

Rapid Cost-Benefit Analysis Tool User Guide

January 2024

The Rapid Cost-Benefit Analysis Tool (the Tool) has been developed to support analysts to conduct calculations in Cost-Benefit Analysis (CBA). This User Guide provides details of the Tool's functions, parameters and inputs and provides a step-by-step guide in how to use the Tool. The User Guide should be read alongside [TPG23-08 NSW Government Guide to Cost-Benefit Analysis](#).

Acknowledgement of Country

We acknowledge that Aboriginal and Torres Strait Islander peoples are the First Peoples and Traditional Custodians of Australia, and the oldest continuing culture in human history. We pay respect to Elders past and present and commit to respecting the lands we walk on, and the communities we walk with.

Artwork:
Regeneration by Josie Rose

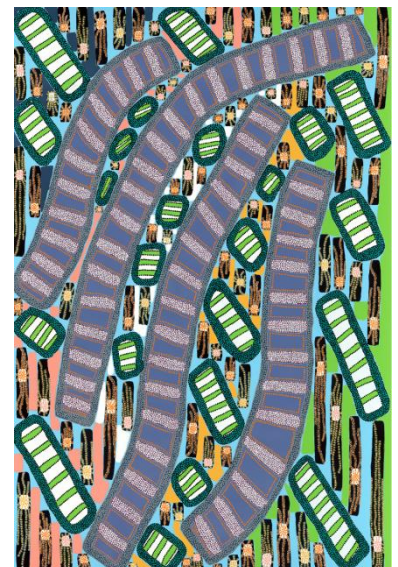


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CBA Tool – key terms

A summary of key terms used in this User Guide is provided below. For any other CBA terminology, please see [TPG23-08 NSW Government Guide to Cost-Benefit Analysis \(CBA Guide\)](#).

Function	Explanation
Analysis Period	The period that defines the start and end date of a CBA. This model supports CBAs with analysis periods of up to 79 years.
Base Year	The year to which all values are discounted when determining a present value. The first year of the analysis period that all the cost and benefit forecasts are valued at in real terms.
Benefit-Cost Ratio (BCR)	The ratio of the present value of benefits to the present value of resource costs.
Central discount rate	The discount rate is used to convert future streams of costs and benefits into present value terms as at the Base Year. This model uses a 5 per cent discount rate for the central estimate, which is consistent with the CBA Guide.
Net Present Value (NPV)	The difference between the present value of benefits and present value of costs.
Option	A feasible alternative that is subject to appraisal, appropriate to the stage of initiative development (see Table 2.2 CBA Guide).
Distributional Inputs	The distributional input cells are used for compiling distributional analysis, which is when the costs and benefits are disaggregated by groups of beneficiaries and those made worse off.

1 Background

This calculator assists analysts in preparing simple CBA.

Context

Analysts may be tasked with the development of CBA to evaluate policy or initiatives. CBA can be conducted by anyone and is a valuable form of analysis across all stages of initiative development, although depending on the scale and/or complexity of the policy or program external support may be required.

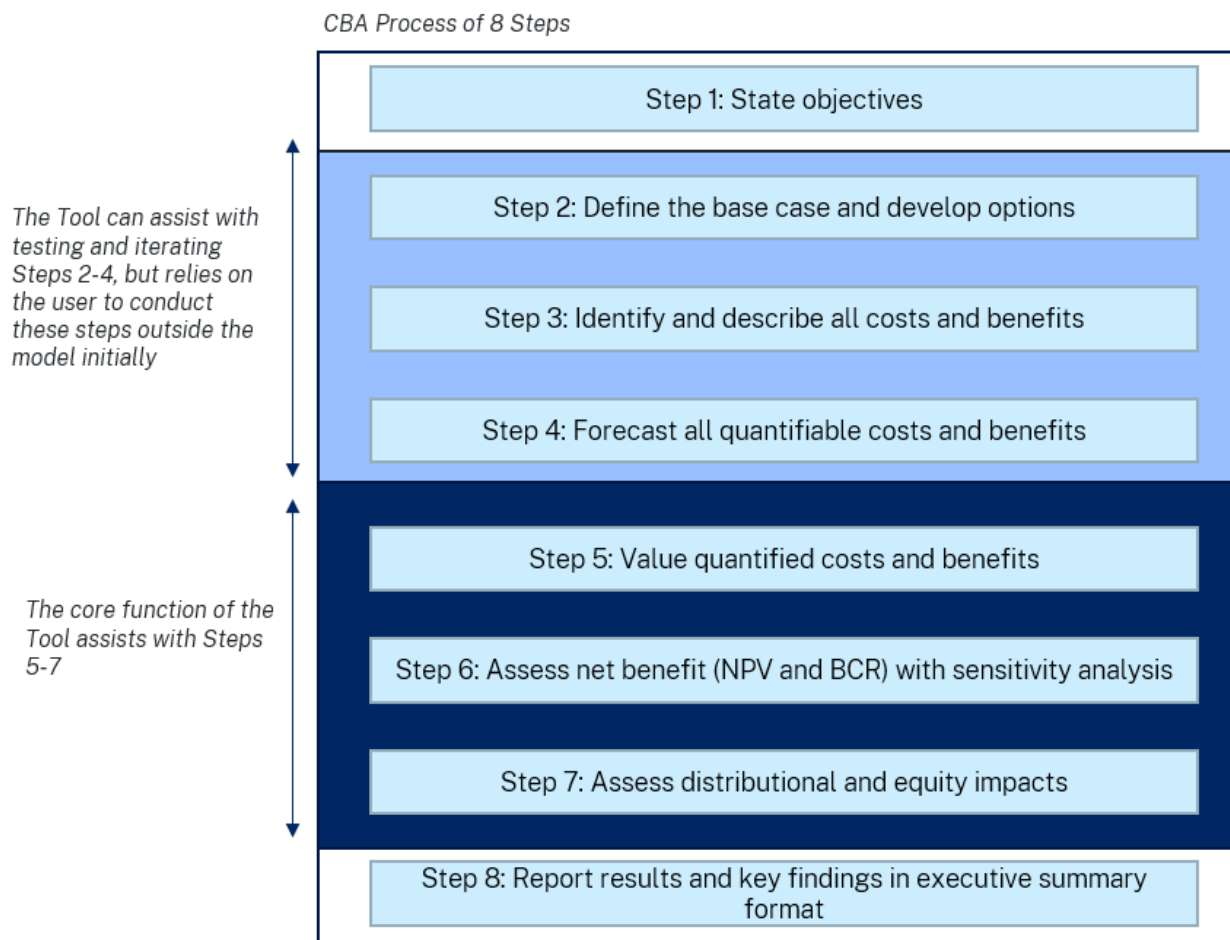
NSW Treasury has developed the Tool to help analysts to produce CBA based on the principles in the CBA Guide. The full CBA process consists of 8 steps (Figure 1). The core function of the Tool is to assist in completing Step 5 to Step 7, however the Tool may be useful for Step 2 to Step 4 to assess, test and iterate base case and options once these have been defined conceptually.

