2 prices. The high case prices are taken from the Green Book supplementary guidance tables<sup>2</sup>. No direct inputs into this sheet are required; it is primarily included for convenience, should companies need to undertake additional sensitivities around certain inputs (explained further in Sections 4.7 and 4.8).
- **Full Opt. Considered** – for network companies to present a summary of the full list of engineering options that have been considered to satisfy the identified problem. This acts as the first step of the filtering process, allowing analysts to quickly understand which options have been taken forward to full CBA assessment and why other options have been discounted.
- **Fixed Data** – used to input specific data points and menu options that feed through into the calculations and drop-down lists respectively within the Template, Baseline and Options sheets.
- **Fixed Time Series Data** – used to input specific time series data points that feed into the calculations within the Template, Baseline and Options sheets.
- **Risk Register** – presents a summary of the risks that the company has identified which could affect the cost efficient and timely delivery of the preferred investment option.
- **Template** – this is the template version of the CBA calculation sheet for reference and to be used to create new sheets if they are required. This sheet does not link through to the Summary sheet and data should not be inputted into this sheet.
- **Baseline** – this sheet is where data consistent with the baseline 'do minimum' scenario should be entered. This sheet links into the Summary and Options sheets in order to allow comparison of each investment option relative to the baseline scenario.
- **Option** – used to input data for a specific investment option, which will be compared against the Baseline data when assessing the economic justification for the option in question. It is expected that multiple options will be presented for each proposed investment, with the network company indicating its preferred option and providing supporting arguments for this choice.
- **(additional workings sheets)** – companies are encouraged to add additional sheets into the CBA template and use these to present data and assumptions that underpin the aggregate level numbers included within the Baseline and Options sheets. This data

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<sup>2</sup> Data tables 1 to 19: supporting the toolkit and the guidance:  
<https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

should be clearly labelled, particularly where numbers are hard coded, and presented in a logical and easy-to-follow format.

## 4.2. Identification of options

Consistent with the HM Treasury Green Book<sup>3</sup>, companies should clearly identify the range of options that were considered to meet the stated aim. This list should, where feasible, include an option that requires a minimal initial investment (the “do minimum option”) against which other options can be compared. Additionally, the option of delaying investment (the “deferral option”) must be considered as part of the CBA. The deferral scenario is not required for Tier 1 repex or other investments that have a legislative driver which means that the investment must occur within a defined time period covered by RIIO-GD2.

### 4.2.1. Baseline Scenario

The “do minimum option” or “baseline scenario” may represent do nothing or business as usual (e.g. ongoing maintenance and repair). This detail is to be completed within the ‘Baseline’ sheet. For instance, we consider the “baseline” scenario to be that which involves the minimum level of intervention that would be required to remain compliant with HSE safety regulations.

For programmes of works, it is expected that the baseline scenario is consistent with the ongoing costs of maintaining the asset population at its current state of operation (i.e. costs associated with maintenance and repair, as well as responding to emergency call outs on the asset population in question over the investment period). It is important that these costs are entered into the CBA (as ‘maintenance & repair’ in the intervention drop-down menu), so that relative differences in opex expenditure resulting from each proposed investment option can be captured within the NPV calculation.

For programmes of works CBAs, the asset population should be entered as the whole population for the asset type being considered, and opex costs should be consistent with the costs of maintaining the whole asset population.

For Tier 1 repex and services programmes of works CBAs, the baseline should be shown as the ‘do minimum’ scenario, with the option showing the costs associated with completing the mandatory replacement programme<sup>4</sup>.

For standalone major projects or company-led expansions of the network, the baseline scenario may be ‘do nothing’, where the alternative to making the investment is to keep the network in its current state.

For each investment, the company should clearly explain, in the supporting commentary boxes in the CBA, what assumptions have been used when defining the baseline scenario.

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<sup>3</sup>HM Treasury - The Green Book;

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685903/The\\_Green\\_Book.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf)

<sup>4</sup> It is noted that the primary and overriding driver of the Tier 1 mains replacement programme (including associated services) is the requirement to comply with HSE legislation under the Iron Mains Replacement Programme. Nevertheless, it is helpful for us to understand the wider value the programme provides, although this will not be a consideration when determining funding allowances for Tier 1 mains and services.

