Cost benefit analysis guidelines

Guidelines to make the Integrated System Plan actionable

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AUSTRALIAN ENERGY REGULATOR

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Contents

1 Nature and authority

Consistent with clause 5.22.5 of the National Electricity Rules (NER), this document sets out the Australian Energy Regulator's (AER's) cost benefit analysis (CBA) guidelines for:

- Australian Energy Market Operator (AEMO) in preparing an integrated system plan (ISP)
- Transmission Network Service Providers (TNSPs) (or more broadly, regulatory investment test for transmission (RIT–T) proponents), in applying the RIT–T to actionable ISP projects.

All references to NER rules and clauses associated with the Energy Security Board's 'Making of National Electricity Amendment (Integrated System Planning) Rule 2020' are to the version that was made by the South Australian Minister on 2 April 2020, which commenced on 1 July 2020, as amended from time to time.

1.1 Role of the CBA guidelines

CBA is an integral part of transmission network planning and investment. The CBA guidelines are to be used by:[1]

- AEMO in preparing an ISP. In doing this, AEMO identifies an optimal development path that promotes the efficient development of the power system, based on a quantitative assessment of the costs and benefits of various options across a range of scenarios.
- RIT–T proponents in applying the RIT–T to actionable ISP projects. Actionable ISP projects are identified in an ISP, and trigger RIT–T applications for these projects. Under the RIT–T instrument, RIT–T proponents must identify the credible option that maximises the present value of net economic benefit to all those who produce, consume and transport electricity in the market (the preferred option). By doing this, the RIT–T instrument realises the purpose of the RIT–T under NER clause 5.15A.1(c), which is to identify the preferred option.

AEMO should read the CBA guidelines in conjunction with the forecasting best practice guidelines and the relevant clauses of the NER.

RIT–T proponents should read the CBA guidelines in conjunction with the RIT–T instrument and the relevant clauses of the NER.

1.2 Authority

Under clause 5.22.5 of the NER, the AER must make and publish the CBA guidelines. The CBA guidelines must:

- In relation to the preparation of an ISP by AEMO:[2]

[1] NER, clause 5.22.2; NER, clause 5.22.5(b); NER, clause 5.22.6(a)(4); NER, clause 5.15A.1(c).

[2] NER, clause 5.22.5(d).

- Be consistent with the purposes of the ISP referred to in clause 5.22.2.
- Require AEMO to test the robustness of alternative development paths to future uncertainties through the use of scenarios and sensitivities.
- Be capable of being applied in a predictable, transparent and consistent manner.
- Describe the objective that AEMO should seek to achieve when:
  - developing the counterfactual development path; and
  - selecting a set of development paths for assessment.
- Describe the framework used to select the optimal development path, including the assessment of the costs and benefits of various development paths across different scenarios.
- Set out how AEMO describes the identified need relating to an actionable ISP project.

- In relation to the application of the RIT–T to actionable ISP projects:[3]
  - Give effect to and be consistent with the relevant NER provisions. These provisions set out what the RIT–T instrument must do, which actionable ISP projects are subject to the RIT–T, the RIT–T procedures for actionable ISP projects, and how actionable ISP projects result in contingent project trigger events.[4]
  - Specify requirements for actionable ISP projects on:
    - the operation and application of the RIT–T;
    - the process to be followed in applying the RIT–T; and
    - how we will address and resolve disputes raised on the RIT–T and its application.
  - Provide guidance as to:
    - what constitutes a credible option for the purposes of NER clause 5.15A.3(b)(7)(iii)(C);
    - acceptable methodologies for valuing the costs of a credible option; and
    - how the RIT–T proponent must apply the ISP parameters.

In developing and publishing the CBA guidelines, the AER must:[5]

- recognise the risks to consumers arising from uncertainty, including over-investment, under-investment, premature or overdue investment;
- provide flexibility to AEMO in its approach to scenario development, modelling and selection of the optimal development path;

[3] NER, clause 5.16A.2.
[4] As set out in NER clauses 5.15A, 5.16A.3–5, respectively.
[5] NER, clause 5.22.5(e).

- require the optimal development path to have a positive net benefit in the most likely scenario; and
- have regard to the need for alignment between the ISP and the RIT–T as it applies to actionable ISP projects.

The AER may specify the relevant parts of the CBA guidelines that are binding on AEMO and RIT–T proponents.[6]

1.3 Definitions and interpretation

In the CBA guidelines, the words and phrases have the meaning given to them in:

- the NER; or
- if not defined in the NER, the glossary (in appendix B).[7]

1.4 Process for revision

We may amend or replace the CBA guidelines from time to time in accordance with the rules consultation procedures and clause 5.22.5 of the NER. We need not comply with the rules consultation procedures when making minor or administrative amendments.[8]

1.5 Version history and effective date

A version number will identify every version of the CBA guidelines.

This version (1.0) of the CBA guidelines commences on the date it is published on the AER website. This version applies to each ISP and every RIT–T for an actionable ISP project, except as provided for in the following transitional arrangements:[9]

- This version of the CBA guidelines does not apply to the development of the 2020 ISP but may apply to RIT–Ts for projects identified in the 2020 ISP.
- For an actionable ISP project in the 2020 ISP:
  (a) this version of the CBA guidelines **does not** apply to a RIT–T where a project assessment draft report has already been published in respect of that project on the date the final CBA guidelines are published on the AER's website; and
  (b) this version of the CBA guidelines **does** apply to a RIT–T where no project assessment draft report has been published in respect of that project on the date the final CBA guidelines are published on the AER's website.

Each time a new version of the CBA guidelines is made in the future, the AER will specify how that new version applies on a transitional basis in accordance with clause 5.22.5(g) and 5.22.5(h) of the NER.

6 NER, clause 5.22.5(c).
7 For convenience, the glossary also sets out definitions from the NER that we have commonly used in the CBA guidelines.
8 NER, clause 5.22.5(f).
9 Consistent with NER, clause 5.22.5(g)-(h).

2 Introduction to the CBA guidelines

This section sets out:

- information relevant to complying with the CBA guidelines (section 2.1)
- an overview of how the CBA guidelines are structured (section 2.2).

2.1 Complying with the CBA guidelines

Certain elements of the CBA guidelines are binding on AEMO and RIT–T proponents. As such, we provide a framework for classifying elements of the CBA guidelines as requirements, considerations or discretionary; and set out compliance expectations.

2.1.1 Classification framework for binding and non-binding elements

Within the CBA guidelines, we classify guidance as 'requirements', 'considerations' or 'discretionary' elements.

Requirements

Requirements are binding. A requirement is any obligation that the CBA guidelines state *'is required'* to be complied with, or which is expressly identified as a '*requirement*'.

For example, if the CBA guidelines state that AEMO *is required* to determine the net economic benefit for each development path in each scenario, AEMO must determine the net economic benefit for each development path in each scenario. A failure to do so will be a breach of a binding element of the guidelines.

Considerations

Considerations are binding. AEMO and RIT–T proponents must have regard to elements of the CBA guidelines classified as considerations when they are making decisions. A consideration is any obligation in the CBA guidelines that state *'must have regard'* to, '*must consider*', or is otherwise expressly identified as a '*consideration'*.

For example, if the CBA guidelines state that AEMO *must have regard* to the likelihood of scenarios occurring, AEMO must have regard to that likelihood when making its decision. However, AEMO may form its own view as to how much weight (if any) to give to a consideration when making a decision. That is, provided AEMO has regard to the consideration when making its decision, AEMO will not be in breach of the CBA guidelines if it decides not to give any weight to that consideration, or to favour one consideration over another. To demonstrate compliance, AEMO would need to explain, in writing, how it has had regard to each consideration, including the weight it has given to the consideration in making its decision (if any).

Discretionary

Elements of the CBA guidelines that are discretionary do not bind AEMO or RIT–T proponents. These elements provide guidance for best practice, with a view to promoting predictability, transparency and consistency. A discretionary element in the CBA guidelines is any information that is not identified as a requirement or consideration, or is specifically identified as a *'discretion'* or '*discretionary'.*

For example, the CBA guidelines may state that AEMO has *discretion* as to how it determines the inputs and assumptions for the ISP and provide information that should guide the exercise of that discretion. This information would not be binding on AEMO.

Appendix A lists all the requirements and considerations contained in the CBA guidelines.

2.1.2 Compliance reporting

Compliance reporting assists the AER in monitoring compliance, and promotes the application of the CBA guidelines in a predictable, transparent and consistent manner.

AEMO *is required* to provide the AER with a compliance report when preparing an ISP, which must be submitted to the AER no later than 20 business days after the publication of the final ISP.

RIT–T proponents *are required* to provide the AER with a compliance report when applying the RIT–T to an actionable ISP project, which must be submitted no later than 20 business days after the publication of the project assessment conclusions report.

In their compliance reports, AEMO and RIT-T proponents *are required* to identify where they:

- have complied with applicable requirements;
- have had regard to applicable considerations (including the reasons for the weight they have attached to each consideration); and
- have resolved key issues raised by the AER through the issues register.

AEMO and RIT–T proponents *are required* to identify breaches of the CBA guidelines, if any, in their compliance reports and provide an explanation for the breach.

If a compliance report contains confidential information, AEMO or the RIT–T proponent *is required* to provide another non-confidential version of the report in a form suitable for publication. The AER may publish the compliance report (or the non-confidential version of the compliance report, if applicable) on its website.

2.2 Overview of the CBA guidelines

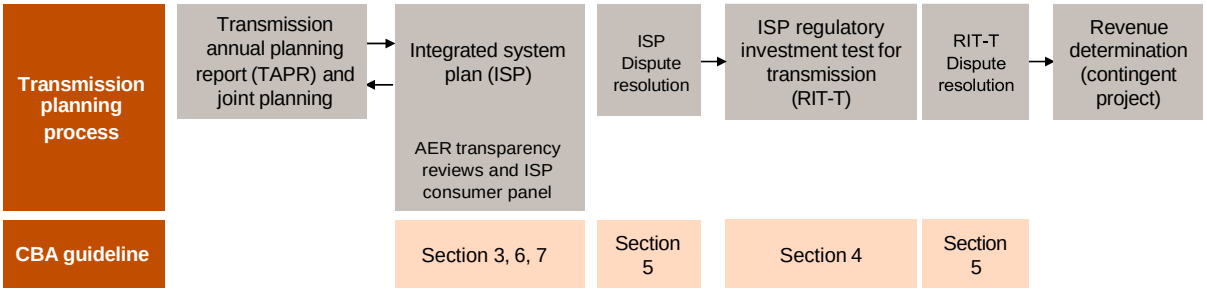
The CBA guidelines provide binding and non-binding guidance for AEMO and RIT–T proponents on:

- CBA operation and application in preparing an ISP (AEMO)—section 3
- operation and application of the RIT–T to actionable ISP projects, and the process to be followed in applying the RIT–T (RIT–T proponent)—section 4

- how we will address and resolve disputes regarding the ISP and RIT–T for actionable ISP projects—section 5
- NER requirements for the AER transparency reviews—section 6
- NER requirements for the ISP consumer panel—section 7.

Figure 1 shows where these sections apply in the new transmission planning process for actionable ISP projects.[10]

Figure 1: CBA guidelines within the new transmission planning process

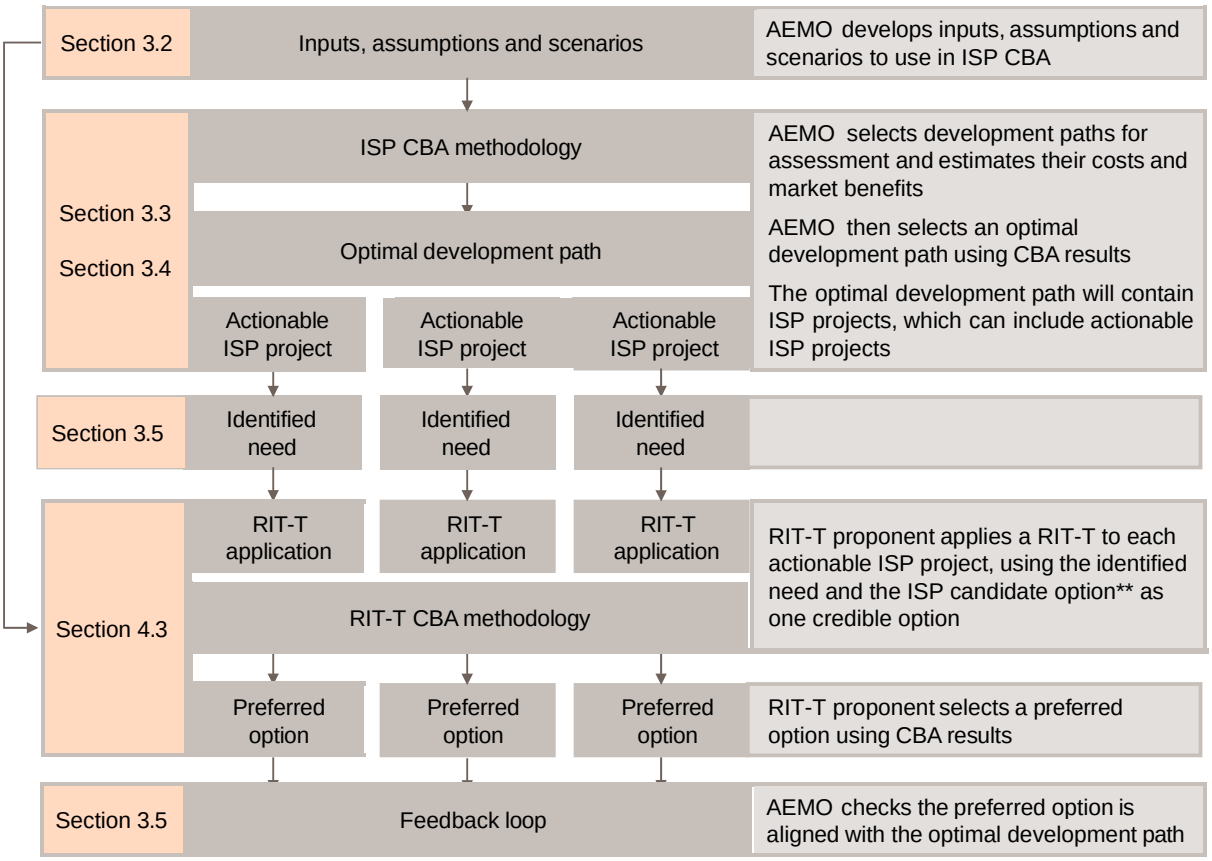


Source: AER analysis.

Figure 2 provides a more detailed summary of the ISP and RIT–T CBA processes and how the CBA guidelines are structured around these processes.

[10] Not all RIT–T applications will flow from the ISP under the new framework. TNSPs will continue to apply RIT–Ts to investment projects that are not driven by the ISP, including those relating to asset replacement projects. The CBA guidelines do not cover the transmission planning process for projects that the ISP does not instigate.

Figure 2: CBA guidelines alongside the ISP and RIT–T CBA processes



Source: AER analysis. Note: *Along with the identified need, AEMO also provides the scenarios for the RIT–T proponent to use in applying the RIT–T to an actionable ISP project. **The ISP candidate option is the credible option specified in the ISP for an actionable ISP project. The RIT–T proponent may then specify other credible options in applying the RIT–T to that actionable ISP project. The glossary in appendix B describes each of these terms.

3 ISP cost benefit analysis guidelines

Consistent with clause 5.22.5 of the NER, this part of the CBA guidelines includes guidelines on CBA operation and application for AEMO in preparing an ISP.

AEMO should read the guidelines in this section in conjunction with the forecasting best practice guidelines and the relevant clauses of the NER. AEMO should also refer to the following sections of the CBA guidelines:

- section 1.2, which sets out the authority that NER clause 5.22.5 provides to the CBA guidelines in relation to preparing an ISP
- section 2.1.1, which sets out the classification framework in the CBA guidelines for introducing binding requirements and considerations on AEMO.

3.1 Overview of the ISP

AEMO must publish an ISP every two years by 30 June in accordance with the procedures under rule 5.22 of the NER. The ISP establishes a whole of system plan for the efficient development of the power system that achieves power system needs for a planning horizon of at least 20 years, for the long term interests of consumers of electricity.[11] In this way, the ISP seeks to coordinate investment across the power system. This promotes efficient investment in, and efficient operation and use of, electricity services for the long-term interests of consumers of electricity.

In preparing an ISP, AEMO undertakes a CBA to identify an optimal development path for the power system, chosen from a range of development path options. The optimal development path contains a set of investments that together address power system needs, and must identify:[12]

- Actionable ISP projects—transmission assets or non-network options whose purpose is to address an identified need. These projects trigger RIT–T applications and preparatory activities during the two years of the relevant ISP.
- Future ISP projects—transmission assets or non-network options whose purpose is to address an identified need. These projects do not trigger RIT–T applications but may trigger preparatory activities during the two years of the relevant ISP.
- ISP development opportunities—developments that do not address an identified need, and may include distribution assets, generation, storage projects or demand side developments. These complete the whole-of-system nature of the ISP, and are intended to inform market participants and policy makers.

In preparing an ISP, AEMO must publish an:[13]

- inputs, assumptions and scenarios report (IASR);

11 NER, clause 5.22.2.
12 NER, clause 5.22.6(a). Definitions are in NER, clause 5.10.2; NER, chapter 10; and also appendix B.
13 NER, clause 5.22.4.

- ISP methodology, if AEMO is not using an existing ISP methodology;
- draft ISP; and
- final ISP.

3.2 Inputs, assumptions and scenarios

Under clause 5.22.8 of the NER, AEMO must publish an IASR for consultation, prior to the draft ISP. The IASR sets out the inputs, assumptions and scenarios AEMO will use in its CBA to identify an optimal development path for an ISP.

The forecasting best practice guidelines set out the process for developing and testing inputs, assumptions and scenarios with stakeholders. The CBA guidelines set out requirements, considerations and discretionary elements for developing economically reasonable inputs and assumptions (section 3.2.1), and scenarios (section 3.2.2).

3.2.1 Inputs and assumptions

In preparing an ISP, AEMO identifies a large number of inputs for its model. These inputs are forecasts over the 20+ year ISP planning horizon (or modelling period), and use different trajectories to match different scenarios. This involves a number of underlying assumptions.

AEMO *is required* to:

- Identify the key inputs or assumptions driving the CBA results in the draft ISP. These have a large impact on the costs or market benefits of one or more development paths.
- Where available, present verifiable sources for each key input and assumption, and their associated forecasting methodologies, in the draft ISP.

AEMO *must have regard* to:

- the performance of its previous forecasts against actual outcomes, through the post-period performance reviews set out in the forecasting best practice guidelines.[14]

Subject to the requirements and considerations set out above, AEMO has flexibility in its development of inputs and assumptions. We recommend AEMO consider the following *discretionary* principles which promote the reasonableness of inputs and assumptions:

- Internal consistency—inputs and assumptions should be applied consistently in the modelling. Inputs and assumptions, taken together, should also be internally consistent.
- Plausibility—inputs and assumptions, taken together, should reflect a realistic operation of the market. Forecasting methodologies should not result in an input, for any given year or scenario, that is beyond system capabilities or is an outlier to other data points.
- Verifiable sources—all inputs, assumptions and forecasting methodologies should be supported by reputable and independent sources where readily available.

[14] See AER, Forecasting best practice guidelines, August 2020, section 4.

- Relevance—inputs should be based on relevant and up to date information. They should be based on market data where available and applicable.
- Transparency—AEMO should explain how it has derived key inputs and assumptions. Where AEMO has chosen a single value from an underlying range or distribution for key inputs (identified in the most recent draft ISP), it should present the single value and the underlying range or distribution if possible.

Discount rate

The discount rate is used in CBA to compare costs and benefits received at different points in time. It reflects the opportunity cost of cash flows associated with investments in terms of delays to consumption or alternative investment opportunities forgone.[15]

The discount rate(s) in the ISP *is required* to be appropriate for the analysis of private enterprise investment in the electricity sector across the National Electricity Market (NEM), and *is required* to be consistent with the cash flows that the ISP is discounting. For example, if real cash flows are applied, a real discount rate must be applied.

Outside of this requirement, AEMO has flexibility in selecting the discount rate(s) for ISP development paths. We recommend AEMO consider the following *discretionary* guidance:

- To meet the above requirement, AEMO should select a discount rate(s) that reflects the systematic risk associated with the expected cost and market benefit cash flow streams over the life of the projects in a development path.
- The lower boundary should be the regulated cost of capital, based on the AER's most recent regulatory determination at the time of the final ISP. If there is more than one option (for example, if there were two 'most recent regulatory determinations' that were published simultaneously), AEMO should choose a value between the options that best reflects the requirement.
- The discount rate should not generally be used to manage uncertainty over predicted costs and benefits. This is because it is typically best practice to capture this uncertainty through sensitivity testing and scenario analysis, rather than through the choice of discount rate.[16] If AEMO departs from this, it should:
    - clearly and transparently provide its reasoning, including supporting evidence
    - show if or how the decision affects the ranking of development paths.
- Since the discount rate is an important parameter for estimating the present value of long term projects, AEMO's choice of discount rate should be informed by expert guidance.
- The choice of discount rate(s) should promote competitive neutrality between network and non-network options in a development path.

[15] Department of the Prime Minister and Cabinet Office of Best Practice Regulation, Guidance note: Cost benefit analysis, February 2016, pp. 5-6; Productivity Commission, Valuing the future: the social discount rate in cost-benefit analysis, April 2010, p. ix.
[16] Productivity Commission, *Valuing the future: the social discount rate in cost-benefit analysis*, April 2010, p. x.

Value of customer reliability

The value(s) of customer reliability (VCR), typically reported in dollars per kilowatt-hour (kWh), is an important parameter for estimating classes of market benefits that relate to reliability, such as changes in voluntary and involuntary load curtailment. Recognising how different customers value reliability is also important to represent the competing tensions of reliability and affordability.

When applying a VCR to value a market benefit class for a development path, AEMO *is required* to use:

- the AER's most recent VCRs for unplanned electricity outages for the NEM, at the time of publishing an ISP timetable under clause 5.22.4 of the NER; and
- the most relevant VCR(s) for the load associated with the unplanned electricity outages.

When applying a VCR, AEMO *must have regard* to:

- any application guidance accompanying the VCR values it is using; and
- the load-weighted VCR that reflects the relevant composition of the different customer types in the specified loads that feature higher up on that jurisdiction's schedule of rotational load shedding.[17]

3.2.2 Scenarios

Scenarios are different future external market environments that are used in a CBA to assess and manage uncertainty about how the future will develop. They are based on variations to input variables and parameters that drive supply and demand conditions (for example, population growth, coal and gas prices, etc.). The market benefits of a given development path will change across different scenarios,[18] and this allows AEMO to understand the impacts of key uncertainties on each development path.

In developing scenarios, AEMO *must consider*:

- The key inputs identified in section 3.2.1 and major sectoral uncertainties affecting the costs, benefits and need for investment in the NEM, when selecting the input variables and parameters that form part of each scenario.
- Taking the most probable value(s) for each input variable and/or parameter that forms part of the most likely scenario.[19]
- Taking a balanced approach to risk in varying input variables and/or parameters to create reasonable scenarios around the most likely scenario. That is, AEMO should consider risks associated with under- or overdue investment and over- or premature investment, consistent with clause 5.22.5(e)(1) of the NER.

[17] If load shedding occurs, then AEMO directs networks to reduce load by turning power off in some areas to maintain balance in the system. It is called rotational load shedding because the outages for consumers are typically kept to about 60 minutes with load shedding rotated between suburbs and regions, based on a priority list by each jurisdiction.

[18] The direct costs of building projects in a development path are assumed to be independent of scenarios.

[19] So long as they together provide an internally consistent and plausible scenario.

- Presenting information on the key input variables it is varying to form each scenario, including (for each key input variable) the value(s) chosen for each scenario and how this compares to the underlying range of possible values.
- Using internally consistent input variables and parameters for each scenario, such that each scenario represents a plausible market environment.

Where the scenarios all have an equal likelihood AEMO *is required to* identify one scenario as the most likely scenario for the purposes of clause 5.22.5(e)(3) of the NER.

Subject to the requirement and considerations set out above, AEMO has flexibility in its development of scenarios, consistent with NER clause 5.22.5(e)(2). We recommend AEMO consider the following *discretionary* principles for developing reasonable scenarios, in that they should:

- Satisfy the objective for AEMO to explore the impact of major uncertainties affecting the costs, benefits and need for investments in an optimal development path. To achieve this objective, it would be valuable to consult with stakeholders in developing a purpose for each scenario. For instance, a 'high distributed energy resource' scenario might explore how a highly distributed grid would affect the costs, benefits and need for investments in an optimal development path.
- Represent a reasonable range of plausible future market environments. This is where a reasonable range should be informed by stakeholder consultation and should be stretching so as to cover a range of uncertainties, but without being skewed by unrealistic events.
- Consist of inputs that are exogenous to the development paths but relevant to investment decision making. That is, the set of input variables used to construct a scenario should not be influenced by a given development path. However, they should be relevant to investment decision making, such that they influence the market benefits of a given development path. For example, the market benefits of a given development path will be different in a fast growth scenario from a slow growth scenario.

Example 1 illustrates three scenarios based on variations to hypothetical input variables that drive electricity market supply and demand outcomes.

Example 1: Scenarios

Table 1 provides a simple illustrative example of three scenarios (slow growth, moderate growth and fast growth) based on variations to hypothetical input variables that drive electricity market supply and demand outcomes. We note that this is a stylised example, and is not designed to be realistic.

In developing the scenarios, AEMO would consider:

- Key input variables that drive electricity demand and supply outcomes over the modelling period are economic and population growth (demand) and renewable generation and storage costs (supply).

  The most probable values for these key input variables are moderate economic and population growth from Australian Treasury forecasts, and neutral forecasts of renewable generation and storage costs (their expected trajectories under moderate economic and

population growth). These form the most likely moderate growth scenario.

- A major uncertainty affecting the costs, benefits and need for investments in an optimal development path is how renewable generation and storage costs could change over time. This leads to a:
    - Fast growth scenario, which contains the economic conditions consistent with fast reductions to renewable generation and storage costs. That is, high economic and population growth, which drive higher production, competition and demand.
    - Slow growth scenario, which contains the economic conditions consistent with slow or no reductions to renewable generation and storage costs (low economic and population growth).

Table 1 Example of scenarios

Scenario	Economic and population growth (demand driver)	Renewable generation and storage costs (supply driver)
Slow growth	Low	Slow change
Moderate growth (most likely scenario)	Moderate	Neutral (expected) change
Fast growth	High	Fast change

Source: AER analysis (illustrative, hypothetical example only).

3.3 CBA methodology

Under clause 5.22.8(d) of the NER, AEMO must publish an ISP methodology for consultation, prior to the draft ISP.[20] This sets out the CBA and modelling methodology that AEMO will use in preparing an ISP.

Under clause 5.22.8(d) of the NER, AEMO's ISP methodology must be consistent with the CBA guidelines, which set out requirements, considerations and discretionary elements for key CBA steps. Under this clause, AEMO must also develop, consult and publish the ISP methodology in accordance with the forecasting best practice guidelines, which focus on process and consultation.

The guidance in this section is structured according to following key CBA steps:

1. Identify a set of development paths to address the power system needs (section 3.3.1).
2. Characterise the counterfactual development path (equivalent to the base case or status quo), under which to compare development paths (section 3.3.2).
3. Quantify the estimated costs of each development path (see section 3.3.3).
4. Identify what classes of market benefits to quantify (see section 3.3.4).

[20] If it is not using an existing ISP methodology.

5. Quantify the estimated market benefits of each development path (see section 3.3.5) by, for each scenario:

   (a) deriving a state of the world with the development path in place and a state of the world with the counterfactual development path in place; and

   (b) comparing the two states of the world in (a) to estimate the market benefit of that development path.

6. Quantify the estimated net economic benefit of each development path in each scenario, identify an optimal development path, and test the results (see section 3.3.6).

The following sections set out requirements, considerations and discretionary elements for each key CBA step.

3.3.1 Selecting development paths

Development paths are the different options AEMO assesses in the ISP CBA, in order to select an optimal development path to take forward.

Under clause 5.22.5(d)(4)(ii) of the NER, the CBA guidelines must describe the objective AEMO should seek to achieve when selecting a set of development paths for assessment. The set of development paths chosen for assessment should reflect a representative sample of the full range of possible transmission investment combinations—as these can differ in location, timing, size and form (for example, non-network option substitutes/hybrids). The guidance in this section promotes this objective. It provides:

- discretionary information on how development paths are defined for the ISP CBA
- requirements for AEMO's process of selecting development paths
- requirements and considerations for AEMO's characterisation of development paths.

Development paths for the purposes of an ISP CBA

This section contains *discretionary* information.

Development paths are defined in clause 5.10.2 of the NER as a set of (investment) projects in an ISP that together address power system needs. For the ISP CBA, these are the core projects that are being tested. These core projects influence how the market, or power system, develops to address the power system needs. The development of the power system in response to the core projects become part of their market benefits. For example, a generation project that is forecast to connect to a transmission project can form part of the transmission project's market benefits.

