

RIIO-T2

October 2018

Cost Benefit Analysis – Combined TOs view

Potential T2 Development Areas

Meeting held on 12th October between the three Transmission Owners. The following key development areas for the T2 CBA model were discussed

Structured Optioneering Process

For each investment decision a longlist of options is required to ensure all possible solutions are put forward for consideration, this is then cut down to arrive at a short list of options which can then be subject to further appraisal. A structured process would ensure consistency for each process

Probabilistic Modelling

Utilising a probabilistic approach through Monte Carlo techniques and scenario forecasting allows outcomes to be informed with a greater degree of sophistication. A random sampling is performed by using uncertain risk variable inputs to generate a range of outcomes with a confidence measure for each outcome

Wider Societal Benefits

The ED1 cost benefit analysis model did not feature the wider societal benefits of each investment option
There are several additional impact areas that can be considered as part of the appraisal process

Potential T2 Development Areas - Conclusions

Structured Optioneering Process

- Consistent approach to ensure the most appropriate options are subject to the appraisal process
 - Agreement that a structured process will provide additional benefit to T2 CBA model.
 - Approach and methodology may differ between TOs based on individual requirements but principles will remain the same
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Caveats associated with probabilistic modelling

- Adds additional complexity to model and there is still uncertainty around assumed values/distributions
 - Potential to overload stakeholders with information
 - Agreement that a probabilistic approach not to be used in T2 model but further discussion required on potential future use
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Wider Societal Benefits

- T2 model will look to include more benefits, both qualitative and quantitative, as part of the appraisal process
 - Agreement that Independent market data/prices will be required if the benefit is to be considered in the CBA model. This includes figures such as Carbon Pricing that are verified by an Independent body. Further discussion required on inclusion location specific benefits i.e. Community Benefits
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Additional Considerations

- Agreement that project bundling should be used in CBA process
 - Agreement to utilise a materiality threshold for appraisal
 - Agreement for OFGEM to specify timescales for project assessment to ensure optimal investment decisions are made
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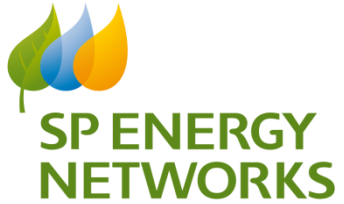
Discussion

- Do you agree with our conclusion that adding probabilistic elements will lead to an overly complex CBA model and further complicates interpretation/presentation of results?
- Are additional benefits without a market rate to be included in the CBA?

Example:

In Scope	Out of Scope
Carbon Pricing	Community Benefits
Network Risk Reduction	Natural Capital

- Views on use of project bundling/materiality threshold for the T2 appraisal process?



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Cost Benefit Analysis – Combined TOs view

Agenda

- T2 Development Areas
- Overview
- Applications in T2
- Existing ED1 Model
- Optioneering Process
- Probability/Uncertainty
- Benefits
- Additional Considerations



Potential T2 Development Areas

Action from the previous meeting to arrange a meeting between the three Transmission Owners to discuss the T2 Cost Benefit Analysis process and arrive at an agreement on the key development areas.

Meeting arranged for 12th October and the following development areas were discussed

Structured Optioneering Process

The optioneering process will benefit from a more structured approach to long list and short list creation

Each intervention can be evaluated consistently to ensure the most appropriate options are then subject to the appraisal process

Probabilistic Modelling

Most inputs, outcomes and impacts of projects are not known with a great deal of certainty

Utilising probability distributions instead of single point values may provide a better representation of potential outcomes but adds another layer of complexity to model

Wider Societal Benefits

The ED1 cost benefit analysis model did not feature the wider societal benefits of each investment option

It is proposed that the T2 model will look to include more benefits, including wider societal benefits, as part of the appraisal process

Overview

What is Cost Benefit Analysis?

Cost-benefit analysis (CBA) is a set of practical procedures for guiding public and private sector expenditure decisions. It helps to inform intelligent selection of optimal investment choice through analysing costs, benefits and risks

The principle of the Cost Benefit Analysis is the determination of financial and economic cash flow of the projects; this is known as the Net Present Value. This value is used to support the decision to accept or reject a proposed investment

Why use Cost Benefit Analysis?

