Supporting Documentation

A Changing Industry and Marketplace

ERGON ENERGY

To ensure we manage the distribution network efficiently, Ergon Energy is regulated under the National Electricity Rules (NER) by a national regulator, the Australian Energy Regulator (AER). It is the AER's role to set the amount of money we're allowed to collect for the use of our electricity network. These network charges make up approximately half of the retail 'price' of electricity in Queensland.

To assist the AER in making the decisions it needs in determining our revenue allowance for 2015 to 2020, we have provided them with our future investment plans as a Regulatory Proposal. After considering our proposal and public submissions, the AER will publish a draft Distribution Determination. This will be available for further consultation in May 2015.

We have engaged with our customers to help inform our proposal and are confident, with the AER's support, that our investment plans will enable us to deliver the best outcome for regional Queensland into the future.

How to read our Regulatory Proposal

Ergon Energy's Regulatory Proposal is presented in a number of documents to make it easier for our different stakeholders to access the information they need.

The document, An Overview Our Regulatory Proposal, provides the context for the proposal and an overview of the price impacts and the broader customer benefits, along with the highlights of how we plan to deliver them. The overview document is supported by a number of documents.

One of these supporting documents is this document, **A Changing Industry and Marketplace**. It details the change the electricity sector is undergoing, both in market participants and emerging technologies, how they are impacting and interacting with the distribution network.

The document, Ergon Energy Regulatory Proposal 2015 to 2020, fully addresses the regulatory requirements of the proposal for the AER.

These and a suite of other documents are available at www.ergon.com.au/futureinvestment

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1. Overview

The electricity sector is undergoing a fundamental transformation and new market participants and emerging technologies (i.e. diversified energy assets, control systems and end-user technologies at or near the customer's premise) are impacting and interacting with the distribution network in ways that have not been seen before at a global and national level.

Compared with the last couple of decades, consumers now have an unprecedented level of discretion around how their electricity is generated, where it is generated and how they wish to consume it. They also have a different set of expectations around the *value* they expect from connecting to the grid, which covers issues such as price, reliability, safety, innovation and flexibility.

These changes represent significant challenges for Ergon Energy, operationally and financially. Not only does Ergon Energy need to meet the operational demands of an expanding range of options for consumers, onsite generation and the management of electricity (which in most instances is being deployed by independent third parties), it is also required to ensure this is done whilst maintaining:

- network performance (reliability and safety)
- compliance with the National Electricity Law and Rules
- industry standards
- a competitively priced service.

The complexity of the contemporary operating environment also challenges the way Ergon Energy interacts with:

- consumers (residential, small to medium sized businesses (SMEs) and Commercial and Industrial (C&I)
- providers and creators of distributed generation resources
- traditional value chain participants (generators, transmission, retailers)
- regulators (economic and technical)
- government
- infrastructure.

Whilst Ergon Energy has legislative obligations that materially affect the way in which it will respond to these challenges, there is scope to critically consider the role of an electricity distributor in this evolving market place.

In line with this, in 2013, Ergon Energy participated in the CSIRO's special inquiry into what the future of the gird may look like, together with more than 35 other industry stakeholders.

While trends in consumer choices, technology, government policy and commercial responses will ultimately decide the future, the forum was able to form a view on some of the possible future scenarios. They have been presented here simply to illustrate the level of industry wide change underway. Our view is that a hybrid of these futures across regional Queensland will deliver the best outcome for our customers, the Queensland economy and the environment.

POSSIBLE SCENARIO FUTURE SCENARIOS

In examining the 'mega-shifts' reshaping the electricity system, the CSIRO highlighted four diverse potential scenarios in their report, Change and Choice: the Future Grid Forum's analysis of Australia's potential electricity pathways to 2050, available at www.csiro.au/future-grid-forum