The Tool assists with:

- discounting costs and benefits to present values
- conducting distributional analysis
- conducting sensitivity analysis
- producing key results including NPV and BCR for project options, compared with the base case.

Users should undertake CBA ‘thinking’ prior to using the Tool. Users should have thought about and have defined the problem, base case and options, relevant cost and benefit categories to use the Tool as the user must enter these as inputs. Further, the Tool does not assist in identifying stakeholders or how to forecast outcomes or outputs of an initiative, rather it relies on the appropriateness and accuracy of the inputs.

Figure 1: Steps in CBA aligned with TPG23-08



1.1 Scope and limitations

Scope

The Tool automates the calculation of costs and benefits to produce CBA results without need for a bespoke model. It may be useful for both NSW Government agencies and others conducting work for agencies where there are clearly defined options and timing. The Tool is likely to be useful:

- where initiatives are in the early stage of development, to test certain options and understand their potential
- where initiatives are below the threshold requirements for a Business Case (i.e. below \$10m in value), where thorough analysis has not yet been developed
- in initiatives where it is mandatory to undertake CBA as part of a Business Case (i.e. above \$10m in value)
- applying standardised valuations for general small-scale programs, and
- ex-post evaluation of previous initiatives.

These **use cases** are aligned with the scope of the Tool, which offers calculations consistent with the method set out in the CBA Guide.

The Tool is built as a generic model, to promote use across programs and sectors. Its intent is to facilitate the development of CBAs for use in policy development and decision making. This tool is of most value where inputs have been defined and there are at most 30 cost or benefit items across all options; more complex analyses would require a more bespoke model. The Tool supplements the CBA Guide and supports analysis of projects, with defined options, timelines, benefit and cost streams.

Limitations

The Tool requires users to undertake manual estimation of inputs, including forecasts, assumptions and parameters. The quality of the outputs is dependent upon the accuracy of any inputs.

The Tool does not:

- substitute for understanding the CBA Guide and the user's ability to apply the principles of CBA
- assist with undertaking key steps of CBA including base case development, options development or identifying, forecasting, or valuing of costs or benefits.

The Tool is generic in nature and is not tailored for any specific sector or project type. For complex projects, cost and benefit inputs must be separately prepared. The Tool calculates one set of CBA key results only. For initiatives with staged components where BCR and NPV are required for each stage, the Tool would need to be used multiple times, each with different inputs. For some initiatives, including complex projects, cost and benefit inputs must be carefully prepared and it may be more appropriate to build a bespoke model.

The Tool does not offer some advanced methods mentioned in the CBA Guide such as Monte Carlo simulation, scenario planning or real options analysis. These may be considered in future iterations based on user feedback.

NSW Government agencies should engage with Treasury for matters relating to the Tool, using the contact email: cee@treasury.nsw.gov.au.

1.2 Related documents

TPG23-08 NSW Government Guide to Cost-Benefit Analysis

The NSW Government Guide to Cost-Benefit Analysis (the CBA Guide) is a Treasury Policy and Guidelines paper that sets out how to undertake CBA for NSW government initiatives. It also describes the role of CBA in supporting evidence-informed decision making and provides guidance for practitioners. It is central to the NSW investment framework for the appraisal and evaluation of public investments.

The CBA principles outlined in the Guide underpin the Tool and its default settings.

NSW Common Planning Assumptions

NSW Common Planning Assumptions are the agreed information assets (data sets, parameters and assumptions, models and analytical tools) used by NSW Government and external stakeholders, to prepare proposals, business plans and strategies that rely on projections.

