Better Regulation

Draft regulatory investment test for distribution Application Guidelines

2013

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Shortened forms

Shortened form	Full form
ACCC	Australian Competition and Consumer Commission
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
DAPR	Distribution Annual Planning Report
DLF	Distribution loss factor
DNSP	distribution network service provider
MW	megawatt
MWh	megawatt hour
NEM	National Electricity Market
NER	National Electricity Rules
NSP	Network Service Providers
PV	Present Value
RIT-D	regulatory investment test for distribution
RIT-T	regulatory investment test for transmission
TAPR	Transmission Annual Planning Report
TNSP	transmission network service provider
VCR	Value of customer reliability
VoLL	Value of lost load

Nature and Authority

Introduction

Consistent with the requirements of cl. 5.17.2 of the *National Electricity Rules* (NER), this document sets out guidance on the operation and application of the *regulatory investment test for distribution* (the RIT-D) (the application guidelines).

Authority

Clause 5.17.2(a) of the NER requires the Australian Energy Regulator (AER) to develop and publish, in accordance with the distribution consultation procedures, the guidelines for the operation and application of the RIT-D. The application guidelines must:

- Give effect and be consistent with the relevant provisions of the NER
- Provide guidance on:
  - The operation and application of the RIT-D
  - The process to be followed in applying the RIT-D
  - What will be considered to be a material and adverse *National Electricity Market* (NEM) impact for the purpose of the definition of *interested parties*
  - How disputes raised in relation to the RIT-D and its application will be addressed and resolved
- Provide guidance and worked examples as to:
  - How to make a determination that a *RIT-D proponent* is not required to prepare and *publish* a *non-network options report*
  - What constitutes a *credible option*
  - The suitable modelling periods and approaches to scenario development
  - The classes of market benefits to be considered
  - The acceptable methodologies for valuing the market benefits of a *credible option*
  - Acceptable methodologies for valuing the costs of a *credible option*
  - The appropriate approach to undertaking a sensitivity analysis
  - The appropriate approaches to assessing uncertainty and risks
  - What may constitute an externality under the *RIT-D*.

Role of the application guidelines

RIT-D proponents must apply the *RIT-D* to all proposed distribution investments, except in the circumstances described in cl. 5.17.3(a) of the NER. The application guidelines provide guidance on

the operation and application of the *RIT-D*, the process for *RIT-D proponents* to follow in applying the RIT-D, and how we will address and resolve disputes regarding the *RIT-D*.

RIT-D proponents should read the application guidelines in conjunction with the requirements in the *RIT-D* and cl. 5.17 of the NER.

Definitions and interpretation

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

- the glossary or
- the NER.

Process of revision

The AER may amend or replace these guidelines from time to time in accordance with the distribution consultation procedures under cl. 6.16 of the NER and cl. 5.17.2(e) of the NER.

Version history and effective date

A version number and an effective date of issue will identify every version of this guideline.

1 Overview of the RIT-D

Under cl. 5.17.2(d) of the NER, the AER must *publish* the *RIT-D* and application guidelines before 31 August 2013. The *RIT-D* is an economic cost benefit test for *RIT-D proponents* to use for assessing and ranking different electricity investment options.

The *RIT-D* commences 1 January 2014. From the *RIT-D* commencement date, *RIT-D proponents* must apply the RIT-D in accordance with cl. 5.17 of the NER to assess the economic efficiency of proposed investment options.

The purpose of the *RIT-D* is to identify the *credible option* that maximises the present value of the net economic benefit to all those who produce, consume and transport electricity in the NEM (the *preferred option*). The *RIT-D* aims to promote efficient distribution investment in the NEM and to ensure that there is greater consistency, transparency and predictability in distribution investment decision making.

The RIT-D replaces the *regulatory test* for distribution investments.

1.1 Purpose of the RIT-D

Clause 5.17.1(b) of the NER states that the purpose of the *RIT-D* is to:

> ...identify the *credible option* that maximises the present value of the net economic benefit to all those who produce, consume and transport electricity in the *National Electricity Market* (the *preferred option*). For the avoidance of doubt, a *preferred option* may, in the relevant circumstances, have a negative net economic benefit (that is, a net economic cost) where the *identified* need is for reliability corrective action.

1.2 Investments subject to RIT-D assessment

Clause 5.17.3 of the NER provides that a *RIT-D proponent* must apply the RIT-D to a *RIT-D project* unless the investment falls under defined circumstances.

A *RIT-D project* is defined in cl. 5.10.2 of the NER as:

(a) a project the purpose of which is to address an *identified need* identified by a *Distribution Network Service Provider*, or

(b) a joint planning project that is not a RIT-T project.

The circumstances where a *RIT-D proponent* does not need to apply the RIT-D include where:

- The *RIT-D project* is required to assess an urgent and unforseen *network* issue that would otherwise put at risk the reliability of the *distribution network* or a significant part of that *network*.
- The estimated cost to the *Network Service Providers* (NSPs) affected by the *RIT-D project* of the most expensive *potential credible option* to address the *identified need* is less than $5 million (as varied in accordance with a cost threshold determination)
- The cost of addressing *identified need* is to be fully recovered through charges other than charges in respect of *standard control services* or *prescribed transmission services*
- The *identified need* can only be addressed by expenditure on a *connection asset* which provides services other than *standard control services* or *prescribed transmission services*

- The *RIT-D project* is related to the refurbishment or replacement of existing assets and is not intended to *augment* a *network*; or
- The refurbishment or replacement expenditure also results in an augmentation to the network, and the estimated capital cost of the most expensive *credible option* to address the *identified need* in respect of the *augmentation* component is under $5 million

A *RIT-D proponent* must not treat different parts of an integrated solution to an *identified need* as distinct and separate options for the purposes of determining whether the RIT-D applies to each of those parts.

Where a *RIT-D proponent* does not need to apply the RIT-D to a proposed investment (with exception of negotiated distribution services and negotiated transmission services), a *RIT-D proponent* must ensure, acting reasonably, that the investment required to address the *identified need* is planned and developed at least cost over the life of the investment.

Urgent and unforseen investments

As outlined in cl. 5.17.3 of the NER, a *RIT-D proponent* does not need to apply the RIT-D to a proposed *RIT-D project* to address an urgent and unforseen *network* issue that would otherwise put the *reliability* of the *distribution network* at risk. Under cl. 5.17.3(c) of the NER, a proposed RIT-D investment is only subject to this exemption if:

- It is necessary that the assets or services to address the issue be operational within six months of the *RIT-D proponent* identifying the issue.
- The event or circumstances causing the *identified need* was not reasonably foreseeable by, and was beyond the reasonable control of, the NSP/s that identified the need.
- A failure to address the *identified need* is likely to materially adversely affect the *reliability* and *secure operating state* of the distribution network or a significant part of that *network*.

Commencement of the RIT-D:

Clause of the NER 11.50.5(b) states:

> After the RIT-D commencement date:
>
> (1) new rules 5.15 and 5.17 have no effect in relation to RIT-D projects that are regulatory test projects;
>
> (2) old clause 5.6.5A continues to apply to regulatory test projects; and
>
> 3) *Registered Participants* must comply with old clauses 5.6.2(e1) to (k) to the extent those provisions are relevant to the application of the regulatory test.

Clause 11.50.2 of the NER defines the RIT-D commencement date as the date that is one year from the commencement date. This is where the commencement date is the amendment date of the relevant rule in the NER. Therefore, the commencement date is 1 January 2013, and the RIT-D commencement date is 1 January 2014.

After 1 January 2014, projects will fall under the RIT-D instead of the old regulatory test, unless:

- By 31 December 2013, a NSP has commenced assessing the projects under the regulatory test; and

- By 31 December 2013, the NSP has submitted a list of those projects to us.

Under cl. 11.50.5(e) of the NER, we may determine whether projects on this list have not commenced assessment under the regulatory test. We consider that a NSP has commenced assessing a project under the regulatory test if, before 1 January 2014, it has:

- Published a project evaluation under the former regulations
- Identified the project in a published *Distribution Annual Planning Report* (DAPR)
- Released a Request for Information, and/or
- Commenced an option analysis for the project under the Regulatory Test.

2 Operation and application of the RIT-D

The application guidelines provide guidance on the operation and application of the RIT-D.

The broad steps for applying the RIT-D can be summarised as follows:

1. Identify a need for the investment.

2. Identify a set of *credible option*s to address the *identified need* (see section 7 of the application guidelines).

Identity a set of *reasonable scenarios* appropriate to the *credible options* under consideration (see section 12 of the application guidelines).

3. Quantify the expected *costs* of each *credible option* with consideration of how expected *costs* will vary across different *reasonable scenarios* (see section 11 of the application guidelines).

Estimate the magnitude of expected *market benefits* of each *credible option* with consideration of how expected *market benefits* will vary across different *reasonable scenarios*. Where the *RIT-D proponent* quantifies *market benefits*, quantification should occur over a probability weighted range of *reasonable scenarios* (see section 10 and appendix A of the application guidelines).

4. Rank each *credible option* by its expected net economic benefit to identify the *credible option* with the highest expected net economic benefit as the *preferred option*. In the relevant circumstances, this will require quantifying the expected net economic benefit of each *credible option*.

This section provides guidance on how to identify an *identified need*. It also explains how to identify *reasonable scenarios*. We discuss the other broad steps listed above in subsequent sections of the application guidelines.

2.1 Identified need

Chapter 5 of the NER defines an *identified need* as the objective a NSP seeks to achieve by investing in the network. An *identified need* may be addressed by either a *network option* or a *non-network option*.

An *identified need* may consist of:

- meeting any of the service standards linked to the technical requirements of schedule 5.1 of the NER or in applicable regulatory instruments (*reliability corrective action*), and/or
- an increase in the sum of consumer and producer surplus in the NEM.

RIT-D proponents should express an *identified need* as the achievement of a desired objective or end, and not simply the means to achieve a desired objective or end. A description of an *identified need* should not mention or explain a particular method, mechanism or approach to achieving a desired outcome.

For example, where a *RIT-D proponent* is concerned about network constraints under increased *load*, the *RIT-D proponent* could express the *identified need* as 'increase the ability of the network to take up *load*'. However, as an example, it would be incorrect for this *RIT-D proponent* to express the *identified need* as, 'installing a capacitor to address a voltage stability issue'.

In describing an *identified need*, a *RIT-D proponent* may find it useful to explain what will or may happen if the *RIT-D proponent* fails to take any action.

2.2 What are reasonable scenarios?

The NER does not define *reasonable scenarios*. In the application guidelines, we define a *reasonable scenario* as a set of variables or parameters that the *RIT-D proponent* does not expect to change across each of the relevant *credible options*.

For example, the following variables should be independent of the *credible options* and should therefore be considered components of each *reasonable scenario*:

- The levels of economic growth and the associated level of base electricity demand
- The level of population growth and the associated level of base electricity demand
- The unit capital and operating costs of generation plant
- The value of any environmental penalties
- The value of unserved energy

In a particular analysis, it may be appropriate to assess the benefits of a *credible option* across high, medium and low demand *reasonable scenarios*.

To the extent that a demand-side option leads to lower peak demand under each of these *reasonable scenarios*, *RIT-D proponents* should account for this in the states of the world associated with that option in each of those *reasonable scenarios*. This ensures that *RIT-D proponents* transparently calculate the benefits of the demand-side option separately in high, medium and low demand scenarios.

Guidance on how *RIT-D proponents* should apply *reasonable scenarios* in the RIT-D is included in section 12 of the application guidelines.

2.3 Preferred option

Under the RIT-D, the *preferred option* is the *credible option* that maximises the net economic benefit to all those who produce, consume and transport electricity in the NEM, compared to all other *credible options*. Where an *identified need* is for *reliability corrective action*, the *preferred option* may have a net economic cost. The net economic benefit of a *credible option* is simply the market benefit less the costs of the *credible option*.

A *credible option* is a project, or set of projects, established to meet an *identified need*. A set of projects may constitute one *credible option* in the form of an integrated solution to meet an *identified need.*

Example 1: Selecting a preferred option

A *RIT-D proponent* has identified five *credible options*. For each *credible option*, the *RIT-D proponent* quantified the costs and *market benefits*. The *RIT-D proponent* then subtracted the costs from the *market benefits* to derive the net economic benefits.

The *credible option* with the highest net economic benefit received the highest ranking. The *RIT-D*

proponent therefore identified it as the *preferred option*. The *preferred option* in this example would be the demand side option combined with a *network option*.

Table A: Calculating expected net economic benefit ($m)

Credible option	Market benefits	Costs	Net economic benefit	Ranking
Network option 1	11.3	11.9	-0.6	5
Network option 2	18	17	1	3
Embedded generation option	13.5	12.4	1.1	2
Demand-side option	0.9	0.5	0.4	4
Demand side option, combined with a network option	14	12	2	1

3 Process to be followed in applying the RIT-D

This part of the guideline summarises the process that a *RIT-D proponent* must follow when applying the RIT-D as set out in the NER. It summarises each stage of the process for applying the RIT-D.

Clause 5.17.4 of the NER sets out in detail the procedures that *RIT-D proponents* must follow in applying the RIT-D. Stakeholders should refer to cl. 5.17.4 of the NER as well as the application guideline.

The RIT-D procedures outline a three stage process:

- *Non-network options report*
- *Draft Project Assessment report*
- *Final Project Assessment report.*

It also specifies that stakeholder consultation on the *RIT-D project* should occur. This process is summarised in Figures A and B.

