

# Request for Expressions of Interest

Provision of inertia network services, inertia support activities and system strength services in Tasmania.

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**2:00 pm (AEST), Friday 9<sup>th</sup> November 2023**

**Expressions of Interest are to be submitted electronically via TenderLink by the Closing Date.**

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## SECTION A: REQUEST FOR EXPRESSIONS OF INTEREST

### A.1 Background

Tasmanian Networks Pty Ltd (**TasNetworks**) owns and operates the transmission and distribution electricity networks in the Tasmanian region of the National Electricity Market (**NEM**). As the Transmission Network Service Provider (**TNSP**) and Jurisdictional Planner in Tasmania, TasNetworks is both the *Inertia Service Provider* and *System Strength Service Provider (SSSP)* as defined by the National Electricity Rules (**NER**). In these roles, we are responsible for ensuring that sufficient *inertia network services*, *inertia support activities* and *system strength services* are made available to the Australian Energy Market Operator (**AEMO**) to manage power system security.

To date, there have been three shortfall declarations within the Tasmanian region addressing both inertia and system strength. The first notice of shortfall was published by AEMO on 13 November 2019, with a subsequent increase in shortfalls declared on 7 May 2021. The most recent shortfall notice was issued on 15 December 2022 following publication of the inaugural System Strength Report and Inertia Report by AEMO on 1 December.

TasNetworks has thus far been able to adequately address the shortfall notices using non-network solutions, more specifically, establishing a services agreement with a registered *Generator* to provide sufficient synchronous machine capabilities on an as-needs basis. The current arrangements are due to expire on 1 December 2025, corresponding with the commencement of the new system strength framework within the NER.

From 2 December 2025 onward, TasNetworks will be responsible for ensuring that:

- Sufficient *inertia* continues to be available to meet the forecast shortfalls. The framework for managing this particular system security service remains unchanged.
- Adequate *system strength services* are made available to AEMO to meet both the defined minimum three phase fault levels at each *system strength node (SSN)*, as well as the *efficient level of system strength* at the same locations.

As a result of these new and ongoing requirements, TasNetworks is seeking Expressions of Interest (**EOI**) from any potential service providers who believe they are capable of:

- Helping address the forecast *inertia* shortfalls from 2 December 2025 to 30 June 2029 at least.
- Delivering *system strength services* from *non-network solutions* to help satisfy the forecast requirements described in the Project Specification Consultation Report (**PSCR**) which has been published in parallel with this EOI.

NER Clauses 5.20B.4 and 5.20C.3 require that *Inertia* and *System Strength Service Providers* must prepare and publish information to enable potential providers of relevant services to develop *non-network options* for consideration in parallel with network solutions. *Inertia* and *System Strength Service Providers* must ultimately make available to AEMO the least cost option, or combination of options, which addresses any identified shortfalls and enable the relevant *System Standards* to be met across the forward planning period.

In that context TasNetworks has published this Request for **EOI** in accordance with NER Clauses 5.20B.4(g) and 5.20C.3(e) to ascertain the type, location, capacity and potential cost of various services available to address forecast needs into the future.

## A.2 Scope of EOI

The scope of this EOI is limited to the provision of the following (together, the “**Services**”):

- (a) *Inertia network services*,
- (b) *Inertia support activities*, and
- (c) *System strength services*

*Inertia network services* are utilised to supplement the *inertia* coming from synchronous generators dispatched through the wholesale spot markets to deliver energy and frequency control ancillary services (**FCAS**). Insufficient inertia can lead to unacceptably high rates of change of frequency (**ROCOF**) following credible and non-credible contingency events. The Frequency Operating Standard has recently been revised to include ROCOF limits for the Tasmanian and mainland regions of the NEM to support secure operation of the interconnected power system<sup>1</sup>. The new standard comes into effect on 9 October 2023.

*Inertia support activities* reduce the *inertia* that is required to be online within a *region*. This is generally achieved by injecting or absorbing active power in a controlled manner with a speed of response that can influence ROCOF across the critical time periods (which are likely to be specific to a particular *sub-inertia network*).

*System strength services* are required to ensure that minimum three phase fault levels are always maintained across the network and to support the forecast connection of inverter based resources (**IBR**) without detrimental impacts to power system security. Low system strength conditions give rise to more volatile network voltages and may also lead to unstable behaviour of power electronic based equipment including high voltage direct current (**HVDC**) interconnectors, wind farms and solar farms. Unstable behaviour can include sympathetic tripping of equipment during network faults, leading to much larger contingency events than initially anticipated. Minimum levels of short circuit capacity must also be maintained to ensure the correct operation of protection system in both the transmission and distribution networks, as well as in *network user* premises (both generators and load customers).

**Expressions of Interest** are invited for the provision of one or more of the described **Services**, with TasNetworks having specific interest in:

- (a) Proposals which can significantly contribute to system *inertia* and/or meaningfully influence the *inertia* requirements of the Tasmanian network.
- (b) Proposals which can significantly contribute to the supply of system strength at each **SSN** as described in Section D.
- (c) Proposals which can deliver multiple **Services** concurrently, thereby improving the efficiency of network operations as well as reducing associated service costs.
- (d) Proposals which can be physically delivered from 2 December 2025 onward, as well as those which are expected to be available, or could be delivered, sometime after that date. Indications of new services expected to be available after 30 June 2029 will also be reviewed with interest.

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<sup>1</sup> [www.aemc.gov.au/market-reviews-advice/review-frequency-operating-standard-2022](http://www.aemc.gov.au/market-reviews-advice/review-frequency-operating-standard-2022)

## A.3 Glossary

In this document:

- (a) A highlighted word or phrase has the meaning as set out below.
- (b) Terms defined in the **NER** have been *italicised* and have the same meanings when used in this document unless otherwise defined.
- (c) This document will be interpreted in accordance with Section 5.20B (Inertia sub-networks and requirements) and Section 5.20C (System strength requirements) of the **NER**.
- (d) Where inadvertent conflict occurs between this document and the **NER**, the definitions, descriptions and requirements as described in the **NER** prevail.

