

ANNUAL ENERGY SECURITY REVIEW 2017–18

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TABLE OF CONTENTS

EXECUTIVE SUMMARY.....5

KEY STATISTICS6

1 INTRODUCTION7

2 WATER YEAR 2017–188

3 ENERGY SECURITY OUTLOOK..... 14

APPENDIX A: BACKGROUND..... 21

APPENDIX B: TERMS OF REFERENCE..... 27

EXECUTIVE SUMMARY

This report is the second Annual Energy Security Review prepared and published by the Tasmanian Economic Regulator (TER) in accordance with Terms of Reference issued by the Tasmanian Government on 24 October 2017. The report contains a review of the most recent water year (2017-18) and an assessment of the forthcoming water year (2018-19)¹.

The analysis in this report indicates that Tasmania's available energy supply will be sufficient to meet demand over the coming 12 months. Based on current inflow assumptions for Tasmanian hydro storages, on-island hydro and wind generation will be able to meet Tasmanian demand in the event of a temporary loss of the Tamar Valley Power Station (TVPS) generation or Basslink outage. Readers should note, however, that commercial decisions made by Hydro Tasmania will determine actual electricity generation sources used throughout the year.

Energy in storage remained above the Prudent Storage Level (PSL) throughout the 2017-18 water year with 6 623 GWh in storage at the end of the water year (representing 46 per cent of total usable energy in storage and six per cent above the PSL).

Large-scale wind projects in Tasmania that have met AEMO's commitment criteria are expected to deliver an additional 256MW of on-island generation and to have a positive impact on Tasmania's energy security during the 2019-20 water year.

During the 2017-18 water year, Hydro Tasmania was unable to export or import for around two and a half months due to a Basslink outage. Given energy in storage was above the PSL at the start of the outage, and the above average inflows that occurred during the outage, Tasmania's energy supply remained secure. The water storage position during the water year also meant that Hydro Tasmania only operated the TVPS generation units for commercial reasons and testing following scheduled maintenance of the Combined Cycle Gas Turbine (CCGT) in August 2018.

Gas transportation arrangements between Hydro Tasmania and Tasmanian Gas Pipeline Pty Ltd (TGP) were finalised through arbitration in May 2018. The outcome secures ongoing access to the pipeline for the TVPS and Hydro Tasmania's wholesale gas customers for the next four years. Also, the Australian Energy Market Operator (AEMO) and the Australian Competition and Consumer Commission (ACCC) have concluded that there would be sufficient supply in the east coast gas market for 2019.

The Monitor and Assessor does not propose any changes to the PSL and High Reliability Level (HRL) as there have been no material changes in supply or demand.

¹ The Monitor and Assessor Functional Specification, developed by the Tasmanian Energy Security Taskforce, stated that timing of the Monitor and Assessor's outputs should be structured around a "water year" commencing at the end of the winter/wet period in Tasmania (ie beginning of November).

KEY STATISTICS

Key statistics for the water year (1 November to 31 October) in GWh²

	2016-17	2017-18
Energy in storage (as at end of water year)	6 766	6 623
Total inflow to Hydro Tasmania's storages	8 604	9 456
Tasmanian demand	10 688	10 905
Hydro generation	8 274	9 601
Wind generation	1 056	1 119
Gas generation	915	774
Solar generation	131	149
Basslink import	1 422	812
Basslink export	964	1 368

² Sources: Energy in storage and inflow data were sourced from Hydro Tasmania. Demand and generation data were sourced from NEM Sight and AEMO.

I INTRODUCTION

Electricity generation in 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.

The Tasmanian Government has in place an Energy Security Risk Response Framework (see Appendix A). Under this Framework, the TER has the role of Energy Security Monitor and Assessor. The Monitor and Assessor provides an additional layer of public reporting on energy security levels. This public reporting includes this annual report and monthly reports (or “dashboards”). This report contains a review of the most recent water year and an assessment of the forthcoming water year.

The Government is currently preparing a bill to amend the *Energy Co-ordination and Planning Act 1995* to include the roles and responsibilities of the Monitor and Assessor. In the meantime, the Monitor and Assessor’s reporting role is set out in *Terms of Reference - Reporting of the Monitor and Assessor* (Terms of Reference, see Appendix B). The Treasurer has requested that special reports under section 9 of the *Electricity Supply Industry Act 1995* be prepared and published in accordance with the Terms of Reference.

The Monitor and Assessor has a role in:

- monitoring energy in storage and informing the Energy Security Coordinator when energy in storage is expected to fall (or actually falls) below predefined levels; and
- providing advice to the Energy Security Coordinator on the adequacy of Hydro Tasmania’s plans to bring energy in storage back to higher levels.

The Director of Energy Planning has been given the role of Energy Security Coordinator and is supported by the Department of State Growth. The Energy Security Coordinator is expected to play an important role if energy in storage drops below predefined levels and there is a need for a coordinated response by all market participants.

The Monitor and Assessor is also required to monitor 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.

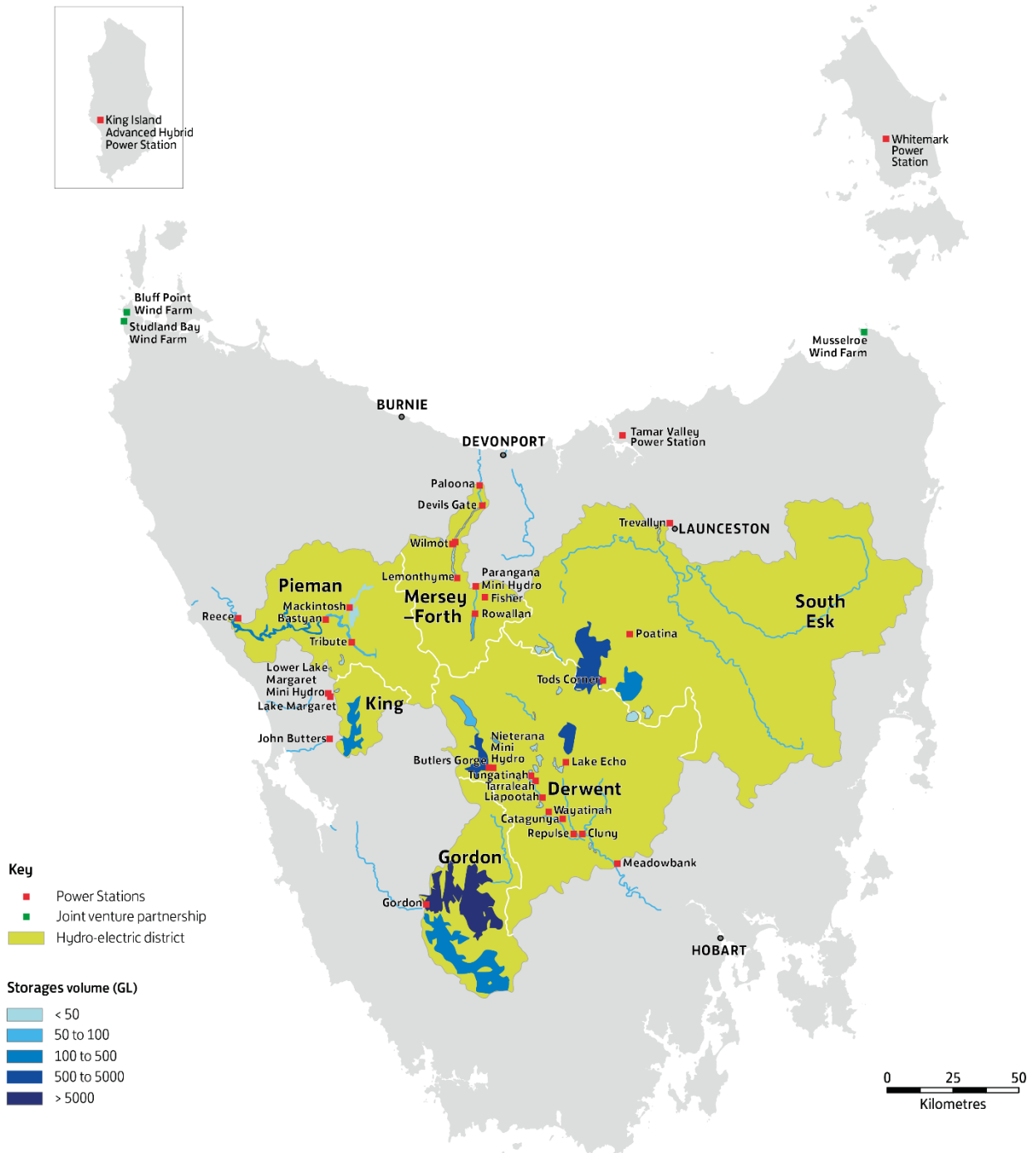
It should be noted that the Monitor and Assessor does not have the power to compel entities to take action to address supply shortfalls. It is predominantly an information gathering and sharing role with the capacity to provide advice to the Energy Security Coordinator and Minister for Energy.