The analysis provides a consistent approach to evaluating multiple options with varying costs and benefits for a single project/or scheme

The approach can be particularly valuable where the lowest cost option within the price review period is not the recommended option. A higher cost option will be backed up by evidence from the CBA model that it delivers greater value over the lifetime of the intervention

Example: Investing in a lower loss transformer which has a higher capital cost but a better net present value

Applications of Cost Benefit Analysis in T2

Within Load and Non-Load T2 investment areas there is scope to use cost benefit analysis to ensure the best value solution is chosen

Load

- **Limited relevance to NOA (separate CBA process) or Customer Driven Connection Projects**
- **Primarily used for interventions with multiple possible solutions (including whole system solutions)**
- **Allows for flexible/commercial solutions to be compared against build solutions**
- **Determination of shared use infrastructure (ex ante / uncertainty mechanisms)**

Non-Load

- **Interventions with different capital and operational costs**
- **Interventions with different risk reductions**
- **Interventions where components have different life expectancies**

CBA Model

Cost Benefit Analysis was used extensively in RIIO-ED1 to support a significant number of investment proposals. A common model was used across all the Distribution Network Operators, this ensured consistency around assumptions and approach to analysis

Existing ED-1 Model Characteristics

- Based on guidance from “HM Treasury: Green Book”
- NPV analysed over 4 main time periods - 16, 24, 32 and 45 years
- Short list of options created from engineering judgement and past experience
- Deterministic values used for cost benefit analysis:

Main Cost Inputs

- Capital investment
- Inspection and Maintenance

Main Benefit Inputs

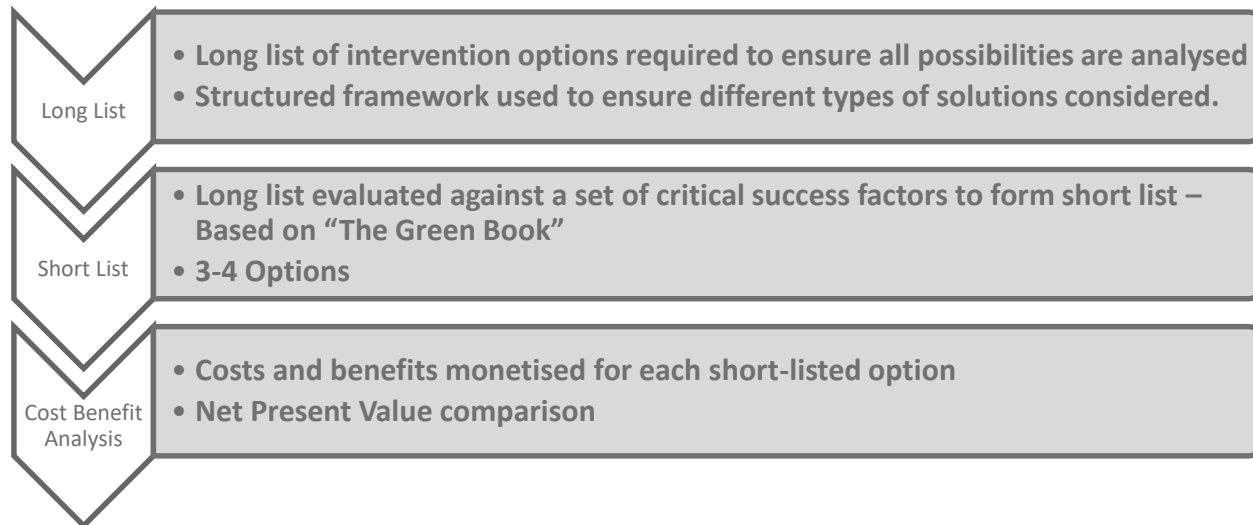
- Customer Interruptions/Customer Minutes Lost savings
 - Capital cost savings
 - Losses savings
- Likelihood of outcomes given equal weighting
 - All options evaluated against the baseline option which represents the “Do Minimum” approach
 - NPVs evaluated and used to inform investment decision