They provide a consistent evidence base for NSW Government agencies to use in planning for key services and infrastructure in the state, from schools and hospitals to roads and transport.

Outcome Values Database (OVD)

Treasury's OVD is a repository of quality assured outcome values and parameters that may be used to proxy economic and social outcomes in CBA.

The OVD enables relevant parameters to be sourced more efficiently and encourages consistency of parameters used in CBA in New South Wales. The OVD reduces the duplication of work and supports agreed valuations for outcomes that span across multiple agencies.

Presently, access to the OVD **is available to NSW government agencies only**. The values in the OVD have been collected from various NSW Government CBA frameworks and compliant CBA. The values are based on either market value, revealed preference methodologies (e.g. willingness to pay/accept) or Value of a Statistical Life Year and Quality Adjusted Life Years approaches. Values derived from wellbeing valuation methods have not been included. For access to the OVD please contact the Centre for Economic Evidence: cee@treasury.nsw.gov.au.

1.3 Disclaimer

The NSW Government and specifically NSW Treasury (henceforth "Treasury"), does not give any warranty, guarantee or representation regarding the accuracy, currency or completeness of any information contained in this Tool and User Guide (including, without limitation, any information included in the document which was provided by third parties). Treasury provides this document without assumption of a duty of care to any person.

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1. Contact Details

The Tool was created by Treasury's Centre for Economic Evidence.

Email: cee@treasury.nsw.gov.au

2 Using the Tool

The Tool is structured in 3 parts: the introduction, inputs and reports.

2.1 How the Tool is structured

The Tool contains 3 sections, outlined in Table 1, each containing supporting worksheets:

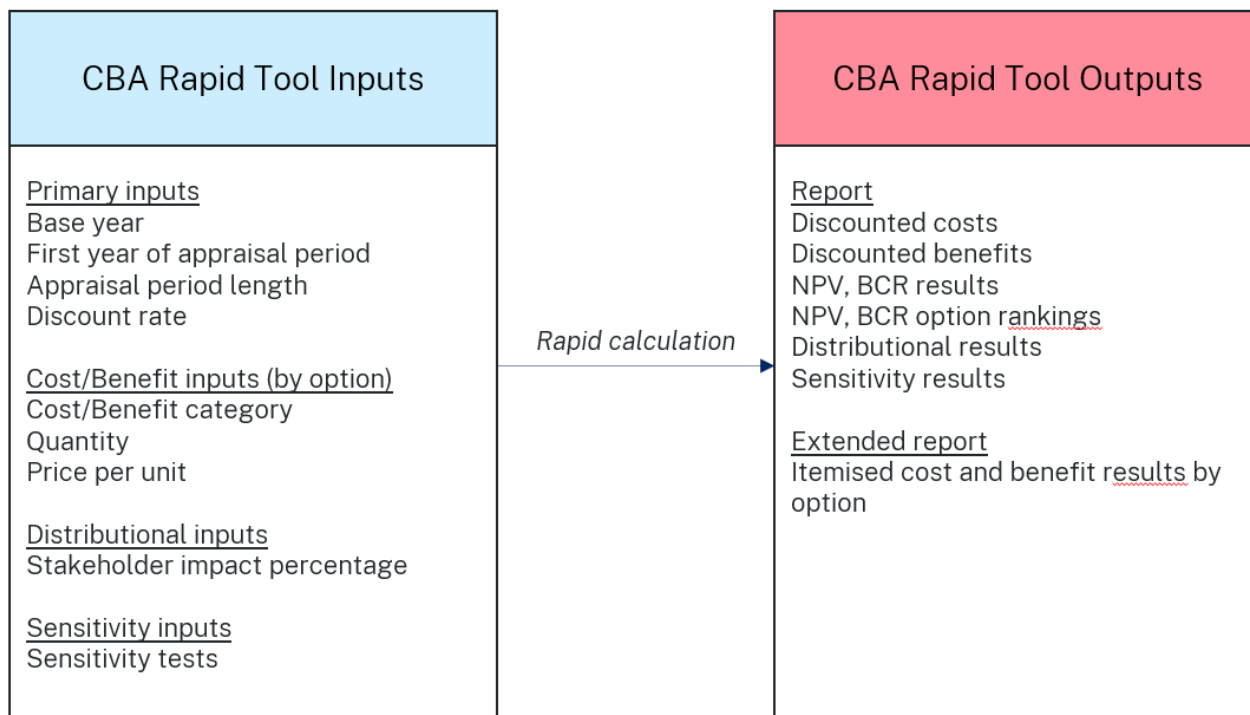
- **Introduction (dark blue Tabs):** background knowledge for the user and summarised instructions and background for the Tool. No user edits are required in this section.
- **Input (light blue Tabs):** where the user enters key information about the project, base case and options. Project costs and benefits must be inputted by category and by year. There are required inputs around sensitivity analysis and distributional analysis.
- **Results (grey Tabs):** presents key CBA results, including NPV and BCR. This section does not require any user edits and will update automatically as inputs change.

