frontier economics

2022 Review of Infrastructure Australia's cost-benefit analysis methodology

A report for Infrastructure Australia | 24 February 2022

Disclaimer

Contents

Tables

Figures

1 Background

The Infrastructure Australia Assessment Framework

Infrastructure Australia's Assessment Framework (the Assessment Framework) provides a national standard for infrastructure development and describes their requirements and process for assessing proposals. The Assessment Framework was updated in 2021 and comprises an overview and four main volumes:

- Stage 1: Defining problems and opportunities
- Stage 2: Identifying and analysing options
- Stage 3: Developing a business case
- Stage 4: Post completion review.

The framework is also supported by four technical guidelines:

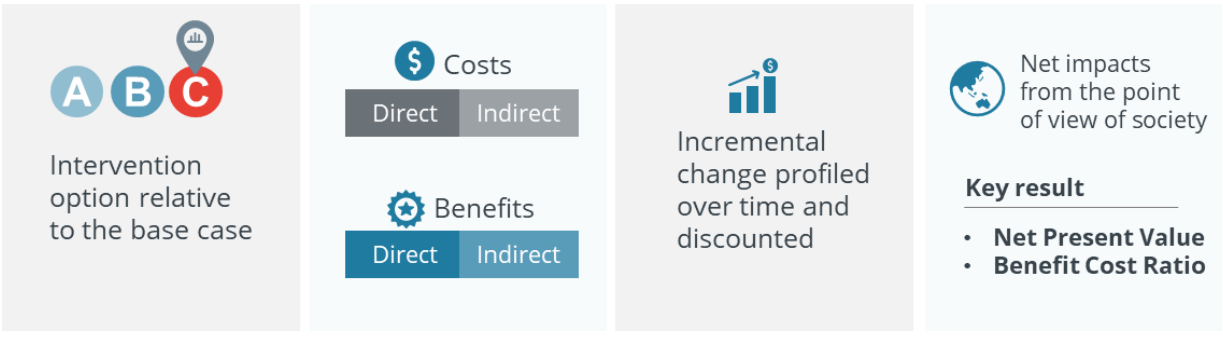
- Guide to program appraisal
- Guide to economic appraisal
- Guide to multi-criteria analysis
- Guide to risk and uncertainty analysis.

Given the scope of this review (detailed later in this section), the main focus is on the **Guide to economic appraisal**. Additional consideration is given to whether the broader suite of documents are consistent with the **Guide to economic appraisal**.

Overview of cost-benefit analysis

Cost-benefit analysis (CBA) is an analytical technique which assesses the economic, environmental and social impacts on society of an intervention compared to a base case (as shown in Figure 1). The focus of CBA is on placing a single monetary value on these economic, social and environmental costs and benefits over time, so that intervention options can be compared to one another. Most CBAs also include a provision for impacts which can't be expressed in monetary terms to still be included in the analysis qualitatively.

Figure 1: Overview of cost-benefit analysis methodology



Scope of this review

Frontier Economics (we) have completed this review to respond to Infrastructure Australia's legislative requirement under the *Infrastructure Australia Act 2008* to review their CBA methodology every two years to 'consider whether the cost benefit analyses take into account social, environmental and economic costs and benefits adequately'. The focus of this review is on the adequacy and technical robustness of the guidance for CBA, with additional consideration given to alignment with best practice CBA guidance.

Previous review

The Centre for International Economics undertook a review of Infrastructure Australia's CBA methodology in 2020[1], to which Infrastructure Australia published a response.[2] As part of this current review, we looked at the extent to which the findings of the previous review have been addressed. As outlined in Table 1, there is just one 2020 finding which has not been addressed yet.

Table 1: Outstanding recommendation from 2020 Review

Finding area	IA Response	Status
Quantifying land use impacts	An update of post completion review guidance with respect to the data collection required to measure realised land use impacts will be considered once the ATAP guidance has been finalised. Opportunities include further enhancement of our post completion review guidance, potentially drawing on an update of ATAP *F7 Review and Post Completion Evaluation 2016*, which is due for revision in 2022.	This has not been addressed yet

The previous review included findings around equity and distribution impacts and delay/deferral. Our review includes findings which relate to ensuring that these changes are practical.

Approach to this review

In order to provide some structure to this review, we have established the following principles:

- **Alignment** –review the CBA methodology's alignment with the broad process set out in Figure 1 and leading international CBA guidance.

