

# Performance and plans for the Ergon Energy Network

A summary of our Distribution Annual  
Planning Report 2019-20 to 2023-24  
for our customers, communities and  
other stakeholders



Part of Energy Queensland

# Purpose

Ergon Energy's [Distribution Annual Planning Report](#) explains how we are continuing to safely and efficiently manage the electricity distribution network in Regional Queensland.

This summary introduces the content in our planning report with links to specific chapters that you can refer to for more information.

The full report details the network's performance in 2018-19 and our plans for 2019-20

to 2023-24. It provides insight into the key challenges we face and our responses to them, highlighting the areas where we are seeking to work closely with our customers, the community and different industry partners.

It also provides information to assist interested parties to:

- understand how the electricity network works
- provide input to the future development of the network
- identify locations that would benefit from significant

electricity supply capability or demand side and non-network initiatives

- identify locations where major industrial loads would be best located.

This information is also supported by our online interactive map of the electricity network and information provided in our [Demand Management Plan](#) and [Demand Side Engagement Strategy](#).

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## Message from our Executive

I am pleased to share this summary of Ergon Energy's Distribution Annual Planning Report for 2019-20 to 2023-24.

Each year we publish our plans to build on the dialogue we have with our many different stakeholders. They cover the key factors shaping our plans, the current and forecasted electricity demand, the state of our networks and service performance trends, as well as our investment intentions for the coming years.

Many of our customers are telling us their primary concern is affordability and that we shouldn't spend any more than is necessary on maintaining, operating and upgrading our network. Through the many customer advocate groups we engage with, we know this means we must work more closely together with all of our stakeholders to balance affordability with other critical customer and community outcomes that need to be achieved.

This includes continuing to ensure the safety of the communities we serve across the Regional Queensland including our employees, by managing the risks associated with the electricity network.

### Enabling greater choice and control

Across the 761,000 homes and business connected to the Ergon Energy network, many are taking greater control over their electricity solutions by investing in solar and other emerging technologies. Our challenge in managing the network is to leverage this growing level of customer-led investment to improve and complement our own efficient investment.

In response to this, we have developed Future Grid plans anticipating an energy environment characterised by rapid technological change, as well as ongoing high penetrations of renewable energy resources.

These factors are shaping our plans as we work to ensure the efficient investment in, and operational use of, regional electricity networks for the long-term interests of our customers and the broader community.

### Thanks. You're part of a bright future

I would like to thank all of the customers and other stakeholders who have engaged with us on our plans over the past year, and participated in our programs, especially the industry partners who are central to our demand management program and to enabling network connections.

I look forward to continuing to work together as we evolve our investment and operational programs to best deliver a bright future for Queensland.

Peter Price  
Head of Corporate Strategy,  
Executive General Manager  
Strategy, Asset Safety and  
Performance