Table 1: Tool worksheets

Worksheet	Function
Introduction	
Cover	Overview of the Tool along with related documents.
Information	Contents page for the Tool, along with definitions of terms used in the CBA.
Guide	User information of the Tool.
Inputs	
Primary inputs	Defining CBA parameters, stakeholders and options.
Cost inputs	User to input cost categories and values for the base case and options.
Benefit inputs	User to input benefit and disbenefit categories and values for the base case and options.
Distributional inputs	User to allocate proportion of cost and benefit categories to pre-specified stakeholder groups, based on where they apply.
Sensitivity inputs	User to define parameters for sensitivity analysis.
Results	
Report	Summary of the CBA.
Extended report	Detailed output of the CBA results for the base case and each option.

The Tool's functionality is summarised in Figure 2. User inputs on the left-hand side should be entered into the Tool, and underpinned by the information developed in CBA Guide Steps 1-4. The Tool calculates outputs shown on the right-hand side of Figure 2.

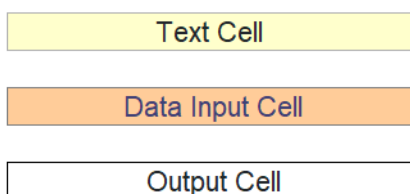
Figure 2: Tool inputs and outputs map



2.2 Cell navigation

The Tool uses colour-coded cells to identify the cells that require text input, numerical data input, and output cells (Figure 3). This colour-coding is designed to make the Tool easier to navigate and prevent errors.

Figure 3: Cell styles



2.3 Detailed instructions

2.3.1 Initial setup

Download the latest version of the Tool from the Treasury website for each use.

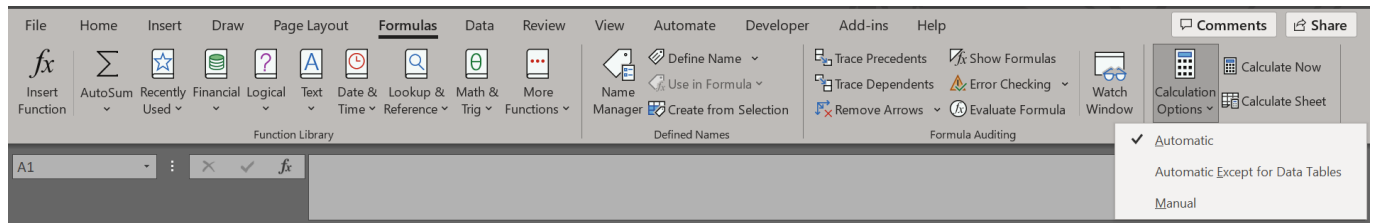
The Tool has been designed to operate with the default settings for Microsoft Excel. Upon opening the file, click the **Enable Editing** button (automatic pop up) to begin configuration. Edited versions will need to be saved to keep any changes. The Tool has been locked and protected to prevent unintentional changes by users. Therefore, only text cells and data input cells can be populated. Formulas, labels, and output cells cannot be changed by users.

To ensure that the model responds to changes, confirm that calculations are set to automatic. This is found in the 'Formulas' ribbon, under the 'Calculation Options' button. Make sure that the 'Automatic' option has been selected.

User instructions:

- Ensure calculations are set to **automatic** as aligned with Figure 4.

Figure 4: Enable Automatic Calculations



2.3.2 Primary inputs

Primary inputs heading ribbon

To begin configuring the model, start in the 'Primary inputs' sheet. The first step is to fill initial details in the heading ribbon of the 'Primary inputs' sheet. These details are optional and have no bearing on results (Figure 5).

User instructions:

- Insert project details in the yellow text cells.

Figure 5: Primary inputs heading ribbon

Primary Inputs			
Initiative Name	<input type="text"/>	Version	<input type="text"/> Comments <input type="text"/>
Agency Name	<input type="text"/>	Author	<input type="text"/>
		Reviewer	<input type="text"/>

Below the inputs ribbon, there are input cells for stating the objectives of the program. In the relevant cells, fill in the program definition, program objectives and intended program outcomes.

Time period and analysis parameters

The **Time period** section provides a basis for the timing for evaluation (Figure 6). All years in the model refer to financial years.

- **Base year** is an important component, as it indicates the year to which all values are discounted to when determining present value.

- The **First year of analysis period** cell captures the start date of the CBA.
- The **Analysis period** defines the start and end date of the CBA.

As per the CBA Guide, the analysis period should be long enough to capture all significant costs and benefits of the initiative, generally matching the expected economic life or design life of the initiative. The Tool has capacity to model benefits and costs up to 79 years following the base year (see CBA Guide Table 2.6 for more details on suggested analysis periods by initiative type). The tool uses the **Analysis period** input to determine results elsewhere in the sheet.

Tip: Base year and analysis period for ex post evaluation

The model allows for ex post evaluation through changing the **Base year** cell. With the assumption of a constant social discount rate, amounts can be expressed in base year dollar terms. Make sure that the **First year of analysis period** is in the same year or after the **Base year**.

Figure 6: Time period and analysis parameters – inputs example

Base year	year	2023
First year of analysis period	year	2023
Analysis period	years	
Final year of analysis period	year	2022
Central discount rate	%	5.0%
Monetary Units*	\$	1

Next are the **Central discount rate** and **Monetary units** parameters:

- The **Central discount rate** is the central social discount rate used for the CBA. As per the CBA Guide, it has been locked to equal 5 per cent a year for New South Wales. Other inputs later in the model allow for variations to the discount rate for sensitivity analysis (see 2.3.5).
- The **Monetary units** number converts dollar amounts in costs and benefits to smaller units for reporting. For example, '1,000' will divide inputs by a thousand dollars, to be summarised in 'Report' and 'Extended Report'.

