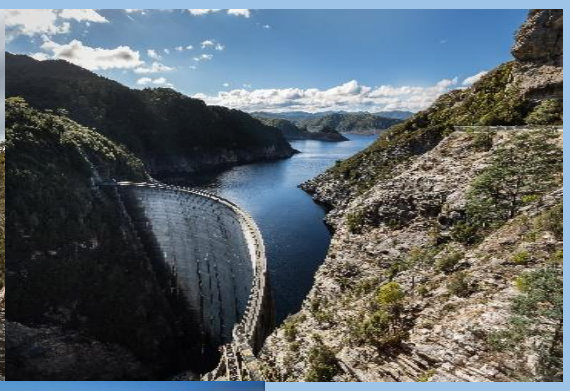
ENERGY IN TASMANIA

ANNUAL SECURITY REVIEW 2018–19



MONITOR AND ASSESSOR FOR ENERGY SECURITY

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EXECUTIVE SUMMARY

Under the *Energy Co-ordination and Planning Act 1995* (the Act), the role of Energy Security Monitor and Assessor (the Monitor and Assessor) has been established to report on energy security in Tasmania and, when necessary, commence the process for risks to energy security to be managed. The Act provides that the Tasmanian Economic Regulator is the Monitor and Assessor.

The Monitor and Assessor is required to carry out an annual energy security review and prepare a report which sets out the Monitor and Assessor's findings from its review of the most recent 12 month period, together with an assessment of the forthcoming 12 month period. For consistency and to allow comparisons to be made with previous annual reviews, the Monitor and Assessor has chosen to continue to base its annual reviews on a water year from 1 November and 31 October. This report therefore reviews the period from 1 November 2018 to 31 October 2019 and makes an energy security assessment for the following 12 month period.

Tasmania's available energy supply is expected to be sufficient to meet demand over the coming 12 months. Based on current inflow assumptions for Tasmanian hydro storages, on-island hydro generation together with wind generation will be able to meet projected Tasmanian demand in the event of a temporary loss of the Tamar Valley Power Station (TVPS) generation or a Basslink outage.

Based on assessing the monthly level of water in storage against the monthly Prudent Storage Level (PSL) at beginning of each month, which is consistent with the framework recommended by the Tasmanian Energy Security Taskforce, the water in storage level did not fall below the PSL over the 2018-19 water year.

At the end of the 2018-19 water year, energy in storage was 6 609 GWh, representing 45.8 per cent of total usable energy in storage. This was approximately six percentage points above the PSL and almost 16 percentage points above the High Reliability Level (HRL). However, in January 2019 and February 2019, energy in storage declined to be only marginally above the PSL for those months.

Large-scale wind projects in Tasmania that have met the Australian Energy Market Operator's (AEMO) commitment criteria are expected to deliver an additional 265MW of on-island generation and to have a positive impact on Tasmania's energy security during the 2019-20 water year.

During the 2018-19 water year, Hydro Tasmania was unable to export or import from 24 August 2019 to 29 September 2019 due to a Basslink outage. Energy in storage was above the PSL at the start of the outage, and there were above average inflows during the outage. As a result, Tasmania's energy supply was not placed at any increased risk over this period.

During the 2018-19 water year, the Monitor and Assessor released monthly dashboards on the website of the Tasmanian Economic Regulator which reported energy in storage levels against the relevant PSL and HRL. The Monitor and Assessor did not require Hydro Tasmania to prepare any recovery plans during 2018-19.

The Monitor and Assessor considers that there is a very low likelihood that energy in storage will fall below the HRL in 2019-20. Energy in storage may fall below the PSL in 2019-20 though it is expected that, if this does occur, it is likely to be for short periods only.

The Monitor and Assessor is currently conducting a review of the existing PSL and HRL profiles due to the expected commencement, in early 2020, of two new large scale wind farms - the Granville Harbour Wind Farm and the Cattle Wind Farm. The Monitor and Assessor will report on the outcome of its review to the Minister for Energy in early 2020.

The Monitor and Assessor has not identified any energy security issues in the natural gas market in Tasmania.

KEY STATISTICS

Key statistics for the water year (1 November to 31 October) in GWh[1]

	2017-18	2018-19
Energy in storage (as at end of water year)	6 623	6 609
Total inflow to Hydro Tasmania's storages	9 456	8 873
Tasmanian demand	10 905	10 582
Hydro generation	9 601	8 859
Wind generation	1 119	1 140
Gas generation	774	481
Distributed generation	149	177
Basslink imports	812	1 095
Basslink exports	1 368	980
Basslink net exports/(imports)	556	(115)

[1] Sources: 2017-18 & 2018-19 energy in storage and inflow data were sourced from Hydro Tasmania. 2017-18 demand and generation data were sourced from NEMSight and AEMO. 2018-19 electricity demand and generation data were sourced from NEMReview.

1 INTRODUCTION

Electricity generation in mainland Tasmania is dominated by hydro generation, which has inherent hydrological risks to energy security due to rainfall variability in hydro catchments and the management of energy in storage.

During 2015-16, Tasmania experienced two concurrent low probability events that impacted on energy security with the Basslink Interconnector out of service and record low rainfall during spring. These events resulted in Hydro Tasmania's water storages falling to historically low levels. Among other things, the Tasmanian Government established the Tasmanian Energy Security Taskforce to advise the Government on how it can better prepare for, and mitigate against, the risk of future energy security events.

The Taskforce's Final Report was released on 16 August 2017.[2] The Taskforce's Final Report contained a range of recommendations including a clearly defined framework for assessing and managing Tasmania's energy security (the Framework). A key element of the Framework is the monthly public reporting of energy in storage levels in Tasmania against the Prudent Storage Level (PSL) and the High Reliability Level (HRL), details of which are set out in section 3.1.1.

Effective from 9 April 2019, and as set out in section 8A of the *Energy Co-ordination and Planning Act 1995* (the Act), the Tasmanian Economic Regulator has been formally assigned the role of Energy Security Monitor and Assessor. The Regulator had been previously carrying out this role under memoranda of understanding entered into with Hydro Tasmania and the Office of Energy Planning. While not bound by the Framework, the Monitor and Assessor considers it provides a very useful guide and anticipates generally following the Taskforce's proposed approach, consistent with the Monitor and Assessor's statutory responsibilities. Further details about the framework are set out in Appendix A of the Annual Energy Security Review 2017-18, which is available on the Regulator's website: https://www.economicregulator.tas.gov.au/about-us/energy-security-monitor-and-assessor/annual-energy-security-review.