#### 4.2.2. Options

The 'Full Opt. Considered' sheet in the CBA template is provided for companies to identify and clearly list the options they have considered for each investment decision. This list of options should include those that have been considered and rejected before full costing (in line with the process outlined in the accompanying EJP), and shortlist those options that have been taken forward, fully costed and presented in the CBA. Clear rationales for inclusion/exclusion of different options should be provided and summarised (i.e. a few lines or bullets) in the comment boxes provided.

For each option which has been taken forward for fully costing, an 'Option' sheet should be completed. The Option sheet should present the costs associated with the investment option (e.g. costs of replacement or refurb) as well as the ongoing opex costs associated with maintaining the whole asset population (i.e. maintenance, repair and emergency costs), taking into account any reductions in these costs as a result of other interventions (e.g. asset replacement meaning less maintenance is required on the new assets). Companies should also include any additional costs or benefits associated with the investment option that they consider to have a material impact on the investment decision and are not already captured within the template.

Asset populations should be entered for all intervention types selected. For maintenance and repair, the asset population should be consistent with the whole asset population, as per the base case. For other intervention types, the asset population should equal the number of assets for which that type of intervention will be undertaken over the whole RIIO-GD2.

The Option sheet includes a table that presents the relative differences between the investment option under consideration and the baseline scenario, both in absolute (present value (PV)) and relative (Net Present Value (NPV)) terms. This allows the key net benefit drivers to be quickly identified, which helps with the quantitative assessment of the option.

Within the 'Baseline' and each 'Option' sheet in the CBA template, there are summary boxes for the Engineering Justification, Stakeholder Support and the GDN View. These summary boxes should provide executive summary style overviews that link back to the key points presented in the EJP and Business Plan. They should provide enough information to outline the key arguments under each category and allow the evaluator to trace back to the relevant section(s) in the supporting documents (i.e. short paragraphs or bullet points summarising the key justification(s) for the proposed investment).

#### 4.2.3. Grouping together assets

Section 3 outlines our expectations for which asset classes companies should submit asset health improvement CBAs. For most asset types, it is expected that individual CBAs will be submitted. However, in some instances, including for major project CBAs, it may be the case that there is a need to group different asset categories together. In such cases, companies should ensure:

- They explain why the particular assets have been grouped together.
- They clearly show, through adding additional calculation sheets, the costs and benefits attributable to each type of asset and how these relate to the aggregate number presented in the Baseline and Options sheets.
- Identify where grouped asset types are non-NARM assets and demonstrate how benefits for these asset types have been calculated.

### 4.3. Valuing the costs and benefits of options

#### 4.3.1. Expenditure costs

Rows 39 to 58 of the Baseline and Option sheets allow companies to input the expenditure associated with the ongoing maintenance of the asset population and, for the Option sheets, the costs directly associated with the proposed investment (e.g. the cost of replacing X number of assets). The purpose of this section is to capture the material costs associated with maintaining an asset class and to understand how these change given the investment being proposed within each option. For each option, the expenditure should include both the capex and opex spends associated with this option. This allows a clear comparison of capex and opex trade-offs and ensures the correct split is applied between capitalised and expensed expenditure in the RAV calculations within the CBA template. In cases where the investment involves the construction of new assets, rather than replacing and maintaining existing assets, the expenditure section will likely only capture the costs associated with the construction of the new asset.

To ensure that the relative impacts on direct network costs can be compared between the Baseline and Option, it is vital that the Baseline and Options templates **are completed in absolute terms**. This will ensure that changes to ongoing network opex costs resulting from a proposed investment will be captured in the final NPV calculations.

The expenditure rows in the template also allow companies to directly input other costs that may not be captured within the existing template categories, but which may have a material impact on the investment decision. Companies should focus on identifying material costs that strongly drive investment decisions, rather than seeking to present a long list of cost items that contain many individually immaterial costs.