<b>Addendum</b>	Any document issued after the date of this Request for <b>EOI</b> and labelled as an “Addendum” to this Request for <b>EOI</b> ; collectively known as “Addenda”.
<b>AEMO</b>	Australian Energy Market Operator Limited.
<b>BESS</b>	Battery Energy Storage System.
<b>Business Day</b>	A day other than Saturday, Sunday and any other day not taken to be a public holiday in Tasmania.
<b>Closing Date</b>	The date specified on the cover of this Request for <b>EOI</b> .
<b>EMT</b>	Electromagnetic transients.
<b>EOI or Expression of Interest</b>	The submission lodged by the <b>Recipient</b> in response to this Request for <b>EOI</b> .
<b>EOI Form</b>	The document contained in Section E.
<b>FACTS</b>	Flexible AC Transmission System.
<b>FCAS</b>	Frequency Control Ancillary Services.
<b>FRT</b>	Fault Ride Through.
<b>HV</b>	High Voltage (defined as 220 kV and 110 kV in this document).
<b>HVDC</b>	High Voltage Direct Current.
<b>IBR</b>	Inverter Based Resource.
<b>ISP</b>	Integrated System Plan.
<b>MVA</b>	Megavolt Ampere, unit of apparent power.
<b>MVA<sub>r</sub></b>	Megavar, unit of reactive power.
<b>MW</b>	Megawatt, unit of active power.
<b>MW.s</b>	Megawatt second, unit of inertia.
<b>NEM</b>	National Electricity Market.
<b>NER</b>	National Electricity Rules.

<b>Notice Period</b>	The time available for TasNetworks to replace a contracted <b>Service</b> before its release from contract, so as to continuously satisfy any ongoing NER obligations.
<b>PSCR</b>	Project Specification Consultation Report (as issued by TasNetworks in conjunction with this EOI to meet the system strength standard in Tasmania from December 2025 onwards).
<b>Recipient</b>	A person in receipt of this Request for <b>EOI</b> .
<b>Request for EOI</b>	This document, including its schedules, attachments and appendices.
<b>ROCOF</b>	Rate of Change of Frequency (also expressed as $df/dt$ ).
<b>Service(s)</b>	The service(s) as more particularly described in Section D.
<b>SOLI</b>	Secure Operating Level of Inertia.
<b>SSN</b>	System Strength Node.
<b>Statement of Compliance</b>	The document contained in Schedule 1 of the <b>EOI Form</b> .
<b>TasNetworks</b>	Tasmanian Networks Pty Ltd.
<b>TNSP</b>	Transmission Network Service Provider.

## SECTION B: INFORMATION FOR RECIPIENTS

### B.1 Legal status

This **Request for EOI** is an invitation to treat and is not intended to have any contractual effect.

**Recipients** may be subsequently invited to submit tenders for the delivery of the **Services** after the conclusion of the **EOI** process, including evaluation of submissions received.

TasNetworks is not obliged to complete the process outlined in this **Request for EOI** or any subsequent tender, or to acquire any **Services** from **Recipients** who respond. Furthermore, TasNetworks may change the process or the description of the **Services** at any time by issuing an **Addendum** to **Recipients**.

### B.2 Confidentiality

This **Request for EOI** is provided solely to enable **Recipients** to submit an **EOI**. **Recipients** must not use information in this document for any other purpose without TasNetworks' prior written consent.

### B.3 Intellectual property

Unless otherwise indicated, TasNetworks owns the intellectual property rights in this **Request for EOI**. **Recipients** are permitted to use and copy this document only for the purposes of submitting an **EOI**.

### B.4 No warranty

Except to the extent required by law:

- (a) TasNetworks makes no warranties or representations as to the accuracy, adequacy or completeness of the **Request for EOI** or any other information provided to a **Recipient**.
- (b) TasNetworks is not liable in any way for any loss or damage of whatever kind (whether foreseeable or not) however arising (including by reason of negligence), incurred by any person in connection with this **Request for EOI** or any other information provided to a **Recipient**.

### B.5 No collusion or dealings with competitors

**Recipients** must ensure that they (and their principals, employees, agents and contractors) do not:

- (a) Discuss this **Request for EOI** with any other person they know has received this **Request for EOI** or might reasonably be expected to have received it; or
- (b) Engage in any conduct that is designed to, or might have the effect of, lessening competition in the supply of the **Services** to TasNetworks.

**Recipients** who wish to engage in legitimate teaming or sub-contracting discussions with persons who might deliver the **Services** must gain TasNetworks' prior approval to do so.

## B.6 Queries

If **Recipients** find any discrepancy, error, or have any doubt as to the meaning or completeness of this **Request for EOI**, or require clarification on any aspect of it, they should notify TasNetworks via the TenderLink online forum.

No representation or explanation to **Recipients** in relation to this **Request for EOI** is taken to be included in the **Request for EOI** unless it is contained in an **Addendum**.

## B.7 Conditions of submitting an EOI

**Recipients** wishing to submit an **EOI** must comply with **Section C**.

## B.8 Reference Information

For context and understanding, **Recipients** are encouraged to familiarise themselves with **NER** Section 5.20B (Inertia sub-networks and requirements), Section 5.20C (System strength requirements), as well as S5.1a.9 and S5.1.14 which both address “*Minimum three phase fault levels and stability for system strength nodes*”.

Familiarity with the following reference documentation is also recommended:

- [1] Australian Energy Market Operator (AEMO); “*2022 System Strength Report*”, Version 1.0, 1 December 2022.
- [2] Australian Energy Market Operator (AEMO); “*2022 Inertia Report*”, Version 1.0, 1 December 2022.
- [3] Australian Energy Market Operator (AEMO); “*System Strength Requirements Methodology*”, Version 2.0, 30 September 2022.
- [4] Australian Energy Market Operator (AEMO); “*Inertia Requirements Methodology – Inertia Requirements and Shortfalls*”, Version 1.0, 1 July 2018.
- [5] Australian Energy Market Operator (AEMO); “*Power System Model Guidelines*”, Version 2.0, 14 July 2023.

[www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/participate-in-the-market/network-connections/modelling-requirements](http://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/participate-in-the-market/network-connections/modelling-requirements)

References [1-4] can be obtained from:

[www.aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/system-security-planning](http://www.aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/system-security-planning)



## SECTION C: EOI REQUIREMENTS AND EVALUATION

### C.1 Submitting an EOI

An **EOI** must meet the following requirements:

- (a) All applicable sections of the **EOI** must be completed in the form of **Section E: EOI Form** including all relevant **Schedules**. **Schedule 2** of the **EOI Form** has also been made available in spreadsheet format to assist those Recipients wishing to offer services from multiple sites and/or from separable items of plant and equipment.
- (b) The **EOI** must be dated and signed by a duly authorised representative, where indicated.
- (c) All supporting documentation evidencing the matters specified in **Schedule 3** to the **EOI Form** must be included with the **EOI**, to the extent applicable to the proposed **Service**.
- (d) If a **Recipient** cannot comply with any element of the **EOI Form** or Schedules, the **Recipient** must specify in the Statement of Compliance the nature of, and reasons for, the non-compliance.
- (e) An **EOI** must be lodged via the TasNetworks electronic tender box on TenderLink by 5:00 pm (AEST) on the **Closing Date**.
- (f) Additional documentation may be submitted with an **EOI** if, in the **Recipient's** opinion, it is necessary for a proper understanding of its **EOI**.

TasNetworks may decide to accept late or non-conforming **EOIs**, but is not obliged to do so under any circumstances.

### C.2 Recipients to perform own due diligence

By submitting an **EOI**, a **Recipient** is taken to have:

- (a) Satisfied itself of the requirements of this **Request for EOI**.
- (b) Made all reasonable enquiries, investigation and assessment of available information relevant to the risks, contingencies and other circumstances relating to provision of the **Services**.
- (c) Satisfied itself as to the correctness and sufficiency of its **EOI**.

### C.3 Commercial-in-confidence

**EOIs** will be treated as confidential and will not be disclosed outside TasNetworks except:

- (a) As reasonably required for the purpose of assessing the proposed **Services**, including consultation with **AEMO** and the Australian Energy Regulator (**AER**).
- (b) When requested by any regulatory or other government authority having jurisdiction over TasNetworks, or its activities.
- (c) As required by law, or in the course of legal proceedings.
- (d) To TasNetworks' external advisers, consultants or insurers.

In such cases, the **Recipient** is deemed to have consented to disclosure by submitting the **EOI**.

#### C.4 No reimbursement for costs of EOI

No **Recipient** is entitled to be reimbursed for any expense or loss incurred in the preparation and submission of its **EOI** or for any costs incurred in attending meetings with TasNetworks during the **EOI** evaluation process.

#### C.5 No publicity

**Recipients** must not make any public or media announcement about this **Request for EOI** or the outcome of this **Request for EOI** without TasNetworks' prior written permission.

#### C.6 EOI evaluation

TasNetworks' assessment of **EOIs** may include, but is not limited to, an evaluation of the following matters as relevant to the provision of the **Services**:

- (a) Ability to deliver the **Services** including expected timeframes for the delivery of new services.
- (b) Ability to meet the minimum technical requirements as specified in **Section D.5** in conjunction with the performance levels nominated in **Schedule 2**.
- (c) The technical and cost effectiveness of the offered **Services** taking into consideration locational aspects where relevant to do so.
- (d) Evaluation of risk and potential liability.
- (e) Any other factors TasNetworks considers to be relevant including any matters raised by **AEMO**.

## SECTION D: DESCRIPTION OF SERVICES

### D.1 Need for services

Within the Tasmanian *region* of the **NEM**, TasNetworks is responsible for ensuring that the following operational limits can be satisfied to maintain a *secure operating state*.

**Table 1: Requirements to achieve a secure operating state (intact network).**

Inertia level	Requirement
<i>Secure operating level of inertia (SOLI)</i>	3,800 MW.s
<i>Minimum threshold level of inertia</i>	3,200 MW.s
System Strength Node (SSN)	Minimum three phase fault level (intact network)
George Town 220 kV (GT220)	1,450 MVA
Waddamana 220 kV (WA220)	1,400 MVA
Burnie 110 kV (BU110)	850 MVA
Risdon 110 kV (RI110)	1,330 MVA

Where the ‘typical’ forecast dispatch of synchronous generation through the energy and **FCAS** markets is insufficient to satisfy the *inertia* requirements, **AEMO** will declare an inertia shortfall. TasNetworks is responsible for identifying and procuring *non-network options* and/or developing *network options* to address any such shortfalls, whichever combination is likely to deliver the least cost outcome within the available time frame(s).

As the **SSSP** for the Tasmanian region, TasNetworks is responsible for satisfying not only the minimum three phase fault level requirement at all times, but also for ensuring that an *efficient level of system strength* is provided at each **SSN** for the period three years in advance of the most recent forecast published by **AEMO**<sup>2</sup>. The *efficient level of system strength* is to help facilitate the connection and stable operation of future **IBR** energy sources, providing new connections with the option to purchase centrally coordinated *system strength services* as an alternative to self-mitigation.

**Services** are categorised in accordance with the **NER** definitions as follows:

- (a) *Inertia network service.*
- (b) *Inertia support activity.*
- (c) *System strength service.*

In developing solutions for the identified *inertia* and system strength needs, TasNetworks is required to take account of planned outages and the risk of unplanned outages which may impact the availability and/or effectiveness of the **Services**. It is important that the service requirements reflect these operational risks.

<sup>2</sup> AEMO published the inaugural 2022 System Strength Report on 1 December 2022. The contents of this document define the *system strength standard specification* from 1 December 2025 onward until updated by the next annual report in December 2023.

## D.2 Service requirements

### D.2.1 Inertia

The 2022 System Inertia Report [2] has identified the following shortfalls for each financial year until 30 June 2028.

**Table 2: Forecast inertia shortfalls – Tasmanian region**

Financial year	2023-24	2024-25	2025-26	2026-27	2027-28
Available inertia 99% of the time [MW.s]	1,939	1,495	1,291	1,291	1,291
Inertia shortfall against <i>secure operating level</i> [3,800 MW.s]	1,861	2,305	2,509	2,509	2,509

Commercial agreements are already in place to address the shortfalls between now and 1 December 2025. The **EOI** process is therefore seeking to identify potential providers of *inertia network services* and *inertia support activities* to satisfy at least 2,509 MW.s of *inertia* over the forward planning period until at least 30 June 2029. TasNetworks considers it reasonable to assume that the profile of *inertia* shortfall will remain consistent into the 2028-2029 financial year.

### D.2.2 System strength

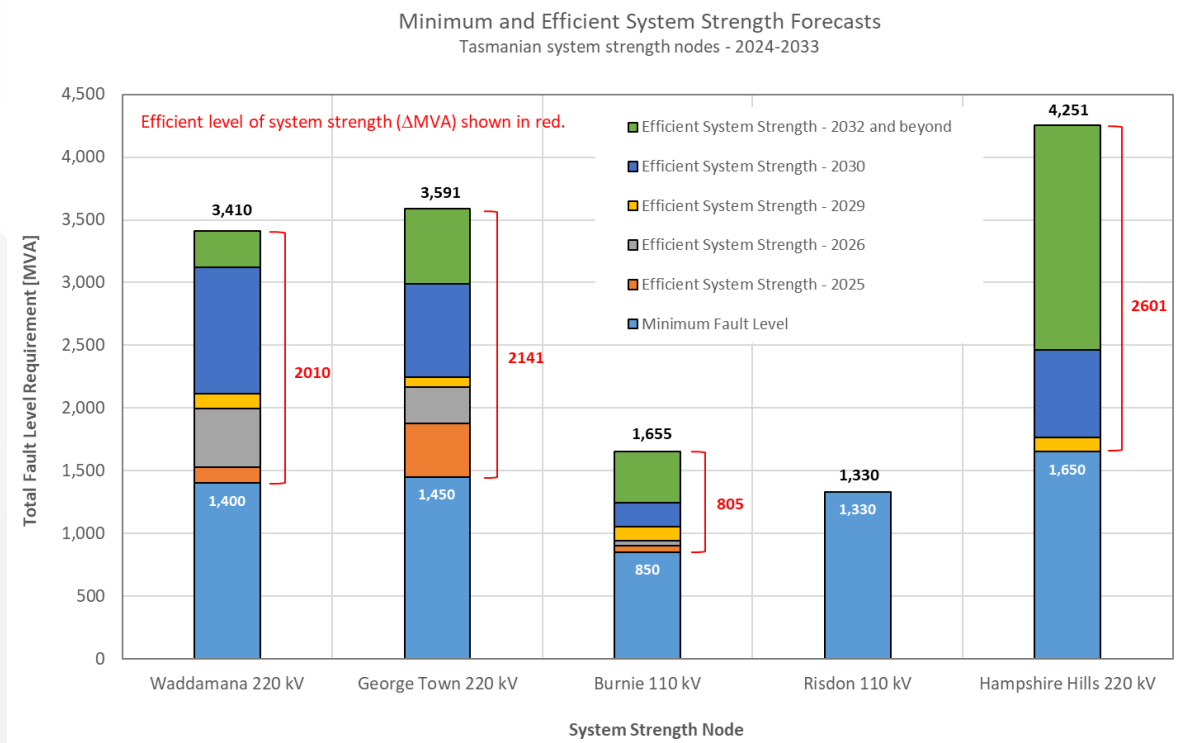
The 2022 System Strength Report [1] confirmed that the required minimum three phase fault levels to be maintained at each **SSN** continue to be as indicated in Table 1 above. The report also provided the forecast **IBR** capacity that TasNetworks needs to consider for the next 10-years. Comparison against the 2022 Integrated System Plan (**ISP**) published by **AEMO** on 30 June 2022 confirms that no additional large scale, transmission interfaced **IBR** is connected in Tasmania beyond 2032 given that the Tasmanian Renewable Energy Target (**TRET**) is satisfied at that time.

TasNetworks has converted the forecast **IBR** capacity increases into estimated three phase fault level requirements at each **SSN**. As part of the process, network topology changes have also been included to reflect the corresponding transmission developments that are expected. Additional transmission capacity is required to facilitate connection of the new generation capacity in each Renewable Energy Zone (**REZ**), as well as the Marinus Link **HVDC** interconnector (identified by the **ISP** as an ‘actionable project’). Furthermore, from 2028 onward, TasNetworks has proactively chosen to consider a fifth **SSN** located at the yet-to-be-constructed Hampshire Hills 220 kV Switching Station. This is a proposed **SSN** intended to help manage future developments in the north west that will include the North West **REZ** and the *connection point* for Marinus Link. An alternate location for this **SSN** depending on the final sequencing of network developments, could be Burnie 220 kV.

Based on the planning data currently available to TasNetworks, and using analysis methodologies recommended by **AEMO**, the estimated *system strength service* requirements for each **SSN** in Tasmania from 2 December 2025 onward are shown below in Table 3 and Figure 1. It can be noted that due to the calculation methodology adopted, the values provided for the *efficient level of system strength* are likely to be conservative and therefore represent an upper bound of our future needs. TasNetworks will continue to refine the forward looking requirements as part of ongoing network planning activities.

**Table 3: Calculated efficient level of system strength (in MVA) by SSN and end of financial year.**

System Strength Node	2024 <sup>3</sup>	2025	2026	2027	2028
Waddamana 220 kV (WA220)	1,400	1,525	1,994	1,994	1,994
George Town 220 kV (GT220)	1,450	1,876	2,170	2,170	2,170
Burnie 110 kV (BU110)	850	902	944	944	944
Risdon 110 kV (RI110)	1,330	1,330	1,330	1,330	1,330
Hampshire Hills 220 kV (HH220)	0	0	0	0	1,650
<b>Total New IBR Assumed (MW)</b>	0	288	579	579	579
<b>Total IBR Forecast by AEMO (MW)</b>	0	258	533	533	533
System Strength Node	2029	2030	2031	2032	2033
Waddamana 220 kV	2,112	3,120	3,120	3,410	3,410
George Town 220 kV	2,248	2,989	2,989	3,591	3,591
Burnie 110 kV	1,052	1,244	1,244	1,655	1,655
Risdon 110 kV	1,330	1,330	1,330	1,330	1,330
Hampshire Hills 220 kV	1,767	2,465	2,465	4,251	4,251
<b>Total New IBR Assumed (MW)</b>	662	1,567	1,567	2,602	2,602
<b>Total IBR Forecast by AEMO (MW)</b>	620	1,495	1,495	2,500	2,500

**Figure 1: Overall accumulation of system strength requirements by SSN.**

<sup>3</sup> Minimum three phase fault levels provided for reference in year 2024.

### D.2.3 Required redundancy for offered services

Depending on the characteristics of the *non-network options* proposed, consideration will then be given to the associated risks of **Services** not being available for various reasons. The final requirements will account for the risks identified during the **EOI** process and thereby address the **NER** obligation to consider planned and unplanned outages.

## D.3 Location of services

At the present time, there is no preferred location for the provision of *inertia network services* or *inertia support activities* however a distribution of **Services** is generally considered to be advantageous<sup>4</sup>. The **SSNs** associated with future **REZ** have been identified as the locations requiring the most support from *system strength services* into the foreseeable future, notably GT220 and WA220 in the short term. BU110 is also considered vulnerable given the limited local supply options and difficulties in transferring support through the shared network during planned outages and following credible contingency events. The situation for BU110 evolves as transmission network developments associated with Marinus Link occur in the surrounding area. While RI110 will not experience the direct impacts of **IBR** developments, maintaining the minimum fault level requirement has the potential to be challenging depending on the operating profile of synchronous generating units in the south of the state in future years.

It follows that a **Recipient** capable of simultaneously providing both *inertia network services* and *system strength services* which contribute significantly to the *three phase fault level* at each **SSN**, will be considered favourably. The ability to manage both *inertia* and *fault levels* concurrently through the selection of appropriately located *non-network options*, directly addresses the **NER** requirements to make available the least cost option or combination of options.

## D.4 Identified non-network options

TasNetworks has identified the following *non-network options* which will or are likely to meet the minimum technical performance requirements described in **Section D.5** and be deliverable within the necessary time frames:

- (a) Synchronous generators participating in the energy market.
- (b) Synchronous generating units deliberately operated at low MW output to provide **Services**.
- (c) Synchronous condenser units owned and operated by *network users*.
- (d) Battery energy storage systems (**BESS**).

The new system strength rules framework requires each **SSSP** to ensure that both the minimum and *efficient levels of system strength* can be achieved in accordance with the rules without reliance on “*any system strength services that may be coincidentally provided by generators as a result of them being dispatched in the energy market in the operational timeframe*”<sup>5</sup>. The final determination by the Australian Energy Market Commission (**AEMC**) requires a **SSSP** “*to procure the whole amount of system strength required to meet the standard*”.

<sup>4</sup> Especially during network outages when multiple inertia and system strength sources may be disconnected as a result of a subsequent credible contingency event.

<sup>5</sup> Refer page 74 of AEMC Draft Determination “Efficient Management of System Strength on the Power System”, which was reaffirmed on page 92 of the final determination.



As a result of this requirement, TasNetworks will look to negotiate the provision of *system strength services* from synchronous generators intending to operate within the wholesale energy market from 2 December 2025 onward. While synchronous generators will naturally provide this capability, the potential need to participate in centrally coordinated security assessments could represent a new overhead activity. At the present time, there is no requirement for TasNetworks to contract with participants operating independently within the energy market for the provision of *inertia*.

In addition to well-established synchronous machine based solutions, TasNetworks also continues to monitor the evolution of grid-forming Flexible AC Transmission System (**FACTS**) devices and their ability to provide system strength and inertial response in addition to the more traditional roles of delivering fast acting voltage and frequency control capabilities.

With regards to **BESS**, suitability to provide one or more **Services** will depend heavily on equipment design, more specifically, whether the power converters are operated as a grid-following or grid-forming devices. Grid-forming is considered more flexible and capable, with inherent response characteristics expected to be similar to that of a synchronous machine (albeit limited by the current rating of the power electronics). Grid-following **BESS** are likely to be limited to the provision of *inertia support activities* only, most likely in the form of fast frequency response capabilities.

Given the number of variables involved with a **BESS** solution, TasNetworks would need to thoroughly investigate the capability of offered equipment prior to commencing any *service agreement* negotiations. This would include the need for electromagnetic transient (**EMT**) simulations.

In addition to the four options identified above, TasNetworks welcomes **Recipients** to offer any other *non-network options* for consideration as part of this **Request for EOI**.

## D.5 Minimum technical requirements

To be considered by TasNetworks, any and all offered **Services** must:

- (a) Be provided by equipment described within a Network Connection Agreement that exists with TasNetworks<sup>6</sup>.
- (b) Comply with the technical requirements defined in any performance standard(s) registered with **AEMO** and forming part of a Network Connection Agreement.
- (c) Where requested to do so as part of a negotiated *service agreement*, have facilities to enable or cease the provision of **Services** as and when instructed by **AEMO** (or TasNetworks) and in any case, within not more than 10 minutes of any such instruction being issued. In the context of synchronous machine operations, this equates to the synchronisation and de-commitment of plant to and from the network in response to real time requirements.
- (d) Have facilities to transmit specified measured quantities via SCADA<sup>7</sup> to TasNetworks' control room which conform to the required standards of reliability, accuracy and latency as would be applied to a *scheduled generating system*. Appropriate data will be shared with **AEMO** via existing communication systems.
- (e) In addition to (d), have facilities to transmit and receive data of various other types as necessary to enable participation in centrally coordinated scheduling and dispatching systems as may be

<sup>6</sup> Note that this is not necessary for the submission of a compliant **EOI**, but is mandatory prior to the delivery of any **Services** into the network.

<sup>7</sup> SCADA – Supervisory Control And Data Acquisition.

developed and implemented by **AEMO** and/or TasNetworks over time. **Recipients** are encouraged to make themselves aware of the Operational Security Mechanism (**OSM**) concepts proposed by the **AEMC**, noting that the framework is undergoing review and is subject to amendments<sup>8</sup>. It is reasonable to assume that an alternative approach having similar basic objectives will still be required at some point.

- (f) Have metering facilities suitable for resolving any compensation payments associated with the provision of **Services**.
- (g) As and when required to support stable operation of the network, continue to contribute reactive power up to the limits defined for the equipment in its Network Connection Agreement, irrespective of which **Services** the equipment is enabled to provide.
- (h) Be supported by simulation models which comply with the requirements stipulated in AEMO's Power System Model Guidelines [5]. This includes the provision of **EMT** models for power electronic interfaced equipment including **BESS**.
- (i) Comply with any and all other relevant technical requirements as defined by the NER including service registration requirements for *Generators* as defined in NER Clauses 5.20B.6(b) and 5.20C.4(b).

## D.6 Excluded services

*Inertia* and *system strength* contributions coming from plant and equipment necessary to be online to support the operation of a *generating system* (and thus mandated as part of a Generator Performance Standard) cannot be offered as a *non-network option*.

For the avoidance of doubt, additional plant and equipment voluntarily installed by a *Generator* that is surplus to the requirements of a *generating system* can be offered to provide **Services**.

For efficiency of assessment and practical application, TasNetworks reserves the right to exclude any offered **Services** which are deemed to be of inadequate capacity or are inappropriately located, and will therefore deliver little or no material benefit to power system security outcomes.

## D.7 Payment for services

The current regulatory framework for *inertia* is based on the principle of mitigating a 'shortfall' to compensate for the lack of services inherently provided from the wholesale energy and FCAS markets. Under the new system strength rules framework, each **SSSP** is responsible for the procurement of all services necessary to meet the *system standards*, including from synchronous generating units.

As a result, for both *inertia* and *system strength*, there will be times when certain categories of *non-network options* are not required to be enabled, as synchronous generators will continue to provide all of the necessary capability to manage relevant system security requirements.

Having considered the time varying requirements for the provision of **Services**, TasNetworks considers that the payment structure for all **Services** should follow the general principles as described below.

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<sup>8</sup> It is recommended that **Recipients** read the AEMC forward directions note dated 23 May 2023 available at the following website: [www.aemc.gov.au/rule-changes/operational-security-mechanism](http://www.aemc.gov.au/rule-changes/operational-security-mechanism)



## (a) Availability Charge

The availability charge is intended to reasonably compensate providers of **Services** for the fixed costs incurred in making the **Services** available to TasNetworks.

This may include:

- Contract management costs.
- Any additional testing/compliance management costs.
- Costs associated with implementing changes to SCADA and dispatching systems, including operational procedures within the service providers business.
- Costs associated with modifying plant and equipment necessary to deliver **Services** that would not otherwise have been necessary for normal operation in the **NEM**. This includes any incremental capital costs associated with the design and construction of new plant and equipment. Service providers should not expect to recoup all such costs in one contract period, but rather demonstrate proportional allocation over time.

In principle, if certain contracted **Services** are not required because a system need never eventuates (due to prevailing market outcomes), the service provider is still entitled to recoup the reasonable costs of being able to respond to an enablement instruction during the contract period.

TasNetworks would anticipate negotiating a fixed availability charge irrespective of the number of **Services** which can be delivered concurrently by a particular asset.

TasNetworks also has an expectation that *system strength services* delivered from synchronous generating units operating 'normally' within the energy market would only be compensated via an 'Availability Charge'. This is on the basis that the marginal cost of providing the service is zero and should not therefore attract a 'Compensation Payment'.

## (b) Compensation Payments

Compensation payments are intended to reimburse providers of **Services** for the costs actually incurred when instructed by **AEMO** (or TasNetworks) to deliver the **Services**.

Depending on how the **Service** is delivered, this may include:

- Energy required to be consumed from the network (to provide the **Services**).
- Opportunity costs associated with the use of available stored energy at a time or at a rate that may not be preferred (compared to what the service provider may have reasonably been expecting to do in the absence of needing to provide **Services**).
- Fair wear and tear (increased operation and maintenance costs) that can be reasonably demonstrated and justified due to the delivery of **Services**.

TasNetworks would anticipate negotiating a compensation payment structure for each **Service** in accordance with the following broad principle:

$$\text{Compensation per enablement (\$)} = \left( \sum_i^j EC_i \times EP_i \right) + (TE \times OC) + FEC$$

Where:

Ref	Units	Description	Intent
EC	[MWh]	Energy required to be Consumed from the network while enabled.	Capture costs which are a function of energy market outcomes or other agreed reference price(s).
EP	[\$/MWh]	Energy Price negotiated with TasNetworks for each trading interval while enabled.	
TE	[hr]	Total Time Enabled (multiple of 5-minute dispatch intervals).	Capture costs which are time variant in nature.
OC	[\$/hr]	Opportunity Cost negotiated with TasNetworks.	
FEC	[\$]	Fixed Enablement Costs negotiated with TasNetworks.	Capture costs which are non-time variant and incurred simply as a result of each enablement request.

Of the three elements, only those costs which are relevant to a specific type of *non-network option* would be utilised. The formula would be applied across each time period that a **Service** is enabled.

For the avoidance of doubt, where an asset is capable of delivering multiple **Services** concurrently, only one compensation payment will be made. Under such circumstances, payment will be for the **Service** that is requested by **AEMO**.

The basic framework presented above is intended to provide general guidance to **Recipients** to assist in the preparation of **EOI** submissions.

**Recipients** are encouraged to propose alternate payment principles if they desire, but should specifically note the requirements of **NER 5.20B.4(f)** and **5.20C.3(d)** which require TasNetworks to make **Services** available at 'least cost'. Formulation of alternate payment principles should consider how a 'least cost' solution could be reasonably demonstrated given the uncertainty associated with real time enablement requirements.

## D.8 Contract period for services

TasNetworks is prepared to consider proposals from **Recipients**, but considers the shortest practical contracting period to be not less than 12-months. As part of this **EOI**, we are specifically looking to identify **Services** sufficient to meet our rule obligations<sup>9</sup> from 2 December 2025 until at least 30 June 2029, and are therefore seeking submissions which address this particular time window.

Notwithstanding future uncertainties, TasNetworks is of the view that certain volumes of **Services** could potentially be contracted over longer time periods with minimal financial risk. Indeed, longer term agreements may deliver lower cost outcomes, i.e. providing income assurance over an extended period of time may encourage more attractive pricing arrangements.

<sup>9</sup> Specifically noting **NER Clause 5.20B.4(c)(5)** and **Schedule S5.1.14**.

As a result, TasNetworks is requesting Expressions of Interest (**EOI**) from any potential service providers who believe they are capable of:

- (a) Helping address the service requirements outlined in **Section D.2** between 2 December 2025 and 30 June 2029.
- (b) Offering new or continued services beyond 30 June 2029, recognising the uncertainty of future needs beyond that date (which are expected to solidify in the coming years). We are particularly interested in understanding how pricing arrangements for **Services** may vary as a function of contract duration.

## SECTION E: EXPRESSION OF INTEREST FORM

To: Tasmanian Networks Pty Ltd  
P.O Box 606  
Moonah, Tasmania, 7009

Expression of Interest for Inertia Network Services, Inertia Support Activities and System Strength Services.

From:

<b>Recipient:</b>		
<b>ABN:</b>		
<b>Address:</b>		
<b>Contact Person:</b>	Name:	
	Title:	
	Telephone No:	
	Facsimile No:	
	E-mail:	

**1. EOI**

The **Recipient** expresses its interest in providing the **Services** in accordance with the requirements of the **Request for EOI** as specified in the Statement of Compliance in **Schedule 1**.

**2. Agency/Joint EOI**

The **Recipient** [is/is not] acting as an agent or trustee for another person, or lodging an **EOI** jointly with other persons.

[If the **Recipient** is acting as an agent or trustee, full details must be provided in this section]

**3. Services**

The **Recipient** provides the supporting information required by **Schedules 2, 3 and 4** for each of the **Services** proposed to be provided.

**4. Addenda to Request for EOI (only if Addenda received)**

In the preparation of its **EOI**, the **Recipient** acknowledges having received the following **Addenda**, if any, to the **Request for EOI**:

Addendum No. 1                      Dated:

Addendum No. 2                      Dated:

Addendum No. 3                      Dated:

NOTE: Highlighted terms in this **EOI Form** and Schedules are defined in the **Request for EOI**. Terms defined in the National Electricity Rules have the same meanings.

Dated this                    day of                    2023

**EXECUTED** by **[NAME OF RECIPIENT]** by its    )  
duly appointed representative in the        )  
presence of:    )

.....  
Witness

.....  
Signature of authorised representative

.....  
Name of witness (print)

.....  
Name of authorised representative (print)

.....  
Position of authorised representative (print)

## Schedule 1: Statement of Compliance

I *[Name]* confirm on behalf of *[Recipient]* that this EOI conforms in every respect with the Request for EOI.

OR

I *[Name]* confirm on behalf of *[Recipient]* that this EOI conforms to the Request for EOI other than in the following respects:

1. *[Please list any non-conforming aspects of EOI]*
2. *[Please list any non-conforming aspects of EOI]*

The number of **Schedule 2** forms attached to this submission is as follows.

- Part 1: Synchronous generator (energy market): *[Please indicate number]*
- Part 2: Synchronous generator (minimum output): *[Please indicate number]*
- Part 3: Synchronous condenser: *[Please indicate number]*
- Part 4: Battery energy storage system: *[Please indicate number]*
- Part 5: Other facility: *[Please indicate number]*

OR

- Filename of **Schedule 2** (spreadsheet format) *[Filename]*

Recipient's name:

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Recipient / authorised representative signature:

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Date:

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## Schedule 2: Description of Proposed Services

Depending on the type of *non-network option* being proposed, **Recipients** must complete the relevant part(s) of this **Schedule 2**. Sections which are not relevant do not need to be completed.

Where a **Recipient** is proposing to offer several facilities to provide a larger aggregated capability to deliver one or more **Services**, this Schedule should be completed for each individual facility, e.g. this cover page in addition to Part 1 should be completed for each synchronous generating unit wishing to be offered to provide **Services** while participating in the energy market.

Alternatively, the spreadsheet version of this **Schedule 2** can be completed where it is easier to present a portfolio of offerings for a range of **Services**.

The **Recipient** proposes to offer the following **Services** from the facility described below:

Service Name	Please indicate (✓)
<i>Inertia Network Service</i>	
<i>Inertia Support Activity</i>	
<i>System Strength Service</i>	

## Part 1: Synchronous generating (SG) unit – Energy market operations

### 1.1 Description of facilities

The **Recipient** proposes to provide the **Services** using the following SG unit when dispatched for energy and/or FCAS through the NEM wholesale markets:

Requested information	Please provide description
Station/unit name and ID:	
Existing or proposed:	<i>Is the unit already operational or proposed to be constructed? If proposed, when will the Service be available?</i>
Nameplate MVA rating:	
Network connection point:	<i>Please describe the location of the existing or proposed network connection point including voltage level.</i>
Modelling data:	<i>Please indicate whether modelling data is available to assess the facility in power system simulation software and if this data is already part of an existing network connection agreement.</i>

### 1.2 Proposed performance levels

The **Recipient** proposes to meet the following performance requirements:

Requirement	Proposed performance
Expected availability (per annum):	<i>[hrs/year or %] considering expected maintenance, forced outage rates and any other operational limitations that may exist.</i>
Expected capacity factor (per annum):	<i>[%] – Represents expected percentage of time that the synchronous generator will be online and participating in the energy market as influenced by fuel availability, operational constraints, and other influences.</i>
(* Inertia when operating in SG mode:	<i>[MW.s]</i>
(* Expected contribution to three phase fault level at the network connection point:	<i>[MVA @ 1.0 p.u terminal voltage, rated MW, unity PF]</i>
(* Reactive power generation capability of the SG when dispatched for the <b>Services</b> at rated MW output:	<i>[Over excited MVA limit @ rated MW @ machine terminals]</i>
(* Reactive power absorption capability of the SG when dispatched for the <b>Services</b> at rated MW output:	<i>[Under excited MVA limit @ rated MW @ machine terminals]</i>

*(\* This information is only required for new synchronous generators not already connected to the Tasmanian power system and for which steady state and dynamic modelling information has not previously been provided to TasNetworks.*



## Part 2: Synchronous generating (SG) unit – Sustained operation at minimum output

### 2.1 Description of facilities

The **Recipient** proposes to provide the **Services** using the following SG unit operating at minimum power output when instructed to do so by **AEMO** or TasNetworks:

Requested information	Please provide description
Station/unit name and ID:	
Existing or proposed:	<i>Is the unit already operational or proposed to be constructed? If proposed, when will the Service be available?</i>
Nameplate MVA rating:	
Network connection point:	<i>Please describe the location of the existing or proposed network connection point including voltage level.</i>
Modelling data:	<i>Please indicate whether modelling data is available to assess the facility in power system simulation software and if this data is already part of an existing network connection agreement.</i>

### 2.2 Proposed performance levels

The **Recipient** proposes to meet the following performance requirements:

Requirement	Proposed performance
Time to commence delivery of the <b>Services</b> following receipt of an instruction from AEMO:	<i>[mins], Synchronisation time to be considered.</i>
Are there any environmental, commercial or operational restrictions that can prevent the SG from being normally available?	<i>Please describe any operational limits that may impact on availability.</i>
Expected availability (per annum):	<i>[hrs/year or %] considering expected maintenance, forced outage rates and any other operational limitations that may exist.</i>
Minimum MW loading for continuous SG operation:	<i>[MW]</i>
Maximum time that SG mode can be sustained at minimum load once enabled:	<i>Please describe any operational limits.</i>
(*) <i>Inertia</i> when operating in SG mode:	<i>[MW.s]</i>
(*) Expected contribution to three phase fault level at the network connection point:	<i>[MVA @ 1.0 p.u terminal voltage, min MW, unity PF]</i>
(*) Reactive power generation capability of the SG when dispatched for the <b>Services</b> at minimum MW loading:	<i>[Over excited MVAR limit @ min MW @ machine terminals]</i>
(*) Reactive power absorption capability of the SG when dispatched for the <b>Services</b> at minimum MW loading:	<i>[Under excited MVAR limit @ min MW @ machine terminals]</i>

(\*) *This information is only required for new synchronous generators not already connected to the Tasmanian power system and for which steady state and dynamic modelling information has not previously been provided to TasNetworks.*

## Part 3: Synchronous condenser (SC) unit

### 3.1 Description of facilities

The **Recipient** proposes to provide the **Services** using the following SC unit when instructed to do so by **AEMO** or TasNetworks:

Requested information	Please provide description
Station/unit name and ID:	
Existing or proposed:	<i>Is the unit already operational or proposed to be constructed? If proposed, when will the Service be available?</i>
Nameplate MVA rating:	
Network connection point:	<i>Please describe the location of the existing or proposed network connection point including voltage level.</i>
Modelling data:	<i>Please indicate whether modelling data is available to assess the facility in power system simulation software and if this data is already part of an existing network connection agreement.</i>

### 3.2 Proposed performance levels

The **Recipient** proposes to meet the following performance requirements:

Requirement	Proposed performance
Time to commence delivery of the <b>Services</b> following receipt of an instruction from AEMO:	<i>[mins], Synchronisation time to be considered.</i>
Maximum time that SC mode can be sustained once enabled:	<i>Please describe any operational limits</i>
Are there any environmental, commercial or operational restrictions that can prevent the SC from being normally available?	<i>Please describe any operational limits that may impact on availability, e.g. lake level restrictions etc</i>
Expected availability for SC operation per annum:	<i>[hrs/year or %] considering expected maintenance, forced outage rates and any other operational limitations that may exist.</i>
Active power drawn from the network when operating as a SC:	<i>[MW at metering point]</i>
Can the SC also be enabled to provide other Market Services at the same time?	<i>[Yes/No], If yes, which services? Example: FCAS</i>
(*) <i>Inertia</i> provided when operating in SC mode:	<i>[MW.s]</i>
(*) Contribution to three phase fault level at the network connection point:	<i>[MVA @ 1.0 p.u terminal voltage, unity PF]</i>
(*) Reactive power generation capability of the SC when dispatched for the <b>Services</b> :	<i>[Over excited MVA limit @ machine terminals]</i>
(*) Reactive power absorption capability of the SC when dispatched for the <b>Services</b> :	<i>[Under excited MVA limit @ machine terminals]</i>

(\*) *This information is only required for new synchronous generators not already connected to the Tasmanian power system and for which steady state and dynamic modelling information has not previously been provided to TasNetworks.*

## Part 4: Battery Energy Storage Systems (BESS)

### 4.1 Description of facilities

The **Recipient** proposes to provide the **Services** using the following **BESS**:

Requested information	Please provide description
Facility name:	
Existing or proposed:	<i>Is the unit already operational or proposed to be constructed? If proposed, when will the Service be available?</i>
Nameplate MW/MWh rating:	<i>Please indicate active power rating for both charge and discharge cycles (if different) as well as energy storage capacity.</i>
Network connection point:	<i>Please describe the location of the existing or proposed network connection point including voltage level.</i>
Modelling data:	<i>Please indicate whether steady state and dynamic modelling data is available (and which formats) to assess the facility in power system simulation software.</i>

### 4.2 Proposed performance levels for ESS operation

The **Recipient** proposes to meet the following performance requirements:

Requirement	Proposed performance
Time to commence delivery of the <b>Services</b> following receipt of an instruction from AEMO:	<i>[mins]</i> <i>If services are to be provided on a continuous basis, please describe intended delivery arrangements.</i>
Expected operating strategy for the BESS:	<i>Please describe in general terms how the BESS will be operated including intended energy management approach, e.g. anticipated to operate with 25% capacity margin when charging / discharging etc.</i>
Expected availability (per annum):	<i>[hrs/year or %]</i>
Converter control design:	<i>[Grid-forming or grid-following] plus any additional descriptions considered appropriate.</i>
For grid-following BESS, required Minimum Short Circuit Ratio (MSCR) at connection point for stable operation of equipment:	<i>[MSCR at connection point, N/A for grid forming device]</i>
Contribution to three phase fault level at the network connection point:	<i>[MVA], Fault current in-feed for a three phase fault at the connection point.</i>
Dynamic overload capability:	<i>Please describe any dynamic overload capability beyond the nameplate rating of the BESS and associated time limits.</i>

For grid-forming BESS, proposed setting of inertia constant and/or potential range of settings that can be considered:	<i>Inertia constant [s]. TasNetworks will need to validate the inertial response characteristics using modelling data provided by the <b>Recipient</b>. The equivalent inertia contribution will be analysed over a range of operating conditions from maximum charge to maximum discharge.</i>
Reactive power generation capability of the BESS when enabled for the <b>Services</b> :	<i>[Over excited MVAR limit @ max -MW] [Over excited MVAR limit @ 0 MW] [Over excited MVAR limit @ max +MW]</i>
Reactive power absorption capability of the BESS when enabled for the <b>Services</b> :	<i>[Under excited MVAR limit @ max -MW] [Under excited MVAR limit @ 0 MW] [Under excited MVAR limit @ max +MW]</i>
Can the BESS also be enabled to provide other Market Services at the same time?	<i>[Yes/No], If yes, which services? Example: FCAS</i>

*Please note that in addition to fault current injection, TasNetworks will assess contributions to other aspects of system strength via simulations using modelling data that is to be provided by the **Recipient**.*

## Part 5: Other technology options

### 5.1 Description of facilities

The **Recipient** proposes to provide the Service/s using the following technology:

Requested information	Please provide description
Facility name:	
Existing or proposed:	<i>Is the unit already operational or proposed to be constructed? If proposed, when will the Service be available?</i>
Facility type:	<i>Please describe the facility being offered to provide the Service/s.</i>
Network connection point:	<i>Please describe the location of the existing or proposed network connection point including voltage level.</i>
Modelling data:	<i>Please indicate whether steady state and dynamic modelling data is available to assess the facility in power system simulation software.</i>

### 5.2 Description of facilities

The **Recipient** proposes to meet the following performance requirements:

Requirement	Proposed performance
Time to commence delivery of the <b>Services</b> following receipt of an instruction from AEMO:	<i>[mins]</i>
Intended operating strategy to deliver the <b>Services</b> :	<i>Please describe how the technology will provide the <b>Services</b> and any other network benefits that can or will be provided in conjunction, e.g. reactive power support etc</i>
Expected availability (per annum):	<i>[hrs/year or %]</i>
Limitations on delivery of the <b>Services</b> :	<i>Please describe</i>
Can the facility also be enabled to provide other Market Services at the same time?	<i>[Yes/No], If yes, which services? Example: FCAS</i>

## Schedule 3: Supporting Documentation

In support of its **EOI**, the **Recipient** must provide the information as detailed below.

Where appropriate to do so, a **Recipient** offering multiple facilities and/or **Services** may choose to provide information and descriptions that pertain to the overall portfolio that is being offered. This is to avoid unnecessary repetition of common material.

- (a) Description of how the **Recipient** intends to satisfy the performance and minimum technical requirements, including the intended mechanisms to enable and cease provision of **Services** upon instruction from **AEMO** where this is relevant.
- (b) Description of modelling data available to represent the facility proposed to deliver the **Services**. The **Recipient** should indicate the availability of RMS<sup>10</sup> and **EMT** models and whether models which may already form part of an existing network connection agreement are considered adequate to represent the facilities when providing the offered **Services**.
- (c) Indicative cost of the **Services** in 2023 Australian dollars – As indicated in **Section D.7**, this may include fixed annualised costs and/or variable (enablement) costs. Recipients are encouraged to present cost breakdowns based on the descriptions provided in **Section D.7**.
- (d) An indication of the main factors that would cause those costs to change (other than inflation over time) and any influencing factors, e.g. contract duration.
- (e) The **Recipient's** approach to risk and liability, and any contracting assumptions relevant to the indicative costs provided.
- (f) Any further information the **Recipient** believes would assist TasNetworks' evaluation of this **EOI**.

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<sup>10</sup> RMS – Root Mean Square. Models of this type are usually provided in PSS/E format. PSS/E is the load flow and transient stability analysis software used by TasNetworks and AEMO.