Figure A: The RIT-D process where a non-network option is or forms a significant part of a potential credible option

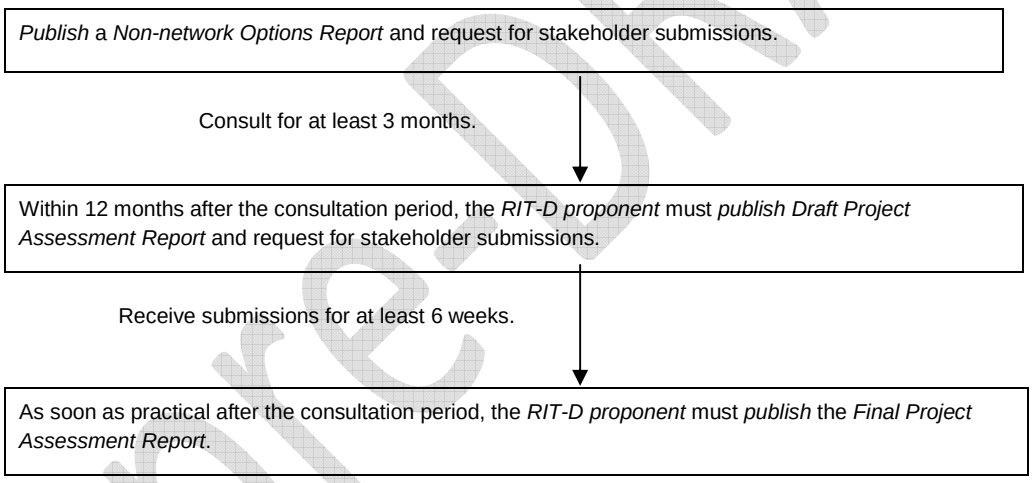
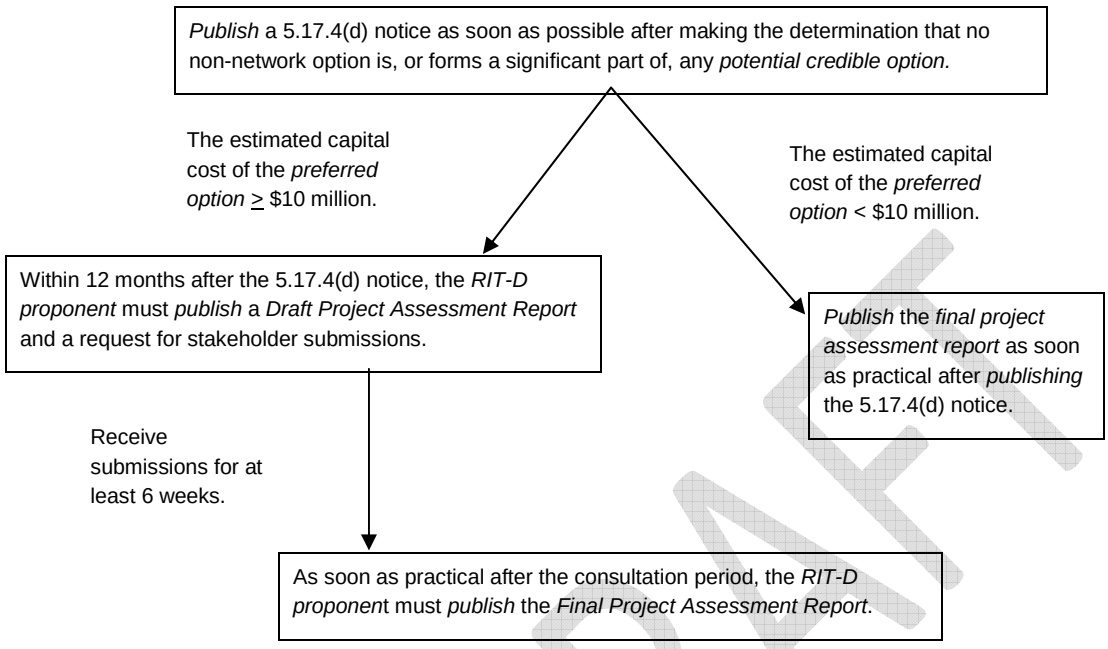


Figure B: The RIT-D process where no non-network option is, or forms a significant part of, a potential credible option



3.1 Stakeholder consultation

Clause 5.17.4(a) of the NER requires *RIT-D proponents* to consult with certain stakeholders on the *RIT-D project*. Specifically, *RIT-D proponents* should consult with:

- *Registered Participants*
- The Australian Energy Market Operator (AEMO)
- *Interested parties*
- *Non-network providers*.

Further, if the *RIT-D proponent* is a *Distribution Network Service Provider* (DNSP), it should also consult with persons registered on its *demand side engagement register*.

RIT-D proponents should consult with stakeholders throughout all stages of the *RIT-D* process. *RIT-D proponents* are to identify and maintain the contact details of the parties that they must consult with. We expect that *RIT-D proponents* have, or are able to develop, sufficient internal capabilities and processes to maintain its *demand side engagement register*.

3.1.1 Non-network options report

A *RIT-D proponent* must call for the stakeholders specified in cl. 5.17.4(a) of the NER to make submissions on the *non-network options report*. *RIT-D proponents* must provide these stakeholders with at least three months to make submissions from the date that the *RIT-D proponent publishes* the *non-network options report*.

When calling for submissions, *RIT-D proponents* should clarify that the identification of additional options should predominately occur at that stage of the consultation process. *RIT-D proponents*

should request for stakeholders to support any *potential credible options* they propose with sufficient information to enable the *RIT-D proponent* to assess the option's technical feasibility.

3.1.2 Consultation on the draft project assessment report:

The consultation period on the *draft project assessment report* must be at least six weeks from the *publication* of the report. Stakeholder consultation on the *draft project assessment report* must include the following:

- The *RIT-D proponent* must *publish* a request for submissions on the matters set out in its *draft project assessment report*, including the proposed *preferred option*.
- The *RIT-D proponent* must consult directly with potentially affected customers if the proposed *preferred option* in the *draft project assessment report* has the potential to have an adverse impact on the quality of service experienced by electricity consumers. This includes anticipated changes in voluntary *load* curtailment by electricity consumers and anticipated changes in *involuntary load shedding* and customer interruptions caused by network outages.

3.1.3 The final project assessment report

If a *RIT-D proponent* is a DNSP, it must notify persons on its *demand side engagement register* when it *publishes* its *final project assessment report.*

RIT-D proponents must *publish* their *final project assessment reports*. If the *RIT-D proponent* is eligible under 5.17.4(n), it may only need to *publish* its *final project assessment report* in its Transmission (TAPR) or DAPR.

3.2 Non-network options report

Clauses 5.17.4(b)-(h) of the NER outline the process that *RIT-D proponents* must follow in screening for *non-network options* and writing a *non-network options report*.

All *RIT-D proponents* are required to prepare and *publish* a *non-network options report*. The only exception is if the *RIT-D proponent* determines, on reasonable grounds, that there will not be a *non-network option* that is a potential *credible option* or that forms a significant part of a potential *credible option*. Section 6 of the application guidelines provides guidance and worked examples on how *RIT-D proponents* can determine whether this exemption applies.

The *non-network options report* must a include:

- A description of the *identified need*.
- The assumptions used in identifying the *identified need*. In cases of proposed *reliability corrective action*, this must also include why the *RIT-D proponent* considers *reliability corrective action* necessary.
- If available, the relevant annual deferred augmentation charge associated with the *identified need*.
- The technical characteristics of the *identified need* that a *non-network option* would be required deliver. For instance, this should include:
    - the size of *load* reduction or additional supply;

- location;
- contributions to power system security or reliability;
- contribution to power system fault levels as determined under cl. 4.6.1 of the NER[1]; and
- the operation profile.

- A summary of *potential credible options* to address the *identified need*, including both *network options* and *non-network options*
- To the extent practicable, the following information for each *credible option*:
  - A technical definition or characteristics of the *credible option*;
  - The estimated construction timetable and commissioning date (where relevant); and
  - The total indicative cost (include capital and operating costs); and
- Information to assist NSPs wishing to present an alternative *potential credible option*. This should include details of how to submit a non-network proposal for consideration by the *RIT-D proponent*.

The *RIT-D proponent* must *publish* the *non-network options report* in a timely manner, having regard to the ability of parties to identify the scope for, and develop, alternative *potential credible options* or variants to the *potential credible options*.

If the *RIT-D proponent* is a DNSP, it must notify persons registered on its *demand side engagement register* when it *publishes* its *non-network options report*.

3.3 Draft project assessment report

If a *RIT-D proponent* decides to proceed with the proposed distribution investment, it must prepare a draft project assessment draft report within:

- 12 months of the end of the consultation period on a *non-network options report*;
- Where a *non-network options report* is not required, the *publication* of the *RIT-D proponent's* notice setting out its reasons for not preparing a *non-network options report*; or
- a longer period agreed to by us in writing.

3.3.1 Information required for project assessment draft report

The *draft project assessment report* must include the following information:

- A description of the *identified need* for the investment;
- The assumptions used in identifying the *identified need*. In the case of proposed *reliability corrective action*, this should include reasons why the *RIT-D proponent* considers *reliability corrective action* necessary;

[1] Clause 4.6.1 of the NER covers power system fault levels. The clause states:
(a) AEMO, in consultation with Network Service Providers, must determine the fault levels at all busbars of the power system as described in cl. 4.6.1(b) of the NER.
(b) AEMO must ensure that there are processes in place, which will allow the determination of fault levels for normal operation of the power system and in anticipation of all credible contingency events that AEMO considers may affect the configuration of the power system, so that AEMO can identify any busbar which could potentially be exposed to a fault level which exceeds the fault current ratings of the circuit breakers associated with that busbar.

- If applicable, a summary of, and commentary on, the submissions on the *non-network options report*;
- a description of each *credible option* assessed;
- where a DNSP had quantified market benefits, a quantification of each applicable market benefit of each *credible option*;
- a detailed description of the methodologies used in quantifying each class of cost or market benefit;
- where relevant, the reasons why the *RIT-D proponent* has determined that a class or classes of market benefits or costs do not apply to a *credible option*;
- the results of a net present value analysis of each *credible option* and accompanying explanatory statements regarding the results;
- the proposed *preferred option* and details on its:
    - technical characteristics;
    - estimated construction timetable and commissioning date (where relevant);
    - Indicative capital and operating costs (where relevant);
    - A statement and accompanying detailed analysis that the proposed *preferred option* satisfied the RIT-D; and
    - If the proposed *preferred option* is for *reliability corrective action* and that option has a proponent, the name of the proponent; and
- Contact details for a suitably qualified staff member of the *RIT-D proponent* who can receive queries on the draft report.

The AER considers that, where a *RIT-D proponent* has undertaken market modelling, the *Draft Project Assessment Report* should also include a description of any assumptions the *RIT-D proponent* has made and summarise the results it found.

3.3.2 Exemption from preparing a project assessment draft report

Under certain circumstances, distribution investments do not require a *draft project assessment report*. Under cl. 5.17.4(n) of the NER, *RIT-D proponents* are exempt from providing a draft *project assessment report* if all of the following conditions are met:

- The *RIT-D proponent* made a determination under cl. 5.17.4(c) that no *non-network option* is a *credible option* or forms a significant part of a *credible option;*
- The *RIT-D proponent published* a notice under cl. 5.17.4(d) setting out the reasons for its determination, including any methodologies and assumptions it used; and
- The estimated capital cost to the NSPs affected by the *RIT-D project* of the proposed *preferred option* is under $10 million (varied in accordance with a cost threshold determination).

3.4 Final project assessment report

As soon as practicable after the consultation period for the *Draft Project Assessment Report*, the *RIT-D proponent* must consider all submissions received and *publish* a *final project assessment report*.

Where a *RIT-D proponent* is exempt from preparing a *Draft Project Assessment Report*, the *RIT-D proponent* must *publish the Final Project Assessment Report* as soon as practical after *publishing* the notice setting out why there are no credible *non-network options*. .

While not explicitly required by the NER, we consider it best practice for a *RIT-D proponent* to also *publish* the *Final Project Assessment Report* on its website. The *RIT-D proponent* may also note on its website that a process exists for resolving RIT-D disputes and the timeframes for lodging a *dispute notice* with the AER.

3.4.1 Information required for project assessment conclusions report

If a *Draft Project Assessment Report* was prepared, the *Final Project Assessment Report* must set out:

- The matters detailed in that report as required under cl. 5.17.4(j) of the NER.
- A summary of any submissions received on the *Draft Project Assessment Report* and the *RIT-D proponent's* response to each submission.

If the *RIT-D proponent* did not *publish* a *Draft Project Assessment Report*, the *RIT-D proponent* only need set out the matters required under cl. 5.17.4(j) of the NER.

3.4.2 Exemption from publishing a final project assessment report

Clause 5.17.4(s) of the NER can exclude a *RIT-D proponent* from *publishing* its *Final Project Assessment Report* under cll. 5.17.4(o)-(p) of the NER, if it meets the following conditions:

- the proposed *preferred option* has an estimated capital cost to the NSPs affected by the *RIT-D project* of under $20 million (varied in accordance with a cost threshold determination); and
- The *RIT-D proponent* includes its *Final Project Assessment Report* as a part of its DAPR, where the *RIT-D proponent* is a DNSP; or
- The *RIT-D proponent* includes its *final project assessment report* as a part of its TAPR, where the *RIT-D proponent* is a *transmission network service provider* (TNSP).

