



# Tasmanian Energy Security Taskforce

Final Report | June 2017  
Executive Summary

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**Tasmanian Energy Security Taskforce**  
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# Foreword

Across Australia, the ability of consumers to expect adequate, reliable and affordable energy, now and into the future, has recently come into sharp focus. Governments are rightly perceived as having the responsibility for energy security and consequently the actions required to ensure energy security is maintained.

During 2015-16, Tasmania experienced its own unique energy security challenges, with the combined impact of two extreme events – record low rainfall during spring, combined with the Basslink interconnector being out of service – resulting in Hydro Tasmania's water storage levels falling to historically low levels. The Tasmanian Government took action to slow the decline of water storages through an Energy Supply Plan, which included voluntary large user demand reduction and the installation of temporary diesel generation. While energy in storage reached a record low of 12.5 per cent in late April 2016, a combination of heavy winter rains in 2016, Basslink being back in operation and the operation of the Tamar Valley Power Station during summer, has seen energy in storage at above 35 per cent at the end of April 2017.

In response to the 2015-16 energy supply security challenges, the Tasmanian Energy Security Taskforce (the Taskforce) was established to advise Government on how it can better prepare for, and mitigate against, the risk of future energy security events.

The Taskforce released a Consultation Paper on 3 August 2016, and this was followed by the Taskforce's Interim Report, released on 21 December 2016. The Interim Report presented the Taskforce's assessment of Tasmania's energy security risks, and identified strengths and areas which require action to improve Tasmania's energy security, with a particular focus on the short-term future. A number of recommendations were made that focussed on ensuring Tasmanians can have confidence that their demand for energy is secure and, importantly, that there is a robust framework for monitoring and responding to risks.

For the Final Report, the Taskforce has continued with an evidence-based approach to undertaking its energy security risk assessment, with the findings and recommendations contained within being developed on the basis of information sought by the Taskforce, together with its own modelling of options for addressing Tasmania's energy security. The Final Report reflects updates made to recommendations proposed as part of the evidence-based assessments made in the Interim Report.

Throughout its work, the Taskforce has actively engaged with relevant stakeholders (including industry participants and customers or their representative organisations) and this has provided important information to support the preparation of the Final Report. The Taskforce is grateful to all stakeholders who took the time to prepare a submission or engage directly on matters pertinent to the Taskforce's Terms of Reference.

As required under its Terms of Reference, the Taskforce has provided the Final Report to the Minister for Energy. It contains the Taskforce's full assessment of energy security now and into the future, having regard to the specific issues that its Terms of Reference require it to investigate, and includes findings and recommendations to the Tasmanian Government for actions to support Tasmania's energy security both now and in the medium to long term.

# Executive Summary

The Taskforce has undertaken its work during a time of considerable uncertainty and national debate around energy security and energy market issues. The number of reviews and announcements relevant to energy security that have occurred over the past 12 months has reinforced the importance of undertaking an assessment of Tasmania's energy security situation.

The energy security issues facing the mainland states are different to those facing Tasmania. Nationally, the central energy security risk is ensuring that there is sufficient energy capacity to meet peak demand. The Taskforce's assessment is that Tasmania's capacity to meet peak demand is strong. However, due to the dominance of hydro-electricity generation in Tasmania and the observed variability of rainfall, the volume of energy supply in Tasmania's water storages prevails as the most important factor in setting Tasmania's energy security. This difference is important in identifying solutions.

It remains the responsibility of the Tasmanian Government for maintaining energy security for the Tasmanian community. This responsibility includes ensuring that the State is prepared for both emergency energy capacity constraints and 'pre-emergency' energy supply shortages. It also extends to the clear communication of risk and mitigation measures to the public to support confidence in the timeliness and appropriateness of responses to energy security challenges.

In the Final Report, the Taskforce sets out a series of recommendations which will improve the Tasmanian Government's oversight of energy security. It outlines the manner in which these improvements can be introduced at a relatively low cost and be operational before the commencement of the dry season at the end of October 2017.

The Taskforce's consultation processes and the mid-term release of its Interim Report have revealed heightened community concern and an appetite for a higher level of insurance to improve the security of energy supply in Tasmania.

As a consequence of higher than average inflows over the past year, the Taskforce's assessment is that Tasmania's electricity energy security is currently 'Managed' and there are no immediate threats to energy security.<sup>1</sup> Hydro-electric water storages remain in the mid-30 per cent range at the end of the dry season, the gas fired Tamar Valley Power Station (TVPS) is available on standby and the Basslink interconnector is back in service.

However, the Taskforce assesses that gas energy security remains 'Susceptible' with a tightening supply of gas on the eastern seaboard and a Tasmanian gas transportation agreement beyond 2017 still subject to protracted negotiations. If satisfactory arrangements are not in place by year end, then higher levels of energy in storage may be required to mitigate against the energy security risk.

In the medium term, the Taskforce has assessed that both retaining the TVPS on standby and maintaining higher water storages are important strategies for managing Tasmania's energy security. While adoption of this approach to energy security does come with a financial cost, this cost is considered to be low relative to the energy security that it provides.

Over the medium to long term, Tasmania has the opportunity to build on its already enviable position for a low emissions future, based on its diverse array of hydro-electric power stations and the potential for further renewable energy development. Higher National Electricity Market (NEM) pricing is likely to encourage further on-island development in Tasmania, whilst over the longer term the significant strengths of Tasmania's hydro-electric based system will become an increasingly important part of a low carbon future for the nation.

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<sup>1</sup> The Taskforce's energy security assessment ratings are defined in Chapter 15 of the Final Report.

The energy landscape is changing rapidly in Australia and this will impact on energy policy and developments in Tasmania. Recent trends in mainland energy pricing, coal-fired generating plant closures and gas availability could impact on Tasmania's energy security in the medium to long term, to the extent that Tasmania remains dependent on energy imports. However, the State is well placed to build on its current energy security position so that the economic and social activities of Tasmanians are supported and resilience to a potential shock to the energy system is strong. Resilience would be increased by additional on-island renewable energy developments and this is consistent with the outcome that would be expected in a competitive market. It would also be consistent with the Tasmanian brand, of which Tasmanians are justifiably proud.