The costs and benefits, and workload volumes, of the preferred option should broadly correspond to the financial values set out in the company's Business Plan and BPDT (where applicable). For example, the maintenance costs for service governor replacement presented for the preferred option in the CBA should broadly tally with the maintenance cost profile presented in the BPDT. There should be a clear link between the volumes presented in the CBA template, the GD BPDT and the NARM BPDT.

#### **Input guidance: filling in the Expenditure section of the CBA template**

- This guidance relates to the inputs in Rows 39-58 of the Baseline and Option sheets
- The asset class should be selected from the drop down menus in column B
  - For distribution mains expenditure, the asset class should be defined as the type of main (in terms of material and diameter band) being decommissioned/abandoned, rather than the main being laid/commissioned.
  - For each asset type, an intervention option should be selected from the drop-down list in column C
- Any freeform entries should be clearly labelled (use comment boxes if additional space is needed for explanation). The type of intervention should also be specified.
- Volumes must be entered for each expenditure line item
- All expenditure values should be entered as negative numbers

#### 4.3.2. Societal costs

The societal costs section of the CBA template is design to value the key environmental, safety and other drivers that support many investment decisions. For consistency we have standardised the assumptions and calculations for the valuation of key environmental

(leakage and shrinkage) and safety (risk of fatality and non-fatal injury) costs, the reduction of which relative to the baseline represents a benefit. We have entered default parameters in the CBA template for these non-marketed items; where companies amend these assumptions full justification should be supplied to support the move from the default parameters. For the benefits associated with preventing fatalities and injuries, we require companies to draw on guidance set out in HM Treasury Green Book<sup>5</sup> and the HSE<sup>6</sup>.

We have separated benefits into environmental benefits and other benefits, which includes safety. In both sections, there are freeform entry rows which allow companies to enter option/project-specific benefits. Companies should specify the type of benefit of any freeform entries, as this will determine the discount rate used (see Section 4.4 for further discussion of discount rates). As with the calculated environmental and safety costs, any freeform entries should be on the basis of absolute costs, allowing comparison of the relative differences between the Baseline and Options. Cost should be entered as negative numbers. Companies should clearly outline the assumptions and data sources used to arrive at the estimate of the financial value of any non-marketed costs (benefits) included within the CBA template. The inclusion of non-marketed costs or benefits within the CBA template should be explained within the EJP.

When including benefits within the CBA, we expect there to be a clear link between the assumptions used in the CBA template and those used in the Gas Distribution Network Asset Risk Metric (NARM) methodology, where applicable. Hence, where there exists a common assumption within the NARM methodology<sup>7</sup> for a value attributed to a specific node or variable, it is expected that this would also be used as the basis for values presented within the CBA. The assumptions used for societal benefits of greenhouse gas emissions and reduced fatality and injury probability are consistent with the NARM methodology. The Network Asset Health framework for the EJP sets out how companies should outline the key assumptions used for probability of failure and consequence of failure justifying an investment.

There may be further non-marketed costs where a fixed assumption or calculation methodology has not been provided in the CBA model. In such instances,

The template includes a monetised risk memo line for both the Baseline and Option sheets. Companies should enter the monetised risk score (as output from their NARM models) into this line for both the Baseline sheet and the preferred Option. The memo line allows for a comparison between the benefits identified within the CBA and the output of the NARM model for a given intervention option. The NARM memo line does not link into the CBA calculations and is for reference only.

In cases where the proposed investments are not covered by the NARM methodology, companies should explain in the EJP the methodology(ies) they used to estimate the societal costs (and benefits) of the Baseline and Option, clearly outlining key assumptions. It is not required to complete the NARM memo line in such instances.

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<sup>5</sup> HM Treasury - The Green Book;

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685903/The\\_Green\\_Book.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf)

<sup>6</sup> <http://www.hse.gov.uk/economics/eauappraisal.htm>

<sup>7</sup> As outlined in Appendices A-F of the Network Output Measures: Health and Risk Reporting Methodology and Framework Consultation;

[http://www.energynetworks.org/assets/files/news/publications/Consultation%20Responses/Gas%20Distribution%20Networks%20\(GDNs\)%20NOMS%20Methodology.pdf](http://www.energynetworks.org/assets/files/news/publications/Consultation%20Responses/Gas%20Distribution%20Networks%20(GDNs)%20NOMS%20Methodology.pdf)