For the ISP CBA, only projects that may become ISP projects should be included in a development path.[21] AEMO can choose which of these projects to include in a given development path, but we would expect projects that may become actionable ISP projects to

[21] An ISP project is an actionable ISP project, future ISP project or ISP development opportunity. These labels are formally applied to an optimal development path, which is why we use the terminology 'may become'. Hereafter, we will say 'ISP projects' rather than 'projects that may become ISP projects' for simplicity.

be included. The projects in each development path need to be held fixed throughout the CBA process.

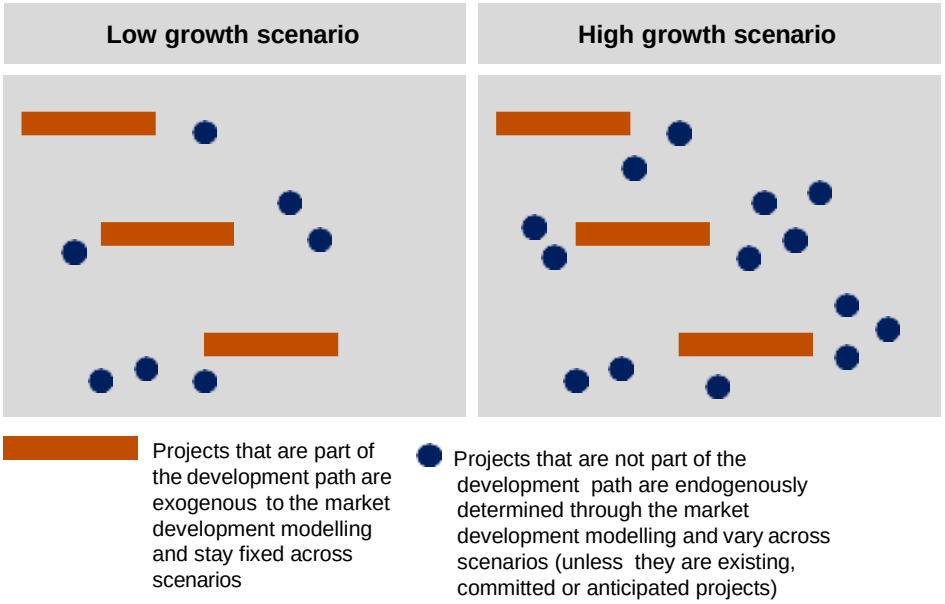
AEMO can also include in a development path, ISP projects identified as actionable in a previous ISP and which have not yet been committed. Because it is important to retain flexibility in the ISP to respond to changing market conditions, AEMO should be able to test whether these projects are still justified. A project identified as actionable in one ISP may not be identified as actionable in a subsequent ISP if it is no longer justified.

All projects outside those selected by AEMO for the development paths are part of the ISP market development modelling to value market benefits (see section 3.3.5). This includes existing assets, and committed / anticipated projects not considered above. It also includes modelled projects, which vary in their development according to which development path or scenario is being modelled. Committed, anticipated and modelled projects are defined in the RIT–T instrument.[22]

For clarity, this means AEMO can include projects that may become actionable ISP projects in its development paths (which are then held fixed throughout the CBA), and can include projects that may become future ISP projects as modelled projects (which will then vary across scenarios in the CBA). In this case, when AEMO selects an optimal development path, the fixed projects become classified as actionable ISP projects, and AEMO can choose which modelled projects to classify as future ISP projects in different scenarios.

Figure 3 illustrates the distinction between projects in a development path and projects that are part of the market development modelling, using two scenarios from example 1.

Figure 3: Illustration of projects in a development path



Source: AER analysis.

22 AER, *Regulatory investment test for transmission (RIT–T)*, August 2020, p. 13 (Glossary). Also see the glossary in appendix B of these CBA guidelines.

Process for selecting development paths

In preparing an ISP, AEMO identifies development paths for CBA differently to how RIT–T proponents identify credible options in applying the RIT–T. In particular, it applies the following steps in selecting development paths:

1. step one—enters a range of network and non-network investment options into its model
2. step two—co-optimises across these options to identify the least cost set of investments to meet peak demand and power system needs in each scenario
3. step three—identifies candidate development paths based on combinations of common transmission investments from step two above, and then re-running the generation and other non-network investments that flow from the transmission investments.

In its process for selecting development paths, AEMO *is required* to:

- In step one, include information from transmission annual planning reports (TAPRs) on all proposed augmentations to the network and proposed replacements of network assets, including the proposed solution and other reasonable network options and non-network options.[23]
- Also in step one, include all committed and anticipated projects, and credible generation (and other non-network) projects that are proposed but not sufficiently progressed to be classified as anticipated.
- In step three, select development paths that include variations in timing and level of transmission (or non-network option substitute/hybrid) investment. To include variations in level of transmission investment, AEMO must select at least one development path (in addition to the counterfactual development path) that excludes one or more projects from the combination of common transmission investments.

Characterisation of development paths

In selecting development paths, AEMO is *required to*:

- select development paths that contain commercially and technically feasible ISP projects, in accordance with the guidance set out in section 4.3.1
- list the ISP projects in each selected development path.

An ISP project must be commercially and technically feasible to be considered as a credible option in applying the RIT–T under clause 5.15.2(a)(2) of the NER. AEMO can seek information about the commercial and technical feasibility of the ISP projects in its development paths from the project proponents. AEMO can engage with the proponents directly to be satisfied of each ISP project's commercial and technical feasibility, or it can satisfy itself by seeking comments on commercial and technical feasibility in a draft ISP. For further guidance on commercial and technical feasibility, see section 4.3.1.

In selecting development paths, AEMO *must have regard* to:

[23] See NER, clause 5.12.2(c)(5). Also see clause NER, clause 5.14.4(a)(3), which references non-network options in the joint planning process.

- including non-network option substitutes or hybrids to a transmission network ISP project in one or more development paths, where appropriate;
- including staged projects in one or more development paths, where appropriate, such that it can assess option value (see section 3.4.2); and
- re-testing all ISP projects identified as actionable in a previous ISP, and which have not yet had costs approved in a contingent project process.

Example 2 illustrates three hypothetical development paths.

Example 2: Development paths

Table 2 provides a simple illustrative example of three development paths (DP 1, DP 2 and DP 3) based on different combinations of ISP projects.

This example takes a small subset of the very wide range of possible combinations of ISP projects. With four ISP projects A, B, C and D, there are 24 (that is, four factorial = 4 x 3 x 2 x 1) possible combinations, more if staged and non-network options are also considered.
This demonstrates the importance of representative sampling. It also demonstrates the usefulness of AEMO's three step process for selecting development paths in filtering through the range of options, and the importance of exploring the boundaries of that process (through development paths with different levels of overall investment, timing, staging and non-network options).

Table 2 Example of development paths

Development path 1 (DP 1)	Development path 2 (DP 2)	Development path 3 (DP 3)
Project A	Project A (deferred)	Project A
Project B	Project B	Project C (staged)
Project C	Project D (NNO)	

Source: AER analysis (illustrative, hypothetical example only). NNO means non-network option.

3.3.2 Defining the counterfactual development path

The counterfactual development path is the status quo or base case that AEMO uses to compare development paths in the ISP CBA. Specifically, AEMO estimates the market benefits of each development path by comparing it to the counterfactual development path, in each scenario. This is because only costs and benefits that would not have occurred in the base case should be included in a CBA.

Under clause 5.22.5(d)(4)(i) of the NER, the CBA guidelines must describe the objective AEMO should seek to achieve when developing the counterfactual development path. The counterfactual development path should result in the least cost set of investments to meet power system needs in each scenario, where no ISP projects in AEMO's selected development paths are built. The guidance in this section promotes this objective.

AEMO *is required* to:

- develop a single counterfactual development path; and
- not include in the counterfactual development path, any ISP projects in its selected development paths (see section 3.3.1) or any projects that may become future ISP projects.

In section 3.3.5, we provide guidance on valuing market benefits. This uses market development modelling that accounts for the 'business as usual' transmission investment (such as small intra-regional augmentation and replacement expenditure projects) forecast to occur with the counterfactual development path in place.

3.3.3 Valuing costs

Costs are the present value of the estimated direct costs of building the ISP projects in a development path.

Under clause 5.22.10(d) of the NER, AEMO must quantify the following classes of costs in preparing an ISP:

- costs incurred in constructing or providing the projects in the development path;
- operating and maintenance costs in respect of the projects in the development path;
- the cost of complying with laws, regulations and applicable administrative requirements in relation to the construction and operation of the projects in the development path; and
- any other class of costs specified in the CBA guidelines; or that AEMO determines to be relevant and the AER agrees in writing before AEMO publishes the draft ISP.

In estimating classes of costs, AEMO *is required* to:

- Not factor qualitative cost considerations into the CBA—that is, all relevant costs must be quantified.
- Not double count any costs across ISP projects in a development path.
- Check its cost estimates against recent contingent project applications, recent tender outcomes governing transmission network augmentations and/or final project outcomes (including variations).[24]
- Not include in any analysis under the ISP, any cost which cannot be measured as a cost to generators, distribution network service providers (DNSPs), TNSPs and consumers of electricity.
- If AEMO establishes there is a material degree of uncertainty in the costs of an ISP project, the cost is the probability weighted present value of the direct costs of the ISP project under a range of different cost assumptions.[25]

[24] We note that if any of this information is confidential, AEMO may not be able to publish the full details of these checks.

[25] For guidance on how to undertake this, see section 4.3.4; and AER, Application guidelines: Regulatory investment test for transmission (RIT–T), August 2020, section 3.9.2. For the avoidance of doubt, the term 'cost assumptions' is distinct from the terms reasonable or relevant scenarios used elsewhere in the CBA guidelines (see section 4.3.4).

- For each development path, present:
    - the key cost items in each class of costs, including the estimated capital cost of each ISP project in each development path (and its source(s));
    - a cost timeline (that is, the stream of annual cost cash flows) for the ISP projects in the development path over their economic lives;
    - the present value of total costs, any cash flow conversion calculations, and any assumptions implicitly or explicitly made about costs beyond the modelling period (equivalent to terminal value, where a project's asset life is longer than the modelling period); and
    - an explanation and justification of the rationale for its approach to calculating the present value of total costs, including for any assumptions.

In estimating classes of costs, AEMO *must consider*:

- the cost allocation principles described under clause 6A.19.2 of the NER if/when allocating costs between electricity and other markets.

Subject to the requirements and considerations set out in this section, AEMO has flexibility in how it values classes of costs. We recommend AEMO consider the following *discretionary* guidance to promote accuracy of cost estimates:

- work with the TNSPs and/or non-network proponents to identify and value the classes of costs in clause 5.22.10(d) of the NER as accurately as possible
- present its methodologies for valuing costs.

Example 3 illustrates hypothetical direct costs associated with the three development paths set out in example 2.

Example 3: Costs

Table 3 provides a simple illustrative example of the hypothetical direct costs of three development paths (DP 1, DP 2 and DP 3). It shows the present value of total costs, as the sum of each class of costs under clause 5.22.10(d) of the NER (that is, construction costs, operation and maintenance costs, and relevant legal compliance costs).

Table 3 Example of estimates of total costs (present value)

Costs	DP 1 ($, mil)	DP 2 ($, mil)	DP 3 ($, mil)
Capital costs	1,890	1,412	935
Operating and maintenance costs	100	80	60
Relevant legal compliance costs	10	8	5
Total costs	2,000	1,500	1,000

Source: AER analysis (illustrative, hypothetical example only).

The cost of complying with laws, regulations and applicable administrative requirements

AEMO *is required* to exclude from its analysis, the costs (or negative benefits) of an ISP project's harm to the environment or to any party that is not prohibited under a law, regulation or other legal instrument.

To the extent that market participants in the NEM may need to, in a particular scenario, pay a tax, levy or other payment (however called) for non-compliance with a government environmental or social scheme (such as a renewable energy target), the ISP will capture this in a development path's market benefits, rather than in its costs. This is because it is a negative market benefit, not a direct cost of building an asset.

The treatment of land

Given that the cost of land may be a cost incurred in constructing or providing an ISP project, the value of land should be included as part of the ISP CBA. Because the CBA assessment is based on the present values of estimated costs and market benefits, in estimating classes of costs AEMO *must have regard* to:

- the market value of land when assessing the costs incurred in constructing or providing an ISP project; and
- the market value of land in ISP projects that explore building on a previously acquired easement (that is, land should not be treated as a sunk cost to the extent that it can otherwise be sold).

Additional classes of costs

Under clause 5.22.10(d)(4) of the NER, AEMO can quantify any other class of costs that it has determined to be relevant and that the AER has agreed to in writing before AEMO publishes the draft ISP; or is specified as a class of cost in the CBA guidelines.

When determining whether to approve a new class of cost, we will likely consider, at minimum, whether the proposed cost:

- Should already be reflected in another class of cost. If it is effectively a component of a pre-existing class of costs, there is no need to introduce a new class.
- Is more appropriately considered under a market benefit class, as many market benefits are valued in terms of avoided costs.
- Falls outside the scope of the market, in which case it should not be included in the CBA.

3.3.4 Market benefit classes

Market benefits are the present value of the estimated economic benefits from the ISP projects in a development path to those who consume, produce and transport electricity in the market. The total market benefit of a development path includes the change in:

- consumer surplus, being the difference between what consumers are willing to pay for electricity and the price they are required to pay

- producer surplus, being the difference between what electricity producers and transporters are paid for their services and the cost of providing those services (excluding the costs of the ISP projects in the development path).

Under clause 5.22.10(c)(1) of the NER, AEMO must, in preparing an ISP, consider the following classes of market benefits that could be delivered by the development path:

- changes in fuel consumption arising through different patterns of generation dispatch;
- changes in voluntary load curtailment;
- changes in involuntary load shedding, with the market benefit to be considered using a reasonable forecast of the value of electricity to consumers (see 'Value of customer reliability' in section 3.2.1);
- changes in costs for parties due to differences in the timing of new plant; differences in capital costs; and differences in the operating and maintenance costs;
- differences in the timing of expenditure;
- changes in network losses;
- changes in ancillary services costs;
- competition benefits;
- any additional option value (where this value has not already been included in the other classes of market benefits) gained or foregone from implementing that development path with respect to the likely future investment needs of the market (see section 3.4.2); and
- other classes of market benefits that are specified in the CBA guidelines; or that AEMO determines to be relevant and the AER agrees in writing before AEMO publishes the draft ISP.

Under clause 5.22.10(c)(3) of the NER, AEMO must take all the above classes of market benefits as material unless it can provide reasons why:

- a particular class of market benefit is likely not to materially affect the outcome of the assessment of the development path; or
- the estimated cost of undertaking the analysis to quantify the market benefit is likely to be disproportionate given the level of uncertainty regarding future outcomes.

AEMO *is required* to exclude from market benefits:

- the transfer of surplus between consumers and producers;
- classes of costs set out in clause 5.22.10(d) of the NER;
- competition benefits or any additional option value where they have already been accounted for in other elements of the market benefit; and
- any market benefit which cannot be measured as a benefit to generators, DNSPs, TNSPs and consumers of electricity.

The transfer of surplus between consumers and producers includes market price impacts. Market prices can be used to value or monetise a market benefit class, or in considering

distributional effects. However, market price impacts of themselves should not be considered as (positive or negative) market benefits, as these are wealth transfers between consumers and producers. Explanatory box 1 shows how this applies to competition benefits.

Explanatory box 1: Competition benefits and bidding behaviour

Valuing competition benefits entails modelling the likely impact of a development path on the bidding behaviour of generators (and other market participants) who may have a degree of market power relative to the counterfactual development path.

However, not all changes in bidding behaviour may count as competition benefits. Where changes in bidding behaviour result in lower cost generation displacing higher cost generation, this **may** be counted as a competition benefit. Where changes in bidding behaviour do not affect the generation that is dispatched, this **may not** be counted as a competition benefit. This will be the case even if the bidding behaviour results in changes in wholesale prices. Changes in prices that do not affect the generation that is dispatched are wealth transfers (transfer of surplus) between producers and consumers, and so must be excluded from market benefit calculations.

Additional classes of market benefits

Under clause 5.22.10(c)(1)(x) of the NER, AEMO can quantify other classes of market benefit that it has determined to be relevant and that the AER has agreed to in writing before AEMO publishes the draft ISP; or are specified as a class of market benefit in the CBA guidelines.

When determining whether to approve a new class of market benefit, we will likely consider, at minimum, whether the proposed benefit:

- Should already be reflected in another class of market benefit. If it is effectively a component of a pre-existing class of benefits, there is no need to introduce a new class.
- Falls outside the scope of the market, in which case it should not be included in the CBA.

3.3.5 Valuing market benefits

Under clause 5.22.10(c)(2) of the NER, AEMO must include a quantification of all classes of market benefits which are determined to be material to the optimal development path in AEMO's reasonable opinion.

AEMO *is required* to assess the market benefits with the development path against the market benefits with the counterfactual development path. This involves, for each development path:

1. deriving the state of the world with the development path in place in each scenario, and the state of the world with the counterfactual development path in place in each scenario;
2. estimating market benefits by comparing, for each scenario, the state of the world with the development path in place against the state of the world with the counterfactual development path in place; and

3. quantifying estimated values for any market benefit classes that are not captured by the market modelling comparison (if any).

This comparison may reveal that a development path results in both positive and negative effects on the market. The calculation will therefore reflect a netting-off process, that accounts for the positive and negative effects of a development path in the market across all the relevant classes of market benefits. This process may result in a development path having a positive or negative total market benefit.

In estimating classes of market benefits, AEMO *is required* to:

- Not factor qualitative market benefits into the CBA—that is, all relevant and material market benefits must be quantified.
- Not double count any market benefits across ISP projects in a development path.
- For each development path, present:
    - the breakdown of total market benefits over the modelling period by market benefit class—in present value terms;
    - a market benefits timeline (that is, the stream of annual market benefit cash flows) for the ISP projects in the development path over their economic lives;
    - the present value of total market benefits, any cash flow conversion calculations, and any assumptions implicitly or explicitly made about market benefits beyond the modelling period (equivalent to terminal value, where a project's asset life is longer than the modelling period); and
    - an explanation and justification of the rationale for its approach to calculating the present value of total market benefits, including for any assumptions.

In estimating classes of market benefits, AEMO *must consider*:

- the cost allocation principles described under clause 6A.19.2 of the NER if/when allocating market benefits between electricity and other markets;
- including all existing assets in all states of the world[26] (until their expected retirement)—unless AEMO has evidence to suggest a project(s) should not be included in the market development modelling;
- including all committed and anticipated projects outside its selected development paths in all states of the world[27] (until their expected retirement)—unless AEMO has evidence to suggest a project(s) should not be included in the market development modelling; and
- presenting the modelled projects that flow from the ISP projects in each development path in each scenario.

[26] That is, in the states of the world with the development path in place in each scenario, and the state of the world with the counterfactual development path in place in each scenario.

[27] That is, in the states of the world with the development path in place in each scenario, and the state of the world with the counterfactual development path in place in each scenario.

Subject to the requirements and considerations set out above, AEMO has flexibility in how it values classes of market benefits. We recommend AEMO consider the following *discretionary* guidance to promote transparency:

- present its methodology(ies) for valuing each material class of market benefit.

The sections below provide additional *discretionary* guidance to describe the binding three step process above in more detail.

Step one: Deriving states of the world in each scenario

A state of the world is a detailed description of all of the relevant market supply and demand characteristics and conditions likely to prevail to meet the power system needs if a development path proceeds in a given scenario. This includes generation, network and load development and operation. A state of the world should be internally consistent in that all aspects of the state of the world could reasonably coexist within a given scenario.

A state of the world is different to a scenario—the state of the world contains the market supply and demand outcomes driven by the scenario; and the scenario contains the external environment and supply/ demand drivers. Any variation to a development path or scenario will change the state of the world. Together, a state of the world, development path and scenario should provide a complete and internally consistent picture of the power system.

For each development path (including the counterfactual), AEMO will use market development modelling to derive a state of the world with the development path in place, for each scenario.[28] This allows AEMO to then derive the market benefits of each development path by comparing the state of the world with it in place against the state of the world with the counterfactual in place, for each scenario.

Example 4 shows what simplified states of the world could look like with the three development paths in example 2 in place across the three scenarios in example 1.

Example 4: States of the world

Table 4 provides a stylised example of hypothetical states of the world with the three development paths from example 2 in place (DP 1, DP 2 and DP 3) under the three scenarios from example 1 (slow growth, moderate growth and fast growth). These would be derived from market development modelling. For simplicity, this example only considers load[29], generation and network; and only considers the load component of each scenario. This shows how states of the world can vary with development paths and scenarios.

[28] The difference between the ISP and RIT–T in deriving states of the world, is that in the ISP, there is a set of ISP projects in a development path which are fixed across scenarios. Whereas RIT–T applications assess single projects that are fixed across scenarios.

[29] Similar in concept to demand.

Table 4 Stylised example of states of the world

	DP 1	DP 2	DP 3	Counterfactual
Slow growth scenario	**State of world 1** Low load DP 1 projects Lowest cost generation and extra network* to meet low load with DP 1 in place	**State of world 2** Low load DP 2 projects Lowest cost generation and extra network to meet low load with DP 2 in place	**State of world 3** Low load DP 3 projects Lowest cost generation and extra network to meet low load with DP 3 in place	**State of world 4** Low load Lowest cost generation and BAU network to meet low load
Moderate growth scenario	**State of world 5** Moderate load DP 1 projects Lowest cost generation and extra network to meet moderate load with DP 1 in place	**State of world 6** Moderate load DP 2 projects Lowest cost generation and extra network to meet moderate load with DP 2 in place	**State of world 7** Moderate load DP 3 projects Lowest cost generation and extra network to meet moderate load with DP 3 in place	**State of world 8** Moderate load Lowest cost generation and BAU network to meet moderate load
Fast growth scenario	**State of world 9** High load DP 1 projects Lowest cost generation and extra network to meet high load with DP 1 in place	**State of world 10** High load DP 2 projects Lowest cost generation and extra network to meet high load with DP 2 in place	**State of world 11** High load DP 3 projects Lowest cost generation and extra network to meet high load with DP 3 in place	**State of world 12** High load Lowest cost generation and BAU network to meet high load

Source: AER analysis (illustrative, hypothetical example only). *Extra network means modelled network projects outside the projects in the development path—and can include replacement or augmentation projects.

Table 4 is a highly stylised and simplified example given the complexity of the power system. However, it can still be used to illustrate how states of the world are used to value the market benefits of a given development path. Taking the slow growth scenario to demonstrate, hypothetical insights can be drawn from states of the world as follows:

- DP 1 has the highest level of network investment. As such, there may be less generation utilising lower cost fuel in more disparate locations, and very little additional network, in state of the world 1. This may increase network losses.
- DP 3 has the lowest level of network investment. As such, there may be more expensive generation located closer to load centres, or more additional network, in state of the world 3. This may decrease network losses.

These points show how states of the world in the slow growth scenario with DP 1 and DP 3 in place (compared to the state of the world with the counterfactual) may affect market benefit classes, such as changes in network losses and changes in fuel consumption arising through different patterns of generation dispatch. Similar insights can be drawn for other states of the world in Table 4.

States of the world capture the existing stock of assets and the future evolution of and investment in generation, network and load outside of the ISP projects in AEMO's selected development paths. As such, AEMO should use and/or derive appropriate:[30]

- existing assets—all assets that exist during the preparation of an ISP should form part of all relevant states of the world (until their expected retirement)[31]
- committed projects—these should form part of all states of the world (until their expected retirement), consistent with the treatment of existing assets
- anticipated projects—these are generally expected to form part of all states of the world (until their expected retirement), but there may be reasons why it is not appropriate to include an anticipated project in a given state of the world because they are not guaranteed to become committed
- modelled projects—appropriate market development modelling determines which modelled projects to include in a given state of the world (until their modelled retirement).

There may be a valid reason for AEMO not to include an existing asset or committed/ anticipated project in any state of the world, and it can do so provided it presents corresponding rationale and/or evidence. For example, there may be an asset/project that is inefficient and consequently distorting the market development modelling results. Further, if any committed or anticipated project is subsequently deferred or cancelled, AEMO should update this information as soon as practicable.

[30] Committed, anticipated and modelled projects are defined consistently with the RIT–T. See AER, *RIT–T*, August 2020, p. 13 (Glossary). Also see the glossary in appendix B of the CBA guidelines.
[31] An asset may not form part of a state of the world in a later year if it is retired.

Step two: Estimating market benefits

Estimating the market benefits of a development path in a given scenario entails comparing the state of the world with the development path in place to the state of the world with the counterfactual development path in place. This is applied across all scenarios, and is illustrated in Example 5.

We note that when using this approach to value market benefits, most market benefits are valued as avoided costs. This means the terminology of costs and benefits can become confusing. For example, valuing changes in involuntary load shedding associated with a given development path involves (for a given scenario):

1. costing the impact of involuntary load shedding in the state of the world with the development path in place
2. costing the impact of involuntary load shedding in the state of the world with the counterfactual development path in place
3. subtracting step one from step two.

Example 5: Market benefits

Following from example 4, AEMO would derive the market benefits of each development path by comparing:

- state of the world (1), (2) and (3) against state of the world (4)
- state of the world (5), (6) and (7) against state of the world (8)
- state of the world (9), (10) and (11) against state of the world (12).

This yields the hypothetical market benefits of DP 1, DP 2 and DP 3 in each of the three scenarios, illustrated in Table 5 which shows the present value of total market benefits.

Table 5 Example of estimates of total market benefits (present value)

Scenario	DP 1 ($, mil)	DP 2 ($, mil)	DP 3 ($, mil)
Slow growth	1,980	1,580	1,220
Moderate growth	2,180	1,720	1,195
Fast growth	2,125	1,480	950

Source: AER analysis (illustrative, hypothetical example only)

Step three: Additional market benefits (if any)

If the market modelling of states of the world do not capture all material market benefit classes, then these should be separately estimated.

For example, if AEMO's market modelling only compares the resource cost impacts of states of the world with different development paths in place, it may not capture market benefits associated with, say, changes in network losses or competition benefits.

Appendix A of the RIT–T application guidelines for non-ISP projects sets out example methodologies for valuing each class of market benefit.[32]

3.3.6 Selecting an optimal development path

After valuing the costs and market benefits of each development path in each scenario, AEMO will use this information to select an optimal development path.

Under clause 5.22.5(d)(5) of the NER, the CBA guidelines must describe the framework for AEMO to select the optimal development path, including the assessment of the costs and benefits of various development paths across different scenarios.

In selecting an optimal development path, AEMO *is required* to follow this framework:

1. Conduct scenario analysis to present a table with the net economic benefit of each development path in each scenario. The net economic benefit of a development path is its market benefit (section 3.3.5) less costs (section 3.3.3).
2. Rank the development paths on the basis of:
   (a) A risk neutral decision making approach. Under a risk neutral approach the ranking must be based on the weighted average net economic benefit of each development path, with weights determined according to the likelihood of each scenario occurring.
   (b) Where relevant, one or more alternative decision making approaches set out in AEMO's ISP methodology.[33]
3. Use professional judgement in balancing the outcomes of the above decision making approaches to select an optimal development path that has a positive net economic benefit in the most likely scenario—and explaining:
   - why the choice optimises the net economic benefit to all those who produce, consume and transport electricity in the market;
   - the potential 'cost' associated with a risk averse choice (if taken); and
   - why the level of risk neutrality or risk aversion chosen is a reasonable reflection of consumers' level of risk neutrality or risk aversion.
4. Undertake sensitivity testing and/or cross checks and explain the significance of these for the optimal development path; and present information on key distributional effects.[34]

[32] AER, Application guidelines: RIT–T, August 2020, appendix A.

[33] If AEMO chooses to rely solely on a risk neutral decision making approach, then this sub-step is unnecessary because there are no other decision making approaches.

[34] These concepts are explained further in Explanatory box 2.

Once AEMO has selected an optimal development path, it will decide which projects to classify as actionable ISP projects, future ISP projects and ISP development opportunities.[35]

Subject to complying with the requirements set out above, AEMO has flexibility in selecting an optimal development path, consistent with NER clause 5.22.5(e)(2). The sections below provide *discretionary* information to explain each step of the above binding framework.

Step one: Scenario analysis

In this context, the use of scenario analysis to assess development paths entails:

- developing a range of different scenarios (see section 3.2.2)
- exploring how each development path has different market benefits across the scenarios, because of different forecast supply and demand outcomes (states of the world).

Through this, AEMO gains a comprehensive understanding of what states of the world could arise with and without each development path in place under different sets of external circumstances. Scenario analysis is one way to assess the risk or uncertainty of a given development path, focussing on risk or uncertainty associated with an unknown future market environment.[36] Scenario analysis results in a table that sets out the net economic benefit of each development path in each scenario (see example 6). This assists stakeholders to interpret the CBA results, understand the risk and uncertainty of different development paths, and replicate AEMO's decision making approaches in step two (below).

[35] NER, clause 5.22.6(a)(5).

[36] This is consistent with NER, clause 5.22.5(d)(2).

Example 6: Scenario analysis

Table 6 provides a simple illustrative example of how net economic benefits can be presented and interpreted across development paths and scenarios. This subtracts the costs of three development paths in example 3 from the market benefits of those development paths across three scenarios in Example 5. In this example, the moderate growth scenario is the most likely scenario.