Modelling and analysis undertaken by the Taskforce reinforces that the following five priority actions identified in the Taskforce's Interim Report should be acted upon by the Tasmanian Government.

### **1. Define energy security and responsibilities.**

- The Taskforce has defined energy security for Tasmania as *"the adequate, reliable and competitive supply of low carbon emissions energy across short, medium and long-term timeframes that supports the efficient use of energy by Tasmanians for their economic and social activities"*.
- Additional recommendations are made to ensure roles and responsibilities are absolutely clear.

### **2. Strengthen independent energy security monitoring and assessment.**

- Energy security risk should be monitored and assessed by a capable independent body with transparent public communication of risk status. The Taskforce considers that the Tasmanian Economic Regulator (TER) has appropriate credentials to undertake this independent 'Monitor and Assessor' role.
- If water storages are near or below an identified energy security level, an 'Energy Security Coordinator' should coordinate responses across market participants to manage energy supply risks. The Taskforce considers that the Director of Energy Planning would be well placed to take on the Energy Security Coordinator role when resourced appropriately, including external technical capability.
- The Taskforce expects that these roles could be implemented with a modest cost impost on the sector with no material pass-through to customer prices.

### **3. Establish a more rigorous and more widely understood framework for the management of water storages.**

- A strong fundamental basis that makes water storage levels a function of energy security risk should be established. The Taskforce recommends the immediate introduction of an Energy Security Risk Response Framework as depicted in Figure 1.1.
- This framework makes it clear when Hydro Tasmania can operate freely within its commercial interests and those occasions where it needs to take increasing steps to redress/avoid energy security risks.
- The Taskforce has developed and modelled specific High Reliability Level (HRL) and Prudent Storage Level (PSL) profiles. These are based on more conservative assumptions for rainfall variability and Basslink availability, and provide the starting point for the Energy Security Risk Response Framework.



#### **4. Retain the TVPS as a backup power station for the present and provide clarity to the Tasmanian gas market.**

- The TVPS is currently required as a backup generator when Tasmania faces a prolonged low rainfall sequence and a six month Basslink outage. No matter that such concurrence is rare, from a risk management perspective, they are both credible scenarios. Figure 1.2 illustrates the comparative risk implications of various future scenarios considered by the Taskforce.
- The transportation of gas to Tasmania is currently contracted until December 2017. Arrangements beyond that date are currently under negotiation. The Taskforce considers it important to see those arrangements in place and a timely resolution is urged, whether by commercial agreement or by using proposed national gas arbitration reforms.<sup>2</sup>
- Whilst it is possible that the proposed arbitration process, if invoked, would preserve the status quo from the time of invocation until the time of determination, there is a residual risk that this may not be the case. In that event, energy in storage profiles should be temporarily adjusted upward from the beginning of the dry season (i.e. from the start of November 2017) until the arbitration process is finalised to mitigate against any increased energy security risk from not having the TVPS available.
- Natural gas is an important energy diversification today that holds important optionality for the future. Retention of the TVPS supports ongoing supply and transportation of gas in Tasmania.
- The long-term energy security need for the TVPS is less certain if new generation is introduced, a second electricity interconnector is built, or there is a major downturn in demand.

#### **5. Support new on-island generation and customer innovation.**

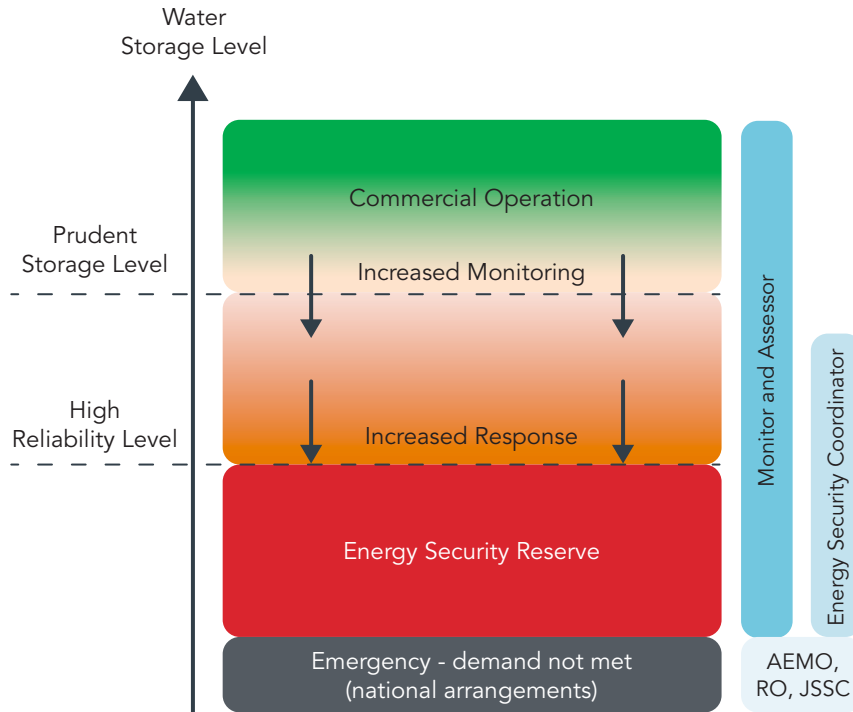
- Tasmania has an annual deficit of on-island hydro-electric and wind generation to on-island consumption of between 700 GWh to 1 000 GWh (approximately seven per cent to 10 per cent per annum) based on long-term average inflows. All other things being equal, a more secure setting would be created if this deficit was reduced or eliminated by new entrant renewable energy developments.
- New entrant developments should not face barriers to entry due to Tasmania's market structure and energy projects. Promoting new renewable energy development of 700 GWh to 1 000 GWh per annum would improve Tasmania's energy security and reduce reliance on Basslink imports, thus mitigating against the risk of high priced imported energy from the rest of the NEM.
- The Taskforce considers that Tasmania's features make it desirable for private sector interests to partner with local businesses and researchers to trial new products and services, such as storage integration and electric vehicles. The piloting of fast moving consumer-led technologies and other innovations would be positive for business sentiment.