**Input guidance: filling in the Total benefits (costs) section of the CBA template**

- This guidance box relates to the inputs in Rows 121-141 of the Baseline and Option sheets.
- Inputs for Leakage (CH<sub>4</sub>) (Row 136), Shrinkage – theft of gas & own use gas (Row 138), Probability of fatality (Row 140) and Probability of non-fatal injury (Row 141) should be entered as positive values and in the units defined within the template.
- Companies may enter additional costs (negative input) or benefits (positive input) into the freeform cells in Rows 123-125 & Rows 129-133.
  - Where companies enter additional costs or benefits, these should be clearly explained in the EJP and the workings and assumptions used to determine the value of these inputs should be presented in the EJP, CBA template (adding additional sheets) or both.

*4.3.3. Calculating NPV*

The present value (PV) of each of the options identified within the Option and Baseline sheets will be calculated in absolute terms. The evaluation of each option will then be made on the basis of comparing the relative benefits of the Options against the Baseline (i.e. comparing the NPV of each option). Thus, it is the improvement in the NPV which is the primary economic consideration when justifying investment options, rather than the absolute value of the NPV. This reflects the fact that the CBA templates do not explicitly account for the value of some benefits associated with the gas network (i.e. the value of consumers having ready access to gas supplies for cooking and heating). However, as these unquantified benefits apply to both the Baseline and Option scenarios, for the purpose of this analysis it is considered that they net out in the final comparison.

*4.3.4. General guidance*

The financial costs and benefits must be in 2018/19 prices, exclude real price effects (RPEs) and be net of expected productivity improvements [i.e. consistent with the data set out in the companies' Business Plan Data Templates (BPDT)]. Fixed price assumptions that are based in a different year (i.e. cost of a fatality) have been uprated to 2018/19 prices.

The technical parameters for calculating the costs of emissions are contained within the Fixed Time Series Data sheet. We have earlier assumed a global warming potential (GWP) figure of 28 for methane, which is consistent with the IPCC's AR5 report<sup>8</sup>, however, the current value of 25 advised by BEIS, which is consistent with the HM Treasury Green Book on Appraisal and Evaluation<sup>9</sup> is recommended going forward. We have opted to use the higher value as this represents the more conservative view on the impact, and therefore costs, of methane emissions on the environment.

The % methane in natural gas mix is a user-defined category, allowing each company to accurately reflect its operating parameters and present its assumptions regarding the changing composition of the gas mix in the future. This also allows companies to present sensitivity analyses demonstrating how the economic justification changes under different future gas mix compositions consistent with different energy pathways (e.g. increasing share of hydrogen in natural gas).

<sup>8</sup> [https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5\\_Chapter08\\_FINAL.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf)

<sup>9</sup> [Valuation of energy use and greenhouse gas emissions \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/674442/Valuation_of_energy_use_and_greenhouse_gas_emissions.pdf)

### Input guidance: filling in other information within the Baseline and Option sheets

- This guidance box relates to inputs in the Baseline and Option sheets.
- **Option name (Cell B6):** this should be a descriptive name, that clearly identifies the option in question (avoid names such as Option 1, Option B2, etc.)
- **Scheme Reference ID (Cell B7):** this should provide a unique reference ID for the investment and option.
- **Expenditure Type (Cell B8):**
- **Preferred Option (Cell B9):** Use the drop-down menu to indicate whether this is the preferred investment option or not. There should only be one preferred investment per CBA file.
- **Spend Area (Cell B10):** use this to indicate the relevant BPDT tables that are related to this proposed investment decision (only required for the preferred option).
- **First year of expenditure outflow (Cell B12):** enter the date of the first year in which investment outflow related to the specific investments in the option occurs.
  - For example, if replacement activity occurs in the first year of RIIO-GD2, then enter 2022. However, if the first replacement or refurbishment activity doesn't occur until the fourth year of RIIO-GD2, then enter 2025.
  - For the majority of spending in RIIO-GD2, companies will likely be undertaking Asset Health improvement work, where they will be proposing to intervene on a certain number of assets within the population, while continuing to carry out maintenance, repair and emergency work across the whole asset population. Hence, it is assumed that ongoing direct opex costs will largely continue throughout the duration of GD2. Therefore, it is the date of the first proposed intervention above and beyond regular maintenance that is important to consider in the context of the CBA assessment, rather than the first year of direct opex spend.
- **Capitalisation rate (Cell B25):** for capex spend, companies should enter a company-specific capitalisation rate, based on the average of their expected capex and opex spend profile over RIIO-GD2. For repex spend, companies should assume capitalisation rate of 100%.
- **Date Undertaken (Cell F6):** enter the date that the CBA template was finalised
- **Authorised By (Cell F8):** enter the name and title of the senior manager or director that authorised the final CBA assessment.