Table 6 Example of scenario analysis results (present value of net economic benefit)

Scenario	DP 1 ($, mil)	DP 2 ($, mil)	DP 3 ($, mil)
Slow growth	-20	80	220
Moderate growth (most likely scenario)	180	220	195
Fast growth	125	-20	-50

Source: AER analysis (illustrative, hypothetical example only).

Table 6 shows all development paths have a positive net economic benefit in the most likely scenario. Table 6 also shows that DP 1 appears to perform well in the fast growth scenario, but performs poorly in the slow growth scenario. However, DP 2 and DP 3 are the reverse. This indicates DP 1 may result in greater risk of asset underutilisation or stranding (that is, over-investment) if the future looks more like the slow growth scenario, but DP 2 and DP 3 may result in greater risk of network constraints (that is, under-investment) if the future looks more like the fast growth scenario.

Step two: Ranking development paths

Once AEMO has performed its scenario analysis, it will rank development paths using a risk neutral decision making approach.

Then AEMO may apply other decision making approaches. These should have been identified in its ISP methodology and may include a risk averse decision making approach(es). Under a risk averse approach, the ranking may be different.

If the future were known, development paths could easily be ranked from the development path with the highest net economic benefit (the optimal development path) to the development path with the lowest net economic benefit. However, investment decisions are subject to uncertainty and risk. The actual net economic benefit of each development path is not known ex-ante.

Given this, decision makers can estimate the net economic benefit of each development path across a range of possible future scenarios (see 'Step one: scenario analysis'), and then apply a range of different decision making approaches to evaluate and rank them. These decision making approaches differ (in part) based on their treatment of risk, which can evaluate development paths on a risk neutral, risk averse or risk taking basis. Evaluating projects on a risk neutral basis is the standard approach used in most policy contexts, but a

risk averse basis can be appropriate when the risks are concentrated on a particular group or are large even when shared/spread across a large population.[37]

Risk neutral and risk averse decision making approaches both account for risk. However:[38]

- A risk neutral decision making approach ranks development paths based on their expected value. This means weighting the net economic benefit in each scenario based on likelihood of the scenario occurring, which could be absolute or relative to the other scenarios. As such, a risk neutral decision making approach prioritises transmission investment risks based on their likelihood, with judgement used to assess likelihoods.
- A risk averse decision making approach does not rank development paths based on their expected value. Rather, it (implicitly or explicitly) weights the net economic benefit in each scenario to reduce variability or the risk of a negative outcome occurring. This is because it places a higher value on reducing the risk of a negative outcome occurring than the likelihood of its occurrence. As such, a risk averse decision making approach uses judgement on risk tolerances to prioritise transmission investment risks. We note there are a number of different risk averse decision making approaches that can be applied, and some do not apply explicit weights to scenarios.

Example 7 illustrates how a risk neutral decision making approach, and one type of risk averse decision making approach, can be used to rank development paths.

Example 7: Risk neutral and risk averse decision making approaches

Table 7 and Table 8 provide an illustrative example of how a risk neutral decision making approach and one type of risk averse decision making approach, respectively, could be used to rank development paths. This example follows from example 6, focussing on three development paths (DP 1, DP 2, DP 3) under three scenarios (slow growth, moderate growth, fast growth).

First we apply a risk neutral decision making approach. In this example, the risk neutral approach weights each net economic benefit in Table 6 according to the relative likelihood of each scenario occurring. The weights used should generally sum to one. We assign the following hypothetical weights to each scenario, noting AEMO would be expected to provide more detailed rationale for its assessment of the (relative or absolute) likelihood of each scenario and choice of corresponding weights:

- slow growth scenario: least likely scenario—weight = 15 per cent
- moderate growth scenario: most likely scenario—weight = 50 per cent
- fast growth scenario: more likely than slow growth—weight = 35 per cent.

Once the weights are assigned, the weighted average net economic benefit of each development path is calculated. For a given development path, this is done by multiplying the weight for each scenario by the net economic benefit under that scenario (for example, 15% x -$20m for DP 1 in the slow growth scenario), and then adding these together. For example, [15% x -$20m] + [50% x $180m] + [35% x $125m] for DP 1.

Table 7 shows that under this approach, DP 1 has the highest weighted average net

[37] Brattle Group, *High-impact, low-probability events and the framework for reliability in the NEM*, February 2019, p. iv; Commonwealth of Australia, *Handbook of Cost Benefit Analysis*, January 2006, pp. 70-72.
[38] Commonwealth of Australia, *Handbook of Cost Benefit Analysis*, January 2006, pp. 70-72.

economic benefit, and so is ranked first. DP 2 is second and DP 3 is a close third.

Table 7 Example of risk neutral approach results

	DP 1 ($, mil)	DP 2 ($, mil)	DP 3 ($, mil)
Weighted average net economic benefit	130.8	115	113
Ranking	1	2	3

Source: AER analysis (illustrative, hypothetical example only).

Second we apply one type of risk averse decision making approach, noting there are several different risk averse decision making approaches that can be applied, and not all of them apply explicit weights to the net economic benefits in each scenario. AEMO does not have to apply the same risk averse decision making approach used in this illustrative example.

In this example, the risk averse approach seeks to mitigate the risk of the lowest net economic benefit occurring, which is -$50 million when DP 3 is chosen under the fast growth scenario in Table 6. As such, this approach assigns the fast growth scenario with a higher weight than its likelihood of occurrence. We assign the following hypothetical weights to each scenario, again noting AEMO would be expected to provide more detailed rationale for its approach:

- slow growth scenario—weight = 20 per cent
- moderate growth scenario—weight = 20 per cent
- fast growth scenario—weight = 60 per cent (because this scenario contains the risk AEMO seeks to mitigate).

Again, once the weights are assigned, the weighted average net economic benefit of each development path is calculated using the same method shown above. Table 8 shows that under this approach, DP 1 has the highest weighted average net economic benefit, and so is ranked first. DP 3 is second and DP 2 is third.

Table 8 Example of one type of risk averse decision making approach

	DP 1 ($, mil)	DP 2 ($, mil)	DP 3 ($, mil)
Weighted average net economic benefit	107	48	53
Ranking	1	3	2

Source: AER analysis (illustrative, hypothetical example only).

In this example, the risk neutral and risk averse approach result in the same first ranked development path (DP 1), although the remaining rankings differ. However, we note this will not always be the case.

Step three: Selecting an optimal development path

Once AEMO has evaluated and ranked the development paths according to its chosen decision making approach(es), it can use this information and its judgement to select an optimal development path. AEMO has full flexibility in its selection, subject to clause 5.22.5(e)(3) of the NER, which states the optimal development path must have a positive net benefit in the most likely scenario.[39] That is, AEMO can rely fully, partly or not at all on the results from any decision making approach it uses.

However, AEMO will have to justify and explain its choice. This will include explaining:

- Why the optimal development path optimises the net economic benefit to all those who produce, consume and transport electricity in the market. This would involve AEMO justifying its choice relative to other potential choices. It would also involve AEMO explaining how it has balanced the risks of over-investment, under-investment, premature or overdue investment, consistent with clause 5.22.5(e)(1) of the NER—this includes identifying and explaining the specific risk(s) AEMO is prioritising if it chooses a risk averse decision making approach. For clarity, optimising (rather than maximising) net economic benefits reflects that the development path with the highest net economic benefit under a risk neutral approach may not be selected using a risk averse approach.
- The potential 'cost' associated with selecting an optimal development path based on a risk averse decision making approach, if AEMO chooses to do so. This is similar in concept to a risk premium, and allows stakeholders to understand the 'cost' of mitigating particular transmission investment risks. The potential 'cost' of selecting an optimal development path based on a risk averse approach is:[40]
    - The difference in weighted average net economic benefit under the risk neutral decision making approach, of the first ranked development path in the risk neutral decision making approach and AEMO's selected optimal development path.[41]
    - In example 7 above, DP 1 is the first ranked development path under the risk neutral decision making approach. However, say AEMO selected DP 2 as the optimal development path under an alternative risk averse decision making approach. Then, the potential 'cost' of selecting an optimal development path based on the risk averse approach is $15.8 million. We calculated this by subtracting the weighted average net economic benefit of DP 2 ($115 million) from the weighted average net economic benefit of DP 1 ($130.8 million), under the risk neutral decision making approach in Table 7.
- Why the level of risk neutrality or aversion chosen is a reasonable reflection of consumers' level of risk neutrality or aversion. This is important because transmission planning and investment should ultimately promote the National Electricity Objective (NEO), which is centred on the long term interests of electricity consumers. In order to

[39] This is the most likely scenario AEMO identifies in section 3.2.2. This holds even if AEMO's chosen decision making approach(es) weights all scenarios equally.

[40] Commonwealth of Australia, *Handbook of Cost Benefit Analysis*, January 2006, p. 71.

[41] This 'cost', in theory, can be an amount up to the difference in the point above. This is why we use the term 'potential'. To know the exact 'cost' we would need to know the risk-averse decision-maker's certainty equivalent.

understand consumers' level of risk neutrality or aversion, AEMO could, among other things, consult directly with the ISP consumer panel[42] and/or consider submissions on this in its draft ISP.

Step four: Testing the optimal development path

Once AEMO has selected an optimal development path, it will undertake sensitivity testing and/or cross checks (see Explanatory box 2). AEMO may or may not change its choice of optimal development path based on the sensitivity testing and/or cross checks. However, AEMO would need to clearly identify its choice and explain its reasoning for why the optimal development path has changed or remained the same.

AEMO should also present information on key distributional effects, but distributional effects should not influence AEMO's choice of optimal development path (see Explanatory box 2).

AEMO has flexibility over how it undertakes sensitivity testing and how many sensitivities to test. We consider sensitivity testing:

- Should only vary inputs (or underlying assumptions) that are not already varied through scenario analysis. That is, should only vary inputs (or underlying assumptions) that are fixed across scenarios.
- Should test important inputs such as the discount rate and VCR.
- Should test cost estimates against the lower and upper end of their ranges. For example, if the accuracy of cost estimates is assumed to be +/- 30 per cent, then AEMO should test at least to these boundaries.
- Should, in deciding how many sensitivities to test, recognise the risk assessment already undertaken through scenario analysis and the resource cost of additional modelling runs.
- Should consider both sides of transmission investment risk (that is, under-investment/ overdue investment, and over-investment/ premature investment) in selecting inputs to vary. This should include testing how accelerating or deferring select actionable ISP projects affects the net economic benefits of the optimal development path.
- Should present results in an accessible way that supports understanding by stakeholders.
- Should be used to identify the key inputs or assumptions in section 3.2.1.
- Could illustrate 'boundary values' for particular inputs at which the optimal development path changes. AEMO can then discuss the plausibility of that value and evaluate the risk of that development path.
- Could be informed by up-to-date, relevant and comparable international experience of market trends and developments.

AEMO also has flexibility over which cross checks to undertake (if any). However, some examples, largely suggested by stakeholders, include:

[42] See NER, clause 5.22.7.

- Checking each actionable ISP project makes a positive contribution to the net economic benefit of the optimal development path under AEMO's decision making approach. This is important because if an actionable ISP project makes a negative contribution to the net economic benefit of the optimal development path under AEMO's decision making approach, removing that project will increase the overall net economic benefit of the development path. The project would also be unable to satisfy the RIT–T.
- Stakeholder feedback on the feasibility of ISP development opportunities and other modelled projects in the optimal development path (with a focus on market participants who have knowledge of the investment environment).
- Specifying the minimum reduction in net economic benefit for the optimal development path to no longer be optimal.
- High level deliverability assessment of the projects in the optimal development path, which could include the ability of the construction market to absorb the projects within identified timeframes.

AEMO also has flexibility over what information it will present for key distributional effects. We consider the key distributional impacts include how the costs and/or market benefits of the optimal development path (or actionable ISP projects) are distributed across:

- NEM regions
- customer types (for example, residential and business)
- participants in the market (e.g. producers, transporters and consumers of electricity).

Key distributional effects could also include:

- how the costs and/or market benefits of the optimal development path (or actionable ISP projects) are distributed across different types of generators/ developers, possibly informed by indicative wholesale market pricing impacts
- estimated customer electricity bill impact (or impact on transmission charges) of the optimal development path (or actionable ISP projects)—similar in concept to those the AER provides for its revenue determinations.[43]

[43] See AER, *Final decision: ElectraNet transmission determination 2018-2023—Overview*, April 2018, section 1.2; AER, *Final decision: ElectraNet transmission determination 2018-2023—Attachment 1: Maximum allowed revenue*, April 2018, section 1.4.4

Explanatory box 2: Sensitivity testing, cross checks and distributional effects

The ISP CBA is inherently subject to uncertainty and risk, as the costs and market benefits of each development path are estimated over an unknown 20+ year planning horizon. As such, it is important for AEMO to perform some checks on its optimal development path.
This explanatory box explains the concepts of sensitivity testing, cross checks and distributional effects.
Sensitivity testing varies one or multiple inputs to test how robust the output of its CBA is to its input assumptions (for example, underlying plant operation assumptions). This is different to scenario analysis, which is focused on risk and uncertainty associated with an unknown future market environment (for example, the collection of input variables and parameters associated with a fast growth scenario).

Cross checks can inform the accuracy of an outcome by 'sense checking' it against information from other sources. For example, the ISP development opportunities in an optimal development path may be generated through market development modelling. While this is the most accurate way to forecast these projects under the ISP methodology, it can be useful to test the results with information from market participants.

Distributional effects consider the distribution of costs and market benefits of an optimal development path—that is, who receives the benefits and who pays the costs. This can be useful for considering the equity of how costs and benefits are distributed across the market. CBA is focused on efficiency and aggregates costs and benefits across individuals/entities without regard to the equity of the distribution of those costs and benefits. As such, CBA cannot resolve equity issues. However, it can draw attention to them through considering distributional effects and allow policy makers the opportunity to address these through government policy.[44]

3.4 Other aspects of the CBA

This section provides guidance (requirements, considerations and discretionary elements) on other aspects of the ISP CBA that fall within one or more of the CBA methodology steps in section 3.3. These include:

- the treatment of externalities, which applies to the quantification of costs and market benefits (section 3.4.1)
- capturing option value in the ISP, which is a class of market benefit under clause 5.22.10(c)(1) of the NER (section 3.4.2)
- considering non-network options in the ISP, before and after the draft ISP (section 3.4.3).

3.4.1 Treatment of externalities

In this context, externalities are economic impacts (costs or benefits) that accrue to parties other than those who produce, consume and transport electricity in the market (see NER clause 5.16.1(c)(9)). As such, section 3.3.3 and section 3.3.4 contain requirements for AEMO to exclude externalities from the costs and market benefits of a development path. Therefore, externalities are not included in the determination of net economic benefit.

[44] Department of the Prime Minister and Cabinet Office of Best Practice Regulation, *Guidance note: Cost benefit analysis*, February 2016, pp. 12-13

This definition of externalities also has a bearing on how AEMO treats project funding for an ISP project, depending on whether it has or will be provided by:

- a Registered Participant under rule 2.1 of the NER or any other party in their capacity as a consumer, producer or transporter of electricity in the market (a Participant)[45]
- any other party (Other Party).

The following are *requirements* for AEMO:

- Funds that move between Participants count as a wealth transfer and do not affect the calculation of costs or market benefits under the ISP.
- Funds from an Other Party to a Participant do affect the calculation of costs or market benefits under the ISP. These funds can only affect the calculation of costs or market benefits when AEMO expects funding commitment. AEMO *is required* to report the funds in the draft ISP and final ISP.

If expected funds from an Other Party to a Participant do not eventuate, AEMO *must consider* whether a subsequent ISP update is required to remove these from the CBA.

Example 8 illustrates a positive and negative externality of an ISP project.

Example 8: Externalities

Positive externality

Assume an ISP project entails upgrading a transmission line located near a small town. AEMO expects upgrading the transmission line will increase the annual earnings of the town's restaurant during the duration of the construction period, due to a large number of construction workers temporarily residing in the town. The present value of these increased earnings is $1 million.

In this example, the $1 million benefit to the restaurant's proprietor is a positive externality. The upgrade of the transmission line drives this benefit. However, this is not realised by the TNSP or any other NEM party in their capacity as consumers, producers or transporters of electricity in the market. Therefore, this benefit is not part of the market benefits of the development path with the ISP project.

Negative externality

Assume an ISP project is a local gas-fired peaking generator, planned for development in close proximity to an existing hotel. AEMO expects the development of the generator will reduce the nearby hotel's annual earnings (due to a loss of visual amenity). The present value of this loss is $15 million.

In this example, the $15 million cost borne by the hotel's proprietor is a negative externality. While the development of the gas-fired peaking generator drives this cost, the generator's developer will not incur the cost. Nor will the cost be borne as a negative market benefit by the developer or any other NEM party in their capacity as consumers, producers or transporters of electricity in the market. It is therefore not part of the costs or market benefits of the development path with the ISP project.

[45] For clarity, by including parties in their capacity as producers and/or transporters of electricity, this definition captures entities such as distributed energy resources suppliers and energy service companies.

3.4.2 Option value

Option value refers to a market benefit that results from retaining flexibility where certain actions are irreversible (sunk), and new information may arise in the future on the payoff from taking a certain action. Option value is likely to arise where there is uncertainty regarding future outcomes, the information that is available in the future is likely to change, and the option considered is sufficiently flexible to respond to that change. Option value is particularly relevant to network investment because almost all network investment decisions are partially or fully irreversible. Appropriate consideration of option value minimises the likelihood of building assets that are ultimately underutilised or stranded.

Option value can manifest at both the development path level, and at an individual project level within a development path. Option value is often created by staging a project in a development path, but can also be created by changing the timing of projects in a development path (including deferral and acceleration) where this creates flexibility for other projects in that development path.

As option value is a class of market benefit, AEMO must quantify option value in preparing an ISP under clause 5.22.10(c) of the NER. That is, unless AEMO can provide reasons why it is not material or the estimated cost of undertaking the analysis is likely to be disproportionate given the level of uncertainty regarding future outcomes.

In capturing option value, AEMO must *have regard to*:

- Development paths that contain option value to account for new information that arises at a later stage, including through:
    - the timing and staging of ISP projects in a development path;
    - the use of non-network options as ISP projects or stages of ISP projects; and
    - staging or deferring ISP projects where the market benefits occur late in the modelling period.

  The stages associated with a staged project can be incorporated into a single ISP project, or can be separated into multiple ISP projects, depending on their characteristics (see 'Selecting development paths with option value').
- Whether scenario analysis results under AEMO's chosen decision making approach (see section 3.3.6) appropriately capture option value (see 'Valuing market benefits associated with option value').
- How staging of actionable ISP projects could be further explored in the RIT–T process, and then describing the identified need and assigning scenarios accordingly (see 'Considering where RIT–Ts could further explore option value').

- When decision rules[46] associated with staged projects eventuate, leading to a subsequent stage being needed or not needed—and, where relevant, incorporating the subsequent stage into an ISP (see 'When decision rules eventuate for subsequent project stages').

It is very important to optimise option value across all actionable ISP projects in an optimal development path through the ISP and RIT–T process. This is because the ISP provides value in its ability to coordinate transmission network investment across the market, and facilitate efficient power system development in an uncertain future environment. As such, the ISP needs to be able to respond flexibly to changing market conditions that may result in change(s) to its optimal development path by deferring, halting, accelerating, reducing or expanding actionable ISP projects from a previous ISP.

The sections below provide further *discretionary* guidance to further explain the above binding considerations for option value in the ISP.

Selecting development paths with option value

Development paths with option value involve staging and timing considerations. This may include a decision rule or policy specifying an action or decision to take at one time, but also an action or decision to take at another time in the future if the appropriate market conditions arise.

Development paths with timing considerations change the timing of ISP projects where this creates flexibility for other projects in that development path. This can include deferring and/or accelerating particular ISP projects in a development path. For example, two interconnectors A and B in different parts of the NEM may be part of a development path. Accelerating the timing of when interconnector A should be completed may relieve constraints or congestion in the NEM in such a way that the timing for interconnector B can be delayed. This would create flexibility around interconnector B, including allowing it to be adapted to changed market conditions or to accommodate advances in technology.

However, it is important to recognise that accelerating an ISP project will remove the option value for that project, even if it creates option value for another ISP project. Therefore, the development path should only include the net option value in the market benefits calculation (positive or negative). For example, the greater flexibility around interconnector B would need to be weighed up against the loss of flexibility that comes from accelerating interconnector A (that is, interconnector A becoming a sunk investment earlier). Variations to the timing of ISP projects in a development path are considered in section 3.3.1 so the rest of this section is focussed on staging ISP projects.

Development paths with staging considerations contain staged ISP projects. An ISP project with staging considerations could, for a given year, range from:

- building the full ISP project

[46] A 'decision rule' refers to action or decision to take at one time, but also an action or decision to take at another time in the future if the appropriate market conditions arise. It is the set of conditions or triggers that, if they occurred, may justify a subsequent stage of a project proceeding.

- building one part, or a smaller capacity, of the full ISP project in a way that allows the rest to be built quickly (or in subsequent stages) if needed
- using a non-network option that manages the immediate need, and allows for the ISP project to be built in the future if needed (in part or full)—many non-network options are reversible investments, and so are a useful way to build flexibility into a project
- undertaking early works (distinct from preparatory activities, see Explanatory box 3), such that the ISP project can be built more quickly in the future if needed (in part or full).

We recommend AEMO work with TNSPs to include as many staged project options as possible in step one of its process for selecting development paths in section 3.3.1, where it enters a range of network and non-network investment options into its model.

Then when identifying development paths in step three of this process, we recommend AEMO look closely at the results from its modelling in step two. If, in one or more scenarios, a full ISP project is not needed, or not needed for a number of years, then staged options should be included in one or more development paths, along with a development path that includes the full build option. The more scenarios where a full ISP project is not needed, or is only needed late in the modelling period, the stronger the staged options should be (with early works being the strongest staged option above) if the project is not deferred altogether.

We also recommend AEMO consider the timing of estimated market benefits of the ISP projects in its development paths. If the market benefits for a full ISP project occur late in the modelling period, then option value can be enhanced by staging or deferring the project. This would avoid consumers paying transmission use of service charges associated with the full project while it is not generating material market benefits.

AEMO then needs to consider how to incorporate the staged options it has identified into the relevant development path. The stages associated with a given project can be incorporated into a single ISP project, or can be separated into multiple ISP projects, depending on their characteristics. We consider:

- Stages can be incorporated into a single ISP project where the stages are more granular or specific, the decision rule is narrow, and/or it is likely the information or circumstances presented in the decision rule will eventuate. For example:
    - A granular or specific stage of a project could be to double circuit a line, where the first stage is a single circuit line with room to build the double circuit if needed.
    - This could involve a narrow decision rule, such as utilisation reaching a specified threshold. In this case, the decision rule only contains one variable, and it is very clear when the next stage of the project would commence.
    - It could be reasonably likely the utilisation threshold (that is, the decision rule) would be met in the future, but the timing was quite uncertain.
    - The decision rule could be determined by AEMO or the relevant TNSP(s) depending on who develops the project stages.
- Stages can be separated into multiple ISP projects where each stage is a significant investment or can be considered as a stand-alone project, the decision rule is complex

or multi-variate, and/or there is significant uncertainty whether the information or circumstances presented in the decision rule will eventuate. For example:

- When conducting early works at the first stage, subsequent stage(s) to build the ISP project (in part or full) would be significant investments, and so best classified as a separate ISP project(s). This would also apply to a minor upgrade project with a subsequent medium or major upgrade stage.
- A decision rule on whether to build an ISP project (in part or full) or a major upgrade could reasonably be complex and multi-variate, as there are many variables that could drive the investment decisions for larger projects.
- More complex decision rules lead to greater uncertainty, and stages that involve significant investments are also more easily disrupted by new technology.
- The decision rule would be determined by AEMO in the ISP when the stages are identified.

Section 4.4 explains how both types of staged projects would progress through the RIT–T, feedback loop and contingent project processes, and includes a worked example.

We emphasise that in both the above cases, the subsequent stages may not occur if the information or conditions presented in the decision rule do not eventuate. In the former (single ISP project), the unneeded stage of the ISP project would not be progressed by the TNSP(s) through the feedback loop and contingent project processes (and should also be excluded from the optimal development path). In the latter (multiple ISP projects), the unneeded ISP project would be excluded from the optimal development path.

Explanatory box 3: Early works versus preparatory activities

Preparatory activities are defined as activities needed to design and to investigate the costs and benefits of actionable ISP projects and if applicable, future ISP projects including:[47]

- detailed engineering design
- route selection and easement assessment work
- cost estimation based on engineering design and route selection
- preliminary assessment of environmental and planning approvals
- council and stakeholder engagement.

Early works, in contrast, are activities that commence prior to the construction of the preferred option, which are undertaken to improve the accuracy of cost estimates, and/or ensure that a project can be delivered within the time frames specified by the most recent ISP. However, we may not be satisfied that an activity, that is nevertheless capable of being characterised in this way, is early works if a RIT-T proponent does not also demonstrate that undertaking the activity is not otherwise a preparatory activity, would not preclude proceeding with an alternative option (in the event that alternative was deemed to be preferred), and if the expenditure associated with the activity was capitalised, that expenditure is prudent and efficient.

[47] See NER, clause 5.10.2.

Specifically, for us to be satisfied that an activity is to be characterised as early works, a RIT–T proponent is required to demonstrate or evidence:

- that the activity is not a preparatory activity for the purposes of clause 5.10.2 of the NER;
- that undertaking the activity will improve the accuracy of cost estimates, and/or ensure that a project can be delivered within the time frames specified by the most recent ISP;
- how undertaking that activity will not preclude, impede or hamper proceeding with alternative options, in the event an alternative option is deemed to be the preferred option.

Valuing market benefits associated with option value

AEMO's ISP scenario analysis and decision making approach(es) (see section 3.3.6) can appropriately capture the market benefits associated with option value. However, this depends on a number of factors, including:

- Whether the scenarios (or associated states of the world) contain the key information for the decision rule or policy on whether to proceed to the next stage of the project. A decision rule or policy could even specify threshold values for one or more input variables to indicate when the next stage of a project should proceed. When the new information arises in the relevant state of the world, the scenario analysis should test the responsiveness of staged projects to this new information.
- Whether the scenario analysis and/or decision making approach(es) result in a weighted average of net economic benefits for each development path. This is because option value can only be captured by averaging net economic benefits across scenarios where the full build option is needed and not needed.
- The extent to which development paths consider the alternative options of staging for each ISP project, including the full build option. This is because option value of a staged project is considered relative to its alternatives. For example, scenario analysis with the staged project should be compared to scenario analysis with the full build option.

If scenario analysis does not appropriately capture the market benefits associated with option value, AEMO should undertake separate analysis to capture the option value associated with staged ISP projects in a development path.[48] See appendix A section A.9 of the RIT–T application guidelines for non-ISP projects for a worked example and visual representations of how option value can be captured.[49]

Considering where RIT–Ts could further explore option value

The ISP can effectively capture option value at a development path level—for example, where building one project creates flexibility in building another project. However, the ISP may have difficulties effectively capturing the option value of all individual ISP projects within a development path. This is because it would be faced with a very large number of development paths if it were to properly explore and assess the option value associated with staging for all ISP projects. As such, the RIT–T is a valuable process for further exploring more granular staging options for individual ISP projects (see section 4.4).

[48] To the extent that this does not result in any double counting.

[49] AER, *Application guidelines: RIT–T*, August 2020, section A.9.

To facilitate this, AEMO will consider how staging of actionable ISP projects could be further explored in the RIT–T process. It can then:

- describe the identified need in a way that allows RIT–T proponents to explore staged credible options that were not considered in the ISP process (see section 3.5.1)
- assign scenarios to the RIT–T proponent that allow for option value to be captured in valuing the market benefits of credible options (see section 3.5.2).

For clarity, where the RIT–T proponent explores staged credible options for an actionable ISP project, it will determine the decision rules for those options, based on relevant information in AEMO's description of the identified need or choice of scenarios. Where the RIT–T proponent progresses a stage of a preferred option, we recommend it include the decision rule(s) when seeking written confirmation from AEMO under clause 5.16A.5(b) of the NER (see section 3.5.3).

When decision rules eventuate for subsequent project stages

In each ISP, AEMO will consider whether the decision rules associated with staged projects have eventuated, leading to a subsequent stage being needed or not needed (where staging is incorporated into a single ISP project or multiple ISP projects). AEMO may need to work with relevant TNSPs to do this, particularly where staging is incorporated into a single ISP project. When a decision rule(s) leads to a new stage being needed or not needed, the ISP should:

- include or exclude the new actionable ISP project that is the next stage of the previous actionable ISP project (where stages are incorporated into multiple ISP projects)
- add or remove the next stage to the ISP project that was identified as actionable in a previous ISP (where stages are incorporated into a single ISP project).

This has implications for applying RIT–Ts (see section 4.4):

- Where stages are incorporated into multiple ISP projects, the new actionable ISP projects will automatically trigger a RIT–T under clause 5.22.6(a)(6) of the NER.
- Where stages have previously been incorporated into a single ISP project and a RIT–T has already been undertaken on the full project, the TNSP can proceed to a contingent project application for the new stage provided the actionable ISP project trigger event in NER clause 5.16A.5 is met (this includes AEMO's feedback loop referred to in section 3.5.3). A RIT–T only needs to be re-applied where there has been a material change in circumstances in accordance with NER clause 5.16A.4 (see section 4.5.4).[50]

3.4.3 Non-network options

A non-network option is defined in the NER as a means by which an identified need can be fully or partly addressed other than by a network option.[51] A non-network option can be a whole ISP project or part of an ISP project (a hybrid). Non-network options are also wide-ranging in their form—they can include new, or enhancements to existing, demand

[50] Also see section 4.5.4. We note that where a RIT–T proponent identifies a staged preferred option for an actionable ISP project, only one stage would be included in a contingent project application at a time (see NER, clause 5.16A.5).

