

TasNetworks Transformation Roadmap 2025

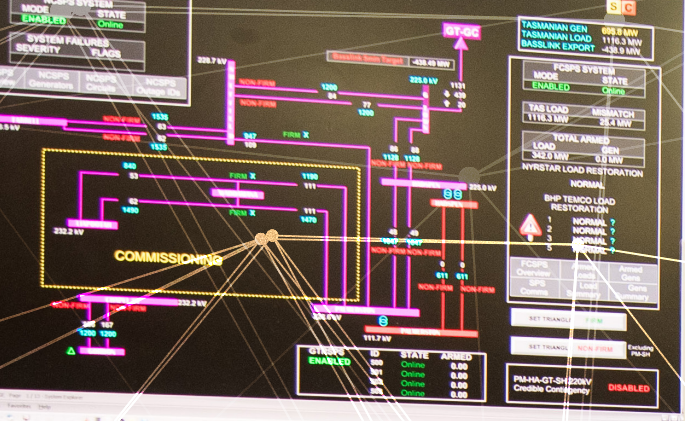
January 2018

Trusted by our customers to deliver
today and create a better tomorrow





SPS SUMMARY

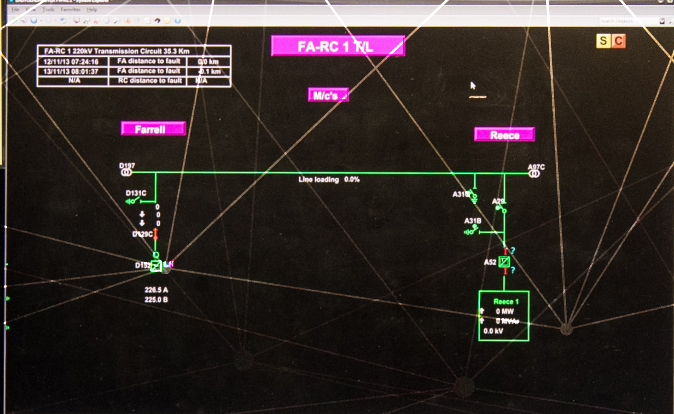
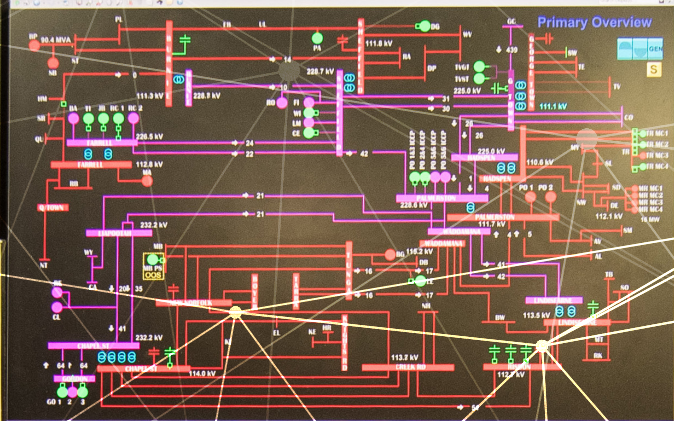


TRACIL TL Data

Line	From	To	Phase	Current (A)	Voltage (kV)	Power (MW)	Status
1	111.8	111.8	1	100	111.8	10	Normal
2	111.8	111.8	2	100	111.8	10	Normal
3	111.8	111.8	3	100	111.8	10	Normal
4	111.8	111.8	4	100	111.8	10	Normal
5	111.8	111.8	5	100	111.8	10	Normal

NAVS Summary

Unit	Mode	State	Output
TV Busbar	ENABLED	ONLINE	ON
TV Busbar CB	ENABLED	ONLINE	ON
TV Busbar CB	ENABLED	ONLINE	ON
TV Busbar CB	ENABLED	ONLINE	ON
TV Busbar CB	ENABLED	ONLINE	ON



Contingency

Number	Name	Type	Status	Violation Type	Base Value	Violation Level	Violation %
1

Active Alarms

No.	Date/Time	Origin	Description	Event	Value
1	28/11/14 11:12:29	OTWm SS Hdr	FIRE SYSTEM FAULT	CHANGE OF STATE 95	ACTIVE
2	28/11/14 11:12:29	OTWm SS Hdr	CHANGING STATE 95	CHANGE OF STATE 95	ACTIVE
3	28/11/14 11:12:29	OTWm SS Hdr	150KV MASTER ZONE PROT	CHANGE OF STATE 95	DISABLED

Summary

Date/Time	Event	Source	Operator
28/11/14 12:17:34	dict	...	taylor@WKS2
28/11/14 12:13:00	dict	...	...
28/11/14 12:12:58	dict	...	...

Multi-new Abnormals

No.	Date/Time	Origin	Description	Event	Value	Status
1	01021272	OTWm SS Hdr	FIRE SYSTEM FAULT	...	...	ACTIVE
2	01021272	Roadway 2 SS	HA-CT1 NCSPS STATE M33	...	...	OPEN
3	01014647	...	CHN FAULT	...	...	ACTIVE

Purpose

We deliver electricity to more than 280,000 households, businesses and organisations on mainland Tasmania, and to electricity consumers in the rest of the National Electricity Market via the electricity link across Bass Strait. We also own, operate and maintain a telecommunications network to enable the safe and efficient operation of the electricity system.

This document is to assist customers (referred to as “you”) engage in the development of our plans for the future. While most people are connected to the electricity distribution network, we also connect large-scale electricity generators and industrial customers directly to the transmission network.

Our plans take all of our customers into consideration.

We published a draft roadmap in June 2017 and have incorporated feedback we received from customers into this document.



We'd like your feedback and input

Our planning is designed around meeting your needs, so we encourage you to share your thoughts about this document with us.

You can do this in many ways including through one of our engagement sessions, through the TasNetworks Customer Council, by email, or by talking to us directly.

Contact us:

tasnetworks.com.au/customerengagement/
communityengagement@tasnetworks.com.au
1800 060 399

Introduction

Electricity systems are radically changing. Improvements in technology, more choice, and greater control over energy are driving this change. Globally, there's movement for cleaner energy, lower costs, and safe, reliable systems.

Our services, and the way we deliver them to you, need to meet your changing needs while being as safe and efficient as possible.

We care about our customers and want to make their experience easier, and as you are one of our customers we want to understand your needs so we can develop services and pricing to reflect the changing way electricity is used.

We must continue to increase our capabilities, to manage a more complex energy system and communicate with a growing audience. New technologies and access to data will help improve our business productivity and will enable our people to learn new skills and develop innovative ways of working.

We're already preparing for these changes. We've created a Roadmap, which sets out how we'll tackle these challenges to meet your needs in a rapidly changing world.

On page 15 you'll find information on our

key programs, which are:

1. Voice of the customer
2. Network and operations productivity
3. Business productivity
4. Electricity and telecoms network capability
5. Predictable and sustainable pricing
6. Enabling and harnessing new technologies and services
7. Workforce of the future



A national context

Australians are embracing new technologies, taking control of their energy use and supporting action on climate change. These shifts are dramatically changing our electricity system, which, in turn, shapes our economy and lifestyle.

Electricity network businesses are working together to understand the many ways Australia's energy future may unfold.

We partnered with the CSIRO to develop the Electricity Network Transformation Roadmap.

It's based on scenarios modelled to the year 2050 and shows the steps we can



take together to improve our country's electricity system, so you get better outcomes.

By 2050, Australia's electricity sector is likely to transition to net zero carbon emissions. By then, 30% to 50% of Australia's electricity will be generated by people like you who will choose to invest in customer-owned electricity generation and storage like solar, battery and other technology.

To support this energy industry transformation the Australian Energy Market Operator (AEMO) has developed an Integrated System Plan to facilitate the efficient development and connection of renewable energy zones across the National Electricity Market (NEM). Tasmania is identified by AEMO as one of Australia's key renewable energy zones.

Our wind resources and complementary hydro energy opportunities provide the potential for Tasmania to be a significant provider of dispatchable renewable energy for Australia. Further interconnection with Victoria will be needed to fully realise these opportunities.

The outlook is that electricity network businesses will:

- Connect millions of customer-owned generators and energy storage systems to each other (often referred to as distributed energy resources or DER for short)
- Enable customers to trade excess energy
- Integrate large-scale renewable energy into the grid and keep the electricity network secure.

In the future, by harnessing distributed energy resources and avoiding duplication of investments, it's predicted you can benefit from significant savings in your energy bills.

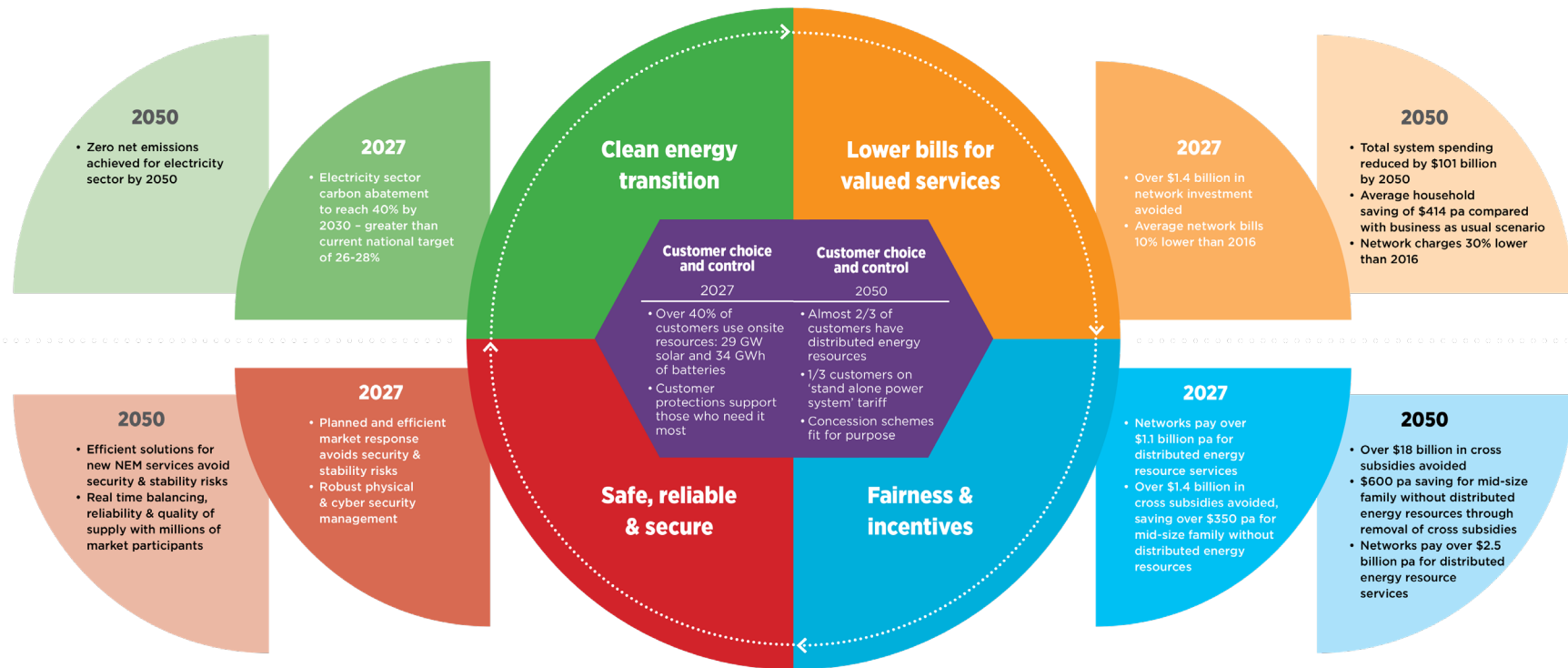
Electricity Network Transformation Roadmap

There are many ways Australia's energy future may unfold. Some futures will produce better outcomes for you and society than others.

The Australian Electricity Network Transformation Roadmap project has

analysed various scenarios to the year 2050 and what we can expect if we achieve our key high-level goals.

Source: Electricity Network Transformation Roadmap: Final Report Summary, Energy Networks Australia and CSIRO (April 2017)



What could this mean for Tasmania and its future?

Clean energy transition

- While Tasmania has almost 100% renewable energy, this is not the case nationally. National and state-based climate change policies continue to progress and it seems certain Australia will keep investing to reduce carbon emissions. The energy sector will play a big role in this by reducing emissions in the energy market.
- In Tasmania, people and businesses will keep investing in small-scale renewable energy technologies like solar.
- There will also be investment in more large-scale renewable generation, particularly new wind farm developments.
- Tasmania's Battery of the Nation proposal aims to integrate investment in new wind farms with secure dispatchable hydro energy that can benefit Tasmania making us self-sufficient for electricity, and benefit the NEM with improved interconnection and power system security.
- We are working with the Australian Renewable Energy Agency (ARENA) and AEMO on further analysis to progress a second transmission link with Victoria.

Customer choice and control

- We've asked Tasmanians and the majority are comfortable with the current levels of reliability. You want lower prices and more choice of services.
- People are already changing the way they use the electricity network. More people now produce and use electricity. This means, more and more, our electricity distribution networks have to manage two-way flows. These flows are more variable than in the past, which makes it more challenging to keep things in balance.

Safe, reliable and secure

- People are paying more attention to (and placing more value on) energy and power system security following recent power system outages and challenges in the NEM.
- We're expecting a range of solutions to emerge at varying costs.
- We need to maintain overall network performance and safety while helping you take up intermittent renewable energy resources.



Capability

- The industry is changing and our business will need to keep pace with change to remain sustainable.
- Our people will need to learn new ways of working, develop new skills and adapt to more and more changes to keep providing the levels of service you expect.

Keep electricity affordable

- Everybody wants affordable electricity.
- Our population is ageing and many are sensitive to increases in costs of living.
- Regulatory reforms will continue and this will change the way electricity is charged. More and more, pricing will be based on how and when you use electricity. We want to ensure that all customers understand and can take advantage of our service and pricing offerings.
- We compare our costs to other network businesses to make sure we keep improving our efficiency.

Data management

- Given the increasingly digital nature of our energy services, data security and privacy issues will remain an important focus.
- We'll need to use our data to both understand customer needs and operate increasingly complex electricity networks.



The economy

- Nationally, we're manufacturing less.
- Economic growth in Tasmania has been slow, except in a few sectors, like agribusiness, aquaculture and tourism.
- With competition increasing in many industries, many large businesses are focused on remaining viable.
- In Tasmania, demand on our electricity system peaked in 2008 and looks to stay fairly flat over the next decade, so our network has capacity for present customers.
- Network upgrades may be needed to support new Tasmanian renewable energy investments and a second interconnector as part of a national plan.

Technology

- People are investing in new energy technologies.
- Technologies such as solar panels, electric vehicles, energy efficiency, demand-side management and other grid technologies are changing system demand and network use.
- New technologies will improve business productivity.
- Network visibility and management of solar and batteries will become more critical for safe and effective operation of the electricity network.

Regulatory reforms and incentives, and policies

- Regulation has a big impact on our business. Through *The Power of Choice* reform program, the laws are changing to provide improved outcomes for you, including:
 - Pricing that reflects the true cost of supplying electricity
 - Separating the competitive and regulated parts of network businesses to protect your long term interests

- Greater competition
- The uptake of advanced meters that will enable you to access more services from retailers and information to help you understand and manage your energy use.
- Electricity is a dangerous product, so we need to ensure we manage it with everyone's safety in mind.
- We need to meet new and increasing compliance obligations.
- Australia's response to climate change and government environmental policies impact the energy sector, particularly the generation mix (such as the percentage of thermal and renewable energy we use to produce electricity).
- Political change and uncertainty can affect electricity pricing reforms.



Our Tasmanian grid in 2025



320,000

customers connected to the grid



120,000

customers
with advanced meters



40,000

customers will have their own renewable
energy source such as solar panels



up to **17,000***

people will be driving an electric car

*AEMO insights: Electric Vehicles, Page 13, August 2016



5,000

people will have a battery to store power

Electricity used and generated in Tasmania in 2025

11,000GWH

55%

used by large industrial customers

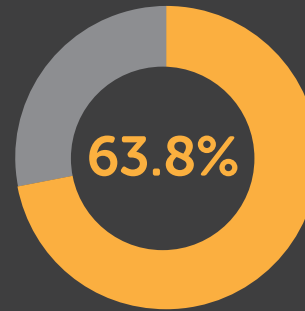
20%

used by small business customers

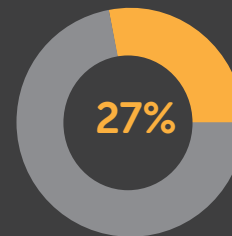
25%

used by residential customers

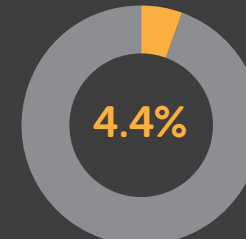
plus an additional
3,000 GWh exported



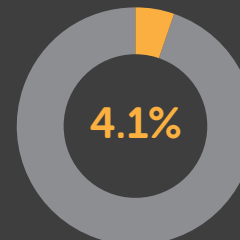
Hydro



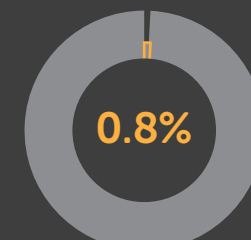
Wind



Gas Turbine



Solar (PV)



Other Embedded

TasNetworks in 2025

We've used the national roadmap to help us design our Roadmap that will take us to 2025.

The key ideas in our Roadmap include improving our traditional services as we transition to potential new services. Our main role will be all about connecting, transferring and balancing energy. By doing these things, we'll make sure we can continue to deliver your power – whether you're using it or selling it to others.

As we approach 2025, our key challenge will be handling complex changes in the electricity industry to keep the system safe, stable and affordable.

To provide the best outcomes for all our customers and our owners, we need to keep delivering safe, reliable and competitive network services – both regulated and unregulated – while also delivering contemporary services that are within our capability. We'll do this by operating a lean and efficient business and looking for growth opportunities within the rapidly evolving environment.



What a better tomorrow looks like

Customer choice and control

- You have more choice and control of your energy use.
- We collaborate with you in our network planning and investment process.
- You enjoy the benefit of having a safe and reliable electricity network.
- We deliver high-quality services at the lowest sustainable prices.
- Our people and systems make it easy and effective for you to do business with us.
- We anticipate and respond to your changing needs and market conditions.
- We develop partnerships to provide new services, choice and competitive pricing.

People

- Our people add value and make a positive difference to your outcomes.
- We build capability and partner with suppliers to provide services to meet your changing needs.
- We're dynamic, responsive and put our customers first.

Zero Harm is our most important consideration for our people, suppliers, customers and the public. So, we'll make sure our equipment and processes are designed and well maintained to keep people and the environment as safe as possible. We'll continue to invest in critical infrastructure and the skills of our people to enable us to stay on top of our emergency and fault responses.



Photo Jonathon Jones

Keep electricity affordable

- We show leadership and technical expertise through regular pilots and trials of customer-led technologies.
- Our pricing structures reflect the costs of providing services and enable you to respond to reduce your electricity bills.
- Tasmania's natural energy advantage is its world-class clean energy base. Our expertise and our customer focus seeks to deliver affordable energy; facilitate economic growth; and maximise Tasmania's renewable energy opportunities.

Safe, reliable and secure

- Our electricity network enables you to connect new technologies and renewable energy sources in a way that supports network reliability and system security.
- We support a growing number of micro-grids and help you get value from your investments in distributed energy resources.
- We use real-time data to manage our network and improve unplanned outage response times.
- We maximise the capability of the existing network.
- Our core network assets are in good condition and efficiently maintained.
- We manage our risks, including the impacts of climate change, bushfires and extreme weather events.

Outcomes of our efforts

- We underpin Tasmania's economic growth by providing safe, reliable and efficient electricity network and other complementary services like telecommunications.
- We provide benefit to the Tasmanian community by providing sustainable shareholder returns.



Roadmap snapshot

There are many 'business as usual' activities to undertake to keep delivering our services to you. Meanwhile, we're preparing for our transition to the future.

We've developed seven programs focused on creating a better tomorrow:

1. Voice of the customer

We'll keep investing in support systems that make it easy for you to do business with us and help us understand your needs, so that either directly or through partnerships, we deliver services you value.

2. Network and operations productivity

We'll improve how we deliver the field works program, continue to seek cost savings and use productivity targets to drive our business.

3. Business productivity

We're transforming our business support systems to reduce costs and add value.

4. Electricity and telecoms network capability

To meet your energy needs and ensure power system security, we'll invest in the network to make sure it stays in good condition, even while the system grows more

complex. For instance, we'll need more sophisticated management, operating and protection schemes for intermittent power generation and to enable new technologies.