The Monitor and Assessor's functions, as set out under the Act, are as follows:

- to monitor and provide reports in relation to energy in storage and other sources of energy;
- to evaluate, on a monthly basis, whether there is sufficient energy in storage and associated generation capacity to meet forecast electricity demand in the Tasmanian region of the National Electricity Market (NEM);
- to require Hydro Tasmania to provide recovery plans;
- to provide the Energy Security Coordinator with a copy of any recovery plan and the Assessor's advice on the quality of the plan;
- to notify the Energy Security Coordinator when energy in storage levels are likely to drop below the HRL;
- to monitor and evaluate the PSL and HRL and advise the Minister for Energy whether changes in the levels are required; and

[2] https://www.stategrowth.tas.gov.au/energy_and_resources/tasmanian_energy_security_taskforce/final_report

- such other functions as may be prescribed.

The Monitor and Assessor therefore provides an additional layer of public reporting on energy security matters and, if the energy security risks are elevated, determines when Hydro Tasmania is required to prepare recovery plans. This public reporting includes monthly reports and this annual report. The annual report contains a review of the most recent water year and an assessment of the forthcoming water year, together with a summary of the Monitor and Assessor's performance during 2018-19.

The Monitor and Assessor is also required to review any significant changes to the Tasmanian energy supply and demand balance and provide advice to the Minister for Energy to ensure that the framework for energy security remains appropriate.

The Act refers to energy security in the Tasmanian region of the NEM, which excludes the Bass Strait Islands. In most instances, such as in the assessment of energy in storage, references to Tasmania in this report are therefore to mainland Tasmania. Electricity supply on the Bass Strait Islands is the responsibility of Hydro Tasmania.

2 MONITOR AND ASSESSOR'S PERFORMANCE DURING 2018-19

As required under section 8C(2) of the Act, the Monitor and Assessor is to report on the performance of its functions and the exercise of its powers for the preceding 12 months. As the role of Monitor and Assessor was only established by statute in April 2019, these functions and powers were not in place over the full 2018-19 period. The account below includes the period when the Regulator operated as Monitor and Assessor before the legislation was enacted.

Below are the Monitor and Assessor's functions as set out under the Act, together with a report on the performance of each function for the preceding 12 months.

(a) to monitor and provide reports in relation to energy in storage and other sources of energy;

The Monitor and Assessor published monthly reports on Tasmanian's energy security on the Regulator's website in the first week of each month. These monthly reports set out Tasmania's energy in storage levels against the PSL and HRL together with the electricity generation mix for each month.

(b) to evaluate, on a monthly basis, whether there is sufficient energy in storage and associated generation capacity to meet forecast electricity demand in the Tasmanian region of the NEM;

The energy security monthly reports evaluated whether there was sufficient energy in storage and associated generation capacity to meet forecast electricity demand in the Tasmanian region of the NEM and whether any additional activity by the Monitor and Assessor was required, such as increased monitoring or whether a recovery plan was required.

(c) to require Hydro Tasmania to provide recovery plans and provide the Energy Security Co-ordinator with a copy of any recovery plan and the Monitor and Assessor's advice on the quality of the plan;

Under the Act, the Monitor and Assessor may require Hydro Tasmania to prepare a recovery plan if the level of energy in storage is below the PSL and the Regulator is of the opinion that it is reasonably possible that it will fall below the HRL. The Regulator must require Hydro Tasmania to prepare a recovery plan if the Regulator is of the opinion that it is probable that the level of energy in storage will fall below the HRL.

As energy in storage did not fall below the PSL during 2018-19, the Monitor and Assessor has not required Hydro Tasmania to provide a recovery plan.

(d) to notify the Co-ordinator when energy in storage levels are likely to drop below the HRL;

There was no time during 2018-19 when the Monitor and Assessor considered that energy in storage levels were likely to drop below the HRL.

(e) to monitor and evaluate the PSL and HRL and advise the Minister whether changes in the levels are required;

During 2018-19, in the Monitor and Assessor's opinion, the PSL and HRL did not require changing. The Monitor and Assessor is currently reviewing the PSL and HRL profiles due to the expected commencement, in early 2020, of two new large scale wind farms - the Granville Harbour and Cattle Hill wind farms.

(f) such other functions as may be prescribed.

No other functions have been prescribed.

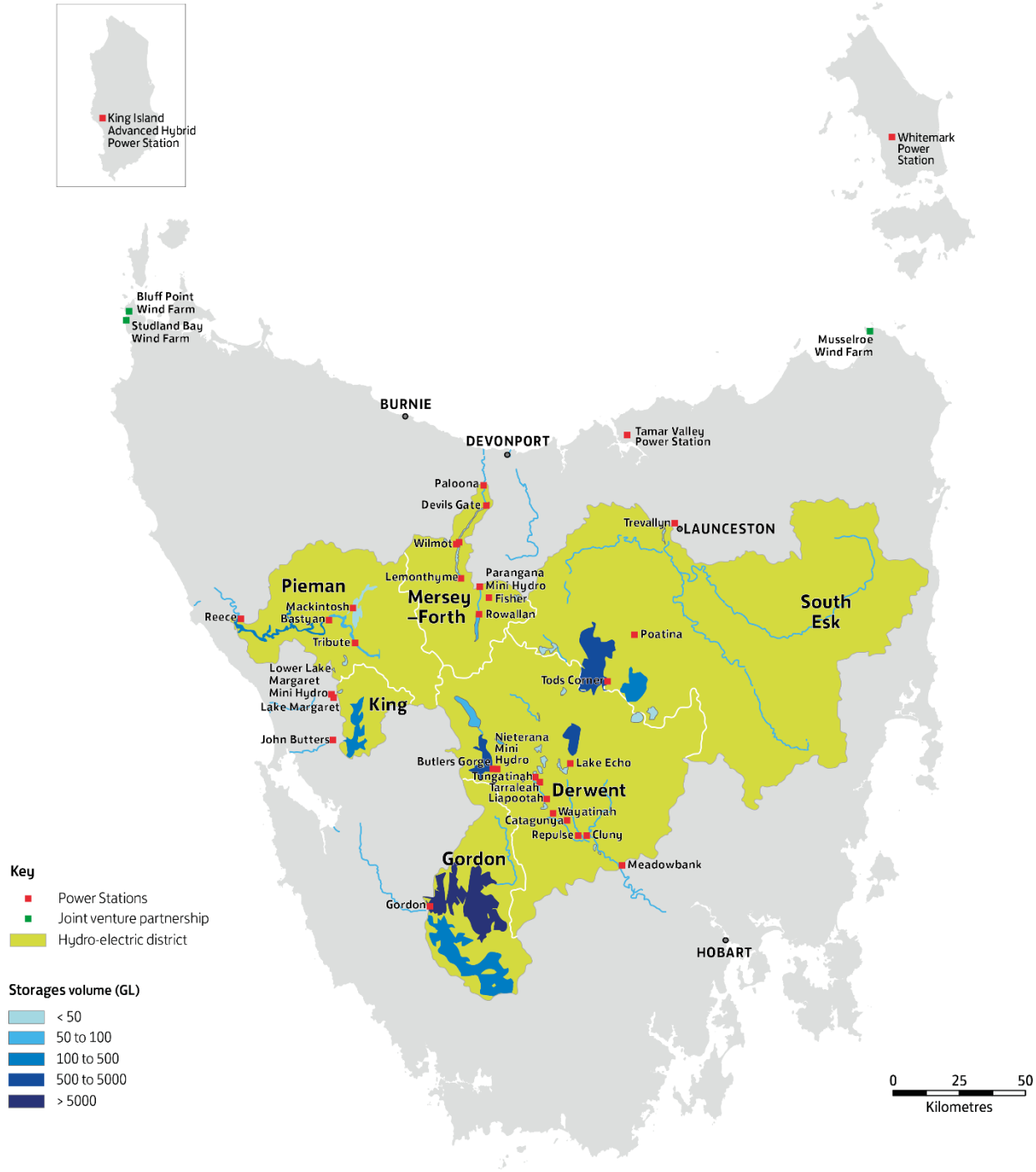
The Monitor and Assessor was not required to exercise any powers under the Act other than those necessary to perform the functions as set out above.