[51] See glossary in NER, chapter 10.

response, generation, storage, distributed energy resources (DER) and other technologies. We note costs of non-network options may not be able to be recovered through the regulatory asset base and revenue allowance in the same way as for network assets.

Consideration of non-network options prior to the draft ISP

While there is a formal process in the NER for AEMO to call for non-network option proposals at the draft ISP stage (see below), the NER does not preclude non-network proponents from providing information to AEMO on non-network options at any time during the transmission planning process. Indeed, under clause 5.14.4(a)(3) of the NER, AEMO and TNSPs must undertake joint planning that includes providing information in relation to non-network options for the purpose of preparing a draft or final ISP or ISP update. The earlier a non-network option is considered in the regulatory process the more likely it is to be able to be robustly considered against network options, especially if there is only one scenario tested in a RIT–T.

Prior to a draft ISP, AEMO *is required* to:

- undertake early engagement with non-network proponents to gather information in relation to non-network options (see Explanatory box 4); and
- if there are any credible non-network options identified through early engagement and joint planning, but not included in a TAPR, include these in step one of its process for selecting development paths in section 3.3.1 (where it enters a range of network and non-network investment options into its model).

Explanatory box 4: Early engagement for non-network options

The ISP will consider network and non-network options in selecting development paths, and RIT–T proponents will further consider non-network options in selecting a preferred option in applying the RIT–T to actionable ISP projects. The preferred option could be a full non-network option, or a combination of network and non-network options. To promote consideration of non-network options on equal grounds with network options, it is important that there is sufficient engagement between AEMO, TNSPs and non-network proponents.

Ideally, the engagement would be iterative and start early. That is, it could commence during a TNSP's development of a TAPR, then non-network proponents could develop their options further with AEMO and TNSPs during joint planning and AEMO's selection of development paths for assessment.

Together, this early engagement can:

- lead to non-network options being included in AEMO's development paths as it prepares a draft ISP
- inform AEMO of the technical possibilities of non-network options, and what information would be useful to provide in its notice requesting submissions for non-network options after the draft ISP under clause 5.22.12 of the NER (see section below)
- equip prospective non-network proponents to propose more suitable or effective non-network option proposals in response to AEMO's notice requesting submissions for non-network options after the draft ISP under clause 5.22.12 of the NER (see section below).

Consideration of non-network options after the draft ISP

In addition to joint planning, clause 5.22.12 of the NER sets out a process to seek non-network option proposals that starts at the draft ISP stage. The process is as follows:

- AEMO must publish a notice requesting submissions for non-network options at the same time as it publishes the draft ISP. The notice must provide sufficient detail on the technical characteristics the non-network options must meet; and describe the identified need the actionable ISP project is addressing.
- Non-network proponents must submit their non-network option proposals within 12 weeks of the publication of the draft ISP.
- AEMO and the relevant TNSP must conduct a preliminary review of non-network option proposals received.
- AEMO must provide its assessment in the final ISP of whether the non-network option proposals meet, or are reasonably likely to meet, the relevant identified need.
- RIT–T proponents must assess the non-network options AEMO identifies as meeting, or reasonably likely to meet, the relevant identified need as one of the credible options in applying the RIT–T at project assessment draft report stage (see section 4.3.1).

In considering non-network options in the process set out in clause 5.22.12 of the NER, AEMO *is required* to:

- Provide sufficient detail on the technical characteristics of the non-network options in its notice requesting submissions for non-network options, in such a way that appropriate non network solutions can be developed.
- Include the ISP consumer panel and/or other consumer stakeholders in the preliminary review of non-network option proposals,[52] to incorporate their views and preferences.
- Document the process and findings of the preliminary review of non-network option proposals, and publish this with or before the final ISP.
- Provide its reasoning in the final ISP for each non-network option proposal AEMO concludes will not meet the relevant identified need. This includes:
    - specific characteristics of the proposed non-network option that do not meet the relevant identified need, and why;
    - if its reasoning is related to risk or uncertainty, then describe the risk/ uncertainty and provide an assessment of the risk/ uncertainty compared to the ISP candidate option, as well as a comparison of the non-network option cost with the ISP candidate option cost;[53] and
    - how the option could be improved to meet the identified need.

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52 For clarity, these are proposals in response to AEMO's notice requesting submissions for non-network options under NER, clause 5.22.12.

53 The ISP candidate option is the credible option specified in the ISP for an actionable ISP project. See appendix B.

3.5 Interactions and alignment with the RIT–T

Clause 5.22.5(e)(4) of the NER obliges the CBA guidelines to have regard to the need for alignment between the ISP and the RIT–T as it applies to actionable ISP projects.

This section sets out requirements, considerations and discretionary elements on areas of the ISP process that feed into the RIT–T process for actionable ISP projects. These are:

- how the ISP describes the identified need relating to an actionable ISP project, which is then used by the RIT–T proponent in applying the RIT–T (see section 3.5.1)
- how AEMO assigns scenarios to the RIT–T proponent for each actionable ISP project, to allow for alignment between the ISP and RIT–T (see section 3.5.2)
- how AEMO is to perform the 'feedback loop', which checks the preferred option selected in the RIT–T process (for an actionable ISP project) is aligned with the optimal development path selected in the ISP (see section 3.5.3).

At a high level, this guidance allows AEMO to choose which scenarios RIT–T proponents use in applying the RIT–T to actionable ISP projects, along with likelihood-based weights that are proportionate to those used in its risk neutral approach in section 3.3.6. If AEMO takes a risk averse approach to selecting the optimal development path, it can incorporate this through its choice of scenarios and/or description of the identified need for the project.

3.5.1 Describing the identified need for an actionable ISP project

The identified need is the reason why an investment in the network is needed. The NER define it as the objective a network service provider (or a group of network service providers) seeks to achieve by investing in the network.[54] Either a network or a non-network option may address an identified need.

The optimal development path in an ISP will likely contain some actionable ISP projects, which trigger RIT–Ts. Under clause 5.22.6(a)(6)(v) and 5.22.5(d)(6) of the NER respectively, the ISP must specify an identified need for each actionable ISP project, and the CBA guidelines must set out how AEMO describes the identified need relating to an actionable ISP project. These identified needs will then be used by the relevant RIT–T proponents in applying the RIT–T to actionable ISP projects.

In describing the identified need relating to an actionable ISP project, AEMO is *required* to:

- Assign one identified need to each actionable ISP project in an optimal development path (noting there can be multiple dimensions or components to a single identified need).
- For each identified need relating to an actionable ISP project, describe the identified need as the objective to be achieved by investing in the network. It is not the means to achieve the objective. That is, a description of an identified need must not mention or explain a particular method, mechanism or approach to achieving a desired outcome.

In describing the identified need for an actionable ISP project, AEMO *must have regard* to:

[54] See the glossary in NER, chapter 10.

- Having a clear and logical basis in contributing to the long term interests of electricity consumers—that is, linked to increasing one or more market benefits, and/or the key driver(s) of those market benefits.
- Maintaining the integrity of the optimal development path, reflecting that AEMO has identified each actionable ISP project to make a particular contribution towards achieving a system-wide optimised solution. This includes incorporating the risks AEMO seeks to mitigate through the actionable ISP project in its optimal development path, if the optimal development path was chosen using a risk averse decision making approach.
- Facilitating RIT–T proponents to explore different credible options (including non-network options) in applying the RIT–T based on more detailed / granular information at the individual project level, rather than pre-supposing a particular solution.
- Facilitating RIT–T proponents to explore credible options with option value (that is, involve staging decisions). This can include considering the timing of when market benefits are expected to be delivered, and key uncertainties to the investment decision that could be used in a decision rule.

Example 9 illustrates how an identified need could be described for a hypothetical actionable ISP project.

Example 9: Identified need relating to an actionable ISP project

Consider a hypothetical actionable ISP project A to upgrade an interconnector between region A and region B by 100 megawatts (MW) to relieve existing and forecast congestion between region A and region B over the modelling period.

An identified need relating to this project would include *increasing net economic benefits (including changes in network losses) in the NEM through relieving existing and forecast congestion on the transmission network between region A and region B*. This is a technology-neutral objective that is specific enough to maintain the integrity of the optimal development path, without restricting RIT–T proponents from exploring different credible options (including non-network options).

If the project had additional market benefits, these could also be included in the identified need (which could assist with the provision of hybrid network / non-network credible options). For example, if actionable ISP project A showed strong market benefits classes related to system security (such as changes in ancillary services costs), the identified need above could be extended to include *enhancing security of electricity supply, including management of inertia and frequency response in region B*.

If AEMO had taken a risk averse decision making approach to selecting an optimal development path in section 3.3.6, it could incorporate this into the identified need. For example, if AEMO's approach seeks to mitigate the risks associated with a fast growth scenario (which drives high demand and renewable generation development), then it could:

- include the fast growth scenario in assigning the scenarios to the RIT–T proponent under the guidance in section 3.5.2, and/or
- provide a specific capacity—100MW in this example.

The identified need could also facilitate the exploration of option value by considering the timing

and key uncertainties around forecast congestion. For example, the key uncertainty affecting congestion forecasts may be the timing of modelled generation connections. 50MW capacity is needed for the initial modelled generation, but the full 100MW capacity may only be needed once/if generation reaches 60 per cent of the modelled generation projections.

3.5.2 Assigning scenarios to RIT–T proponents for actionable ISP projects

Once AEMO has selected an optimal development path in accordance with the framework in section 3.3.6, it *is required* to assign one or more scenarios to each actionable ISP project that will be used by the relevant RIT–T proponent in applying the RIT–T to that project.

In selecting the scenario(s) to assign to each actionable ISP project in an optimal development path, AEMO *is required* to:

- Only use scenarios identified in the IASR.
- Assign a likelihood-based weight to each scenario if more than one scenario is assigned to a given actionable ISP project. These must be proportional to the weights used by AEMO in presenting a risk neutral decision making approach, as part of the framework for selecting an optimal development path set out in section 3.3.6. These weights must be used even if AEMO has selected the optimal development path based on a risk averse decision making approach.
- Explain its reasoning for selecting the scenario(s) and corresponding weights (if applicable) for each actionable ISP project, and seek stakeholder input on its choices.

In selecting the scenario(s) to assign to each actionable ISP project in an optimal development path, AEMO *must have regard* to:

- achieving consistency between the ISP and related RIT–Ts, including through alignment of the risks AEMO is prioritising through its decision making approach(es) under the framework for selecting an optimal development path set out in section 3.3.6;
- allowing the RIT–T proponent to capture the option value of exploring credible options that contain more granular staging decisions (that is, contain key uncertainties to the investment decision which could influence a decision rule); and
- balancing the need for a rigorous CBA with reducing the analytical burden on the RIT–T proponent in the RIT–T process.

For the avoidance of doubt, AEMO may, at its discretion, assign only one scenario to be used in a RIT–T.

3.5.3 Feedback loop

Under clause 5.16A.5(b) of the NER, for the actionable ISP project trigger event to occur, AEMO must provide written confirmation that the preferred option, identified in applying the RIT–T to an actionable ISP project, is aligned with the optimal development path in the most recent ISP. This process is also known as the 'feedback loop', and can entail re-running the ISP model with the RIT–T preferred option.

Specifically, under clause 5.16A.5(b) of the NER, to be eligible to submit a contingent project application in relation to an actionable ISP project (or a stage of an actionable ISP project), a RIT–T proponent must obtain written confirmation from AEMO that:[55]

- the preferred option addresses the relevant identified need specified in the most recent ISP and aligns with the optimal development path referred to in the most recent ISP; and
- the cost of the preferred option does not change the status of the actionable ISP project as part of the optimal development path as updated in accordance with clause 5.22.15 (ISP updates) where applicable.

In providing written confirmation to the RIT–T proponent, AEMO *is required* to:

- publish its written confirmation to the RIT–T proponent on AEMO's website; and
- identify the cost (of the RIT–T preferred option) that AEMO has used as its basis for confirming that the status of the actionable ISP project as part of the optimal development path remains unchanged (noting that section 4.4 clarifies what this cost should be where staging is involved).

In performing the feedback loop on a RIT–T preferred option (if the preferred option, or its cost, differs from the ISP candidate option), AEMO *must consider*:

- Removing the ISP candidate option from all development paths where it is featured, and replacing these with the RIT–T preferred option (and associated cost).
- Re-running the CBA modelling and scenario analysis if practicable, to test whether the optimal development path referred to in the most recent ISP:
    - still has a positive net economic benefit in the most likely scenario with the RIT–T preferred option; and
    - is still optimal with the RIT–T preferred option under the same decision making approach, or that any difference is immaterial.
- Adapting the extent to which it re-runs the CBA modelling and scenario analysis to the size of the difference between the costs and/or market benefits of the ISP candidate option and the RIT–T preferred option.

For clarity, the ISP candidate option is the credible option specified in the ISP for an actionable ISP project (see the glossary in appendix B). The RIT–T proponent may then specify other credible options in applying the RIT–T to that actionable ISP project, and select the ISP candidate option or another credible option as the preferred option.

[55] This is one of four eligibility provisions set out in NER, clause 5.16A.5.

3.5.4 Actionable ISP project names

This section provides *discretionary* guidance only. We recommend AEMO and RIT–T proponents work together to ensure consistent naming conventions for actionable ISP projects across the ISP and RIT–T processes. Where AEMO and/or a RIT–T proponent does change the name of an actionable ISP project, it should reference the previous name(s) in the relevant ISP and/or RIT–T reports it develops, and project webpage.

4 RIT–T guidelines for actionable ISP projects

Consistent with NER clause 5.16A.2(a), this part of the CBA guidelines includes guidelines for the operation and application of the RIT–T for actionable ISP projects. The separate, 'RIT–T application guidelines' apply to RIT–T projects that are not actionable ISP projects.[56]

A proponent applying the RIT–T to an actionable ISP project should read these guidelines along with the RIT–T instrument and relevant NER clauses.[57] The RIT–T proponent should also refer to the following sections of the CBA guidelines:

- section 1.2, which sets out the authority that NER clause 5.16A.2 provides to the CBA guidelines in relation to actionable ISP projects.
- section 2.1.1, which sets out the classification framework in the CBA guidelines for introducing binding requirements and considerations on RIT–T proponents.

4.1 Overview of the RIT–T for actionable ISP projects

RIT–T proponents must apply the RIT–T to actionable ISP projects, which the ISP specifies as 'ISP candidate options',[58] to be tested through a RIT–T application in accordance with the procedures under NER clause 5.16A.4. While the ISP is already underpinned by a NEM-wide CBA that identifies 'ISP candidate options' to address identified needs, RIT–T applications are important for identifying the most efficient way to meet an identified need because they explore:

- Credible options at a more granular technical level, including by exploring refinements to the ISP candidate option. When the RIT–T proponent undertakes its more granular assessment of how to meet a single identified need on its network, it has greater capacity to explore, where applicable, things like combining options, staging options and/or designing highly flexible projects with option value; and
- Non-network options that AEMO has had a limited opportunity to assess because they were submitted to AEMO in response to either:
    - the draft ISP, such that AEMO could only initially assess the option as being reasonably likely to meet the identified need;[59] or
    - the final ISP (following from AEMO identifying a new actionable ISP project after publishing the draft ISP), such that AEMO was unable to assess responses to its notice for non-network options in the ISP.[60]

In this way, and in accordance with NER clause 5.15A.1(c), the RIT–T has the purpose of identifying the *credible option* that maximises the present value of net economic benefit to all

[56] AER, *Application guidelines: RIT–T*, August 2020.

[57] The RIT–T is a binding regulatory instrument. See AER, *RIT–T*, August 2020.

[58] NER, clause 5.10.2 defines an ISP candidate option as 'a credible option specified in an Integrated System Plan that the RIT–T proponent must consider as part of a regulatory investment test for transmission for an actionable ISP project'.

[59] NER, clause 5.22.12.

[60] NER, clause 5.22.14(c)(1).

those who produce, consume and transport electricity in the *'market'*.[61] Fulfilling the purpose of the RIT–T promotes efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity.[62]

For avoidance of doubt, while the RIT–T adds value in how it extends and refines the ISP analysis, it does not seek to duplicate analysis that AEMO was better placed to undertake. As such, in accordance with the NER, RIT–T proponents must:[63]

- Always apply the CBA to the need identified in the ISP, and must always test the ISP candidate option as part of this analysis.
- Not be obligated to test credible options that AEMO already considered would not form part of the optimal development path, nor non-network options that AEMO already considered would not meet the identified need.
- Use the ISP parameters for the ISP project (inputs, assumptions, scenarios, other ISP projects and weightings) in its analysis, unless it can provide demonstrable reasons why an addition or variation is necessary.
- Use the ISP market modelling in its analysis, insofar as practicable. In practice, this would typically entail using AEMO's modelling outcomes from the ISP (that is, by including ISP projects consistently with the results of AEMO's modelling).[64] This could also involve drawing on the modelling methodologies AEMO used in developing the ISP.

4.2 Actionable ISP projects subject to a RIT–T application

Under NER clause 5.16A.3, a RIT–T proponent must apply the RIT–T to an identified need associated with an actionable ISP project (which is a type of RIT–T project)[65] unless the project falls under defined circumstances.

One of these circumstances is where the RIT–T project is to address an urgent and unforeseen network issue that would otherwise put at risk the reliability of the transmission network.[66] An actionable ISP project meets this criterion if AEMO makes this specification in the ISP as per NER clause 5.16A.3(b) or if the project meets the criteria under NER clause 5.16.3(b), which include:

- the assets or services to address the issue need to be operational within six months of the issue being identified;
- the circumstances causing the identified need were not reasonably foreseeable by, and were beyond the control of, the network business (or businesses) that identified the need;[67]

[61] Where NER, Chapter 10 defines 'market' as any of the markets or exchanges described in the NER, for so long as AEMO conducts the market or exchange.

[62] In line with the National Electricity Objective in the NEL, Section 7.

[63] NER, clause 5.15A.3(b)(7)–(8).

[64] That is, including other actionable ISP projects in all states of the world and non-actionable ISP projects where scenario appropriate (that is, in the scenarios where the ISP modelling specifies the project would occur).

[65] NER, clause 5.10.2 provides a definition of a RIT–T project.

[66] NER, clause 5.16.3(a)(1).

[67] Since AEMO identifies needs for actionable ISP projects, 'network business (or businesses) that identified the need' should be interpreted as 'the RIT–T proponent' in this context.

- a failure to address the identified need is likely to materially adversely affect the reliability and secure operating state of the transmission network; and
- the project is not a contingent project.[68]

NER clauses 5.16.3(a)(2)–(11) set out other circumstances that exempt a RIT–T project from the RIT–T, which include where:

- The estimated capital cost of the most expensive technically and economically feasible option to address the identified need is less than the RIT–T cost threshold (as varied in accordance with a 'RIT–T cost threshold' determination).[69] As general guidance, an option is likely to be economically feasible where its estimated costs are comparable to other credible options that address the identified need. The exception to this is where the RIT–T proponent expects the higher cost option to deliver materially higher market benefits. For clarity, since the NER refer to the capital cost of an option, an external financial or capital contribution[70] would produce an exemption if it reduced the capital cost of the option to be below the RIT–T cost threshold.
- The proposed expenditure relates to maintenance and is not intended to augment the transmission network or replace network assets.
- The proposed investment is to re-route one or more paths of the network for the long term and has a substantial primary purpose other than the need to augment the network. The RIT–T proponent must reasonably estimate that the investment will cost less than the RIT–T cost threshold[71] or is likely to have no material impact on network users.
- The identified need can only be addressed by expenditure on a connection asset, which provides services other than prescribed transmission services or standard control services.
- The cost of addressing the identified need is to be fully recovered through charges other than charges in respect of prescribed transmission services or standard control services. In practice, this means a RIT–T application is not necessary if an external contribution results in the project falling below the RIT–T cost threshold. In these circumstances, the external contribution means that, to the extent of that contribution, the costs of the project do not need to be recovered from electricity consumers via the regulated charges of the relevant network business (or businesses).
- The proposed expenditure relates to a 'protected event emergency frequency control scheme' investment and is not intended to augment the transmission network.
- The proposed expenditure is an inertia service payment or a system strength service payment.

[68] We determine contingent projects under NER, clause 6A.8.1(b) as part of a transmission revenue determination.

[69] Under NER clause 5.15.3, we must review RIT–T cost thresholds every three years. We will publish details regarding any review of the RIT–T thresholds (including any revisions to this threshold) on our website www.aer.gov.au. This threshold was $7 million at the time of drafting.

[70] For clarity, a capital contribution might differ from a financial contribution if an external party donates a piece of kit (such as a battery, for example).

[71] For further details, see the previous footnote.

- The proposed expenditure is for a network investment undertaken by the TNSP to satisfy its obligation as an inertia service provider or system strength service provider under NER clause 5.20B.4 or 5.20C.3, respectively and:
    - immediately prior to AEMO giving the shortfall notice, the TNSP was not obligated to provide the inertia network services for that inertia sub-network or the system strength services for that fault level node; and
    - the TNSP has less than 18 months after AEMO gave the notice to make the inertia network or system strength services available.

Under NER clause 5.16A.3(d), where a TNSP does not need to apply the RIT–T to a proposed investment (with the exception of funded augmentations),[72] it must ensure, acting reasonably, that the investment is planned and developed at least cost over its life.

4.3 Operation and application of the RIT–T

This section provides guidance for the operation and application of the RIT–T to actionable ISP projects. To apply the RIT–T instrument to an actionable ISP project, a RIT–T proponent must apply the following steps:[73]

1. Adopt the need for the investment as identified in the ISP (the 'identified need').
2. Identify a set of credible options to address the identified need, which must include the ISP candidate option (section 4.3.1).
3. Characterise the base case, under which to compare credible options (section 4.3.2).
4. Use ISP parameters for inputs to include in the CBA or explain why a variation, addition or omission is necessary (section 4.3.3).
5. Quantify the estimated costs of each credible option (see section 4.3.4).
6. Identify what classes of market benefits to quantify, which must include all classes of market benefits identified in the relevant ISP (see section 4.3.5).
7. Quantify the estimated market benefits of each credible option (see section 4.3.6), by:
    (a) deriving states of the world to compare the market benefits of that credible option relative to the base case under each scenario that the ISP identifies as relevant (which may only be one of the ISP scenarios); and
    (b) estimating the weighted market benefit of that credible option over the relevant scenario/s, using the likelihood-based weightings identified in the ISP.
8. Quantify the estimated present value net economic benefit of each credible option and identify the preferred option as the credible option with the highest estimated present value of net economic benefit (section 4.3.7). Then, the RIT–T proponent *must* perform sensitivity analysis (or testing) on all credible options by varying one or multiple inputs/assumptions (section 4.3.8).

[72] A funded augmentation is a transmission network augmentation for which a TNSP is not entitled to receive a charge under NER chapter 6A.
[73] As set out in AER, *RIT–T*, August 2020.

NER clause 5.15A.1(c) specifies that the purpose of the RIT–T is to identify the credible option that maximises the present value of net economic benefit to all those who produce, consume and transport electricity in the market. Following from this purpose, the economic impacts that accrue to parties other than those who produce, consume and transport electricity in the market are externalities. As such, under the RIT–T instrument, RIT–T proponents must exclude externalities from the costs and market benefits of a credible option, thereby excluding them from the determination of net economic benefits.[74] For further guidance on what constitutes an externality, see section 3.4.1.

4.3.1 Credible options

The RIT–T instrument specifies that a RIT–T proponent must consider the following credible options when applying a RIT–T to an actionable ISP project:[75]

- The ISP candidate option or ISP candidate options,[76] which may include refinements of an ISP candidate option.
- Non-network options identified in the ISP as being reasonably likely to meet the relevant identified need, in accordance with NER clause 5.22.12(e)(1). For completeness, a non-network option can also include a network component (a hybrid), such that the non-network component does not need to address the entire identified need.[77]
- Any new credible options that were not previously considered in the ISP that meet the identified need (including any non-network options submitted to AEMO in accordance with NER clause 5.22.14(c)(1)). New credible options will typically arise from new information or changes in circumstances that was not available/did not apply to AEMO when developing the ISP, or as variants of the ISP candidate option.

Following from NER clause 5.15A.3(b)(8), the RIT–T instrument specifies that a RIT–T proponent is not required to consider:[78]

- any credible option that AEMO already considered but did not include in the ISP optimal development path; and
- any non-network options identified in the ISP as not meeting the relevant identified need, in accordance with NER clause 5.22.12(e)(2).

When a RIT–T proponent is considering whether to include new credible options that AEMO did not consider in the ISP, it must *have regard to* the guidance below on what constitutes a credible option when justifying its decision.

NER clause 5.15.2 defines a credible option as an option (or group of options) that must:

[74] AER, *RIT–T*, August 2020, paragraph 4.

[75] AER, *RIT–T*, August 2020, paragraph 2(c) and as required under NER clause 5.15A.3(b)(7)(iii).

[76] NER, clause 5.10.2 defines an ISP candidate option as 'a credible option specified in an Integrated System Plan that the RIT–T proponent must consider as part of a regulatory investment test for transmission for an actionable ISP project'.

[77] NER, chapter 10 defines a non-network option as a means by which an identified need can be fully or partly addressed other than by a network option.

[78] AER, *RIT–T*, August 2020, paragraph 2(g)–(h).

- Address the identified need that the ISP has specified for the actionable ISP project. In demonstrating whether a credible option achieves this, the RIT–T proponent should reference the driver (or drivers) of the net economic benefits that it expects to flow from the credible option. Similarly, for identified needs relating to reliability corrective action, the RIT–T proponent should clearly demonstrate how it expects the credible option will address the specific service standard or obligation underpinning the identified need.
- Be commercially feasible such that a reasonable and objective operator, acting rationally in accordance with the requirements of the RIT–T instrument, would be prepared to develop or provide the option in isolation of any substitute options. For an example of commercial feasibility, see the RIT–T application guidelines.[79]
- Be technically feasible such that there is a high probability that it will, if developed, provide the services that the RIT–T proponent has claimed it could provide for the purposes of the RIT–T assessment. In providing these services, the option should also comply with relevant laws, regulations and administrative requirements. For an example of technical feasibility, see the RIT–T application guidelines.[80]
- Be implemented in sufficient time to meet the identified need.

Under NER clause 5.15.2(b), when identifying new credible options that were not previously considered in the ISP, the RIT–T proponent must consider all options it could reasonably classify as credible options, taking into account:

- Energy source, technology, and ownership.
- The extent to which the credible option enables intra-regional or inter-regional trading of electricity.
- Whether it is a network or non-network option.
- Whether the credible option is intended to be regulated.
- Whether the credible option has a proponent.[81] There may be more than one proponent for a given credible option. NER clause 5.15.2(d) prevents a RIT–T proponent from rejecting an option that would otherwise satisfy the RIT–T on the basis that it lacks a proponent.
- Any other factor that the RIT–T proponent reasonably considers should be taken into account. In considering what it should take into account, the RIT–T proponent *must have regard to* the following:
    - if the identified need in the ISP entails meeting a service standard, the degree of flexibility offered by that service standard;

[79] AER, *Application guidelines: RIT–T,* August 2020, Example 3.

[80] AER, *Application guidelines: RIT–T,* August 2020, Example 3.

[81] A person can be characterised as a proponent of an option where it has identified itself to the RIT–T proponent in writing that it is a proponent of an option. The person should have also reasonably demonstrated a willingness and potential ability to devote or procure the required human and financial resources to the technical specification and refinement of the option if the RIT–T proponent agrees to consider the option as a credible option, and development of the option if it is identified as the preferred option.

- the advantages of constructing credible options with option value (see the below sub-section for further guidance); and
- the benefits of constructing new credible options to meet the identified need in the ISP over broadly similar timeframes to the ISP candidate option and non-network options identified in the ISP. This facilitates the use of similar modelling periods and increases the transparency and robustness of the analysis.

NER clause 5.15A.2(b)(2) states that the RIT–T must not require a level of analysis that is disproportionate to the scale and likely impact of each of the credible options under consideration.

The number of credible options that a RIT–T proponent assesses for meeting a particular identified need should be proportionate to the magnitude of the likely costs of any credible option. For example, if the RIT–T proponent reasonably estimates that a credible option to meet an identified need was $50 million, then it should consider a larger number and range of credible options than if the estimated cost of most credible options was around $10 million, all other things being equal.

Developing credible options with option value

The RIT–T proponent may find value in retaining flexibility to respond to changing market conditions where the option/s it is considering to meet the identified need involve a sunk or irreversible action and are associated with materially uncertain market benefits. For example, where there is uncertain future demand for connections from wind generators at a remote connection point, it may be efficient to configure connection assets to allow for easier augmentation if additional demand for connections at that connection point arose in the future.

As demonstrated in example 10, a credible option may include a decision rule specifying, not just an action to take now, but also an action to take in the future if the appropriate market conditions arise.