2 WATER YEAR 2017-18

2.1 Energy in Storage

Hydro Tasmania's 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

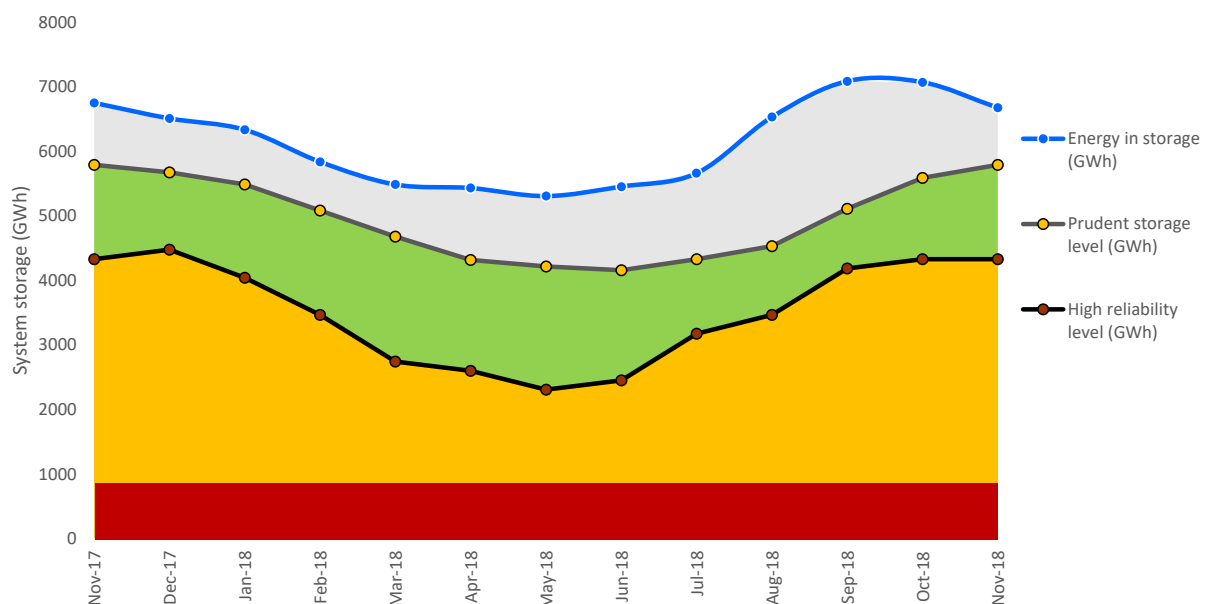


Under the Government’s Energy Security Framework (see Appendix A), the Monitor and Assessor and the Energy Security Coordinator have various roles depending on the amount of energy in storage, and its likely trend in coming months, relative to the PSL and HRL.

The HRL is a set of independent monthly storage levels above which Tasmania could withstand a six-month Basslink outage (coinciding with very low inflows to energy in storage) without risk of unserved energy, while avoiding extreme environmental risk in *yingina* / Great Lake.³ The PSL is a “storage buffer” above the HRL representing an energy in storage profile under average supply and demand conditions, which would allow energy in storage to remain above the HRL in the event of a historically low 3-month inflow sequence.

Figure 2 depicts the total energy in storage in Tasmania compared to the HRL and PSL for the 2017-18 water year.

Figure 2 - Energy in storage during the 2017-18 water year



As shown in Figure 2, energy in storage remained above the Prudent Storage Level (PSL) throughout the 2017-18 water year with 6 623 GWh in storage at the end of the water year (representing 46 per cent of total usable energy in storage and six per cent above the PSL).

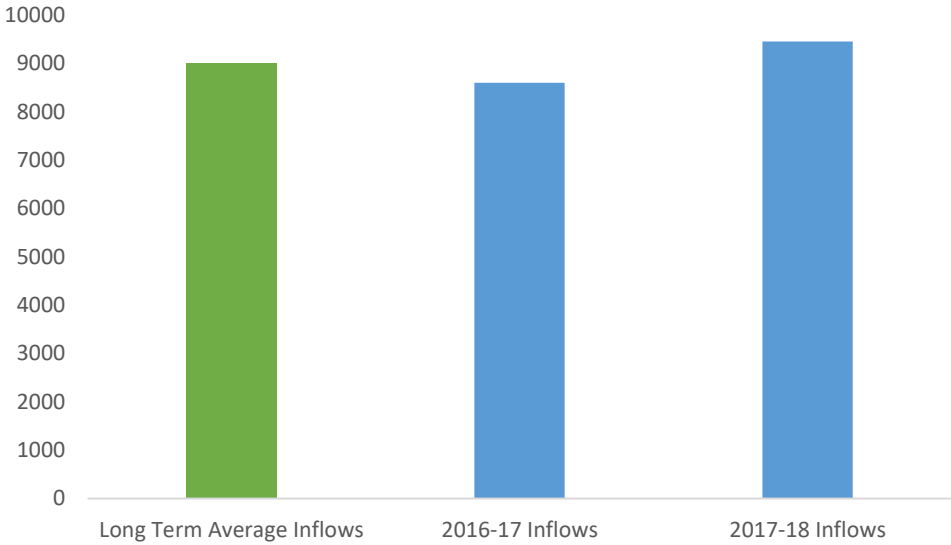
2.1.1 Inflows into Hydro Tasmania storages

Figure 3 shows that total inflow, or yield, for the 2017-18 water year was 9 456 GWh, which is 10 per cent higher than the 2016-17 level and five per cent above the long term average.⁴ Inflows were below average from November 2017 to January 2018 and from September 2018 to October 2018 and above average from February 2018 to August 2018.

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

⁴ The Energy Security Taskforce Final Report states that, since 1997, there has been a clear shift downwards in annual average inflows into Tasmania’s hydroelectric catchments. The Taskforce derived an average annual inflow of 9 000 GWh using data from 1996 onward.

Figure 3 - Total inflows into Hydro Tasmania’s storages (GWh)



2.1.2 Demand

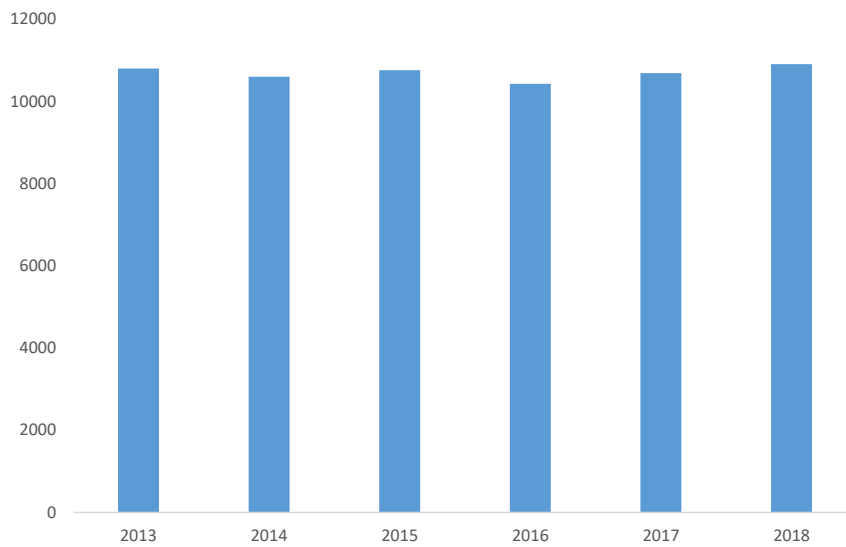
Tasmanian electricity demand is dominated by large industrial customers involved in industries such as metal smelting, mining and paper production. According to the Energy Security Taskforce, four large major industrial customers account for 54 per cent of the State’s electricity load with a further four per cent of load accounted for by customers connected directly to the transmission network. Residential and business customers connected to the distribution network represent 19 per cent and 23 per cent of Tasmania’s load respectively.⁵ This situation poses risks to the supply and demand balance given the high percentage of electricity consumed by a small number of customers.