3 WATER YEAR 2018–19

3.1 Energy in Storage

Hydro Tasmania's hydro generation power stations are grouped into six separate catchment areas with total useable energy in storage equivalent to 14 437 GWh of electricity. The bulk of the energy in storage is contained in *yingina* / Great Lake and Lake Gordon/Lake Pedder.

Figure 1: Hydro Tasmania's catchment areas and power stations



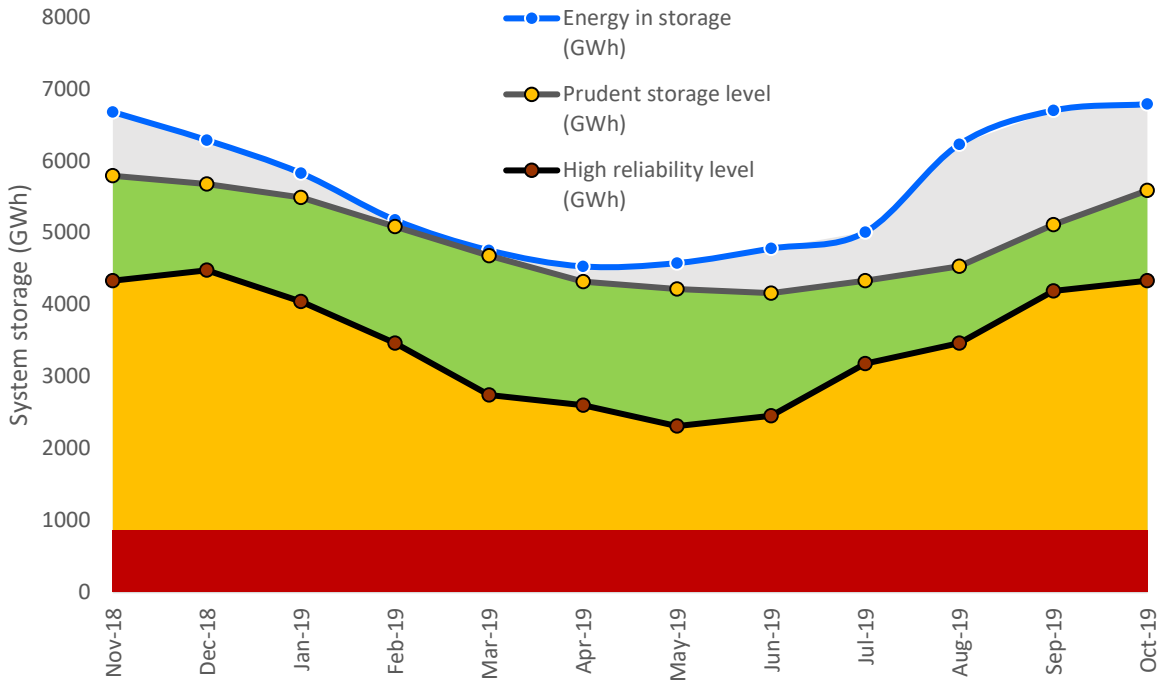
3.1.1 Storage level profiles

The HRL is a set of monthly storage levels, set from the beginning of each month, above which Tasmania could withstand a six-month Basslink outage, coinciding with very low inflows to energy in storage, without risk of unserved energy and while avoiding extreme environmental risk in *yingina* / Great Lake.[3]

The PSL incorporates additional storage above the HRL such that there is a low likelihood of energy in storage entering the HRL under normal operating conditions.

Figure 2 depicts the total energy in storage in Tasmania at the beginning of each month compared to the HRL and PSL set for that month, for the 2018-19 water year.

Figure 2: Energy in storage during the 2018-19 water year



As shown in Figure 2, monthly levels of energy in storage remained above the PSL over the 2018-19 water year. Energy in storage dropped to within 93 GWh and 76 GWh of the PSL at the beginning of February 2019 and March 2019 respectively. There were weeks in early 2019 when the level of energy in storage fell marginally below the PSL for that month, though water in storage levels were above the PSL by the beginning of the following month.

The 2018-19 water year ended on 31 October 2019. As at 4 November 2019, energy in storage was 6 609 GWh, representing 45.8 per cent of total usable energy in storage. This was approximately six percentage points above the PSL and almost 16 percentage points above the HRL.