3.5 Reapplication of the RIT-D

Clause 5.17.4(t) of the NER states that if a material change in circumstances means that the identified *preferred option* in the *Final Project Assessment Report* is no longer the *preferred option*, the *RIT-D proponent* must re-apply the RIT-D to the *RIT-D project*.

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 *Final Project Assessment Report*; or
- The *credible options* assessed in the *Final Project Assessment Report*.

The AER can make a determination to exclude *RIT-D proponents* from this clause, where it considers appropriate. In making a determination under cl. 5.17.4(t) of the NER, we must have regard to:

- The *credible options* (other than the *preferred option*) identified in the *Final Project Assessment Report*;
- The change in circumstances identified by the *RIT-D proponent*
- Whether a failure to promptly undertake the *RIT-D project* is likely to materially affect the reliability and secure operating state of the distribution network, or a significant part of that network.

We expect that situations that call for the re-application of the RIT-D under cl. 5.17.4(t) of the NER will be exceptional. Likewise, circumstances where we make a determination to exclude *RIT-D proponents* from this clause are also likely to be exceptional. For this reason, we will consider these situations on a case-by-case basis when deciding whether or not such a determination would be appropriate.

4 Material and adverse market impacts

Clause 5.15.1 of the NER defines an interested party as a:

> ...a person including an end user or its representative who, in the AER's opinion, has the potential to suffer a material and adverse National Electricity Market impact from the investment identified as the *preferred option*...

Material and adverse NEM impacts do not relate to personal detriment or personal property rights.

For the purpose of this clause, we must provide guidance on what we consider to be material and adverse NEM impacts.

Example 2.1 Impacts relating to personal detriment

The *RIT-D proponent* has identified a demand management program as its *credible option*. A part of this program will entail installing smart meters with time of use (ToU) pricing. The *RIT-D proponent* expects this will defer its need for network augmentation and will reduce the costs of electricity to end-users overall.

The *RIT-D proponent* also expects that some of its customers will not want to change their electricity consumption, and will continue to consume the majority of their electricity during hours of peak demand. These consumers may claim that the *preferred option* would cause them detriment.

To the extent that the *RIT-D proponent* proposes a ToU charging structure that is cost-reflective, the negative impacts of the demand management program on particular customers would constitute an impact relating to personal detriment, and therefore, we would not consider these consumers as *interested parties* on this basis. However, if a consumer contends that the structure of ToU charges under the demand management program is demonstrably not cost-reflective, this would imply that the demand management program could lead to inefficiency and hence constitute a wider market detriment.

Example 2.2: Impacts relating to personal property rights

The *RIT-D proponent* has identified a *network option* as its *credible option*. Under this option, the *RIT-D proponent* will build poles and wires. This network infrastructure will run through several different properties. Some of the property owners are displeased with this proposal and believe it will devalue their property.

This would constitute an impact relating to personal property rights. Therefore, we would not consider these property owners as *interested parties* on this basis.

If a stakeholder has the potential to suffer a material and adverse impact from an externality, we cannot consider them to be an interested party for the purposes of cl. 5.15.1 of the NER. This is because material and adverse NEM impacts do not concern impacts relating to personal detriment and personal property rights.

Section 15 of the application guidelines discusses externalities in more detail.

Material and adverse market impacts for the purposes of defining *interested parties* should include:

- An impact on a network operator or other stakeholders such as aggregators or energy service companies in the NEM that:
  - Constrains the network operator's ability to fulfil functions mandated under the NER; or
  - Undermines its ability to perform its operations to the extent that it can no longer operate or perform a particular function. This may result from physical obstruction or a substantial reduction in profitability; or
- An impact on an electricity consumer, in their role as a consumer of electricity that reduces the quality or reliability of their electricity supply below what is required under the NER.

Example 2.3: Material and adverse impacts to network operators

The *RIT-D proponent* identified a demand management project or program as a *credible option* to meet an increase in forecasted demand. As a part of its demand management project or program, the *RIT-D proponent* plans to roll-out smart meters through two network operators operating in the distribution network.

There is a third network operator in the distribution network that the *RIT-D proponent* has not planned to partner with to roll-out its smart meters. The third network operator is concerned that the demand management project or program is giving its competitors an unfair advantage in the distribution region. The third network operator has forecast that the demand management project or program will have a material and adverse impact on the profitability of its operation, such that it would no longer be able to operate in the distribution region.

In this example, the third network operator would be an *interested party* for the purposes of cl. 5.15.1 of the NER.

5 Dispute resolution

Clause 5.17.5 of the NER sets out the process that we and disputing parties must follow in resolving RIT-D disputes.

5.1 Who can make a RIT-D dispute

A dispute can only be lodged by the following parties:

- *Registered Participants*
- The Australian Energy Market Commission (AEMC)
- *Connection Applicants*
- *Intending Participants*
- AEMO
- *Interested parties*
- *Non-network providers.*

The NER and the application guidelines refer to a person/party disputing a conclusion in the *final project assessment report* as a *disputing party*.

5.2 What can be disputed

The *disputing party* may only dispute conclusions made by the *RIT-D proponent* in the *Final Project Assessment Report* on the grounds that:

- The *RIT-D Proponent* has not applied the RIT-D in accordance with the NER; or
- There was a manifest error in the calculations that the *RIT-D proponent* performed in applying the RIT-D

A dispute may not be raised about any issues in the *Final Project Assessment Report* which:

- The RIT-D treats as externalities, or
- Relate to an individual's personal detriment or property rights

Further guidance and examples on the matters that the RIT-D treats as externalities are set out in section 15 in the application guidelines.

5.3 Lodging a dispute and information required

Within 30 days of the *RIT-D proponent publishing* the *final project assessment report*, the *disputing party* must:

- give notice of the dispute in writing setting out the grounds for the dispute to the AER; and
- at the same time, provide a copy of the *dispute notice* to the relevant *RIT-D proponent*.

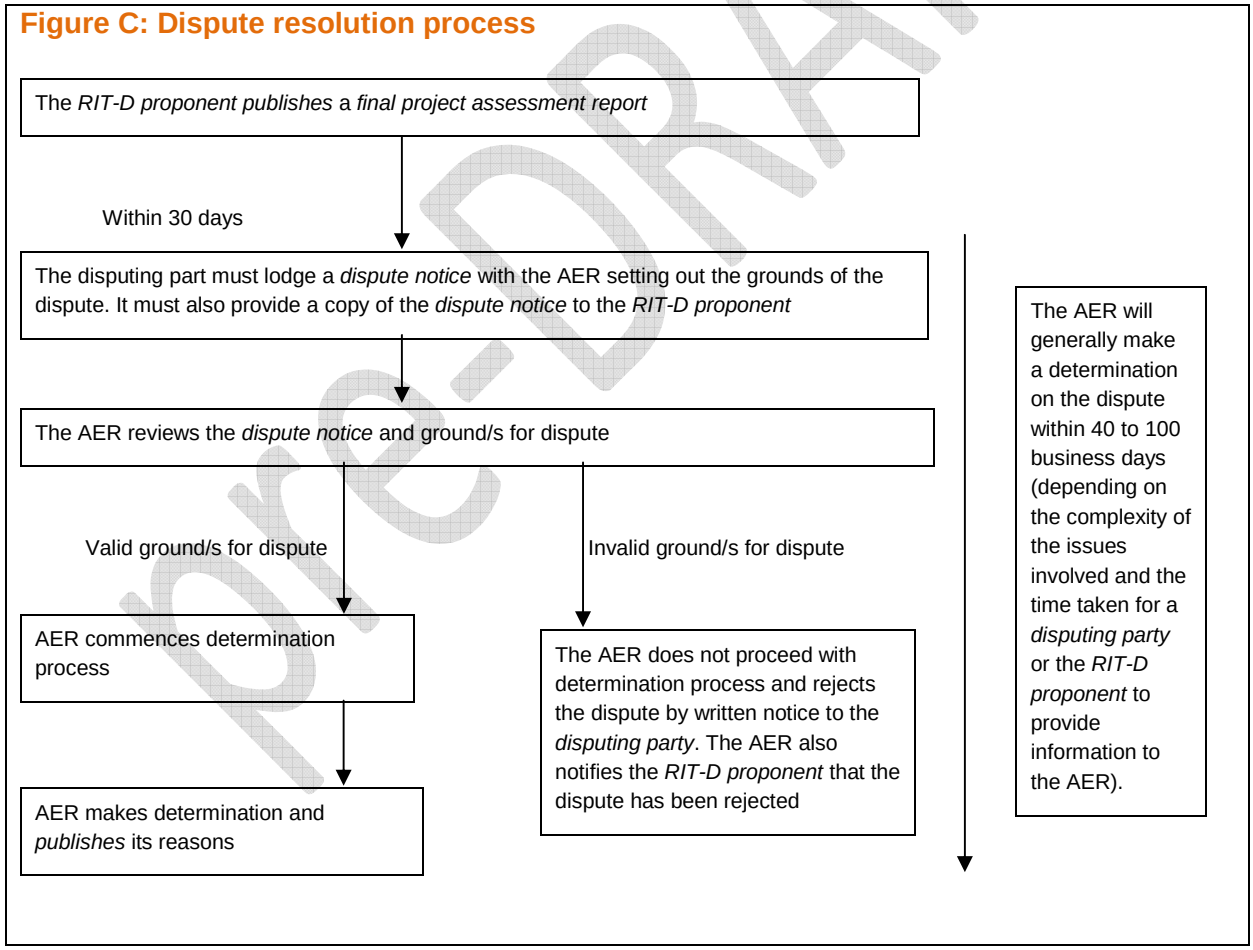
The *dispute notice* should include the following information:

- the *disputing party*'s name, a contact officer, address, email and telephone number;
- the ground/s for the dispute;
- any submissions the *disputing party* made regarding the *RIT-D proponent's* non-network option report, the *Draft Project Assessment Report* and the *Final Project Assessment Report* (if applicable);
- the *RIT-D proponent's* response to any submissions made by the *disputing party* regarding the project assessment conclusions report (if applicable);
- details of any meetings held by the *RIT-D proponent* with the disputing party (if applicable); and
- the details of any other known parties involved in the matter.

5.4 Procedure for a dispute

The AER, *RIT-D proponents* and disputing parties all have different obligations under cl. 5.17.5 of the NER to ensure the timely resolution of disputes. Figure A summarises the process for resolving RIT-D disputes.

Figure C: Dispute resolution process



5.5 Timeframe for resolving disputes

We must either reject the dispute or make and *publish* a determination:

- within 40 days of receiving the *dispute notice*, or
- within a period of up to an additional 60 days where we notify *interested parties* that the additional time is required to make a determination because of the complexity or difficulty of the issues involved.

5.6 AER determination

After considering the *dispute notice* and any other relevant information, we must either reject the dispute or make and *publish* a determination. We can only require the *RIT-D proponent* to amend its *final project assessment report* if we determine that it applied the RIT-D incorrectly or there was a manifest error in its calculations when applying the RIT-D.

If we decide to reject the dispute, we must do the following:

- Reject the dispute by written notice to the *disputing party* if we consider that the grounds for the dispute were misconceived or lacking in substance; and
- Notify the *RIT-D proponent* that the dispute has been rejected.

If we do not reject the dispute, we must make and *publish* a determination that does the following:

- States that, based on the grounds of the dispute, the *RIT-D proponent* will not need to amend the project assessment conclusions report; or
- Directs the *RIT-D proponent* to amend the matters set out in the *final project assessment report*.

5.7 Expert consultants

We may engage an expert to provide advice. Given the level of technical and engineering detail involved in RIT-D assessments, such experts may include engineers, economists or experts in the electricity industry.

It is likely that an engineering consultant would be needed to advise us on the engineering/planning aspects where the *identified need* is for reliability corrective action. Given the complex economic modelling and analysis required, we may also require an economic consultant to assist in resolving disputes regarding the quantification of market benefits.

5.8 Material the AER may consider

In making a determination on the dispute, we:

- Must only take into account information and analysis that the *RIT-D proponent* could reasonably be expected to have considered or undertaken at the time it performed the RIT-D;
- Must *publish* our reasons for making the determination;
- May disregard any matter raised by the *disputing party* or the *RIT-D proponent* that is misconceived or lacking in substance; and
- Must specify a reasonable timeframe for the *RIT-D proponent* to amend its *final project assessment report*, where we have directed them to do so.

We are likely to consider the following material:

- The *dispute notice*
- The *non-network options report*, the *draft project assessment report* and the *final project assessment report* (as applicable)
- Any expert advice or reports on the proposed *preferred option*
- The *RIT-D proponent's* annual planning reports and any other relevant planning publications
- Relevant planning criteria, reliability requirements or jurisdictional licensing requirements and
- Relevant regulatory decisions relating to the proposed *preferred option*.

Requests for further information

Under cl. 5.17.5(h) of the NER, we may request further information from the *disputing party* and *RIT-D proponent*. The *disputing party* or the *RIT-D proponent* must provide any additional information that we request as soon as reasonably practicable.