User instructions:

- Insert primary project details.
- State program definition and objectives.
- Insert time period details to align with project. Note all years are financial.
- Insert appraisal parameter details.

Stakeholder groups

Underneath the **Stakeholder groups** heading, there are cells to identify up to 4 stakeholders (Figure 7). Common groups could include Consumers or Service Users, Businesses, Government and other stakeholders (e.g. broader NSW community) who are impacted by the initiative. If there are less than 4 stakeholders under consideration, leave the remaining cells empty.

The stakeholders represent groups which will be used in the distributional analysis.

User instructions:

- Insert names of relevant stakeholder groups desired for use in distributional analysis. Leave cells blank if less than 4 groups are required.

Figure 7: Stakeholder groups inputs

	Stakeholder Groups (who will gain benefits or bear costs)
Stakeholder 1	<input style="width: 100%; height: 20px;" type="text"/>
Stakeholder 2	<input style="width: 100%; height: 20px;" type="text"/>
Stakeholder 3	<input style="width: 100%; height: 20px;" type="text"/>
Stakeholder 4	<input style="width: 100%; height: 20px;" type="text"/>

Options

Users can specify up to 10 options in addition to the base case. The user can enter names for each of the options and base case, to describe each case. After entering the desired option names, leave the unused option slots empty (Figure 8).

User instructions:

- Insert names of base case and required project options. If less than 10 options are required, leave additional cells blank.

Figure 8: Options naming inputs

<u>Options</u>	Name
<i>Base Case</i>	<input style="width: 100%; height: 20px;" type="text" value="Do Min"/>
<i>Option 1</i>	<input style="width: 100%; height: 20px;" type="text" value="Option 1"/>
<i>Option 2</i>	<input style="width: 100%; height: 20px;" type="text"/>
<i>Option 3</i>	<input style="width: 100%; height: 20px;" type="text"/>

2.3.3 Cost inputs

This sheet contains all costs for the base case and each project option, by year.

All cost inputs should be in **real, undiscounted dollars** ('real' meaning excluding price inflation) in terms of the base year. Cost profiles must be entered and remain in dollar form (e.g. \$50,000.00).

- Generally, **price per unit** will not change in real terms over time. There may, however, be cases where you might reasonably expect real cost escalation over time. An escalating cost profile is consistent with input costs increasing above expected general price inflation growth.
- While the default assumption is no real price escalation, that is, *the real price of the input remains constant over time*, this can be changed if there is supporting evidence to expect real price changes over the time. For example, the prices of steel and concrete, used for an infrastructure project, could be expected to rise in real terms over the analysis period.

The Tool allows for up to 30 cost items, for the base case and each option. Cost category cells that are not required can be left empty.

For each cost item to input, the **Cost Category** and **Option** need to be defined.

- **Cost Category** refers to the title of the cost item e.g. operational or recurrent expenditure (opex), capital expenditure (capex), land, employee wages, contractor wages, equipment, concrete, etc.
- The **Option** column specifies under which option the cost item applies (base case or a numbered project option).

Note, that even if multiple options have the same cost profile, they must still be separately entered in a line for each option (i.e. with the same **Cost Category** and cost inputs, and a different **Option** selected).

To differentiate between costs allocated to different project options, each **Option** selection in the drop-down menu will be automatically assigned a colour. This is purely a visual representation of the selected option as shown in Figure 9.

Figure 9: Option selection

	Cost Category	Option
1	Opex	Base Case
2	Opex	Option 1
3	Capex	Option 1

Cost outputs will only be calculated for the years within the CBA analysis period, as identified in the 'Primary inputs' tab.

- If quantities or prices are entered for years that fall outside the analysis years, these years will show a zero cost. To check which years are within the analysis period and will therefore be counted, see Row 7 *Evaluation Flag* in the 'Cost inputs' tab.
- If the row shows a '1' and the cell is highlighted light blue, then that year is within the analysis period. Make sure that the analysis period is aligned to the incidence of cost and benefit items across the timeline.

Inputting costs for each Cost Category:

Method 1: Quantity x price per unit by year

Cost inputs for each cost item are required as quantity and price per unit parameters, over the profile input cells. The total cost output will be calculated automatically as the product of the quantity and price per unit for each year of the analysis period:

$$\text{Cost Output} = \text{Quantity} \times \text{Price per Unit}$$

Method 2: Input total cost by year

If cost items require more complex forecasting than the above formula (e.g. escalation, customised forecasting), this should be calculated externally to the Tool.

If cost profiles are externally calculated and are ready to input in as a cost per year, per cost category (i.e. do not require a *quantity x price* approach), change the quantity to '1' for each year in the analysis period, and enter the cost profile in the corresponding **price per unit** cells for each year of the analysis period.

Tip: Treatment of disbenefits and cost savings

The CBA Guide outlines the method to calculate the BCR. Any disbenefits (such as air pollution, carbon emissions, noise, congestion, etc.) should be subtracted from other (positive) benefits within the numerator of the BCR. To achieve this in the Tool, choose the 'Disbenefit' item under the 'Benefit Type' heading.