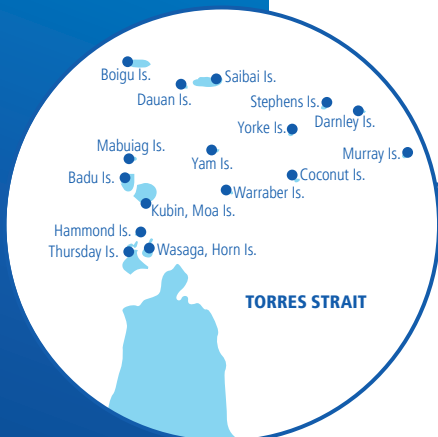
# Our network



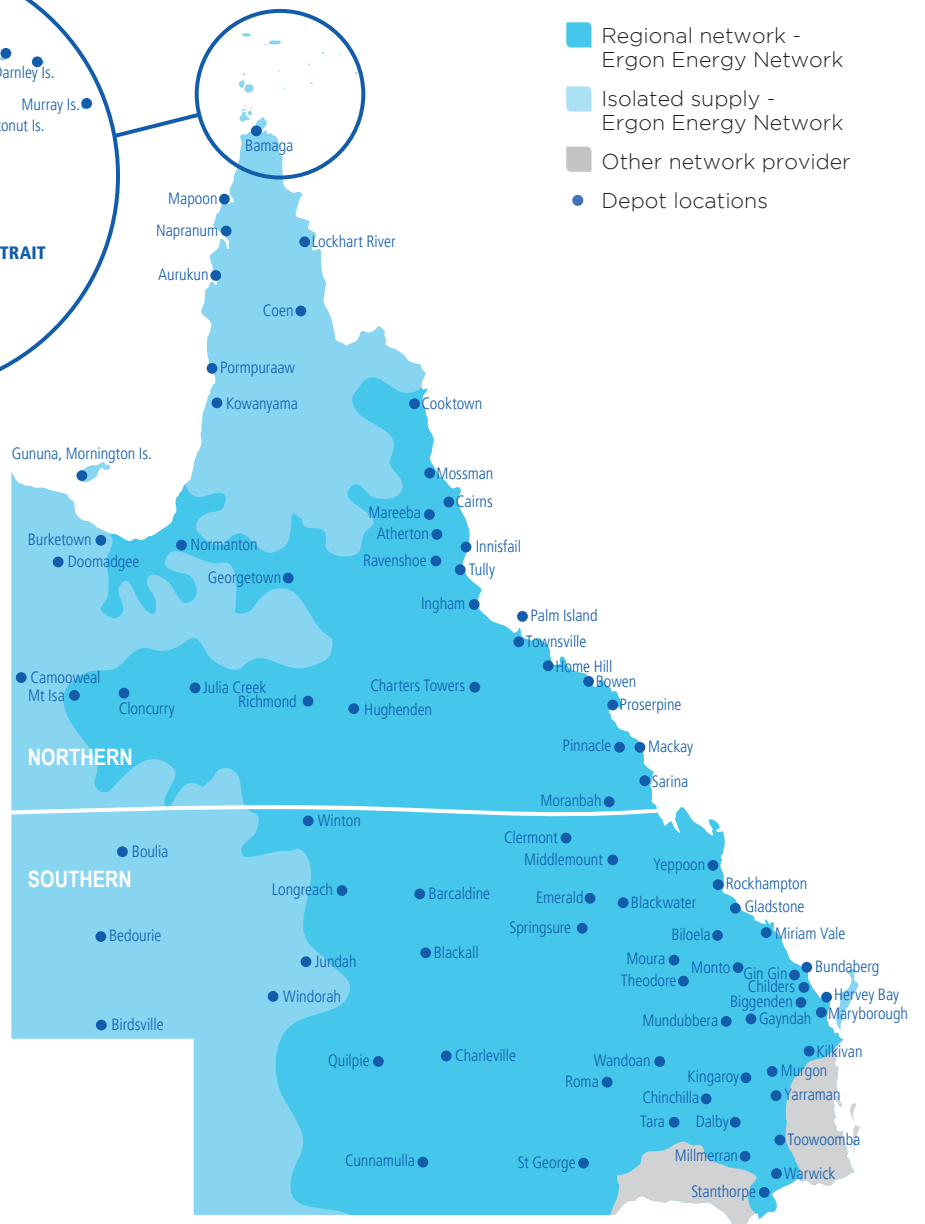
**258**  
zone substations

**103,300**

distribution transformers



# Our service area



- Regional network - Ergon Energy Network
- Isolated supply - Ergon Energy Network
- Other network provider
- Depot locations

**1,021,270**  
power poles



**143,300km**  
overhead powerlines



**9,000km**  
underground power cable

**761,000**  
connected customers



# What is shaping our plans?

To ensure we're meeting the needs of our customers and communities we invest in listening to their expectations, concerns and ideas.

We continue to hear that safety should never be compromised and that electricity affordability remains the core overriding concern for many. At the same time, in addition to keeping the lights on, it is clear our customers want greater choice and control around their energy solutions, with a strong interest in renewables and other energy-related technologies.

These insights are shaping our plans.

## Our engagement program

To ensure we're meeting the unique and diverse needs of our communities and customers, in a period where our industry is undergoing rapid transformation, a coordinated, performance measured, multi-channel community and customer engagement program is required.

Most recently, our 'conversations' have been used to refine our overall strategic direction, with the use of a stakeholder issues assessment, to prioritise the economic, social, environmental and governance topics that matter most. This process, built upon work already undertaken, engages Ergon's network businesses' investment plans for our 2020-25 Regulatory Proposals and our network tariff reform program.