A request for further information will be in writing. The notice will explain that:

- The request is being made under cl. 5.17.5(h) of the NER;
- The period of time for making a determination is automatically extended by the time it takes the relevant party to provide the requested information, provided that:
    - we make the request for additional information at least seven days prior to the expiry of the relevant period
    - the *RIT-D proponent* or *disputing party* provides the information within 14 days of receipt of the request

While the NER expressly provides for us to request information from the *RIT-D proponent* or the *disputing party*, we can request 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*.

6 Clause 5.17.4(c) determinations

The application guidelines must provide guidance and worked examples on how to make a determination under cl. 5.17.4(c) of the NER. Clause 5.17.4(c) of the NER states that a *RIT-D proponent* is not required to prepare a *non-network options report* if it determines, on reasonable grounds, that there will not be a *non-network option* that is a *potential credible option* or that forms a significant part of a *potential credible option* to address the *identified need*.

6.1 Screening for non-network options

Before *RIT-D proponents* can make a determination under cl. 5.17.4(c) of the NER, they must screen for *non-network options*. We consider screening to mean that *RIT-D proponents* must consider all feasible *non-network options*, such as:

- Any measure or program targeted at reducing peak demand, including:
    - Improvements to or additions of automatic control schemes such as direct *load* control
    - Energy efficiency programs or a demand management awareness program for consumers
    - Installing smart meters with measures to facilitate cost-reflective pricing.
- Increased local or distributed generation/supply options, including:
    - Capacity for standby power from existing or new *embedded generators*
    - Using energy storage systems, load transfer capacity and more.

6.2 Assessing non-network options as potential credible options

Once a *RIT-D proponent* screens for *non-network options*, it can determine whether or not any of these *non-network options* could individually or jointly with another option(s) constitute a *credible option*.

RIT-D proponents must keep in mind that *credible options* may be a variety of different measures combined to form one integrated solution to an *identified need*. Therefore, a *RIT-D proponent* must consider treating a package of different *non-network options* as one *credible option* when determining whether a non-network option could constitutes part of a *credible option*. A *RIT-D proponent* must also determine whether or not any *non-network options* could combine with a network or generation option to form a significant part of a *credible option*. *Non-network options* could form a significant part of a *credible option* to address the *identified need* where:

- Adding a *non-network option* to a *network option* or a generation option could be used as an integrated solution for addressing an *identified need* such as increasing the net economic NEM benefit.
- The *network option* is not a feasible *credible option*, unless the *RIT-D proponent* combines it with a *non-network option*.

When making this determination, a *RIT-D proponent* should assess whether the option (or group of options) would potentially:

- Address the *identified need*
- Is (or are) commercially and technically feasible. An option is commercially and technically feasible where its estimated costs are comparable to (or less than) other *credible options* that address the *identified need*. One exception to this general guidance applies where the *credible option* (or options) is/are likely to deliver materially higher market benefits. In such circumstances, the option may be commercially feasible despite the higher expected cost.
- Can be implemented in a sufficient time to meet the *identified need*

A *RIT-D proponent* must state its reasoning if it determines that no *non-network options* satisfy these criteria.

Example 3.1: A non-network option as a significant part of a credible option

The *identified need* is to increase the capacity in the distribution network by 20 per cent. The *RIT-D proponent* has identified two *credible options*:

1. Install larger capacity feeders that will increase capacity in the distribution network by 40 per cent; or
2. Introduce a demand management program to reduce peak *load*, increasing available network capacity by 10 per cent. The *RIT-D proponent* will then install smaller, less-costly feeders so that total capacity will increase by 20 per cent.

Both options 1 and 2 are credible in that they can both address the *identified need*, are both commercially and technically feasible and can both be implement in a sufficient time to meet the *identified need*.

Consequently, the *RIT-D proponent* could not make a determination under cl. 5.17.4(c) of the NER.

6.3 Publishing a clause 5.17.4(d) notice

As previously discussed, cl. 5.17.4(c) of the NER states that a *RIT-D proponent* is not required to prepare a *non-network options report* if it determines, on reasonable grounds, that no *non-network options* could be *potential credible options* or form a significant part of a *potential credible option* to address the *identified need*.

Clause 5.17.4(c) of the NER states:

> If a RIT-D proponent makes a determination under paragraph (c), then as soon as possible after making the determination it must *publish* a notice setting out the reasons for its determination, including any methodologies and assumptions it used in making its determination.

A *RIT-D proponent's* reasons in a cl. 5.17.4(d) of the NER notice must include an explanation of:

- Why no *non-network options* could address the *identified need*; and
- Why no *non-network options* are commercially feasible; or
- Why no *non-network options* are technically feasible; or

- Why no *non-network options* could be implemented in a sufficient time to meet the *identified need;* and
- Why no *non-network option* satisfies all of the above requirements, when forming a significant part of a *credible option*; and
- The methodologies and assumptions used to determine the above points.

We require *RIT-D proponents* to apply this level of consideration to every *non-network option* available.

A *RIT-D proponent* only needs to describe why a *non-network option* is not a *credible option* in one respect. For instance, if a *non-network option* does not address the *identified need* and is not technically feasible; the *RIT-D proponent* is only required to show that it does not address the *identified need* or that it is technically infeasible. This does not preclude a *RIT-D proponent* from showing why it fails to satisfy both these requirements. A *RIT-D proponent* may find it prudent to explain why it fails both requirements, in order to minimise the chance of potential disputes.

7 Credible options

Clause 5.15.2(a) of the NER provides that a *credible option* is an option, or group of options that:

- addresses the *identified need*;
- is (or are) commercially and technically feasible; and
- can be implemented in sufficient time to meet the *identified need*

This is where an *identified need* is defined as

> the objective a *Network Service Provider* (or in the case of a need identified through joint planning under clause 5.14.1(d)(3) or clause 5.14.2(a), a group of *Network Service Providers*) seeks to achieve by investing in the *network.*

A set of projects may constitute one *credible option* if such projects form one integrated solution to meet a given *identified need.* To the extent possible, RIT-D proponents should construct credible options using sets of individual options that meet identified needs over broadly similar timeframes. This facilitates the use of similar-length modelling periods (see section 8 of the application guidelines) and increases the transparency and robustness of the analysis.

Where there is a material degree of uncertainty regarding the future scenarios, and the option (or options) under consideration involve a sunk or irreversible action by the RIT-proponent, there may be value in retaining flexibility to respond to changing market developments or scenarios as they emerge. One way of doing this is to consider credible options formed by a group of options that include:

- An initial option that allows the RIT-T proponent to defer expenditure of a more costly option until more information becomes available and
- A subsequent option that would only be implemented under certain future conditions or states of the world.

When a *RIT-D proponent* accounts for this value, it is effectively incorporating option value into its RIT-D assessment.

Example 4 Identifying credible options when there is uncertainty

A *RIT-D proponent* is considering augmenting a section of its distribution network.

The *RIT-D proponent* has forecast future demand, but has found that there is a material degree of uncertainty. There has been talk of a major property developer planning to build a large residential estate in the area. Consequently, the *RIT-D proponent* has forecasted the following future scenarios:

- Low demand - demand is forecast to decrease by 1 per cent over the next 6 years with 50 per cent probability
- High demand - demand is forecast to increase by 20 per cent over the next 6 years with 50 per cent probability

In light of the high demand scenario, the *RIT-D proponent* is considering investing in a large substation and additional poles and wires (the network augmentation option). This investment would be costly and would only be beneficial in the forecast high demand scenario. There is a 50 per cent

chance that this high demand scenario won't eventuate.

However, it may be prudent for the *RIT-D proponent* to retain the flexibility to respond to the high demand scenario as it emerges. This could enable the large substation investment to be delayed until the *RIT-D proponent* is certain that the major property development will go ahead.

If the *identified need* is such that it is sub-optimal for the *RIT-D proponent* to do nothing while it waits for this information, it could be prudent for it to make a smaller or more reversible investment in the interim. This could entail implementing a direct *load* control project, or giving electricity consumers incentive payments to reduce their levels of peak demand.

In this example, the *RIT-D proponent* identifies the following *credible options*:

- Option to augment the network in year 2.
- Option to implement a voluntary *load* curtailment program in year 1 and wait for more information before deciding whether to augment the network. Subject to the information, which the *RIT-D proponent* expects to receive in year 3, the *RIT-D proponent* could augment the network in year 4.

After the *RIT-D proponent* quantifies the market benefits in both *reasonable scenarios* (low demand and high demand), it finds that the market benefits are highest in the second option.

Number and range of credible options

Clause 5.15.2(c) of the NER states that in applying the RIT-D, the RIT-D proponent must consider all options that it could reasonably classify as credible options, without bias to energy source, technology, ownership and whether it is a network or non-network option.

It is possible that in the presence of integrated solutions, RIT-D proponents may consider a large magnitude of credible options that comprise a number of similar 'sub-options'— that is, different variants of integrated solutions. It is important that RIT-D proponents consider all such credible options and 'sub-options' so they can adequately take option value into account (see example 4).

Further, cl. 5.15.2(d) of the NER confirms that *RIT-D proponents* should not exclude options without proponents as potentially constituting *credible options*.

8 Suitable modelling periods

The duration of modelling periods should take into account the size, complexity and expected life of the relevant *credible option* to provide a reasonable indication of the market benefits and costs of the *credible option*. This means that by the end of the modelling period, the network is in a 'similar state' in relation to needing to meet a similar *identified need* to where it is at the time of the investment. This means that the suitable modelling period could vary according to the credible option under consideration. However, to the extent possible, the RIT-D proponent should construct credible options (using packages of individual options - see section 7 of the application guidelines) that require assessment under similar modelling periods.

It is difficult to provide definitive guidance on how *RIT-D proponents* should implement this principle. However, it is unlikely that a period of less than 5 years would adequately reflect the market benefits of any *credible option*. In the case of very long-lived and high-cost investments, it may be necessary to adopt a modelling period of 20 years or more.

When considering longer modelling periods, a RIT-D proponent may find that costs and market benefits may eventually become immaterial due to discounting. Under such circumstances, a *RIT-D proponent* may exercise discretion when selecting a suitable modelling period so that the RIT-D does not require a level of analysis that is disproportionate to the scale and likely impact of the *credible options* being considered.

Example 6: Suitable modelling periods

The *identified need* is to maintain reliability under conditions of rising peak load. The *RIT-D proponent* has identified two *credible options* to achieve this:

1. Increase capacity in the section of the network to take up *load* by 10 per cent. This will be achieved through network augmentation; or
2. Decrease peak demand through a DSP program such that the existing network can serve an increase in the pre-DSP peak load of 10 per cent.

Under the first option, the *RIT-D proponent* will build the plant in year 4. Project planning will commence in year 2. The *RIT-D proponent* expects the new plant will satisfy the capacity needs on the section of the distribution network until year 20, after which it will consider more options for meeting the *identified need*. In this case, a suitable modelling period would be 20 years.

Under the second option, the *RIT-D proponent* will develop the demand response program and start rolling out the demand response in year 3. Project planning will commence in year 1. The *RIT-D proponent* expects end-users to gradually take up the demand response, which will reach a steady state in year 12. The *RIT-D proponent* expects it will need to consider more options for meeting the *identified need* in year 20. In this case, a suitable modelling period should be approximately 20 years. This is because there are approximately 20 years from the commencement of project planning until the network is in a similar state in terms of the *identified need*.

9 Market benefit classes

The total benefit of a *credible option* 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; and
- Producer surplus, being the difference between what electricity producers and transporters receive in payment for their services and the cost of providing those services (excluding the costs of the *credible option*).

We require *RIT-D proponents* to include all classes of market benefits in its analysis that it considers to be material when applying the RIT-D. A *RIT-D proponent* must consider whether each *credible option* could deliver the classes of market benefits specified under cl. 5.17.1(c)(4) of the NER. Clause 5.17.1(d) of the NER specifies that:

> A RIT-D proponent may, under the *regulatory investment test for distribution*, quantify each class of market benefits under paragraph (c)(4) where the RIT-D proponent considers that:
>
> (1) any applicable market benefits may be material; or
>
> (2) the quantification of market benefits may alter the selection of the *preferred option*

Consequently, while a *RIT-D proponent* must consider each class of market benefit specified under cl. 5.17.1(c)(4) of the NER, it is not obligated to quantify the benefits that it considers to be immaterial or will not alter the selection of the *preferred option*. However, where an identified need is not for reliability corrective action, including more classes of market benefits may assist a credible option to have a positive net economic benefit and hence satisfy the RIT-D.

Example 7.1: Market benefits with immaterial impacts

A *RIT-D proponent's preferred option* is to upgrade one of its substations. The *RIT-D proponent* expects that constructing this *credible option* will cost $40 million. As a part of this upgrade, the *RIT-D proponent* proposes to install more efficient transformers.

Load at region of the distribution network is 100 MW. Energy costs after generation are $11/MWh.

The *RIT-D proponent* expects the new transformers to marginally reduce electrical energy losses from 6 per cent to 5.9 per cent when operating at 100 MW.

In the base case:

- Total losses = $11*0.06*100 MW = $66 per hour

In the state of the world with the *credible option*:

- Total losses = $11*0.059*100 MW = $64.9 per hour

Assuming the same conditions over 8,760 hours per year, the contribution of decreased network losses to the market benefit of the *credible option* is ($66 - $64.9)*8760 = $9 636 per year.

Without this class of market benefit, the *RIT-D proponent* estimates that the net economic benefits for the *preferred option* are $50 million. The identified option ranked second has an estimated net economic benefit of $10 million. In light of this information, *RIT-D proponents* may consider this cost

reduction as immaterial, as it by no means has an impact on the ranking of *credible options*.