The Final Report provides a series of recommendations that support these priority actions and which are designed to improve the resilience of Tasmania's energy security across the short, medium and long term. The Taskforce commends them to the Tasmanian Government for their earliest implementation.

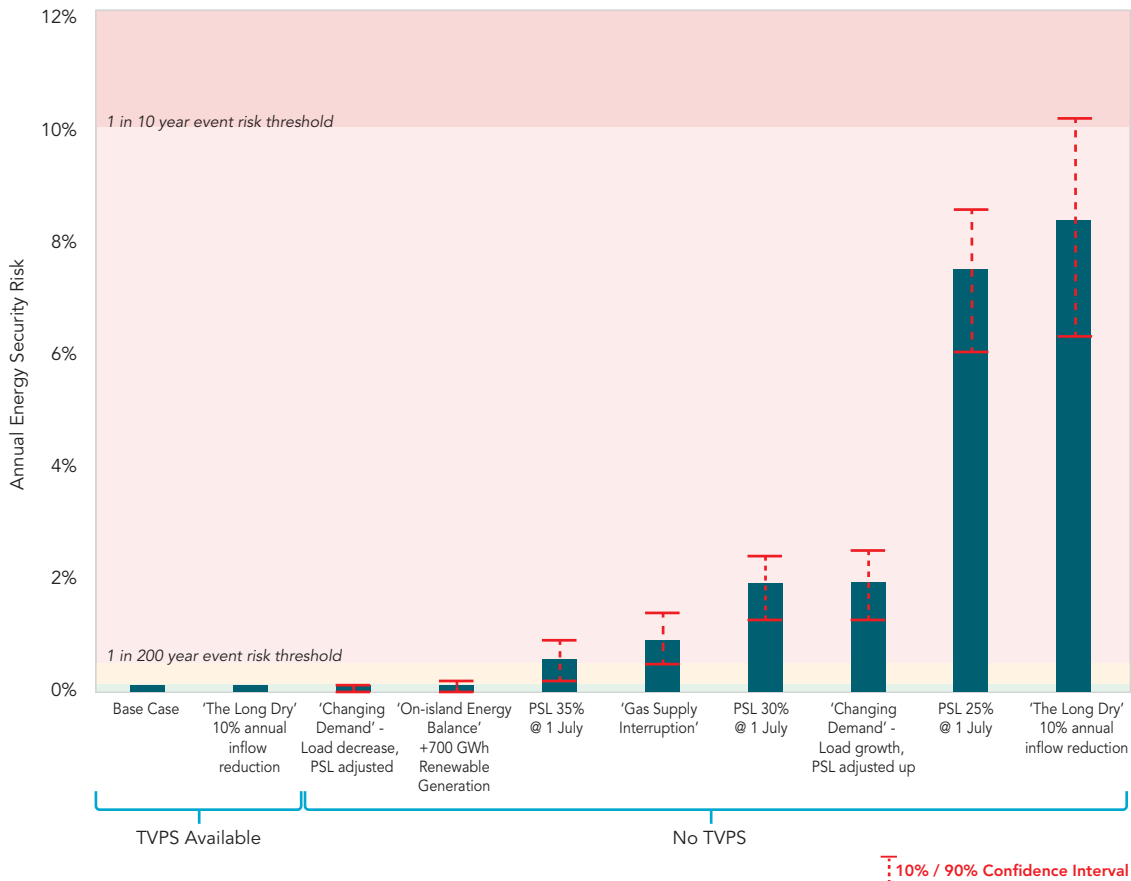
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<sup>2</sup> Vertigan M, 2016, *Examination of the current test for the regulation of gas pipelines*.

**Figure 1.1 Proposed Energy Security Risk Response Framework**



**Figure 1.2 Risk of an energy security event across scenarios modelled by the Taskforce**



# Key Findings and Recommendations

## Key findings

The Taskforce's key findings are summarised below. This summary lists findings arising from the Taskforce's Interim Report (some of which have been updated based on Final Report analysis) and highlights additional new findings that the Taskforce has identified in the Final Report.

### Energy security in Tasmania

- As an island that is small in population and isolated from major markets, Tasmania needs to place additional emphasis on ensuring its energy security.
- Tasmanian demand is unusual in the NEM due to the substantial requirements of four large major industrial customers, who account for around 55 per cent of the State's annual electricity load.
- Because of the importance of energy security to households and businesses, the responsibility for energy security ultimately rests with the Tasmanian Government.
- Energy security comes at a cost which is ultimately borne by Tasmanian consumers, either through the prices they pay or through the impact on the financial returns of Government businesses.
- Tasmania has experienced four energy security events this century that have been classed as low probability. This recent history indicates that two or more separate low probability events can occur within a short period.

#### *Additional findings:*

- There have been significant events in 2016-17 affecting both electricity and gas markets across Australia. Growth in intermittent renewable energy generation, reducing energy demand, concern over future gas scarcity and an increase in energy security events all combine to increase uncertainty in the energy sector.
- Despite these events, future forecasts for energy supply and demand remain largely as expected. Tasmanian energy demand is projected to remain flat or increase only moderately. While emerging technologies are advancing, they are yet to have a material impact on supply or demand.

### Tasmania's energy system

- Tasmania's energy system is diverse, though dominated by hydro-electric generation (which represents three quarters of stationary energy use) and liquid fuels (for non-stationary/transport energy use).
- Tasmania's electrical energy system is energy constrained rather than capacity constrained – this means that Tasmania has sufficient generating capacity to meet peak demand, but that the fuel sources (principally water) for these generators to operate can sometimes be in short (and even critically low) supply.
- The Taskforce estimates that Tasmania currently has an annual energy deficit between on-island generation and Tasmanian consumption of between 700 GWh and 1 000 GWh, based on long-term averages. This means Tasmania relies on interconnection with the mainland, though variability in inflows provides opportunities to export energy.
- While the risk of low inflows into Hydro Tasmania's dams can be managed in most instances (through drawing down the 'stock' of water held in storage, Basslink imports, gas generation and wind generation) the 2015-16 energy security event demonstrates that Tasmania's energy security is severely tested by concurrent adverse events.