Tasmanian demand for the 2017-18 water year was 10 905 GWh, representing a two per cent increase on the 2016-17 water year (10 688 GWh). Year-to-year demand variations are reflective of several factors, including the weather in Tasmania.

As shown in Figure 4, Tasmanian demand over the previous five years has been stable, fluctuating only slightly around 10 600 GWh.

⁵ Tasmanian Energy Security Taskforce Final Report, June 2017, page 83.

Figure 4 - Tasmanian demand history - 12 months to 31 October (GWh)



2.1.3 Generation mix

Table 1 below shows the generation mix for Tasmania for the 2017-18 water year.

Table 1 - Tasmanian generation mix (GWh)

Generation mix	2016-17	% of total	2017-18	% of total
Hydro	8 274	70%	9 601	77%
Wind	1 056	9%	1 119	9%
Gas	915	8%	774	6%
Basslink import	1 422	12%	812	7%
Solar	131	1%	149	1%

It is noted that solar generation output reduces the demand on other generation sources. While a very small part of the current generation mix, it continues to grow.

Table 1 shows that, over the 2017-18 water year, wind provided roughly nine per cent of total generation and hydro generation provided around 77 per cent of total generation. Market conditions led to the use of TVPS (six per cent of generation) and Basslink imports (seven per cent of generation) to supplement Tasmanian generation for a significant portion of the year, mostly between November 2017 and May 2018.

In Figures 5 and 6, a period of significant Basslink export can be seen (generation above the green line) between June 2018 and September 2018, concurrent with above average inflows to hydro storages.

Figure 5 - Tasmanian generation mix (GWh)

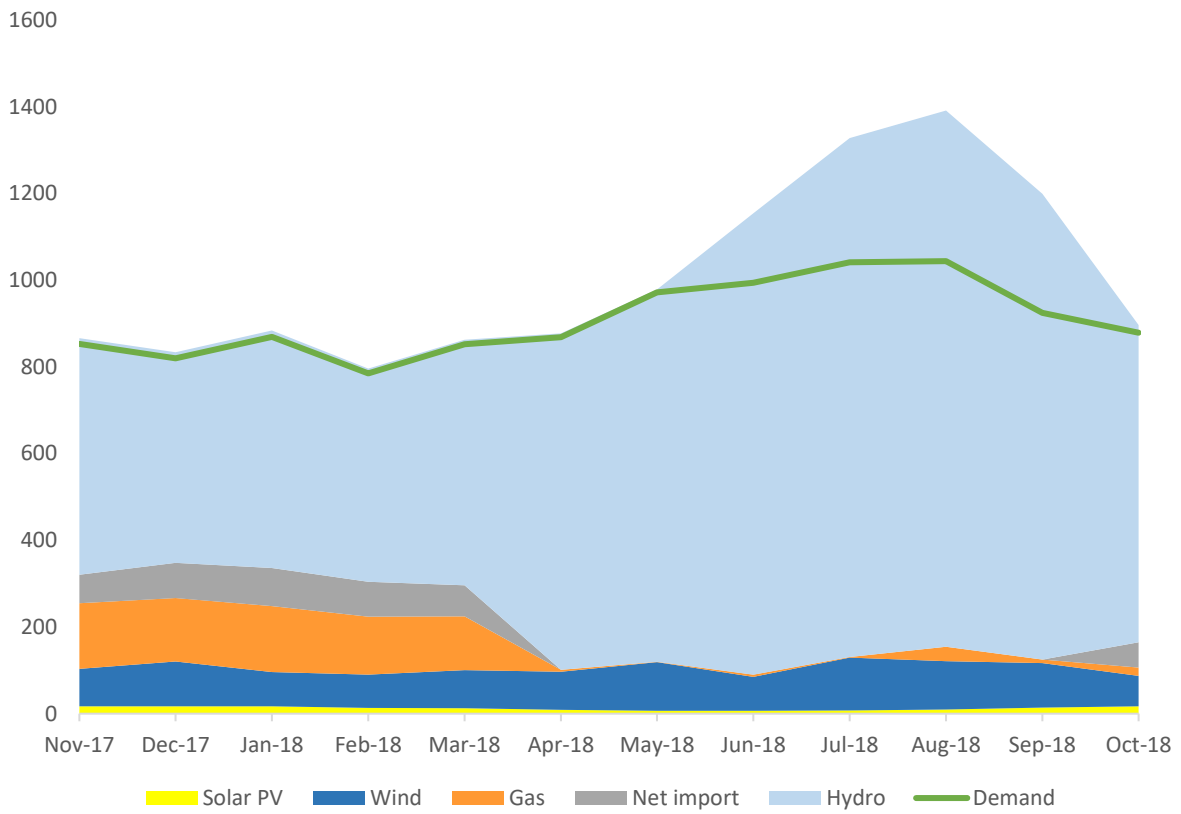
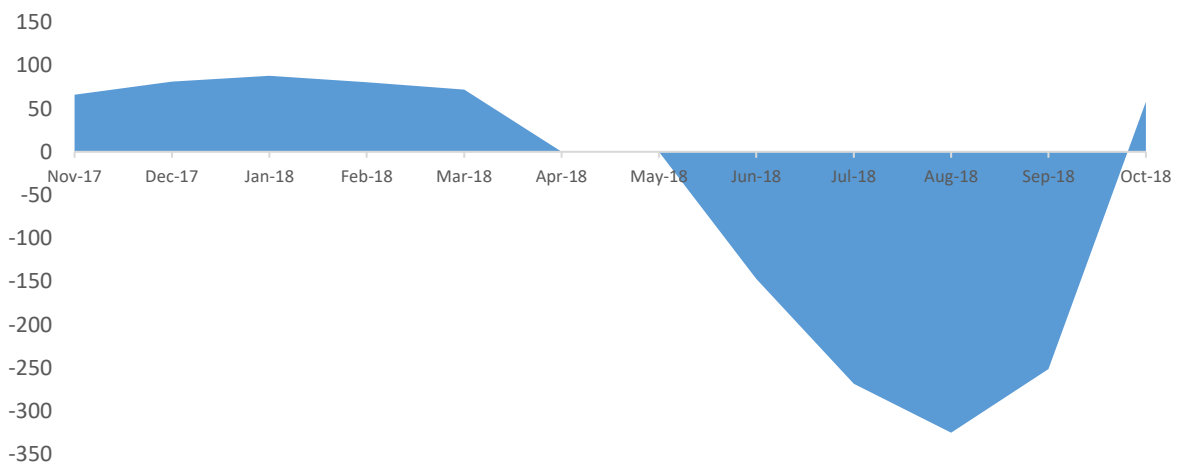


Figure 6 - Basslink flow (GWh)



2.1.4 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 Pty Ltd (BPL) is the owner, operator and maintainer of the Basslink infrastructure. The Regulator does not regulate BPL, but licenses BPL as a transmission service provider. Basslink allows the export of Tasmanian generated electricity into the NEM and the import of mainland generated power into Tasmania.

According to technical specifications, the Basslink undersea cable is designed to be operated at a continuous export rating of 500MW or at 630MW for limited periods. In December 2017, BPL announced that it would not operate the interconnector above the continuous rating of 500MW. This decision does not affect Tasmania's energy security since Basslink's maximum import rate is 480MW and the decision only relates to Basslink's operations while exporting.

According to BPL, on 24 March 2018, during routine maintenance at the transition station in Victoria, a third-party contractor damaged a piece of equipment. The damaged equipment was unique and required expertise and equipment from overseas for repair before the interconnector could recommence operations. Basslink recommenced operations on 5 June 2018.

2.2 Discussion

At the start of the 2017-18 water year, the total energy in storage was above the PSL and continued to track above the PSL to be four percentage points above the PSL at the start of the Basslink outage on 24 March 2018 (at 36 per cent of total energy in storage).

Due to the Basslink outage, Hydro Tasmania could not export or import for around two and a half months. However, as mentioned above, the PSL is a buffer above the HRL while the HRL represents monthly storage levels above which Tasmania could withstand a six-month Basslink outage (coinciding with very low inflows) without risk of unserved energy or avoid extreme environmental risk in *yingina* / Great Lake. Given energy in storage was above the PSL at the start of the outage, and the above average inflows that occurred during the period of the outage, Tasmania's energy supply remained secure.

Output from the TVPS represented only six per cent of generation for the 2017-18 water year. Given the water storage position, Hydro Tasmania only operated the TVPS generation units for commercial reasons and testing following scheduled maintenance of the CCGT in August 2018.

3 ENERGY SECURITY OUTLOOK

3.1 Forecast Energy in Storage

Hydro Tasmania has advised the Monitor and Assessor that, based on the current energy in storage, and assuming average inflows to hydro storages, Tasmanian energy in storage should remain above the HRL over the next 12 months.

3.1.1 Forecast rainfall in Hydro Tasmania catchments

Figure 7 shows the median Tasmanian rainfall over the coming three-month period based on Bureau of Meteorology (BOM) observations from 1990 to 2012.

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

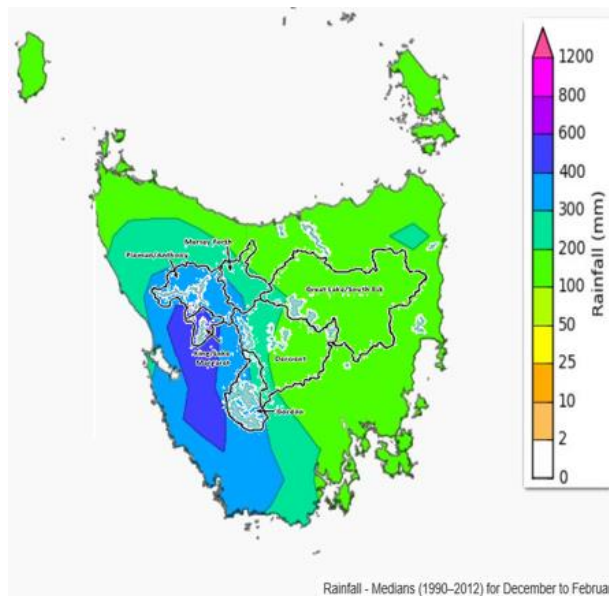
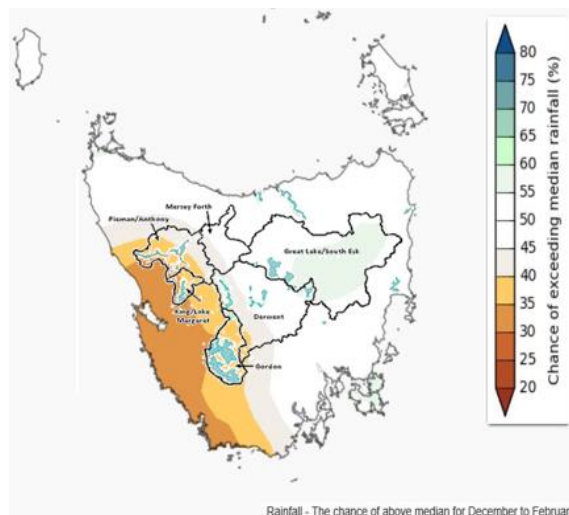


Figure 8 shows the BOM forecast of Tasmanian rainfall exceeding the median over the next three months. On this chart, areas above 50 per cent are likely to receive above average rainfall while those below 50 per cent are likely to receive below average rainfall.

Figure 8 - Rainfall - the chance of above median for December to February

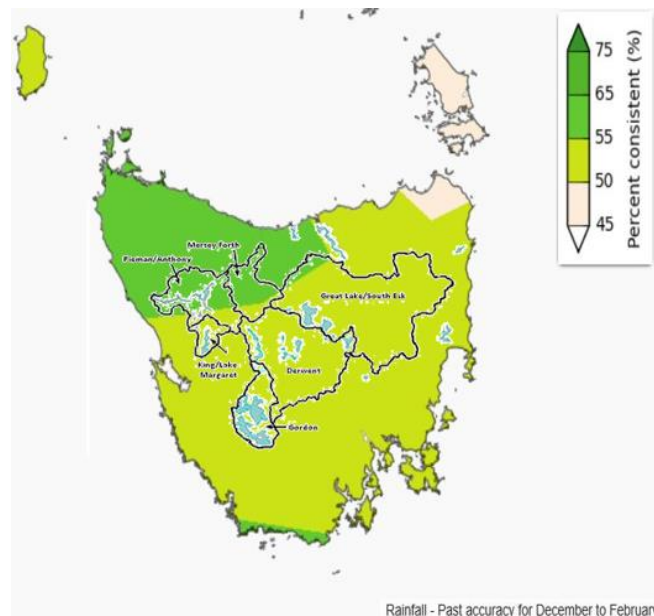


The BOM's summer climate outlook (December 2018 to February 2019) issued 15 November 2018 indicates that western Tasmania and scattered parts of central Australia and Queensland are likely to be drier than a normal summer period. December is also likely to be drier than average in northern Western Australia and western Tasmania.

Development towards El Niño in the tropical Pacific Ocean continues, with outlooks suggesting El Niño conditions are likely through the summer months. However, El Niño typically has a weaker influence in the current drought areas of south eastern Australia during summer than it does in winter and spring.

A positive Indian Ocean Dipole (IOD) is currently underway and driving dry conditions in southeast Australia. However, models expect the positive IOD to follow its normal seasonal cycle, and decay in November or early December. The outlook accuracy for Tasmania is depicted below in Figure 9.

Figure 9 - Rainfall - past accuracy for December to February



3.1.2 Forecast demand

AEMO's latest demand forecast prepared for the Electricity Statement of Opportunities (ESOO), released on 24 August 2018, forecasts Tasmanian Native Demand of 10 846 GWh for 2018-19 and 10 879 GWh for 2019-20.

AEMO stated that, with limited forecast growth in rooftop PV, operational electricity consumption is forecast to increase slightly in the short term in Tasmania, driven by projected increased business consumption, mainly from the manufacturing sector.

3.1.3 Natural gas

The TVPS at Bell Bay is an important contributor to Tasmania's overall energy security due to its capacity to provide backup gas-powered generation (GPG) that can replace, or slow, the use of energy in storage. In the event of a long-term interruption to gas supply in Tasmania, adjustments would need to be made to the HRL and PSL profiles.

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 CCGT with a 208 MW generating capacity and four OCGT units with a current combined peak generating capacity of 158 MW. The base-load CCGT is available for operation at short notice. The CCGT usually only operates over summer and autumn when water storages are declining, while the OCGT will remain available at all times providing quick start generation capability. Three of the OCGT units can also act as a synchronous condenser providing system control.

On 2 May 2018, Hydro Tasmania announced that the Arbitrator of the gas transportation arrangements between Hydro Tasmania and Tasmanian Gas Pipeline Pty Ltd (TGP) had reached a determination. The outcome secures ongoing access to the pipeline for the TVPS and Hydro Tasmania's wholesale gas customers for the next four years. Since 31 December 2017, interim arrangements have been in place for those customers, at the direction of the Arbitrator.

AEMO's 2018 Gas Statement of Opportunities (GSOO) assesses the adequacy of eastern and south-eastern Australian gas markets to supply forecast maximum demand and annual consumption over a 20-year outlook. Information relevant to gas supplied by the Tasmanian Gas Pipeline is set out below.

AEMO stated that the eastern and south-eastern Australian gas markets have been irrevocably changed by liquefied natural gas (LNG) exports and the subsequent coupling of the Australian gas market to international markets. The scale of gas sent for export has led to a tightening of domestic supply.

One of the major changes for the Australian gas industry in 2017 was the Commonwealth Government's introduction of the Australian Domestic Gas Security Mechanism (ADGSM), under which the Commonwealth Minister for Resources can determine whether export restrictions should be imposed to avoid any potential shortfall in meeting domestic demand for gas.

Also in 2017, gas producers and pipeline operators made a commitment to the Commonwealth Government to make gas supply available to electricity generators during peak demand periods. The Gas Supply Guarantee mechanism has been developed by industry to facilitate the delivery of these commitments. While the ADGSM is intended to provide means to manage the risks of annual domestic energy balance, the Gas Supply Guarantee mechanism is directed to short-term deliverability and supply issues for GPG and as such is most appropriate to address operational risks or major unplanned events.

AEMO reported that under the current production and demand scenario, there will be no shortfall in the Australian east coast gas market till 2030. AEMO also reported that the Northern Gas Pipeline is expected to be online by December 2018, helping further increase supply available to eastern and south-eastern gas markets by connecting the Northern Territory gas supply to Queensland. Increased commitments to develop alternative electricity generation sources reduces the need for high volumes of GPG of electricity in the National Electricity Market. However, risks remain that natural variances in weather-driven consumption and GPG could increase gas demand and tighten the supply-demand balance.

The Commonwealth Department of Industry, Innovation and Science stated that export restrictions are not necessary to ensure gas supply security in 2019. A new Heads of Agreement was made between the Australian Government and east coast LNG exporters on 28 September 2018 to maintain a secure supply of gas to east coast gas users for 2019 and 2020. This agreement confirms the industry's commitment to providing uncontracted gas to the east coast domestic market in the event of a shortfall and has meant that the ADGSM has not been required since its introduction. The Department also cited the ACCC's latest interim report of its Gas Inquiry 2017-2020 which confirmed that there would be sufficient supply in the east coast gas market for 2019.

3.1.4 Energy Supply Capability

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

Table 2 - Energy supply capability assumptions

Parameter	Assumptions
Demand	10 857 (pro rata AEMO ESOO FYE19 and FYE20 native demand)
Energy in Storage above HRL	2 292 (46 per cent minus 30 per cent)
Wind	900 GWh
Low inflow	6 700 GWh
Average inflow	9 000 GWh
Basslink import	Low inflow 3 000 GWh (450 MW average import 85 per cent of time and 200 MW average export 5 per cent of time) Average inflow 1 000 GWh (400 MW average import 60 per cent time and 200 MW average export 30 per cent of time)
Thermal generation	876 GWh (six months at 200 MW average for low and median inflow case)

Tasmanian demand during the 2018-19 water year is assumed to be AEMO's latest demand forecast for 2018-19 and 2019-20 (pro rata) prepared for the ESOO, released on 24 August 2018.

Wind generation is assumed to be 900 GWh, which is consistent with Energy Security Taskforce assumptions in both its interim and final reports. Since the commissioning of the Musselroe Wind Farm the lowest annual wind generation output for Tasmania has been 898 GWh and therefore 900 GWh can be considered a conservative assumption.

Average hydro inflows are assumed to be 9 000 GWh per annum, which is the same as used in the Energy Security Taskforce report, and is derived using data from 1997.⁶ The low inflow scenario is the mean minus two standard deviations.

The average annual Basslink import between 2010-11 and 2014-15 was 1 000 GWh and has been assumed for the 2018-19 water year (Basslink import for 2017-18 water year was 821 GWh). The low inflow scenario assumes 3 000 GWh of Basslink import.

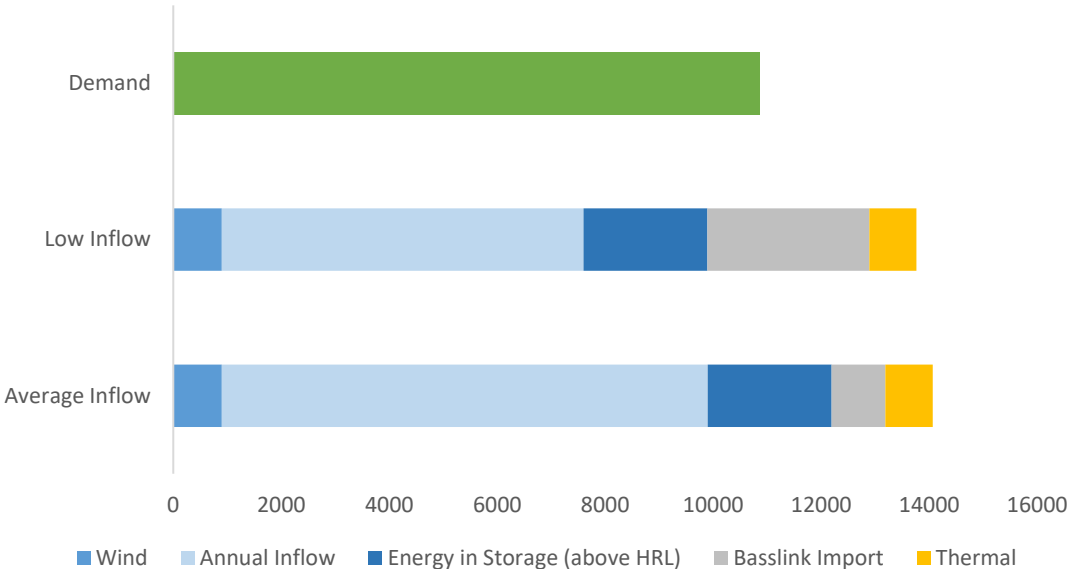
⁶ Since 1997 there has been a clear shift downwards in annual average inflows into Tasmania's hydro-electric catchments.

Thermal generation assumes a 24 hour, 200 MW average output for the CCGT for six months given that GPG is typically not required for half the year (OCGT units are not included due to their predominant peaking use and high failure risk when run as baseload).

Solar PV and other behind the meter energy sources are not shown as these are shown as an offset in the definition of Tasmanian demand. While the Clean Energy Council estimates there is approximately 117 MW of solar PV capacity in Tasmania, the amount of energy generated annually from solar PV is relatively small (estimated at an average of around 12 GWh per month).

Hydro storages are currently 16 per cent above the HRL and, assuming average inflows, will likely remain above the HRL for the coming water year. Figure 10 below shows the Tasmanian supply capability.

Figure 10 - Energy supply capability



3.2 Potential future developments

This section discusses potential future developments that may affect Tasmania’s energy security.

3.2.1 New wind generation

Large-scale wind projects in Tasmania that have met AEMO’s commitment criteria are expected to deliver an additional 256MW of generation. The Wild Cattle Hill Wind Farm (144MW) is due to commence commercial operation in December 2019. The Granville Harbour Wind Farm (111.6MW) is due to commence commercial operation in summer 2019-20. If these projects commence as indicated, once operational, they could move Tasmania to a position of self-sufficiency in renewable energy.

3.2.2 Project Marinus

TasNetworks is undertaking a feasibility and business case assessment into further Bass Strait interconnection, in partnership with the Australian Renewable Energy Agency (ARENA).⁷ The purpose of Project Marinus is to assess the viability of further interconnection between Tasmania and the rest of the NEM.

With respect to energy security, a second interconnector would help manage the risk of relying on a single link. TasNetworks aims to release an Initial Feasibility Report in December 2018. The Monitor and Assessor will continue to monitor the project's development and its likely impact on Tasmania's energy security.

3.2.3 Battery of the Nation

Hydro Tasmania released its report *Battery of the Nation Analysis of the Future National Electricity Market* in April 2018.