Example 7.1: Market benefits that will not alter the selection of the preferred option

RIT-D proponents should quantify classes of market benefits that may affect the identification of the *preferred option*.

For example, a *RIT-D proponent* is considering three *credible options*:

- A *network option*
- A sophisticated demand-side option
- A simple demand-side option with a deferred *network option*

Assume that each option has a similar cost and only has an impact on *load shedding*.

The *RIT-D proponent* determines, on reasonable grounds, that all three *credible options* will reduce *involuntary load shedding* by a very similar amount.

However, the *RIT-D proponent* expects that these *credible options* will differ significantly in the changes in *voluntary load shedding* they produce.

While the *credible options* may produce marginal differences in *involuntary load shedding*, the *RIT-D proponent* is not required to calculate these differences as this will be irrelevant to identifying the *preferred option*. However, the *RIT-D proponent* expects, on reasonable grounds, that the *preferred option* will depend on the relative changes in voluntary *load shedding*.

In this example, the *RIT-D proponent* may only need to quantify the changes in voluntary *load shedding* to identify the *preferred option*.

RIT-D proponents should consider the classes of market benefits that are relevant to the circumstances surrounding the individual RIT-D assessment and the *credible options* under consideration.

Clause 5.17.1(c)(4) of the NER requires *RIT-D proponents* to consider whether each *credible option* could deliver the following classes of market benefits:

- Changes in voluntary *load* curtailment;
- Changes in *involuntary load shedding* and customer interruptions caused by network outages, using a reasonable forecast of the value of electricity to customers;
- Changes in costs for parties, other than the *RIT-D proponent*, due to differences in:
  - The timing of new plant;
  - Capital costs; and
  - The operating and maintenance costs;
- Differences in the timing of expenditure;

- Changes in *load transfer capacity* and the capacity of *embedded generators* to take up *load*;
- Any additional option value (where this value has not already been included in the other classes of market benefits) gained or foregone from implementing the *credible option* with respect to the likely future investment needs of the NEM;
- Changes in electrical energy losses; and
- Any other class of market benefit determined to be relevant by the AER.

We consider this list of market benefit classes to be sufficiently extensive. It would be difficult to propose any additional market benefit class that would have a material impact and/or be specific to the NEM. For this reason, we do not propose any additional, specific class of market benefit.

However, we will consider any other class of market benefits determined to be relevant by the *RIT-D proponent*. On application from a *RIT-T proponent*, we will consider whether to allow the quantification an additional class of market. However, a *RIT-D proponent* must receive approval before it makes its *non-network options report* available to other parties. If the *RIT-D proponent* is not preparing a *non-network options report*, the AER must provide its approval before the *RIT-D proponent publishes* the notice of its determination that there are no *non-network options* that are credible options.

10 Valuing market benefits

Under cl. 5.17.2(c)(5) of the NER, the RIT-D guidelines must provide guidance and worked examples as to the acceptable methodologies for valuing the market benefits of a *credible option*. This section provides guidance on valuing market benefits broadly.

In the RIT-T guidelines, the market benefit of a *credible option* is obtained by:

- Comparing, for each relevant *reasonable scenario*:
    - The state of the world with the *credible option* in place, with
    - The state of the world in the base case, in which no credible option is implemented by the TNSP
- Weighting any benefits or costs by the probability of each *reasonable scenario* occurring.[2]

However, under the RIT-D, where the *identified need* is for reliability corrective action, there is no point in establishing a base case in which no credible option is implemented. Rather, the *RIT-D proponent* will only have to calculate the relative market benefits between *credible options*.

A relative market benefit of a *credible option* is obtained by:

- Selecting one credible option to serve as the base case for the RIT-D analysis (base case credible option)
- Comparing, for each *reasonable scenario*, the state of the world with each other *credible option* (other credible option) in place against the state of the world with the base case credible option in place;
- Where the state of the world with another credible option in place exhibits lower costs than the state of the world with the base case option in place, the difference constitutes a relative market benefit to that other credible option. Where the reverse occurs, the difference constitutes a negative relative market benefit or a relative market cost and
- Weighting any relative market benefits or costs by the probability of each *reasonable scenario* occurring.

The RIT-D proponent will then need to demonstrate that the preferred option has the highest relative net economic benefit of all the credible options, which may be zero if the preferred option is the base case credible option.

Example 8: Credible options affecting reasonable scenarios (demand management)

The level of economic growth and the associated level of base electricity demand are key components of a *reasonable scenario*.

To the extent that a demand-side option leads to lower peak demand under each of these *reasonable scenarios*, *RIT-D proponents* should account for this effect in the states of the world associated with that option in each of those *reasonable scenarios*.

This ensures that *RIT-D proponents* transparently calculate the benefits of the demand-side option in

[2] Defined as a set of variables or parameters that are not expected to change across each of the relevant credible options

high, medium and low demand scenarios, because such benefits of the demand-side option may vary according to the demand scenario.

10.1 Deriving relevant states of the world

State of the world is taken to mean a reasonable and mutually consistent description of all of the relevant market supply and demand characteristics and conditions that may affect the calculation of market benefits over the period of the assessment.

A state of the world should be internally consistent in that all aspects of the state of the world could reasonably coexist. Crucially, the development of new generation (incorporating capacity, technology, location and timing) is likely to vary depending on which *credible option* RIT-D is implemented. Therefore, each *credible option* will be associated with a different state of the world reflecting different patterns of generation investment and other characteristics and conditions.

All existing assets and facilities at the time the RIT-D is applied must, at least initially,[3] form a part of all states of the world. *RIT-D proponents* must also derive appropriate committed, anticipated and modelled projects—that is, future investment in generation, network and *load*—relevant to or contingent upon any or all credible options proceeding or not proceeding.

Like existing plant, committed projects should form a part of all states of the world, based on the reasonable judgement of *RIT-D proponents*. Anticipated projects should be included based on the reasonable judgement of *RIT-D proponents*.

The choice of modelled projects in a given state of the world will need to be determined based on appropriate market development modelling. This involves determining what kind of projects would be developed in the longer term, both with and without each *credible option* proceeding. Market development modelling must be undertaken on a transparent and robust basis.

By enabling the derivation of modelled projects in the presence of a *credible option* and the base case, market development modelling assists in determining the market benefits of the *credible option* in a given *reasonable scenario*. For example, market development modelling may assist in determining whether—in high, medium or low demand *reasonable scenarios*—a demand-side *option* is likely to lead to the deferral (or advancement) of new generation investment compared to other *credible option*s. To the extent it does, this would constitute a positive (or negative) contribution to the market benefit of the *credible option* in each of those *reasonable scenarios*.

10.2 Comparing relevant states of the world

RIT-D proponents obtain the market benefit of a *credible option* in a given *reasonable scenario* by comparing the different states of the world with each option (including the base case credible option) in place. *RIT-D proponents* must derive the states of the world with each *credible option* in place and compare the associated states of the world across all *reasonable scenarios*. The example below illustrates how this could be done in a case where the *identified need* is the meeting of a mandatory service standard and there are two *credible options* that would satisfy that need – a *network option* and a demand-side response option.

Example 9.1 Comparing states of the world where the identified need is for reliability

[3] Reasonable scenarios may appropriately contemplate mothballing or retirement of existing plant or facilities.

corrective action

Given two *credible options* (a *network option* and a demand-side option) and three *reasonable scenarios* (high, medium and low demand), it is necessary to:

First, derive both a *network option* state of the world and a demand-side option state of the world under conditions of high, medium and low demand. This will require six market development modelling paths to establish six states of the world:

1. *Network option* with high demand;
2. Demand-side option with high demand;
3. *Network option* with medium demand;
4. Demand-side option with medium demand;
5. *Network option* with low demand; and
6. Demand-side option with low demand.

Second, compare the states of the world under each *credible option* under conditions of high, medium and low demand. This requires a comparison between state of the world (1) against (2), (3) against (4) and (5) against (6). Treating the *network option* as the base case credible option, this yields the relative market benefits of the demand-side option as compared to the *network option* in each of the three *reasonable scenarios*.

For this example, assume that the *network option* has fixed and operating costs of:

- $30 million in a high demand scenario;
- $20 million in a medium demand scenario; and
- $10 million in a low demand scenario.

Further, assume that the demand-side option has fixed and operating costs of:

- $40 million in a high demand scenario;
- $10 million in a medium demand scenario; and
- $5 million in a low demand scenario.

This means that the demand-side option has relative market benefits of:

- Negative $10 million in a high demand scenario;
- $10 million in a medium demand scenario; and
- $5 million in a low demand scenario.

10.3 Weighting the market benefits arising in each reasonable scenario

The final step is to weight the market benefits of each *credible option* arising in each *reasonable scenario* to derive the market benefit of that *credible option*.

Example 9.2 Comparing probability-weighted states of the world

Drawing from the above example, assume that the probability of a:

- High demand scenario is 50 per cent;
- Medium demand scenario is 40 per cent; and
- Low demand scenario is 10 per cent.

Under these assumptions, the relative market benefit of the demand-side option is -$0.5 million (being 0.5*-$10m + 0.4*$10m + 0.1*$5m). This means that the network option is the preferred option to address the identified need for reliability corrective action.

11 Valuing costs

Under cl. 5.17.1(c)(6) of the NER, the *RIT-D proponent* must consider whether the following classes of costs would be associated with each *credible option*:

- Financial costs incurred in constructing or providing the *credible option*;
- Operating and maintenance costs over the operating life of the *credible option*;
- Cost of complying with laws, regulations and applicable administrative requirements in relation to the *credible option*; and
- Any other financial costs the AER determines to be relevant.

A *RIT-D proponent* must capture these classes of costs in its analysis when applying the RIT-D.

Note that where the identified need is for reliability corrective action, costs refer to the incremental or relative costs of another credible option over (or under) the base case credible option. RIT-D proponents must take care not to subtract actual option costs from relative market benefits.

11.1 Other financial costs

A *RIT-D proponent* may propose any other financial cost that it considers relevant. If a *RIT-D proponent* makes such a proposal, it should provide the AER with a written explanation outlining why the financial cost is relevant, including any relevant assumptions the *RIT-D proponent* may have made.

The *RIT-D proponent* must submit this proposal to the AER before making its *non-network options report* available to other parties. If the *RIT-D proponent* is not preparing a *non-network options report*, we must approve the proposal before the *RIT-D proponent publishes* the notice of its determination that there are no credible *non-network options*.

If we agree that the *RIT-D proponent* should account for the proposed class and magnitude of financial cost, we will provide approval in writing. The AER will make this determination as soon as practical, taking the complexity of the suggestion into account.

The cost of complying with laws and regulations

In some cases, a *RIT-D proponent* may have a choice as to how it complies with a law, regulation or administrative requirement. For example, the *RIT-D proponent* may lawfully choose to pay a financial amount rather than undertake some other action (which is otherwise necessary to comply with the relevant law, regulation or administrative requirement). If the financial amount is smaller than the costs of undertaking some other action, then the *RIT-D proponent* may treat this financial amount as part of the costs of such a *credible option*.

However, any harm to the environment or to any party that is not expressly prohibited or penalised under the relevant laws, regulations or administrative requirements does not form part of the costs or affect the market benefits of the *credible option*.

The limitation of costs in the RIT-D in this manner places the onus on policy makers to explicitly prohibit certain activities or to determine the value to be placed on various types of harm and to impose financial penalties accordingly. It is not the role of the RIT-D to prohibit or penalise certain activities that policy-makers have not themselves determined to prohibit or penalise.

Example 10.1 Cost of a credible option (un-priced externality)

To meet an *identified need*, a *RIT-D proponent* identifies as a *credible option* the development of a local gas-fired *embedded generator* in close proximity to an existing hotel. The present value of the *embedded generator*'s expected construction and operating costs is $90 million. The *RIT-D proponent* expects the generator to reduce the hotel's earnings due to a loss of visual amenity – the present value of this loss is $5 million. There are no planning standards, consents or other requirements which protect the hotel against this loss.

In the absence of any planning standards, consents or other requirements hindering its development, the costs of the *credible option* remain $90 million. The negative externality created by the *embedded generator*'s development and borne by the hotel is not regulated or legislated by any relevant law, regulation or administrative requirement and hence does not form part of the costs of the *credible option*.

Example 10.2 Cost of a credible option (penalised externality)

Continuing Example 10.1, assume that a regulatory body allows the development of the *credible option* contingent on the *RIT-D proponent* paying for landscaping to conceal the *embedded generator* and to reduce the harm to the visual amenity of the hotel's guests. The present value of this landscaping is $5 million.

In this case, the costs of the *credible option* would be $90m + $5m = $95m. The $5m is now included as part of the costs of the *credible option* since a relevant regulatory body decreed that the generator's development was contingent on such an expense being incurred.

12 Reasonable scenarios

Clause 5.17.1 of the NER requires *RIT-D proponents* to base the RIT-D on a cost-benefit analysis that includes an assessment of *reasonable scenarios* of future supply and demand.

Clause 5.17.1(2) of the NER states that the RIT-D must not require a level of analysis that is disproportionate to the scale and likely impact of each *credible option* considered. Consequently, the appropriate number and choice of *reasonable scenarios* is likely to vary for each set of *credible options*.