#### 4.4. Applying the Spackman approach to gas distribution network investment

The Spackman approach involves the following two-step approach<sup>10</sup>:

- Convert capital costs into annual costs using the company's cost of capital.
- Use the Social Time Preference Rate (STPR) of 3.5% (*less than & equal to 30 years*); 3% (*greater than 30 years*) to discount all costs and benefits<sup>11</sup>, except safety where the Health Discount Rate (HDR)<sup>12</sup> of 1.5% (*less than/equal to 30 years*); 1.2857% (*greater than 30 years*) should be used.

<sup>10</sup> Joint Regulators Group (4 October 2011) Discounting for CBAs involving private investment but public benefit. para 3.10; [https://www.ofcom.org.uk/data/assets/pdf\\_file/0029/37856/jrg\\_statement.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0029/37856/jrg_statement.pdf)

<sup>11</sup> HM Treasury - The Green Book, Annex A6: Discounting, Table 9; [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685903/The\\_Green\\_Book.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf)

<sup>12</sup> HM Treasury - The Green Book, Annex A6: Discounting, Table 10; [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685903/The\\_Green\\_Book.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf)

The capital costs should be converted to equivalent annual costs that are recovered through customers' bills. The CBA spreadsheet model assumes 45-year sum of digits' depreciation in line with our RIIO-GD1 regulatory depreciation policies. The annual capital costs should also be calculated over the assumed economic life of the asset.

To convert capital costs into annual cost recovered through customers' bills, we require companies to use a pre-tax weighted average cost of capital (WACC) figure (a simple average of the expected WACC across RIIO-2) which is consistent with their own individual Business Plan submissions. The WACC should be based on the assumption of notional gearing.

Due to future uncertainties, we have limited the timeframe of the CBA model to 45 years (from the final year of investment during the RIIO-GD2 period). At the current time, we have also assumed depreciation occurs over 45 years, using the sum of digits method, which is consistent with the approach used in RIIO-GD1.

We expect companies to take into account uncertainty and risk when presenting their Business Plans for RIIO-GD2. This includes accounting for the risk of asset stranding and companies should demonstrate that they have considered the option of deferral within the CBA. Companies should also take into consideration options for whole system solutions, in line with the guidance outlined in our Sector Specific Methodology Consultation document. The IDPs include both quantitative and qualitative components, allowing companies to provide commentary that clearly outlines their decision making process, including how they assess potential investment risks. We will take these arguments into account when assessing the business case for each investment.

Where CBA outcomes are marginal, the company should run sensitivities on key input assumptions and productivity improvements beyond RIIO-GD2. In particular, where environmental factors play an important role in driving net benefits, companies are encouraged to demonstrate that the proposed investment is consistent with different future energy pathways (e.g. transition to a hydrogen-based economy, compatibility with deep electrification of the economy).

#### **4.5. Other key assumptions and inputs**

The weighted average cost of capital (WACC) input should be company-specific and consistent with each company's assumed average WACC for RIIO-GD2. It should be based on notional gearing.

#### **4.6. Decision rule**

The purpose of the CBA template is to enable companies to demonstrate the proposals included in their Business Plans provide the optimum solution which demonstrates value for customers.

While we do not expect companies to use CBAs mechanistically (i.e. including all schemes with positive NPV and excluding all those with negative NPV), we expect variations to be qualified. The output from the CBA is an important element of companies justifying their preferred option, and should be considered alongside factors such as the technical and economic asset life, payback periods and risks to investment.