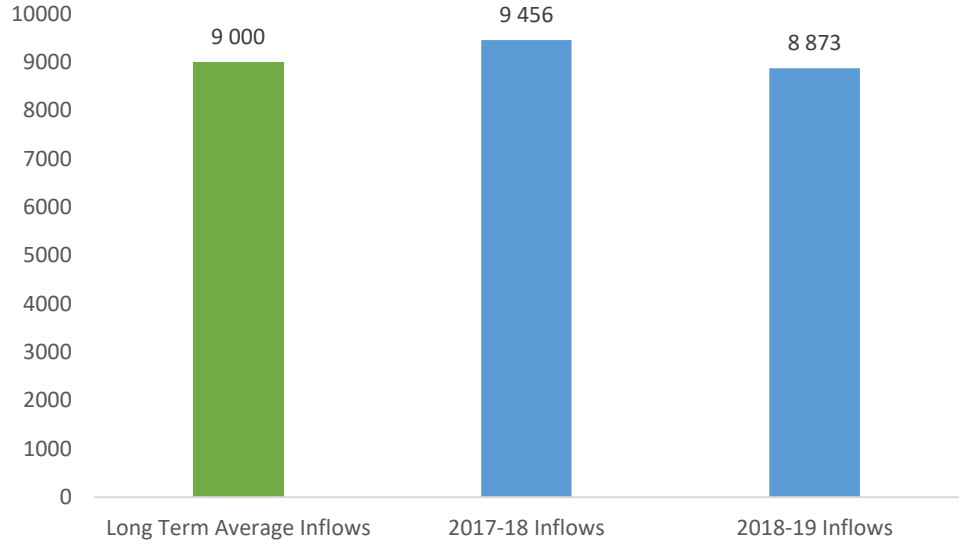
[3] Unserved energy is energy that is demanded by customers that cannot be supplied.

3.1.2 Inflows into Hydro Tasmania storages

Total inflow, or yield, for the 2018-19 water year was 8 873 GWh, which was six per cent lower than the 2017-18 level and one per cent below the long term average (Figure 3). From November 2018 to June 2019 (8 months) the inflows were close to historic averages. This was followed by a wetter than average July 2019. August returned to being close to average but September and October were drier than average.

When comparing inflows for the 2018-19 water year to the 2017-18 water year (1 November 2017 to 30 October 2018) the total yield in 2018-19 was around 580 GWh lower, with a monthly pattern of inflows similar to the 2017-18 water year.

Figure 3: Total inflows into Hydro Tasmania's storages (GWh)



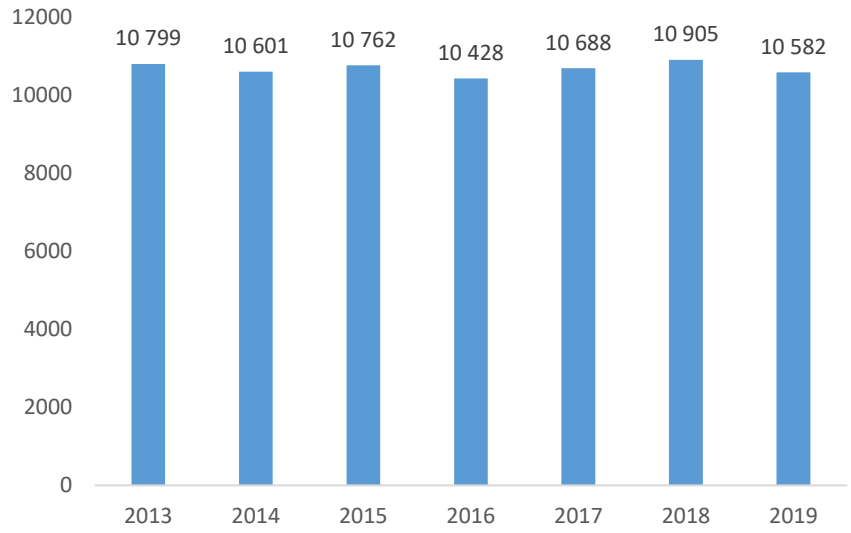
3.1.3 Demand

Tasmanian electricity demand is dominated by large industrial customers involved in industries such as metal smelting, mining and paper production. According to the Energy Security Taskforce, four large major industrial customers account for 54 per cent of the State's electricity load. Residential and business customers connected to the distribution network account for 19 per cent and 23 per cent of Tasmania's load respectively.[4]

Tasmanian demand for the 2018-19 water year was 10 582 GWh, representing a three per cent decrease on the 2017-18 water year (10 905 GWh). Year-to-year demand variations are due to several factors, including the weather in Tasmania and the changed demand from larger commercial and industrial customers. Tasmanian demand over the previous seven years has been stable, showing little variation around 10 600 GWh (Figure 4).

[4] Tasmanian Energy Security Taskforce Final Report, June 2017, page 83.

Figure 4: Tasmanian electricity demand (GWh), 12 months to 31 October (2012-13 to 2018-19)



3.1.4 Basslink

Basslink is a high voltage direct current electricity interconnector that connects the Tasmanian power system to the Victorian power system via transmission assets and transfer stations. Basslink allows the export of Tasmanian generated electricity into the NEM and the import of mainland generated power into Tasmania.

On 24 August 2019, a failure in the low voltage (metallic return) resulted in a Basslink outage until 29 September 2019. There was no impact on energy security in Tasmania as a result of this outage, as discussed below.

3.1.5 Electricity generation mix

Table 1 below shows the generation mix in Tasmania for the 2017-18 and 2018-19 water years.

Table 1: Tasmanian generation mix (GWh)

Generation source	2017-18	% of total	2018-19	% of total
Hydro	9 601	82.5%	8 859	83.1%
Wind	1 119	9.6%	1 140	10.7%
Gas	774	6.6%	481	4.5%
Distributed generation[5]	149	1.3%	177	1.7%

[5] Distributed generation includes solar, mini-hydro and small-scale wind.

Output from distributed generation systems reduces the requirement for generation from other sources. The table shows that distributed generation makes a small, but growing contribution to total generation in Tasmania.

Over the 2018-19 water year, hydro generation accounted for 83.1 per cent of total generation and wind provided 10.7 per cent of total generation. The share of generation from TVPS fell from 6.6 per cent in 2017-18 to 4.5 per cent in 2018-19.

Figure 5 shows the Tasmanian generation mix in 2018-19. Basslink was net exporting when total generation was above demand (generation above the green line) and net importing when total generation was less than demand (generation below the green line). The monthly volumes of imports and exports are presented in Figure 6.

Total electricity generation in Tasmania in 2018-19 was marginally below total Tasmanian demand, resulting in net imports via Basslink of 115 GWh, representing around one per cent of Tasmanian demand. By contrast, in 2017-18, generation in Tasmania exceeded demand, with net exports via Basslink of 556 GWh, the equivalent to around five per cent of Tasmanian demand in that year.

Figure 5 - Tasmanian generation mix and demand (GWh) over the 2018-19 water year

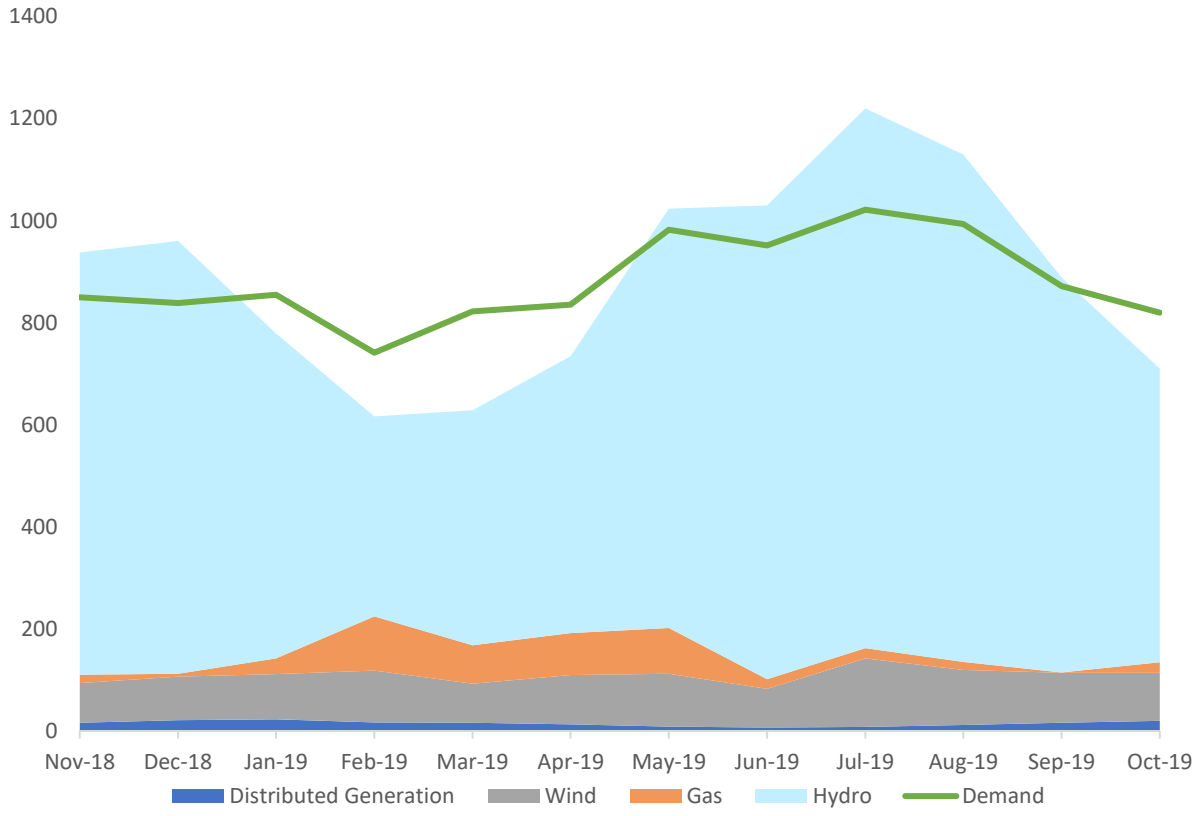
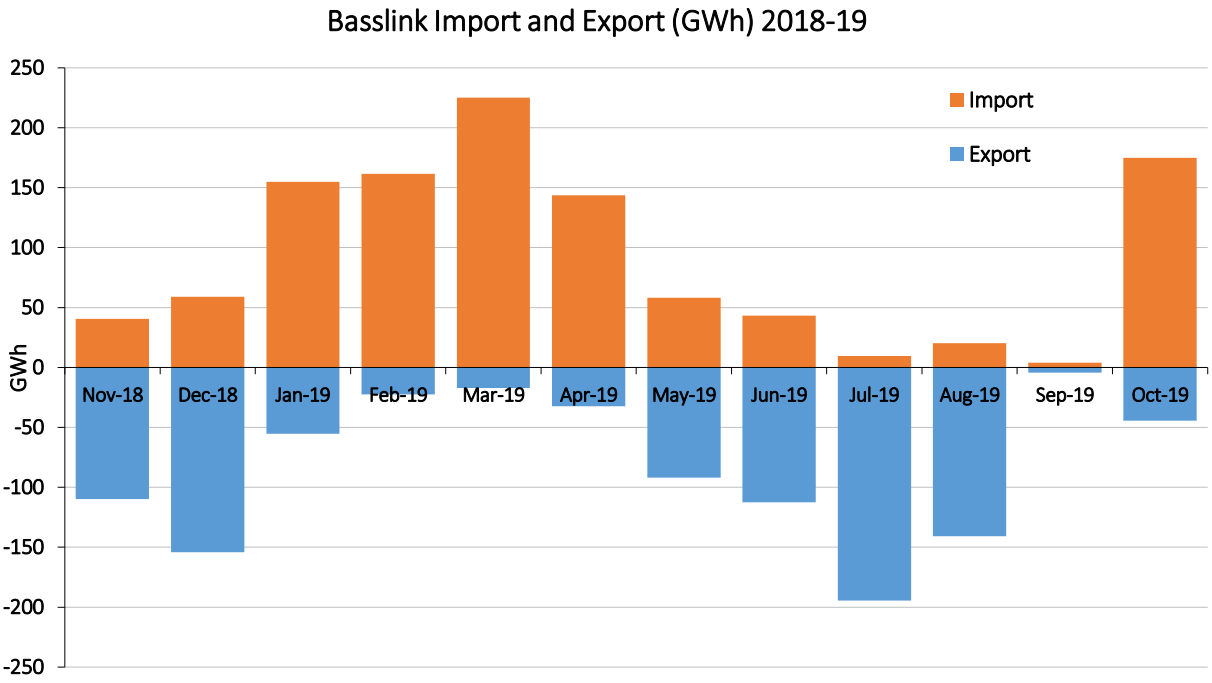


Figure 6 - Basslink Imports and Exports (GWh)



3.2 Discussion

At the start of the 2018-19 water year, the total energy in storage was 46.2 per cent of the maximum storage level, which was 6.2 percentage points above the PSL. This provided a sufficient buffer such that with the relatively low inflows in early 2019, energy in storage remained above the PSL, though only marginally above at the start of February 2019 and March 2019.

Energy in storage levels increased from March 2019 and stayed well above the PSL over the remainder of the 2018-19 water year. The 2019-20 water year has therefore commenced with water in storage levels comfortably above the PSL.

At the start of the Basslink outage on 24 August 2019, the energy in storage level was 14 percentage points above the PSL. There were high levels of inflows to Hydro Tasmania's storages over the five week period of the outage. As a result, Tasmania's energy supply remained secure over this period.

The Monitor and Assessor did not increase monitoring activities over 2018-19 and did not require Hydro Tasmania to prepare a recovery plan. The Monitor and Assessor was not therefore required to exercise any powers under the Act over 2018-19 other than those necessary under its regular monitoring functions.

