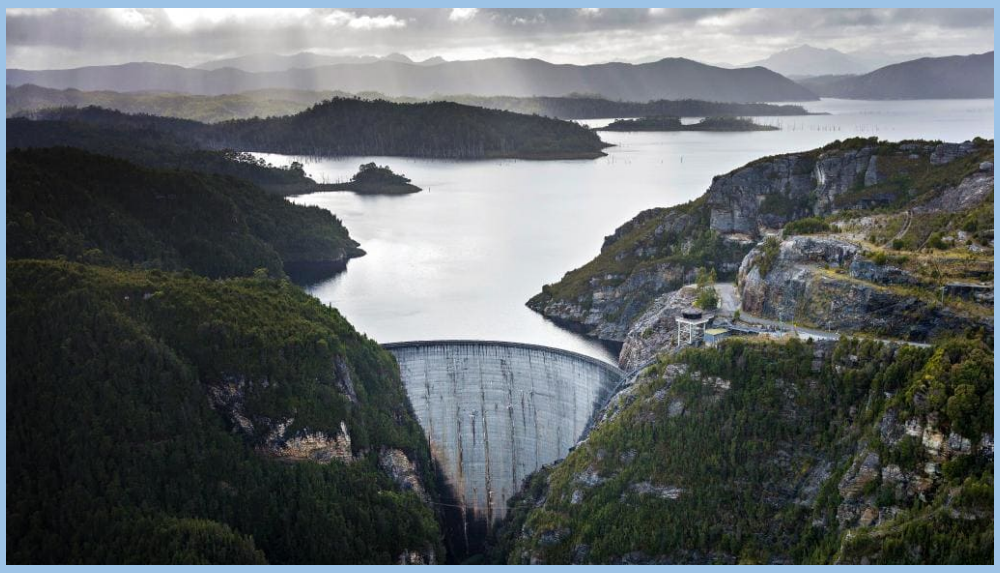
ENERGY IN TASMANIA REPORT 2017-18



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EXECUTIVE SUMMARY

Tasmanian electricity demand increased in 2017-18, by roughly 3.6 per cent. This was likely due in part to a 1.2 per cent increase in electricity customer numbers during 2017-18, but may also indicate increased customer confidence and economic activity.

Tasmanian on-island generation was considerably higher during 2017-18, rising some 9.7 per cent. All major Tasmanian generation sources showed increased output in 2017-18, with hydro generation output significantly higher than in the previous two years due to Hydro Tasmania's water storages sitting at around 40 per cent capacity for much of the year. Solar generation also increased, with more than 2 000 customers connecting new solar systems to the Tasmanian network. Due to this increase in generation, Tasmania was a net exporter of electricity via Basslink during 2017-18.

The energy supply industry in Tasmania experienced relatively few disruptions during 2017-18. The most significant of these occurred in May 2018, when strong wind and heavy rain caused widespread damage to TasNetworks' distribution assets in Hobart and South East Tasmania, leading to loss of supply for many customers.

Another noteworthy incident during 2017-18 involved third-party damage to the Basslink cable, which rendered it unavailable to transfer electricity for several weeks between March 2018 and June 2018. However, this did not result in any disruption to the Tasmanian energy supply, as Hydro Tasmania's water storages were sufficient to meet Tasmanian electricity demand during this time.

There were no significant electricity transmission or distribution reliability issues in 2017-18, with overall performance levels similar to those in previous years. However, the number and extent of weather related outages did lead to an increase in the number of communities performing poorly against certain reliability measures.

The State's natural gas distribution network and the Tasmanian Gas Pipeline linking Tasmania with Victoria did not experience any major reliability issues, with performance levels matching or improving on those seen in 2016-17.

In summary, Tasmanian electricity and natural gas suppliers met most of their respective performance standards during 2017-18. The main body of this report contains performance information and analysis for each major entity in the Tasmanian energy market.

KEY STATISTICS

Electricity Industry	2015-16	2016-17	2017-18
National Energy Market information[1]			
Tasmanian demand (GWh)	10 487	10 527	10 909
Tasmanian generation (GWh)	9 863	10 120	11 104
Hydro Tasmania			
Hydroelectric generation (GWh)	8 038	8 305	9 178
Woolnorth Wind Farm Holding			
Wind generation (GWh)	987	1 042	1 079
AETV			
Thermal generation (GWh)	769	785	838
Basslink[1]			
Imports (GWh)	1 097	1 372	878
Exports (GWh)	473	965	1 073
TasNetworks			
Supply interruptions (excluding Major Event Days)			
- Annual average outage duration (minutes)	248	252	282
- Annual average number of outages per customer	1.75	1.67	1.82
Poor performing distribution communities (out of 101)	26	27	35
Value of GSL payments ($m)	1.39	3.81	3.21
Customers with connected solar PV systems	25 007	27 094	29 273
Solar PV generation (GWh)	82	89	93
Aurora Energy			
Residential standard retail customers	209 762	214 733	220 049
Aurora Pay As You Go (APAYG) customers	26 670	23 641	21 076
Concession customers (including APAYG)	91 410	90 644	92 863
Business customers	37 811	37 020	37 514
Residential customers on payment plans	2 085	2 419	2 797
Natural Gas Industry	**2015-16**	**2016-17**	**2017-18**
Tas Gas Networks			
Volume of natural gas distributed (TJ)	2 656	2 577	2 701
Unplanned interruptions	280	148	57
Annual average interruption duration per customer (minutes)	59	58	6
Aurora Energy			
Residential customers	3 957	4 109	4 240
Business customers	121	133	141
Customers on a payment plan	70	87	108
Tas Gas Retail			
Residential customers	8 355	8 714	9 004
Business customers	788	902	854
Customers on a payment plan	2 828	3 124	3 237

[1] This information comes from National Electricity Market (NEM) data and may not directly align with other data presented in this report, which comes from the annual performance information each entity has reported to the Regulator.

1 INTRODUCTION

Section 10A of the *Electricity Supply Industry Act 1995* (ESI Act) allows the Regulator to prepare a state of the industry report for the Tasmanian electricity supply industry (ESI). The Regulator may prepare this report on its own initiative, or if directed by the Minister for Energy and the Treasurer.

Similarly, Section 8A of the *Gas Act 2000* (Gas Act) allows the Regulator to prepare a state of the industry report for the gas supply industry (GSI).

This Energy in Tasmania (EiT) 2017-18 Report provides:

- a Tasmanian National Electricity Market (NEM) summary;
- a Tasmanian retail-electricity market summary; and
- key performance information for the Tasmanian ESI and GSI.

The performance information is available in an Excel workbook on the Office of the Tasmanian Economic Regulator's (OTTER) website.

2 ELECTRICITY MARKET SUMMARY

The National Electricity Market (NEM) is a wholesale electricity spot market where supply and demand is met simultaneously in real-time through a centrally-coordinated dispatch process.

The NEM comprises five regional market jurisdictions (Queensland, New South Wales, Victoria, South Australia and Tasmania) interconnected into a single electricity transmission grid. The NEM's transmission network carries power from electricity generators to large industrial energy users and local electricity distributors across the five states. In Tasmania, Government Business Enterprises (GBEs) and State-owned Companies (SOCs) own and operate the majority of electricity generation and transmission assets.

NEM control centres aggregate and schedule electricity generation at five-minute intervals every day. Generators bid to provide the market with specified amounts of electricity at specified prices over set times. The Australian Energy Market Operator (AEMO) stacks these bids from cheapest to most expensive and aggregates the respective bid amounts until the size of the bid stack is equal to market demand. The bid price of the last generator dispatched to equalise supply and demand sets the regional dispatch price, while the average of the six dispatch prices in each half hour (ie trading interval) sets the spot price. All generators operating in a particular NEM region during a trading interval receive the spot price for any electricity they provide to the market irrespective of their initial bid price.

The Australian Energy Market Commission (AEMC) and the Australian Energy Regulator (AER) are responsible for overseeing and regulating the NEM. The AEMC is responsible for rule-making and responding to requests for rule changes, which usually come from NEM participants. The AER is responsible for enforcing and monitoring compliance with the National Electricity Rules (NER), as well as for economic regulation of electricity transmission and distribution in the NEM.

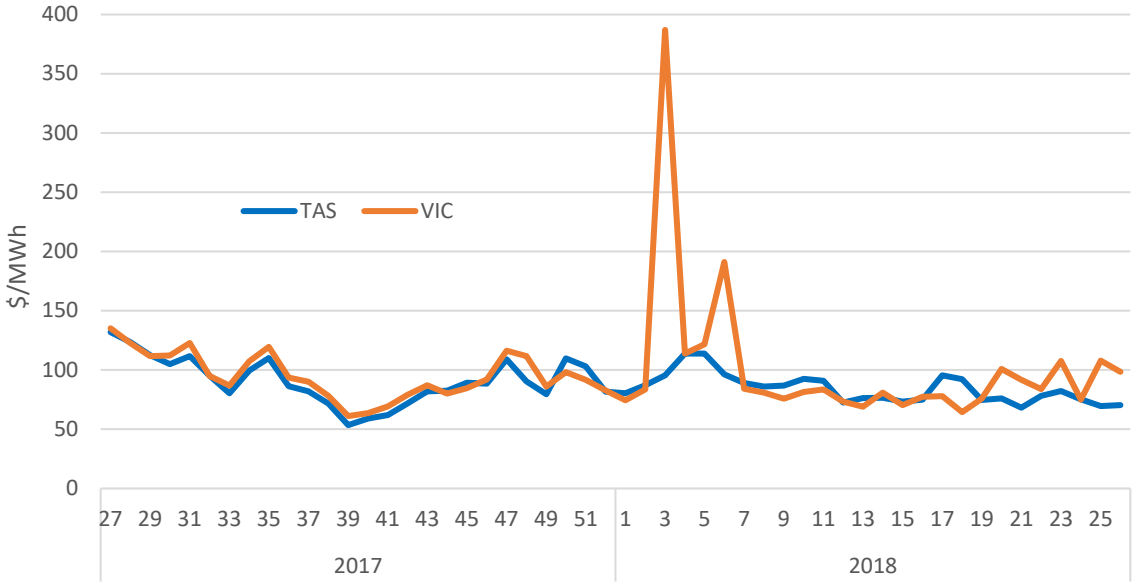
2.1 Wholesale Electricity Costs

As illustrated in Figure 2.1, spot prices in Tasmania generally tracked Victorian spot prices during 2017-18, with spot prices in both jurisdictions dropping considerably since the beginning of the financial year.

From January 2018 Tasmanian spot prices did not follow Victorian prices as closely as they did in the first half of 2017-18, as evidenced by the two large spikes in the Victorian spot price that do not appear in the Tasmanian spot price profile. Spot prices in the mainland NEM jurisdictions have become increasingly volatile in recent years as uncertainty continues regarding existing and new generation sources, and the future structure of the NEM. Management of Tasmanian hydro storages allows Tasmania to meet its electricity demands through on-island sources when spot prices in the mainland NEM are particularly high, reducing the Tasmanian electricity market's exposure to wholesale price volatility.

In addition to these factors, Tasmania's regulated pricing frameworks (standing offer and wholesale contracts) ensured that prices for most Tasmanian electricity consumers did not vary significantly during 2017-18.

Figure 2.1 Tasmanian and Victorian volume-weighted average electricity spot prices – 2017-18



To manage risks associated with the spot market, Tasmanian electricity retailers have the option of purchasing financial contracts under the Tasmanian wholesale contract regulatory framework. Under the framework, Hydro Tasmania is required to offer four regulated electricity derivative contracts. The framework includes a legislated derivatives instrument (known as the Wholesale Contract Regulatory Instrument) which specifies the terms and conditions for the contracts and the derivation of contract prices. The aim of providing regulated derivative contracts is to reduce the commercial risk faced by retailers operating in the Tasmanian market to a level comparable to the risk facing retailers in other regions of the NEM.

2.2 Tasmanian demand and generation statistics

The Tasmanian electricity generation fleet comprises hydroelectric, thermal, wind and embedded[2] generators. No single generator holds an exclusive licence to generate electricity in Tasmania. All generators with capacity greater than five MW must hold a licence issued by the Regulator and be registered as a generator in the NEM, unless exempted from registration by AEMO.

Table 2.1 outlines Tasmania's electricity demand and supply information. The source of the information in this table is aggregated NEM data and, therefore, may not directly align with entities' financial year performance information.

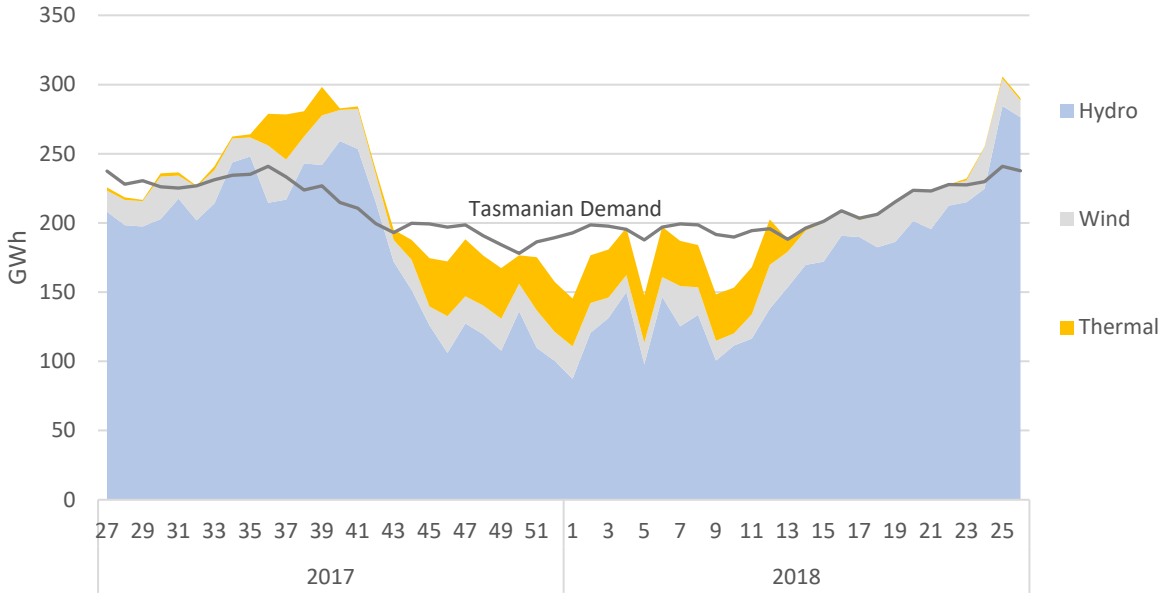
[2] Embedded generators are small generation units connected directly to the electricity distribution network.

Table 2.1 Tasmanian electricity demand and generation

	2013-14	2014-15	2015-16	2016-17	2017-18
Tasmanian demand (GWh)	10 720	10 513	10 487	10 527	10 909
Tasmanian Generation					
Hydroelectric	11 925	8 167	8 018	8 263	9 146
Thermal	893	18	781	794	847
Wind	996	898	1 009	1 063	1 112
Temporary Diesel	-	-	55	-	-
Basslink exports	3 113	772	473	965	1 073
Basslink Imports	20	2 203	1 097	1 372	878

Figure 2.2 illustrates Tasmanian electricity demand and generation sources for 2017-18 on a NEM week basis.[3] On this chart, a shortfall between generation and demand indicates Basslink imports, while generation above demand indicates Basslink exports.

Figure 2.2 Tasmanian electricity demand and generation source

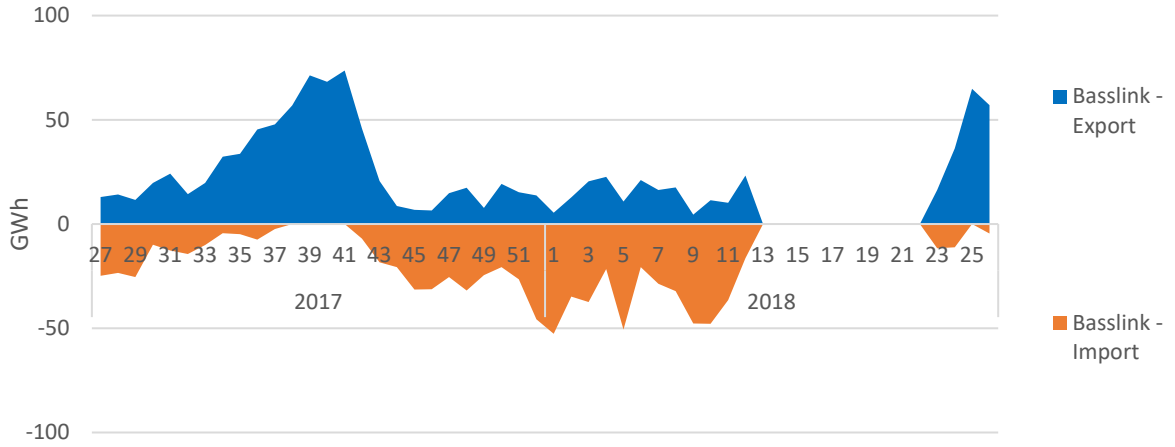


2.2.1 Basslink import-export

Hydro Tasmania exports or imports electricity via Basslink in response to NEM market conditions. Hydro Tasmania can also use Basslink imports to provide security of supply during periods where electricity demand exceeds supply in Tasmania. Figure 2.3 shows Basslink import and exports for 2017-18.

[3] NEM weeks run from Sunday to Saturday.

Figure 2.3 Basslink flows - 2017-18



Basslink was unavailable for electricity transfer between weeks 12 and 23 of 2018, following an unplanned outage. As on-island sources were sufficient to meet Tasmanian electricity demand over that period, the Basslink outage did not constitute a supply disruption event or have any apparent impact on Tasmanian wholesale electricity prices.

2.3 Frequency Control Ancillary Services

Frequency Control Ancillary Services (FCAS) maintain the frequency of the power system within a normal operating band centred around 50 Hz. AEMO states that it accepts frequency deviations occurring inside the normal operating band of 49.85 Hz to 50.15 Hz, as it would place an unrealistic burden on market participants to maintain a constant frequency of 50 Hz.

In general, FCAS are of two types:

- Regulation FCAS are services that correct for continual minor frequency deviations under typical load and generation conditions to maintain power system frequency within the normal operating band.
- Contingency FCAS are fast, slow and delayed services used to recover from larger frequency deviations arising from contingent events such as the loss of a generating unit, transmission line or major load.

As the frequency may need to adjust up or down to return to the normal operating band, each of these FCAS services is further categorised as a ‘raise’ or ‘lower’ service.

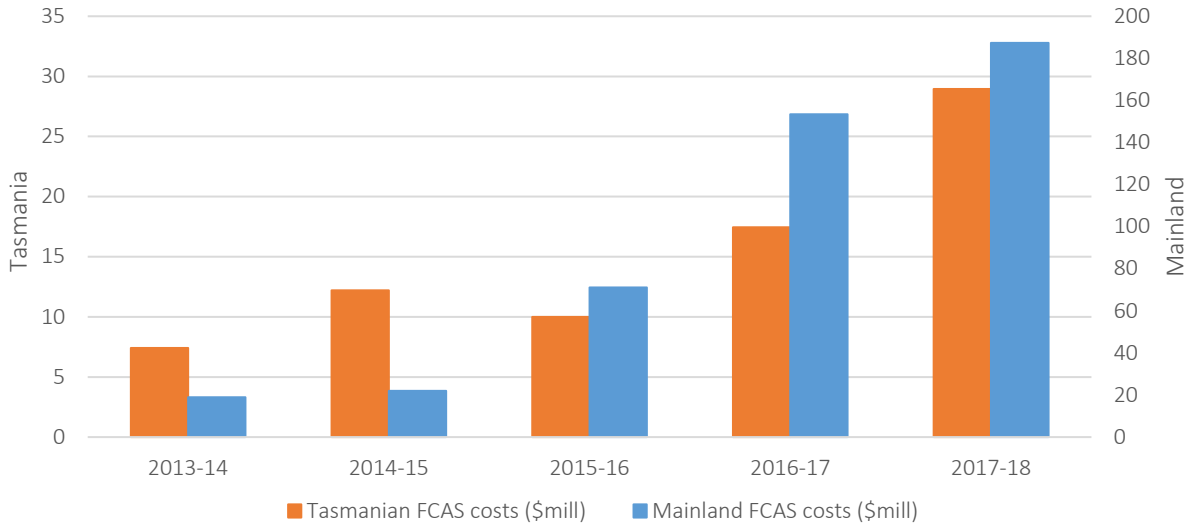
Each type of FCAS has a separate market that operates in parallel to the energy market in the NEM. AEMO purchases FCAS from suppliers in each of the eight FCAS markets in a similar manner to the energy bidding system, and recovers the costs of procuring FCAS from market participants as part of the settlement process. Regulation FCAS cost recovery is on a causer pays basis with costs split between generators and customers based on their role in restoring or deviating electricity system frequency. Contingency FCAS cost recovery is proportional to electricity generation or consumption, with raise services costs recovered from generators and lower services costs recovered from customers.

In Tasmania, sources of FCAS are:

- Hydro Tasmania; through its hydro generating units, the Tamar Valley Power Station (TVPS) (the Combined Cycle Gas Turbine can provide lower contingency FCAS) and the Adaptive Under Frequency Load Shedding Scheme[4] (AUFLS 2); and
- Basslink[5], where an increase or decrease in imports or exports can transfer FCAS to assist frequency control.

Figure 2.4 presents historical Tasmanian and mainland FCAS costs.

Figure 2.4 FCAS costs



The Regulator has been closely monitoring FCAS costs in Tasmania and in the broader NEM over the past year. FCAS costs in Tasmania increased considerably in 2017-18, with a similar increase observable in mainland NEM FCAS costs.

FCAS market participants report that, at a national level, rising electricity prices have increased the opportunity costs involved in providing FCAS (ie having to keep generation units on standby rather than either operating them to generate electricity or shutting them down completely) leading to increases in FCAS costs in recent years. AEMO further notes that the FCAS market is undergoing increasingly rapid changes in the number and nature of its participants as older, larger-scale synchronous generators, which have traditionally provided FCAS, are decommissioned, new intermittent renewable generation units come online and new technology providers enter the market.

In Tasmania specifically, AEMO's December 2014 reclassification of Basslink means that Basslink is temporarily unable to provide raise contingency FCAS into Tasmania. However, in addition to the likely expansion of AUFLS 2, trials are underway at the Musselroe Wind Farm, in conjunction with AEMO, to assess the technical capability of wind generators to provide reliable FCAS.

[4] Under frequency load shedding is a method of restoring electrical power system frequency by reducing the load on the system. AUFLS 2 allows Hydro Tasmania to enter contractual agreements with major electricity users to trip their loads to meet raise contingency FCAS requirements. The aim of the scheme is to adaptively calculate and trip a minimum amount of load while providing a fast, smooth and safe transition back to normal operating frequency.

[5] Basslink is unable to transfer FCAS services while flow is between approximately -50 MW and +50 MW ('No-Go' Zone) or at its operational limit, and is currently unable to supply raise contingency services into Tasmania due to reclassification.

AEMO reporting of FCAS recovery rates during 2017-18 shows that the impact of these increased FCAS costs has been borne primarily by generators rather than customers. The Regulator considers that the rises in FCAS costs seen in 2017-18 are representative of market conditions and has therefore not taken any regulatory action in relation to Tasmanian FCAS costs, but will continue to monitor FCAS market outcomes.

2.4 Tasmanian retail electricity market summary

Customers in Tasmania can purchase electricity through both individually negotiated market contracts and regulated tariffs (ie standing offer prices under standard retail contracts, which cover both prices and service standards). Regulated tariffs provide a safety net price for small customers, which is the maximum price that the Regulated Offer Retailer can charge those customers under a standard retail contract. Any small customer meeting the conditions for supply is entitled to receive supply from the Regulated Offer Retailer. In the Tasmanian market, the Regulated Offer Retailer is Aurora Energy Pty Ltd (Aurora Energy).

Under the National Energy Customer Framework (NECF), which has applied in Tasmania since 1 July 2012, retailers no longer require a licence to operate in Tasmania provided they have retailer authorisation from the AER. Since 1 July 2014, retailers with AER retailer authorisation have been free to enter the Tasmanian market. During 2017-18, three electricity retailers (ERM, Flow Power and Aurora Energy) supplied electricity to business customers. Aurora Energy continued to be the sole retailer supplying electricity to residential customers. Table 2.2 presents the number of Tasmanian electricity customers by type.

Table 2.2 Number of Tasmanian electricity customers by customer type

	2013-14	2014-15	2015-16	2016-17	2017-18
Total Tasmanian Electricity Customers (Excluding BSI)	268 373	272 528	274 649	275 865	279 072
Other retailer market share (other than Aurora Energy)	0.10%	0.10%	0.10%	0.17%	0.16%
Total small business customers	35 990	35 944	36 177	35 358	35 648
Other retailer small business market share	0.00%	0.20%	0.30%	0.47%	0.50%
Total large business customers	2 256	2 036	2 047	2 133	2 299
Other retailer large business market share	10%	14%	14%	14%	11%

3 HYDRO-ELECTRIC CORPORATION (HYDRO TASMANIA)

The Hydro-Electric Corporation, trading as Hydro Tasmania (Hydro Tasmania) is the major licensed electricity generator in Tasmania. It owns and operates 30 hydro power stations with a combined generating capacity of 2 283 MW. Since 2013, Hydro Tasmania has also been the owner and operator of the TVPS through its wholly owned subsidiary AETV Pty Ltd. Chapter 4 of this Report contains details of AETV's performance.

Hydro Tasmania also generates electricity on the Bass Strait Islands (Flinders and King Islands) from a combination of solar, wind and diesel sources, and provides electricity distribution and retail services on the Bass Strait Islands (BSI). The total capacity of Hydro Tasmania's BSI generation is 13.77 MW. Table 3.1 presents the total energy supplied and peak generation in relation to Hydro Tasmania's mainland Tasmanian and BSI operations.

Table 3.1 Energy supplied and peak generation [6]

	2013-14	2014-15	2015-16	2016-17	2017-18
Energy Supplied (GWh)	11 941	8 182	8 053	8 322	9 195
Peak Generation (MW)	2 139	2 187	2 161	2 025	2 160

Chapter 9 of this Report provides details of Hydro Tasmania's distribution and retail performance on the BSI.

3.1 Hydro generation

Hydro generation is the main source of electricity in Tasmania. Table 3.2 summarises hydro generation volumes.

Table 3.2 Hydro generation

	2013-14	2014-15	2015-16	2016-17	2017-18
Energy Supplied (GWh)	11 925	8 167	8 038	8 305	9 178

Table 3.3 summarises Hydro Tasmania's performance in terms of availability, forced outages and planned outages.

Table 3.3 Generation reliability

	2013-14	2014-15	2015-16	2016-17	2017-18	Target
Availability Factor	91.04%	85.11%	89.64%	85.20%	86.50%	>80.00%
Forced Outage Factor	0.72%	1.20%	1.67%	2.16%	2.60%	<2.00%
Planned Outage Factor	8.24%	13.69%	8.69%	12.64%	10.90%	<18.00%

[6] Includes generation on the Bass Strait Islands but excludes generation from TVPS and Woolnorth Wind Farm Holdings' wind farms.

Hydro Tasmania failed to meet its target for forced outage factor during 2017-18. The Regulator also notes that Hydro Tasmania's 10-Year Asset Management Plan forecasts reductions in the availability factor and increases in the planned outage factor over the next ten years as it repairs and refurbishes its aging asset base. Hydro Tasmania considers that hydro plant availability of 80 per cent, in combination with TVPS generation, Basslink imports and projected generation from new wind power developments, will be sufficient to meet Tasmanian demand during this time.

3.1.1 Water storages

Hydro Tasmania's water storage capacity is 14 437 GWh .[7] Since hydro generation is the major source of electricity in Tasmania, this water storage is crucial for energy security in the State. Between 2012 and 2016, the Minister for Energy required Hydro Tasmania to maintain a minimum water storage level of 25 per cent. Since June 2016, Hydro Tasmania is required to maintain a minimum water storage level of 30 per cent at 30 June of each year. Table 3.4 summarises Hydro Tasmania's water storage levels as at 30 June.

Table 3.4 Water storages as at 30 June

	2013-14	2014-15	2015-16	2016-17	2017-18
Water Storages (% full)	28.0	29.7	28.5	34.9	39.6

Hydro Tasmania exceeded its target of 30 per cent at the end of June 2018 with water storage levels at 39.6 per cent.

Figure 3.1 shows Hydro Tasmania's historical water storage levels from 1 July 2008 to 1 July 2018. This chart illustrates the highly seasonal nature of water storage levels, with levels generally increasing through the winter and spring months before decreasing during summer.

Figure 3.1 Historical water storage levels

Further information on Hydro Tasmania's water storages and the Tasmanian Government's Energy Security Framework is available in the Annual Energy Security Review published by the Economic Regulator in its capacity as Energy Security Monitor and Assessor.[8]

[7] Excludes Lakes Gardiner, Margaret and Plimsoll. Hydro Tasmania reports against this value for historical consistency.

[8] http://www.economicregulator.tas.gov.au/about-us/energy-security-monitor-and-assessor/annual-energy-security-review

4 AETV PTY LTD

AETV operates the TVPS and is a wholly owned subsidiary of Hydro Tasmania. The TVPS consists of a Combined Cycle Gas Turbine (CCGT) with a 209 MW generating capacity and four open cycle gas turbine (OCGT) units with a combined peak generating capacity of 178 MW. Table 4.1 summarises the TVPS's generation output.

Table 4.1 Generation summary

	2013-14	2014-15	2015-16	2016-17	2017-18
Energy Supplied (GWh)	893	18	769	785	838
Peak Generation (MW)[9]	5 374	1 318	7 901	7 655	6 080

Since 2016-17, AETV has operated TVPS to integrate with hydro generation and NEM conditions. The OCGT plant provides FCAS services while the CCGT supplements hydro generation as required, usually between September and June. The TVPS generation output corresponds to the thermal generation shown in Table 2.1.

4.1 Generation performance

Table 4.2 summarises TVPS performance in terms of availability, forced outages and planned outages.

Table 4.2 Whole-of-station generation performance

	2013-14	2014-15	2015-16	2016-17	2017-18	Target
Availability Factor	60.3%	73.7%	40.0%	58.5%	59.3%	77.64%
Forced Outage Factor	1.0%	0.7%	2.9%	0.7%	5.6%	<1.48%
Planned Outage Factor	38.7%	25.6%	57.1%	40.8%	35.1%	20.87%

Hydro Tasmania water storage levels were relatively high for much of 2017-18 so there was little need for CCGT support of hydro generation. AETV explained that, because of the loading it applies to CCGT operating statistics when calculating TVPS's performance measures, the very low level of CCGT activity during 2017-18 meant TVPS was unable to meet its availability and outage factor targets.

[9] Previous editions of the Energy in Tasmania Report included TVPS's maximum peak load rather than peak generation. Maximum peak load refers to output during a one-hour period, whereas peak generation refers to output during a 24-hour period.

5 WOOLNORTH WIND FARM HOLDING PTY LTD

Woolnorth Wind Farm Holding Pty Ltd (Woolnorth) owns and operates the Musselroe, Studland Bay and Bluff Point wind farms in Tasmania. Woolnorth is a joint venture between Shenhua Clean Energy and Hydro Tasmania. Shenhua Clean Energy owns a 75 per cent share in Woolnorth, with Hydro Tasmania owning the remaining 25 per cent.

The Musselroe Wind Farm has 56 turbines with a total generation capacity of 168 MW. The Studland Bay Wind Farm has 25 turbines with a total generation capacity of 75 MW while the Bluff Point Wind Farm has 37 turbines with a total generation capacity of 64.75 MW. Table 5.1 summarises the three wind farms' historical electricity generation.

Table 5.1 Wind generation summary

Energy Supplied (GWh)	2013-14	2014-15	2015-16	2016-17	2017-18
Bluff Point (64.75 MW capacity)	251	221	230	231	249
Musselroe (168 MW capacity)	482	433	515	563	564
Studland Bay (75 MW capacity)	262	244	242	247	266

5.1 Generation performance

Wind farms are intermittent generators because both their output and availability factor depends on the strength and direction of the wind. As with other forms of generation, repair and maintenance activities also affect the availability of wind farms. Table 5.2 shows Woolnorth's generator availability factor.

Table 5.2 Wind turbine generator availability factor

	2013-14	2014-15	2015-16	2016-17	2017-18	2017-18 Target
Bluff Point	97.39%	96.35%	97.08%	96.94%	96.49%	>97%
Musselroe	98.33%	98.95%	99.24%	98.54%	99.39%	>97%
Studland Bay	97.67%	97.97%	97.12%	98.06%	97.60%	>97%

5.2 Asset management

As in recent years, Woolnorth's asset management activities during 2017-18 involved repair and replacement of damaged equipment at its three wind farms. Wind turbine assets replaced during 2017-18 included blade bearings, gearboxes and generators. Woolnorth also replaced some 33 kV cabling assets at its Musselroe Wind Farm. There are no planned major capital works during 2018-19 for any of Woolnorth's three wind farms.

6 TASNETWORKS PTY LTD

TasNetworks Pty Ltd (TasNetworks) owns and operates the electricity transmission network in Tasmania and is the State's Transmission Network Service Provider (TNSP). The Tasmanian electricity transmission network consists of 1 068 km of 220 kV lines and 1 247 km of 110 kV lines, with some smaller transmission elements operating at 44, 33, 22 or 11 kV.

TasNetworks is also the State's Distribution Network Service Provider (DNSP). This distribution network connects to the transmission system at 47 'terminal substations' throughout mainland Tasmania (including Bruny Island) and supplies electricity to 288 737 installations.

6.1 Transmission performance

The Tasmanian Electricity Code (TEC) requires TasNetworks, as the TNSP, to report to the Regulator annually on the performance of the transmission network. Table 6.1 summarises key transmission system statistics.

Table 6.1 Key transmission-system statistics

	2013-14	2014-15	2015-16	2016-17	2017-18
System peak demand for period (MW)	1 685	1 715	1 747	1 721	1 694
Unserved energy (%)[10]	0.0009	0.0008	0.00004	0.00073	0.00072
Total system minutes off supply	2.92	2.63	0.14	2.38	2.47

There was little change in TasNetworks' key transmission-system statistics from 2016-17 to 2017-18, with overall network performance remaining strong.

6.1.1 Transmission network reliability

TasNetworks reports on the reliability of its transmission network based on the number and duration of any loss of supply (LOS) events. Table 6.2 shows TasNetworks' reliability performance measures.

Table 6.2 Transmission network reliability

LOS duration	2013-14	2014-15	2015-16	2016-17	2017-18	Target
> 0.1 system minute	7	5	0	2	4	≤15
> 1.0 system minute	0	0	0	1	1	≤2

TasNetworks experienced four LOS events greater than 0.1 system minute and one event greater than 1.0 system minute during 2017-18 (both within the target range). This continues the trend of TasNetworks meeting its transmission network reliability targets over the past five years.

[10] Unserved energy refers to customer demand that suppliers cannot deliver due to deficiencies in generation or network capacity.

6.1.2 Plant availability

Through its Service Target Performance Incentive Scheme (STPIS), the AER sets service standard targets that encourage transmission network operators to maintain and improve their performance. TasNetworks uses the STPIS targets for circuit availability as a measure of plant availability. Table 6.3 summarises TasNetworks' performance against its STPIS targets.

Table 6.3 Performance against STPIS targets

	2013-14	2014-15	2015-16	2016-17	2016-17	Target
Transmission line circuit availability (critical) (%)	99.42	99.48	99.74	98.90	98.93	≥99.13
Transmission line circuit availability (non-critical) (%)	99.47	99.71	99.75	99.63	99.86	≥98.87
Transformer circuit (%)	99.39	99.37	99.60	99.68	98.70	≥99.28
Capacitor bank (%)	99.31	98.10	99.49	99.77	98.25	≥99.00

TasNetworks was marginally below most of its STPIS targets for circuit availability in 2017-18, but met its availability target for non-critical transmission lines. TasNetworks stated that its circuit unavailability during the year was almost entirely due to planned outages for operating and capital works.

6.1.3 Outage duration

Unplanned outage duration for transmission lines and transformers is a useful measure of the effectiveness of a TNSP's management plans and operational responses to unexpected events. Table 6.4 shows the average unplanned outage durations for TasNetworks' assets compared to the STPIS targets set by the AER.

Table 6.4 Average unplanned outage duration (minutes)

	2013-14	2014-15	2015-16	2016-17	2017-18	Target
Transmission lines	174	236	437	267	686	≤326
Transformers	279	498	1 710	27	51	≤712

TasNetworks met its 2017-18 unplanned outage target for transformers, but reported a significant decline in its performance against the target for unplanned outages of transmission lines. This was due to repairs addressing third-party damage to a cable supplying the North Hobart Substation, requiring specialist equipment and outside expertise.

6.1.4 Major projects

TasNetworks reported that it has no current or imminent major capital works projects (ie works over $10 million) relating to transmission assets. This continues a trend of reduced capital works expenditure over recent years.

6.2 Distribution performance

The Tasmanian high voltage (HV) distribution network distributes electricity at 44, 33, 22 or 11 kV. There are 419 high voltage distribution feeders in Tasmania, categorised by the predominant supply area they service. The HV distribution network is best characterised as a rural overhead network, since most of the HV feeders and almost all the low voltage (LV) network are overhead cables. Underground

cables are restricted to central business districts, subdivisions and commercial centres in urban and suburban areas.

Distribution substations throughout Tasmania reduce incoming voltage to 230/400 volts and supply the majority of customers through the LV network. There are a number of HV customers with their own distribution substations, which take electricity supply directly at 22 kV and/or 11 kV, while highly energy intensive customers receive supply via dedicated distribution feeders.

Table 6.5 shows the total distribution customer aggregated electricity consumption in Tasmania, measured at the point of supply.

Table 6.5 Total distribution customer consumption

	2013-14	2014-15	2015-16	2016-17	2017-18
Customer consumption at point of supply (GWh)	4 112	4 314	4 328	4 227	4 334
Maximum demand (MW)	944	953	959	946	962

Total customer consumption in 2017-18 increased slightly compared to 2016-17 levels. The maximum demand for electricity from the distribution network was also slightly higher. Both of these figures have stayed relatively stable over the past five years, with only minor year-to-year variations.

6.2.1 Overall distribution network performance

The frequency and duration of interruptions to supply measure system reliability in the distribution network. TasNetworks reports these statistics as averages, termed SAIFI and SAIDI, totalled over a 12-month period.

- SAIFI is the System Average Interruption Frequency Index (measured in number of interruptions); and
- SAIDI is the equivalent measure for the duration of any interruptions (measured in minutes).

Table 6.6 and Table 6.7 present SAIFI and SAIDI measures for 2017-18 and the preceding three financial years, representing the frequency and duration of interruptions to supply that an average customer connected to the system would experience during those respective 12-month periods.

In 2017-18, TasNetworks reported SAIDI and SAIFI figures calculated based on the number of customers connected to its distribution network rather than on the apparent power in the network. This aligns the basis of TasNetworks' reporting to the Regulator with the basis of its reporting to the AER, but means that the SAIDI and SAIFI figures from previous Energy in Tasmania Reports are not directly comparable with the figures in the 2017-18 Report.

Table 6.6 Overall network performance (SAIFI)

	2014-15	2015-16	2016-17	2017-18
Planned	0.25	0.25	0.27	0.24
Unplanned	1.71	1.75	1.67	1.82
MED	0.50	0.28	0.30	0.41

Table 6.7 Overall network performance (SAIDI)

	2014-15	2015-16	2016-17	2017-18
Planned	54	58	67	63
Unplanned	307	248	252	282
MED	177	105	127	154

During 2017-18 there were six major event days (MEDs), compared to four in 2016-17. A MED is a day when, due to extreme events, the SAIDI exceeds a certain threshold set by the AER. In 2017-18, the threshold for a MED was 6.60 minutes. MEDs during 2017-18 were predominantly associated with extreme weather, for example the storms of May 2018 that caused severe wind and flood damage across Hobart and South East Tasmania.

6.2.2 Cause of supply interruptions

TasNetworks' field crews report on the causes of any supply interruptions once they have identified and repaired the relevant faults. The major identified causes of supply interruption include planned outages, vegetation, weather, wildlife, and asset failure. Figure 6.1 and 6.2 present a breakdown of supply interruption causes and their relative contributions to overall system SAIFI and SAIDI.

Figure 6.1 Contributions to system SAIFI by cause

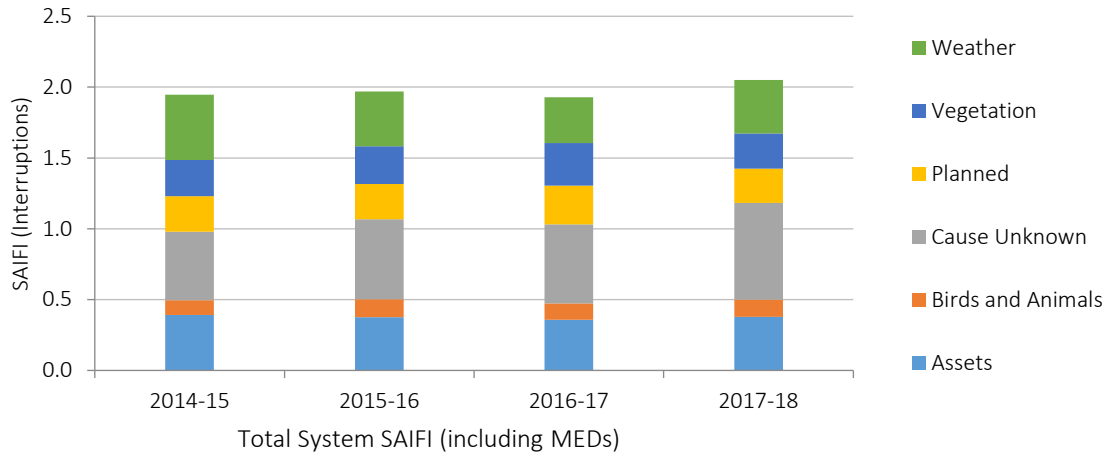
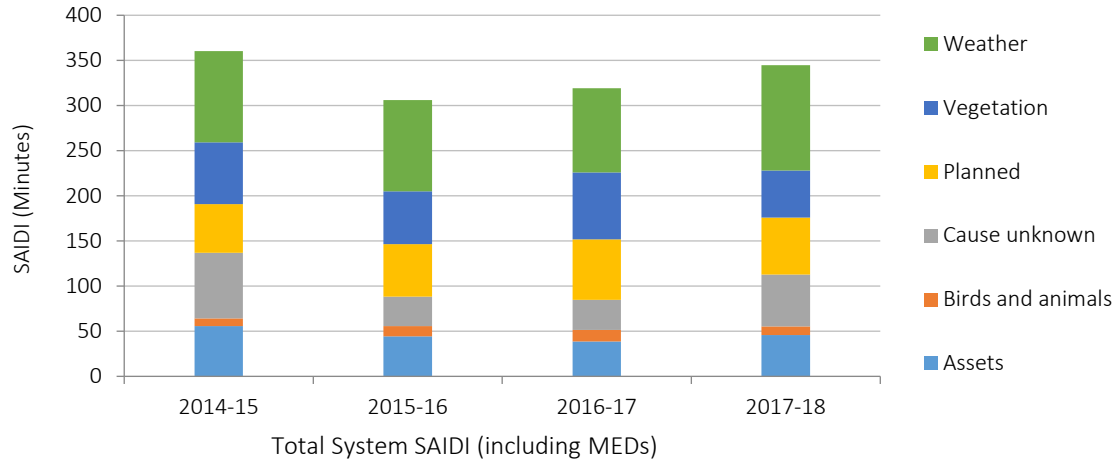


Figure 6.2 Contributions to system SAIDI by cause



TasNetworks reported that the majority of the weather related interruptions that occurred during 2017-18 were associated with MEDs, and that many of the 'cause unknown' events were also likely weather related.

6.2.3 Reliability of supply

To measure distribution supply reliability, Tasmania has 101 'supply reliability communities', with each community assigned to one of five supply reliability categories as follows:

- Critical infrastructure (1 community);
- High density commercial (8 communities);
- Urban and regional centres (32 communities);
- High density rural (33 communities); and
- Low density rural (27 communities).

The TEC sets limits for reliability of supply performance (ie frequency and duration of interruptions) at each category level. Table 6.8 shows TasNetworks' performance against the TEC reliability of supply limits.

Table 6.8 Reliability of supply performance

	2014-15	2015-16	2016-17	2017-18	Category target
Critical infrastructure					
SAIFI	0.45	0.30	0.42	0.15	<0.2
SAIDI	65	40	26	30	<30
High density commercial					
SAIFI	0.27	0.41	0.14	0.38	<1
SAIDI	23	32	18	70	<60
Urban and regional centres					
SAIFI	1.30	1.36	1.25	1.48	<2
SAIDI	187	162	168	227	<120
High density rural					
SAIFI	2.83	2.83	3.29	3.19	<4
SAIDI	546	472	601	544	<480
Low density rural					
SAIFI	4.21	4.18	3.86	3.72	<6
SAIDI	973	806	738	701	<600

During 2017-18, four out of the five reliability categories failed to meet the TEC SAIDI performance targets, the exception being the Critical Infrastructure category. TasNetworks has stated that this poor performance was attributable to severe weather events not only causing network outages but also hampering or delaying repair efforts. However, these weather events had less effect on the frequency of interruptions, with all reliability categories meeting their SAIFI performance targets for the year.

Table 6.9 summarises reliability category performance against TEC limits during 2017-18. Table 6.10 shows the total number of communities where TasNetworks failed to meet the TEC reliability of supply limits.

Table 6.9 Individual community performance against TEC limits

	SAIFI target	Non-complying communities	SAIDI target	Non-complying communities	Non-compliant in both measures
Critical Infrastructure (1)	0.2	0	30	0	0
High density commercial (8)	2	0	120	1	0
Urban and regional centres (32)	4	2	240	13	2
High density rural (33)	6	2	600	9	2
Low density rural (27)	8	0	720	12	0

Table 6.10 Non-complying communities

	2013-14	2014-15	2015-16	2016-17	2017-18
Non-complying with SAIFI limits	11	8	8	9	4
Non-complying with SAIDI limits	37	39	24	24	35
Non-complying with both measures	10	8	6	6	4

As implied by Table 6.8, TasNetworks exceeded the TEC SAIDI target for at least one community in all reliability categories other than Critical Infrastructure during 2017-18. The majority of these exceedances occurred on MEDs, though planned outages, vegetation, wildlife, asset failure and unknown causes also contributed to poor performance in Urban communities. Two communities each in the Urban and High Density Rural categories also failed to meet the SAIFI target. TasNetworks reported that this was due to outages with unknown causes.

Individual community performance reports are available in the 2017-18 EiT Performance Data Workbook on the OTTER website.

6.3 Guaranteed service level

There has been a guaranteed service level (GSL) scheme in Tasmania since 1 January 2004. Under this scheme, TasNetworks must make payments to customers who experience supply interruptions greater than the reliability supply threshold set for their particular reliability category. Table 6.11 lists the current reliability supply thresholds for each of the five reliability categories, and the associated GSL payment amounts.

Table 6.11 Reliability supply thresholds and GSL payments

	Timely restoration threshold (hours)		Reliable supply threshold (number)
Critical Infrastructure, High Density Commercial and Urban	>8	>16	10
Higher Density Rural	>8	>16	13
Lower Density Rural	>12	>24	16
GSL Payment	$80	$160	$80

Table 6.12 lists the number and amount of GSL payments made by TasNetworks.

Table 6.12 GSL payments

	2013-14	2014-15	2015-16	2016-17	2017-18
Timely restoration payments >8 or 12 hours					
Payments made	12 406	14 426	8 016	17 970	17 686
$ paid	992 480	1 084 720	641 280	1 437 600	1 414 880
Timely restoration payments >16 or 24 hours					
Payments made	10 005	13 514	3 631	13 053	9 290
$ paid	1 600 800	2 118 880	580 960	2 088 480	1 486 400
Reliable supply payments >10 Outages					
Payments made	1 442	928	1 477	840	2 815
$ paid	115 360	74 080	118 160	67 200	225 200
Reliable supply payments >13 Outages					
Payments made	1 803	380	394	1 980	906
$ paid	144 240	27 280	31 520	158 400	72 480
Reliable supply payments >16 Outages					
Payments made	1 009	899	196	716	148
$ paid	80 720	66 080	15 680	57 280	11 840
Total					
Payments made	26 665	30 147	13 714	34 559	30 845
$ paid	2 933 600	3 371 040	1 387 600	3 808 960	3 210 800

The number and amount of GSL payments made in 2017-18 were both somewhat lower than in 2016-17. TasNetworks explained that this was primarily due to a substantial decrease in the number of payments made for restorations taking longer than 16 or 24 hours.

6.4 Complaints about quality and reliability of supply

TasNetworks reports to the Regulator on the performance of its complaints and claims handling processes. Table 6.13 shows the number of quality and reliability of supply complaints received by TasNetworks.

Table 6.13 Complaints about supply quality and reliability

2013-14	2014-15	2015-16	2016-17	2017-18
712	537	479	505	581

6.5 Quality of supply

Quality of supply refers to the quality of the electricity supply waveform. Deviations from the standard 230/400 volt, 50 Hertz supply waveform can cause interference or interruption to customers' electricity supply. Several factors affect quality of supply including momentary voltage sags and swells, dips and spikes, harmonics, brownouts and other electrical noise or pollution. Table 6.14 presents TasNetworks' distribution performance in terms of the various quality of supply indicators.

Table 6.14 Quality of supply performance indicators

	2013-14	2014-15	2015-16	2016-17	2017-18
Over-voltage events due to high voltage injection events[11]	0	1	2	2	2
Customers receiving over-voltage due to high voltage injection[12]	0	12	15	6	3
Over-voltage events due to lightning[13]	902	21	81	24	20
Customers receiving over-voltage due to lightning[14]	73	39	127	39	40
Over-voltage events due to voltage regulation or other causes[15]	79	129	98	106	74

In addition to the events listed in Table 6.14, in December 2017 TasNetworks notified the Regulator that 338 of its customers were receiving electricity at voltages exceeding the TEC technical standard. By 30 June 2018, TasNetworks had resolved the overvoltage issue for most of the affected customers. The Regulator's 2017-18 Annual Report contains further details about this issue.

6.6 Customer service

TasNetworks gathers network performance information through its fault centre and reports the information it receives back from field crews regarding faults, repairs and restoration details.

In August 2015, TasNetworks implemented a new fault messaging system called MMS. This system can place outage information on both fault centre phones and TasNetworks' website. Customers are now able to input their postcode and receive outage information relating to their specific location and the system can hold an unlimited number of specific outage messages. If the messages are not sufficient to meet a customer's needs, or a customer has a new fault to report, the customer can speak to a member of the fault centre team for assistance. Table 6.15 lists the number of calls answered by members of TasNetworks' fault centre team.[16]

Table 6.15 Number of calls answered at fault centre

	2013-14	2014-15	2015-16	2016-17	2017-18
Calls answered	76 392	57 714	42 769	48 889	50 203

11 High voltage injection events relate to reported incidents involving contact between HV and LV lines and pass through of transmission over-voltage events.

12 The figure for the number of customers receiving over-voltage due to high voltage injection comes from the number of claims made by customers for damaged equipment relating to such events.

13 Over-voltage events due to lightning relates to the number of reported interruptions where the reported cause was lightning.

14 The figure for the number of customers receiving over-voltage due to lightning comes from the number of claims made by customers for damaged equipment relating to those events.

15 Figures for over-voltage events due to voltage regulation and other causes and the number of customers receiving over-voltage due to those events come from the number of complaints attended where a recording of the supply voltage verified the over-voltage situation.

16 Previous editions of the Energy in Tasmania Report listed the total number of calls made to TasNetworks' fault centre. With MMS resolving many of these calls, the Regulator and TasNetworks have agreed that the number of calls actually answered by fault centre operators is a more appropriate measure of TasNetworks' customer service performance.

6.7 Customer Charter payments

Some of TasNetworks' service standards carry a guarantee, which allows customers to claim a credit to their account within one month of TasNetworks failing to meet a specified service standard. These standards include:

- ensuring that new connections and reconnections are completed by the agreed date;
- providing at least four business days' notice to customers of planned interruptions to supply; and
- ensuring that faulty streetlights are repaired inside seven business days.

Table 6.16 shows the number and amount of Customer Charter payments made by TasNetworks.

Table 6.16 Customer Charter payments

	2013-14	2014-15	2015-16	2016-17	2017-18
New Connections					
Total	2 124	2 510	3 018	2 795	2 779
Completed by scheduled date	1 845	2 195	2 251	2 239	2 141
Percentage completed by scheduled date	86.9%	87.5%	74.6%	80.1%	77.0%
Customer Charter Payments	534	339	390	257	155
Total payment value	$61 210	$36 120	$41 670	$25 740	$16 410
Reconnections					
Total	33 337	30 348	29 913	27 041	25 162
Completed by scheduled date	32 998	29 209	29 851	26 909	25 056
Percentage completed by scheduled date	99.0%	96.2%	99.8%	99.5%	99.6%
Customer Charter Payments	0	0	0	0	0
Total payment value	$0	$0	$0	$0	$0
Planned interruptions					
Total	3 728	7 630	8 929	3 864	2 850
Customer Charter Payments	30	36	56	87	116
Total payment value	$1 020	$1 130	$1 860	$2 640	$4 040
Public Lights[17]					
Faults reported	2 262	2 869	2 441	2 627	2 062
Faults repaired in 7 Days	1 894	2 416	1 312	1 813	1 154
Faults not repaired in 7 Days	339	338	1 129	824	908
Customer Charter Payments	13	14	11	14	11
Total payment value	$990	$420	$330	$420	$330

TasNetworks' Customer Charter payments can vary considerably from year to year, though in recent years they have been trending downwards. Readers should note that the number of eligible events for Customer Charter payments does not necessarily correlate with the number of payments made in any given year, as not all customers will submit a claim to receive payment.

[17] Following changes to its Customer Charter in 2017-18, as of November 2017 TasNetworks no longer provides customer charter payments to customers who report faulty public lighting near their properties.

6.8 Embedded generation

Embedded generators are small-scale generation units that connect directly to the distribution network, as distinct from large power stations that transmit power into the distribution network via the transmission network. As the DNSP for Tasmania, TasNetworks must monitor and report on the number and capacity of embedded generation units connected to the Tasmanian distribution network.

6.8.1 Embedded generation over 0.5 MW

As of 30 June 2018, there were 14 embedded generation units with a greater than 0.5 MW capacity connected to the Tasmanian distribution network. These units include small-scale hydro, biomass and natural gas generators, and have a combined installed generation capacity of 31.02 MW with a 20.52 MW export capacity.

6.8.2 Photovoltaic generation

As of 30 June 2018, the Tasmanian distribution network had 29 273 photovoltaic (PV) generation units connected to it with a total generating capacity of 112.6 MW.

In accordance with Division 5A of the ESI Act, many customers with embedded generation installations are entitled to a payment from their retailer for the electricity they export into the distribution network. Customers receive either the transitional FiT or the standard FiT.[18] Customers are only entitled to receive the transitional FiT for billing periods or parts of billing periods ending before 1 January 2019. The State Government is reviewing Tasmanian FiT arrangements to determine the conditions that will apply following cessation of the transitional FiT.

Table 6.17 summarises the details of embedded PV generation units connected to the Tasmanian distribution network.

Table 6.17 Solar PV connections

	2013-14	2014-15	2015-16	2016-17	2017-18
Total generating capacity (MW)	62.8	85.8	87.5	98.0	112.6
Electricity supplied (GWh)	42.5	71.3	82.0	89.1	92.9
Customers connected at end of year	20 328	22 940	25 007	27 094	29 273
New connections during year	5 926	2 469	2 082	2 101	2 030
Customers with transitional FiT rate	18 950	18 792	17 961	17 194	16 424
Amount paid to retailers for transitional FiT ($mill)	4.13	12.67	13.02	11.68	10.26

[18] The transitional FiT is available to customers with installations connected prior to 31 August 2013, or with installations approved for connection prior to 31 August 2013 that were connected or upgraded prior to 31 August 2014. Customers with installations connected after 31 August 2014 receive the standard FiT.

7 BASSLINK PTY LTD

Basslink is a High Voltage Direct Current electricity interconnector comprising converter technology and transmission assets that connect the Tasmanian power system to the Victorian power system. Basslink Pty Ltd (BPL) is the owner, operator and maintainer of the Basslink infrastructure. The Regulator does not regulate BPL, but licences 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. This link provides a continuous rated export capacity of 500 MW from Tasmania and an import capacity up to a maximum of 480 MW.[19] A dynamic rated maximum export capacity of up to 630 MW is available for limited periods. However, the interconnector rarely operated above its continuous rated export capacity during 2017-18.

There are two contracts governing the operation of Basslink: the Basslink Operations Agreement (BOA) and the Basslink Services Agreement (BSA). These two agreements are independent of each other and contain different performance obligations for Basslink.[20] The BOA is the contractual mechanism between the State of Tasmania and the operators of Basslink and, amongst other things, sets out Basslink's performance targets. The BSA is the agreement between Hydro Tasmania and BPL. It establishes the rights and obligations of both parties regarding the operation of Basslink and includes a number of financial incentives relating to Basslink's performance in terms of its availability.

7.1 Basslink performance

The Regulator does not set any performance measures for Basslink. However, BPL provides annual performance information to the Regulator as required under the conditions of its transmission licence.

On 24 March 2018, a third-party damaged Basslink equipment during routine maintenance at its Victorian transition station. The resultant unplanned outage caused a temporary separation of Tasmania from the mainland power grid. Following complex technical repairs, which required equipment and personnel from overseas, Basslink resumed normal operations on 5 June 2018. Table 7.1 shows Basslink performance data.

Table 7.1 Basslink performance

	2013-14	2014-15	2015-16	2016-17	2017-18
Basslink availability (%)	98.77	98.71	99.60[21]	98.72	79.77
Minutes unavailable	6 462	6 780	2 074	6 273	106 329
Total unplanned outages	4	2	1	4	1

[19] Measured at the Tasmanian connection point.

[20] More detail on the contents of these agreements is available in *An Independent Review of the Tasmanian Electricity Supply Industry Final Report Volume II, March 2012*. The report is available at http://www.electricity.dpac.tas.gov.au/final_report.

[21] In the 2015-16 Performance Report it submitted to the Regulator, Basslink reported that the interconnector was available as per contractual agreements for 99.60 per cent of the time during 2015-16. Therefore, Basslink considered that the 20 December 2015 to 14 June 2016 interconnector outage did not affect its performance in this regard.

8 AURORA ENERGY PTY LTD

Aurora Energy is the dominant electricity retailer in Tasmania. Aurora Energy provides both standing offer (regulated) and unregulated electricity products to customers on mainland Tasmania (including Bruny Island). Aurora Energy also retails natural gas.

Under the NECF that came into effect on 1 July 2012, electricity retailers in Tasmania no longer require a licence provided they have retailer authorisation from the AER. However, in accordance with a direction issued under Regulation 13 of the *Electricity Supply Industry Regulations 2008* the Regulator requires Aurora Energy to report on its retail performance against the same measures as those set by the AER. Table 8.1 presents Aurora Energy's electricity customer data.

Table 8.1 Electricity customers

	2013-14	2014-15	2015-16	2016-17	2017-18
Standing Offer					
Residential customers	199 487	204 936	209 762	214 733	220 049
Residential customers with a concession (excluding APAYG customers)	74 177	76 325	77 581	78 185	81 559
Small business customers	32 315	32 885	30 579	30 654	31 276
Market Offer					
Residential customers (APAYG)	30 640	29 612	26 670	23 641	21 076
APAYG Customers with a concession	14 253	14 701	13 829	12 459	11 304
Small business customers	3 671	2 996	5 479	4 537	4 192
Large business customers	2 036	1 761	1 753	1 829	2 046
Total Customers	268 149	272 190	274 243	275 394	278 639

The number of customers using Aurora Energy's pay as you go products has steadily declined over the past five years. Aurora Energy does not allow customers to install new Aurora Pay As You Go (Aurora PAYG) meters because the technology used to support Aurora PAYG is reaching the end of its functional life. However, the Regulator understands that Aurora Energy will launch a new product, called Aurora Pay As You Go Plus (Aurora PAYG+), in the first quarter of 2019 with a view to decommissioning the current Aurora PAYG product by 31 December 2019. Aurora PAYG+ will be a digital product using the data from advanced meters to give customers greater visibility and control of their energy use, and will include various other features that are not available through the current product.

8.1 Electricity retail performance

Table 8.2 presents a summary of Aurora Energy's call centre performance.

Table 8.2 Call centre performance (electricity)

	2013-14	2014-15	2015-16	2016-17	2017-18
Total calls	359 204	339 521	320 602	305 630	328 638
Calls answered in 30 seconds (%)	74.5	71.4	73.6	73.5	75
Average time to answer calls (seconds)	34	46	40	21	19.5
Calls abandoned (%)	2.1	2.8	2.9	2.7	2.9

Table 8.3 presents a summary of the complaints Aurora Energy has received.

Table 8.3 Complaints summary (electricity)

	2013-14	2014-15	2015-16	2016-17	2017-18
Billing complaints	3 306	6 174	6 108	7 767	11 687
Marketing	14	2	0	0	0
Customer transfer	12	0	1	0	0
Other	974	1 895	1 909	2 368	5 896
Total	4 306	8 071	8 018	10 135	17 583

Aurora Energy became responsible for metering work during 2017-18 under the Power of Choice (Metering Competition) industry reforms. Aurora Energy reported that, along with an improved internal focus on identifying and registering any customer dissatisfaction, the metering competition changes have contributed to an increase in complaint levels.

8.2 Electricity customers experiencing payment difficulties

The NECF requires Aurora Energy to provide alternative payment plans for customers experiencing financial difficulties. Aurora Energy:

- offers several payment options to help customers work through financial difficulties;
- runs the Your Energy Support (YES) program, which provides affordable energy options for vulnerable households; and
- participates in the Centrepay scheme, whereby customers receiving Centrelink payments can opt to have scheduled bill payments automatically debited from their fortnightly Centrelink payments.

Table 8.4 shows the number of Aurora Energy's electricity customers experiencing payment difficulties.

Table 8.4 Electricity customers experiencing payment difficulties

	2013-14	2014-15	2015-16	2016-17	2017-18
Centrepay customers	5 787	6 142	6 682	7 792	8 621
Residential customers (excluding YES customers) repaying a debt	5 945	4 229	3 676	3 562	3 710
Average amount of debt	$704	$706	$739	$756	$776
Small business customers repaying a debt	498	274	188	167	162
Average amount of debt	$1 136	$1 138	$885	$871	$386
Residential customers on payment plans	2 956	2 376	2 085	2 419	2 797
Customers on YES program	987	1 663	2 065	2 208	3 251
YES customers with concession	780	1 345	1 632	1 728	2 492

Aurora Energy explained that the substantial increase in the number of customers on the YES program during 2017-18 is due to improvements in its processes for earlier identification of customers experiencing energy affordability issues and referring them to the program.

8.3 Electricity disconnections and reconnections

Aurora Energy reports to the Regulator on the number of standard metered customers disconnected and/or reconnected to TasNetworks' electricity distribution network. These numbers exclude any customers using APAYG products who self-disconnect. Table 8.5 shows the number of Aurora Energy electricity customer disconnections and reconnections.

Table 8.5 Disconnections and reconnections

	2013-14	2014-15	2015-16	2016-17	2017-18
Disconnections					
Residential	1 555	1 046	1 172	1 016	818
Business	125	68	83	83	42
Reconnections within seven days – same name					
Residential	741	488	524	476	410
Business	22	20	24	22	6
Customers disconnected more than once in the last 24 months	130	136	70	68	53

The number of Aurora Energy business electricity customers disconnected from the network during 2017-18 decreased by almost 50 per cent from the previous year. Aurora Energy reported that it made a particular effort in 2017-18 to help small businesses resolve their payment difficulties and avoid subsequent disconnections.

8.4 Electricity Community Service Obligations

Community Service Obligations (CSO) are contractual arrangements between the Tasmanian Government and electricity retailers whereby retailers receive a subsidy in return for

providing electricity price concessions to pensioners and Health Care Card holders. Aurora Energy received $40.1 million from the Tasmanian Government to fund its community service obligations during 2017-18.[22] Table 8.6 details Aurora Energy's CSO payments.

Table 8.6 Community Service Obligation payments received

	2013-14	2014-15	2015-16	2016-17	2017-18
CSO payments ($million)	36.7	37.2	38.4	40.9	40.1

8.5 Gas retail performance

In addition to its electricity retail activities, Aurora Energy also holds a licence to retail natural gas in Tasmania. Aurora Energy sells gas to approximately 30 per cent of the Tasmanian market. Table 8.7 shows Aurora Energy's gas customer data.

Table 8.7 Gas customers

	2013-14	2014-15	2015-16	2016-17	2017-18
Residential customers	3 697	3 836	3 957	4 109	4 240
Business customers	117	119	121	133	141

Table 8.8 summarises Aurora Energy's gas customer call centre performance and the number of complaints received.

Table 8.8 Call centre and complaints performance (gas)

	2013-14	2014-15	2015-16	2016-17	2017-18
Call Centre					
Total calls	356	155	91	756	931
Calls answered in 30 seconds (%)	72	72	73	70	72
Complaints	58	119	118	133	243

8.6 Gas customers on payment plans

Aurora Energy reports to the Regulator on the number of its gas customers who have entered arrangements to help manage payment of their accounts, as shown in Table 8.9.

[22] Aurora Energy 2018 Annual Report, page 56.

Table 8.9 Gas customers on payment plans[23]

	2013-14	2014-15	2015-16	2016-17	2017-18
Residential customers	124	133	70	87	108
Average amount of debt	$500	$569	$276	$327	$330
Business customers	0	0	0	0	0
Average amount of debt	$0	$0	$0	$0	$0

8.7 Gas disconnections and reconnections

Aurora Energy reports to the Regulator on the number of metered gas customers disconnected from the gas distribution network due to non-payment. Aurora Energy also reports to the Regulator on the number of customers subsequently reconnected to the gas distribution network. Table 8.10 shows the number of Aurora Energy gas customer disconnections together with reconnections.

Table 8.10 Gas customer disconnections and reconnections

	2013-14	2014-15	2015-16	2016-17	2017-18
Disconnections					
Residential	42	53	61	46	39
Business	0	1	0	0	0
Due to suspected illegal use of gas	0	0	1	0	2
Reconnections – same name					
Residential	10	7	8	10	5
Business	0	0	0	0	0

[23] While Table 8.9 reports the average amount of debt held by customers on a payment plan, readers should note that not all customers enter payment plans due to debt.

9 BASS STRAIT ISLANDS

Hydro Tasmania provides electricity generation, distribution and retail services on the BSI.[24] There are no transmission networks on the BSI.

Electricity generated on King Island comes from a combination of:

- five diesel generators (7.20 MW),
- five wind turbines (2.45 MW);
- a solar array (0.1 MW); and
- domestic solar (approximately 0.8 MW)

On Flinders Island, electricity generation comes from a combination of:

- four diesel generators (2.94 MW);
- one wind turbine (0.9 MW);
- privately owned wind generators (0.3 MW);
- a solar array (0.175 MW); and
- domestic solar (approximately 0.5 MW).

Table 9.1 shows customer information for Hydro Tasmania's BSI operations.

Table 9.1 Bass Strait Island customer information

	2013-14	2014-15	2015-16	2016-17	2017-18
Flinders Island					
Residential customers	551	600	602	574	586
Business customers	119	140	149	144	163
Annual consumption (MWh)	3 573	4 045	3 545	4 364	4 577
Connected kVA	6 245	6 350	6 350	6 350	6 350
King Island					
Residential customers	939	1 036	1 027	977	969
Business customers	211	290	279	288	309
Annual consumption (MWh)	10 350	10 944	9 188	10 623	11 984
Connected kVA	16 443	16 703	16 703	16 703	16 703

[24] For the purposes of this report, the BSI include King and Flinders Islands but exclude Cape Barren Island and all other islands in Bass Strait.

9.1 BSI generation performance

Table 4A.6 of the TEC sets performance targets for electricity generation on the BSI. Table 9.2 shows the generation performance on Flinders and King Islands.

Table 9.2 Bass Strait Islands generation performance

	2013-14	2014-15	2015-16	2016-17	2017-18	Target
Flinders Island						
System blackout events	1	5	9	19	8	<20
Average restoration time (minutes)	8	40.25	10	29.93	23.50	<12.50[25]
King Island						
System blackout events	3	0	0	0	1	<8
Average restoration time (minutes)	1	0	0	0	6	<13.75[26]

As shown in Table 9.2, King Island experienced a single system blackout event relating to generation equipment during 2017-18. This was the first system blackout event on King Island since 2013-14. Hydro Tasmania attributes this high-level of performance to the commissioning of the King Island Renewable Energy Integration Project (KIREIP) in 2013.

Hydro Tasmania's new Flinders Island Hybrid Energy Hub, commissioned in November 2017, integrated renewable energy sources to the Flinders Island generation mix and has substantially reduced the incidence of system blackout events on Flinders Island from 19 in 2016-17 to eight in 2017-18. Hydro Tasmania expects that a full year of Energy Hub operation should see the incidence of system blackouts decrease further in 2018-19.

9.2 BSI distribution system performance

9.2.1 King Island

The King Island electricity distribution network consists of four 11 kV overhead feeders of approximately 400 km in total length. There are also several short sections of underground 11 kV cable totalling about 1.2 km in length. Table 9.3 summarises the performance of the King Island distribution network.

[25] This is the target restoration time for outages occurring between 06:00 and 21:59. The target restoration time for outages occurring between 22:00 and 05:59 is 22.50 mins.

[26] This is the target restoration time for outages occurring between 06:00 and 21:59. The target restoration time for outages occurring between 22:00 and 05:59 is 23.75 mins.

Table 9.3 King Island distribution performance

	2013-14	2014-15	2015-16	2016-17	2017-18	Target
Industrial Feeder						
SAIFI	2.01	0.05	0.00	0.47	2.41	<6
SAIDI	336	27	1	112	791	<480
Currie Feeder						
SAIFI	2.31	0.18	0.09	1.00	2.45	<6
SAIDI	296	30	8	143	731	<480
Grassy Feeder						
SAIFI	9.88	6.66	2.40	5.74	6.29	<8
SAIDI	2 179	1 074	194	5 438	1 402	<600
Cape Wickham Feeder						
SAIFI	8.69	5.03	2.41	3.10	3.75	<8
SAIDI	1 493	549	54	563	1 034	<600

Hydro Tasmania experienced several lengthy unplanned outages of its King Island feeders during 2017-18. More than 50 per cent of outages were due to vegetation outside clearance zones, extreme weather or wildlife strikes. Hydro Tasmania is focusing on asset management and vegetation control among other measures to improve the performance of these feeders.

9.2.2 Flinders Island

The Flinders Island electricity distribution network consists of three 11 kV overhead feeders of approximately 330 km in total length. There is no underground 11 kV feeder cabling on Flinders Island. Table 9.4 summarises the performance of the Flinders Island distribution network.

Table 9.4 Flinders Island distribution performance

	2013-14	2014-15	2015-16	2016-17	2017-18	Target
Whitemark Feeder						
SAIFI	1.42	1.46	0.50	1.80	11.89	<6
SAIDI	51	126	60	26	779	<480
Palana Feeder						
SAIFI	4.83	6.94	1.14	6.00	10.92	<8
SAIDI	299	207	29	274	407	<600
Lady Barron Feeder						
SAIFI	6.18	2.75	1.30	2.44	10.34	<8
SAIDI	413	110	216	103	566	<600

Hydro Tasmania reported that the commissioning and ongoing configuration of the new Energy Hub on Flinders Island resulted in a number of interruptions to feeder operation during 2017-18. The Whitemark feeder was also out of service for seven hours while being upgraded in June 2018.

9.3 BSI retail performance

Hydro Tasmania's retail arm, Momentum Energy, sells electricity to customers on the BSI. The TEC requires Hydro Tasmania to report on its BSI retail performance against the same measures required of authorised retailers by the AER. Table 9.5 summarises Hydro Tasmania's BSI retail performance.

Table 9.5 Bass Strait Islands retail performance

Performance measure	2013-14	2014-15	2015-16	2016-17	2017-18
Call centre					
Total calls	747	517	686	801	981
Calls answered in 30 seconds (%)	67	77	86	91	93
Average time to answer calls (seconds)	26	20	17	16	7
Calls abandoned (%)	2	2	1	1	1
Complaints					
Billing complaints	77	39	2	0	3
Other	5	4	0	2	2
Total	82	43	2	2	5
Residential customers experiencing payment difficulties (excludes hardship customers)[27]					
Number repaying a debt	n/a	120	254	135	76
Average amount of debt ($)	n/a	1 023.00	501.08	875.60	965.95
Business customers experiencing payment difficulties					
Number repaying a debt	n/a	16	51	24	19
Average amount of debt ($)	n/a	344.00	1 943.26	598.59	435.24
Customers on hardship program	n/a	9	25	17	15

The number of both residential and business customers experiencing payment difficulties declined in 2017-18 compared with 2016-17. The number of customers on the hardship program also fell slightly.

9.4 BSI Community Service Obligations

Due to the islands' isolation, the cost of supplying electricity on the BSI is significantly higher than on mainland Tasmania despite the replacement of some diesel generation with solar PV and wind turbines. To offset this, the Tasmanian Government provides a BSI Community Service Obligation (CSO). The CSO

[27] The numbers reported here for 2014-15 and 2015-16 are not the same as the numbers reported in previous *Energy in Tasmania* reports. In its performance reporting for 2016-17, Hydro Tasmania informed the Regulator that in previous years its average debt values for BSI customers were incorrectly calculated based on all customers, including those with zero and credit balances. The Regulator has altered the 2014-15 and 2015-16 numbers in Table 9.5 to provide the corrected average debt values. The figures in Table 9.5 are therefore not comparable with those in previous Energy in Tasmania Reports.

is a contractual arrangement between the Tasmanian Government and Hydro Tasmania, which the parties re-negotiate periodically.

The CSO:

- provides direct concessions to BSI customers who are pensioners; and
- subsidises the costs incurred by Hydro Tasmania in supplying electricity to BSI customers.

In 2017-18, the net cost of the CSO to the Tasmanian Government was $10.0 million as shown in Table 9.6. [28]

Table 9.6 CSO payments received by Hydro Tasmania ($million)[29]

	2013-14	2014-15	2015-16	2016-17	2017-18
CSO payment	9.2	9.6	11.4	9.9	10.0

9.5 Price comparison

Noting Section 9.4, Table 9.7 compares electricity prices paid by customers on the BSI with the regulated standing offer electricity prices paid by residential and business customers on mainland Tasmania during 2017-18, in terms of both supply charges (fixed/service) and energy (usage) charges.

Table 9.7 Electricity price comparison - Momentum (BSI) and Aurora Energy (mainland Tasmania) for 2017-18

	Momentum	Aurora Energy	Aurora Energy
	Tariff 51	Tariff 31 Residential light and power	Tariff 22 Business light and power
Service charge (including meter charges) (cents per day)	89.35	92.74	99.88
Energy (cents per kWh)	27.84	25.9	33.18 (first 500 kWh/qtr) 24.55 (additional use/qtr)

The following charts compare the annual electricity bills for a typical residential customer and a typical business customer on the BSI with those on the Tasmanian mainland, based on the method and assumptions used for the Regulator's January 2018 *Comparison of Australian Standing Offer Energy Prices*. Figure 9.1 compares a BSI residential customer on Momentum Energy Tariff 51 with mainland Tasmanian customers on Aurora Energy Tariff 31 and a combined Tariff 31/Tariff 41[30] (the most common tariff combination in mainland Tasmania), assuming a total annual usage of 7 500 kWh and a 45/55 per cent split between Tariff 31 and Tariff 41 usage. The comparison suggests that BSI residential customers pay more per year for electricity than do mainland Tasmanian customers, particularly those mainland Tasmanian customers on the Tariff 31/Tariff 41 combination.

[28] Hydro Tasmania 2018 Annual Report, page 70.

[29] Hydro Tasmania reports CSO payments figures on the cash basis accounting method, ie the figures in Table 9.6 show the value of payments received rather than payments incurred.

[30] Tariff 41 is Aurora Energy's Heating and Hot Water tariff.

Figure 9.1 Residential comparison

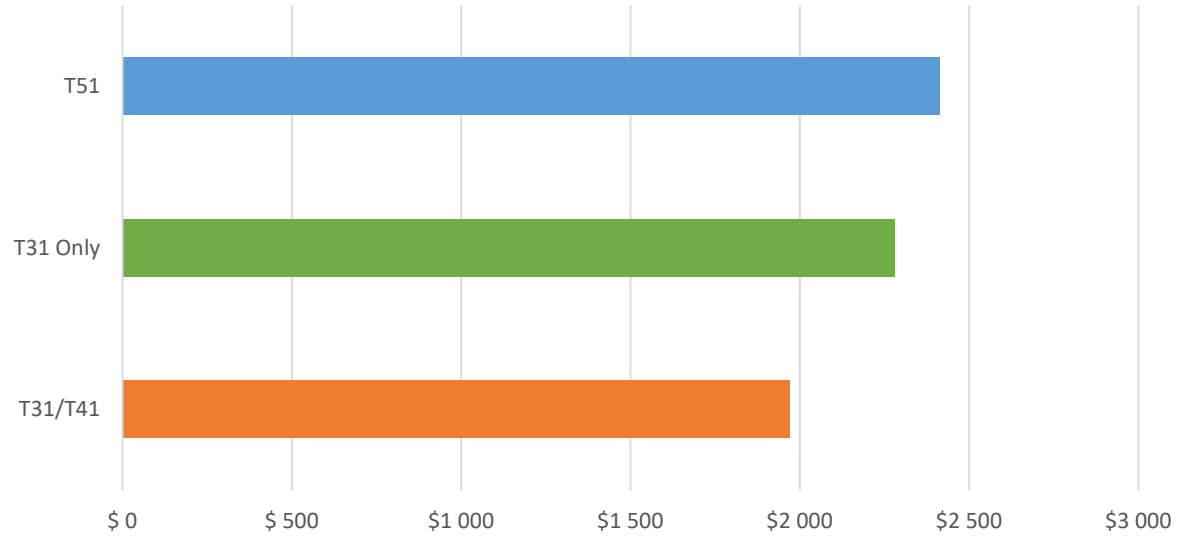
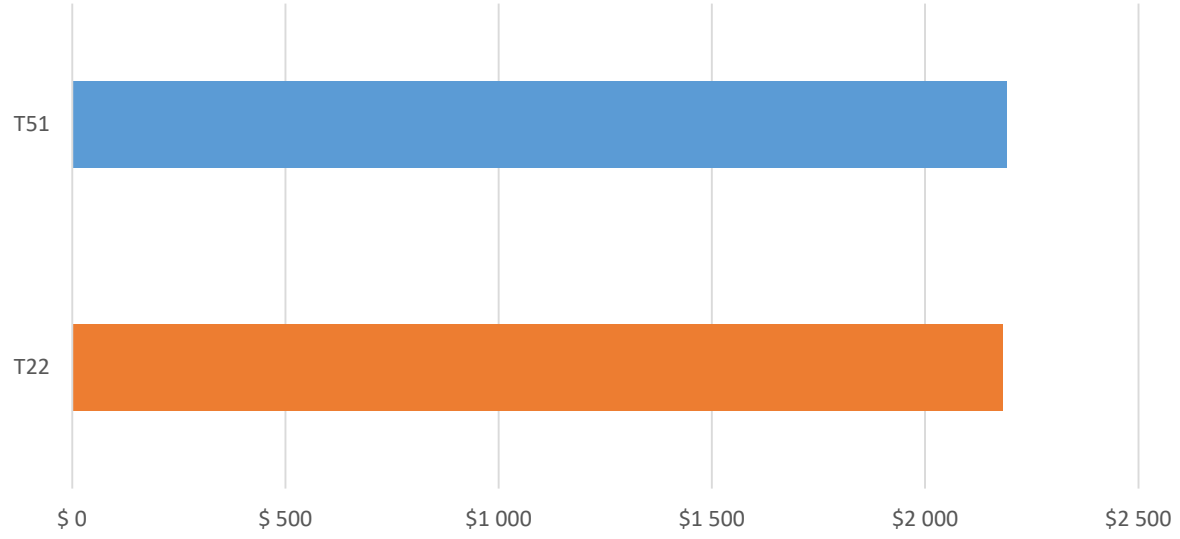


Figure 9.2 compares a BSI business customer on Momentum Energy Tariff 51 with a mainland Tasmanian customer on Aurora Energy Tariff 22, assuming a total annual usage of 6 700 kWh. The comparison suggests that BSI business customers pay marginally more per year for electricity than mainland Tasmanian business customers do.

Figure 9.2 Business comparison



However, given the relatively higher cost of supplying electricity on the BSI compared to the Tasmanian mainland, without the CSO arrangement between the Tasmanian Government and Hydro Tasmania electricity costs for BSI customers would be considerably higher.

10 TASMANIAN GAS PIPELINE PTY LTD

Tasmanian Gas Pipeline Pty Ltd (TGP) holds a pipeline licence (operations) in Tasmania and operates the Tasmanian Gas Pipeline (the pipeline). The pipeline transports natural gas from the Longford Plant in Victoria, entering Tasmania at Bell Bay and running to Bridgewater in the south and Port Latta in the north-west. Meter stations at various locations along the pipeline allow for connection to local distribution networks and for direct supply connections to major industrial customers.

Under the terms of its licence, TGP is required to report its annual performance data to the Regulator. Table 10.1 shows TGP's performance information.

Table 10.1 Performance data

	2013-14	2014-15	2015-16	2016-17	2017-18	Target
Unplanned interruptions to supply	0	0	2	2	0	0
Third-party encroachments	1	1	1	1	2	<5
Unaccounted for gas losses (%)	1.00	1.35	1.19	1.09	1.04	<1.00
Environmental incidents	0	0	0	0	0	0
Maintenance plan compliance (%)	99.40	99.70	96.00	100.00	99.30	>90

TGP recorded two third-party encroachments (ie some form of unauthorised work occurring within the pipeline easement) during 2017-18, both on the section of pipeline between Bell Bay and Port Latta. The first incident involved a property owner beginning excavation works to install irrigation infrastructure over the top of pipeline, without proper knowledge of the pipeline location or notifying TGP of the work. The second incident related to a building found to be partially inside the pipeline easement. TGP reported that this situation appears to have been present for some time and was the result of a surveying error.

Unaccounted for gas losses decreased from 1.09 per cent in 2016-17 to 1.04 per cent in 2017-18, which is slightly above TGP's long-term target of 1.00 per cent. Unaccounted for gas refers to the difference between the amount of gas entering the pipeline and the amount of gas delivered out of the pipeline, and may result from meter inaccuracy, leakage from the pipeline, theft or tampering, or variations in surrounding temperature and pressure during measurement.

11 TAS GAS NETWORKS PTY LTD

Tas Gas Networks (TGN) holds a distribution licence (operations) to maintain and operate the State's natural gas distribution network, delivering gas to Tasmanian homes and businesses. The Tasmanian Gas Distribution Code requires TGN to submit an annual return to the Regulator on its performance against a range of measures specified in the Code.

TGN reports on the distribution of gas to customers consuming less than 10 terajoules (TJ) per annum (10 TJ is equivalent to 2.78 GWh) and to customers consuming more than 10 TJ per annum. There were 14 011 customers connected to TGN's distribution network as at 30 June 2018. Only 35 of these customers consumed more than 10 TJ of gas during the year. Table 11.1 shows the quantity of gas TGN distributed to its customers.

Table 11.1 Gas distribution (GJ)

	2013-14	2014-15	2015-16	2016-17	2017-18
To customers consuming <10TJ	814 838	757 460	813 134	835 203	868 534
To customers consuming >10TJ	1 805 377	1 926 292	1 843 023	1 741 782	1 832 908
Unaccounted for gas (%)	-0.71	0.52	-1.57	-0.38	0.71

The total consumption of gas increased slightly during 2017-18. Customers consuming over 10 TJ annually accounted for almost 68 per cent of total gas consumption.

The percentage of unaccounted for gas (ie gas lost from the distribution system) during 2017-18 was 0.71, below what is considered average for a gas distribution network. TGN has improved its meter calibration to correct for an error that in previous years has provided negative values for the percentage of unaccounted for gas, suggesting that customers consumed more gas than the distribution system actually delivered.