Similarly, cost savings can materialise when an initiative results in a reduction in a certain cost relative to the base case. These avoided costs should be reported as a 'Benefit' in the 'Benefit Inputs' sheet.

This treatment aligns with the CBA Guide, see Appendix 7.1.

User instructions:

To enter the costs for one cost item (cost item #1 as aligned with Figure 10):

- Enter the **Cost category** or the title of the cost
- Enter the **Option** which the cost item applies to (base case or numbered project option)
- Enter the costs for this cost category by year:
 - Method 1) Quantity and Price by year: Input the quantity and price per unit of the cost for each year of the analysis period. The total cost output for each year will be automatically calculated.
 - Method 2) Input total cost by year (i.e. the cost profile is prepared and generated from an external source).
 - Change all the **quantity** cells in the timeline to '1'
 - Copy the cost inputs for each year from the external source and paste them into the timeline 'price per unit' row.
 - The total cost output for each year will show the figures from the external source, for the analysis period only.

Repeat the process above for each cost item.

Figure 10: Cost Inputs Example

Cost Inputs (Undiscounted)					2023	2024	2025		
Key:		Text Cell	Note: Costs should be expressed in real, undiscounted terms relative to the base case. Avoid changing the units for dollar amounts.			Financial Year	2023	2024	2025
		Data Input Cell			Year Start Count	0	1	2	
		Output Cell			Year End Count	1	2	3	
Cost Category	Option	Measure	Evaluation Flag	Undiscounted Total	1	1	1		
1	Opex	Base Case	Quantity		1	1	1		
			Price per Unit		\$10	\$10	\$10		
			Cost Output	\$ 30	\$ 10	\$ 10	\$ 10		

2.3.4 Benefit inputs

The layout of ‘Benefit Inputs’ is similar to ‘Cost Inputs’. Refer to Section 2.3.3 for detail. This sheet contains all benefits or disbenefits for the base case and each project option, by year.

All benefit inputs should be in real, undiscounted dollars in terms of the base year. Do not change the units from dollars (e.g. \$50,000.00).

As per Table 4.2 of the CBA Guide, common benefit categories can include savings or avoided costs, labour surplus, producer surplus or benefits to the wider community. Disbenefits, also known as negative externalities, could include air pollution, noise or congestion etc.

User instructions:

To enter the values for one benefit item (example shown in Figure 11):

- Enter the **Benefit category** or the title of the benefit/disbenefit.
- Enter the **Option** which the benefit/disbenefit item applies to (base case or numbered project option).
- Choose whether the item is a benefit or a disbenefit.
 - Disbenefits will be converted into **negative** dollars automatically.
- Enter the amount for this benefit/disbenefit category by year:
 - Method 1) Quantity and Price by year: Input the quantity and price per unit of the benefit for each year of the analysis period. The total benefit output for each year will be automatically calculated.
 - Method 2) Input total benefit by year (i.e. the benefit profile is prepared and generated from an external source.
 - Change all the **quantity** cells in the timeline to ‘1’.
 - Copy the benefit inputs for each year from the external source and paste them into the timeline ‘price per unit’ row.
 - The total benefit output for each year will show the figures from the external source, for the analysis period only.
- Repeat the process above for each benefit/disbenefit item.

Figure 11 Benefit Inputs example

Benefit Inputs (Undiscounted)					2023	2024	2025		
Key:		Text Cell	Note: Benefits should be expressed in real, undiscounted terms in base year dollars. Avoid changing the units for dollar amounts.			Financial Year	2023	2024	2025
		Data Input Cell			Year Start Count	0	1	2	
		Output Cell			Year End Count	1	2	3	
Benefit Category	Option	Benefit Type	Measure	Evaluation Flag	1	1	1		
1	Consumer surplus	Base Case	Benefit	Quantity	1.00	1.00	1.00		
			Price per Unit		10.00	10.00	20.00		
			Benefit Output	\$ 40.00	\$ 10.00	\$ 10.00	\$ 20.00		

2.3.5 Distributional inputs

'Distributional inputs' allows for distributional analysis, which involves the allocation of estimated costs and benefits to specific stakeholder group(s), shown in Figure 12. The Tool allows for the assignment of costs and benefits based on a percentage of present value, for up to 4 stakeholder groups. The first 70 rows of the worksheet show costs, followed by benefits from row 71 and below.

The **Cost Category**, **Option** and **Present Value** and stakeholder headings will be automatically populated based on the input sheets. The inputs required are the percentage impact for a given cost or benefit item to each stakeholder.

Note, the total of the percentages, shown in the **Check** cells in Column Q, must add to 100.

User Instructions:

- The columns **Costs** or **Benefits**, **Cost/Benefit Category**, **Option** and **Present Value** will populate automatically.
- Enter the percentage impact of the cost or benefit item relevant to each stakeholder. This should equal 100 across each row (see the **Check** column).

Figure 12: Distributional analysis inputs – costs

Costs	Cost Category	Option	Present Value	Stakeholder Groups (%)				Check
				Group 1	Group 2	Group 3	Group 4	
1	Opex	Base Case	\$ 29	25.0%	25.0%	25.0%	25.0%	100.0%

2.3.6 Sensitivity inputs

Sensitivity analysis tests how CBA results vary in response to changes in specific parameters. Note, the method used in the Tool is generic in nature and each project will have its own set of sensitivities that may need to be tested externally to the Tool.

The Tool automates the calculation of sensitivity analysis of 3 variables (Figure 13):

- Discount rates
- Changes to (total) Costs
- Changes to (total) Benefits

The Tool can calculate CBA results under 3 different discount rates, in addition to the central discount of 5 per cent (as stated in 'Primary Inputs'). The CBA Guide requires reporting sensitivity analysis at 3 per cent and 7 per cent, which is pre-populated and locked. Analysts have the option of entering an additional alternative discount rate; this function should, however, be used with caution and requires justification.

Costs and Benefits can be varied by a specified percentage but there is no recommended rate to use. Realistic deviations from central estimates should be considered, as well as the potential for asymmetric cost and benefit profiles.

User instructions:

- Choose an alternative discount rate if necessary (note that 3 per cent and 7 per cent discount rate sensitivities are mandatory per the CBA Guide).
- Choose percentages to increase and decrease costs and benefits in the orange cells.
- Review updated results in Sensitivity table in results tab.

Figure 13: Sensitivity inputs

	Lower discount rate	%	3.0%
Discount rates	Upper discount rate	%	7.0%
	Alt discount rate	%	10.0%
	Upper costs	%	20.0%
Costs +/-	Lower costs	%	-20.0%
	Upper benefits	%	20.0%
Benefits +/-	Lower benefits	%	-20.0%

3 Interpreting results

The Tool produces a range of results for each CBA. The 'Report' sheet summarises key indicators, while the 'Extended Report' sheet goes into more detail around the timeline of future costs and benefits.

3.1 Central CBA discounted results

The Central CBA discounted results present the main findings in the 'Report' sheet (Figure 14).

Figure 14: Central CBA discounted results

Option	NPV	BCR	NPV Rank out of 2	BCR Rank out of 2
Base Case	\$66		-	-
Option 1	-\$104	0.535	2	2
Option 2	\$90	1.392	1	1

Results use 5% Discount Rate

NPV and BCR are calculated according to the CBA Guide method (Figure 15). Note that rankings for NPV and BCR are not applicable to the base case. Additionally, options with a negative BCR are not ranked as they should not be pursued (see Appendix 7.1 of the CBA Guide for further technical detail).

Figure 15: Cost and benefit breakdown

Option	Total		Relative to Base Case	
	PV Costs	PV Benefits	Incremental Costs	Incremental Benefits
Base Case	\$29	\$38	-	-
Option 1	\$195	\$157	\$167	\$120
Option 2	\$200	\$355	\$171	\$318

In the second table, the total present value of costs and benefits for each option has been summarised. Incremental results are relative to the base case, and so do not apply to the base case.

To the right of the summary table, a graph shows Incremental NPV per option. Users can edit this graph using instructions in Appendix A or create new visuals external to the sheet, using the summary table data. A clustered column graph also shows the net incremental distributional impacts between stakeholders for each option.

3.2 Distributional analysis results

The **Distributional Results** table shows the project impacts on specified sets of stakeholders (Figure 16). For each option, the present value of total costs and benefits attributed to each stakeholder is shown and the NPV is calculated. This information is also presented graphically. Users can edit this graph using instructions in Appendix A or create new visuals external to the sheet.

Figure 16: Distributional results

Distributional Results (\$)			
Stakeholder Option	Costs	Group 1 Benefits	NPV
Base Case	\$7	\$38	\$31
Option 1	\$26	\$0	-\$57
Option 2	\$30	\$0	-\$60

3.3 Sensitivity analysis results

The first table under **Sensitivity Results** outlines the calculated NPV and BCR under various assumptions based on varying a single parameter at a time (Figure 17). This includes the lower, upper and alternative discount rate determined in 'Sensitivity Inputs'. It also includes any variations to costs and benefits. For example, 'Costs +x%' increases costs by a percentage amount but holds benefits constant and discounts using the central discount rate.

Figure 17: Sensitivity results

Sensitivity Results (\$)				
Sensitivity Option	3% Discount Rate		7% Discount Rate	
	NPV	BCR	NPV	BCR
Base Case	\$68		\$65	
Option 1	-\$96	0.589	-\$111	0.484
Option 2	\$112	1.467	\$71	1.323

The second table outlines the high-case scenario and a low-case scenario analyses by option. These are based on a set of parameters moving simultaneously (Table 2). Scenarios are designed to offer the low and high realistic results, so that a range of results (or a weighted average) can be interpreted. The box to the right of the table shows the inputs of each scenario based on the chosen sensitivity values.

Table 2: Parameters for high-case and low-case scenarios

Parameter	Low-case scenario	High-case scenario
Cost variation (%)	Increase	Decrease
Benefit variation (%)	Decrease	Increase

3.4 Qualitative costs and benefits

Projects may have impacts that are unable to be quantified but should be considered alongside impacts quantified in the CBA results. Input text cells are available to document any of these qualitative benefits and costs. Useful information for each qualitative benefit or cost identified could include the direction of each impact (i.e. positive or negative effect) and their likely significance.