[1] The Centre for International Economics (2020), Infrastructure Australia Framework Review: Report of the 2020 Review of the Infrastructure Australia Assessment Framework, available at https://www.infrastructureaustralia.gov.au/sites/default/files/2020-03/CIE%202020%20IAAF%20review%20report_0.pdf

[2] Infrastructure Australia (2021), Response to the March 2020 review of the cost–benefit analysis methodology set out in the Infrastructure Australia Assessment Framework, available at https://www.infrastructureaustralia.gov.au/sites/default/files/2021-07/IA%20response%20to%202020%20CBA%20Review%20Report_updated.pdf

- **Clarity** –review whether the CBA methodology provides clear, accurate and concise information on how to conduct a robust CBA. For this we draw on our experience of undertaking CBA in a broad range of sectors.
- **Application** –review how the design of the CBA methodology is likely to facilitate the development of high-quality economic and social infrastructure proposals in practice. For example, through signposting information (e.g., the **Guide to economic appraisal**), the use of case studies and real-world examples and the extent to which guidance is likely to assist proponents with identifying robust methods and values to quantify key impacts.

These principles allow consideration of both the technical robustness of the CBA guidance and also the practicalities of applying the guidance. The findings of our review against these principles are detailed in Section 2.

Findings are either identified as a recommended change or for consideration. A recommended change reflects a finding that we think should be implemented by Infrastructure Australia to improve the alignment, clarity or application of the CBA guidance. A finding for consideration reflects a finding that we think Infrastructure Australia should consider actioning to improve the alignment, clarity or application of the CBA guidance.

In addition to reviewing the CBA guidance against these principles, we have also identified broader opportunities that Infrastructure Australia may wish to consider to take a leadership role in strengthening the evidence base for CBA to more robustly capture a broad range of impacts. These opportunities are outlined in Section 3.

2 Review findings

Overarching review finding

The overarching finding of this review is that **the CBA guidance within the Assessment Framework provides an adequate and fit for purpose methodology** to support proponents in developing a robust CBA of infrastructure proposals. The broad CBA process set out in the guidance aligns with best practice approaches. There are also a number of useful features such as the example boxes on typical costs and benefits for a range of infrastructure types.

Specific review findings

In addition to our overarching review finding, we have specific recommendations on the alignment, clarity and application of Infrastructure Australia's CBA guidance. These specific findings are summarised in Table 2.

Table 2: CBA methodology recommendations

	Finding area	Principle	Recommendation	Recommended change or for consideration
1	**BASE CASE DEFINITION**	Application	Revise the base case definition to focus on a "business as usual" base case. Currently, Infrastructure Australia's stated preference for "the committed and funded expenditure approach" to a base case could be misconstrued and result in "do nothing" base cases being developed when a "do minimum" or "business as usual" base case is the preferred approach.	Recommended change
2	**BENEFIT-COST RATIO DEFINITION**	Alignment	More clearly define the benefit-cost ratio as the present value of economic, social and environmental benefits divided by the present value of economic, social and environmental costs. The current definition in the guidance could be problematic for analyses which include avoided costs or disbenefits.	Recommended change
3	**DISTRIBUTIONAL ANALYSIS**	Alignment	Reposition the distributional analysis advice to solely focus on articulating the distribution of costs and benefits. The current recommended steps for distributional analysis align with a funding analysis.	Recommended change
4	**ECONOMIC VS FINANCIAL ANALYSIS**	Clarity	Highlight the difference between financial and economic analysis – in terms of objective, scope and information requirements – earlier in the **Guide to economic appraisal**.	Recommended change
5	**TREATMENT OF TRANSFERS**	Clarity	Give more prominence to the treatment of transfers in CBA in the guidelines. Transfers should be excluded from CBA and it is important to provide clear guidance to practitioners on this point.	For consideration

6	**GREATER CLARITY ON INFRASTRUCTURE AUSTRALIA'S EXPECTATIONS FOR APPLYING CBA GUIDANCE IN PRACTICE**	Application	Communicate more clearly in the **Guide to economic appraisal** and **Stage 3: Developing a business case** documents that the complexity and level of effort spent on a CBA should be proportional to the complexity, level of risk and estimated cost of the infrastructure investment. This could include guidance on the factors or drivers that suggest more resources be spent on the CBA, and how the analysis would change.	For consideration
7	**NON-MONETISED IMPACTS**	Application	Provide greater clarity on how non-monetised costs and benefits should be incorporated into a CBA and presented to decision-makers. Consider including additional guidance regarding the type and scale of non-monetised costs and benefits that may impact on the selection of a preferred option.	For consideration
8	**DEFERRAL TEST**	Application	Provide clearer guidance on the implications of findings from a deferral test. For example, if a marginal project doesn't improve from a five year deferral (relative to a well-defined base case) it is unclear whether the implication is that the original option should be maintained or that the option be tested against deferral for a further five years.	For consideration
9	**BROADER DISCUSSION OF APPRAISAL PERIODS**	Application	Provide guidance in the **Guide to economic appraisal** on the appraisal period for short- and long-life infrastructure options.	For consideration

1. Base case definition

Revise the base case definition to focus on a "business as usual" base case.

Category: Application

Rating: Recommended change

Reference: the Assessment Framework Stage 1: Defining Problems and Opportunities, page 27 and Guide to economic appraisal, pages 17-19

Discussion:

The Assessment Framework **Stage 1: Defining problems and opportunities** document states:

> The base case should identify the expected outcomes of a 'do-minimum' situation, reflecting the continued operation of the network of service under good management practices. We recommend the committed and funded expenditure approach to defining the base case, but recognise that some states and territories use the planning reference case approach.

The wording of this section of the guidance may be confusing to proponents. The advice may be misunderstood as suggesting that a "committed and funded expenditure approach" can be selected even in scenarios where a "planning reference case"[3] is more appropriate to ensure continued delivery of services that meets customer and/or compliance obligations. That is to say, the wording could be misconstrued as permitting a "do nothing" base case should there not be committed and funded expenditure in the relevant infrastructure area.

The **Guide to economic appraisal** includes the following guidance:

> A 'do-minimum' base case assumes that general operating, routine and periodic maintenance costs will continue to occur, plus a minimum level of capital expenditure to maintain services at or near their current level without significant deterioration (for example, maintaining access or service quality). This may include asset renewals and replacement of life-ending components on a like-for-like basis, as well as committed and funded projects and smaller scale changes required to sustain viable operations under the base case.

In general, we consider this a clearer definition of a base case. However, we are aware of situations where large scale changes are required to where an infrastructure provider has an obligation to provide a defined level of service over time – in these situations a "business as usual" base case is more applicable terminology than "do minimum."

[3] Defined in **Stage 1** of the Assessment Framework as "*The planning reference case approach – which includes all projects that are outlined in strategic planning documents, such as transport and land-use strategies, even if they have not been committed to and fully funded*."

2. Benefit-cost ratio definition

More clearly define the benefit-cost ratio as the present value of economic, social and environmental benefits divided by the present value of economic, social and environmental costs.

Category: Alignment

Rating: Recommended change

Reference: Guide to economic appraisal, page 67

Discussion:

The **Guide to economic appraisal** states that for a benefit-cost ratio (BCR):

> "we recommend the use of the following formula:
>
> $$BCR = \frac{benefits^{*}}{(investment\ costs\ +\ net\ increase\ in\ operating\ costs^{**})}$$
>
> * generally represented by the PV of total incremental economic, social and environmental benefits
>
> ** generally represented by the PV of total costs"

While we agree that in practice for most analyses this is how a BCR should be calculated, it does raise the important issue of how to treat avoided costs and disbenefits. That is, for the purpose of the BCR, logically it would be expected to see avoided costs be treated as a benefit and disbenefits be treated as a cost.

The following extract from the UK Department for Transport's *Transport analysis guidance*[4] provides a useful discussion on this topic:

> The benefit-cost ratio (BCR) is given by PVB / PVC [Present value of benefits / Present value of costs] and so indicates how much benefit is obtained for each unit of cost, with a BCR greater than 1 indicating that the benefits outweigh the costs.
>
> Whether an impact is included as a negative cost or a positive benefit (or vice versa) will impact on the BCR. Therefore, the BCR requires a clear definition of what constitutes a cost or a benefit. It might appear attractive to classify all positive impacts as benefits and negative impacts as costs. However, this would lead to inconsistencies as a given impact could be negative for some schemes or options and positive for others, leading to changes in the BCR definition between schemes.
>
> For example, consider an appraisal comprising three elements: investment costs, time savings and greenhouse gas emissions; and comparing two options, both with investment costs of £10m. Option A generates time saving benefits of £50m and

[4] UK Department for Transport 2021, *TAG Unit A1.1 Cost-Benefit Analysis*, available at https://www.gov.uk/government/publications/webtag-tag-unit-a1-1-cost-benefit-analysis-may-2018

> greenhouse gas benefits of £10m while Option B yields greater time savings of £100m but increases greenhouse emissions with a £10m disbenefit. Both options cost the same and the total net benefit (the NPV, see below) of Option B is £80m compared with £50m for Option A, suggesting that Option B should be preferred.
>
> However, if the PVC is defined to include all negative impacts, Option A has a BCR of 6 ((50+10)/10) while Option B has a BCR of 5 (100/(10+10)). This definition of the PVC moves the greenhouse gas impact between the PVB and PVC for the two options and distorts the BCR, reducing its usefulness in comparing schemes or options.
>
> As the BCR is used to inform value for money assessments of transport schemes, the PVC should reflect the public budget available to fund transport schemes, referred to as the 'Broad Transport Budget'. The PVC should only comprise Public Accounts impacts (i.e. costs borne by public bodies) that directly affect the budget available for transport.

The hypothetical example provided by the Department for Transport makes sense for projects which are being compared by a funder. However, it does essentially lead to a position where the BCR is a hybrid economic/financial measure with a net economic impact divided by a financial cost. Given that Infrastructure Australia has a broader remit "to deliver better infrastructure for all Australians" it may be more appropriate to consider a truly economic analysis—that is, from the point of view of society rather than the 'funder' (despite its role providing advice to the government to inform funding decisions). Given this, it may be more appropriate to define the BCR to be the present value of all benefits (including avoided costs) divided by the present value of all costs (including disbenefits). To put it another way, going back to the UK's Department for Transport example, our expectation would be that the CBA methodology would treat a $10m cost to government the same as a $10m greenhouse gas cost to society.

The definition of the BCR is particularly important as infrastructure projects increasingly look to incorporate circular economy concepts which tend to place greater emphasis on reducing externality impacts. Take, for example, a hypothetical integrated water management project focussed on investment in wastewater systems to accommodate major urban growth. An appropriately defined "do minimum" base case would mean that wastewater services are provided in both the base case and project case – that is, in both cases, investment needs to occur to ensure services meet customer and compliance expectations. Therefore, there would be no direct level of service benefit. While there may be some environmental benefits under some project cases from alternative solutions (improved waterway health, reduced ocean discharge, reduced greenhouse gas emissions etc.), the key benefit to an integrated water management project involving wastewater recycling may be avoided upgrades elsewhere in the water network. If these avoided costs are netted off against project costs (that is, included in the BCR denominator), rather than being treated as a benefit (that is, included in the numerator), then they would fundamentally change the BCR. This creates a risk that the value of the project case to society is understated.

We recommend that the BCR should be defined as the present value of benefits divided by the present value of costs with clear guidance provided on treatment of avoided costs and disbenefits. Taking this approach would align with CBA Guidance provided in New South Wales, Queensland and Victoria, which all focus on the BCR being the present value of benefits divided by the present value of costs.

3. Distributional analysis

Reposition the distributional analysis advice to solely focus on articulating the distribution of costs and benefits.

Category: Alignment

Rating: Recommended change

Reference: Guide to economic appraisal, page 65-66

Discussion:

The inclusion of a sub-section in **Step 6: Identify non-monetised impacts** of the **Guide to economic appraisal** on equity and distributional effects aligns with best practice approaches to CBA. The distributional analysis is described as follows:

> 1. Identify the key groups of interest for the analysis.
>
> 2. Allocate costs and benefits from the CBA to the identified groups.
>
> 3. Consider whether any of these costs or benefits may be shifted to another group.
>
> 4. Include any transfer payments that have not been included in the CBA, and consider which groups are impacted.
>
> 5. Consider whether the impacts not monetised in the CBA are likely to affect groups in different ways.

While this does provide a guide to undertaking a distributional analysis of sorts, the transfer payments element in Step 4 really makes it a funding analysis rather than a socio-economic overlay to CBA. Undertaking the first, second and fifth steps of this process and then assessing the implications of the distribution for the broader CBA findings would be more useful.

The Victorian Department of Treasury and Finance's Economic Evaluation Guideline[5] includes the following:

> A cost-benefit analysis should instead identify and describe how the impacts of the project or policy are distributed between various groups. A description of the distributional impacts on the affected stakeholders, including the scale of the impact and how it spreads across different groups, should be included separately.

This description better aligns with our thinking of how a distributional analysis should be undertaken. Given that a CBA produces a net impact from the point of view of society, a distributional analysis should look to disaggregate this net impact. For example, a transport CBA for an inner city road junction improvement may show that an option is net beneficial. However, the net impact may mask a situation where journey time savings for the dominant direction of road travel outweigh disbenefits for local active transport users seeking access to education and

[5] Department of Treasury and Finance (2013), Economic Evaluation for Business Cases: Technical guidelines

services. The distributional analysis should focus on identifying impacts that may not be apparent from the overarching CBA results.

We recommend that Infrastructure Australia update their distributional analysis guidance to focus on understanding the distribution of costs and benefits, as well as the implications for the broader CBA findings.

4. Economic vs financial analysis

Highlight the difference between financial and economic analysis – in terms of objective, scope and information requirements – earlier in the **Guide to economic appraisal**.

Category: Clarity

Rating: Recommended change

Reference: Guide to economic appraisal, pages 23-24

Discussion:

One potential point of clarity in the **Guide to economic appraisal** is how it deals with the difference between economic and financial analysis. While this point is covered in a sub-section on theoretical basis of CBA, it could be given greater prominence in the document. For example, it may be useful to include in the "At a glance" box on page 8 of the review or have a standalone box to disambiguate between economic and financial analysis. Having a clearer distinction between economic and financial analysis could make the **Guide to economic appraisal** more accessible to a broader range of users. That is, a financial appraisal provides a cash-flow focus to investment decision making, whereas an economic appraisal is from the point of view of society.

This distinction could cover the following elements:

- relevant scope or focus of analysis (e.g., society vs agency)
- types of costs and benefits (e.g. resource impacts vs cash flow impacts)
- discount rate for converting to present value.

5. Treatment of transfers

Give more prominence to the treatment of transfers in CBA in the guidelines.

Category: Clarity

Rating: For consideration

Reference: Guide to economic appraisal, page 16

Discussion:

One of the key differences between an economic and financial appraisal relates to the treatment of transfers. Transfers, such as revenues (costs) from sales or taxes (subsidies) that impact the prices of goods and services, in general should be excluded from CBA because they do not represent a resource cost to society. Rather, they are a financial transfer between parties as no economic value is created or consumed. Put another way, within a CBA framework a transfer has a both a cost and a corresponding equal and opposite benefit. For example, toll road revenues are a cost to drivers and a benefit to the toll road operator.

However, sale values (which inform revenues) can be an important consideration in CBA where the proponent is seeking to identify or value alternative uses of resources, say land or buildings. Monetising the social impact of interventions that reduce land use (or footprint requirements) or improve amenity may utilise sales or recent estimates of property values.

It is noted that Footnote 6 in the **Guide to economic appraisal** provides a definition of transfers:

> Financial transfer payments between various individuals/firms are not included in the economic CBA because they do not result in a net change in welfare. It is purely a financial gain or loss, without a change in economic efficiency. They result in a change in the distribution of benefits or costs without changing the overall net benefits. Most taxes, fares and tolls are transfer payments from consumers to government or infrastructure owners/operators, while subsidies are often transfer payments from government to consumers.

Nevertheless, we suggest more clearly highlighting the treatment of transfers across the guide more clearly (similar to double counting which is well covered in Box 4 in the **Guide to economic appraisal**).

6. Greater clarity on Infrastructure Australia's expectations for applying CBA guidance in practice

Communicate more clearly in the **Guide to economic appraisal** and **Stage 3: Developing a business case** documents that the complexity and level of effort spent on a CBA should be proportional to the complexity, level of risk and estimated cost of the infrastructure investment. This could include guidance on the factors or drivers that suggest more resources be spent on the CBA, and how the analysis would change.

Category: Application

Rating: For consideration

Reference: Guide to economic appraisal

Discussion:

The **Guide to economic appraisal** provides a robust and detailed guide on how to undertake a CBA. However, should a proponent look at the **Guide to economic appraisal** they may struggle to understand how to scale and tailor a CBA to the project or program that they are developing. The exception to this is the section on Rapid cost-benefit analysis which is clear that it applies to Stage 2 of the Assessment Framework.

More specifically, the **Guide to economic appraisal** and **Stage 3: Developing a business case** documents state that CBAs should consider all impacts. There is a risk that using the words "all impacts", may lead to over specified CBAs where a disproportional amount of effort is spent valuing impacts which are small in magnitude and do not impact on the key findings of a CBA.

Rather, there may be an opportunity to clarify:

- CBA doesn't necessarily need to be complex, detailed and expensive to undertake. Even a simple CBA can be informative and cost-effectively support decision-making. This is because a CBA 'framework' is primarily a process for organising the available information in a logical and methodical way to support decision-making. It requires proponents to be clear about the objective (i.e. what they are seeking to identify), the potential options for achieving the objective and the transparent and objective evaluation process followed for comparing these options.
- The extent of analysis undertaken for a CBA should be matched to the complexity, level of risk and estimated cost on a case-by-case basis – that is, they should be 'fit for purpose' given the proposed investment (non-investment) or option to address the business need.
- There are some common areas or elements where a simple vs complex CBA will differ:
    - The extent of analysis undertaken to monetise social and environment outcomes, including primary research
    - The extent of risk and resilience analysis including the number of factors considered in sensitivity analysis and complexity of techniques (e.g. adaptive pathway or real options analysis).

7. Non-monetised impacts

Provide greater clarity on how non-monetised costs and benefits should be incorporated into a CBA and presented to decision-makers. Consider including additional guidance regarding the type and scale of non-monetised costs and benefits that may impact on the selection of a preferred option.

Category: Application

Rating: For consideration

Reference: Guide to economic appraisal, page 65

Discussion:

Section 2.7 (**Step 6: Identify non-monetised impacts**) provides guidance on approaches to non-monetised costs and benefits. However, it does not provide any guidance on when the potential size or nature of non-monetised costs and benefits should change a preferred option as identified by key CBA metrics. The **Guide to economic appraisal** does state:

> Note that quantitative and qualitative measures are not easily comparable like monetised costs and benefits, as applying monetary values weights the relative importance of impacts. These characteristics require the judgement of decision-makers, which may vary from person to person, depending on the circumstances.

The 2021 refresh of the Assessment Framework acknowledges the importance of costs and benefits that are not readily monetised. To support decision-making where non-monetised impacts are included in the analysis, the guidance should be clear on when they may affect the selection of a preferred option. For example, take a situation where two options have similar CBA results but one option has a strategically important qualitative benefit. In this instance, the guidance would provide clarity on how to balance monetised and qualitative impacts to determine a preferred option.

8. Deferral test

Provide clearer guidance on the implications of findings from a deferral test.

Category: Application

Rating: For consideration

Reference: Guide to economic appraisal, page 69

Discussion:

In Box 10 of the **Guide to economic appraisal** on "recommended sensitivity tests" there is a deferral test. This test states:

> If the proposal presents marginal value for money and first-year rate of return (FYRR) is less than the discount rate: defer cost and benefit cash flows by five years to test whether the CBA results (net benefits) improve because of the deferral of the project.

The implication of different results from this test are unclear. For example, if a marginal project doesn't improve from a five year deferral (relative to a well-defined base case) it is unclear whether the implication is that the original option should be maintained or that the option be tested against deferral for a further five years.

Infrastructure Australia should consider providing clearer guidance on the implications of the deferral test within the **Guide to economic appraisal**. In particular, on the implications of the deferral test in the following three situations:

- Where the deferral test finds that delaying the intervention by five years improves the CBA results
- Where the deferral test finds that delaying the intervention by five years results in similar CBA results to the original option
- Where the deferral test finds that delaying the intervention by five years worsens the CBA results.

9. Broader discussion of appraisal periods

Provide guidance in the **Guide to economic appraisal** on the appraisal period for short- and long-life infrastructure options.

Category: Application

Rating: For consideration

Reference: Guide to economic appraisal, pages 23-24

Discussion:

We agree that in many instances the following statement from the **Guide to economic appraisal** will be correct:

> the appraisal period should be on the expected economic or design life of the asset.