4 ENERGY SECURITY OUTLOOK

4.1 Forecast Energy in Storage

Given the energy in storage at the start of the 2019-20 water year, the Monitor and Assessor considers that there is a very low likelihood that energy in storage will fall below the HRL in 2019-20, assuming average inflows to hydro storages.

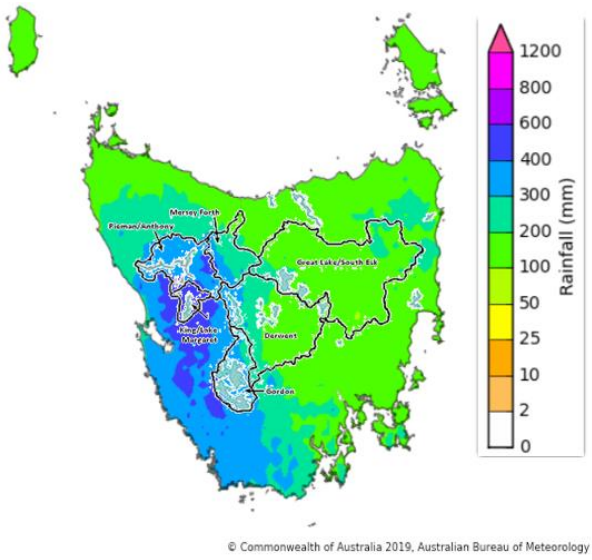
The Monitor and Assessor considers that energy in storage may fall below the PSL in 2019-20 but that if this does occur, it is likely to be for short periods only.

The following sections set out the basis for this assessment.

4.1.1 Forecast rainfall in Hydro Tasmania catchments

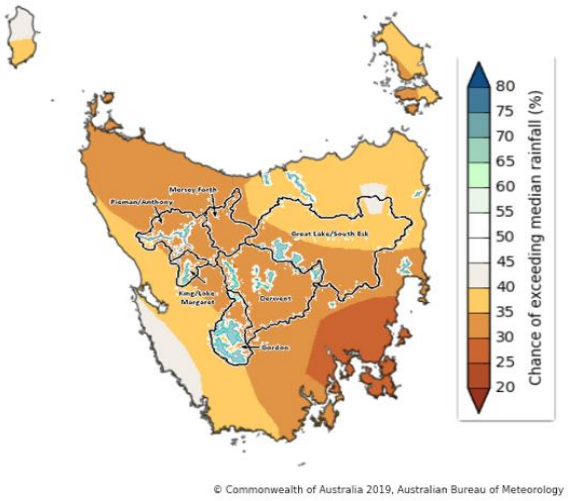
Figure 7 shows the median Tasmanian rainfall over the three-month period from December 2019 to February 2020, based on Bureau of Meteorology (BOM) observations from 1990 to 2012. Rainfall levels are consistently significantly higher in the western side of Tasmania, which is where the catchment areas for Hydro Tasmania's larger dams are located.

Figure 7 - Rainfall - Medians (1990-2012) for December 2019 to February 2020



The BOM makes an assessment whether Tasmanian rainfall is likely to be above or below the median levels over the following three month period. The most recent assessment, for the period from December 2019 to February 2020, is that rainfall is expected to be below the median level across the State (Figure 8).

Figure 8: Rainfall in Tasmania - the chance of above median levels from December 2019 to February 2020



4.1.2 Forecast demand

The most recent demand forecast from the Australian Energy Market Operator, prepared for the Electricity Statement of Opportunities which was released on 22 August 2019, forecasts Tasmanian native demand[6] to be around current levels in 2019-20 (10 634 GWh) and 2020-21 (10 690 GWh).

4.1.3 Tamar Valley Power Station

The Tamar Valley Power Station (TVPS) at Bell Bay provides diversity in Tasmania's energy mix. It contributes to Tasmania's energy security, though its importance has been decreasing with the development of wind generation in the State.

Hydro Tasmania owns and operates the TVPS, which is the only large thermal generator in Tasmania and is powered by gas supplied by the Tasmanian Gas Pipeline. The pipeline transports natural gas from the Longford Plant in Victoria to Bell Bay.

The TVPS consists of a combined cycle gas turbine (CCGT) generation plant with a 208 MW generating capacity and four open cycle gas turbine (OCGT) units with a combined generating capacity of 178 MW. Three of the OCGT units can also act as synchronous condensers[7] providing system control.

The CCGT is operated when, for Hydro Tasmania, it makes commercial sense to do so. When it is not in regular service Hydro Tasmania can return the CCGT to service at its discretion with less than three months' lead time. The OCGT units remain available at all times providing quick start generation capability.

As noted above, output from the TVPS accounted for 4.5 per cent of electricity generation in Tasmania over 2018-19. This represents a significant decline in output from the previous three years.

[6] Native demand is demand that is met by local scheduled, semi-scheduled, non-scheduled, and exempt generation, and by generation imports to the region, excluding the demand of local scheduled loads. Native demand only includes generation for which AEMO and the jurisdictional planning bodies receive sufficient information.

[7] A synchronous condenser is a large machine with a spinning shaft, electromechanically coupled to the grid, that can boost system strength and assist with voltage control and inertia https://energylive.aemo.com.au/Energy-Explained/Synchronous-condensers (accessed 19 November 2019).

In the event of a long-term interruption to gas supply in Tasmania, or a change in the mode of operation of the TVPS, the HRL and PSL profiles would need to be reviewed and possibly amended to reflect the revised gas generation volume.

4.1.4 Energy Supply Capability

This section compares the forecast available energy supply against the 12 month demand forecast for the 2019-20 water year. The assumptions underlying this approach are set out in Table 2.

Table 2: Energy supply capability assumptions for the 2019-20 water year

Parameter	Assumptions
Demand	10 653 GWh
Wind generation	1 330 GWh
Energy in storage above HRL at the start of 2019-20	2 278 GWh
Low inflow scenario	6 700 GWh
Basslink net imports under low inflow scenario	2 500 GWh
TVPS generation low inflow scenario	800 GWh
Average inflow scenario	9 000 GWh
Basslink net imports under average inflow scenario	1 000 GWH
TVPS generation average inflow scenario	600 GWh

Expected Tasmanian electricity demand for the 2019-20 water year is taken from AEMO's most recent demand forecast for the 2019-20 and 2020-21 financial years, adjusted pro rata for the 2019-20 water year.