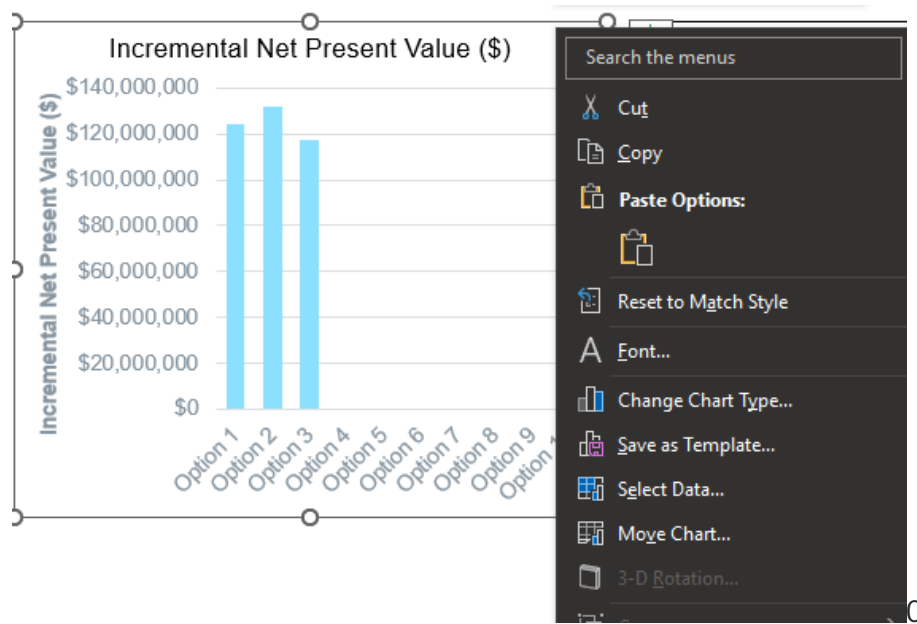
When the monetary impact on stakeholders is unable to be determined or not material, distributional analysis can be done qualitatively. This combined set of factors can assist in deciding between the options.

Appendix A

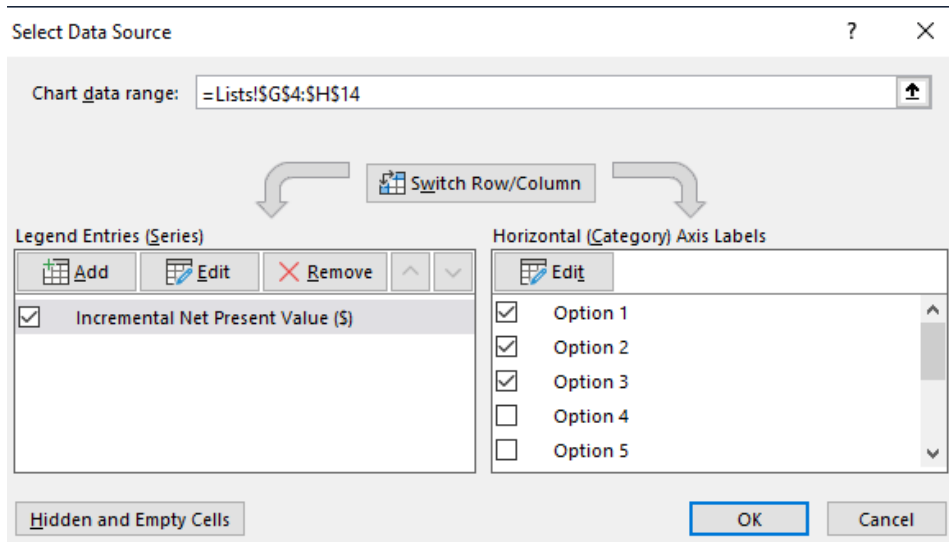
Amending charts in the results tab

A chart with the Incremental Net Present Value of each option will be generated. By default, it will include all 10 options. To display fewer options, use the following steps:

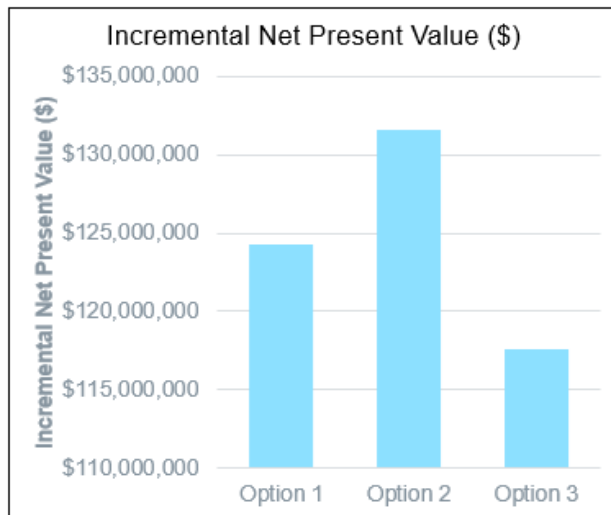
1. Right-click the chart and click 'Select Data...':



2. Under the Horizontal (Category) Axis Labels heading, deselect unnecessary options from the list:



3. After clicking 'OK', the resulting graph will display the chosen options:



The same method can be used on the 'Distributional Analysis' chart.

Further information and contacts

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