However, this may not be suitable for assets with a long life – such as a pipeline which may have a 100 year asset life – or for interventions which provide a short-term solution and therefore require reinvestment.

For infrastructure assets with a long life, there are practical considerations around the ability to forecast far into the future and the effect of discount rates on impacts far into the future.

More generally, we note that the examples in this sub-section in the **Guide to economic appraisal** relates to existing guidance which suggests 20-50 year appraisal periods. Infrastructure Australia should consider whether clear guidance is required for infrastructure which has an asset life that is shorter or longer than this. For instances where a short-term solution is considered, it is important to include a renewal value to allow direct comparison to other options with a longer asset life. For instances with a long, multi-generational useful life, we suggest that Infrastructure Australia consider whether their preferred approach is a 50-year appraisal period with a residual value included at the end of this period.

3 Broader opportunities

The focus of this review has been whether the Assessment Framework provides adequate and technically robust CBA guidance. As part of the review, some broader opportunities for Infrastructure Australia to provide clear guidance on accepted methodologies and strengthening the evidence base for CBA to more robustly capture a broad range of impacts have been identified. These broader opportunities comprise:

- **Accounting for social and environmental impacts in CBA**: when it comes to applying the Assessment Framework's CBA guidance, we expect a key challenge is keeping pace with emerging methods to value relevant social and environmental impacts, including climate sustainability, community resilience and social value.

  While there are some useful sources for valuing CBA impacts[6], consistent parameter values and guidance for applying accepted methodologies for valuing social and environmental impacts is lacking. Priority areas for appropriately accounting for social and environmental impacts include valuing:

  - Social impacts such as:
    - Community resilience
    - Changes in human health
    - Quality of life impacts
  - Environmental impacts:
    - Cost of carbon
    - Urban heat island impacts
    - Biodiversity impacts.

  Infrastructure Australia may wish to take a leadership role in this space. There are a range of approaches which Infrastructure Australia could take to address this:

  - Taking a coordinating role to identifying and signposting existing guidance endorsed by Commonwealth, State and Territory Governments to direct proponents to best practice and industry recognised valuations and parameter values available.
  - Taking an active role to build the evidence base by identifying and addressing key gaps in social and environmental impact valuation and developing guidelines for agreed parameter values and techniques.

  Should Infrastructure Australia wish to take an active role then they should be conscious of the necessary trade-offs between having context-specific environmental and social

[6] Most notably, the Australian Transport Assessment and Planning parameter values (see https://www.atap.gov.au/parameter-values/index) and the Cooperative Research Centre for Water Sensitive Cities' Investment Framework for Economics of Water Sensitive cities value tool (see https://watersensitivecities.org.au/content/project-irp2/).

values and having values which can be readily applied by proponents. One possible solution here would be to seek to provide a benchmark parameter value together with a technique to develop a context specific value. The easily usable, 'ready reckoner' value would allow for more impacts to be valued in CBAs while the technique to develop a context specific value could be encouraged for use in CBAs for more complex, risky or large infrastructure investments.

- **Addressing broader challenges around treatment of transformational projects**: we are aware that some infrastructure projects are identified as being "transformational" and, in some instances, seek to use this as a rationale to take a non-standard approach to CBA (e.g. lower discount rates, longer analysis periods, focus on wider economic benefits). To the best of our knowledge, there is a gap from both Infrastructure Australia and State and Territory Governments[7] in defining what constitutes a transformational project, their appropriate treatment and any requirements for their assessment. It may be beneficial for Infrastructure Australia to work with other stakeholders to define transformational infrastructure (noting that such a definition should be flexible to the context of an intervention). As an extension to this, it may be worth considering whether any additional CBA guidance is required for transformational projects or whether the existing CBA guidance within the Assessment Framework is appropriate.

[7] Some other sources already provide definitions of transformational projects, without providing guidance on how they should be treated. For example, the World Bank has defined transformational projects as "interventions that support deep, systemic, and sustainable change with the potential for large-scale impact in an area of a major development challenge". See ieg.worldbankgroup.org/blog/transformational-development-projects-what-makes-them-different

Frontier Economics

Brisbane | Melbourne | Singapore | Sydney

Frontier Economics Pty Ltd
395 Collins Street Melbourne Victoria 3000

Tel: +61 3 9620 4488
https://www.frontier-economics.com.au

ACN: 087 553 124 ABN: 13 087 553 124