We also became one of the first to commit to a national Energy Charter to progress the solutions required to deliver energy in line with customer and community expectations. The Charter, launched in January 2019, aims to build accountability across the supply chain and improve customer outcomes.

Through the Energy Charter we have agreed to these five principles:

- We will put the customers at the centre of our business and the energy system
- We will improve energy affordability for customers
- We will provide energy safely, sustainably and reliably
- We will improve the customer experience
- We will support customers facing vulnerable circumstances.

These efforts help align our future thinking with the long-term interests of our customers and communities.

For more on our engagement program go to: [Chapter 3 Community and Customer Engagement](#)



## Safety first - a no compromise approach

Safety is seen by the community as a no compromise area. As our networks age and the risk of equipment failure towards end-of-life increases, our focus on maintaining safety outcomes for our staff, customers and communities is paramount.

We continue to focus on improvements in our maintenance and replacement practices across all asset categories, we also continue to invest in new

technology trials that have the potential to deliver improved, safer and more efficient outcomes for our customers.

As an example of this commitment we have replaced 100's of kilometres of Low Voltage (LV) copper conductor and our inspection and condition monitoring work has been the driver of more than 20 renewal programs.



## Making electricity more affordable

Our customers have told us that affordability is their primary concern – for both cost of living and business competitiveness. Affordability is more than part of our purpose statement, it is a fundamental consideration in how we manage our network.

The merger of Energex and Ergon into the Energy Queensland group has made possible the implementation of a number of savings measures. Since 2016, our efforts have delivered over \$510 million in savings – these efficiencies will ultimately flow on to our customers as more affordable electricity.

Our forward investment program, reaching into the next regulatory period from 2020, remains focused on minimising costs to customers, while still ensuring that we meet the outcomes that our customers expect. Our asset management strategies aim to balance our customers' need for a safe, secure, and reliable electricity supply, and their desire for this service to be provided at minimal cost. A key part of that process is to optimise the economic benefits of network improvement, while always considering the potential for non-network solutions, such as demand management.





## The growth in solar energy

Queensland has one of the highest penetrations of solar roof top solar energy systems in the world. The rapid uptake of solar photovoltaic system (PV) has changed the distribution of electricity impacting the LV network and creating a number of system design and operation challenges.

As at the end of June 2019, 160,166 solar PV systems, from <1kW to 50MW, were connected to the Ergon Energy network with a total installed capacity of 1,240MVA. The volume of new solar PV connections over the past 12 months was

almost 50% higher than in the previous 12 months, with the total solar PV capacity added being 300% higher, largely due to the connection of several large solar farms. Strategic planning initiatives, such as the implementation of the 230V LV Standard, help us manage voltages across the network and enable further uptake of solar PV.

For more information on solar energy growth go to:

- [Chapter 5 Network Forecasting](#)
- [Chapter 11 Power Quality](#) or
- [Chapter 12 Emerging Network Challenges and Opportunities](#)



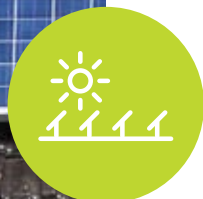
**1,400**

new solar energy connections per month



**160,166**

small-scale solar energy systems connected to the network



**1,240MVA**

solar generation capacity on the network



**23%**

of all Regional Queensland residential customers have rooftop solar energy



## The changing use of the network

The increase in distributed solar energy resources is changing the way the network is used with two-way energy flows and new daily load profiles emerging across the network.

In some areas this has been quite significant with the 'hollowing out' of demand at the substation level during day light hours and a reduction in traditional afternoon electricity peak demands, as represented in the demand profile graph below.

While this occurs, significant two-way flows of electricity along local 'poles and wires' are experienced

in residential areas as homes and businesses share their energy output to meet the community's energy needs, which continues to peak as 'school gets out' and 'meal time' begins.