5. Predictable and sustainable pricing

Because we want to deliver the lowest sustainable prices, we'll transition our pricing to better reflect the way you produce and use electricity and provide you with greater choice and control over your energy use.

6. Enabling and harnessing new technologies and services

By investing in technology and customer service, we'll be better able to host the technologies you're embracing. We'll aim to make the most of your investments in distributed energy resources for the benefit of all.

7. Workforce of the future

Our people are integral to delivering power to you. We'll keep developing knowledge and skills to continuously improve systems and processes, embrace new technologies and provide you with great service.



Our programs in detail

Voice of the customer

We're making a whole-of-business effort to make sure we earn your trust. To achieve this, we want to work with you to ensure your experience is easy and effective. We're putting better systems in place to enable us to engage with you more effectively, such as building a new customer relationship management system.

We'll be able to better identify groups of people who have similar needs. This will help us customise solutions in the best possible way.

We'll enable and encourage you to connect your homes and businesses, small and large-scale renewable energy sources and new technologies to the electricity network in ways that support grid reliability.

We'll balance your need for choice and convenience with our commitment to reliability and safety.

Key programs

To underpin our efforts. We will:

- Prioritise our outage restoration management system, so we can get your power back on faster
- Continually improve our engagement, particularly by gaining real-time insights
- Use data and systems to better understand and meet your needs
- Make your experience easy when dealing with us by enabling you to do more via our website and online portals
- Smooth the way for new connections
- Provide new services you value.



Network and operations productivity

We've set productivity targets to keep improving our business and manage risks. Being productive and innovative are vital steps to keeping us viable and ensure we provide safe, reliable and efficient services. We'll continue to understand the opportunities and trial new things with a view to achieving further efficiencies and continued sustainable prices.



Key programs

To underpin our operations and increase productivity. We will:

- Maintain our focus on Zero Harm
- Deliver our work program as effectively as possible
- Improve our supply chain
- Deliver best-practice network operational response to restore power supply safely
- Manage critical infrastructure and environmental impacts
- Ensure our people, particularly in the field, have real-time data to enable them to be more effective in providing services to you
- Implement our excellence program across the business.

Business productivity

We're transforming our business support systems to improve processes and reduce costs. Our transformation is based around tools that bring together people, processes and technology essential to running in a streamlined and efficient way – such as asset management, network operations, accounting and human resources. We have plans for future projects that'll result in further efficiencies.

Key programs

To underpin our business transformation. We will:

- Implement a technology strategy and appropriate governance frameworks
- Focus on improving data and asset information, while managing cyber-security risks
- Maintain contemporary market systems to meet evolving regulatory and compliance obligations for the National Electricity Market.

Electricity and telecoms network capability

Power system reliability and security is critical to meeting ongoing energy needs. So, we'll invest in the network and supporting telecommunications systems, particularly as the system grows more complex, to make sure it remains fit for purpose. For instance, we'll need more sophisticated management, operating and protection schemes for intermittent power generation and new technologies. Where it's safe, we'll reduce the need for new investments by driving our assets harder, while ensuring they remain resilient.

To manage demand and balance the load on our network, we need to add automated and real-time systems and practices to our normal network operations. We want to remain as one of the leading transmission network operators while improving our distribution network operating systems. We have long-term asset management information strategies to improve our geospatial information system. This will form the basis of an advanced distribution management system to help us deliver the services you choose, when you need them.

In the transmission network we'll concentrate on managing power system security and integrating large-scale renewable energy sources.

Significant growth in industries such as agriculture and aquaculture mean dramatically increased demand on regional areas of the distribution network that has had historically weak inter-connection. This change, combined with more distributed energy resources and reliability requirements in some regions, means we need to reinforce our networks in a targeted and cost effective way. We'll improve our network planning and forecasting techniques. This will help us put the right network support services in place to deliver the biggest possible benefits to you.



Key programs

To help us maintain network capability. We will:

- Prepare the network for more distributed energy resources (such as solar panels, batteries and electric vehicles)
- Integrate large-scale renewable energy sources like wind, solar, pumped hydro, and maintain power system security
- Improve systems for both asset management and geospatial information
- Move to an advanced distribution management system
- Leverage metering data and distribution network intelligence
- Improve our asset management data
- Lead analysis of a second transmission link between Tasmania and Victoria.



Predictable and sustainable pricing

We have submitted our first combined transmission and distribution revenue proposal. This puts forward the investment plans (to 2025) that will help us achieve success and deliver for our customers. Our proposal meets our obligations while reducing network costs. It includes gradual changes to network pricing arrangements.

For you to reap the benefits from pricing reform, we must not only get the timing right but also bring the Tasmanian community with us. Changes, such as introducing advanced meters, will enable you to use technology to better understand and control your electricity use.

Because we're the main provider of transmission and distribution network services in Tasmania, the Australian Energy Regulator sets the amount of revenue we can earn from our customers each year. This protects you by making sure we deliver services at a fair cost. We want to provide you with the lowest sustainable prices, while maintaining or improving the safety, quality and reliability of our services.

Key programs

To make sure we keep pricing predictable and sustainable. We will:

- Trial technologies that'll enable you to understand and control your electricity use and electricity bill, and help us develop better customer information and pricing signals
- Continue to implement pricing reform.



Enabling and harnessing new technologies and services

We'll take the lead on a program of network and customer-led trials. This way, we can make the most of opportunities by either taking on proven technologies or developing new products and services. To deliver these services effectively, we'll identify and build appropriate strategic partnerships.

Key programs

To address the changing role of the grid. We will:

- Demonstrate and enable customer-led technologies
- Introduce new products and services to suit changing needs.

Workforce of the future

We're working towards understanding what our business will look like in the future, so we can support our people and our key suppliers to develop the skills they'll need to deliver. A constructive business culture that encourages innovation will boost business productivity and help us adapt to an operating environment that is expected to continue changing.

Collaboration is a focus to ensure we achieve good outcomes from end-to-end processes.

Key programs















To ensure our culture and capability flourishes. We will:

- Build organisational capability for a technology-enabled future
- Continue to build a constructive business culture
- Improve our ability to embrace change
- Strive for business excellence in everything we do.







Electricity Network Transformation in Tasmania

There are a range of possible futures, this table shows what 2025 might look like:

CLEAN ENERGY TRANSITION	2016	2025
Conventional hydro power	 Conventional hydro = 2,310MW	 Conventional hydro = 2,400MW
Large scale wind farms	 Wind = 308MW	 Wind = 1,100MW
Solar systems	 Solar (PV) = 96MW	 Solar (PV) = 167MW
Pumped hydro (Battery of the Nation)	 Pumped hydro = 0MW	 Pumped hydro = approx 300MW
Customers with distributed energy resources	 27,000 customers or (9.2%)	 40,000 customers or (12.5%)
Batteries – installed capacity	 Negligible installations and capacity	 Low take-up but increased to 33MW Equivalent capacity to Hydro's Lake Echo Power Station
Electric vehicles	 200	 Estimate 5,000 - 17,000

Electricity Network Transformation in Tasmania

CUSTOMER CHOICE AND CONTROL	2016	2025
Customers with advanced meters (that allow remote read)	<p>1%</p> 	<p>35-45%</p> 
New urban micro-grids	<p>none</p>	<p>2 new significant micro grids (commercial property precinct, community precinct)</p>
Connected customers	 288,000	 320,000

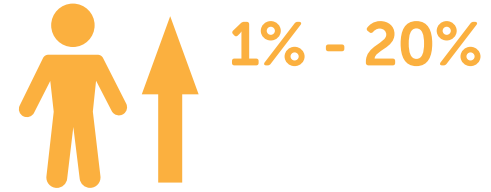
Electricity Network Transformation in Tasmania

LOWER BILLS FOR VALUED SERVICES



2016

2025

Percentage of residential customers on improved tariffs



Electricity Network Transformation in Tasmania

SAFE RELIABLE AND SECURE	2016	2025
Maximum demand (MW) (TAS)	1,747MW	1,850MW
Electricity Consumption (GWh) (TAS)	10,109GWh	9,250 (low) – 11,000GWh (med)
Portion of total consumption by major industrial customers	5,668GWh = 58%	4,700GWh (low) 50% – 6,144GWh 55%
Portion of peak demand by major industrial customers	43%	38-45%
Portion of total consumption by largest 250 distribution customers	1,619GWh or 16%	2,004GWh or 18%
Interconnectors	Basslink 	Basslink + second interconnector assessment completed and maybe under construction/commissioned 





TasNetworks
Delivering your power