Hydro Tasmania 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 energy to mainland Australia. This value could be amplified by targeted investment in pumped hydro technology increasing system controllability – a critical asset in a national market with substantial variable wind and solar generation. Tasmania's wind resource is relatively untapped and could bring substantial diversity to the national market. 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.

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

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

3.3 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 factors to consider as recommended by the Energy Security Taskforce and a short comment on the status of each factor.

⁷ <https://www.tasnetworks.com.au/our-network/planning-and-development/project-marinus-second-interconnector-assessment/>

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

Supply and demand balance factors	Assessment
The connection of material new generation source(s) in the Tasmanian region of the National Electricity Market (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 will investigate the wind farm's impact on generation in the Tasmanian NEM region and the PSL/HRL after they have commenced operation and relevant data are available.
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 10 846 GWh for 2018-19 and 10 879 GWh for 2019-20, which is not a material increase.
A material permanent change in interconnector import capacity (+/-100 MW).	There has been no change 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.

In summary, the Monitor and Assessor considers that the HRL and PSL remain appropriate for the 2018-19 water year.

3.4 Conclusion

The analysis in this report indicates that Tasmania's available energy supply will be sufficient to meet demand over the coming 12 months. Based on current inflow assumptions for Tasmanian hydro storages, hydro and wind generation will be able to provide for Tasmanian demand in the event of a temporary loss of TVPS generation or a Basslink outage. Commercial decisions made by Hydro Tasmania will determine actual electricity generation sources used throughout the year.

The Monitor and Assessor does not propose any changes to the PSL and HRL as there have been no material changes in supply or demand.

APPENDIX A: BACKGROUND

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. The Tasmanian Government introduced an Energy Supply Plan, which included voluntary large user demand reduction and the installation of temporary diesel generation.

Energy in storage reached a record low of 12.5 per cent in late April 2016. However, energy in storage increased to above 36 per cent by the end of April 2017 through a combination of heavy winter rains in 2016; Basslink resuming service; and the operation of the TVPS during summer.

The Tasmanian Energy Security Taskforce was established in response to the 2015-16 energy supply security challenges 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 by the Government on 16 August 2017. The Taskforce Final Report recommended that the Tasmanian Economic Regulator assume the role of energy security Monitor and Assessor. The Monitor and Assessor is to provide independent oversight and transparent public reporting of energy security taking a holistic view of electricity and gas energy that would be informed primarily by data provided by relevant energy supply providers.

In order to carry out the role of Monitor and Assessor on a long term and ongoing basis, legislative changes are being prepared. However, in the meantime, the Government considered it essential that the Monitor and Assessor functions commence in line with the timeframe set out in the Taskforce's Final Report.

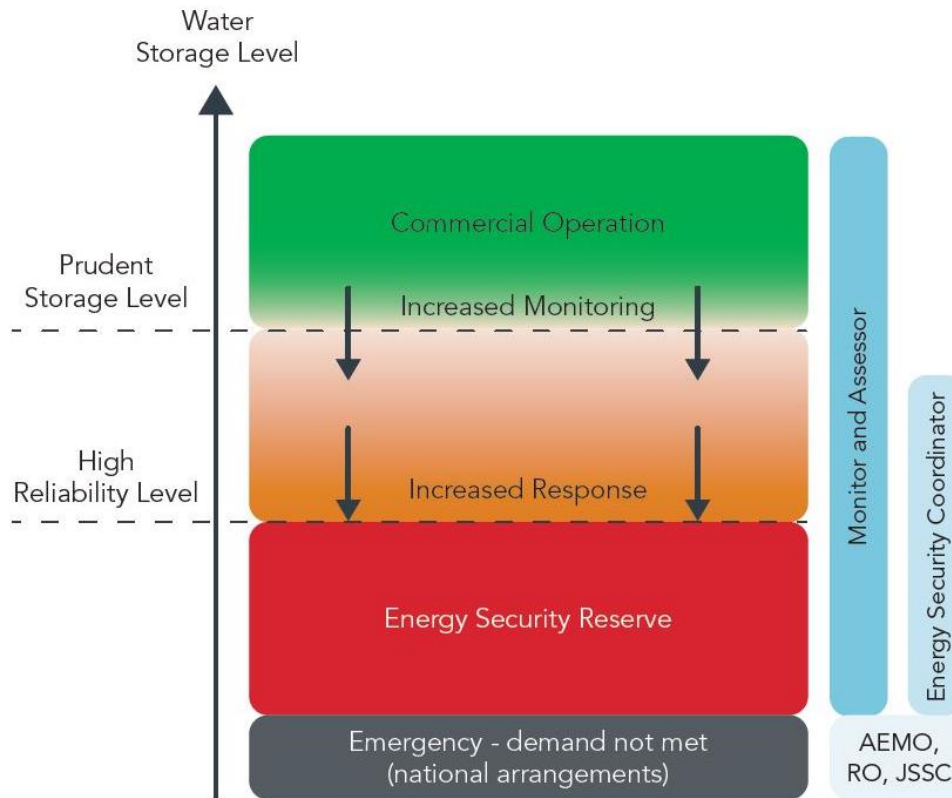
Accordingly, the Taskforce's recommendations relevant to the Monitor and Assessor's reporting role were incorporated into the documents, titled, *Terms of Reference - Reporting of the Monitor and Assessor* (Terms of Reference). The Treasurer has requested that special reports under section 9 of the *Electricity Supply Industry Act 1995* be prepared and published in accordance with the Terms of Reference.

The Tasmanian Government's energy security risk response framework

Overview

The Energy Security Risk Response Framework represents the Government's view of the interaction between energy security risk response thresholds and energy security oversight roles, as shown in Figure 11.

Figure 11 - Energy Security Risk Response Framework⁸



Source: Tasmanian Energy Security Taskforce Final Report

Under the Energy Security Risk Response Framework, energy in storage levels are regularly assessed against pre-determined communication and response thresholds. When these thresholds are passed, or are forecast to be passed, the Monitor and Assessor and/or the Energy Security Coordinator initiate escalating communication and response actions.

Whilst there is a high focus on electricity, the impact of gas on energy security is also monitored. Principally this is done through information provided on the operation of the TVPS and availability of gas to the broader Tasmanian gas market.

High Reliability Level and Prudent Storage Level

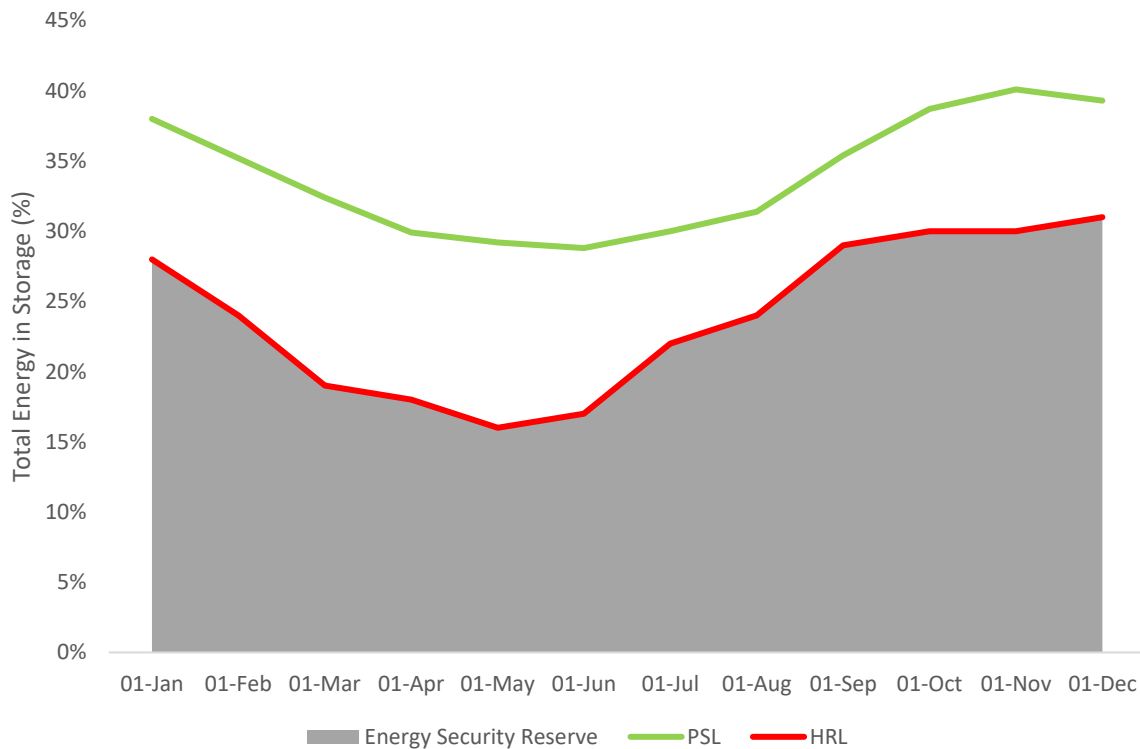
The framework identifies two key energy in storage profiles across a rolling 12 month period, as shown in Figure 12:

- High Reliability Level (HRL) – the threshold to which reserve water is held for energy security purposes where the reserve is sufficient to withstand a six month Basslink outage coinciding with a very low inflow sequence and avoid extreme environmental risk in *yingina* / Great Lake; and

⁸ National market rules and procedures relating to energy emergencies are overseen by the Australian Energy Market Operator (AEMO) and are only initiated when demand is unable to be met. AEMO operates a NEM emergency management protocol and the Power System Emergency Management Plan (PSEMP) that dictate the level of response to be undertaken to ascending levels of emergency criticality. There are two key roles in Tasmania under this national framework. The Responsible Officer (RO) is a statutory role under National Law and has the key responsibility to enact load shedding directed by AEMO, or the jurisdiction, as part of an emergency response. The RO has historically been an officer in the transmission business in Tasmania (now TasNetworks). The JSSC is appointed by the Tasmanian Minister for Energy in accordance with Section 110 of the National Electricity Law (NEL). The Jurisdictional System Security Coordinator (JSSC) has the key responsibility to prepare load shedding priorities and sensitive loads for Tasmania and arrange their authorisation.

- Prudent Storage Level (PSL) – set to create a “storage buffer” from the HRL that is sufficiently conservative that the likelihood of storages falling below the HRL is low under normal operational conditions.

Figure 12 - High Reliability Level and Prudent Storage Level



Calculating the High Reliability Level

The objective of the HRL is to communicate the level of total energy in storage where the NEM Reliability Standard of 0.002 per cent unserved energy (USE) can still be met and there is no incursion into the yingina/Great Lake Extreme Environmental Risk Zone (EERZ) with a six month Basslink outage and a very low inflow sequence, assuming 200 MW (876 GWh) of generation from the TVPS is utilised.

The Taskforce’s Interim Report referred to the energy in storage below the HRL as the “energy security reserve”, which should only be accessed in exceptional circumstances, such as: an extreme period of low inflows; an extended Basslink outage; or an extended unplanned outage to the full output of Gordon Power Station or Poatina Power Station (the largest hydro-electric power stations in the Tasmanian generation system). Under the Energy Security Risk Response Framework accessing the HRL is likely to require the involvement of the Energy Security Coordinator.

It should be noted that the HRL is a set of monthly storage levels required to meet the NEM reliability standard should a Basslink outage occur in a given month and lasts for six months and is not a storage trajectory.

The Taskforce tested Hydro Tasmania’s calculation of the HRL for suitability and robustness by calculating the amount of energy needed to meet demand under the following conditions:

- Basslink unavailable for six months;
- Tasmanian demand equivalent to 10 600 GWh per annum (profiled monthly);

- lowest six monthly inflow sequences from Hydro Tasmania modelled inflow data;
- wind generation of 900 GWh per annum; and
- gas generation of 876 GWh, reflecting TVPS operation during the six month Basslink outage.

The output from this analysis was the amount of energy in storage required each month in the event of an extended Basslink outage. This calculated storage requirement was then added to the theoretical “floor” of the energy supply from Tasmania’s hydro-electric system (referred to as the USE threshold) at which point Hydro Tasmania indicated that all demand may not be met. This was then be used to form an HRL profile based on readily available data independently of Hydro Tasmania’s calculations. The results of this analysis are presented in Figure 13 below.

Figure 13 - Taskforce HRL and Hydro Tasmania’s HRL

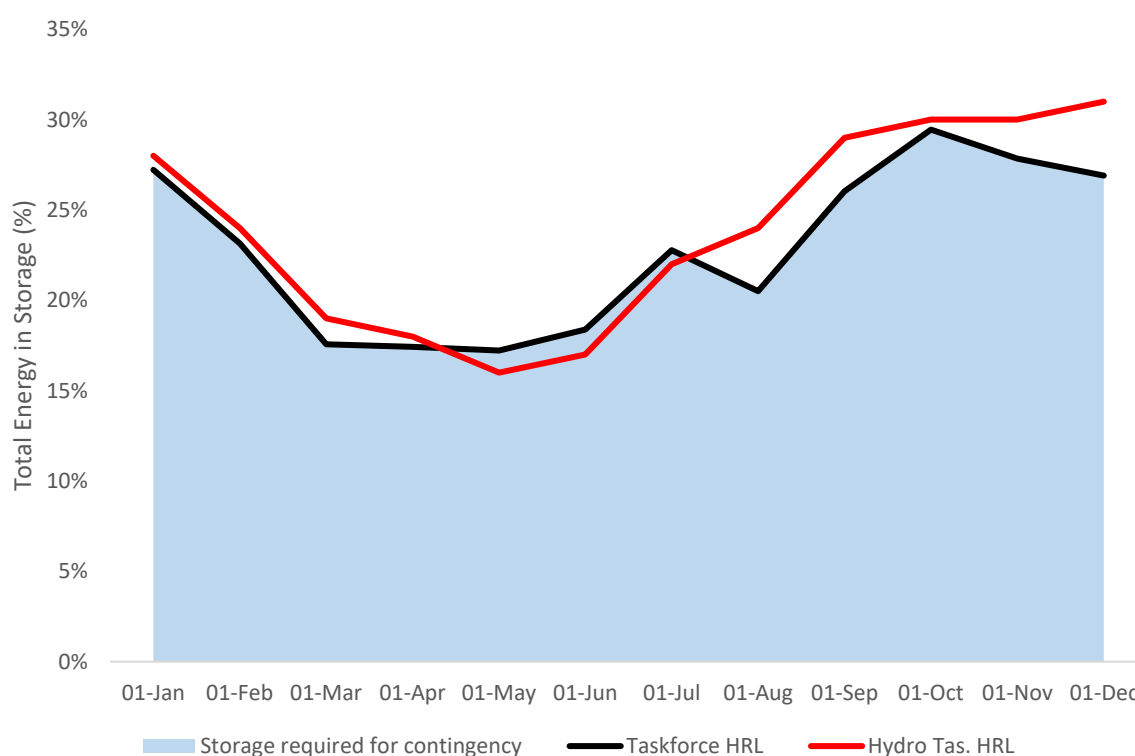


Figure 13 shows that the Taskforce’s calculation of the HRL profile (and hence the minimum required amount of energy in storage each month) broadly supported Hydro Tasmania’s calculation of the HRL profile. Overall, Hydro Tasmania’s HRL profile was more conservative than that calculated by the Taskforce, including during the drier months of the year between November and April. For this reason, as well as for ease of implementation and future reference, the Taskforce recommended that the HRL profile should be initially set based on Hydro Tasmania’s more conservative calculation.

Any future revision of the HRL profile would require Hydro Tasmania to submit its own calculation for review by the Monitor and Assessor who will undertake its own independent assessment as to its appropriateness using the calculation methodology provided to it by the Taskforce.

Calculating the Prudent Storage Level

The PSL profile is a set of monthly storage targets that provide an allowance for three months of low inflows above the HRL profile to ensure the low risk operation of the hydro-electric system in Tasmania.

The PSL methodology involves calculating an annual profile to represent the movement of energy in storage in a 12 month period under average inflow conditions. The annual profile of the PSL is generated from average monthly supply and demand conditions. This annual profile is then applied to ensure that the most vulnerable monthly position of the PSL remains above the HRL profile equivalent to an historic dry three month sequence with Basslink and TVPS support.

Firstly, a monthly minimum level was derived from the following conditions:

- Tasmanian demand (monthly profile of 10 600 GWh per annum);
- historically low monthly inflow sequences;
- wind generation of 225 GWh for any three month period (900 GWh per annum, evenly distributed across the year);
- gas generation of 219 GWh for any three month period (1.5 months of 200 MW flat generation); and
- Basslink import of 657 GWh for any three month period (equivalent to 300 MW flat import).

Secondly, an average profile was applied to single monthly minimum values such that the resulting profile is never below the monthly minimum values. This gives a monthly storage profile that is strong enough to withstand a historically low three month inflow sequence with Basslink and TVPS support.

Hydro Tasmania provided its own calculation of the PSL profile based on the Taskforce's methodology, which aligned with the Taskforce's calculated PSL profile.

Any future revision of the PSL profile would require Hydro Tasmania to submit its own calculation for review by the Monitor and Assessor, which would undertake its own independent assessment as to its appropriateness using the calculation methodology provided to it by the Taskforce.

Under the Government's framework, the Minister for Energy approves the HRL and PSL profiles and any future proposed variation of these by the Monitor and Assessor.

The Minister for Energy approved the Taskforce's recommended HRL and PSL on 15 November 2017 as set out in Figure 12.

Role of the Monitor and Assessor

The Monitor and Assessor role is intended to provide an additional layer of public reporting on energy security levels in addition to current public reporting. This public reporting includes monthly reports (or "dashboards") and an annual review of the water year and the forthcoming year, which is the subject of this report.

Each month the Regulator examines Hydro Tasmania's forecast energy in storage profiles relative to the PSL or HRL. Any preliminary forecast to access the energy security reserve will require Hydro Tasmania to demonstrate how storages will be managed to try to avoid going below the HRL and entering the energy security reserve.

In the event that energy in storage falls below the HRL, Hydro Tasmania is to provide the Monitor and Assessor with an HRL Recovery Plan that will be implemented, including how storages will be returned above the HRL once the energy security reserve is accessed. At this point, the Monitor and Assessor will notify the Energy Security Coordinator that an HRL Recovery Plan has been submitted, together with its advice on the suitability of the plan for returning storages above the HRL profile.

It is not intended that the Monitor and Assessor have the power to compel entities to take action to address supply shortfalls. It is predominantly an information gathering and sharing role with the capacity to advise the Energy Security Coordinator on the suitability of submitted HRL Recovery Plans.

The Monitor and Assessor is also required to monitor any changes to the Tasmanian energy supply/demand balance to ensure that the threshold levels (ie the HRL and PSL profiles) for the Energy Security Risk Response Framework remain set at the appropriate level to maintain security of energy supply. The Monitor and Assessor will only consider proposing changes to the HRL and PSL profiles when there are material changes to supply and/or demand, or if Hydro Tasmania requests a change to be made.

Role of the Energy Security Coordinator

The Director of Energy Planning has been given the role of Energy Security Coordinator and is supported by the Department of State Growth. The Energy Security Coordinator is expected to play an important role if energy in storage drops below the HRL and there is a need for a coordinated response by all market participants. While arrangements are yet to be finalised between the Monitor and Assessor and the Energy Security Coordinator, it is expected that under certain circumstances, the Monitor and Assessor will notify the Energy Security Coordinator and an HRL Recovery plan may be requested from Hydro Tasmania. The Energy Security Coordinator will review the HRL Recovery Plan to provide a point of independent oversight and also ensure it can assist with any coordination activities. The Energy Security Coordinator will be required to coordinate activities outside of Hydro Tasmania's control, including coordinating other generation sources and demand reduction activities (if required).

As the Energy Security Coordinator is intended to be the coordinator of "pre-emergency" responses to energy supply security events, it is essential that it considers the HRL Recovery Plan adequate and practical. It is understood that the Energy Security Coordinator will review the HRL Recovery Plan and confirm its adequacy. Seeking this approval at the forecasting stage should allow time for the Energy Security Coordinator to review advice from the Monitor and Assessor and to advise modifications to the proposed pre-emergency responses if deemed necessary. The key goal of this requirement is to ensure an adequate plan is in place at the start of an electricity supply shortfall event rather than to prevent Hydro Tasmania from accessing water storages.

APPENDIX B: TERMS OF REFERENCE

Terms of Reference

Reporting of the Monitor and Assessor

Under section 9 of the *Electricity Supply Industry Act 1995*, the Treasurer requests that the Tasmanian Economic Regulator prepare, to be published until such time as there is an express provision in legislation:

- a report containing an annual energy security review that is to be published by mid-November each year;
- a monthly energy in storage 'dashboard' report on a standard set of energy security parameters; and
- a special report, if the situation should arise, whereby the supply/demand balance changes to the extent that a revision to the High Reliability Level (HRL) and Prudent Storage Level (PSL) profiles established under the Energy Security Risk Response Framework should be considered by the Minister for Energy.

Background

A key learning from the 2015-16 energy security event was that there is a perceived lack of independent oversight and transparent public reporting of energy security, particularly in relation to Hydro Tasmania's water storages. In this context, the Tasmanian Energy Security Taskforce recommended the establishment of a Monitor and Assessor role to provide this function, including the publication of an assessment of Tasmania's energy security status at regular intervals together with a dynamic energy security forecast. The Government supported the Taskforce's recommendation that this role be undertaken by the Tasmanian Economic Regulator (TER).

Scope

1. The TER is to undertake an annual energy security review to be completed in early November after the wet season that:
 - a. examines forecast energy in storage levels and forecast demand, providing commentary on whether energy in storage may drop below the PSL and/or HRL profiles; and
 - b. reviews changes to the Tasmanian energy supply/demand balance to ensure the threshold levels for the Energy Security Risk Response Framework (ie the PSL and HRL profiles) remain set at an appropriate level to maintain security of energy supply.
2. The TER is to undertake monthly energy in storage 'dashboard' reporting on a standard set of energy security parameters. The parameters to be reported on shall be determined by the TER.
3. If the situation arises whereby supply/demand balance changes to the extent that a revision to the HRL and PSL profiles established under the Energy Security Risk Response Framework should be considered by the Minister for Energy, the TER is to prepare a special report to the Treasurer providing evidence for the need for a change to those profiles to be considered.

The TER should be guided by the following documents when determining the scope of its reporting requirements:

- Tasmanian Energy Security Taskforce Interim Report (released December 2016).
- Tasmanian Energy Security Taskforce Final Report (released August 2017).
- Functional Specifications prepared by the Taskforce for the Monitor and Assessor / Energy Security Coordinator roles.

Key deliverables and timeframes

1. A report from the TER to the Treasurer, containing an annual energy security review, is due by mid-November each year. The TER is to publish that report on the TER's website within seven days of providing that report to the Treasurer.
2. The TER shall provide monthly energy in storage 'dashboard' reports to the Treasurer on a standard set of energy security parameters. The first report is to be produced by mid-November 2017 and further reports are to be provided monthly thereafter. The TER is to publish each monthly report on the TER's website within seven days of providing that report to the Treasurer.
3. If the situation arises whereby supply/demand balance changes to the extent that a revision to the HRL and PSL profiles should be considered by the Minister for Energy, the TER shall provide a special report to the Treasurer detailing evidence that a change to those profiles should be considered. The TER shall also consider natural gas supply adequacy to the extent it affects thermal electricity generation at the Tamar Valley Power Station, and its availability to the broader Tasmanian gas market (as per the Functional Specifications for the Monitor and Assessor).
4. All reports to the Treasurer listed in these Terms of Reference are also to be provided to the Minister for Energy at the same time as they are provided to the Treasurer.