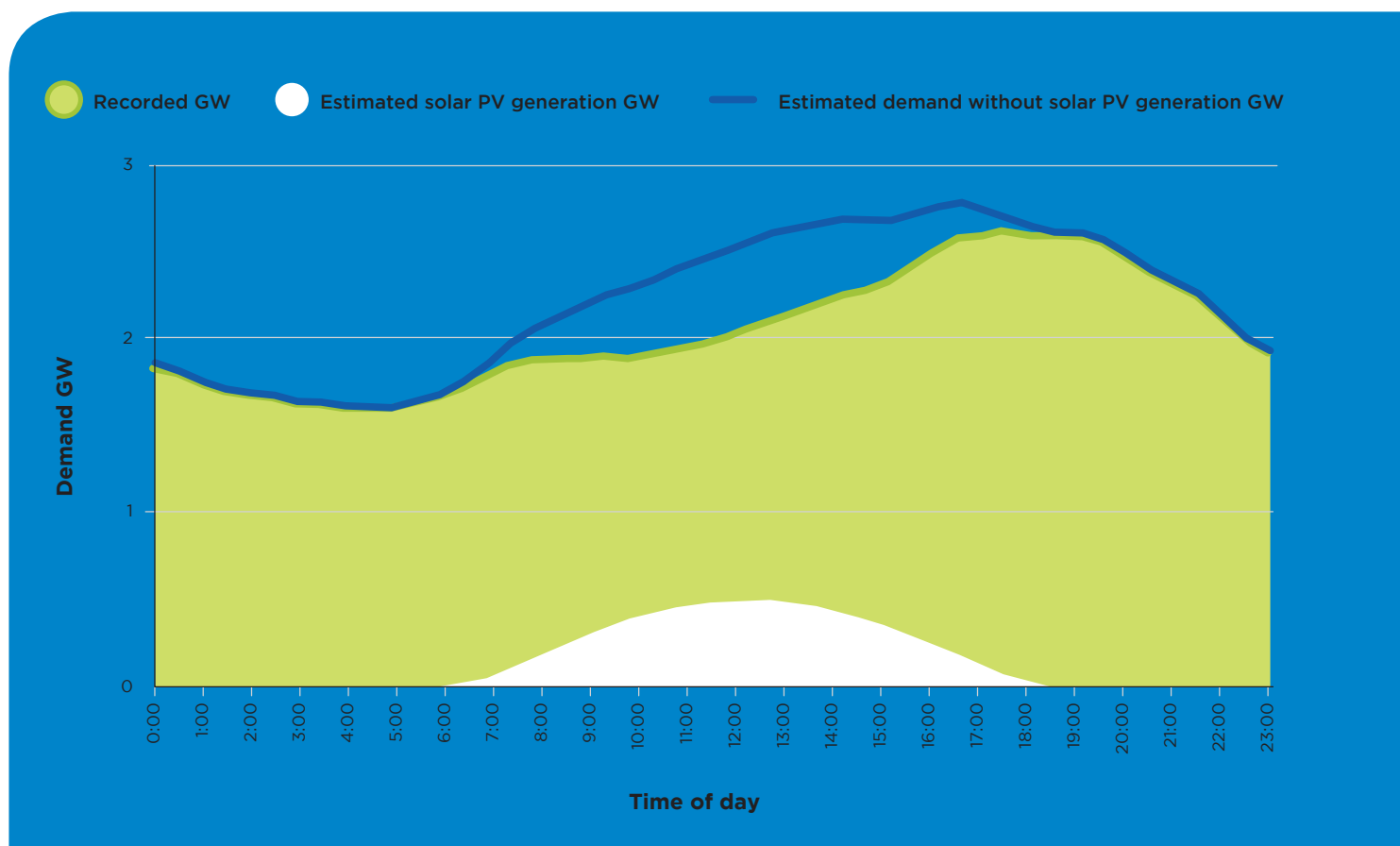
Also shown in the demand profile graph below, how solar PV energy helps address the network peak in early afternoons. As the sun and solar generation fades later in the day however, a 'de facto' peak presents itself (albeit lower than what it would have been earlier without the benefit of solar).

'Demand' is the 'energy' required at a point in time.

It is important to understand that this effect can be very different on a day-to-day basis with demand on the network returning, often dramatically, when cloud cover reduces the local solar energy output. Where there are high levels of solar, quality of supply or voltage issues also need to be addressed. These challenges are shaping our network plans.

For further information please refer to:

- [Chapter 5 Network Forecasting](#)
- [Chapter 11 Power Quality](#) or
- [Chapter 12 Emerging Network Challenges and Opportunities](#)





## Did you know

We supply power to over **100 hospitals and 1,000 schools**



North Queensland experienced its **largest rainfall in 120 years**

On average, every day we connect **22 new residential customers** to our grid



Our network stretched out would **circle the Earth 4 times**

## Security is a priority

Energy security has become an increasing area of importance. Our approach to network security is dictated by our Safety Net obligations specified in our Distribution Authority. Overall the Ergon Energy network is performing well against these obligations as result of efficient historical investments in the network and our operational response capability. There were no network events during 2018-19

where Safety Net targets were breached. With regard to managing peak demand, relatively warmer ambient temperatures, compared to last year across most of regional Queensland over the summer months, resulted in the summer system peak of 2,623MW on Wednesday 20 February 2019 at 6.00pm. This was less than the previously recorded highest system peak (2,637MW in February 2017 at 7:30pm).

# How is the network performing? Where are we focusing?

We're always at the ready for whatever Queensland's challenging summer season delivers. We're continually maintaining and renewing our network to ensure the safety, security and reliability of supply.

And we're focusing on using technology to do things smarter, more safely, more efficiently, and to deliver great customer experiences.

## Our disaster response

Our response capability is constantly tested by a range of severe weather events across the state, and each event is unique in terms of scale and impact. In 2018-19 Ergon Energy experienced a total of 13 significant weather events that impacted its networks and required an escalation of its fault response processes.

In November 2018, severe bushfires were experienced across the state and from December 2018 to May 2019 a total of five tropical cyclones formed and threatened to impact the Queensland coast.

Three of these tropical cyclones resulted in a coastal crossing in the Far North with subsequent damage to the Ergon Energy infrastructure. In addition, multiple severe storm events impacted the regions of the network requiring five escalated responses in Regional Queensland.

In February 2019, our largest mobilisation of staff occurred in response to the North Queensland monsoon and flooding events which included the severe floods in Townsville and Western regions.



# Ergon network reliability

In 2018-19, Ergon Energy's reliability of supply was favourable on five of the six measures related to duration and frequency of power outages quantified by the System Average Interruption Duration Index (SAIDI) and the System Average Interruption Frequency Index (SAIFI) respectively.

Ergon's Long Rural SAIDI measured unfavourably compared with the Minimum Service Standards (MSS) Limit having been significantly impacted throughout October 2018 and March 2019 by severe thunder storms and lightning strikes, extensively affecting the network in Wide Bay, South West, North West and Capricornia regions. The Long Rural supply network also experienced a significant increase

in the frequency of planned supply interruptions due to an increase in planned remediation works to repair newly identified priority defects.

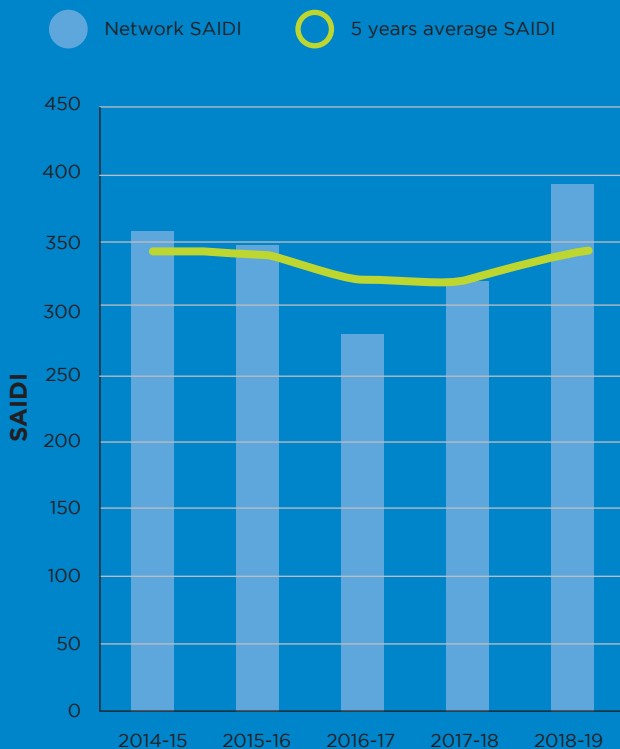
Our overall reliability performance has improved since the inception of MSS in 2005 with both the duration and frequency of overall outages reducing by 26% and 36% respectively. This is a reflection of the targeted investment made during the last two regulatory control periods towards achieving the regulated MSS.

The graphs below illustrate the five-year trend in outage duration and frequency.

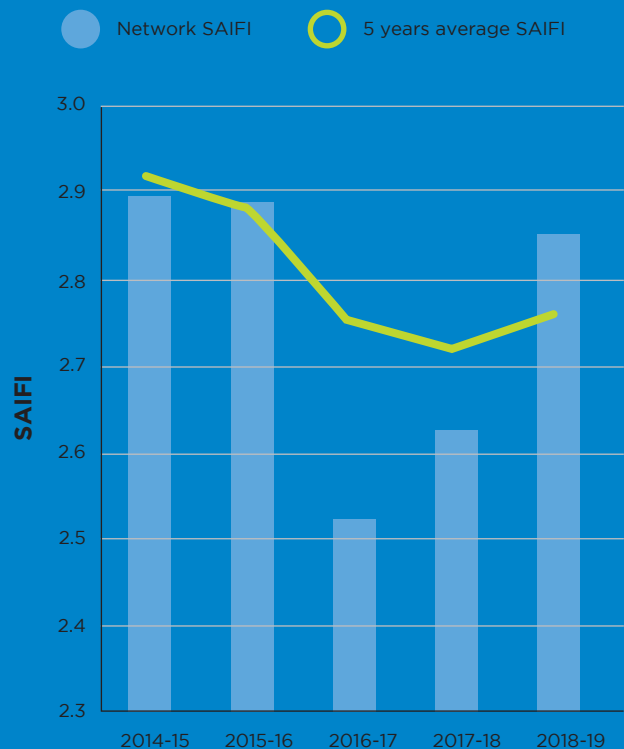
For further information please refer to: [Chapter 10 Network Reliability](#)



Ergon network outage duration



Ergon network outage frequency



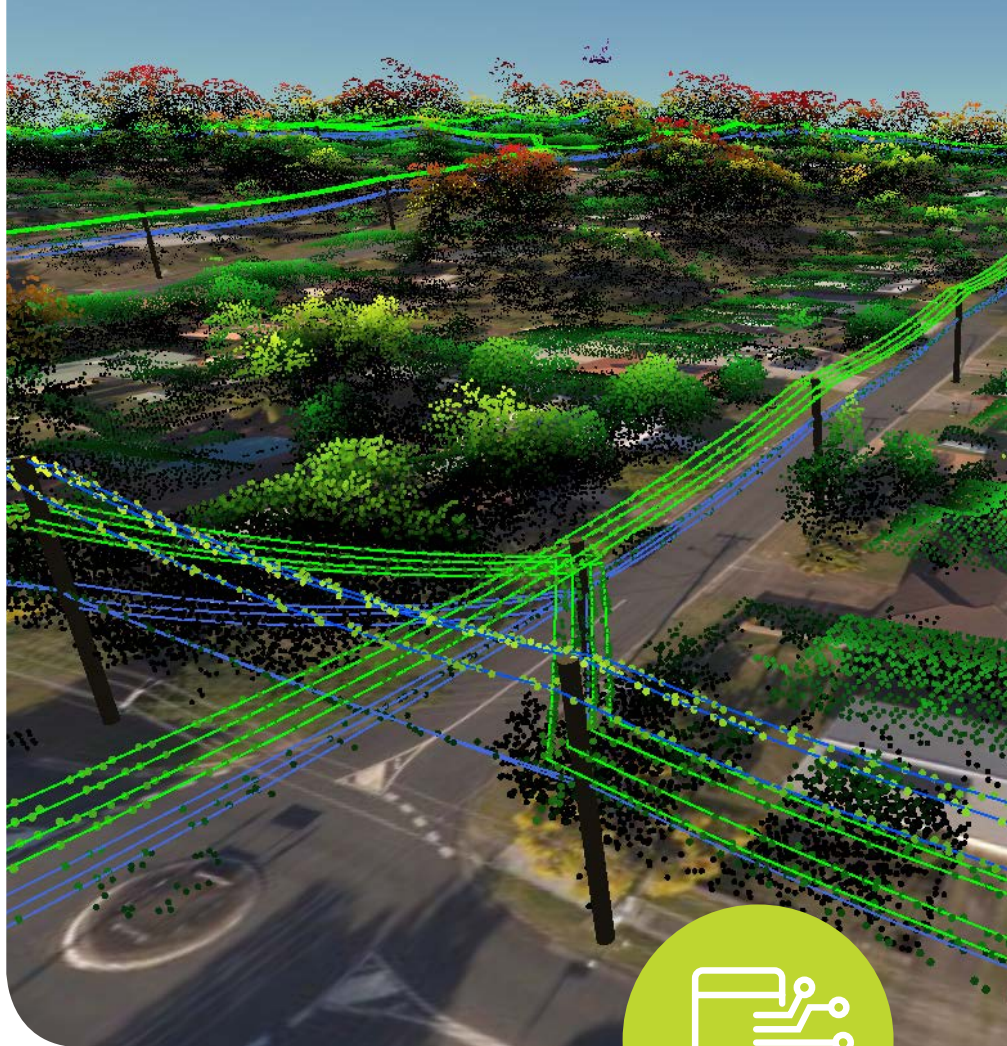
## Managing an ageing network

Our networks are ageing and require regular inspections and condition monitoring. Ergon Energy employs condition and risk-based asset inspection, maintenance, refurbishment and replacement strategies. End-of-economic-life replacement and life-extension refurbishment decisions are informed by risk assessments considering safety, history, performance, cost, and other business delivery factors.

Our assets are inspected at scheduled intervals to detect physical indications of degradation that lead to impending failures. Typical examples of inspection and condition monitoring activities include:

- analysis of power transformer oil to monitor for trace gases produced by internal faults
- inspection of customer service lines
- assessing the extent of decay in wood power poles to determine residual strength
- inspection of timber cross-arms to detect visible signs of degradation
- electrical testing of circuit breakers.

In particular, Ergon Energy has a well-established asset inspection program to meet regulatory requirements. All assets are inspected in rolling period inspection programs.



## Using technology to deliver smarter solutions

Ergon Energy is building its' capability with an ongoing investment into technologies that deliver improvement in risk outcomes and efficiency.

These efforts include utilising Lidar data from the aerial asset and vegetation monitoring management technology. This aircraft-based laser and imaging capture system provides spatial mapping of the entire overhead line network. The data captured is processed to enable identification and measurement of the network and surrounding objects such as buildings, terrain and vegetation. This system creates a virtual version of the real world to allow the fast and accurate inspection and assessment of the physical network and the surrounding environment, particularly vegetation (see above).

The integration of this information into our decision framework and works planning processes is increasingly delivering productivity and efficiency improvements for vegetation management and other network analytics such as clearance to ground analysis, clearance to structure analysis, pole movement and leaning poles analysis. Other innovative identification systems are also being developed.

For more information on Ergon Energy's approaches to maintenance, please refer to: [Chapter 9 Asset Life-Cycle Management](#)

## Major projects 2018-19

In 2018-19, our teams delivered a large program of work to ensure the network remained safe and reliable. Our capital program aims to improve and reinforce electricity supplies across Regional Queensland to meet our customers' evolving needs.

During the year, we commissioned the following major projects:



### Moranbah substation

Augmentation and redevelopment



### Jarvisfield substation

Refurbishment of 11kV switchboard equipment and protection



## Finding the best solutions together

To move to a more sustainable energy system we know our network needs to enable customer choice in electricity supply. This requires an intelligent grid and a focus on making it easier to connect to the network.

We believe our customers, the community and industry partners are part of the solution to the challenges we face together. Through collaboration we can better target our future investments and delivery to Regional Queensland.

## We are open to exploring the alternatives

Before investing in significant network projects, we explore if non-network options could provide an efficient alternative solution by engaging the market through a Regulatory Investment Test for Distribution (RIT-D) process.

The following approved projects listed below have credible options greater than the RIT-D cost threshold of \$6 million. As such, the Final Project Assessment Reports for these projects are published in the Ergon Energy website under [Current Consultations](#).

In progress:

- Addressing reliability requirements in the Garbutt network area
- Ensuring reliability of electricity supply and managing asset risks in the Douglas Shire Area

- Planella Substation reinforcement
- Addressing reliability requirements in the Cannonvale network area
- Reliability of electricity supply and network asset risk management in the Wide Bay Burnett area
- Reliable provision of electricity to the Kilkivan supply area
- Pittsworth regional reinforcement
- Reliability and capacity reinforcement for the North Toowoomba network.

Complete:

- Charleville SVC replacement
- Addressing reliability requirements in West Toowoomba Substation
- South West Toowoomba reinforcement.

## Sustainability – the future is in an intelligent grid

We continue to transform our networks into an intelligent grid so that our customers can leverage the many benefits of digital transformation and distributed energy resources and other emerging technologies (like solar, battery storage and electric vehicles), as well as the next generation of home and commercial energy management systems.

We see this as fundamental to our role in the future which has been supported by our customers' feedback as part of recent engagements. More importantly, we see ourselves increasing our collaboration with our customers and market proponents, to help leverage the benefits of this new technology in our network and help deliver overall improved outcomes for customers.



## Improving our connection process

During 2018-19, we continued to align the connection process more generally for Energex and Ergon Energy Network to deliver consistent customer experiences and increased efficiencies.

This has included a major system investment and administration reviews focused upon improvements to the customer experience which will enable customer and industry partners access to information and improve the network connections process.

We are also working with stakeholders to evolve regulations around connection requirements to enable innovation for new electricity supply solutions that deliver balanced outcomes.

For more information go to: [Chapter 12 Emerging Network Challenges and Opportunities](#)



## Large scale solar

Ergon Energy is supporting the connection of a large number of major renewable energy projects and has established formal connection agreements with major generators that will provide more than 900MW of renewable energy. We are also working with a number of other generation proponents in the application

phase that could further extend renewable generation by another 1GW in the coming years.

For a more in depth look at our approaches to large scale solar farms visit: [Chapter 12 Emerging Network Challenges and Opportunities](#)



## Fringe of grid customers

Ergon Energy's infrastructure includes one of the largest Single Wire Earth Return (SWER) networks in the world with approximately 64,000 kilometres supplying 4 per cent of its total customer base. The majority of this SWER network was installed in the 1970's and 1980's and is largely situated in the sparsely populated Western Queensland.

Providing cost-effective and reliable electricity supply in remote locations is challenging and as the network comes to the end of its life, alternative future supply options are being investigated. Stand Alone Power Systems (SAPS) is one of our initiatives focused on delivering alternate supply model solutions for our fringe-of-grid (i.e. remote) customers.

SAPS typically includes renewable generation (predominately solar PV) and battery storage with back-up diesel generation. Advances in battery management systems and reductions in the cost of battery technologies are enabling SAPS to become increasingly economically viable compared to traditional network supply by poles and wires in remote locations.

These technologies will help improve the service experience, particularly for remote customers who are supplied electricity over long distances, while providing the opportunity to lower ongoing future service costs. We are trialling SAPS as an alternative to network supply for individual customers supplied by long SWER lines and exploring alternate long-term opportunities.

## Demand management and other non-network solutions

Our Demand Management program forms part of an integrated approach that also includes our forecasting, planning, intelligent grid and tariff strategies to help lower electricity charges for our customers. When it is efficient to do so, the implementation of non-network solutions will replace or complement the need for network investment. This involves working with end use customers and our industry partners to reduce demand to

maintain system reliability in the short term and over the longer term, improve and complement efficient investment in the network. The implementation of a non-network alternative is commonly referred to as demand management. Through the Demand Management program customers are incentivised to reduce demand.

For a more in depth look at our demand management visit: [Chapter 8 Demand Management Activities](#)



## Our online interactive network map

Ergon's Emerging Network Limitations Map shows the distribution network and the areas forecast to have emerging network limitations.

They aim to enable interested parties to understand how the electricity supply system supports customer and participant needs as well as provide input into future development plans. They also show stakeholders where significant electricity supply capability or demand side and non-network initiatives could assist, or where major industrial loads would be best located.

Ergon's Distribution Annual Planning Report and Interactive Network Limitations Map are prepared and made available solely for information purposes, to support effective engagement around our network planning processes. Importantly, they do not show how the network is operated electrically.

All information should be independently investigated, reviewed, analysed and verified, and must not be relied upon in connection with any investment proposal or decision

Visit the interactive map [here](#)



## Our belief

We believe our customers are part of the solution to the challenges we face together, and trust that the DAPR provides our stakeholders with the opportunity to review our plans and engage with us on our path forward. It is only through collaboration that we will be able to properly target our future investments and be able to work together to deliver the best outcome for Regional Queensland.



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