Nevertheless, the following steps should indicate whether a particular number of *reasonable scenarios* are appropriate or otherwise:

1. For each variable or parameter forming part of a *reasonable scenario*, take the most probable value or values. Combining these probable values will generate one or more *reasonable scenario(s)*, referred to as 'central *reasonable scenario(s)*'. Under the central *reasonable scenario*, the net economic benefits of each *credible option* can be determined.

2. Undertake sensitivity analysis on those parameters or values that the *RIT-D proponent* reasonably believes could change the ranking of *credible options* by net economic benefits. This could be done on a 'one-at-a-time' basis, where the net economic benefits of a *credible option* are calculated and compared under:

    - a central *reasonable scenario*, and
    - a *reasonable scenario* based on the same central *reasonable scenario* but with a change to one of the parameters or values in that central *reasonable scenario* (referred to as a 'modified central *reasonable scenario*').

3. Where a change to a parameter or value in a central *reasonable scenario* yields a change to the ranking of *credible options* by net economic benefits, the *RIT-D proponent* should adopt additional *reasonable scenarios* that reflect variations in that parameter or value.

Under this approach, *RIT-D proponents* only need to include the additional *reasonable scenarios* where changes in variables could affect the ranking of *credible options*.

Consider a simple stylised example where the *RIT-D proponent* is assessing two *credible options*. The *RIT-D proponent* reasonably considers that the single most probable *reasonable scenario* comprises of the following parameters:

- medium base forecast electricity demand;
- a discount rate of 8 per cent; and
- medium capital and operating costs for existing, committed, anticipated and modelled projects.

This becomes the central *reasonable scenario* and the *RIT-D proponent* calculates the net economic benefit of the two *credible options* under this scenario.

13 Sensitivity Analysis

After the *RIT-D proponent* develops *reasonable scenarios* and its central *reasonable scenario*, it can then apply sensitivity analysis to each of the variables in the central *reasonable scenario*. This could involve the *RIT-D proponent* calculating the net economic benefit of each *credible option* under a modified central *reasonable scenario* that alters one of the variables in the central *reasonable scenario*—such as the level of forecast base electricity demand—while holding the other variables constant.

Sometimes the ranking of *credible options* by net economic benefits calculated under, for example, a demand-modified central *reasonable scenario* may be significantly different from that calculated under the associated central *reasonable scenario*. When this occurs, the *RIT-D proponent* should include an additional set of *reasonable scenarios* that reflect varying levels of forecast electricity demand. The *RIT-D proponent* could then apply the same approach to the other elements of the central *reasonable scenario*.

Example 11: Demand sensitivity

This example shows how a *RIT-D proponent* could undertake a sensitivity analysis of forecast demand. Assume this example is for *reliability corrective action* and therefore a relative ranking of *credible options* is required (as opposed to a comparison with a 'do nothing' base case to quantify market benefits).

Assume there are two *credible options*.

1. Augmentation of a distribution line– costing $60 million
2. Connecting an *embedded generator*– costing $15 million

The first option is chosen as the base case credible option, so only the relative market benefits and costs of the second credible option can and need to be calculated.

The *RIT-D proponent* forecasts that energy and peak demand in the region will grow by 3 per cent over the period of the analysis.

In the central *reasonable scenario*, the market benefits of the *embedded generator credible option* will be determined as follows:

- Variable electricity costs will be higher than under the base case network augmentation option
- Planned augmentation of the distribution network will occur in year 13 as opposed to year 3 in the base case.

As the cost of the embedded generator credible option are lower than the costs of network augmentation credible option, the incremental costs of the *embedded generator* will be negative, -$45 million. Assume that the *RIT-D proponent* calculates the relative market benefits of the embedded generation *credible option* as -$40 million, this means the relative net economic benefit of the embedded generation *credible option* is $5 million.

The *RIT-D proponent* now runs a sensitivity analysis on the assumption regarding growth in energy and peak demand. Under this modified central *reasonable scenario*, growth in energy and peak

demand in the region will be 10 per cent over the period of the analysis instead of 3 per cent.

In this modified scenario, the market benefits of the embedded generation *credible options* will change from that in the central reasonable scenario in that:

- Incremental total variable electricity costs will be higher than under the central reasonable scenario; and
- Planned augmentation of the distribution network will occur in year 7 as opposed to year 2 in the base case, rather than coming forward from year 13 to year 3 under the central reasonable scenario.

Under this modified scenario of high demand, the *embedded generator* will defer the need for network augmentation by 5 years as opposed to 10 years in the central *reasonable scenario* of medium demand.

Assuming project costs do not change, the *RIT-D proponent* calculates the relative market benefit of the embedded generation connection *credible option* as -$55 million and accordingly the relative net economic benefit of the embedded generation connection *credible option* is -$10 million.

The analysis shows that, in the event that growth in energy and peak demand is higher than forecast, the ranking of net economic benefit between the two *credible options* may change. Therefore, it may be necessary for the *RIT-D proponent* to develop additional *reasonable scenarios* with varying levels of forecast demand in its assessment of the *credible options*.

The impact of sensitivity analysis on the number and choice of *reasonable scenarios* used to assess a particular set of *credible options* will vary according to the circumstances surrounding the RIT-D assessment. Further, there may be other approaches for deriving the appropriate number and choice of *reasonable scenarios* for each set of *credible options* under consideration.

The discussion above showed how *RIT-D proponents* could use sensitivity analysis to formulate the appropriate number and choice of *reasonable scenarios* to apply in a RIT-D. Once a *RIT-D proponent* has formulated an appropriate number and choice of *reasonable scenarios*, it will need to calculate the market benefits of each *credible option* arising under each *reasonable scenario*. These market benefits would then need to be probability-weighted to derive the relevant market benefits of each *credible option*.

In this context, it is important to note that the number of *reasonable scenarios* and *credible options* used in a particular RIT-D assessment will have a major influence on the extent of modelling and analysis for the *RIT-D proponent* to undertake.

Assume that a *RIT-D proponent*, having undertaken appropriate sensitivity analysis, reasonably chooses to assess a $50 million investment in a network asset to increase network transfer capability to accommodate expected *load* growth in order to meet mandatory reliability standards (i.e. for reliability corrective action). The proponent conducts this analysis using the network option as the base case credible option and assesses this project:

- against one alternative *credible option*

- based on a single set of capital and operating costs for existing, committed, anticipated and modelled projects
- based on two alternative demand forecasts
- using two alternative carbon prices

This would necessitate the development of:

- 4 *reasonable scenarios*—encompassing two different demand levels (high and low) and two different carbon prices, and
- 8 states of the world, reflecting one set of *reasonable scenarios* for each of the two *credible options*.

A *RIT-D proponent* will often have to model a separate market development path for each state of the world. For example, it would be appropriate to model how plant expansion paths change with different levels of demand with or without different *credible options*. However, there may be some parameters for which it would be infeasible or unnecessary to model separate plant expansion paths as those parameters varied. Such parameters could include discount rates and generator bidding behaviour.

Table 1 Modelling and analysis required under the RIT-D (Reliability corrective action project)

Reasonable scenario	Credible option	Market development path	State of the world
1: High demand, low carbon price	Base case	1	1
1: High demand, low carbon price	Alternative option	2	2
2: High demand, high carbon price	Base case	3	3
2: High demand, high carbon price	Alternative option	4	4
3. Low demand, low carbon price	Base case	5	5
3. Low demand, low carbon price	Alternative option	6	6
4: Low demand, high carbon price	Base case	7	7
4: Low demand, high carbon price	Alternative option	8	8

If *RIT-D proponents* varied some of the input assumptions further, then the number of *reasonable scenarios*, market development paths and required states of the world would multiply. In particular, the assessment of more alternative *credible options* would involve an escalating volume of analysis.

14 Uncertainty and risk

We recognise that at the time of applying the RIT-D, the future will be uncertain. Given this, the expected costs and market benefits of a *credible option* will be uncertain. This uncertainty may have a material impact on selecting the *preferred option*. This section provides information and guidance on how a *RIT-D proponent* can respond to this uncertainty when applying the RIT-D.

Material uncertainty over the future market supply and demand conditions can affect the calculation of the market benefits or costs of a *credible option*. When this occurs, this should affect how a *RIT-D proponent* chooses its range of *reasonable scenarios*. Those *reasonable scenarios* should reflect the range of potential outcomes. Associated with each *reasonable scenario* is a probability corresponding to the likelihood of that scenario occurring. *RIT-D proponents* are required to probability-weight the market benefits and costs.

14.1 Uncertainty regarding market benefits

The market benefit of a *credible option* is the probability-weighted sum of all market benefits of that option across all *reasonable scenarios*. The methodology for assigning probabilities to each *reasonable scenario* will depend on the methodology for defining the *reasonable scenario*. For example, where there is uncertainty about future demand, two different methodologies are possible:

- Under the first approach, a range of equally-spaced values for future demand is chosen, and probability weightings for each of these values chosen. Extreme values of future demand will receive lower probabilities than values closer to the mean.
- Under the second approach, *RIT-D proponents* will rank different values for future demand. After *RIT-D proponents* rank these values, they will divide them into groups—quartiles, or deciles, etc. The *RIT-D proponents* will then select a representative value for demand from each group. The probability assigned to each representative value is the same—25 per cent in the case of quartiles, 10 per cent in the case of deciles, etc. Under this approach, the probability of each demand value arising is constant, but the chosen representative demand values are likely to be grouped closer together for values of demand closer to the mean.

Either approach is acceptable. However the methodology for assigning probabilities to each *reasonable scenario* must be consistent with the methodology for choosing the *reasonable scenarios* themselves.

Where a *RIT-D proponent* has no material evidence for assigning a higher probability for one *reasonable scenario* over another, a *RIT-D proponent* may weight all *reasonable scenarios* equally.

Example 12.1: Calculating market benefits across a probability weighted range of reasonable scenarios

A *RIT-D proponent* is considering three *credible options* to address an identified need of reliability corrective action across four *reasonable scenarios*.

The three *credible options* are:

- A *network option* (Base case *credible option*)
- A distributed generation (DG) option

- A demand-side participation (DSP) option

The four *reasonable scenarios* are:

- High capital costs; High demand (Scenario 1)
- High capital costs; Low demand (Scenario 2)
- Low capital costs; High demand (Scenario 3)
- Low capital costs; Low demand (Scenario 4).

The following probabilities of occurrence are assigned to each of the above *reasonable scenarios*:

- High capital costs; High demand (Scenario 1) = 8 per cent
- High capital costs; Low demand (Scenario 2) = 32 per cent
- Low capital costs; High demand (Scenario 3) = 12 per cent
- Low capital costs; Low demand (Scenario 4) = 48 per cent.

Table 2 below shows the performance of the two other *credible options* (DG and DSP) across each of the four *reasonable scenarios* according to their relative market benefit over the base case network option (which by definition has a relative market benefit of zero).

Table 3: Credible options across reasonable scenarios ($m)

Credible option	**Relative market benefit**			
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Base case network option	0	0	0	0
Distributed generation option	3	11	-5	7
Demand-side participation option	-5	20	-35	4

For each other *credible option*, the *RIT-D proponent* must weigh the relative market benefit under each *reasonable scenario* by that *reasonable scenario's* probability of occurrence. Calculating the probability-weighted relative market benefit across the range of *reasonable scenarios* requires analysis from the results generated in Table 3. Table 4 therefore generates one relative market benefit estimate for each other *credible option*.

Table 4: Calculating expected market benefit ($)

Credible option	**Probability-weighted relative market benefit under each scenario**				**Probability weighted relative market benefit**
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	
Base case network option	0	0	0	0	0
Distributed generation	240,000	3,520,000	-600,000	3,360,000	6,520,000

option					
Demand-side participation option	-400,000	6,400,000	-4,200,000	1,920,000	3,720,000

14.2 Uncertainty regarding costs

The cost of the *credible option* is the probability weighted present value of the direct costs of the *credible option* under the different cost assumptions. Where the identified need is reliability corrective action, costs refer to incremental costs above (or below) the base case credible option.

For the avoidance of doubt, the term 'cost assumptions' is distinct from the term *reasonable scenarios* used elsewhere in the RIT-D and the application 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 or the price of copper. Similarly, whether a *reasonable scenario* reflects high or low demand growth is unlikely to affect the costs of a *credible option*. This is why the RIT-D requires the *RIT-D proponent* to separately undertake a weighted averaging of the direct costs of a *credible option* as well as the market benefits of a *credible option*.

Example 12.2: Calculating expected cost

The following example continues on from Example 8.1. For each of the three *credible options* the *RIT-D proponent* also considered three cost assumptions ('Low', 'Medium' and 'High').

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

- *Base case 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.
- Distributed 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.
- Demand-side participation 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.

A *RIT-D proponent* can calculate an expected cost for each other *credible option* by taking a

weighted-average across cost assumptions. Table 5 below outlines this.

Table 5: Calculating expected cost ($m)

Credible option	Cost scenario			Expected cost	Expected relative cost
	Low	Medium	High		
Base case network option	7.5	10	17.5	11.3	0
Distributed generation option	8	12	14	13.5	2.2
Demand-side participation option	0.4	0.5	0.75	0.9	-10.8

15 Externalities

The RIT-D seeks to identify the *credible option* that maximised the present value of the net economic benefit to all those who produce, consume and transport electricity in the NEM. Consequently, the RIT-D considers economic impacts that accrue to parties other than those who produce, consume and transport electricity in the NEM as externalities.