Where a scheme has a marginally positive or negative NPV relative to the baseline, companies should consider the inclusion/exclusion of such a scheme drawing on sensitivity analysis and the identification of any non-monetised benefits or costs. As an example, such non-monetised costs/benefits might include:

- a. (Non-monetised) engineering judgement on what constitutes an efficient project, as detailed in the required EJP
- b. Evidence of stakeholder support for one option over another (i.e. providing connectivity to vulnerable customers).

We expect companies to clearly set out such judgements as part of their IDP, and have, accordingly, provided a section for a brief synopsis for both engineering justification and stakeholder support within the CBA template.

It is the overall position determined across the following three distinct elements which will determine and substantiate the most appropriate solution:

1. Engineering Justification Paper
2. Stakeholder Engagement and Support
3. The quantitative analysis (i.e. CBA).

The IDP will be assessed in its entirety by Ofgem to inform the viability and justification of any proposed investments within the company's well-justified Business Plan. Investments which present high quality EJPs and CBAs, as well as demonstrate consistency with stakeholder preferences will be more likely to be considered as high confidence.

Included within the CBA template and EJP are sections for capturing risks associated with the preferred option. These risks should capture any material risk which may impact the cost and/or timing of the preferred investment. The risk impact should be broadly quantified and the likelihood of occurrence estimated, according to the drop-down menu options within the CBA template. The relevant controls and risk mitigation should also be captured within this section. These sections are important as they demonstrate that companies have undertaken a comprehensive evaluation of the proposed spend. It does not, however, mean that where companies have identified a number of risks, the proposed expenditure will automatically be treated with lower confidence. The confidence assigned to each spend will be determined by a number of factors, of which potential risks will be one.

Ofgem also intends to utilise the evidence presented in the IDPs as part of the ongoing monitoring and assessment of delivery throughout the price control period. Where there has been material divergence in the cost, timing and/or nature of the solution from that which was assessed and funded through the Business Plan process, we expect these changes to be subject to the same rigor and assessment that the original proposal was subjected to. We would expect an updated IDP, with the baseline being the original solution, to be available to Ofgem upon request.

#### **4.7. Uncertainty and sensitivity analysis**

We expect companies to undertake sensitivity analysis consistent with the HM Treasury Green Book guidance<sup>13</sup>.

- *"Sensitivity analysis is fundamental to appraisal. It is used to test the vulnerability of options to unavoidable future uncertainties. Spurious accuracy should be avoided, and it is essential to consider how conclusions may alter, given the likely range of values that key variables may take. Therefore, the need for sensitivity analysis should always be considered, and, in practice, dispensed with only in exceptional cases.*

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<sup>13</sup> HM Treasury - The Green Book;  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685903/The\\_Green\\_Book.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf)

- *The calculation of switching values shows by how much a variable would have to fall (if it is a benefit) or rise (if it is a cost) to make it not worth undertaking an option. This should be considered a crucial input into the decision as to whether a proposal should proceed. It therefore needs to be a prominent part of an appraisal.”*

We expect companies to consider sensitivity analysis with respect to key parameters, for example:

1. Asset performance / health deterioration rates
2. Ongoing efficiency assumptions
3. Future demand growth / reduction
4. Future energy scenarios
5. Future utilisation of assets

Sensitivity analyses should primarily focus on the preferred option, demonstrating that it is viable under a range of different potential scenarios. However, companies may also need to undertake sensitivities on other options, to provide comparators under different assumptions. For example, when testing the sensitivity of a key input assumption (e.g. capacity utilisation) it is appropriate to only consider the impact on the preferred option, however, when evaluating the impact of higher carbon prices it is important to consider this impact on each of the options identified in the CBA.

#### **4.8. Future pathways – Net Zero**

It is crucial that companies demonstrate that the investments being proposed are consistent with the UK Governments’ net zero emissions by 2050 target, which came into legislation in June 2019 (Net Zero) and we have set out our expectations on how companies should approach this in the updated RIIO-2 Business Plan Guidance<sup>14</sup>, in particular the need for investment supporting net zero pathways. Companies must consider how the investments they are proposing align with different future pathways and where there is a high risk of asset stranding relating to a specific pathway (e.g. the move towards full electrification) companies are encouraged to propose how uncertainty mechanisms could be used to de-risk the investment.