Average hydro inflows are assumed to be 9 000 GWh per annum, which is the same as used in the Energy Security Taskforce's report, and is derived using data from 1997.[8] The low inflow scenario, at 6 700 GWh, is the mean inflow minus two standard deviations. This implies there is around a 97.5 per cent probability that the inflow in 2019-20 will be above the low inflow level.

Since the commissioning of the Musselroe Wind Farm, the lowest annual wind generation output for Tasmania has been 898 GWh and therefore 900 GWh had been assumed in the previous two annual

[8] Since 1997 there has been a clear shift downwards in annual average inflows into Tasmania's hydro-electric catchments.

reports on energy security. The wind generation assumption for 2019-20 has been adjusted to account for the two new large-scale wind farms currently under construction that are due to commence operating in Tasmania during 2020 - the Granville Harbour Wind Farm and the Cattle Hill Wind Farm.

As reported to the Monitor and Assessor, the expected annual generation, at full operation, for Granville Harbour Wind Farm is 400 GWh and, for Cattle Wind Farm, the expected annual generation is 463 GWh. It is assumed that by the end of October 2020, each wind farm will have produced around one half of its respective full annual output, which combined is around 430 GWh. Total wind generation is therefore assumed to be 1 330 GWh over the 2019-20 water year.

Average annual Basslink imports between 2010-11 and 2014-15 were around 1 000 GWh and this level has been assumed for the 2019-20 water year. This is equivalent to 228 MW of average imports across Basslink for 50 per cent of the year. The low inflow scenario assumes 2 500 GWh of Basslink imports, equivalent to 380 MW of average imports for 75 per cent of the year. Basslink has a long term average import capacity of around 450 MW.

Generation from the TVPS is assumed to be 600 GWh under the average inflow scenario from the CCGT in the summer months and the OCGT units throughout the year. This assumed level is below the average level in recent years and reflects higher gas prices and expected new wind generation in 2020. Under the low inflow scenario, TVPS output is assumed to be 800 GWh.

Generation from distributed generation systems such as solar PV and other behind the meter energy sources are not included. This is because the estimates of demand used in this report do not include consumption from distributed generation systems as the purchase of this energy is not from AEMO and is therefore not reported as being made via the NEM. As the absolute level of generation in Tasmania from distributed generation systems is relatively small, at an estimated 1.7 per cent of total generation, annual changes in output from distributed generation systems are not expected to have a material effect on overall energy security.

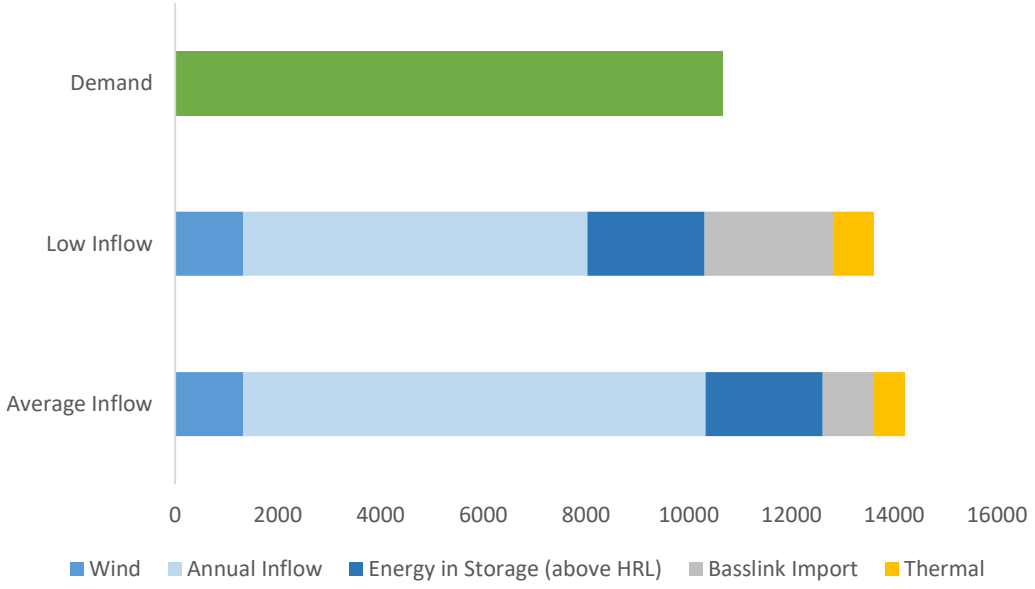
At the start of the 2019-20 water year energy in storage was around 2 278 GWh above the HRL. This represents additional energy supply capability that can be utilised without an unacceptable energy security risk. It is assumed that other sources of energy, as set out above, would be utilised before energy in storage fell to the HRL level.

The results are presented in Figure 9 below. Under both the low inflow and the average inflow scenarios, energy supply capability in Tasmania in 2019-20 is significantly above forecast demand. If rainfall levels in Tasmania over the next three months are below the median, as suggested by the BOM's assessments, this is not expected to have a significant impact on overall levels of energy security.

The likelihood that energy in storage would decline, over 2019-20, such that it would fall below the HRL is assessed as very low. On this basis, the overall level of energy security risk is assessed as very low.

It is more likely that energy in storage will fall below the PSL, which is substantially above the HRL, for short periods over 2019-20 depending on the monthly variability of inflows. This does not represent a serious risk to energy security provided there are sufficient options available to Hydro Tasmania to return energy in storage levels to above the PSL in the short to medium term.

Figure 9: Energy supply capability in Tasmania 2019-20 water year



4.2 Potential future developments

This section discusses potential future developments that may affect Tasmania's long term energy security.

4.2.1 New wind generation

There are additional large-scale wind projects proposed in addition to the Cattle Hill Wind Farm and the Granville Harbour Wind Farm. These include the Robbins Island wind farm with a generation capacity reported to be in the range of 400 MW to 1 000 MW. A further proposed project, the Jim's Plains Renewable Energy Park, is reported to consist of up to 160 MW of wind, battery storage and associated infrastructure[9].

Assuming the Robbins Island wind farm has a capacity of 1 000 MW and both Robbins Island and Jim's Plains wind farms generate 3.2 GWh per MW of capacity, these projects would together add more than 3 700 GWh to the State's expected wind generation output of 1 763 GWh once the Granville Harbour and Cattle Hill wind farms are in full operation. While the projects are likely to be focused on meeting demand for electricity in mainland Australia, they would also further reduce energy security risks in Tasmania.

It is expected that these and other new proposals are contingent on an additional interconnector from Tasmania to Victoria, as discussed below.

[9] https://robbinsislandwindfarm.com/about/ (accessed 19 November 2019).