Clause 5.17.1(c)(4) of the NER requires the *RIT-D proponent* to consider whether each *credible option* could deliver specified classes of market benefits. Similarly, 5.17.1(c)(6) of the NER requires the *RIT-D proponent* to consider whether each *credible option* would be associated with various classes of costs. Neither of these clauses requires *RIT-D proponents* to consider externalities as costs nor market benefits of a *credible option*. Therefore, externalities should not be included in the determination of the net economic benefit.

We interpret the qualifier, '*all those who...consume...electricity in the NEM*' in cl. 5.17.1(b) of the NER as referring to costs or benefits incurred or obtained, respectively, by parties in their capacity as consumers of electricity. Thus, *RIT-D proponents* should exclude costs or benefits which arise but are incidental or consequential to parties' electricity consumption from their RIT-D analysis.

Examples of negative and positive externalities are set out below.

Example 13 Changes in property values

In order to support increased consumer demand for electricity, the *RIT-D proponent* augments the distribution network by installing a new substation and electricity wires.

The increase in network infrastructure decreased the visual aesthetics of that region. Residents around the new substation were also concerned that the new plant could cause negative health impacts. Consequently, property prices around this area of the network decreased by 2per cent.

RIT-D proponents cannot measure the decrease in visual aesthetics and the associate drop in property values as a negative market benefit to persons in their capacity as generators, DNSPs, TNSPs or consumers of electricity. Therefore, the *RIT-D proponent* would consider it an externality and exclude it from its RIT-D analysis.

A Valuing specific classes of market benefits

Under cl. 5.17.2(c)(5) of the NER, the RIT-D guidelines must provide guidance and worked examples as to the acceptable methodologies for valuing the *market benefits* of a *credible option*.

This appendix provides guidance and worked examples on valuing the following specific classes of *market benefits*:

- Changes in voluntary *load* curtailment
- *Involuntary load shedding*
- Changes in costs to other parties
- Differences in the timing of distribution investment
- Changes in *load* transfer capacity and the ability of *Embedded Generators* to take up *load*
- Additional option value
- Changes in electrical energy losses.

A.1 Voluntary load curtailment

A *credible option* may lead to a change in the amount of voluntary *load* curtailment. For example, a demand-side reduction option may lead to an increase in the amount of voluntary *load* curtailment. This would make a negative contribution to the market benefits of the *credible option*, derived from:

- The quantity (in MWh) of voluntary *load* curtailment undertaken due to the *credible option*, multiplied by
- Consumers' willingness to pay (or be paid) (in $/MWh) for the electricity that is voluntarily curtailed due to the *credible option*.

The less consumers need to be paid to voluntarily curtail their power use, the lower the negative market benefits from a voluntary curtailment option. This is because in a competitive market, the amount consumers need to be paid to curtail should reflect the real loss of utility they experience from not consuming power as set out in example 14.

Example 14 Voluntary load curtailment

Assume that a group of large consumers is paid $1,500/MWh for electricity not consumed during 100 pre-notified hours of critical peak pricing (CPP) each year, with this notionally allocated as $300/MWh for energy, $400/MWh for transmission and $800/MWh for distribution. This could be taken to indicate that consumers are willing to voluntarily curtail their use of the applicable distribution network for $800/MWh at CPP times. Over the 100 hours, assume that the large consumers collectively curtail their consumption by 1,000 MWh. This means that they have collectively been paid $800,000 (being 1000 * 800) to forego use of the distribution network for this time. This amount can be used as a proxy for the loss in utility those customers experience and hence as a negative market benefit of the option. The margin of the demand side option provider should be considered as part of the costs of providing the option.

to the market benefits of the demand-side option should be more than offset by a positive contribution to market benefit caused by a reduction in the amount of *involuntary load shedding* that would otherwise occur (see Example 14).

RIT-D proponents would derive the net contribution to the market benefits of the demand-side option from the difference between the value of unserved energy to consumers generally (e.g. $30,000/MWh) and the value of that energy to those consumers who have voluntarily agreed to consume less as a result of the demand-side option. For example, a demand-side option that led to voluntary *load* curtailment of 10 MWh of electricity valued by consumers at $30/MWh instead of *involuntary load shedding* of 10 MWh of electricity valued at $30,000/MWh would yield a positive contribution to market benefits of ($30,000-$30)*10 = $299,700.

Example 14: Increased voluntary and decreased involuntary load curtailment

Load is 201 MW. Remote coal-fired generation has a fuel cost of $10/MWh and capacity of 250 MW. The capacity of the network between the remote generator and the *load* is limited to 200 MW. In the event demand outstrips supply *load* is involuntarily curtailed. Customers value involuntarily curtailed energy at $30,000/MWh.

The *credible option* is a demand side management scheme whereby commercial customers agree with a retailer to reduce power demand by 1 MW when requested by the retailer. This will occur when the retailer expects that the spot price would exceed $1,000/MWh in the absence of *load* curtailment. The $1,000/MWh price reflects the retailer's view of its commercial customers' underlying willingness to pay for electricity.

In the base case:

- Demand outstrips supply by 201 MW – 200 MW = 1 MW.
- Price is set at the value customers place on involuntarily curtailed *load* ($30,000/MWh) and 1 MW of *load* is involuntarily curtailed to ensure demand = supply.
- Value of voluntary *load* curtailment = 0 MW*$1,000 = $0 per hour.
- Value of involuntary *load* curtailment = 1 MW*$30,000 = $30,000 per hour.

In the state of the world with the *credible option*:

- Demand = *load* – voluntary *load* curtailment = 201MW – 1MW = 200 MW.
- Price is set by the remote generator at $10/MWh.
- Voluntary *load* curtailment under the *credible option* and at a price of $10/MWh is 1 MW.
- Demand = supply and there is no *load shedding*.
- Value of voluntary *load* curtailment = 1 MW*$1000 = $1,000 per hour.

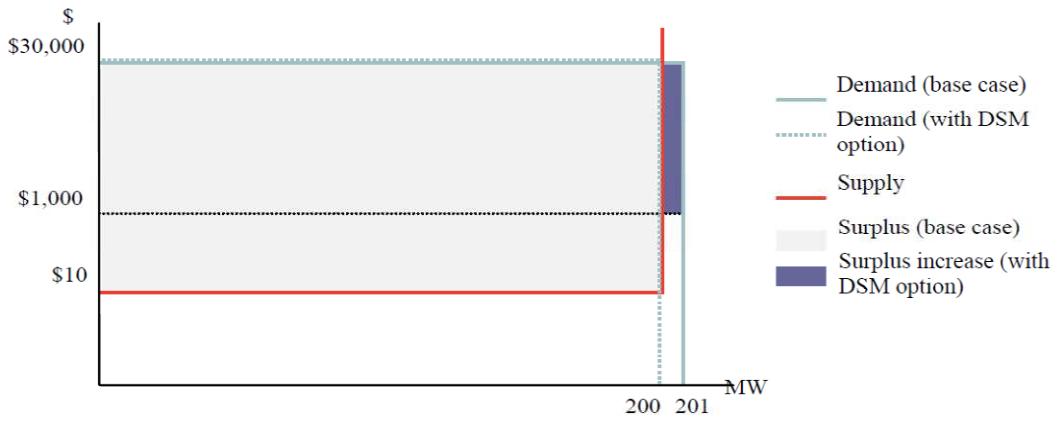
The market benefit of the *credible option* arising from the demand side option is:

- benefit of decreased involuntary *load* curtailment = $30,000 - $0 = $30,000 less

- benefit of increased voluntary *load* curtailment = $1,000 - $0 = $1,000.

The combined contribution to the market benefits of the *credible option* (in terms of increased voluntary and decreased involuntary *load* curtailment) is thus $29,000 per hour. Assuming the same conditions over 10 hours in a year, the total contribution to the market benefits of the *credible option* would be 10*$29,000 = $290,000 per annum.

Figure D: Increased voluntary and decreased involuntary load curtailment



A *credible option* may lead to a reduction in the amount of voluntary *load* curtailment. For example, a *RIT-D proponent* may have a pre-established program where it pays large customers to reduce their energy usage during times of peak demand. For instance, this may entail paying energy-intensive factories to temporarily shut-down. If a *RIT-D project* (for example, augmenting the distribution network) decreases reliance on such programs, then this would represent a reduction in voluntary *load* curtailment.

Theoretically, if such a program was efficient, then the reduction in the *RIT-D proponent's* payments to reduce energy consumption should reflect the market benefit from decreased voluntary *load* curtailment. However, formally, the reduction in voluntary *load* curtailment would be valued by multiplying:

- The quantity (in MWh) of voluntary *load* curtailment not undertaken due to the *credible option*, by
- Consumers' willingness to pay (in $/MWh) for the electricity that is not voluntarily curtailed due to the *credible option*.

The costs of providing the additional electricity that is not voluntarily curtailed will partly offset the positive contribution of this market benefit.

A.2 Involuntary load shedding and customer interruptions

A *credible option* may lead to a reduction in the amount of *involuntary load shedding*. This may occur if the *credible option* is:

- A local generation option that supplies electricity;

- A demand-side reduction option that leads to voluntary *load* curtailment and thereby reduces demand for electricity;
- A control scheme that helps prevent overloads on the network; or
- A *network option* that enables electricity to be plentiful at times that *involuntary load shedding* would otherwise need to occur. *Network options* could achieve this by transporting electricity from a location where it is relatively plentiful to a location where it is relatively scarce. They could also achieve this by improving infrastructure so that less energy is lost in distribution or so that infrastructure is more resilient to external interferences.

This reduction in *involuntary load shedding* can be valued as a market benefit by multiplying:

- The quantity (in MWh) of *involuntary load shedding* not required due to the *credible option*, by
- A reasonable forecast of the value of electricity to consumers (in $/MWh) not shed due to the *credible option*.

Examples of reasonable estimates of the value of electricity to consumers include:

- The market price cap (or Value of Lost *Load*, VoLL)
- The *Value of Customer Reliability* (VCR) used by AEMO for network planning in Victoria.

A negative contribution due to the provision of the *credible option* would be partially offset this positive contribution to market benefits. For example, a local generation option may reduce *involuntary load shedding* but will increase the use of fuel to supply electricity.

Example 15: decreased involuntary load shedding

Load is 201 MW. Remote coal-fired generation has a fuel cost of $10/MWh and capacity of 250MW. The capacity of the network between the remote generator and the *load* is limited to 200 MW. Customers' value of involuntarily curtailed energy is $30,000/MWh.

The *credible option* is to build a 25 MW local gas-fired generator with a fuel cost of $100/MWh. In the base case:

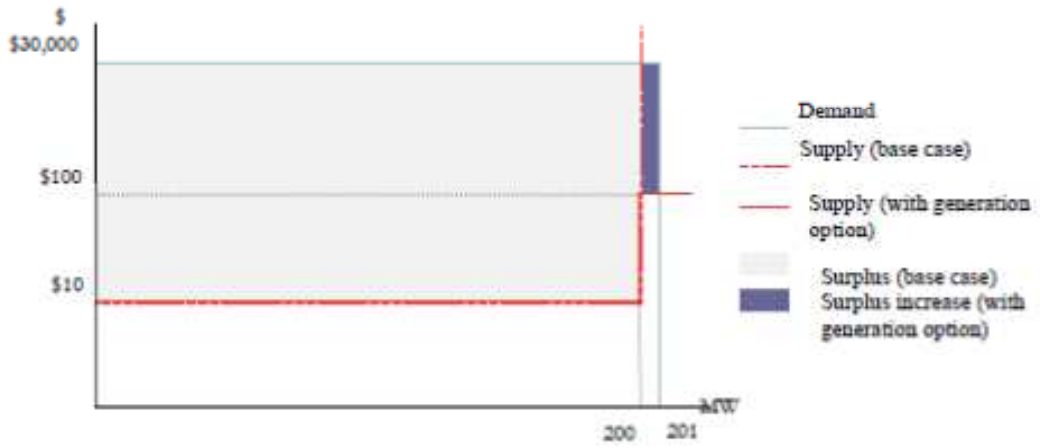
- Demand outstrips supply by 201 MW – 200 MW = 1 MW.
- The value customers place on involuntarily curtailed energy is $30,000/MWh.
- Value of fuel consumed = 200 MW*$10 = $2,000 per hour.
- Value of involuntarily curtailed *load* = 1 MW*$30,000 = $30,000 per hour.

In the state of the world with the *credible option*:

- Output of remote generator = 200 MW and output of local generator = 1 MW.
- The local gas-fired generator has a fuel cost of $100/MWh.
- Value of fuel consumed = 200 MW*$10 + 1 MW*$100 = $2,100 per hour.
- Demand = supply and hence there is no *load shedding*.

The contribution to the market benefits of the *credible option* from a reduction in involuntary *load* curtailment is $30,000 - $0 = $30,000. This would be partly offset by the cost of increased fuel consumption needed to generate electricity which is $2,100 - $2,000 = $100 per hour. The net contribution to the market benefits of the *credible option* (in terms of decreased involuntary *load* curtailment and increased fuel consumption) is thus $29,900 per hour. Assuming the same conditions over 10 hours in a year, the total contribution to the market benefits of the *credible option* is 10*$29,900 = $299,000 per annum.