When considering the compatibility of proposed investments with Net Zero, companies should take into account factors such as:

- **Primary economic driver** – does the economic justification of the proposed investment rely strongly on environmental benefits? If so, how does this change when key parameters (i.e. carbon prices or utilisation) are adjusted?
- **Payback periods** – when does the investment payback? Does the investment primarily benefit existing or future consumers? What is the payback period in relation to the economic and technical life of the intervention? What is the benefit/cost ratio of the investment over the RIIO-GD2 period?
- **Pathways and end points** - what assumptions have been made regarding the transition to net zero, in particular, companies should set out where these differ from the Climate Change Committee’s Net Zero report<sup>15</sup>. Of particular importance are the role and timing of the electrification of heating, transport, carbon capture and storage

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<sup>14</sup> RIIO-2 Business Plan Guidance – Available at:  
[https://www.ofgem.gov.uk/system/files/docs/2019/09/riio-2\\_business\\_plans\\_guidance\\_september\\_2019\\_-\\_published\\_0.pdf](https://www.ofgem.gov.uk/system/files/docs/2019/09/riio-2_business_plans_guidance_september_2019_-_published_0.pdf)

<sup>15</sup> Climate Change Committee (May 2019) – Net Zero: The UK’s contribution to stopping global warming: <https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf>

(CCS), hydrogen and biogas. Where the assumptions about the pathway are relevant to the investment, these should be identified.

- **Asset stranding risks** – is the asset at a heightened risk of being stranded? Is the proposed intervention compatible with different technologies (e.g. hydrogen) and pathways (e.g. electrification of heat)
- **Sensitivity to carbon prices** – would a higher carbon price assumption change the preferred option?
- **Future asset utilisation** – how would the needs case and economic justification for the asset be impacted should the number of customers on the gas network or the demand for gas fall significantly in the future?
- **Whole systems benefits** – are there wider benefits to the proposed investment that enable whole systems solutions or support other investments compatible with Net Zero targets?

Where companies identify a preferred option as potentially being highly sensitive to these types of factors, they are encouraged to undertake further sensitivity analysis to demonstrate their proposed investment is broadly compatible with Net Zero. High sensitivity can be defined as an option no longer being NPV positive or being only marginally NPV positive, the preferred option no longer providing a superior NPV to some or one of the alternative options, the payback period for the preferred option increasing significantly or the option being at high risk of becoming obsolete in the foreseeable future.

Given the broad range of inputs that companies may choose to vary, we do not intend to be prescriptive about how companies undertake sensitivity analyses. However, our CBA template already calculates sensitivity to higher carbon values, for ease of use and consistency. Companies may refer to this in cases where they seek to demonstrate the sensitivity of the NPV due to changes in leakage and shrinkage benefits resulting from higher carbon prices. In cases where companies have identified other cost / benefits that are also a function of carbon prices, we expect companies to use the high case carbon prices consistent with the HM Treasury Green Book<sup>16</sup> to demonstrate carbon price sensitivity.

Companies may use the existing CBA template to run additional sensitivity analyses and submit these alongside the original CBA. Where companies make changes to the inputs to the CBA (e.g. technical inputs for emissions reductions resulting from different utilisation assumptions), they should clearly outline how they have derived these revised inputs, including how underlying assumptions have changed. These additional sensitivity analyses do not necessarily indicate that the preferred option is no longer justified, but GDNs should consider the outputs of any further analyses when explaining how they have built in flexibility to their Business Plans in order to deal with future uncertainty.

#### 4.9. Links to Business Plan

Companies should clearly show the links between their CBA, EJP, Business Plan and BPDTs. For example, the companies should show how the workload and cost forecasts underpinning the CBA feed through into the overall Business Plan proposals and BPDTs. We have included an area within the template for companies to reference which BPDT/Regulatory Reporting Pack table the CBA would fall under for the preferred option.

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<sup>16</sup> HM Treasury - The Green Book;  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/685903/The\\_Green\\_Book.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf)