

# Fact sheet: System Strength

## Our role

TasNetworks is the Transmission Network Service Provider (**TNSP**) and Jurisdictional Planner for the Tasmanian region of the National Electricity Market (**NEM**). As a result, we are also the System Strength Service Provider (**SSSP**) and Inertia Service Provider for Tasmania. The National Electricity Rules (**NER**) define each of these roles and associated responsibilities.

TasNetworks is resolute in its commitment to power system security which underpins the delivery of safe and reliable services for our customers.

## What is system strength?

System strength is a broad term encompassing a number of specific technical elements, however the fundamental components include:

- (a) Ensuring that adequate short circuit current is always available to facilitate the correct operation of network protection systems.
- (b) Ensuring that stable voltage control can be maintained across the network, both before, during and after network contingency events.
- (c) Ensuring that the voltage at the connection point of grid-following inverter based resources (**IBR**) is sufficiently robust to allow for their continuous, uninterrupted operation, even when subjected to network faults and other credible disturbances.

Ensuring that adequate levels of system strength are available across the network is important for managing power system security, especially when high levels of IBR need to be integrated into the system.

## What is an Inverter Based Resource (IBR)?

IBR includes wind generation, solar photovoltaics (**PV**), battery energy storage systems (**BESS**), hybrid power plants, high voltage direct current (**HVDC**) networks<sup>1</sup>, flexible AC transmission system (**FACTS**) devices, and any other equipment that is interfaced to the power system through a power electronic converter.

While the specific implementation can vary, how IBR

interacts with and supports the power system is fundamentally different to that of synchronous machines like hydro. These differences need to be properly accounted for in the planning and operation of our future power system.

For the Tasmanian network now and looking forward, the impacts of wind, solar PV and HVDC will be most relevant, especially as we move towards achieving the Tasmanian Renewable Energy Target (**TRET**) and increasing our HVDC interconnection capacity with the mainland via Marinus Link.

## What is changing in the power system?

The traditional source of system strength has been synchronous generation (e.g. hydro) which is inherently capable of addressing the core elements outlined above, as well as providing inertia (which assists with the management of network frequency control). As the penetration of IBR grows, the need for synchronous generation to be online is reducing, i.e. when the sun is shining and the wind is blowing, IBR can increasingly meet the electrical demands of customers, often resulting in synchronous generation disconnecting from the network. As the number of synchronous generators remaining online progressively reduces, issues related to low system strength become more prevalent and require deliberate management. Undoubtedly, technological advancements will help address such issues in the future, however system security and reliability must continue to be adequately managed in the meantime.



<sup>1</sup> Such as Basslink and the future Marinus Link interconnectors.

## How is the change being managed?

The energy transition is occurring rapidly, in line with various State and Federal Government renewable energy policies, and IBR is replacing synchronous generators right across the National Electricity Market (NEM). As a result, the Australian Energy Market Commission (AEMC) introduced changes to the NER on 21 October 2021 which require SSSPs to proactively plan for and pre-emptively provide sufficient system strength services right across their networks. The new rules address not only the requirements of the existing power system, but also what is required to support the forecast connection of future IBR, predominantly wind and solar PV generation.

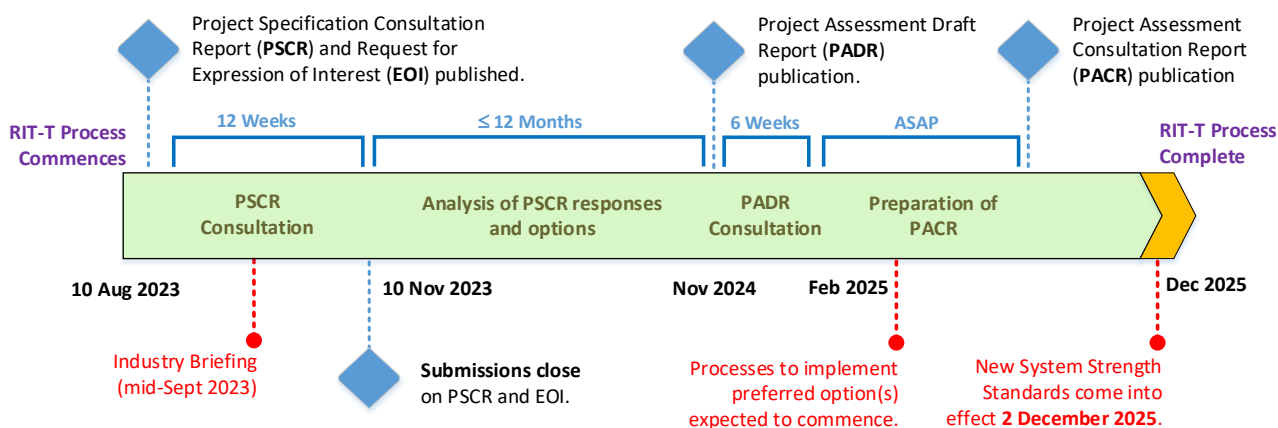
The new Rules come into full effect on 2 December 2025, with SSSP planning obligations having already commenced on 1 December 2022.

## What is TasNetworks doing to address its planning obligations?

We are undertaking a Regulatory Investment Test for Transmission (RIT-T) to examine all technical

possibilities and identify the preferred solution to meet forecast system strength requirements in Tasmania. The RIT-T process enforces rigour in the cost benefit analysis and provides transparency for consumers. It also provides an opportunity for network users to have input through consultation processes, including the ability to propose and offer non-network solutions to help address system strength in Tasmania. A non-network solution would typically involve a third party providing services to TasNetworks under a commercial arrangement, thereby reducing or eliminating the need for additional network owned assets to be constructed.

In August, TasNetworks commenced the RIT-T process with the publication of a Project Specification Consultation Report (PSCR). This is the first step in what is likely to be an eighteen month to two year process to identify and then implement technical solutions that will enable us to meet our regulatory obligations, as well as support the future growth of the Tasmanian power system.



## What might a future solution look like?

Without prejudicing the outcomes of the RIT-T process, we anticipate that the final solution will likely be a mix of network and non-network solutions. While system strength may be provided to some parts of the network from existing and new third party assets made available to TasNetworks under commercial agreement(s), other parts of the power system may require bespoke solutions that necessitate the installation of new network assets.

The deployment of non-network solutions are the likely outcome for 2 December 2025 given the significant delays being experienced across the industry to procure and install new equipment due to supply chain constraints.

## Who is paying for the provision of these new services?

The AEMC Rule Determination describes in detail how the costs involved with providing system strength are to be allocated going forward. The new framework introduces a 'user-pays principle' for any new connecting parties that are reliant on a particular level of system strength being available at their connection point.

In short:

- New generators or network customers (loads) that are connecting IBR technologies will have the option to purchase centrally provided services (from TasNetworks) or self-mitigate their impacts on the network (i.e. supply their own).

- (b) The revenue generated by TasNetworks from the 'sale' of system strength services will help offset the costs of providing the solutions in a pre-emptive manner.
- (c) Any costs not recouped from new IBR connections will be passed through to Tasmanian consumers. For this reason, TasNetworks is heavily focused on identifying 'the right solutions' so as to minimise the potential cost impacts for all stakeholders.

We recommend that anyone interested in these matters familiarise themselves with the Final Rule Determination which is available online at:

[www.aemc.gov.au/rule-changes/efficient-management-system-strength-power-system](http://www.aemc.gov.au/rule-changes/efficient-management-system-strength-power-system)

### What are we seeking from you?

TasNetworks is seeking written submissions to our recently published PSCR by **2 PM Thursday 9 November 2023**. To support the preparation of submissions from intending non-network service providers, a Request for Expression of Interest (**EOI**) has also been released.

All documentation, including further reference material, is available from our System Strength RIT-T webpage which is located at:

<https://www.tasnetworks.com.au/systemstrength>

For further information, please contact:

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Email submissions or queries in relation to our System Strength RIT-T can be sent directly to:

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