Figure E: Decrease involuntary load shedding



As noted above, a demand-side reduction option may simultaneously have a negative contribution to market benefit due to an increase in voluntary *load* curtailment as well as a positive contribution to market benefit due to a decrease in *involuntary load shedding*. However, the net effect on market benefit would almost always be positive, as electricity will usually be worth more to those who are involuntarily curtailed than to those who are voluntarily curtailed. For an example, see **Example 14: Increased voluntary and decreased involuntary load curtailment.**

A.3 Costs to other parties

Other parties may experience costs from differences in the timing of new plant, capital costs, as well as operating and maintenance costs. This class of costs captures the impact of a *credible option* on the plant expansion path of the market.

To the extent that a *credible option* leads to a delay in the commissioning of a new plant (which reduces the present value of the resource costs incurred to meet demand), or to other reductions to other parties' costs, this represents a positive *market benefit* of the option. The reverse is also the case.

Credible options that delay the need for investment in the distribution network could potentially have a similar impact on the need for investment in the transmission network. These are likely to include options aimed at managing *load* when and where there are network constraints. Such *credible options* may constitute demand management programs and the use of embedded generation and energy storage.

Example 16: Delaying network augmentation

The *credible option* is a program aimed at managing peak demand. As well as delaying the need to augment the distribution network, it will also delay the need to augment the transmission network by 3 years. Without the demand management program, the transmission network would need to be augmented immediately (t=0). The augmentation of the transmission network has a capital cost of $**2**00 million. The discount rate is 7 per cent.

Based on the above assumptions, the positive contribution to the market benefits of the demand management program option to the delayed investment in the transmission network (in terms of delaying capital costs only) can be calculated as follows:

Present value (PV) of the capital costs in the transmission augmentation in the base case:

$$PV = \frac{\$200m}{(1.07)^0} = \$200m$$

Present value of the capital costs in the transmission augmentation with the *credible option*:

$$PV = \frac{\$200m}{(1.07)^3} = \$163m$$

The positive contribution to the market benefits of the *credible option* due to the delayed investment in the transmission network is $200m - $163m = $37 million.

A.4 Timing of expenditure

A *credible option* may change the timing (or the configuration) of other future investments to be made by (or for) the *RIT-D proponent*.

When considering such changes in timing, the *RIT-D proponent* should only take distribution investments into account that are directed towards different *identified need*s to that of the *credible option*. It is not clear whether or how many investments this category could or would include.

Example 17: Changes in timing of expenditure

A *RIT-D proponent* has forecasted that it will need to replace a lot of the plant in one of its substations in 9 years. It has estimated that it will need to spend $15 million in replacement costs.

The current discount rate is 9 per cent.

Meanwhile, the *RIT-D proponent* is currently considering a *non-network option* to meet an *identified need* for reliability corrective action. This will involve an integrated solution where it will combine direct *load* control, demand response and the connection of an *embedded generator*.

The *RIT-D proponent* has forecasted that the integrated solution will decrease peak demand 15 per cent by year 5, and 20 per cent by year 10. The *RIT-D proponent* has estimated that this will also alleviate stress on the network and will push-back its need to replace the plant in its substation by 1 year.

The *RIT-D proponent* could calculate the present value of replacement costs in year 9 as a part of its base case.

$$PV = \frac{\$15m}{(1.09)9} = \$\ 6,\ 906,\ 417$$

The RIT-D proponent could calculate the present value of replacement costs in year 10 as the state of the world with the *credible option* in place.

$$PV = \frac{\$15m}{(1.09)10} = \$6,\ 336,\ 162$$

The positive contribution to the market benefits of the *credible option* due to the delayed investment in the substation is decrease present value costs – $6,906,417 - $6,336,162 = $570,255

A.5 Load transfer capacity and embedded generators

Chapter 5 of the NER defines *load transfer capacity* as:

> meeting the *load* requirements for a *connection point* by the reduction of *load* or group of *loads* at the *connection point* and increasing the *load* or group of *loads* at a different *connection point*.

RIT-D proponents can improve *load transfer capacity* where a *credible option* allows end users to gain access to a back-up power supply. This is a market benefit in that this back-up power supplies can service end-users in the event of a power failure.

RIT-D proponents could count improved capacity for *embedded generators* to take up *load* as a market benefit in for the same reason. Namely, where embedded generation can reliably take up *load*, it can contribute to the security of supply by supplementing the power available from the grid. Consequently, in the event of a supply failure, *RIT-D proponents* can use protective equipment to "island" the embedded generation and part of the affected network to ensure that a part of the affected *load* remains supplied.

A *RIT-D proponent* could effectively treat the market benefits gained from increased *load transfer capability* and/or the ability of *embedded generators* to take up *load* as it would for changes in *involuntary load shedding*. A worked example on how to calculating this is under, Involuntary load shedding and customer interruptions.

A.6 Option value

Clause 5.17(c)(4)(vi) of the NER requires *RIT-D proponents* to consider option value as a class of potential market benefit where it had not already been included in other classes of market benefits.

Option value refers to a benefit that results from retaining flexibility in a context in which certain actions are irreversible (sunk), and new information may arise in the future as to the payoff from taking a certain action. We consider that 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 *credible options* considered by the *RIT-D proponent* are sufficiently flexible to respond to that change.

We believe that appropriate identification of *credible options* is capable of capturing any option value, thereby meeting the requirement to consider option value as a class of market benefit under the RIT-D.

Identifying *credible options* is discussed further in section 7 of the application guidelines. Example 4 provides a worked example.

A.7 Electrical energy losses

A *credible option* may lead to a net increase or decrease in network losses. An increase in network losses makes a negative contribution to the market benefits of a *credible option* while a decrease in network losses makes a positive contribution to the market benefits of a *credible option*.

The majority of electricity losses occur in the distribution network. These electricity losses may be minimised through the following:

- Power lines could be built so that they connect large consumers more directly
- Improving the efficiency of distribution transformers, or, where possible, reducing the number of transformation steps
- Reducing the average utilisation rate of distribution network cables, since higher *loads* on powerlines result in higher variable losses.
- Using powerlines and cables with wider cross-sections
- Potentially, installing distributed generations systems for energy to be consumed locally or in densely populated areas
- Systems for optimising energy delivery efficiency on distribution systems

Example 19: Decreased electrical energy losses

Load at region B in the distribution network is 100 MW. Energy costs after generation are $12/MWh and capacity on the distribution network is 120 MW.

The *credible option* is the augmentation of the distribution network at region B. This will entail installing more distribution network cables. The *RIT-D proponent* expects the augmentation to reduce distribution losses from 20 per cent to 5 per cent when operating at 100 MW.

In the base case:

- Price is $12/MWh
- Total losses = $12*0.2*100 MW = $240 per hour

In the state of the world with the *credible option*:

- Price is $12/MWh

- Total losses = $12*0.05*100 MW = $60 per hour

Assuming the same conditions over 8.760 hours per year, the contribution of decreased network losses to the market benefit of the *credible option* is ($240 - 60)*8760 = $1,576,800 per year.

B Glossary

Term	NER Ref	Meaning
Connection Applicants	Ch. 10	A person who wants to establish or modify *connection* to a *transmission network* or *distribution network* and/or who wishes to receive *network services* and who makes a *connection* enquiry as described in cl. 5.3.2 of the NER. Note: In the context of Chapter 5A, the above definition has been displaced by a definition specifically applicable to that Chapter. See cl. 5A.A.1 of the NER.
Credible option	Cl. 5.15.2 (a)	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)
Demand side engagement register	Ch. 5	A facility by which a person can register with a *Distribution Network Service Provider* their interest in being notified of developments relating to *distribution network* planning and expansion.
Dispute notice	Cl. 5.17.5 (c) (1)	The notice given by the *disputing party*, setting out the grounds for the dispute in writing
Disputing party	Cl. 5.17.5 (c)	The party disputing matters in the *final project assessment report*
Draft project assessment report	Ch. 5	The report prepared under cl. 5.17.4(i) or the NER
Dual Function Asset	Ch. 10	Means any part of a *network* owned, operated or controlled by a *Distribution Network Service Provider* which operates between 66 kV and 220 kV and which operates in parallel, and provides support, to the higher voltage *transmission network* which is deemed by cl. 6.24.2(a) of the NER to be a *dual function asset*. For the avoidance of doubt: (a) a *dual function asset* can only be an asset which forms part of a *network* that is predominantly a *distribution network*; and (b) an asset which forms part of a *network* which is predominantly a *transmission network* cannot be characterised as a *dual function asset*, through the operation of cl. 6.24.2(a) of the NER.
Embedded generators	Ch. 10	A *Generator* who owns, operates or controls an *embedded generating unit*. This is where an *embedded generating unit* is defined as a *generating unit connected* within a *distribution network* and not having direct access to the *transmission network*.
Final project assessment report	Ch. 5	The report prepared under cll. 5.17.4(o) or (p) or the NER.
Identified need	Ch. 5	*Identified need* means the objective a *Network Service Provider* (or in the case of a need identified through joint planning under clause 5.14.1(d)(3) or clause 5.14.2(a), a group of *Network Service Providers*) seeks to achieve by investing in the *network*.
Interested parties	Cl. 5.15.1	In cll. 5.16.4, 5.16.5, 5.17.4 and 5.17.5 of the NER, interested party means a person including an end user or its representative who, in the AER's opinion, has the potential to suffer a material and adverse National Electricity Market impact from the investment identified as the *preferred option* in the project assessment conclusions report or the *final*

		project assessment report (as the case may be).
Involuntary load shedding	Ch. 10	*Load shedding* where the *load* shed is not an *interruptible load* except l*oad* under the control of under frequency relays as described in cl. 5.1.10.1(a) of the NER, or a *scheduled load.*
Intending Participants	Ch. 10	A person who is registered by AEMO as an *Intending Participant* under Chapter 2.
Load	Ch. 10	A *connection point* or defined set of *connection points* at which electrical power is delivered to a person or to another *network* or the amount of electrical power delivered at a defined instant at a *connection point*, or aggregated over a defined set of *connection points*.
Load shedding	Ch. 10	Reducing or disconnecting *load* from the *power system*.
Load transfer capacity	Ch. 5	Meeting l*oad* requirements for a *connection point* by the reduction of l*oad* or group of *loads* at the *connection point* and increasing the l*oad* or group of l*oads* at a different *connection point*
Network option	Ch. 5	A means by which an *identified need* can be fully or partly addressed by expenditure on a transmission asset or a distribution asset which is undertaken by a *Network Service Provider*
Non-network option	Ch. 5	A means by which an *identified need* can be fully or partly addressed other than by a *network option*
Non-network options report	Ch. 5	The report prepared under cl. 5.17.4(b) or the NER.
Non-network providers		A party supplying electricity services with a material financial interest in a particular option being considered or not considered a credible option.
Potential credible option	Ch. 5	An option which a *RIT-D proponent* or RIT-T proponent (as the case may be) reasonably considers has the potential to be a *credible option* based on its initial assessment of the *identified need*.
Preferred option	Cl. 5.17.1 (b)	The credible option that maximises the present value of the net economic benefit to all those who produce, consume and transport electricity in the *National Electricity Market*
Publish/publication	Ch. 10	A document is published by the *AER* if it is: (a) published on the *AER's* website; and (b) made available for public inspection at the *AER's* public offices; and (c) in the case of a document inviting submissions from members of the public – published in a newspaper circulating generally throughout Australia. In Part B of Chapter 5, a document is published by the *Distribution Network Service Provider* if it is published on the *Distribution Network Service Provider's* website. Otherwise, a document is published by someone else if it is made available to *Registered Participants* electronically.
Registered participant	Ch. 10	A person who is registered by *AEMO* in any one or more of the categories listed in rules 2.2 to 2.7 (in the case of a person who is registered by *AEMO* as a *Trader*, such a person is only a *Registered Participant* for the purposes referred to in rule 2.5A). However, as set out in cl. 8.2.1(a1), for the purposes of some provisions of rule 8.2 only, *AEMO*, *Connection Applicants*, *Metering Providers* and *Metering Data Providers* who are not otherwise *Registered Participants* are also deemed to be *Registered Participants*
Reasonable scenario	N/A	a set of variables or parameters that the *RIT-D proponent* does not expect to change across each of the relevant *credible options*.
Reliability corrective action	Ch. 5	Investment by a *Transmission Network Service Provider* or a *Distribution Network Service Provider* in respect of its *transmission network* or *distribution network* for the purpose of meeting the service standards linked to the technical requirements of schedule 5.1 or in

		applicable regulatory instruments and which may consist of *network options* or *non-network options.*
RIT-D project:	Ch. 5	(a) a project the purpose if which is to address an *identified need* identified by a *Distribution Network Service Provider*, or (b) a joint planning project that is not a RIT-T project
RIT-D proponent	Ch. 5	The *Network Service Provider* applying the *regulatory investment test for distribution* to a *RIT-D project* to address an *identified need*. The *RIT-D proponent* may be: (a) if the *identified need* is identified during join planning under cl. 5.14.1(d)(3), a *Distribution Network Service Provider* or a *Transmission Network Service Provider* ; or (b) in any other case, a *Distribution Network Service Provider*.
Sub-transmission line	Ch. 5	Means a power line connecting a sub-transmission asset to either the *transmission system* or another sub-transmission asset.
Value of customer reliability		The value that customers place on the reliable supply of electricity - or conversely the cost incurred by customers of not having electricity supplied for a period of time
Zone Substation	Ch. 5	A *substation* for the purpose of connecting a *distribution network* to a sub-transmission *network*.