11.1 Customer complaints

Table 11.2 shows the number of gas distribution complaints made directly to TGN.

Table 11.2 Customer complaints made directly to Tas Gas Networks

	2013-14	2014-15	2015-16	2016-17	2017-18
Detectability of gas by odour	128	111	181	194	228
Inadequate gas supply	3	4	6	21	13
Other	22	12	17	21	25

11.2 Reliability of supply

The Gas Distribution Code requires TGN to report on a number of reliability measures. These measures include performance in terms of both planned and unplanned supply interruptions. Table 11.3 provides details of TGN's reliability of supply performance and shows continuing improvement over recent years.

Table 11.3 Reliability of supply performance

	2013-14	2014-15	2015-16	2016-17	2017-18
Planned interruptions	0	0	0	0	0
Unplanned interruptions					
Affecting 0-5 customers	432	263	278	147	57
Duration (minutes)	31 555	18 917	16 534	8 284	335
Affecting 6-100 customers	1	2	2	1	0
Duration (minutes)	210	1 760	90	115	0
Average interruption duration per customer	71	78	59	58	6
Confirmed reports of no gas	433	265	280	140	62
Confirmed reports of no gas as a proportion of the number of connections (%)	3.7	2.1	2.1	1.05	0.4
Instances of loss of supply to a geographical area	0	1	1	0	0

12 TAS GAS RETAIL PTY LTD

Tas Gas Retail (TGR) is a licensed natural gas retailer in Tasmania and sells gas to nearly 70 per cent of Tasmanian gas customers. Table 12.1 shows TGR's gas customer data.

Table 12.1 Customer numbers

	2013-14	2014-15	2015-16	2016-17	2017-18
Residential customers	6 545	7 146	8 355	8 714	9 004
Business customers	620	664	788	902	854

TGR changed the method it uses to extract customer data during 2015-16, to align its reporting more closely with the definition of 'customer' under the *Gas Act 2000*. The Regulator understands that this change has contributed to some of the increase in customer numbers observed since 2014-15.

Table 12.2 presents a summary of TGR's gas customer call centre performance and the number of complaints received.

Table 12.2 Call centre and complaints performance

	2013-14	2014-15	2015-16	2016-17	2017-18
Call Centre performance[31]					
Total calls	7 197	-	8 172	12 958	13 673
Calls answered in 30 seconds (%)			87	99	89
Complaints	44	33	30	20	51

12.1 Customers on payment plans

TGR reports on the number of customers who have entered arrangements to help manage payment of their accounts, as shown in Table 12.3. [32]

[31] TGR changed premises in 2014, to a site where the phone system was unable to record call numbers. TGR upgraded its phone system in November 2015 to rectify this issue. Table 12.2 therefore has no total calls data for 2014-15, and the data reported for 2013-14 and 2015-16 refers only to part of those years (July-January and November-June respectively).

[32] During an audit of its reporting systems during 2017, TGR discovered that it had not been correctly capturing customer data in relation to payment plans. Customers on payment plans who vacated their properties during the reporting period were not included in the reported figures. TGR rectified this issue in its 2017-18 Performance Report to the Regulator. The figures in Table 12.3 are therefore not comparable with those in previous Energy in Tasmania Reports.

Table 12.3 Customers on payment plans[33]

	2013-14	2014-15	2015-16	2016-17	2017-18
Residential customers	2 729	2 461	2 616	2 910	2 975
Average amount of debt	$533	$776	$837	$964	$1 250
Business customers	259	200	212	214	262
Average amount of debt	$3 794	$5 780	$6 493	$8 876	$7 636

There has been a slight upward trend in the number of TGR customers on payment plans over recent years. TGR explained that this is an outcome of its ongoing customer service emphasis on earlier identification of customers in financial difficulty and offering flexible long-term payment arrangements.

12.2 Disconnections and reconnections

TGR reports on the number of metered customers disconnected from the gas distribution network due to non-payment, and those subsequently reconnected to the network. Table 12.4 shows the number of disconnections together with the number of reconnections.

Table 12.4 Disconnections and reconnections

	2013-14	2014-15	2015-16	2016-17	2017-18
Disconnections					
Residential	412	484	175	142	94
Business	19	42	9	7	8
Due to suspected illegal use of gas	0	3	2	0	1
Reconnections – same name					
Residential	125	147	111	71	52
Business	1	21	4	4	3

The number of disconnections decreased in 2017-18, continuing the trend of the previous three years. The Regulator understands that this decrease is due in part to TGR's work identifying and offering help to customers in financial difficulty. TGR reported that improved access to energy hardship funds has also helped customers avoid disconnection due to non-payment.

[33] While Table 12.3 reports the average amount of debt held by customers on a payment plan, readers should note that not all customers on payment plans enter those plans due to debt.

GLOSSARY OF TERMS

Term	Meaning within the context of this report
AEMC	Australian Energy Market Commission. The AEMC is the rule maker for Australian electricity and gas markets. It makes and amends the National Electricity Rules, National Gas Rules and National Energy Retail Rules, and provides market development advice to governments.
AEMO	Australian Energy Market Operator. AEMO is responsible for operating Australia's largest gas and electricity markets and power systems, providing critical planning, forecasting and power systems information, security advice, and services for governments and consumers.
AER	Australian Energy Regulator. The AER regulates wholesale and retail energy markets, and energy networks, under national energy legislation and rules. Its functions mostly relate to energy markets in eastern and southern Australia.
AETV	Aurora Energy Tamar Valley Pty Ltd. AETV is a subsidiary company of Hydro Tasmania and operates the Tamar Valley Power Station.
APAYG	Aurora Pay as You Go. APAYG is a prepaid electricity service available to Aurora Energy's residential customers.
BOA	Basslink Operations Agreement. The BOA is the contractual mechanism between the State of Tasmania and the operators of Basslink and, among other things, sets out Basslink's performance targets.
BPL	Basslink Pty Ltd. BPL is the owner, operator and maintainer of the Basslink infrastructure.
BSA	Basslink Services Agreement. The BSA is the agreement between Hydro Tasmania and Basslink Pty Ltd. It establishes the rights and obligations of both parties regarding the operation of Basslink, and includes a number of financial incentives relating to Basslink's performance in terms of its availability.
BSI	Bass Strait Islands. The BSI include Flinders and King Islands but exclude Cape Barren Island and all other islands in Bass Strait.
CCGT	Combined Cycle Gas Turbine. A CCGT uses both a gas and a steam turbine and produces up to 50 per cent more electricity than a traditional gas-fired plant. The waste heat from the gas turbine heats the steam turbine, which generates extra power.
CSA	Community Service Agreement. CSAs are contractual arrangements between the Tasmanian Government and electricity retailers, under which retailers receive a subsidy in return for providing electricity price concessions to pensioners and Health Care Card holders.
CSO	Community Service Obligation. The CSO provides direct concessions to Bass Strait Island electricity customers who are pensioners, and subsidises the costs incurred by Hydro Tasmania in supplying electricity to Bass Strait Island customers.

Term	Meaning within the context of this report
DNSP	Distribution Network Service Provider. DNSPs manage the conversion of electricity from the high voltage transmission network into medium and low voltages, and the transport of electricity from points along the transmission lines to residential and business customers.
ESI Act	*Electricity Supply Industry Act 1995* (Tas). An Act to promote efficiency and competition in the electricity supply industry, to provide for a safe and efficient system of electricity generation, transmission, distribution and supply, to provide for the safety of electrical installations, equipment and appliances, to enforce proper standards in the performance of electrical work, to protect the interests of consumers of electricity and for related purposes.
FCAS	Frequency Control Ancillary Services. Ancillary services are the specialty services and functions provided by the electricity grid that support the continuous flow of electricity and ensure supply can continually meet demand. FCAS does this by maintaining the frequency of electricity in the power system between normal operating bands.
FiT	Feed-in Tariff. A FiT is a pricing mechanism whereby an electricity utility pays a customer for the excess electricity generated by the customer's micro distributed generation systems and exported to the grid.
GSL	Guaranteed Service Level. Under the GSL scheme, TasNetworks must make payments to customers who experience supply interruptions greater than the reliability supply threshold set for their particular reliability category.
GWh	Gigawatt hour. A GWh is a measure of electrical energy equivalent to a power consumption of one billion watts for one hour.
HV	High voltage. HV refers to voltage greater than 1 kilovolt.
KIREIP	King Island Renewable Energy Integration Project. Hydro Tasmania delivered KIREIP with the goal of increasing King Island's renewable energy generation capacity and reducing its dependence on fossil fuels.
kV	Kilovolt. A kV is a unit of electromotive force equal to one thousand volts.
kVA	Kilovolt ampere. A kVA is a unit of apparent power in an electrical circuit equal to one thousand volt amperes.
kW	Kilowatt. A kW is unit of power equal to one thousand watts.
kWh	Kilowatt hour. A kWh is a measure of electrical energy equivalent to a power consumption of one thousand watts for one hour.
LOS	Loss of Supply. A LOS constitutes a short or long-term loss of electric power or natural gas to an area.
LV	Low voltage. LV refers to voltage less than 1 kilovolt.
MED	Major Event Day. A MED is a day when, due to extreme events, the System Average Interruption Duration Index exceeds a certain threshold set by the Regulator (in 2017-18 that threshold was 6.60 minutes).
MW	Megawatt. A MW is unit of power equal to one million watts.

Term	Meaning within the context of this report
MWh	Megawatt hour. A MWh is a measure of electrical energy equivalent to a power consumption of one million watts for one hour.
NECF	National Energy Customer Framework. The NECF is a suite of legal instruments that regulate the sale and supply of electricity and gas to retail customers. The NECF includes the National Energy Retail Law, the National Energy Retail Rules and the National Energy Retail Regulations.
NEM	National Electricity Market. The NEM comprises five regional market jurisdictions (Queensland, New South Wales, Victoria, South Australia and Tasmania) connected by a number of interconnectors into a single alternating current system and associated synchronous electricity transmission grid.
NER	National Electricity Rules. The NER govern the operation of the National Electricity Market. The Rules have the force of law, grounded under the National Electricity Law.
OCGT	Open Cycle Gas Turbine. An OCGT is a combustion turbine fired by liquefied gas that turns a generator rotor to produce electricity.
OTTER	Office of the Tasmanian Economic Regulator.
PV	Photovoltaic. PV systems generate electric power by using solar cells to convert energy from the sun into a flow of electrons.
SAIDI	System Average Interruption Duration Index. SAIDI is a reliability indicator for electric power utilities. It is a measure of the average outage duration experienced per customer per year, reported in minutes.
SAIFI	System Average Interruption Frequency Index. SAIFI is a reliability indicator for electric power utilities. It is a measure of the average number of outages experienced per customer per year.
STPIS	Service Target Performance Incentive Scheme. The purpose of the STPIS is to provide incentives to Transmission Network Service Providers to maintain and improve their level of service for the benefit of participants in the National Electricity Market and end users of electricity.
TEC	Tasmanian Electricity Code. The TEC provides a statement of the relevant technical standards of the electricity supply industry, an access regime to facilitate new entry, guidance on price setting methodologies, a means of resolving disputes that may arise and establishes advisory committees to assist the Regulator.
TGN	Tas Gas Networks Pty Ltd. TGN holds a distribution licence (operations), and maintains and operates Tasmania's gas distribution network.
TGP	Tasmanian Gas Pipeline Pty Ltd. TGP holds a pipeline licence (operations), and transports natural gas from the Longford Plant in Victoria to Tasmania.
TGR	Tas Gas Retail Pty Ltd. TGR is a licensed retailer of natural gas in Tasmania.
TJ	Terajoule. A TJ is a unit of energy equal to one trillion joules.

Term	Meaning within the context of this report
TNSP	Transmission Network Service Provider. TNSPs manage the high voltage lines that transmit electricity to cities, towns and across state borders in the five interconnected jurisdictions of the National Electricity Market.
TVPS	Tamar Valley Power Station. TVPS is a thermal electricity generation facility consisting of a Combined Cycle Gas Turbine and four open cycle gas turbine units.
YES program	Your Energy Support program. The YES program provides affordable energy options for Aurora Energy customers living in households that may struggle to pay their electricity bills.