## Definition and assessment of energy security in Tasmania

- Energy security definitions exhibit common features focussing on 'adequacy', 'reliability' and 'competitiveness/affordability'.
- Existing frameworks for assessing energy security use both quantitative and qualitative data and generally look across different time horizons.
- A transparent assessment of Tasmania's energy security risks would help promote business and household confidence in the Tasmanian economy and society.
- Tasmania's electricity energy security in the short term is assessed as being Managed.<sup>3</sup> Tasmania's electricity reliability is Resilient due to the number and diversity of generators, and a network that generally performs well against independent assessments. However, Tasmania lacks some competitiveness features and its on-island energy deficit is a less secure state than if local supply and demand were in balance.
- Tasmania's gas energy security in the short term is assessed as being Susceptible.

### *Additional findings:*

- Whilst in the past 12 months there have been significant events affecting both electricity and gas markets across Australia, the implications for Tasmania are not as heightened and consequently have not materially changed the energy security risk assessment for Tasmania outlined in the Interim Report.
- Retention of the TVPS on standby and the implementation of a new Energy Security Oversight Framework would, all other things being equal, result in Tasmania's electricity energy security adequacy and overall ratings in the short term improving to Resilient.
- Tasmania's electricity energy security in the medium and long term is assessed as Managed. Tasmania has opportunities to strengthen this assessment over time, and this will depend on how the on-island energy deficit is addressed.
- If gas transportation arrangements are not recontracted soon, this will directly impact the availability and price of gas for Tasmanian users.
- Tasmania's gas energy security in the medium and long term is assessed as being Susceptible, based on the current outlook for gas prices and supply.

## Energy security oversight

- State and national arrangements for managing energy emergency situations, in particular capacity risks arising from sudden weather events, are well understood, practiced and implemented when necessary. Significant reforms are not needed for these emergency arrangements, but rather continuous improvement should be pursued through engagement, practice and learning amongst the key bodies and persons involved.
- Frameworks to monitor, assess and respond to avoid energy supply security threats becoming an emergency situation are not as defined as for emergencies resulting from capacity events.
- Existing arrangements are based on legislation that is two decades old and have not been updated for major changes in the energy market.
- Tasmania's energy security oversight would be improved by enhancing independent oversight of water storages in the context of all energy supplies and demand. This is a common feature of the hydro systems that the Taskforce examined, including Norway, New Zealand, Manitoba and Iceland.
- When energy supply threats increase, but before they become an emergency situation, there

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<sup>3</sup> The Taskforce's energy security assessment ratings are defined in Chapter 15.

is a need for a clear authority in the State to coordinate and manage the situation from a State perspective (an Energy Security Coordinator role).

- Clearer roles and responsibilities would also enhance independent oversight, create transparency and public confidence, and provide Hydro Tasmania with clarity and reduce perceptions of it being conflicted between commercial drivers and its role in maintaining energy security.
- Gas oversight arrangements could be strengthened through greater clarity between the Department of State Growth and the Director of Gas Safety.
- Regular assessments and communication of energy security risks through a new and independent Monitor and Assessor role would enhance public confidence.

*Additional findings:*

- While Tasmania's energy security is assessed as being Managed in the short term, formalisation and implementation of the Energy Security Risk Response Framework, including the Monitor and Assessor and Energy Security Coordinator roles, would likely result in a Resilient assessment.
- Whether through laws, rules and/or licence conditions, it is important that the Energy Security Risk Response Framework is embedded as a sustainable operating model that will persist over years, if not decades, regardless of changes in board compositions, corporate strategies or government ownership structures.
- The Energy Security Risk Response Framework must be fully resourced, preferably with dedicated allocations, to ensure it is sustainable and supported.
- Any extended delays to the implementation of the Monitor and Assessor and Energy Security Coordinator roles may risk implementation not eventuating due to perceived lack of necessity or relevance.
- While Government is ultimately responsible for energy security, it does not require the explicit control of all energy security levers and tools to be retained within the immediate control of the Minister. The expertise and experience of Tasmania's energy businesses can be utilised to maintain energy security in a pre-emergency situation.
- During the course of the year, the actions of the Monitor and Assessor will differ according to the energy in storage relative to its prudent benchmark, forecasts of the upcoming months of inflows and the availability of Basslink.
- The successful operation of the Monitor and Assessor role relies on the free flow of information from Hydro Tasmania and a high level of analytical capability to use this information to assess the prevailing level of energy security of Tasmania.

## Management of Tasmania's hydro-electric storages

- Additional generation sources outside the existing hydro and wind generation are required to prevent an annual reduction in storages under average or below average inflow conditions. In most cases, Basslink alone is a sufficient source of energy to maintain annual energy storage levels in times of low inflow. Thermal generation is currently depended upon if Basslink is unavailable.
- Hydro Tasmania's interim storage targets of between 30 and 40 per cent, together with the return of Basslink and higher inflows, have improved Tasmania's energy security at least over the next year.
- The establishment of a Prudent Storage Level (PSL) profile, below which operation should be independently scrutinised and above which would allow Hydro Tasmania the freedom to operate commercially, would clearly articulate the Tasmanian Government's risk appetite to Hydro Tasmania.
- The use of extreme low inflow sequences in modelling and planning will result in improved prudent planning for energy supply risks.

- The energy stored below Great Lake's Environmental Extreme Risk Zone (EERZ) may not be accessed even in high energy security risk situations.
- Other jurisdictions with a dominant hydro generation profile offer good examples of planning, communication and regulator involvement that can be leveraged for the Tasmanian energy system.
- Escalation of communication and responses is required when energy security risks increase to ensure that the public are aware of the risk level and the actions being taken to mitigate these risks.

#### *Additional findings:*

- A High Reliability Level (HRL) profile for energy in storage applies the national concept of unserved energy (USE) to the energy constrained Tasmanian system. This allows comparison to a national standard that is accepted and well understood in the energy industry.
- The HRL profile should reflect the capability of energy in storage to meet demand over a six month period without Basslink support.
- The PSL profile should reflect an operational energy in storage profile under average supply and demand conditions. The PSL profile should also allow for a historically low three month inflow sequence and still remain at or above the HRL profile.
- As energy security is ultimately the responsibility of the Tasmanian Government, it is appropriate for the Minister for Energy to approve the proposed HRL and PSL profiles and any future variation of these. Initially these benchmarks could be established by adopting the recommendations of the Taskforce and then only varied following consideration of advice from the Monitor and Assessor.
- A material change in either supply or demand would need to occur before undertaking a reassessment of the HRL and PSL profiles.
- Energy security issues created by capacity constraints (rather than energy constraints), if they were to occur, are managed through existing national arrangements and would most likely happen in the early wet season as a result of a delay in wet season inflows. The expertise of Hydro Tasmania in managing capacity of the hydro-electric generation network need not be duplicated by the Monitor and Assessor as it is a complex task that requires a high level of modelling expertise.

#### Impact of climate change

- Tasmania has experienced a downward trend in total annual rainfall and runoff since 1970, with the largest changes being observed in autumn. Concurrent with these decreases, a significant reduction in inflows to hydro-electric catchments has been observed in Tasmania since the mid-1970s, with an acceleration of the trend since the mid-1990s.
- Climate change is projected to decrease inflows in the central plateau catchments, which may have a significant impact on power generation as these feed into the major storage of Great Lake. Projected changes to the seasonality of inflows in the western catchments may also reduce power generation.
- These changes have implications for Hydro Tasmania's long-term average yield assumptions and management of water storages over the next 10-20 years, particularly Great Lake and Lake Gordon/Pedder.
- Seasonal and inter-annual rainfall variability will continue to pose the largest hydrological risks over the short to medium term, rather than long-term climate change impacts.
- Other climate change projections relevant to energy security include decreased summer and autumn wind speeds that may reduce wind generation capacity (and coincide with projected declines in inflows during these months), and an increase in extreme events that may affect electricity infrastructure (e.g. bushfires, intense rainfall events and flooding).

## Role of gas for energy security

- The viability of the Tasmanian gas market appears Susceptible given its scale and increasing supply and price risks associated with both gas commodity and pipeline access. The TVPS is currently an important factor in helping to support the viability of Tasmania's gas market.
- Gas generation is a common feature of hydro-electric systems across the world as a backup generation source to manage hydrological risk. However, gas generation has become increasingly uneconomic to operate in the NEM (particularly as base load generation) due to increased fuel and operational costs.
- In the absence of reliable alternatives, gas generation remains important to Tasmania to mitigate against hydrological and Basslink failure risks. As such, the TVPS provides a backup energy generation source for Tasmania.
- The contractual arrangements to support standby gas generation at the TVPS could be made on an as-needed basis. While this may be the most cost effective approach for Hydro Tasmania, it may result in greater transportation price increases for non-TVPS customers.
- There is also a risk that in a tight east coast gas market, contracting gas and pipeline access on an as-needed basis could be difficult, if gas commodity becomes fully (or near fully) contracted and pipeline storage becomes a valuable product in the Victorian gas market.
- Locking in long-term gas supply and transportation agreements in the current market comes with high costs and risks, and may forego the opportunity to add more cost effective energy supply options over the medium to long term.
- Transportation price increases to non-TVPS customers are limited by customers' capacity to pay, otherwise the risk of fuel switching or other actions will increase.
- In the medium to long term, the role of gas generation in Tasmania will depend on the competitiveness of gas relative to other energy sources. Similarly, gas will need to remain competitive to retain and attract gas consumers, or risk being transitioned out of the Tasmanian market through customer fuel switching.

### *Additional findings:*

- Until additional generation to address Tasmania's annual on-island energy deficit is proven reliable and adequate, gas generation will continue to serve as the primary backup energy generation source for the Tasmanian energy sector.
- There may be value in running the TVPS at select times, to address low inflows, to ensure operational effectiveness and/or to take advantage of imbalances between gas and electricity markets.
- Gas market regulatory reforms are seeking to bring greater efficiency and competitiveness into national legislation by introducing new mechanisms such as binding arbitration to resolve disputes or inability to reach agreement between pipeline operators and shippers. From a Tasmanian perspective, these regulatory reforms should strengthen gas energy security.

## Interconnection with the National Electricity Market

- Basslink represents the single largest alternative energy source for Tasmania after hydro-electric inflows and storages, meaning that it is also an important mitigation asset for hydrological risk. It can import up to 40 per cent of Tasmania's consumption needs and meet around a quarter of Tasmania's peak demand.
- Based on how interconnectors (particularly subsea interconnectors) have performed historically in other jurisdictions, and having now experienced a six month outage, there is sufficient evidence to consider a six month outage of Basslink to be a scenario that should be planned for.

- In most scenarios, Tasmania can manage its hydrological risk through Basslink imports alone without there being a challenge to energy security. However, Tasmania should not solely rely on Basslink being available to ensure energy security and, hence, other contingencies are required in addition to Basslink.
- The future energy mix in the NEM and how it will be managed to maintain adequate and reliable supply is uncertain, meaning the implications for energy imports to Tasmania in the medium to long term are also presently unclear.
- Interconnection with the NEM is a significant strategic issue facing Tasmania over the medium to long term. Greater interconnection could create more revenue opportunities for Tasmania from a higher priced NEM but could increase prices and load risk in Tasmania.

*Additional findings:*

- Based on the limited evidence available to it, the Taskforce is unable to reach a conclusion as to whether Basslink will be more or less reliable in the future than it has been in the past.
- There is insufficient evidence to suggest that a longer outage of 12 months or more is a plausible scenario that should be specifically planned for at this time. However, the risk of a subsea Basslink outage extending beyond six months appears to be greater until all ordered spares are delivered in early 2019.
- An independent and publicly communicated review of Basslink's asset management and compliance plans would provide greater public confidence as to their adequacy.
- A second Bass Strait electricity interconnector would enhance Tasmania's energy security and provide wider benefits. However, its development is not required to ensure Tasmania's long-term energy security if the Energy Security Risk Response Framework is adopted and new on-island generation is supported.

## Renewable energy, emerging technologies and consumer participation

- During the 2015-16 energy security event, wind made an important contribution to meeting Tasmanian electricity demand. Without this contribution, additional draw down of hydro storages and/or additional load reductions would have been required to meet demand until sufficient temporary diesel generation was commissioned.
- Tasmania's current on-island energy deficit can be addressed by building additional renewable energy projects, which will also serve to diversify the State's generation mix and reduce its dependence on energy imports.
- Tasmania has a world class wind resource, but the cost competitiveness of wind could be challenged over time as the cost of other technologies decline. Large-scale solar development should not be dismissed, despite Tasmania's resource being relatively more limited than mainland Australia.
- The potential role of other renewable energy sources such as wave, tidal, biomass and geothermal will depend on their competitiveness relative to other technologies and investor interest.
- Small-scale renewable energy, such as household integrated solar photovoltaic (PV) and storage, has the potential to make a small contribution to reducing Tasmania's on-island energy deficit, but provides 'consumer-level energy security', whereby consumers perceive they have greater energy security when they are able to control some of their supply and demand.
- A more technologically advanced network could also improve the reliability of the network (particularly in the face of future challenges) and minimise the impact of emergency power restrictions if they were ever needed.
- There may be aggregate energy security benefits in the form of network optimisation and peak



demand reduction when embedded storage technologies are combined with new products and services (e.g. time-of-use tariffs and advanced meters) that allow consumers greater control and choice over their own energy use.

- Greater consumer control and choice can also enable improved energy efficiency. Tasmania's building stock is relatively old and there is an opportunity to improve the energy efficiency in residential homes and commercial premises.
- While there are a range of predictions regarding the rate of take-up of new technologies and services, changes in other sectors have occurred more rapidly and differently than thought possible.
- Electric vehicles (EVs) may assist in reducing Tasmania's dependence on liquid fuels in the non-stationary energy sector in the longer term and provide other benefits to the State.

#### *Additional findings:*

- Much of the progression of solar PV, battery storage and EVs depends on a range of factors that are largely beyond the control of the Tasmanian Government. The ability for Tasmania to significantly influence or control these factors creates uncertainty over their value to, and impact on, the energy security of the stationary energy sector.
- Over the long term, the energy security impact from EVs is expected to be low and focussed on network infrastructure.
- The need for demand-side management measures is limited due to Tasmania's excess generation capacity, although the unique characteristics of the State ensure that some locations will benefit from measures to reduce peak demand.
- The highest value in voluntary demand reductions to ease concerns during an energy supply security event in Tasmania come from major industrial energy consumers.

#### **Additional findings – assessment of energy security options**

- With the TVPS on standby and the adoption of the HRL and PSL profiles from 1 July 2017, the Tasmanian electricity energy security situation can be considered Resilient in the short term, as it would take multiple adverse events before electricity energy supply security was threatened.
- If the situation arose whereby the TVPS was temporarily unavailable, but it was considered that the TVPS could return to service in a reasonable timeframe if required to support energy security, then the HRL and PSL profiles would not necessarily require adjustment.
- If the situation arose whereby the TVPS was permanently unavailable and energy storage levels were not adjusted to reflect this loss of generation potential, then the electricity energy security situation would be assessed as Susceptible.
- However, if the TVPS was permanently unavailable and the HRL and PSL profiles were adjusted upwards to reflect that loss of generation potential, then the electricity energy security situation would be assessed as being Managed, but would not be considered as robust as with the TVPS on standby.
- While retaining the TVPS on standby and increasing energy in storage does have a financial cost, the cost is low for the energy security it provides.
- Medium-term scenario analysis indicates that:
  - The TVPS is important in reducing energy security risk in the event of a prolonged reduction in inflows. With a 10 per cent reduction in long-term average inflows, the TVPS changes from a source of backup generation to a source of baseload generation.
  - In the event of a significant reduction in long-term average inflows, new (non-hydro) generation should be developed in Tasmania in order to support Resilient electricity energy security.

- The TVPS is important in reducing the energy security risk in the event of an increase in demand.
- In the event of a material increase in demand in Tasmania, it would be prudent to accompany the demand increase with additional generation development to ensure the on-island energy balance remains in a manageable state.
- A significant demand reduction would result in an on-island surplus of energy generation and would alleviate energy security concerns in Tasmania. In scenarios of a very large demand reduction, this could result in stranded assets with adverse implications for generating asset owners.
- There is an increased energy security risk if gas is unavailable to operate the TVPS. 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 that only partially offset this risk.
- Increasing non-hydro renewable energy generation would increase on-island self-sufficiency and is likely to provide a net benefit to Tasmania.
- Operation of the TVPS to meet the on-island generation deficit is not preferred unless its operating costs reduce or market prices for electricity significantly increase.
- Tasmania's energy security is not materially impacted by a carbon price. Tasmania would be in a better position to adjust to a price on carbon if it were a net exporter of energy sourced from renewable energy generation.
- The approach of adopting a PSL of around 30 per cent at 1 July each year (and 40 per cent at the end of October) and the retention of the TVPS provides a Resilient level of electricity energy security in the short term, as well as other benefits, at a cost that is low relative to the energy security that it provides.
- The development of additional Tasmanian renewable energy generation would provide a Resilient electricity energy security rating in the medium to long term and is assessed as being the most cost-effective option for reducing the on-island generation deficit in the medium term.

## Priority actions and recommendations

Table 1.1 presents the Taskforce's five priority actions and its final recommendations to the Tasmanian Government that support those actions. The recommendations are organised logically with each of the priority actions rather than presented sequentially in recommendation number order. Each recommendation is identified with a prefix to indicate whether it was made in the context of the Interim Report ('IR') or the Final Report ('FR'). Recommendations from the Interim Report that have been changed in the Final Report are identified with the prefix 'FR' to indicate that they have been updated. Readers should refer to the recommendations where they appear in the chapters of either the Interim Report or the Final Report to understand the context in which they have been made.

**Table 1.1 Priority actions and final Taskforce recommendations**

Recommendations	No. in Interim Report or Final Report <sup>4</sup>
<b>Priority Action 1: Define energy security and responsibilities</b>	
The following definition of energy security should be adopted for Tasmania: <i>Energy security is the adequate, reliable and competitive supply of low carbon emissions energy across short, medium and long-term timeframes that supports the efficient use of energy by Tasmanians for their economic and social activities.</i>	IR-1
Responsibility for developing an energy security policy that clearly articulates Tasmania’s approach to energy security should rest with the Department responsible for the energy portfolio.	IR-2
Responsibility for monitoring and assessing energy security should rest with an external body with pre-established market monitoring capabilities. A new Monitor and Assessor role should be established to provide independent oversight and transparent public reporting. The Tasmanian Economic Regulator (TER) should undertake the Monitor and Assessor role.	FR*-2
An Energy Security Coordinator role should be established to coordinate responses across market participants to manage electricity supply risks when water storages are near or below an identified ‘energy security reserve’ level. The Director of Energy Planning (DEP) / Department of State Growth should undertake the Energy Security Coordinator role provided that the following necessary prerequisites are in place: <ul style="list-style-type: none"> <li>• external technical and analytical capability is contracted on an ongoing basis, with TasNetworks contracted to undertake this role in the first instance; and</li> <li>• the Energy Security Coordinator function is provided with an explicit State Growth budget allocation.</li> </ul>	FR*-3
Where necessary, legislation must be enacted or amended to ensure relevant officers or bodies have the appropriate functions and powers to support the roles and responsibilities. More efficient organisation of policy and regulatory resources across Government should also be investigated, to improve role clarity and the critical mass of existing small resources spread across several agencies.	IR-7
New oversight roles proposed as part of the Energy Security Response Framework should be implemented as soon as practicable, with interim measures/directives in place by 1 July 2017 where possible, and no later than the end of October 2017 to enable the first annual energy security assessment to be undertaken at the commencement of the 2017-18 dry season.	FR-6
A review of the Director of Energy Planning’s role, the <i>Energy Planning and Coordination Act 1995</i> and the <i>Electricity Supply Industry Act 1995</i> (at least as it relates to energy security matters) should be undertaken to modernise and streamline arrangements with the other reform considerations.	IR-8
The Monitor and Assessor role should consider forward gas supply and demand risks as part of its broader consideration of energy security. The Director of Gas Safety should be responsible for engaging and coordinating responses with industry and gas customers on potential or actual emergency gas supply risks as they emerge.	IR-10
The Department of State Growth should review the emergency management requirements for natural gas emergencies to ensure there are clear lines of accountability between the Director of Gas Safety and the Energy Security Coordinator.	FR*-5
<b>Priority Action 2: Strengthen independent energy security monitoring and assessment</b>	
Additional resources of sufficient size to maintain capability should be provided for the monitoring and assessing function. Funding for these resources could initially come via a Budget appropriation, though a regulatory charge on relevant market participants to ensure the function is sustainable would appear appropriate as a permanent funding source.	IR-4
The Monitor and Assessor role should publish an annual assessment of Tasmania’s energy security status and make available on a website a dynamic (at least monthly) forecast of energy supplies relative to forecast Tasmanian consumption, as well as an assessment of hydrological risk.	IR-9

<sup>4</sup> IR = recommendation made in the Interim Report; FR = recommendation made in the Final Report; FR\* = recommendation made in the Interim Report that has been substantially updated or changed in the Final Report. The wording of some Interim Report recommendations has been altered slightly to make actions more definitive (e.g. ‘should’ instead of ‘could’).

Recommendations	No. in Interim Report or Final Report <sup>4</sup>																								
Hydro Tasmania should undertake an annual review and forecasting process in October each year, near the end of the high inflow season between May and October. This should provide sufficient time to implement measures, if required, to maintain energy security over the dry period from November to April and beyond if dry conditions continue into May, as has historically occurred. The annual review should be independently verified by the Monitor and Assessor and the outcomes transparently made publicly available as part of the annual assessment.	IR-18																								
<b>Priority Action 3: Establish a more rigorous and more widely understood framework for the management of water storages</b>																									
A High Reliability Level (HRL) should be adopted as 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 Great Lake.	IR-12																								
The HRL profile should be set at the following levels at the beginning of each month: <table border="1" data-bbox="169 846 1125 913"> <thead> <tr> <th>Jan</th> <th>Feb</th> <th>Mar</th> <th>Apr</th> <th>May</th> <th>Jun</th> <th>Jul</th> <th>Aug</th> <th>Sep</th> <th>Oct</th> <th>Nov</th> <th>Dec</th> </tr> </thead> <tbody> <tr> <td>28.0%</td> <td>24.0%</td> <td>19.0%</td> <td>18.0%</td> <td>16.0%</td> <td>17.0%</td> <td>22.0%</td> <td>24.0%</td> <td>29.0%</td> <td>30.0%</td> <td>30.0%</td> <td>31.0%</td> </tr> </tbody> </table>	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	28.0%	24.0%	19.0%	18.0%	16.0%	17.0%	22.0%	24.0%	29.0%	30.0%	30.0%	31.0%	FR-7
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec														
28.0%	24.0%	19.0%	18.0%	16.0%	17.0%	22.0%	24.0%	29.0%	30.0%	30.0%	31.0%														
A Prudent Storage Level (PSL) should be set to create a 'storage buffer' from the HRL that is sufficiently conservative that the likelihood of storages falling below the HRL is very low.	IR-13																								
The PSL profile should reflect an operational energy in storage profile under average supply and demand conditions and be set such that storages remain at or above the HRL profile following an historically low three month inflow sequence.	FR-8																								
The PSL profile should be set at the following levels at the beginning of each month: <table border="1" data-bbox="169 1149 1125 1216"> <thead> <tr> <th>Jan</th> <th>Feb</th> <th>Mar</th> <th>Apr</th> <th>May</th> <th>Jun</th> <th>Jul</th> <th>Aug</th> <th>Sep</th> <th>Oct</th> <th>Nov</th> <th>Dec</th> </tr> </thead> <tbody> <tr> <td>38.0%</td> <td>35.2%</td> <td>32.4%</td> <td>29.9%</td> <td>29.2%</td> <td>28.8%</td> <td>29.4%</td> <td>31.4%</td> <td>35.4%</td> <td>38.7%</td> <td>40.1%</td> <td>39.3%</td> </tr> </tbody> </table>	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	38.0%	35.2%	32.4%	29.9%	29.2%	28.8%	29.4%	31.4%	35.4%	38.7%	40.1%	39.3%	FR-9
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec														
38.0%	35.2%	32.4%	29.9%	29.2%	28.8%	29.4%	31.4%	35.4%	38.7%	40.1%	39.3%														
The Minister for Energy should be responsible for final approval of the HRL and PSL profiles and any future changes to these.	FR-10																								
Future changes to the HRL and PSL profiles should be based upon advice from the Monitor and Assessor and should only be made when there are material changes to supply and/or demand.	FR*-11																								
Energy stored in Great Lake below the Environmental Extreme Risk Zone (EERZ) should be clearly identified as constrained when communicating total energy in storage levels.	IR-17																								
A transparent scale of escalating actions should be implemented as energy in storage approaches lower levels with higher energy security risk. The following response levels should be implemented: <ul style="list-style-type: none"> <li>• 'Commercial operation' – if storage levels are above the PSL, Hydro Tasmania operates commercially and with only routine reporting obligations.</li> <li>• 'Increased monitoring' – if Hydro Tasmania's forecasts indicate plausible scenarios of falling below the PSL, or storages actually falling below the PSL. Hydro Tasmania would provide the Monitor and Assessor with a recovery plan that demonstrated how storages are intended to be returned above the PSL.</li> <li>• 'Increased response' – if Hydro Tasmania's scenarios indicate plausible scenarios of needing to access storages below the HRL. Hydro Tasmania would be required to provide a recovery plan that demonstrated how storages will be maintained to avoid entering the HRL or, if deemed unavoidable, how storages will be returned above the HRL once entered.</li> <li>• 'Energy security reserve' – if operating storages under the HRL, Hydro Tasmania would be required to work with the Energy Security Coordinator to ensure the recovery plan is being implemented and is working as intended.</li> </ul>	IR-19																								
Hydro Tasmania must submit a robust HRL Recovery Plan to the Energy Security Coordinator for approval prior to accessing the energy security reserve.	FR*-4																								
Hydro Tasmania should be required, through an appropriately robust governance mechanism (legislation or through a ministerially directed mechanism), to comply with the proposed Energy Security Risk Response Framework.	IR-21																								

Recommendations	No. in Interim Report or Final Report <sup>4</sup>
The Energy Security Coordinator should design (in consultation with key stakeholders) a pre-planned scheme for large customer demand-side responses or provision of additional generation in response to energy security threats.	FR-14
Contingency measures should be evaluated using a competitive process to determine the most effective supply and/or demand measures, with key criteria used to select preferred options. The criteria should include cost, reliability and environmental impact.	IR-20
The Energy Security Coordinator should request that Hydro Tasmania provides early notice to major industrial users if energy in storage stays below the HRL and that potential buyback arrangements or additional generation may be required.	FR-15
More conservative assessments of hydro generation output and consideration of potential seasonal changes to average wind speeds should be included in energy security planning to account for the combination of climate change impact projections and historical rainfall variability. All historical low inflow sequences should be used to assess risks, not just those associated with more recent trends.	IR-22
Hydro Tasmania should specifically model lower inflows into Great Lake that are projected as a result of climate change, and advise the Monitor and Assessor of the implications for balancing storages across the hydro-electric system and any increased dependence on one (particularly Lake Gordon) or more storages.	IR-23
Hydro Tasmania and TasNetworks should closely engage with the Bureau of Meteorology and other experts to fully understand the opportunities to use improved climate modelling and weather forecasting for underlying assumptions of historical and future rainfall, wind variability and extreme events.	IR-24
The TER should, to the extent possible and as soon as practicable, undertake its independent appraisal of Basslink's compliance and asset management plans and publicly report on their adequacy.	FR*-1
Energy security planning should include planning for at least a six month Basslink outage.	IR-29
<b>Priority Action 4: Retain the TVPS as a backup power station for the present and provide clarity to the Tasmanian gas market</b>	
The TVPS, particularly the combined cycle gas turbine (CCGT), should be retained at least until there is a reliable alternative in place to mitigate against hydrological and Basslink failure risk.	IR-25
Commercial negotiations currently underway to resolve the gas commodity and transportation arrangements to support the TVPS should be resolved in a timely manner that allows for certainty for all gas market participants to secure gas supply beyond 2017.	FR-12
Should an arbitration process be invoked for gas transportation arrangements, and should the process not provide for preservation of existing arrangements pending determination of the arbitration, then the HRL and PSL profiles should be temporarily adjusted upward from the beginning of the dry season at 1 November 2017 until the arbitration process is finalised to mitigate against the increased energy security risk of not having the TVPS available.	FR-13
<b>Priority Action 5: Support new on-island generation and customer innovation</b>	
The Tasmanian Government should ensure that new entrant renewable energy development is able to establish in Tasmania where such an outcome is consistent with that which would be expected in a competitive market.	IR-30
The Tasmanian Government should prudently facilitate, enable and ensure there are no unnecessary barriers to consumer-controlled energy management opportunities and choices, as a contribution to reducing Tasmania's energy deficit, optimising network outcomes, improving competitiveness for consumers and positioning Tasmania as open to innovation.	IR-32