Example 10: Developing credible options with option value

Assume a RIT–T proponent is assessing an ISP candidate option to fully upgrade a transmission line in the immediate term—'Option (a)'. Assume that while Option (a) does not include staging, AEMO specifies the identified need in a way that directs the TNSP to apply the RIT–T in a way that considers potential project staging.

Assume the identified need from the ISP is to accommodate a level of demand growth in the region over the next 20 years that occurs in one of the three ISP scenarios illustrated in example 1—the fast growth scenario, taking into account the uncertainty that such high demand will eventuate. Assume AEMO has specified all three ISP scenarios are relevant for the identified need associated with the ISP candidate option.

In light of uncertain demand growth, the RIT–T proponent wants to develop credible options with option value. To do this, it develops credible options that meet the identified need, but also includes a decision rule. Specifically, in addition to Option (a), the RIT–T proponent develops:

- Option (b): upgrade a transmission line to cover likely demand growth in the next five years (without consideration of future growth) coupled with a generic non-network option following

a decision based on the same 'decision rule' as for option (c) (see below). This option should be lower cost than Option (a) in the slow and moderate growth ISP scenarios, but will likely have lower market benefits than Option (a), particularly after year five, in the fast growth ISP scenario.

- Option (c): upgrade a transmission line as per Option (b), but also allow for sufficient extra space (perhaps by installing larger towers than necessary) to allow for a relatively low-cost expansion of the network following a decision based on a 'decision rule'. This decision rule might be to expand the network if peak demand reaches a specified level, indicating that the fast growth ISP scenario is likely to eventuate. The extra space provided under this option would likely incur an additional up-front cost relative to Option (b). To capture the higher market benefits of this option relative to Option (b), the RIT–T proponent would model the costs and benefits of the second stage expansion versus the costs and benefits of the non-network supplementary project that it would trigger under option (b)

The ability of a RIT–T proponent to formulate credible options incorporating a decision rule or policy enables the RIT–T CBA to include option value as a potential class of market benefit. For further information on how the ISP incorporates option value, see section 3.4.2.

4.3.2 Characterising the base case

Where the RIT–T applies to an actionable ISP project, the RIT–T instrument defines the base case as a situation in which the credible option is not implemented by, or on behalf of, the RIT–T proponent.

The CBA guidelines *require* the base case be where the RIT–T proponent does not implement a credible option to meet the identified need, but rather continues its business as usual activities. These activities are ongoing, economically prudent activities that occur in absence of a credible option. A well-formed base case is important for compliance with:

- NER clause 5.15A.3(b)(1), which specifies that the RIT–T must assess the costs and benefits of future supply and demand if each credible option were implemented compared to the case where that option is not implemented; and
- paragraph 7 of the RIT–T instrument, which specifies that market benefits must be the present value benefits of a credible option calculated by comparing, for each relevant scenario: the state of the world with the credible option in place versus the state of the world in the base case.[82]

Where AEMO has identified that reliability corrective action is driving the identified need, the base case may reflect a state of the world where service standards are violated. However, this does not undermine the importance of the base case in providing a consistent point of comparison across all credible options for meeting those mandatory requirements. As such,

[82] AER, *RIT–T*, August 2020, paragraph 7.

it is a *requirement* that the base case for corrective action will still need to be represented as 'business as usual' with no significant investments.

For further guidance, the RIT–T application guidelines provide worked examples on characterising the base case for different types of identified needs.[83]

4.3.3 Selecting inputs

Under NER clause 5.16A.2(c)(3), the CBA guidelines must provide guidance as to how the RIT–T proponent must apply the ISP parameters. This is where NER clause 5.10.2 defines ISP parameters as meaning, for an ISP project:

- the inputs, assumptions and scenarios set out in the most recent IASR;
- the other ISP projects associated with the optimal development path (where ISP projects include actionable ISP projects, future ISP projects and ISP development opportunities); and
- any weightings specified as relevant to that project.

In accordance with the NER,[84] the RIT–T instrument specifies that the RIT–T proponent must adopt the most recent ISP parameters, or identify and provide demonstrable reasons for why an addition, omission or variation to the ISP parameters is necessary. Following from the RIT–T instrument, unless the RIT–T proponent can provide 'demonstrable reasons' for why an addition or variation is necessary, it must apply ISP parameters in its RIT–T application for the actionable ISP project by:[85]

- Adopting the scenario/s that AEMO has specified as relevant to that RIT–T application, and the inputs and assumptions from the most recent IASR. For completeness, the IASR will include, as inputs, the discount rate and VCR to apply.
- Adopting the likelihood-based weightings to apply to the scenario/s that AEMO has identified as relevant to that RIT–T application. For clarity, if AEMO determines that one or more scenarios in the IASR should not apply in the RIT–T application, it will effectively assign that scenario/those scenarios a zero per cent weighting for the ISP project and will adjust the relative weightings for the remaining ISP scenario/s accordingly. If AEMO identifies that only one ISP scenario is relevant, it will effectively assign that scenario 100 per cent weight.
- Including other[86] actionable ISP projects across all states of the world.
- Treating non-actionable ISP projects (that is, future projects and ISP development opportunities) as modelled projects. Further guidance on this is under section 4.3.6, including example 12.

[83] AER, *Application guidelines: RIT–T*, August 2020, Examples 4 and 5.

[84] NER clause 5.15A.3(7)(iv) directs the RIT–T to specify that the RIT–T proponent must: 'adopt the most recent ISP parameters, or if the RIT–T proponent decides to vary or omit an ISP parameter, or add a new parameter, then the RIT–T proponent must specify the ISP parameter which is new, omitted or has been varied and provide demonstrable reasons why the addition or variation is necessary'.

[85] AER, *RIT–T*, August 2020, paragraphs 7(b), 18, 20(a), 26, 28.

[86] That is, actionable ISP projects other than the project undergoing the RIT–T application, which will not be in the base case.

The CBA guidelines *require* that 'demonstrable reasons' for departing from ISP parameters be limited to where there has been a material change that AEMO would, but is yet to reflect in, a subsequent IASR, ISP or ISP update. For example, this might include a material change in circumstances, such as where the AER has published updated VCR values that AEMO is yet to incorporate in the IASR. Where a material change is not a change in circumstances or facts (for example, a change in the RIT–T proponent's understanding or assessment of the facts, rather than a change in the facts themselves), the RIT–T proponent might choose to attain written confirmation of the change from AEMO.

Moreover, the RIT–T instrument also specifies that if the RIT–T proponent decides to vary the discount rate set out in the ISP parameters, it must still use a commercial discount rate that is appropriate for the analysis of a private enterprise investment in the electricity sector and consistent with the cash flows being discounted.[87]

4.3.4 Valuing costs

The RIT–T instrument specifies that costs are the present value of a credible option's direct costs.[88] Under NER clause 5.15A.3(b)(6), these must include the following classes of costs:

- Costs incurred in constructing or providing each credible option. For completeness, the market value of land is a direct cost of providing the credible option. This applies even if the credible option entails building on a previously acquired easement. This is because costs associated with previous land acquisitions are not sunk costs to the extent that the RIT–T proponent can otherwise sell the land.
- Operating and maintenance costs in respect of each credible option. The RIT–T instrument specifies that the RIT–T proponent must quantify operating and maintenance costs in respect of the operating life of the credible option.[89] A consequence of this is that, if the modelling period is shorter than the life of the credible option, the RIT–T proponent is *required* to incorporate the operating and maintenance costs (if any) for the remaining years of the credible option into the terminal value.
- Costs of complying with relevant laws, regulations and applicable administrative requirements in relation to the construction and operation of each credible option. There may be cases where the RIT–T proponent can lawfully pay a financial amount rather than undertake some other action for compliance.[90] In such cases, the RIT–T proponent *must consider* whether the financial amount is smaller than the costs of undertaking some other action before determining whether it should treat the financial amount as part of that credible option's costs. However, to satisfy the RIT–T instrument, a RIT–T proponent must exclude any costs (or negative benefits) of a credible option's harm to the environment or to any party that is not prohibited under the relevant laws, regulations

[87] AER, *RIT–T*, August 2020, paragraphs18–19.
[88] AER, *RIT–T*, August 2020, paragraph 5.
[89] AER, *RIT–T*, August 2020, paragraph 5(b).
[90] For example, purchasing renewable energy certificates rather than reducing emissions.

or legal instruments.[91] For further guidance on this area, see the RIT–T application guidelines.[92]

- Any other class of costs that the RIT–T proponent determines to be relevant and that we have agreed to in writing before the RIT–T proponent makes the relevant project assessment draft report available to other parties under NER clause 5.16A.4, or that is specified as a class of cost in the RIT–T instrument.

There may be material uncertainty regarding the costs of a credible option when the RIT–T proponent undertakes the RIT–T assessment. If there is a material degree of uncertainty in the costs of a credible option, the RIT–T instrument states that the RIT–T proponent must calculate the expected cost of the option under a range of different reasonable cost assumptions.[93]

For the avoidance of doubt, the term 'cost assumptions' is distinct from the terms reasonable or relevant scenarios used elsewhere in the RIT–T instrument and the CBA guidelines. The direct costs of a credible option may vary for reasons other than the nature of the relevant/reasonable scenario. For example, the direct costs of a credible option may be uncertain because they depend on variables such as exchange rates, the price of copper or the price of thermal coal. Similarly, whether a relevant/reasonable scenario reflects high or low demand growth is unlikely to affect the costs of a credible option. This is why the RIT–T instrument directs RIT–T proponents to undertake a weighted averaging of the direct costs of a credible option differently to its calculation of the market benefits of a credible option.[94]

Example 11 shows how to calculate costs under uncertainty.

Example 11: Calculating the expected cost

Consider an identified need where there are three credible options—a network option, generation option, and demand-side option.

For each of the three credible options, the RIT–T proponent also considered three cost assumptions ('Low', 'Medium' and 'High').

The three cost assumptions and associated probabilities of occurrence for each credible option were:

- Network option:
  - Low (low steel prices; favourable exchange rate) = 15 per cent
  - Medium (medium steel prices; average exchange rate) = 55 per cent
  - High (high steel prices; unfavourable exchange rate) = 30 per cent.
- Generation option:
  - Low (low steel prices; low labour costs) = 10 per cent
  - Medium (medium steel prices; medium labour costs) = 50 per cent
  - High (high steel prices; high labour costs) = 40 per cent.

[91] That is, to comply with AER, *RIT–T*, August 2020, paragraph 4.
[92] AER, *Application guidelines: RIT–T*, August 2020, example 6.
[93] AER, *RIT–T*, August 2020, paragraph 6.
[94] AER, *RIT–T*, August 2020, paragraphs 6–7.

- Demand-side option:
    - Low (low implementation and maintenance costs) = 30 per cent
    - Medium (medium implementation and maintenance costs) = 50 per cent
    - High (high implementation and maintenance costs) = 20 per cent.

As table 9 outlines, the RIT–T proponent can calculate an expected cost for each credible option by taking a weighted-average across cost assumptions.

Table 9: Calculating expected cost ($m)

Credible option	Low cost assumption	Medium cost assumption	High cost assumption	Expected cost
Network option	22.5	25	32.5	26.9
Generation option	23	27	29	27.4
Demand-side option	5	6	7	5.9

4.3.4A Cost estimation

Cost estimation accuracy

Where the estimated capital costs of the preferred option exceeds $100 million (as varied in accordance with a cost threshold determination as contemplated by clause 5.16.4(k)(10)(i) of the NER), a RIT–T proponent must, in a RIT–T application:

- outline the process it has applied, or intends to apply, to ensure that the estimated costs are accurate to the extent practicable having regard to the purpose of that stage of the RIT-T,[95]
- for all credible options (including the preferred option), either:
    - apply the cost estimate classification system published by the Association for the Advancement of Cost Engineering (AACE), or
    - if it does not apply the AACE cost estimate classification system, identify the alternative cost estimation system or cost estimation arrangements it intends to apply, and provide reasons to explain why applying that alternative system or arrangements is more appropriate or suitable than applying the AACE cost estimate classification system in producing an accurate cost estimate.

This requirement does not apply where the preferred option or credible option relates to a program of works, but where no individual component of that program has an estimated capital cost in excess of $100 million (as varied in accordance with a cost threshold determination as contemplated by clause 5.16.4(k)(10)(i) of the NER).

A RIT–T proponent is not required to apply a specific classification level within the AACE cost estimate classification system, but must set out what level of accuracy they have assumed and why the cost estimate falls within the specified class. The AACE classification adopted may appropriately vary both across credible options within the same RIT-T, and at different stages of the RIT-T process, provided that in each case the cost estimates provide an appropriate basis for ranking the credible options under the RIT-T.

We also encourage all RIT–T proponents, where the estimated capital costs of the preferred option is less than $100 million (as varied in accordance with a cost threshold as contemplated by clause 5.16.4(k)(10)(i) of the NER), to consider outlining the process it intends to apply to ensure that the estimated costs of each credible option are as accurate as possible.

Additional cost estimation information and contingency allowances

Being as transparent as possible about how a cost estimate of a credible option is arrived at, in a way that is comprehensible to all interested stakeholders, is important. This includes, to the extent possible (subject to any properly made claims for confidentiality), identifying and disclosing the component parts or breakdown of that cost estimate

Accordingly, for each credible option, a RIT–T proponent must specify, to the extent practicable and in a manner which is fit for purpose for that stage of the RIT-T:

- all key inputs and assumptions adopted in deriving the cost estimate
- a breakdown of the main components of the cost estimate

[95] NER, cl. 5.16.2(c)(2).

- the methodologies and processes applied in deriving the cost estimate (e.g. market testing, unit costs from recent projects, and engineering-based cost estimates)
- the reasons in support of the key inputs and assumptions adopted and methodologies and processes applied
- the level of any contingency allowance that have been included in the cost estimate, and the reasons for that level of contingency allowance.

Contingency allowances are often included in cost estimates to allow a RIT-T proponent to take into account uncertainty in the costs of a credible option. If a contingency allowance is included in a cost estimate for a credible option, the RIT-T proponent must explain:[96]

- the reasons and basis for the contingency allowance, including the particular costs that the contingency allowance may relate to
- how the level or quantum of the contingency allowance was determined.

4.3.5 Market benefit classes

Under NER clause 5.15A.3(b)(4), when applying the RIT–T to an actionable ISP project, the RIT–T proponent must quantify all classes of market benefits identified in the relevant ISP and may also consider other classes of market benefits in accordance with the CBA guidelines (as set out in section 3.3.4).

A RIT–T proponent has *discretion* when considering whether to quantify a market benefit class set out in section 3.3.4 that AEMO did not include in the ISP. In applying its *discretion*, the RIT–T proponent should consider whether:

- doing so is likely to materially affect the outcome of the CBA
- the associated computational burden of including it is not expected to be disproportionate to the potential benefits.

If the identified need in the ISP is for reliability corrective action, under NER clause 5.15A.3(b)(5), the quantification of market benefits will only apply insofar as the market benefit delivered by the credible option exceeds the minimum standard required for reliability corrective action.

[96] NER, cl. 5.16A.2(c)(8).

4.3.6 Methodology for valuing market benefits

Under the RIT–T instrument, the RIT–T proponent must calculate the market benefits of credible options by assessing the market benefits with and without each credible option—specifically, this entails calculating a credible option's market benefits by:[97]

i. deriving the states of the world with and without the credible option in place under each relevant scenario; and

ii. comparing, for each relevant scenario, the state of the world with the credible option in place against the state of the world in the base case.

Under the RIT–T instrument, RIT–T proponents must calculate the final net economic benefit by weighting the benefits in each relevant scenario by the likelihood of that scenario occurring, as directed by AEMO.[98] That is, after a RIT–T proponent completes step (ii) above, and only where AEMO directs the RIT–T proponent to use more than one scenario, the RIT–T proponent must complete a third step of weighting any positive or negative benefit derived in (ii) by the likelihood-based weightings that AEMO has prescribed for each relevant ISP scenario.

The following sections describe this three-step process in more detail.

Deriving states of the world

Under the RIT–T instrument, to calculate market benefits for each credible option, a RIT–T proponent must derive the states of the world with and without the credible option in place under each relevant scenario, or adopt the states of the world determined through the ISP if applicable.[99] A state of the world is a detailed description of all the relevant market supply and demand characteristics and conditions likely to prevail if a credible option proceeds or in the base case.

The pattern of generation development (incorporating capacity, technology, location and timing) will likely vary depending on which credible option proceeds (noting there may be little variation if credible options are similar to each other). To capture the pattern of generation development, the RIT–T instrument directs the RIT–T proponent to use the ISP parameters to derive appropriate:[100]

- Committed projects: these must form part of all states of the world, consistent with the treatment of existing assets and facilities.
- Actionable ISP projects: these projects constitute 'ISP parameters' and must form part of all states of the world, consistent with the treatment of committed projects. This is with exception to the actionable ISP project undergoing the RIT–T application, which the RIT–T proponent must exclude from the base case states of the world (see the description of the 'take one out at a time' approach below).

[97] AER, *RIT–T*, August 2020, subparagraph 7(a) and as required under NER, clause 5.15A.3(b)(7)(v).
[98] AER, *RIT–T*, August 2020, subparagraph 7(b).
[99] AER,*RIT–T*, August 2020, subparagraph 7(a).
[100] AER, *RIT–T*, August 2020, paragraphs 24–28. See the RIT–T for definitions of committed, anticipated and modelled projects.

- Anticipated projects: these projects constitute 'ISP parameters' and the RIT–T proponent must apply the ISP to include these in all relevant states of the world.
- Modelled projects: Appropriate market development modelling will determine which modelled project to include in a given state of the world. For completeness, where the RIT–T proponent adopts the market modelling from the ISP, ISP projects that are not actionable ISP projects (that is, future ISP projects and ISP development opportunities) will usually be modelled projects.

Under the RIT–T instrument, all RIT–T applications to actionable ISP projects must explore an ISP candidate option as a credible option.[101] Since the ISP candidate option will form part of the optimal development path, the RIT–T proponent must remove that candidate option from all states of the world in the base case or where a different credible option is in place.[102] This is a 'take one out at a time' approach, and allows the RIT–T proponent to estimate an individual project's incremental market benefit.

Example 12 illustrates how to apply the 'take one out at a time' approach to calculate the market benefits of an ISP candidate option.

Example 12: Take one out at a time approach to ISP candidate options

The ISP has identified a transmission extension to a renewable energy zone (REZ1) as an ISP candidate option (Project B). Project B is an actionable ISP project that forms part of the optimal development path.
The RIT–T proponent will estimate the market benefits of the generation expansion path from building Project B, which results in extending the network to REZ1, by doing the following:

- Including all actionable ISP projects (including Project B) in each scenario that the ISP identifies as relevant (which may only be one of the ISP scenarios). These results will reflect states of the world with Project B in place.
- Including all future ISP projects and modelled transmission projects where scenario appropriate.
- Obtaining or deriving the base case state or other states of the world (such as where a different credible option is being tested) without Project B present. Where the ISP has not reported this information, the RIT–T proponent might request results of relevant states of the world without Project B from AEMO (if available) or work with AEMO to re-run the ISP modelling to generate the required results. Alternatively, the RIT–T proponent could independently undertake market modelling for each relevant scenario to identify the generation expansion path without the extension to REZ1.
- For each relevant scenario, calculating the difference in generation investment and dispatch costs between the expansion path in each base case and the expansion path with the extension to REZ1 in place. This will reflect changes in the location and/or type of generation plant compared with the base case.

[101] AER, *RIT–T*, August 2020, subparagraph 2(c)(i) and as required under NER, clause 5.15A.3(b)(7)(iii)(A).
[102] AER, *RIT–T*, August 2020, subparagraph 26(a).

Deriving market benefits

Under the RIT–T instrument, to derive the market benefit of a credible option in a given scenario, the RIT–T proponent must compare the state of the world with the option in place with the base case state of the world. Moreover, the RIT–T proponent must apply this derivation across all relevant scenarios (insofar as multiple scenarios are relevant), as shown in example 13.[103]

Example 13: Deriving market benefits across states of the world

Assume the ISP specifies an identified need where there are three credible options:

- a network option, which is the ISP candidate option
- a generation option, which is a non-network option identified in the ISP as being reasonably likely to meet the identified need
- a demand-side option, which was not previously considered in the ISP.

This analysis will require deriving four states of the world (and consequently, four market development paths) in respect of each relevant scenario. These include where: (1) neither credible option is implemented (the base case), (2) the network option is implemented, (3) the generation option is implemented, and (4) the demand-side option is implemented.

Assume the ISP has identified that two scenarios are relevant to the ISP project—the most likely moderate growth scenario and the fast growth scenario (from example 1). Given this, the RIT–T proponent must:

- **derive** a network option, generation option, demand-side option and base case states of the world under the most likely and fast growth scenarios
- **compare** the credible option and base case states of the world under conditions of the most likely and fast growth scenarios.

This will require eight market development modelling paths to establish eight states of the world*:*

1. network option in the most likely scenario
2. generation option in the most likely scenario
3. demand-side option in the most likely scenario
4. base case in the most likely scenario
5. network option in the fast growth scenario
6. generation option in the fast growth scenario
7. demand-side option in the fast growth scenario
8. base case in the fast growth scenario.

[103] AER, *RIT–T*, August 2020, Paragraph 7.

It will then be necessary to compare:

- (1), (2) and (3) against (4)
- (5), (6) and (7) against (8).

This should yield the market benefits of the network, generation and demand-side option in each of the two relevant scenarios.

Weighting market benefits

Under the RIT–T instrument, the RIT–T proponent must weight the market benefits in each relevant scenario consistently with the likelihood-based weightings provided in the ISP.[104] For any RIT–T application where AEMO has not specified which scenario/s or weightings to apply, the RIT–T proponent *must consider* the AER's guidance on estimating probability-based weightings as set out in the previous RIT–T application guidelines that applied to all RIT–T projects.[105]

Example 14 continues from example 13 by showing how to probability-weight relevant scenarios to calculate weighted market benefits.

Example 14: Weighting market benefits across states of the world

This example continues example 13 where the RIT–T proponent is considering three credible options across the two relevant scenarios. The three credible options are a: network option, generation option, and demand-side option. The two relevant scenarios are the most likely moderate growth scenario and the fast growth scenario.

Assume the three credible options' market benefits relative to the base case under the two scenarios are as per table 10.

Table 10: Market benefits of credible options across relevant scenarios ($m)

Credible option	Market benefit, Most likely	Market benefit, Fast growth
Network option	45	5
Generation option	40	20
Demand-side option	10	25

Assume the ISP specifies that for the actionable ISP project under consideration, the relative likelihoods of the two relevant scenarios are:

- moderate growth = 80 per cent
- fast growth = 20 per cent.

[104] AER, *RIT–T*, August 2020, subparagraph 7(b).

[105] That is, under AER, *Application guidelines: RIT–T*, December 2018.

Calculating the weighted market benefit across the relevant scenarios requires one more step than the analysis for generating the results in table 10. For each credible option, the market benefit under each relevant scenario must be weighted in accordance with the relative likelihood that the ISP assigns that scenario. This generates one market benefit estimate for each credible option, as outlined in table 11 below.

Table 11: Calculating weighted market benefit ($m)

Credible option	Market benefit × weight, moderate growth	Market benefit × weight, fast growth	Relative likelihood-weighted market benefit
Network option	45 × 80%	5 × 20%	37
Generation option	40 × 80%	20 × 20%	36
Demand-side option	10 × 80%	25 × 20%	13

4.3.7 Selecting the preferred option

Consistent with NER clause 5.15A.1(c), the preferred option is the credible option that maximises the net economic benefit across the market, compared to all other credible options. The net economic benefit of a credible option is simply the market benefit less the costs of the credible option. Under NER clause 5.15A.1(c), the preferred option may have a net economic cost where the identified need is for reliability corrective action, providing inertia network services required under NER clause 5.20B.4, or providing system strength services required under NER clause 5.20C.3.

Example 15: Calculating weighted net economic benefit

This example builds on example 14 and example 11. Combining the information in table 9 and table 11 allows a single net economic benefit to be calculated for each credible option. The net economic benefits and ranking of each of the credible options is outlined in table 12.

Table 12: Calculating expected net economic benefits ($m)

Credible option	Relative likelihood-weighted market benefit	Expected cost	Expected net economic benefit	Ranking
Network option	37	26.9	10.1	1
Generation option	36	27.4	8.6	2
Demand-side option	13	5.9	7.1	3

4.3.8 Sensitivity testing

RIT–T proponents *must perform* sensitivity testing on all credible options by varying one or multiple inputs/assumptions. Sensitivity testing allows the RIT–T proponent to test and show how robust the CBA output is to its input assumptions or to particular events occurring insofar as they are relevant to the particulars of the RIT–T assessment (such as relevant project delays, early asset retirements or particular high impact low probability events). In considering whether or how to perform sensitivity testing, the RIT–T proponent *must have regard to* any relevant risks identified in stakeholder submissions, and whether sensitivity testing would build on the analysis already undertaken in the ISP and be proportionate and relevant to the RIT–T assessment.

The RIT–T proponent has *discretion* to illustrate 'boundary values' for important input assumptions (such as the discount rate and VCR) at which the preferred option changes. For example, if the preferred option changes when the discount rate falls below 5.0 per cent or rises to above 13.0 per cent, then the boundary values for the discount rate will be 5.0–13.0 per cent. The RIT–T proponent can then discuss the plausibility of the discount rate falling outside those boundary values and evaluate the risk of that credible option. In this example, the RIT–T might determine that the discount rate is unlikely to fall below 5.0 per cent or rise above 13.0 per cent. In this case, the RIT–T proponent can be confident that the results of its CBA are robust to the discount rate.

4.3.9 Suitable modelling periods

The RIT–T proponent *must consider* using the ISP modelling period (also known as the planning horizon) of 20+ years as the default when assessing credible options to meet identified needs arising out of the ISP. A RIT–T proponent might use a different modelling period to the ISP because there may be:

- Some circumstances where the expected profile of the market benefits and costs of the ISP candidate option are longer than the modelling period used in the ISP. In these circumstances, the RIT–T proponent *must consider* whether it might be valuable to adopt a longer modelling period, whilst also considering the need for alignment with the ISP. In such cases, the RIT–T proponent might adopt a longer modelling period so that by the end of the period, the network is in a ‘similar state’ to where it was at the time of the investment in relation to needing to meet a similar identified need.
- Some relatively incremental ISP candidate options where the RIT–T proponent *must consider* whether a shorter period would reduce the computational burden without compromising the quality of the CBA or undermining alignment with the ISP. However, we expect that the size, complexity and expected life of ISP candidate options would typically warrant a modelling period matching the ISP modelling period.

Where the modelling period is shorter than the expected life of a credible option, the RIT–T proponent is *required to* include any relevant and material terminal values in its discounted cash flow analysis. The RIT–T proponent is *required* to explain and justify the assumptions underpinning its approach to calculating the terminal value, which represents the credible option's expected cost and benefits over the remaining years of its economic life.

4.4 Staged projects under the ISP framework

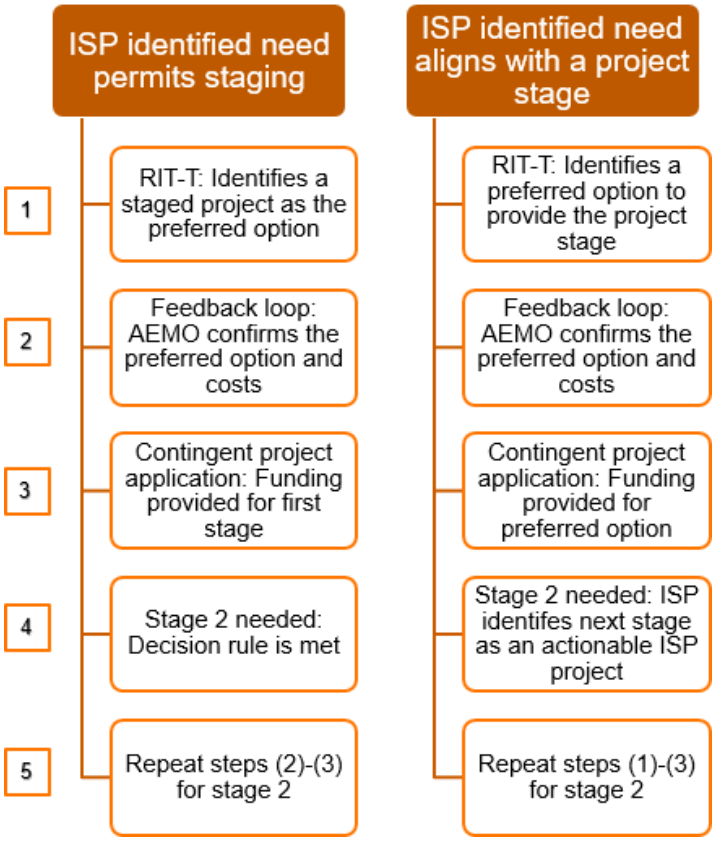
This section provides guidance on how staged projects progress through the ISP, RIT–T application process, feedback loop and contingent project application process.

As discussed in section 3.4.2, projects that address identified needs arising from the ISP can be staged at:

- the RIT–T level by AEMO specifying an identified need that allows for staging. In such cases, the actionable ISP project may or may not be a staged project; or
- the ISP level, by AEMO forming an identified need that a stage of a project would address. In such situations, the actionable ISP project will be one stage of a project.

Figure 4 illustrates how projects progress through the regulatory approval process differently under the two different staging mechanisms. The main difference occurs at step (4). That is, when a staged project is identified through the RIT–T application, the decision to commence the next stage is determined by a decision rule being met. Another RIT–T application is not required unless there has been a material change in circumstances not contemplated by the decision rule. This is because the first RIT–T application had already tested both stages. In contrast, when the project stage is identified as an actionable ISP project, AEMO will determine when (or if) the next stage will commence in a subsequent ISP. The RIT–T proponent will need to apply the RIT–T to the second stage of the project as the previous RIT–T application only tested the first stage.

Figure 4: Progression of staged actionable ISP projects



The first part of example 16 below builds on example 10 to illustrate how, after a RIT–T proponent formulates a staged option, how this project would progress through the regulatory framework. The second part of example 16 illustrates how a project stage identified as an actionable ISP project would progress through the regulatory framework.

Under clause 5.16A.5 of the NER, the TNSP must go through AEMO's feedback loop (see section 3.5.3) before submitting each contingent project application where staging has occurred at the RIT–T level. For the purposes of clause 5.16A.5(b) of the NER, the relevant cost is the cost for the particular stage.[106] However, AEMO also *must have regard to* the full cost of the project in in providing its written confirmation, under clause 5.16A.5(b) of the NER, that the status of the project remains unchanged.

Example 16: Progression of staged actionable ISP projects

Progression of a staged preferred option identified in a RIT–T application

- This example builds on example 10, where the RIT–T proponent developed two staged credible options with option value. Assume that, after applying the RIT–T, the RIT–T proponent identifies one of these staged credible options (Option (c)) as the preferred option. Option (c) has two stages —'Stage 1' and 'Stage 2'.
- Assume there is no RIT–T dispute and AEMO provides written confirmation that Option (c) (including the decision rule) is consistent with the optimal development path. On this basis, the trigger event has occurred that allows the TNSP to submit a contingent project application for Stage 1. Assume the AER approves the contingent project and the TNSP proceeds to invest in Stage 1.
- In this example, Stage 2 will form part of the optimal development path in a subsequent ISP if AEMO judges that:
- the decision rule is expected to be met within the following two years (otherwise AEMO would likely treat Stage 2 as a modelled project); and
- there have been no other material changes in circumstances that would otherwise result in Stage 2 being inconsistent with the optimal development path (such material changes may warrant a RIT–T reapplication).

Assume that in a subsequent ISP, AEMO finds that Stage 2 forms part of the optimal development path. In this case:

- The ISP does not specify a specific identified need or actionable ISP project for Stage 2 as a previous ISP already specified the identified need and actionable ISP project associated with this project. On this basis, once it has been determined that the decision rule will be met, Stage 2 should be treated as part of the 'actionable ISP project' for the purposes of the RIT–T instrument.
- The timing of Stage 2 reflects the decision rule in the previous RIT–T application.
- Stage 2 costs reflect the latest cost estimates that AEMO has developed (in consultation

[106] This cost is also the relevant cost for clause 5.16A.5(d).

with the relevant TNSP) for the latest ISP.

In this example, the TNSP does not re-apply the RIT–T for Stage 2, because the economic outcomes align with the contingencies/decision rule contemplated in its previous RIT–T application.

As such, the previous RIT–T application covering both stages of Option (c) is sufficient to satisfy the contingent project trigger for an actionable ISP project (or stage of an actionable ISP project), as long as the feedback loop is satisfied and any dispute is resolved. If, when the decision rule is met, the costs of Stage 2 have increased since the previous RIT–T application, AEMO's feedback loop will test whether the cost increase changes the status of Stage 2 as forming part of the optimal development path.

Once the trigger event is met, the TNSP can submit a contingent project application to the AER for Stage 2 of Option (c).

Progression of an 'early works' project stage identified in the ISP

This example does not build on a previous worked example.

Assume the ISP:

- Includes an identified need to increase net economic benefits through increasing network transfer capacity by 1,000 MW between two regions three years earlier than would otherwise be the case in the event that NEM development reflects what the ISP has identified/labelled as a 'step change scenario'.
- Includes an ISP candidate option to complete early works for an interconnector. This is where early works would be 'Stage 1' of a staged project, and 'Stage 2' would be to build the interconnector.
- Has determined that only Stage 1 should be an actionable ISP project because of the uncertainty around the optimal timing and occurrence of Stage 2. In particular, while the expeditious implementation of Stage 2 would be net beneficial under the 'step change scenario', Stage 2 would come at a net cost under an ISP scenario that AEMO has identified/labelled as the 'slow change scenario'. As such, a future ISP will determine whether Stage 2 will become actionable.
- Directs the RIT–T proponent to explore multiple ISP scenarios, given that option value is driving the market benefits of addressing the identified need. The ISP specifies that the step change, the slow change and a 'central scenario' are relevant.
- Given the direction provided in the ISP, the RIT–T proponent applies the RIT–T by:
- Including Stage 1 as a credible option, given it is the ISP candidate option. No credible option includes Stage 2, as the cost and scope of doing so is far greater than what is needed to meet the identified need. Assume that after considering whether any alternative credible options could meet the identified need, the RIT–T proponent determines that the ISP candidate option is the only credible option in this instance.[107]

[107] Note that this may, but will not necessarily be the case for identified needs that are met by early works.

- Forming a base case that includes all other actionable ISP projects and modelled future ISP projects (where scenario appropriate). In this case, the un-staged interconnector project (that is, the way the interconnector would proceed in the absence of staging) would be a modelled project that the RIT–T proponent will include in the base case where scenario appropriate (consistently with AEMO's modelling). In this example, this would mean that the un-staged interconnector project will not occur in the slow change scenario, but will occur three years later in the step change scenario (relative to when the credible option is implemented).
- Drawing on the ISP modelling to calculate the net economic benefits of the credible option. These would be driven by:
    - The net benefits of being able to bring Stage 2 forward by three years in the step change scenario. AEMO's modelling indicates this would have substantial benefits in terms of NEM investment and dispatch outcomes, which would more than offset the costs of bringing the investment forward (driven by the time value of money).
    - The costs of bringing early works forward in the step change and central scenarios, relative to when these would occur in the base case. This would be driven by the time value of money, and potentially the need to redo some of the early works (if the lapse in time has resulted in some of this work becoming outdated).
    - The costs of undertaking early works in the slow change scenario, relative to the base case where none of these costs would occur (because in this example, the interconnector is not needed in the slow change scenario).
- Assume the RIT–T proponent identifies the ISP candidate option as the preferred option and the relevant trigger event for the contingent project is satisfied. In this case, the TNSP submits a contingent project application for Stage 1. The AER makes its contingent project determination solely in respect of the costs of Stage 1, and the TNSP commences Stage 1.
- Assume AEMO identifies Stage 2 as an actionable ISP project in a subsequent ISP, and identifies the interconnector as an ISP candidate option. The TNSP applies a RIT–T to Stage 2 and finds that the ISP candidate option is the preferred option. After receiving feedback loop confirmation from AEMO (and after any relevant RIT–T dispute has been resolved), the TNSP will lodge a new contingent project application for Stage 2.

4.5 RIT–T consultation process for actionable ISP projects

NER clause 5.16A.4 establishes two formal stages for RIT–T proponents to follow when applying the RIT–T to actionable ISP projects—a project assessment draft report (Draft Report) and project assessment conclusions report (Conclusions Report).

4.5.1 Consumer and non-network engagement

The NEO calls TNSPs to operate their networks in the long-term interests of electricity consumers. Accordingly, TNSPs should engage with their consumers so they can provide

services that align with their long term interests. This section includes guidance on how best practice consumer engagement can occur in RIT–T applications. Taking a best practice approach to consumer and non-network engagement should help RIT–T proponents to:

- identify the preferred option, by allowing a suitable range of credible options (in addition to the ISP candidate option) to be considered and by providing additional scrutiny to the analysis to ensure it is robust
- apply the RIT–T in a way that is credible, which reduces the scope for misunderstandings and disputes, and increases our ability to fast-track further regulatory assessments on expenditure related to that project.

In line with best practice, the RIT–T proponent *must consider* describing in each RIT–T report how it has:

- engaged with consumers, as well as other stakeholders; and
- sought to address any relevant concerns identified as a result of that engagement.

The RIT–T proponent:

- *Must consider* undertaking early engagement with consumers, non-network businesses and other key stakeholders to the extent that doing so complements rather than duplicates or hinders AEMO's engagement work in developing the ISP. Such early engagement might occur through consultation on the RIT–T proponent's annual planning reports and might aim to equip prospective non-network proponents to propose more suitable or effective credible options.
- Is *required to* provide transparent, user-friendly data to stakeholders, to the extent this protects commercially sensitive information and is not already provided by the ISP. In doing so, the RIT–T proponent *must have regard* to how it can present information in line with stakeholder preferences.
- Must *have regard to* how it can adopt best practice consumer engagement in line with our 'consumer engagement guideline for network service providers'.[108] As part of this, the RIT–T proponent should:
    - Make efforts to understand broader consumer views, recognising that the consumers who do not actively participate in consultation with TNSPs can be those most affected by investment decisions. As an example, such efforts might include convening a consumer reference group for more significant projects.
    - Recognise that making submissions during the RIT–T application process takes considerable time and effort on the part of consumers. We encourage RIT–T proponents to give adequate weight to the suggestions made and perspectives offered by consumers in their submissions. We also encourage RIT–T proponents to be aware of demands placed on stakeholders when there are multiple consultation processes on foot. For instance, strategies such as early engagement

[108] The AER may update these guidelines from time to time. The current version at the time of drafting is AER, *Better Regulation, Consumer Engagement Guideline for Network Service Providers*, 2013.

or being flexible to consider suggestions made outside written submissions might prove beneficial.

4.5.2 Project assessment draft report

Under NER clause 5.16A.4(c), the RIT–T proponent must publish a Draft Report by the date specified in the ISP for that project or a longer period that we have agreed to in writing.

Information required for the Draft Report

Under NER clause 5.16A.4(d), the Draft Report must include:

- The identified need set out in the ISP (including, in the case of proposed reliability corrective action, why reliability corrective action is necessary).
- A description of each credible option assessed. For completeness, these credible options must include:
    - the ISP candidate option or ISP candidate options, which may include refinements of an ISP candidate option;
    - any non-network options identified in the ISP as being reasonably likely to meet the relevant identified need; and
    - any new credible options that were not previously considered in the ISP that meet the identified need (including any non-network options proposed in response to actionable ISP projects that were first included in the final ISP).[109]
- A quantification of the costs, including a breakdown of operating and capital expenditure for each credible option.
- An assessment of the market benefits with and without each credible option and accompanying explanatory statements regarding the results.
- If applicable, demonstrable reasons for varying any ISP parameters.
- The RIT–T proponent's proposed preferred option, including details of the technical characteristics and the estimated construction timetable and commissioning date.
- As per NER clause 5.16A.4(d)(1), any other matters as *required* by the CBA guidelines, which include:
    - if applicable, demonstrable reasons for adopting different modelling techniques to what AEMO used in the ISP; and
    - if applicable, an explanation as to why any non-network options proposed in response to new actionable ISP projects in the final ISP are not credible options.

Consultation process

NER clauses 5.16A.4(e)–(h) and (m) prescribe the consultation process in this section.

[109] In accordance with NER clause 5.22.14(c)(1)), AEMO must call for proposals of non-network options for projects in the final ISP that were not included in the draft ISP. Otherwise, proposals for non-network options occur at the draft ISP stage.

Promptly after finalising the Draft Report, the RIT–T proponent must provide it to AEMO. The RIT–T proponent and AEMO must publish the Draft Report on their websites within five business days of the RIT–T proponent finalising the Draft Report.

The RIT–T proponent must seek submissions from registered market participants, AEMO and interested parties on the proposed preferred option presented, and the issues addressed in the Draft Report. Seeking submissions in this context should entail the RIT–T proponent publishing a request for submissions on its website. The period for consultation must be not less than six weeks from the date that AEMO publishes the Draft Report on its website.

Within four weeks after the end of the consultation period, at the request of an interested party, a registered participant or AEMO, the RIT–T proponent must meet with the relevant party if two or more relevant parties request a meeting. The RIT–T proponent may meet with a relevant party if, after considering all submissions, it considers that the meeting is necessary.

NER clause 5.16A.4(m) exempts a RIT–T proponent from drafting a Draft Report if:

- the estimated capital cost of all credible options is less than $35 million (as varied in accordance with a cost threshold determination);
- AEMO has identified in the relevant draft ISP that the identified need to be addressed relates to reliability corrective action and will have the benefit of this exemption; and
- AEMO confirms that it did not receive submissions on the draft ISP identifying additional credible options that could deliver a material market benefit.

4.5.3 Project assessment conclusions report

NER clauses 5.16A.4(i)–(l) prescribe the consultation process in this section.

As soon as practicable after the consultation period for the Draft Report, the RIT–T proponent must make available its Conclusions Report to all registered participants, AEMO and interested parties.[110] We consider 'as soon as practicable' to be as soon as possible and practical taking into account the individual circumstances. In this context, individual circumstances would include the complexity of issues that stakeholders raise in submissions on the Draft Report. When considering what constitutes 'as soon as possible', we will likely have regard to how quickly RIT–T proponents have previously been able to produce Conclusions Reports.

The RIT–T proponent may discharge its obligation to make the Conclusions Report available this way by instead including it as part of its TAPR, as long as the TAPR is published within four weeks from when the Conclusions Report is finalised. While the NER provides this allowance, it is best practice to publish the Conclusions Report as a standalone document given its importance, and to facilitate greater transparency and readability.

[110] NER Chapter 10 includes definitions for registered participant, interested party and AEMO.

Promptly after finalising the Conclusions Report, the RIT–T proponent must provide it to AEMO. The RIT–T proponent and AEMO must publish the Conclusions Report on their websites within five business days of the RIT–T proponent finalising the Conclusions Report.

The Conclusions Report must set out:

- the matters required in the Draft Report (see section 4.5.2); and
- a summary of, and the RIT–T proponent's response to, submissions received from interested parties regarding the Draft Report.
- In addition to what the NER specify, the CBA guidelines r*equire* RIT–T proponents to publish, in addition to a summary of submissions, any submissions received in response to the Draft Report, unless marked confidential. In case of confidential submissions, a RIT–T proponent *must consider* working with submitting parties to make a redacted or non-confidential version public.

The Conclusions Report is *required* to be dated to inform potential disputing parties of the timeframes for lodging a dispute notice with the AER.

4.5.4 Reapplication of and reopening triggers for the RIT–T

Clause 5.16A.4(n) of the NER sets out that if a material change in circumstances has occurred, the RIT–T proponent must notify us of that and the actions it proposes to take as a result. The RIT–T proponent must also provide us with any information necessary to support the actions it proposes to take. Within 40 days, we must determine the actions the RIT–T proponent is to take. When making this determination, we must have regard to:

- the credible options (other than the preferred option) identified in the conclusions report
- the material change in circumstances identified by the RIT–T proponent
- whether a failure to promptly undertake the RIT–T project is likely to materially affect the reliability and secure operating state of the transmission network, or a significant part of that network
- whether the RIT-T proponent has had regard to:
    - whether, in the RIT-T proponent's reasonable opinion, reapplying the regulatory investment test for transmission to the RIT-T project is justified in the circumstances
    - the costs and delay that may result from the actions the RIT-T proponent proposes to take as a result of the material change in circumstances
    - the costs and delay that may result from the reapplication (in whole or in part) of the regulatory investment test for transmission to the RIT-T project.

Clause 5.16A.4(o)) of the NER provides that a material change in circumstances may include, but is not limited to:

- a change in the key assumptions used in identifying the identified need described in the project assessment conclusions report; or
- for a RIT-T project where the estimated capital cost of the preferred option is in excess of

$100 million (as varied in accordance with a cost threshold determination as contemplated by clause 5.16.4(k)(10)(i) of the NER) and where AEMO is not the sole RIT-T proponent, one or more RIT reopening triggers applying to the project have been triggered, or

- a change in circumstances which, in the reasonable opinion of the RIT-T proponent, means that the preferred option identified in the project assessment conclusions report may no longer be the preferred option.

Since RIT–T proponents should be applying the inputs, assumptions and scenarios from the most recent IASR (see section 0), if changes to key inputs, assumptions or scenarios trigger an ISP update, the RIT–T proponent should actively consider whether there has been a change in circumstances that materially affects its RIT–T project.

4.5.5 RIT reopening triggers

A RIT reopening trigger is defined in Chapter 10 of the NER as meaning:

> … the events, factors, or circumstances which, if they occur or eventuate would mean that the preferred option for a RIT-D project contemplated by clause 5.17.4(j)(13) or RIT-T project contemplated by clause 5.16.4(k)(10) or clause 5.16A.4(d)(9) may no longer be the preferred option, and may include a change in the key assumptions used in identifying or ranking the credible options for that project.

In addition to complying with the definition of a RIT reopening trigger, where the estimated capital cost of the preferred option exceeds $100 million (as varied in accordance with an applicable cost threshold determination under clause 5.16.4(k)(10)(i) of the NER) and where AEMO is not the sole RIT-T proponent, a RIT-T proponent must propose one or more relevant RIT reopening triggers. These RIT reopening triggers must be tailored to the specific circumstances of the project in question.

The principles that we consider should guide the development of a RIT reopening trigger are:

- identifying the key inputs and assumptions used in RIT modelling, and the events, factors and changes in circumstances that may alter those key inputs and assumptions
- identifying an event, factor or circumstance that would have a real, rather than a potential or a possible, likelihood on affecting the key inputs and assumptions and may eliminate net benefits of the preferred option and/or alters the ranking of credible option
- being objective and capable of being verified
- where possible, quantify boundary values of key inputs and assumptions, for example the cost limit of a project before the net benefits of the project becomes negative.

Worked examples of RIT reopening triggers and proposed actions that a RIT-T proponent may take in response to a material change in circumstances is set out in **Appendix B**.

5 Dispute resolution

This part of the CBA guidelines include guidelines on how we will address and resolve disputes raised in relation to the ISP (section 5.1) and RIT–T applications for actionable ISP projects (section 5.2). These guidelines explain the NER provisions relevant to ISP disputes, as well as how the AER intends to apply those provisions.

The guidelines in this section contain relevant information for AEMO and potential disputing parties, who should read this in conjunction with the relevant clauses of the NER (clause 5.23 for disputes on the ISP and clause 5.16B for disputes on RIT–T applications for actionable ISP projects).

5.1 Disputes on the ISP

This section sets out how we will address and resolve disputes raised in relation to an ISP. It provides information on who may raise a dispute, what matters can be disputed, how to lodge a dispute, and the process that we, AEMO and disputing parties must follow in resolving a dispute.

NER clause 5.23 sets out a dispute resolution process for disputing the procedures that AEMO must observe under the NER when making an ISP. These are also called 'prescribed ISP processes'.

5.1.1 Who can make an ISP dispute

NER clause 5.23.1(a) identifies a 'disputing party' as a person disputing one or more prescribed ISP processes to be observed by AEMO in connection with the making of an ISP, on the basis that they were not observed. Any person can lodge a dispute on the ISP.

5.1.2 What can be disputed

NER clause 5.23.1(a) only allows disputing parties to dispute 'prescribed ISP processes', which are the following subset of procedures that AEMO must observe when making an ISP:

- the processes for the IASR and ISP methodology under NER clause 5.22.8(b);
- the consultation for a draft ISP under clauses 5.22.11(a)(2) and (3), (b), (c) and (e) of the NER; and
- the obligations in respect of an ISP under NER clause 5.22.14(c).

5.1.3 Lodging a dispute

Under NER clause 5.23.1(c), within 30 days of AEMO publishing a final ISP, the disputing party must:

- give notice of the dispute in writing setting out the grounds for the dispute to us; and
- at the same time, provide a copy of the dispute notice to AEMO.

NER clause 5.23.1(b) states that the dispute notice must establish:

- that the disputing party made a submission in the prescribed ISP process(es)—if it did not, then the notice needs to set out the reasons for which the disputing party did not make a submission and should be entitled to raise a dispute;
- that AEMO has not observed one or more prescribed ISP processes; and
- the reasons why the AER should accept the dispute notice.

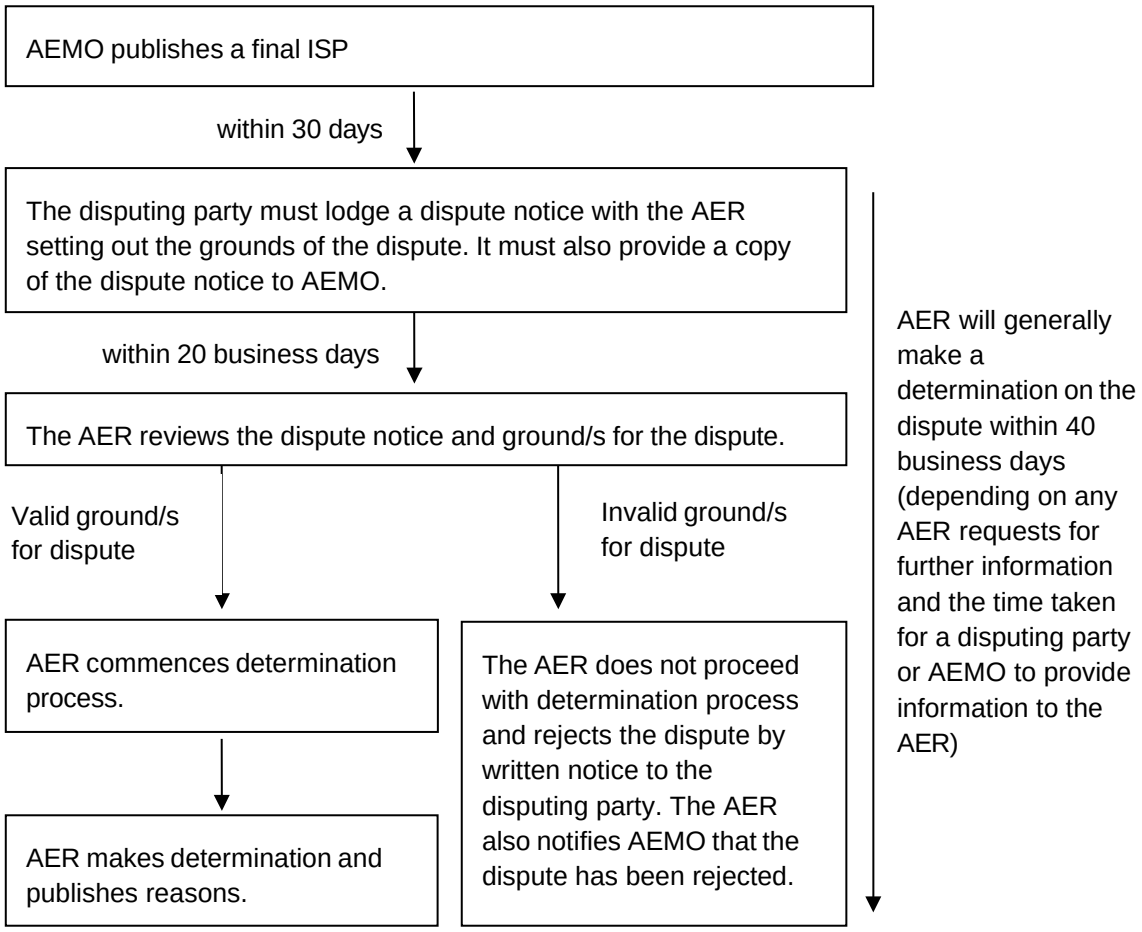
The dispute notice should also include the following information:

- the disputing party's name, a contact officer, address, email and telephone number
- the prescribed ISP process(es) that is the subject of the dispute
- the ground/s for the dispute
- any submissions the disputing party made to the prescribed ISP process, and any other relevant consultation process in the making of the ISP
- AEMO's reply to any submissions made to the prescribed ISP process, and any other relevant consultation process in the making of the ISP (if applicable)
- details of any meetings held by AEMO with the disputing party (if applicable)
- details of any other relevant meetings related to the prescribed ISP process(es) the disputing party attended (if applicable)
- details of any unanswered requests by the disputing party (if applicable)
- the details of any other known parties involved in the matter.

5.1.4 Procedure for a dispute

The AER, AEMO and disputing parties all have different obligations under NER clause 5.23 to ensure the timely resolution of disputes. Figure 5 summarises the process for resolving disputes on the ISP.

Figure 5: Dispute resolution process



Source: AER analysis; NER, clause 5.23.

Timeframe for resolving disputes

Under NER clause 5.23.4(a), we must either reject the dispute or make and publish a determination within 40 business days of receiving the dispute notice.

NER clause 5.23.3(c) allows use to extend the time for making our determination if we have requested further information regarding a dispute from the disputing party or AEMO, provided:

- we make the request for the additional information at least seven business days prior to the expiry of the period for making our determination; and
- AEMO or disputing party provides the additional information within 14 business days of receipt of the request.

Under these circumstances, the NER allow us to extend the time for making our determination by the time it takes the disputing party or AEMO to provide our requested information.

Initial AER review

Under NER clause 5.23.2, within 20 business days of receiving a dispute notice, we must review it and either:

- Reject the dispute by written notice to the disputing party, and notify AEMO. Under NER clause 5.23.2(a), we can only reject the dispute at this stage if we consider that:
    - based on the dispute notice, the disputing party has not established a prima facie case in respect of the matters under clause 5.23.1(b)(1), (2), or (3);
    - if clause 5.23.1(b)(4) applies, the reasons given are not sufficient to justify an entitlement to raise a dispute;
    - the matter was already considered in an AER transparency review (in an IASR review report or ISP review report);
    - that the grounds for the dispute and the reasons described are misconceived or lacking in substance; or
    - the dispute is vexatious.
- Accept the dispute notice and notify the disputing party and AEMO.

AER determination

If we accept a dispute notice, then under NER clause 5.23.4 and within the timeframes outlines above (see 'Timeframe for resolving disputes'), we must either reject the dispute or make and publish a determination.

If we reject the dispute, the NER state that we must:

- reject the dispute by written notice to the disputing party if we consider the grounds for the dispute are not established; and
- notify AEMO that the dispute has been rejected.

If we do not reject the dispute, the NER state that we must make and publish a determination:

- directing AEMO to remedy the non-observance with the prescribed ISP process, which direction may include requiring AEMO to consider whether an ISP update is required; or
- stating that, based on the grounds of the dispute, AEMO does not need to take any remedial action in respect of the ISP.

NER clause 5.23.4(c) specifies that, in making a determination, we:

- must publish our reasons for making the determination;
- may disregard any matter raised by the disputing party or AEMO that we consider is misconceived or lacking in substance;
- must only consider compliance with the prescribed ISP process;
- must not consider the merits of the conclusions of the ISP, or direct the amendment of the ISP, or require AEMO to undertake an ISP update; and

- must specify a reasonable timeframe for AEMO to comply with the determination (if applicable).

Effect of an AER determination

Under NER clause 5.23.4(b), AEMO must comply with our determination within the timeframe specified in the determination. If, having regard to the determination, AEMO considers it needs to provide an ISP update, then it must publish an ISP update in accordance with NER clause 5.22.15.

The raising of a dispute or the making of an AER determination does not affect the validity, or stay the operation, of the relevant ISP. NER clause 5.23.4(d) specifies that the relevant ISP will remain in effect until such time as replaced in whole or in part by an ISP update.

Requests for further information

We may request further information regarding a dispute from the disputing party or AEMO. Under NER clause 5.23.3(b), the disputing party or AEMO (as the case may be) must provide any information we request as soon as reasonably practicable.

A request for further information will be in writing and the notice will explain that:

- the request is being made under NER clause 5.23.3
- the timeframe within which AEMO or the disputing party should provide the information (generally 14 business days)
- under NER clause 5.23.3(c), the clock has stopped for when we must make a determination.

While the NER expressly provide for us to request information from AEMO or the disputing party, we are not prohibited from requesting information from a party that is external to a dispute. We may ask third parties to provide information voluntarily. We can also issue a notice under section 28 of the National Electricity Law (NEL).[111]

Depending on the nature of the information and our anticipated use of it, we may allow the applicant and/or disputing party an opportunity to comment on the information.

5.2 Disputes on RIT–T applications to actionable ISP projects

Under NER clause 5.16A.2(b)(2)(iii), the CBA guidelines must set out how we will address and resolve disputes raised in relation to RIT–T applications to actionable ISP projects.

NER clause 5.16B.5 sets out a dispute resolution process for disputing the conclusions that a RIT–T proponent has made in its Conclusions Report, for both actionable ISP projects and other RIT–T projects. These dispute resolution procedures align for both types of projects except that:

[111] A further description of section 28 notices is provided under AER, *Application guidelines: RIT–T*, August 2020, p. 73.

- NER clause 5.16.B(b)(3) prevents disputes on actionable ISP projects from being made on matters in the Conclusions Report that use or rely on matters in the most recent ISP or IASR. These matters include the identified need, ISP parameters, credible options or classes of market benefits relevant to that actionable ISP project.
- NER clause 5.16B(g)(3) prevents us from making a determination to direct the RIT–T proponent to amend the matters set out in the Conclusions Report for an actionable ISP project on the basis that the preferred option has been incorrectly assessed as having a material inter-network impact. However, we can make this determination for RIT–T projects that are not actionable ISP projects.

Bearing these differences in mind, the dispute resolution process described in the RIT–T application guidelines also applies to actionable ISP projects. As such, RIT–T proponents and potential disputing parties should refer to this guidance on who may raise a dispute, what matters can be disputed, how to lodge a dispute, and the process that we, the RIT–T proponent and other disputing parties must follow in resolving a dispute.[112]

[112] AER, *Application guidelines: RIT–T*, August 2020, section 5.

6 Transparency reviews

This part of the CBA guidelines describes the NER provisions concerning transparency reviews in relation to the IASR (section 6.1) and draft ISP (section 6.2).

6.1 Transparency reviews on the IASR

NER clause 5.22.9 describes how we must review the transparency of the IASR that AEMO will use to prepare the draft ISP. The output of the transparency review will be an IASR review report, which we must publish within one month of AEMO publishing the relevant IASR. Under NER clause 5.22.9(a), the IASR report must include whether:

- AEMO has adequately explained how it has:
    - derived key inputs and assumptions; and
    - changed key inputs and assumptions since the previous ISP.
- When selecting key inputs and assumptions, AEMO has:
    - based this information on verifiable sources; or
    - where verifiable sources are not readily available, provided stakeholders with adequate opportunity to propose alternative inputs and assumptions.
- Under NER clause 5.22.9(b), we are not required to consult on an IASR review report. While the NER do not strictly prevent us from consulting on an IASR review report, we are unlikely to do so because:
- the one month timeframe to develop and publish the IASR review report would make consultation implausible; and
- if we identify issues in the IASR review report, these issues will be consulted on later by AEMO in the draft ISP.[113]

Moreover, to enable a straightforward, expeditious and robust transparency review of the IASR, our forecasting best practice guidelines (FBPG) guide AEMO to facilitate active AER involvement when developing each IASR.[114] Facilitating our active involvement will improve our knowledge of the inputs and consultation that AEMO has undertaken and allow us to see how AEMO has properly consulted and considered stakeholder input.

- Under NER clause 5.22.9(c), if the IASR review report identifies issues with the IASR, AEMO must:
- as soon as practicable, provide further explanatory information in an addendum to the IASR; and
- consult on the issues in the draft ISP.

[113] As required under NER clause 5.22.9(c)(2).

[114] AER, *Forecasting best practice guidelines*, August 2020, p. 7.

If a party later submits a dispute notice to us in relation to the ISP, we may reject that notice if the IASR review report already considered the matter.[115]

6.2 Transparency reviews on the draft ISP

NER clause 5.22.13 describes how we must review the transparency of the draft ISP. The output of the transparency review will be an ISP review report, which we must publish within one month of AEMO publishing the relevant draft ISP. Under NER clause 5.22.13(a), the IASR report must include whether AEMO has adequately explained how:

- it has derived key inputs and assumptions; and
- key inputs and assumptions have contributed to the outcomes in the draft ISP.

Under NER clause 5.22.13(b), we are not required to consult on an ISP review report. While the NER do not strictly prevent us from consulting on an ISP review report, we are unlikely to do so because:

- the one month timeframe to develop and publish the ISP review report would make consultation implausible; and
- if we identify issues in the ISP review report, these issues will be consulted on later by AEMO.[116]

Under NER clause 5.22.13(c), if the ISP review report identifies issues with the draft ISP, AEMO must:

- as soon as practicable, provide further explanatory information in an addendum to the draft ISP; and
- consult on the issues.

If a party later submits a dispute notice to us in relation to the ISP, we may reject that notice if the ISP review report already considered the matter.[117]

[115] NER, clause 5.23.2(a)(3).
[116] As required under NER clause 5.22.13(c)(2).
[117] NER, clause 5.23.2(a)(3).

7 ISP consumer panel

NER clause 5.22.7 includes provisions on the ISP consumer panel. In respect of preparing an ISP, AEMO must establish and support an ISP consumer panel (section 7.1) to provide AEMO written consumer panel reports (section 7.2).

7.1 Establishing an ISP consumer panel

AEMO must include the timing for establishing an ISP consumer panel in its ISP timetable (which it must publish within three months of the most recent ISP).[118]

Under NER clause 5.22.7(b), AEMO must appoint at least three members to the ISP consumer panel. These members must have qualifications or experience in a field that AEMO considers relevant to the assessment of the ISP, and who have experience representing consumer interests.

Under NER clause 5.22.7(c), before appointing members to the ISP consumer panel, AEMO must publish an expression of interest that includes:

- the terms of reference for the ISP consumer panel; and
- information about the requisite qualifications and experience required to become a member.

7.2 Consumer panel reports

Under NER clause 5.22.7(a), the ISP consumer panel must provide AEMO with two written 'consumer panel reports'— one on the IASR that AEMO will use to prepare a draft ISP, and another on the draft ISP.

Under NER clause 5.22.7(d), the ISP consumer panel:

- must, in accordance with the terms of reference, give a consumer panel report to AEMO within two months of AEMO publishing the IASR and draft ISP, respectively;
- must, in preparing the consumer panel report, have regard to the long term interests of consumers; and
- may carry out its activities as it considers appropriate, but must seek to give consumer panel reports by consensus.

Under NER, clause 5.22.7(e), a consumer panel report must:

- include the ISP consumer panel's assessment of the evidence and reasons supporting the IASR or draft ISP respectively; and
- state whether the report is given by consensus.

[118] NER, clause 5.22.4(a)-(b).

Under NER clause 5.22.7(f), AEMO must publish consumer panel reports on its website. While AEMO is not obliged to give effect to recommendations in consumer panel reports, it must have regard to them, including in preparing an ISP.[119] Specifically, AEMO must:[120]

- if applicable, in its draft ISP, explain how it had regard to the consumer panel report on the IASR; and
- in its ISP, explain how it had regard to the consumer panel report on the draft ISP.

[119] NER, clause 5.22.7(g), 5.22.10(b)(8).

[120] See NER, clause 5.22.11(a)(2) and 5.22.14(b)(2), respectively.

Appendix A: Binding requirements and considerations

This appendix re-iterates our classification framework for the elements of the CBA guidelines and lists all binding requirements and considerations for AEMO and RIT–T proponents set out in the CBA guidelines.

Classification framework for binding and non-binding elements of the CBA guidelines

Within the CBA guidelines, we classify guidance as 'requirements', 'considerations' or 'discretionary' elements.

Requirements

Requirements are binding. A requirement is any obligation that the CBA guidelines state *'is required'* to be complied with, or which is expressly identified as a '*requirement*'.

Considerations

Considerations are binding. AEMO and RIT–T proponents must have regard to elements of the CBA guidelines classified as considerations when they are making decisions. A consideration is any obligation in the CBA guidelines that state a person *'must have regard'* to or '*must consider*' a consideration or is otherwise expressly identified as a '*consideration'*.

To demonstrate compliance, AEMO would need to explain, in writing, how it has had regard to each consideration, including the weight it has given to the consideration in making its decision (if any).

Discretionary

Elements of the CBA guidelines that are discretionary do not bind AEMO or RIT–T proponents. These elements provide guidance for best practice, with a view to promoting predictability, transparency and consistency. A discretionary element in the CBA guidelines is any information that is not identified as a requirement or consideration, or is specifically identified as a *'discretion'* or '*discretionary'.*

List of binding requirements and considerations in the CBA guidelines

Table 13 lists all binding requirements and considerations for AEMO and RIT–T proponents set out in the CBA guidelines.

Table 13: List of binding elements on AEMO in the CBA guidelines

#	Provision	Classification	Section of guidelines
	Complying with the CBA guidelines		2.1
	Compliance reporting		2.1.2
1	AEMO *is required* to provide the AER with a compliance report when preparing an ISP, which must be submitted to the AER no later than 20 business days after the publication of the final ISP.	Requirement	
2	In its compliance reports, AEMO *is required* to identify where it: • has complied with applicable requirements • has had regard to applicable considerations (including the reasons for the weight it has attached to each consideration); and • has resolved key issues raised by the AER through the issues register.	Requirement	
3	AEMO *is required* to identify breaches of the CBA guidelines, if any, in its compliance reports and provide an explanation for the breach.	Requirement	
4	If a compliance report contains confidential information, AEMO *is required* to provide another non-confidential version of the report in a form suitable for publication.	Requirement	
	ISP cost benefit analysis		3
	Inputs, assumptions and scenarios		3.2
	Inputs and assumptions		3.2.1
5	AEMO *is required* to: • identify the key inputs or assumptions driving the CBA results in the draft ISP. These have a large impact on the costs or market benefits of one or more development paths. • Where available, present verifiable sources for each key input and assumption, and their associated forecasting methodologies, in the draft ISP.	Requirement	
6	AEMO *must have regard* to the performance of its previous forecasts against actual outcomes, through the post-period	Consideration	

	performance reviews set out in the forecasting best practice guidelines.[121]		
7	The discount rate(s) in the ISP *is required* to be appropriate for the analysis of private enterprise investment in the electricity sector across the National Electricity Market, and *is required* to be consistent with the cash flows that the ISP is discounting.	Requirement	
8	When applying a VCR to value a market benefit class for a development path, AEMO *is required* to use: • the AER's most recent VCRs for unplanned electricity outages for the NEM, at the time of publishing an ISP timetable under clause 5.22.4 of the NER; and • the most relevant VCR(s) for the load associated with the unplanned electricity outages.	Requirement	
9	When applying a VCR, AEMO *must have regard* to: • any application guidance accompanying the VCR values it is using; and • the load-weighted VCR that reflects the relevant composition of the different customer types in the specified loads that feature higher up on that jurisdiction's schedule of rotational load shedding.[122]	Consideration	
	Scenarios		3.2.2
10	In developing reasonable scenarios, AEMO *must consider*: • the key inputs identified in section 3.2.1 and major sectoral uncertainties affecting the costs, benefits and need for investment in the NEM, when selecting the input variables and parameters that form part of each scenario. • Taking the most probable value(s) for each input variable and/or parameter that forms part of the most likely scenario.[123] • Taking a balanced approach to risk in varying input variables and/or parameters to create reasonable scenarios around the most likely scenario. That is, AEMO should consider risks associated with under- or overdue investment and over- or premature investment, consistent with clause 5.22.5(e)(1) of the NER. • Presenting information on the key input variables it is varying to form each scenario, including (for each key input	Consideration	

[121] See AER, *Forecasting best practice guidelines*, August 2020, section 4.

[122] If load shedding occurs, then AEMO directs networks to reduce load by turning power off in some areas to maintain balance in the system. It is called rotational load shedding because the outages for consumers are typically kept to about 60 minutes with load shedding rotated between suburbs and regions, based on a priority list by each jurisdiction.

[123] So long as they together provide an internally consistent and plausible scenario

	variable) the value(s) chosen for each scenario and how this compares to the underlying range of possible values. • Using internally consistent input variables and parameters for each scenario, such that each scenario represents a plausible market environment.		
11	Where the scenarios all have an equal likelihood AEMO *is required* to identify one scenario as the most likely scenario for the purposes of clause 5.22.5(e)(3).	Requirement	
	CBA methodology		3.3
	Selecting development paths		3.3.1
12	In its process for selecting development paths, AEMO *is required* to: • In step one, include information from transmission annual planning reports (TAPRs) on all proposed augmentations to the network and proposed replacements of network assets, including the proposed solution and other reasonable network options and non-network options.[124] • Also in step one, include all committed and anticipated projects, and credible generation (and other non-network) projects that are proposed but not sufficiently progressed to be classified as anticipated. • In step three, select development paths that include variations in timing and level of transmission (or non-network option substitute/hybrid) investment. To include variations in level of transmission investment, AEMO must select at least one development path (in addition to the counterfactual development path) that excludes one or more projects from the combination of common transmission investments.	Requirement	
13	In selecting development paths, AEMO *is required* to: • select development paths that contain commercially and technically feasible ISP projects, in accordance with the guidance set out in section 4.3.1; and • list the ISP projects in each selected development path.	Requirement	
14	In selecting development paths, AEMO *must have regard* to: • including non-network option substitutes or hybrids to a transmission network ISP project in one or more development paths, where appropriate; • including staged projects in one or more development	Consideration	

[124] See NER, clause 5.12.2(c)(5). Also see clause NER, clause 5.14.4(a)(3), which references non-network options in the joint planning process.

	paths, where appropriate, such that it can assess option value (see section 3.4.2); and • re-testing all ISP projects identified as actionable in a previous ISP, and which have not yet had costs approved in a contingent project process.		
	Defining the counterfactual development path		3.3.2
15	AEMO *is required* to: • develop a single counterfactual development path; and • not include in the counterfactual development path, any ISP projects in its selected development paths (see section 3.3.1) or any projects that may become future ISP projects.	Requirement	
	Valuing costs and market benefits		3.3.3–5

16	In estimating classes of costs and market benefits, AEMO *is required* to:
	• Not factor qualitative cost or market benefit considerations into the CBA—that is, all relevant costs and market benefits must be quantified.
	• Not double count any costs or market benefits across ISP projects in a development path.
	• Not include in any analysis under the ISP, any cost or market benefit which cannot be measured as a cost or benefit to generators, distribution network service providers (DNSPs), TNSPs and consumers of electricity.
	• For each development path, present:
	  ○ the key cost items in each class of costs, including the estimated capital cost of each ISP project in each development path (and its source(s));
	  ○ the breakdown of total market benefits over the planning horizon by market benefit class—in present value terms;
	  ○ cost and market benefits timelines (that is, the stream of annual cost and market benefit cash flows) for the ISP projects in the development path over their economic lives;
	  ○ the present values of total costs and market benefits, any cash flow conversion calculations, and any assumptions implicitly or explicitly made about costs or market benefits beyond the modelling period (equivalent to terminal value, where a project's asset life is longer than the modelling period); and
	  ○ an explanation and justification of the rationale for its approach to calculating the present value of total
		Requirement	3.3.3
			3.3.4
			3.3.5

	costs and market benefits, including for any assumptions. • Exclude from its analysis, the costs (or negative benefits) of an ISP project's harm to the environment or to any party that is not prohibited under a law, regulation or other legal instrument.		
17	In estimating classes of costs and market benefits, AEMO *must have regard* to: • the cost allocation principles described under clause 6A.19.2 of the NER if/when allocating costs or market benefits between electricity and other markets.	Consideration	3.3.3 3.3.5
18	In estimating classes of costs, AEMO *is required* to: • check its cost estimates against recent contingent project applications, recent tender outcomes governing transmission network augmentations, and/or final project outcomes (including variations);[125] and • if AEMO establishes there is a material degree of uncertainty in the costs of an ISP project, the cost is the probability weighted present value of the direct costs of the ISP project under a range of different cost assumptions.[126]	Requirement	3.3.3
19	In estimating classes of costs, AEMO *must have regard* to: • the market value of land when assessing the costs incurred in constructing or providing an ISP project; and • the market value of land in ISP projects that explore building on a previously acquired easement (that is, land should not be treated as a sunk cost, to the extent that it can otherwise be sold).	Consideration	3.3.3
20	AEMO *is required* to exclude from market benefits: • the transfer of surplus between consumers and producers; • classes of costs set out clause 5.22.10(d) of the NER; and • competition benefits or any additional option value where they have already been accounted for in other elements of the market benefit.	Requirement	3.3.4
21	AEMO *is required* to assess the market benefits with the development path against the market benefits with the counterfactual development path. This involves, for each development path:	Requirement	3.3.5

[125] We note that if any of this information is confidential, AEMO may not be able to publish details about these checks.

[126] For guidance on how to undertake this, see section 4.3.4; and AER, *Application guidelines: RIT–T*, August 2020, section 3.9.2. For the avoidance of doubt, the term 'cost assumptions' is distinct from the terms reasonable or relevant scenarios used elsewhere in the CBA guidelines (see section 4.3.4).

1. deriving the state of the world with the development path in place in each scenario, and the state of the world with the counterfactual development path in place in each scenario;
2. estimating market benefits by comparing, for each scenario, the state of the world with the development path in place against the state of the world with the counterfactual development path in place; and
3. quantifying estimated values for any market benefit classes that are not captured by the market modelling comparison (if any).

22	In estimating classes of market benefits, AEMO *must have regard* to: • including all existing assets in all states of the world[127] (until their expected retirement)—unless AEMO has evidence to suggest a project(s) should not be included in the market development modelling; • including all committed and anticipated projects outside its selected development paths in all states of the world[128] (until their expected retirement)—unless AEMO has evidence to suggest a project(s) should not be included in the market development modelling; and • presenting the modelled projects that flow from the ISP projects in each development path in each scenario.	Consideration	3.3.5
	Selecting an optimal development path		3.3.6
23	In selecting an optimal development path, AEMO *is required* to follow this framework : 4. Conduct scenario analysis to present a table with the net economic benefit of each development path in each scenario. The net economic benefit of a development path is its market benefit (section 3.3.5) less costs (section 3.3.3). 5. Rank the development paths on the basis of: (a) A risk neutral decision making approach. Under a risk neutral approach the ranking must be based on the weighted average net economic benefit of each development path, with weights determined according to	Requirement	

[127] That is, in the states of the world with the development path in place in each scenario, and the state of the world with the counterfactual development path in place in each scenario.
[128] That is, in the states of the world with the development path in place in each scenario, and the state of the world with the counterfactual development path in place in each scenario.

	the likelihood of each scenario occurring. (b) Where relevant, one or more alternative decision making approaches set out in AEMO's ISP methodology.[129] 6. Use professional judgement in balancing the outcomes of the above decision making approaches to select an optimal development path that has a positive net economic benefit in the most likely scenario—and explaining: • why the choice optimises the net economic benefit to all those who produce, consume and transport electricity in the market; • the potential 'cost' associated with a risk averse choice (if taken); and • why the level of risk neutrality or risk aversion chosen is a reasonable reflection of consumers' level of risk neutrality or risk aversion. 7. Undertake sensitivity testing and/or cross checks and explain the significance of these for the optimal development path; and present information on key distributional effects.[130]		
	Other aspects of the CBA		3.4
	Treatment of externalities		3.4.1
24	The following are *requirements* for AEMO: • Funds that move between Participants[131] count as a wealth transfer and do not affect the calculation of costs or market benefits under the ISP. • Funds from an Other Party[132] to a Participant do affect the calculation of costs or market benefits under the ISP. These funds can only affect the calculation of costs and market benefits when AEMO expects funding commitment. AEMO *is required* to report the funds in the draft ISP and final ISP.	Requirement	
25	If expected funds from an Other Party to a Participant do not eventuate, AEMO *must consider* whether a subsequent ISP update is required to remove these from the CBA.	Consideration	
	Option value		3.4.2

[129] If AEMO chooses to rely solely on a risk neutral decision making approach, then this sub-step is unnecessary because there are no other decision making approaches.
[130] These concepts are explained further in Explanatory box 2.
[131] Participant is a Registered Participant under Rule 2.1 of the NER or any other party in their capacity as a consumer, producer or transporter of electricity in the market.
[132] Other Party is any other party.

26	In capturing option value, AEMO *must have regard* to:
	• Development paths that contain option value to account for new information that arises at a later stage, including through:
	  ○ the timing and staging of ISP projects in a development path;
	  ○ the use of non-network options as ISP projects or stages of ISP projects; and
	  ○ staging or deferring ISP projects where the market benefits occur late in the modelling period.
	The stages associated with a given project can be incorporated into a single ISP project, or can be separated into multiple ISP projects, depending on their characteristics.
	• Whether scenario analysis results under AEMO's chosen decision making approach (see section 3.3.6) appropriately capture option value.
	• How staging of actionable ISP projects could be further explored in the RIT–T process, and then describing the identified need and assigning scenarios accordingly.
	• When decision rules[133] associated with staged projects eventuate, leading to a subsequent stage being needed or not needed—and, where relevant, incorporating the subsequent stage into an ISP.
		Consideration	

	Non-network options		3.4.3
27	Prior to the draft ISP, AEMO *is required* to: • undertake early engagement with non-network proponents to gather information in relation to non-network options (see Explanatory box 4); and • if there are any credible non-network options identified through early engagement and joint planning, but not included in a TAPR, include these in step one of its process for selecting development paths in section 3.3.1 (where it enters a range of network and non-network investment options into its model).	Requirement	
28	In considering non-network options in the process set out in clause 5.22.12 of the NER, AEMO *is required* to: • Provide sufficient detail on the technical characteristics of the non-network options in its notice requesting	Requirement	

[133] A 'decision rule' refers to action or decision to take at one time, but also an action or decision to take at another time in the future if the appropriate market conditions arise. It is the set of conditions or triggers that, if they occurred, may justify a subsequent stage of a project proceeding.

	submissions for non-network options, in such a way that appropriate non network solutions can be developed. • Include the ISP consumer panel and/or other consumer stakeholders in the preliminary review of non-network option proposals,[134] to incorporate their views and preferences. • Document the process and findings of the preliminary review of non-network option proposals, and publish this with or before the final ISP. • Provide its reasoning in the final ISP for each non-network option proposal AEMO concludes will not meet the relevant identified need. This includes: o specific characteristics of the proposed non-network option that do not meet the relevant identified need, and why; o if its reasoning is related to risk or uncertainty, then describe the risk/ uncertainty, and provide an assessment of the risk/ uncertainty compared to the ISP candidate option, as well as a comparison of the non-network option cost with the ISP candidate option cost;[135] and o how the option could be improved to meet the identified need.		
	Interactions and alignment with the RIT–T		3.5
	Describing the identified need for an actionable ISP project		3.5.1
29	In describing the identified need relating to an actionable ISP project, AEMO *is required* to: • Assign one identified need to each actionable ISP project in an optimal development path (noting there can be multiple dimensions or components to a single identified need). • For each identified need relating to an actionable ISP project, describe the identified need as the objective to be achieved by investing in the network. It is not the means to achieve the objective. That is, a description of an identified need must not mention or explain a particular method, mechanism or approach to achieving a desired outcome.	Requirement	
30	In describing the identified need relating to an actionable ISP project, AEMO *must have regard* to: • Having a clear and logical basis in contributing to the long	Consideration	

[134] For clarity, these are proposals in response to AEMO's notice requesting submissions for non-network options under clause 5.22.12 of the NER.

[135] The ISP candidate option is the credible option specified in the ISP for an actionable ISP project. See appendix B.

	term interests of electricity consumers—that is, linked to increasing one or more market benefits, and/or the key driver(s) of those market benefits. • Maintaining the integrity of the optimal development path, reflecting that AEMO has identified each actionable ISP project to make a particular contribution towards achieving a system-wide optimised solution. This includes incorporating the risks AEMO seeks to mitigate through the actionable ISP project in its optimal development path, if the optimal development path was chosen using a risk averse decision making approach. • Facilitating RIT–T proponents to explore different credible options (including non-network options) in applying the RIT–T based on more detailed / granular information at the individual project level, rather than pre-supposing a particular solution. • Facilitating RIT–T proponents to explore credible options with option value (that is, involve staging decisions). This can include considering the timing of when market benefits are expected to be delivered, and key uncertainties to the investment decision that could be used in a decision rule.		
	Assigning scenarios to RIT–T proponents for actionable ISP projects		3.5.2
31	Once AEMO has selected an optimal development path in accordance with the framework in section 3.3.6, it *is required* to assign one or more scenarios to each actionable ISP project that will be used by the relevant RIT–T proponent in applying the RIT–T to that project.	Requirement	
32	In selecting the scenario(s) to assign to each actionable ISP project in an optimal development path, AEMO *is required* to: • Only use scenarios identified in the IASR. • Assign a likelihood-based weight to each scenario if more than one scenario is assigned to a given actionable ISP project. These must be proportional to the weights used by AEMO in presenting a risk neutral decision making approach, as part of the framework for selecting an optimal development path set out in section 3.3.6. These weights must be used even if AEMO has selected the optimal development path based on a risk averse decision making approach. • Explain its reasoning for selecting the scenario(s) and corresponding weights (if applicable) for each actionable ISP project, and seek stakeholder input on its choices.	Requirement	
33	In selecting the scenario(s) to assign to each actionable ISP project in an optimal development path, AEMO *must have regard* to:	Consideration	

	• achieving consistency between the ISP and related RIT–Ts, including through alignment of the risks AEMO is prioritising through its decision making approach(es) under the framework for selecting an optimal development path set out in section 3.3.6; • allowing the RIT–T proponent to capture the option value of exploring credible options that contain more granular staging decisions (that is, contain key uncertainties to the investment decision which could influence a decision rule); and • balancing the need for a rigorous CBA with reducing the analytical burden on the RIT–T proponent in the RIT–T process.		
	Feedback loop		3.5.3
34	In providing written confirmation to the RIT–T proponent [under clause 5.16A.5(b) of the NER], AEMO *is required* to: • publish its written confirmation to the RIT–T proponent on AEMO's website; and • identify the cost (of the RIT–T preferred option) that AEMO has used as its basis for confirming that the status of the actionable ISP project as part of the optimal development path remains unchanged (noting that section 4.4 clarifies what this cost should be where staging is involved).	Requirement	

35	In performing the feedback loop on a RIT–T preferred option (if the preferred option, or its cost, differs from the ISP candidate option), AEMO *must consider*:
	• Removing the ISP candidate option from all development paths where it is featured, and replacing these with the RIT–T preferred option (and associated cost).
	• Re-running the CBA modelling and scenario analysis if practicable, to test whether the optimal development path referred to in the most recent ISP:
	  ○ still has a positive net economic benefit in the most likely scenario with the RIT–T preferred option; and
	  ○ is still optimal with the RIT–T preferred option under the same decision making approach, or that any difference is immaterial.
	• Adapting the extent to which it re-runs the CBA modelling and scenario analysis, to the size of the difference between the costs and/or market benefits of the ISP candidate option and the RIT–T preferred option.
		Consideration	

Table 14 summarises the binding requirements and considerations for RIT–T proponents set out in the CBA guidelines.

Table 14: List of binding elements on RIT–T proponents in the CBA guidelines

#	Provision	Classification	Section of guidelines
1	RIT–T proponents *are required* to provide the AER with a compliance report when applying the RIT–T to an actionable ISP project, which must be submitted no later than 20 business days after the publication of the project assessment conclusions report.	Requirement	2.1.2 — Compliance reporting
2	In its compliance reports, RIT–T proponents *are required* to identify where they: • have complied with applicable requirements • have had regard to applicable considerations (including the reasons for the weight they have attached to each consideration); and • have resolved key issues raised by the AER through the issues register.	Requirement	2.1.2 — Compliance reporting
3	RIT–T proponents *are required* to identify breaches of the CBA guidelines, if any, in their compliance reports and provide an explanation for the breach.	Requirement	2.1.2 — Compliance reporting
4	If a compliance report contains confidential information, RIT–T proponents *are required* to provide another non-confidential version of the report in a form suitable for publication.	Requirement	2.1.2 — Compliance reporting
5	When a RIT–T proponent is considering whether to include new credible options that AEMO did not consider in the ISP, it *must have regard to* the guidance in section 4.3.1 of the CBA guidelines on what constitutes a credible option when justifying its decision. When identifying new credible options, the RIT–T proponent must consider all options it could reasonably classify as credible options, taking into account factors that the RIT–T proponent reasonably considers it should take into account. In considering what it should take into account, the RIT–T proponent *must have regard* to the following: • if the identified need in the ISP entails meeting a service standard, the degree of flexibility offered by that service standard; • the advantages of constructing credible options with option value; and	Consideration	4.3.1 — Credible options

	• the benefits of constructing new credible options to meet the identified need in the ISP over broadly similar timeframes to the ISP candidate option and non-network options identified in the ISP.		
6	The base case is *required* to be where the RIT–T proponent does not implement a credible option to meet the identified need, but rather continues its business as usual activities, including for where reliability corrective action is driving the identified need.	Requirement	4.3.2 — Selecting the base case
7	'Demonstrable reasons' for departing from ISP parameters are *required* to be limited to where there has been a material change that AEMO would, but is yet to reflect in, a subsequent IASR, ISP or an ISP update. For example, this might include a material change in circumstances, such as where the AER has published updated VCR values that AEMO is yet to incorporate in the IASR. Where a material change is not a change in circumstances or facts (for example, a change in the RIT–T proponent's understanding or assessment of the facts, rather than a change in the facts themselves), the RIT–T proponent might choose to attain written confirmation of the change from AEMO.	Requirement	4.3.3 — Selecting inputs
8	If the modelling period is shorter than the life of the credible option, the RIT–T proponent is *required* to incorporate the operating and maintenance costs (if any) for the remaining years of the credible option into the terminal value.	Requirement	4.3.4 — Valuing costs
9	RIT–T proponents *must perform* sensitivity testing on all credible options by varying one or multiple inputs/assumptions. In considering whether or how to perform sensitivity testing, the RIT–T proponent *must have regard to* any relevant risks identified in stakeholder submissions, and whether sensitivity testing would build on the analysis already undertaken in the ISP and be proportionate and relevant to the RIT–T assessment.	Requirement	4.3.8 — Sensitivity testing
10	When valuing the costs of compliance, there may be cases where a RIT–T proponent can lawfully pay a financial amount rather than undertake some other action for compliance. In such cases, the RIT–T proponent *must consider* whether the financial amount is smaller than the costs of undertaking some other action before determining whether it should treat the financial amount as part of that credible option's costs.	Consideration	4.3.4 — Valuing costs
11	For any RIT–T application where AEMO has not specified which scenario/s or weightings to apply, the RIT–T proponent *must consider* the AER's guidance on estimating probability-based weightings as set out in the previous RIT–T application guidelines that applied to all RIT–T projects.[136]	Consideration	4.3.6 — Methodology for valuing market benefits

[136] That is, under AER, *Application guidelines: RIT–T*, December 2018.

12	The RIT–T proponent *must consider* using the ISP modelling period (also known as the planning horizon) of 20+ years as the default when assessing credible options to meet identified needs arising out of the ISP. If the expected profile of the market benefits and costs of the ISP candidate option are longer than the modelling period used in the ISP, the RIT–T proponent *must consider* whether it might be valuable to adopt a longer modelling period, whilst also considering the need for alignment with the ISP. For relatively incremental ISP candidate options, the RIT–T proponent *must consider* whether a shorter period would reduce the computational burden without compromising the quality of the CBA or undermining alignment with the ISP.	Consideration	4.3.9 — Suitable modelling periods
13	Where the modelling period is shorter than the expected life of a credible option, the RIT–T proponent is *required to* include any relevant and material terminal values in its discounted cash flow analysis. The RIT–T proponent is *required* to explain and justify the assumptions underpinning its approach to calculating the terminal value, which represents the credible option's expected cost and benefits over the remaining years of its economic life.	Requirement	4.3.9 — Suitable modelling periods
14	For the purposes of clause 5.16A.5(b) of the NER, the relevant cost is the cost for the particular stage.[137] However, AEMO also *must have regard* to the full cost of the project in providing its written confirmation, under clause 5.16A.5(b) of the NER, that the status of the actionable ISP project remains unchanged.	Consideration	4.4 — Staged projects under the ISP framework
15	The RIT–T proponent *must consider* describing in each RIT–T report how it has engaged with consumers, as well as other stakeholders; and sought to address any relevant concerns identified as a result of that engagement. The RIT–T proponent *must consider* undertaking early engagement with consumers, non-network businesses and other key stakeholders to the extent that doing so complements rather than duplicates or hinders AEMO's	Consideration	4.5.1 — Consumer and non-network engagement

[137] This cost is also the relevant cost for NER, clause 5.16A.5(d).

	engagement work in developing the ISP. The RIT–T proponent also *must have regard to* how it can adopt best practice consumer engagement in line with our 'consumer engagement guideline for network service providers'.[138]		
16	The RIT–T proponent is *required to* provide transparent, user-friendly data to stakeholders, to the extent this protects commercially sensitive information and is not already provided by the ISP.	Requirement	4.5.1 — Consumer and non-network engagement
17	In providing transparent, user-friendly data to stakeholders, the RIT–T proponent *must have regard* to how it can present information in line with stakeholder preferences.	Consideration	4.5.1 — Consumer and non-network engagement
18	The Draft Report is *required* to include, if applicable: • Demonstrable reasons for adopting different modelling techniques to what AEMO used in the ISP. • An explanation as to why any non-network options proposed in response to new actionable ISP projects in the final ISP are not credible options.	Requirement	4.5.2 — Project assessment draft report
19	When publishing the Conclusions Report, RIT–T proponents are *required* to: • Publish, in addition to a summary of submissions, any submissions received in response to the Draft Report, unless marked confidential. • Date the Conclusions Report to inform potential disputing parties of the timeframes for lodging a dispute notice with the AER.	Requirement	4.5.3 — Project assessment conclusions report
20	If a RIT–T proponent receives any confidential submissions on its Draft Report, it *must consider* working with submitting parties to make a redacted or non-confidential version public.	Consideration	4.5.3 — Project assessment conclusions report

[138] The AER may update these guidelines from time to time. The current version at the time of drafting is AER, *Better Regulation, Consumer Engagement Guideline for Network Service Providers*, 2013.

B Guidance and worked examples on RIT reopening triggers and action taken in response

Clause 5.16A.2(c)(4) of the NER requires we provide examples on RIT reopening triggers and actions that may be taken in response to a RIT reopening trigger being triggered.

This appendix provides examples of the following scenarios:

- increase in the cost of the preferred option (B.1)
- decrease in the cost of an alternative credible option (B.2)
- demand shock (B.3)
- change in government policy (B.4)
- Significant event affecting multiple variables (B.5)
- technological change (B.6).

This appendix also provides examples of actions that may be taken in response to a RIT reopening trigger being triggered (B.7).

B.1 Increase in the cost of the preferred option

A RIT-T proponent has completed a RIT-T for an identified need and found the preferred option to be a new transmission line. Prior to the works being started, the proponent becomes aware that the cost to construct the line has significantly increased due to increases in the costs of copper and steel.

All else being equal, the significant increase in capital cost could change the ranking of credible options. For example, a different network option involving the augmentation of an existing transmission line could become more net beneficial (or have a lower net market cost) than the original preferred new line option. Alternatively, a third-party proposed non-network option (such as demand management) could become the preferred option to address the identified need.

Example 17: Potential reopening triggers in response to increase in the cost of the preferred option

In anticipation of these types of circumstances, the RIT-T proponent could develop option cost increase-related reopening triggers such as:

- Preferred option present value (PV) real cost increase of 10% or more compared to that applied in the relevant project assessment conclusions report
- Preferred option PV real cost increase of 25% or more of the estimated net market benefit of the option, as identified in the project assessment conclusions report
- Preferred option PV real cost increase of 50% or more of the difference between the estimated net market benefit of the preferred option and the estimated net market benefit of the next-ranked credible option, as identified in the project assessment conclusions report.

B.2 Decrease in the cost of an alternative credible option

A RIT-T proponent has completed a RIT-T for an identified need and found the preferred option to be the augmentation of an existing transmission line. Prior to the works being started:

- the RIT-T proponent becomes aware that the cost to construct a different and more expensive network credible option (e.g. a new transmission line) has fallen significantly due to lower copper and steel prices
- A third-party proponent of a non-network credible option considered in the RIT-T notifies the TNSP proponent of the preferred option that the cost of the non-network option has fallen significantly since the PACR was undertaken due to improvements in technology.

Example 18: Potential reopening triggers in response to decrease in the cost of an alternative credible option

In anticipation of these types of circumstances, the TNSP proponent could develop option cost decrease-related reopening triggers such as:

- Non-preferred network credible option PV real cost decrease of 25% or more compared to that applied in the relevant PACR
- Non-preferred non-network credible option PV real cost decrease of 25% or more compared to that applied in the relevant PACR; and
- Non-preferred non-network credible option PV real cost decrease of 50% or more of the difference between the estimated net market benefit of the preferred (network) option and the estimated net market benefit of the non-network credible option, as identified in the PACR.

Note that where the original preferred option is a non-network option, cost-related reopening triggers will need to reflect both the attributes of the relevant preferred and non-preferred credible options, as well as the applicable incentives and information set(s) available to the relevant option proponent(s).

B.3 Demand shock

A RIT proponent has completed a RIT-T for an identified need, being the meeting of new demand in a particular greenfield area, and found the preferred option to be a new transmission line to the area. Subsequently, a large industrial business planning a new plant in the region faces delays and pushes back its planned expansion in the region by 24 months. This reduces the anticipated demand for electricity in the region in the short to medium term.

In this example, the demand shock is a reopening trigger. Assuming the cost of the preferred option is unchanged, the delay to the plant would tend to decrease both the market benefits and the net market benefit of the preferred option. The delay to the plant could also have implications for other related sources of demand in the region (such as new housing developments) and could provide a basis to reconsider the ranking of credible options and the timing of the preferred option. A demand shock may alternatively involve an unanticipated increase in demand due, for example, to a government decision to support an industrial plant in a particular region.

Example 19: Demand shock

In anticipation of these types of circumstances, the proponent could develop demand-related reopening triggers such as:

- Average forecast demand at the connection point(s) served by the preferred option for the next 10 years at least 5% lower or higher than that applied in the relevant PACR; or

Average forecast demand growth or decline at the connection points served by the preferred option for the next 10 years at least 50% higher or lower (for example, 3% pa instead of 2% pa or 1% pa instead of 2% pa) than the rates applied in the relevant PACR.

B.4 Change in government policy

A RIT proponent has completed a RIT-T for an identified need and found the preferred option to be a new 330 kV single-circuit transmission line. The federal government then announces a change in its climate change policy to bring forward the date by which Australia is to achieve 'net zero' emissions. The change in government policy is a reopening trigger due to its impact on the expected net benefits of the relevant credible options. All else being equal, the policy change could make a double-circuit or higher voltage (eg 500 kV) transmission line more net beneficial than the original preferred option.

Example 20: Change in government policy

In anticipation of these types of circumstances, the proponent could develop policy-related reopening triggers such as the introduction, removal or significant changes to a key applicable domestic or international law that was likely to lead to a change in the potential cost, capacity or output of generation, storage or other sources of electricity supply in areas that a credible option considered in the PACR was expected to draw power from.

B.5 Significant event affecting multiple variables

A RIT proponent has completed a RIT-T for an identified need and found the preferred option to be a new transmission line. Prior to the works being started, a global pandemic is declared, leading to government-mandated lockdowns and staff shortages in critical industries, in turn resulting in disruptions to international supply chains. As a result:

- household electricity demand rises slightly, but industrial and commercial electricity demand fall dramatically, leading to a substantial net overall reduction in demand and
- the costs of the preferred option and some other network and storage credible options (requiring imported capital equipment) considered in the RIT-T rise significantly; however
- the costs of some demand-side credible options fall due to the larger share of overall demand attributable to more price-responsive households.

This reopening trigger affects both demand and cost assumptions used in the modelling of credible options in the RIT-T. This could justify a full reapplication of the RIT-T to consider the identified need, the list of credible options and the preferred option (see below).

Example 21: Significant event affecting multiple variables

In anticipation of these types of circumstances, the RIT proponent could develop 'combination' reopening triggers that either incorporate tighter thresholds than individual component triggers or have more radical consequences, in cases where the effects of changes in different variables are reinforcing.

For example, in addition to the above preferred option cost increase threshold of 10% (example 17 above) and demand reduction threshold of 5% (example 19 above), a combination trigger could incorporate a 5% increase in real costs coupled with a 2.5% reduction in average forecast demand over the next 10 years.

B.6 Technological change

A RIT proponent has completed a RIT-T for an identified need and found the preferred option to be a new transmission line. Prior to the works being started, the proponent becomes aware of a newly available technology that is expected to revolutionise energy storage in a way not reflected in the credible options considered in the original RIT-T assessment. This technological change is a reopening trigger due to its ability to make available promising new credible options not previously considered.

Example 22: Technological change

In anticipation of such possible events or changes, the proponent could include a general reopening trigger where it is notified of any event or circumstance expected to result in the timely availability of a new credible option that offers higher net market benefits than the preferred option across the range of reasonable scenarios considered in the original RIT-T. The new option should not be merely a reconfiguration or resizing of an already-considered credible option, but incorporate a major advancement or change in technology.

B.7 Actions that may be taken in response to a RIT reopening trigger being triggered

If a RIT reopening trigger has been triggered, a RIT proponent must inform us of the actions it proposes to take, and the timeframes in which it proposes to take such actions. The actions that a RIT proponent must include, at a minimum, are specified in clause 5.16.4(z4B) of the NER. Namely:

(1) publishing a statement that the preferred option identified remains the preferred option, as well as any supporting information necessary to demonstrate that the preferred option identified remains the preferred option; or

(2) publishing a statement that the preferred option is no longer the preferred option and identifying the new preferred option, as well as any supporting information necessary to demonstrate that the preferred option is no longer the preferred option and the reasons the new preferred option is the preferred option.

In addition to these minimum actions, examples of other actions a RIT proponent may wish to consider taking are set out in the following examples:

Example 23: Other actions to take in response to a RIT reopening trigger being triggered

A RIT proponent, prior to formally notifying us of a RIT reopening trigger being triggered which constitutes a material change in circumstances, may wish to consider taking the following actions:

- stakeholder consultation
- preparing a report of the process, including a summary of stakeholders' views and its own conclusions, and
- providing this report to us at the same time it notifies us of the material change in circumstances

A RIT proponent, after formally notifying us of a RIT reopening trigger being triggered which constitutes a material change in circumstances, in addition to the statement it is required to publish under the NER, may also wish to consider taking the following possible actions:

- explaining how the ranking of credible options may have changed, as a result of taking actions including:
    - further stakeholder consultation proportionate to the likely impact of the RIT reopening trigger being triggered
    - preparing a report of the process, including a summary of stakeholders' views and its own conclusions, and

providing this report to us to inform our decision in whether to accept or reject the RIT proponent's proposed action.Example 24: Desktop analysis only required

In many cases, a reopening trigger will affect the costs or market benefits of the credible options considered in a RIT assessment in a reasonably similar manner.

For example, a 20% increase in the costs of a preferred option that is a new transmission line will tend to also be reflected in higher costs of other network credible options. Even if all the credible options considered in a RIT are not affected by a cost change in the same way or to the same extent as the preferred option, the cost increase may not alter the preferred (top-ranked) option or the ranking of other credible options. In these cases, all that may be required of a proponent is a transparent checking of whether the identity of the top-ranked option is undisturbed by the trigger event.

For example, using the triggers presented in Example 17, if there is an increase in the preferred option costs of 10% but the other applicable cost-related triggers are not met, unless the identified need is for reliability corrective action or system security, the preferred option is unlikely to have changed since the RIT was conducted even if the market benefits of some lower-ranked credible options have increased since then.

Nevertheless, in all cases (but particularly in the case where the original RIT included non-network credible options), the proponent should check whether the ranking of options has changed through a desktop analysis by adjusting the costs of all options of the same type as the preferred option (eg network, storage, local generation, etc). If the outcome is that the ranking of credible options does not change, then subject to an NSP's other regulatory obligations, the proponent should publish the outcome and no further analysis or consultation is required.

If the outcome is that the ranking of credible options does not change, then subject to an NSP's other regulatory obligations, the proponent should publish the outcome. No further analysis or consultation is required.

Alternatively, if the analysis results in the top-ranked option changing, it may be appropriate to update the preferred option. If the ranking of credible options change but the top-ranked option remains the same, the proponent should consider whether further consultation or analysis may be worthwhile.

Consider a situation where:

- The preferred option in a RIT-T to meet an identified need with positive net market benefits is a transmission network option. Assume that it experiences a cost increase of 10%, from $1 billion to $1.1 billion. At the same time, the gross market benefit of the preferred option in the PACR was $1.5 billion, such that the cost increase leads to a fall in estimated net market benefits of the option from $500 million to $400 million.
- The two other credible options considered in the RIT-T were also network options, and respectively had PACR costs of $600 million (option A) and $1.2 billion (option B), gross market benefits of $800 million (option A) and $1.5 billion (option B), and thus net market benefits of $200 million (option A) and $300 million (option B).
- The TNSP proponent considers that the cost increase affecting the preferred option is likely to similarly affect the two other credible options considered in the PACR. Therefore, the proponent conducts a desktop analysis, which suggests that the costs of option A are likely to have risen from approximately $600 million to $660 million and the costs of option B are likely to have risen from approximately $1.2 billion to $1.32 billion. The estimated net benefits of option A would thus fall from $200 million to $140 million and the net benefits of option B fall from $300 million to $180 million. On that basis, there would be no change to the preferred option or to the ranking of credible options;
- Accordingly, as the cost increase activated the reopening trigger referred to in the first dot point in Example 17 only, no further action from the proponent beyond publishing the outcome would be necessary.

Example 25: Consultation on credible options

Activation of some reopening triggers may not directly change the preferred option, but may indicate that stakeholder consultation is worthwhile to test whether the preferred option may have changed since the relevant RIT assessment was conducted.

For example, using the triggers presented in Example 17, if there is an increase in the preferred option costs of 50% of the difference in net market benefits between the preferred option and the second-ranked option (or perhaps even a lower-ranked option if the difference is relatively small) has a different proponent, it would be appropriate for the proponent of the preferred option to check if the costs or market benefits of the second-ranked (or similar) option(s) have significantly changed since the RIT was undertaken.

Consider a situation where the preferred option for an identified need of the maximisation of net market benefits is a transmission augmentation, which was reported in the PACR as having costs of $1 billion, gross market benefits of $1.5 billion and a net market benefit of $500 million. At the same time, the second-ranked option in the PACR was a local generation option that had costs of $500 million, gross market benefits of $700 million and a net market benefit of $200 million. Assume that the costs of the preferred (augmentation) option rise by 20%, to $1.2 billion, leading to an estimated revised net market benefit of that option of $300 million. In this case, the preferred option cost increase ($200 million) represents more than half the original gap between the net

market benefits of the preferred option ($500 million) and the second-ranked generation option ($200 million), being $300 million. Under these circumstances, it would therefore be appropriate for the TNSP proponent to consult with the generation option proponent to check whether the costs of the generation option may have fallen by at least $100 million since the PACR. It would also be appropriate for the proponent to consider whether the gross market benefits of the option have risen, by at least $100 million since the PACR. In either case, the alternative option proponent with whom the preferred option proponent consults would need to justify any revised figures appropriately.

If consultation with the alternative option proponent does not reveal a large enough reduction in costs or increase in benefits to change the preferred option, the original preferred option proponent should publish the outcome and could proceed without further analysis. However, if consultation with the other proponent showed that the preferred option has likely changed, then subject to a broader market-wide consultation process, either the alternative option should proceed instead of the original preferred option, or the RIT-T would need to be reapplied in full or part. If the proponent chooses to conduct a wider stakeholder consultation, it should prepare a report of the process, including a summary of stakeholders' views and its own conclusions, and provide it to the AER before proceeding further.

Broad stakeholder consultation is also likely to be an appropriate initial response to the demand reopening triggers referred to in Example 19 because a desktop analysis by the preferred option proponent is unlikely to be capable of fully accounting for a significant change in forecast demand. Likewise, broad consultation in the first instance is likely to be an appropriate initial response to the trigger referred to in Example 22 (technological change). In all cases where a broad consultation is undertaken, the preferred option proponent should prepare a report of the process, including a summary of stakeholders' views and its own conclusions, and provide it to the AER before proceeding further.

Example 26: Full reapplication of RIT-T required

Fully reapplying a RIT is likely to be an appropriate response to the more complicated scenarios considered above, for example where there are:

- demand shocks (Example 19);
- major changes in government policy that substantially change underlying electricity demand and/or supply conditions (Example 20);
- significant events affecting various electricity demand and/or supply conditions that substantially affect electricity demand and/or supply conditions (Example 21); or
- technological developments that gives rise to new credible options that offer comparable or higher net market benefits to the original preferred option (Example 22).

In some or all of these circumstances, neither a desktop adjustment to a previous RIT assessment nor a consultation process with any one or small group of proponent stakeholders would be likely to offer a robust response to the question of whether the preferred option in a RIT may have changed. Therefore, the default outcome should be a reapplication of the RIT in full or in part.

That said, it may be appropriate for the preferred option proponent to undertake a preliminary broad consultation process to gather views on whether a reapplication of the RIT was warranted, before commencing such a process. The proponent should prepare a report of the consultation, including a summary of stakeholders' views and its own conclusions, and provide it to the AER before proceeding further. Only where there is widespread agreement amongst stakeholders that

a RIT reapplication is not needed or would cause unnecessary delay should the proponent decide against a reapplication.

Appendix C: Glossary and shortened forms

This appendix provides a glossary of key terms and a list of shortened forms

Glossary

Table 15 provides the description of key terms used in the CBA guidelines.

Table 15: Key terms

Term	Description
Actionable ISP project	Defined in NER chapter 10 as a project: • that relates to a transmission asset or non-network option the purpose of which is to address an identified need specified in an ISP and which forms part of an optimal development path • for which a project assessment draft report is required to be published in the ISP that identifies that project.
Anticipated project	Anticipated project means a project which: • does not meet all of the criteria for a committed project; and • is in the process of meeting at least three of the criteria for a committed project (as listed in the 'committed project' definition below).
Base case	In a RIT–T application, a situation in which the *credible option* is not implemented by, or on behalf of the *RIT–T proponent.* *For a definition of the 'base case' development path in the ISP, see the definition for the 'counterfactual development path' below.*
Committed project	Committed project means a project that meets the following criteria: • the proponent has obtained all required planning consents, construction approvals and licenses, including completion and acceptance of any necessary environmental impact statement; • construction has either commenced or a firm commencement date has been set; • the proponent has purchased/settled/acquired land (or commenced legal proceedings to acquire land) for the purposes of construction; • contracts for supply and construction of the major components of the necessary plant and equipment (such as generators, turbines, boilers, transmission towers, conductors, terminal station equipment) have been finalised and executed, including any provisions for cancellation

	payments; and • the necessary financing arrangements, including any debt plans, have been finalised and contracts executed.
Consideration	A binding element of the CBA that AEMO must have regard to.
Costs	The present value of the direct costs of a credible option or development path. The classes of costs are set out in the NER (clause 5.15A.2(b)(8), 5.15A.3(b)(6), 5.22.8(d)).
Counterfactual development path	The status quo or base case that AEMO uses to compare the development paths in the ISP CBA.
Cross checks	Cross checks can inform the accuracy of an outcome by 'sense checking' it against information from other sources.
Credible option	Defined in NER clause 5.15.2(a) as being an option (or group of options) that: (1) addresses the identified need; (2) is (or are) commercially and technically feasible; and (3) can be implemented in sufficient time to meet the identified need, and is (or are) identified as a credible option in accordance with paragraphs (b) or (d) (as relevant).
Development path	Defined in NER clause 5.10.2 as a set of projects in an ISP that together address power system needs.
Discretionary element	A non-binding element of the CBA guidelines.
Distributional effects	Distributional effects consider the distribution of costs and market benefits of an optimal development path—that is, who receives the benefits and who pays the costs.
Future ISP project	Defined in NER clause 5.10.2 as a project: • that relates to a transmission asset or non-network option the purpose of which is to address an identified need specified in an ISP and which forms part of an optimal development path • that is forecast in the ISP that identifies the project, to be an actionable ISP project in the future.
Identified need	Defined in NER chapter 10 as the objective a network service provider or a group of network service providers seeks to achieve by investing in the network in accordance with the NER or an ISP
ISP	Defined in NER chapter 10 as a plan developed and published by AEMO under rule 5.22 as amended by an ISP update from time to time. The ISP provides a whole of system plan for the efficient development of the power system that achieves power system needs. It identifies an optimal development path that contains ISP projects, some of which trigger the application of a RIT–T, or preparatory activities.

ISP candidate option	Defined in NER clause 5.10.2 as a credible option specified in the ISP that the RIT–T proponent must consider as part of a RIT–T for an actionable ISP project.
ISP development opportunity	Defined in NER clause 5.10.2 as a development identified in an ISP that does not relate to a transmission asset or non-network option and may include distribution assets, generation, storage projects or demand side developments that are consistent with the efficient development of the power system.
ISP parameters	Defined in NER clause 5.10.2 as, for an ISP project: • the inputs, assumptions and scenarios set out in the most recent IASR; • the other ISP projects associated with the optimal development path; and • any weightings specified as relevant to that project.
ISP project	Defined in NER clause 5.10.2 as an actionable ISP project, a future ISP project or an ISP development opportunity.
ISP update	Defined in NER chapter 10 as an update to an Integrated System Plan published by AEMO under NER clause 5.22.15.
Market benefits	The present value of the benefits of a credible option or development path, or a benefit to those who consume, produce and transport electricity in the market, that is, the change in producer plus consumer surplus. The classes of market benefits are set out in the NER (clause 5.15A.2(b)(4), 5.15A.3(b)(4), 5.22.8(c)).
Modelled project	Modelled project means a hypothetical project derived from market development modelling in the presence or absence (as applicable) of the relevant: • development path (for the ISP) • credible option (for a RIT–T application).
Net economic benefit	Net economic benefit equals the market benefits less costs.
Non-network option	Defined in NER chapter 10 as 'a means by which an *identified need* can be fully or partly addressed other than by a *network option*'. For avoidance of doubt, the AER interprets this definition to mean that non-network options:[139] • Involve 'non-network assets—that is, assets that are not used to convey or control the conveyance of electricity to

[139] The AER provides the interpretation in AER, *Consultation paper: Demand management incentive scheme and innovation allowance mechanism,* January 2017, p. 20.

	customers, and that are not connection assets. For instance, non-network assets might include assets that customers use to reduce their demand for electricity, or assets on which expenditure is undertaken by a third party; or • Can also include options that involve some expenditure on a network asset, but not expenditure on network assets alone.
Optimal development path	Defined in NER chapter 10 as a development path identified by AEMO as the optimal development path in the most recent ISP in accordance with rule 5.22.
Other Party	Any other party than a Participant (where Participant is defined below).
Participant	A Registered Participant under clause 2.1 of the NER or any other party in their capacity as a consumer, producer or transporter of electricity in the market.
Preferred option	Defined in NER clause 5.15A.1(c) as the credible option that maximises the present value of net economic benefit to all those who produce, consume and transport electricity in the 'market'.[140]
Preparatory activities	Defined in NER clause 5.10.2 as activities required to design and to investigate the costs and benefits of actionable ISP projects and if applicable, future ISP projects including: • (detailed engineering design; • route selection and easement assessment work; • (cost estimation based on engineering design and route selection; • preliminary assessment of environmental and planning approvals; and • council and stakeholder engagement.
Power system needs	The power system needs are, as defined in clause 5.22.3(a) of the NER: • the reliability standard; • power system security; • system standards; and • standards or technical requirements in Schedule 5.1 or in an applicable regulatory instrument.
Scenario	Different future external market environments that are used in a CBA to assess and manage uncertainty about how the future will

[140] Where chapter 10 of the NER defines 'market' as any of the markets or exchanges described in the NER, for so long as the market or exchange is conducted by AEMO.

	develop. They are based on variations to key input variables and parameters that drive supply and demand conditions (for example, population growth, coal and gas prices, etc.).
Requirement	A binding element of the CBA guidelines that AEMO must achieve.
Risk neutral decision making approach	Risk neutral decision making approaches are based on expected value. That is, they weight different payoffs based on their likelihood of occurrence. In this context, this means weighting the net economic benefit of development paths in each scenario based on the likelihood, or relative likelihood, of the scenario occurring. Risk neutral decision making approaches prioritise transmission investment risks based on their likelihood of occurrence (with judgement used to assess likelihoods).
Risk averse decision making approach	Risk averse decision making approaches (implicitly or explicitly) weight different payoffs to reduce variability or the risk of a negative outcome occurring. In this context, this means (implicitly or explicitly) weighting the net economic benefit of development paths in each scenario in a way that mitigates particular risks. Risk averse approaches place a higher value on reducing the risk(s) of a negative outcome occurring than the likelihood of its occurrence. As such, a risk averse decision making approach uses judgement on risk tolerances to prioritise risks.
RIT–T	Defined in NER chapter 10 as the test developed and published by the AER in accordance with clauses 5.15A.1 and 5.16.2 as in force from time to time, and includes amendments made in accordance with clause 5.16.2. It is a CBA that assesses credible options to address an identified need, and identifies the credible option that maximises the present value of net economic benefit to all those who produce, consume and transport electricity in the market (the preferred option).
Scenario analysis	Scenario analysis entails developing/describing a range of different scenarios and exploring how different development paths produce different market benefits across each scenarios. Through this, AEMO gains a comprehensive understanding of what states of the world could arise with and without each development path in place under different sets of external circumstances. Scenario analysis is one way to assess the risk or uncertainty of a given development path, focussing that associated with an unknown future market environment.
Sensitivity testing	Sensitivity testing varies one or multiple inputs to test how robust the output of its CBA is to its input assumptions (for example, underlying plant operation assumptions).
State of the world	A state of the world is a detailed description of all of the relevant market supply and demand characteristics and conditions likely to prevail to meet the power system needs if a development path proceeds in a given scenario. This includes generation, network

and load development and operating requirements.

Shortened forms

Table 16 provides the extended form of key abbreviations used in the CBA guidelines.

Table 16: Abbreviations

Shortened Form	Extended Form
ACCC	Australian Competition and Consumer Commission
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
APR	annual planning report
CBA	cost benefit analysis
CBA guidelines	cost benefit analysis guidelines
CCP	Consumer Challenge Panel
COAG EC	Council of Australian Governments Energy Council
CoGaTI	Coordination of generation and transmission investment (AEMC biennial review)
Conclusions Report	project assessment conclusions report
Consultation Report	project specification consultation report
DAPR	distribution annual planning report
DER	distributed energy resources
DNSP	distribution network service provider
Draft Report	project assessment draft report
ESB	Energy Security Board
FBPG	Forecasting best practice guidelines
Finkel Review	The Commonwealth of Australia's independent review into the future security of the National Electricity Market

HILP	high impact low probability
IASR	inputs, assumptions and scenarios report
ISP	integrated system plan
kWh	kilowatt hour
NEL	National Electricity Law
NEM	National Electricity Market
NEO	National Electricity Objective
NER	National Electricity Rules
repex	replacement expenditure
repex rule change	the replacement expenditure planning arrangements rule change
reset	regulatory / revenue determination process (for electricity DNSPs and TNSPs respectively)
REZ	renewable energy zones
RIT–D	regulatory investment test for distribution
RIT–T	regulatory investment test for transmission
RRO	retailer reliability obligation
TAPR	transmission annual planning report
TNSP	transmission network service provider
VCR	value of customer reliability