Optioneering Process

For each investment decision a longlist of options is required to ensure all possible solutions are put forward for consideration, this is then cut down to arrive at a short list of options which can then be subject to further appraisal. It was evident that for the ED1 model an unstructured optioneering process was a major limitation in ensuring all the best options were put forward for consideration

A more structured approach to providing the most suitable options requires development for T2. This will provide a clearer process and support engagement with relevant stakeholders to develop intervention options. Process needs to be fully agreed before CBA model can be used to ensure repeat analysis is not required for new options

This would support a whole system approach however further clarification from OFGEM is required on how gas and distribution can be considered through this method



Deterministic or Probabilistic?

The existing ED1 model assigned single point (deterministic) monetary values over the life of the intervention and assumes equal weighting to the likelihood of outcomes

Utilising a probabilistic approach through Monte Carlo techniques and scenario forecasting allows outcomes to be informed with a greater degree of sophistication. A random sampling is performed by using uncertain risk variable inputs to generate a range of outcomes with a confidence measure for each outcome

Moving to a probabilistic approach has been considered but there remains a high level of uncertainty over assumed values and assumptions on distributions. Furthermore, adding probability in to models adds an extra layer of complexity which may make communicating analysis and conclusions to stakeholders more difficult

It is recommended to agree on the T2 model before attempting to implement any probabilistic elements in to analysis and engage in further discussion over the level of detail for probability modelling

Costs & Benefits Considered in T2

Another limitation of the existing model was the lack of wider societal benefits and costs. There are numerous additional impact areas that should be considered as part of each option.

Some of these wider benefits can be monetised and included as part of the analysis. Others may be considered qualitatively as part of the optioneering process

- Environmental Impacts
 - Carbon Impacts
 - Wider economic and engineering
 - Stakeholders Impact
 - Health and Safety
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There is a risk that benefits, and assumptions around those benefits, will vary across the TOs. For the T2 CBA model it is proposed that benefits included can be quantified by a market rate. An example of this would be using Carbon Prices published by the Department for Business, Energy and Industrial Strategy. This will ensure consistency across all analysis

The inclusion of additional benefits without a market rate will require more discussion on assumptions to ensure there is a consistent methodology

Additional considerations

In addition to all previously considered points, we propose several additional developments for the T2 cost benefit analysis model

Programs of Work

- In certain cases it may be appropriate to group similar projects into programs of work. This would allow a single cost benefit analysis to arrive at a conclusion which can then be used to inform decision making for each project
- *Example: Fault level issues at multiple GSPs. TOs perform a single CBA for one GSP and use this result to inform the decision for the other sites*

Investment Threshold

- It is proposed to include a materiality threshold for cost benefit analysis. Any investment below a specified cost threshold subject to a lower level of scrutiny
- *Example: Australian Regulatory Investment Test. This involves a materiality threshold which is updated on a regular basis*

Analysis Timescales

- Cost benefit analysis will be performed for works costed at a specific point in time and may be subject to change
- OFGEM to ensure project review timescales are agreed and adhered to. This will ensure investment decisions are made with most up to date figures

CBA Development

Existing ED1 Model

Standardised in ED1 for all DNOs. Used for specific Programs



T2 Initial Review and Analysis

All TOs reviewing CBA applications, approaches and current processes



Cross TO call

Meeting to discuss and agree on key development areas for T2 model



Broad agreement of the following areas

Structured Optioneering
Process

Wider Societal Benefits

Programs of
work/Materiality threshold

OFGEM review timelines

Potential T2 Development Areas - Conclusions

Structured Optioneering Process

- Consistent approach to ensure the most appropriate options are subject to the appraisal process
 - “The Green Book” may provide a platform for methodology to be based on
 - Agreement that a structured process will provide additional benefit to T2 CBA model. Approach and methodology may differ between TOs based on individual requirements but principles will be the same
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