4.2.2 Project Marinus/Marinus Link

The NEM is changing as new renewable energy generation infrastructure replaces ageing, coal-fired infrastructure. Marinus Link is a proposed 1 500 MW capacity undersea electricity connection that would provide a second link between Tasmania and Victoria and provide substantially increased opportunities for renewable energy from Tasmania to contribute to meeting energy demand in mainland Australia.

This represents a much larger capacity than Basslink (nominal rating of 500 MW). The effect of a link such as the Marinus Link is that the Victorian and Tasmanian electricity markets would be much more closely integrated than they currently are. As Basslink will continue to operate, the total capacity of the two interconnectors could exceed the maximum demand level in Tasmania, which would allow all of Tasmania's demand to be satisfied from imported energy. Alternatively, this would allow for substantially more exports into the mainland regions of the NEM.

TasNetworks is currently assessing the project's viability with a Business Case Assessment Report scheduled for release in December 2019.[10] The feasibility and business case assessment phase of Marinus has received $20 million in funding support from the Tasmanian Government through TasNetworks and the Commonwealth Government through the Australian Renewable Energy Agency (ARENA).

The Commonwealth Government has provided $56 million to progress the project into the Design and Approvals phase. It is reported that if the Marinus Link is constructed, this is more likely to be after 2025 than in the next few years. A key issue for Project Marinus is appropriately allocating costs to those regions of the NEM who are expected to benefit from Marinus' operation.

The Monitor and Assessor will continue to monitor the project's development and its likely impact on Tasmania's energy security.

4.2.3 Battery of the Nation

Battery of the Nation is a suite of projects being developed by Hydro Tasmania to examine how Tasmania's hydroelectric power system can be redeployed and augmented with pumped hydro energy storage to meet the needs of the transitioning national power system.

Hydro Tasmania has stated that Tasmania's existing hydropower assets can play a system balancing role, maximising the value of new variable renewable energy developments while providing a new supply of secure and firm electricity to mainland Australia. Hydro Tasmania considers that this value could be amplified by targeted investment in pumped hydro technology which increases system controllability as new assets may be complementary in a national market with substantial variable wind and solar generation. Hydro Tasmania also stated that Tasmania's wind resource is relatively untapped and could bring substantial diversity to the national market and that with further interconnection and a sound development plan, Tasmania could produce significantly more renewable energy for the nation and more fully realise the value of its current hydropower system.[11]

Hydro Tasmania further states that new on-island wind generation and more interconnection to the mainland would mean secure long term electricity supply for Tasmania. Hydro Tasmania also considers that the project would diversify Tasmania's supply options and reduce direct exposure to climate change

[10] https://www.marinuslink.com.au/

[11] Hydro Tasmania's "Battery of the Nation: Analysis of the future National Electricity Market, April 2018" report https://www.hydro.com.au/docs/default-source/clean-energy/battery-of-the-nation/future-state-nem-analysis-executive-summary.pdf?sfvrsn=205ce928_0

variability, particularly relating to rainfall.[12] These projects are dependent on the Marinus Link being commissioned.

The Monitor and Assessor will continue to monitor the project's development and its impact on energy security.

4.3 PSL and HRL assessment

This section provides a review of the Tasmanian energy supply and demand balance to assess whether the HRL and PSL remain set at the appropriate level for the coming water year.

Table 3 shows the conditions, as recommended by the Energy Security Taskforce, for the Monitor and Assessor to commence a review of the profiles and a short comment on the status of each factor.

Table 3: Review of the Tasmanian energy supply and demand balance

Supply and demand balance factors	Assessment
The connection of material new generation sources in the Tasmanian region of the NEM equivalent to two per cent (around 300 GWh) of total energy in storage or greater.	As mentioned in section 3.2.1, new wind generation projects are scheduled to commence commercial operation in the 2019-20 water year. The Monitor and Assessor is currently assessing the impact of these new wind farms on generation in the Tasmanian NEM region and has commenced a review of the PSL/HRL profiles.
The material reduction or increase (+/-500 GWh) of the current Tasmanian demand forecast (10 600 GWh average) as reported by AEMO.	AEMO's latest demand forecast prepared for the Electricity Statement of Opportunities forecasts Tasmanian Native Demand of 10 634 GWh for 2019-20 and 10 690 GWh for 2020-21, which is very close to current levels.
A material permanent change in interconnector import capacity (+/-100 MW).	There has been no material change of +/-100 MW to the interconnector's import capacity.
A long-term (six months or greater) unplanned outage of either of the Gordon or Poatina Power Stations in their respective entireties.	Gordon and Poatina Power Stations remain fully operational.

4.4 Natural gas

Tasmania's demand for natural gas is significantly below the demand for electricity, at around 10 petajoules (PJ) per year in 2017-18 according to AEMO's most recent *2019 Gas Statement of*

[12] Hydro Tasmania's "Battery of the Nation: Analysis of the future National Electricity Market, April 2018" report https://www.hydro.com.au/docs/default-source/clean-energy/battery-of-the-nation/future-state-nem-analysis-executive-summary.pdf?sfvrsn=205ce928_0

Opportunities, released in March 2019. This gas, supplied from Victoria, is the equivalent of 2 780 GWh or around 26 per cent of electricity demand in Tasmania.

Natural gas is, however, an important energy source in Tasmania. According to AEMO, in 2017-18 around eight per cent of gas was used by residential and commercial customers, 51 per cent was used by industrial customers and around 41 per cent was used by TVPS. Demand in Tasmania is less sensitive to weather than in mainland jurisdictions as there is proportionally higher demand from large industrial customers.

AEMO is forecasting little change in the demand for natural gas in Tasmania in the years ahead, with the possibility of a slight decline primarily due to the impact of the projected price increases on industrial consumption. Natural gas demand is heavily influenced by the level of gas-fired generation at TVPS. AEMO estimates that the CCGT could be expected to consume between 3 PJ and 7 PJ if returned to service again to operate over a summer season.

AEMO considers that supply from existing and committed gas developments is forecast to provide adequate supply to meet gas demands nationally until 2023. AEMO has not identified any major risks to natural supply in south-east Australia over the short to medium term. On average, over the past five years, gas from the Victorian gas basins has supplied around 150 PJ per year to Tasmania, New South Wales, and South Australia.

The Monitor and Assessor considers that, given Tasmania's relatively small share of this total supply, it is not expected that Tasmania will face energy security issues in the natural gas market in the short to medium term.

A potentially more significant issue in Tasmania is the increase in natural gas prices, as they converge to export parity prices. AEMO reports that although commodity gas prices have fallen in recent months, prices offered by retailers to industrial users remain on average higher than commodity gas prices previously charged by gas producers.