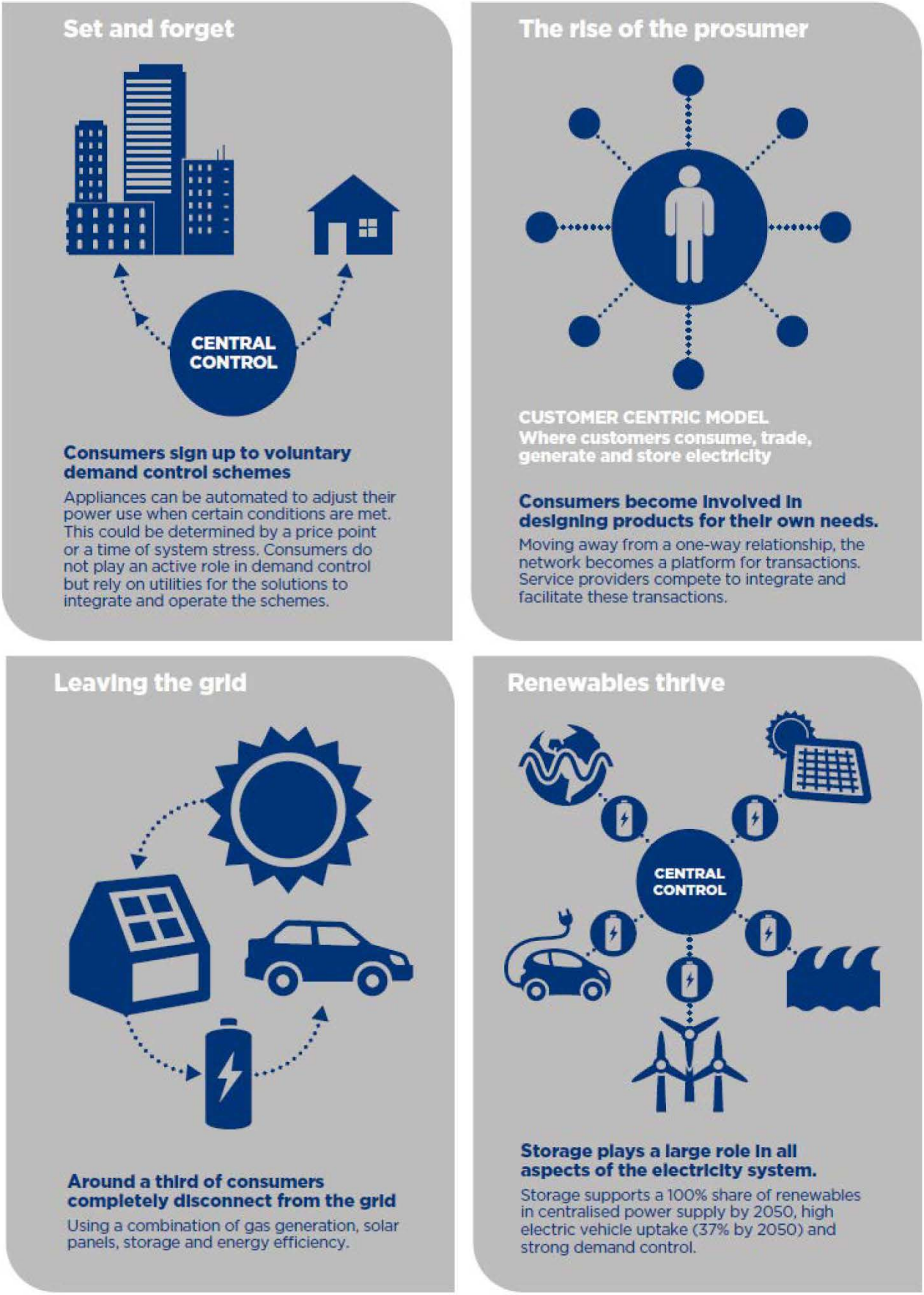

Figure 1: Potential scenarios for electricity supply in the future

2. A changing energy market

Over the last decade the following issues/developments have played a part in the transformation of the electricity sector, specifically the distribution of electricity.

Advances in communications and controls

As new kinds of distributed generation technologies are introduced, including loads (that both use and contribute energy to the network) and equipment, the distribution network has been required to evolve from a radial, one way commodity delivery system to a bidirectional one. Increased customer awareness of power use (efficiency) and increased price sensitivity (demand/consumption) has also contributed to the need for enhanced approaches to the management of the network, including structural and operational performance.

As the level of sophistication grows in the grid, the need for distribution network service providers to more effectively plan, invest in and operate the network becomes even more critical.

Distributed generation

Climate change policies and subsidies for rooftop solar photovoltaic (PV) installations have led to a rapid increase in the number of households and businesses with solar PV. The uptake of solar PV has exceeded initial expectations with more than 16% of Queensland households now with solar energy systems and 15% of Queensland are looking to either purchase more panels or acquire solar PV in the next two years.[1]

Approximately one in six households in regional Queensland have solar.

Solar energy exports, together with renewable energy from the sugar industry (bagasse) and other sources, are already contributing over 10% of the electricity for our main grid.

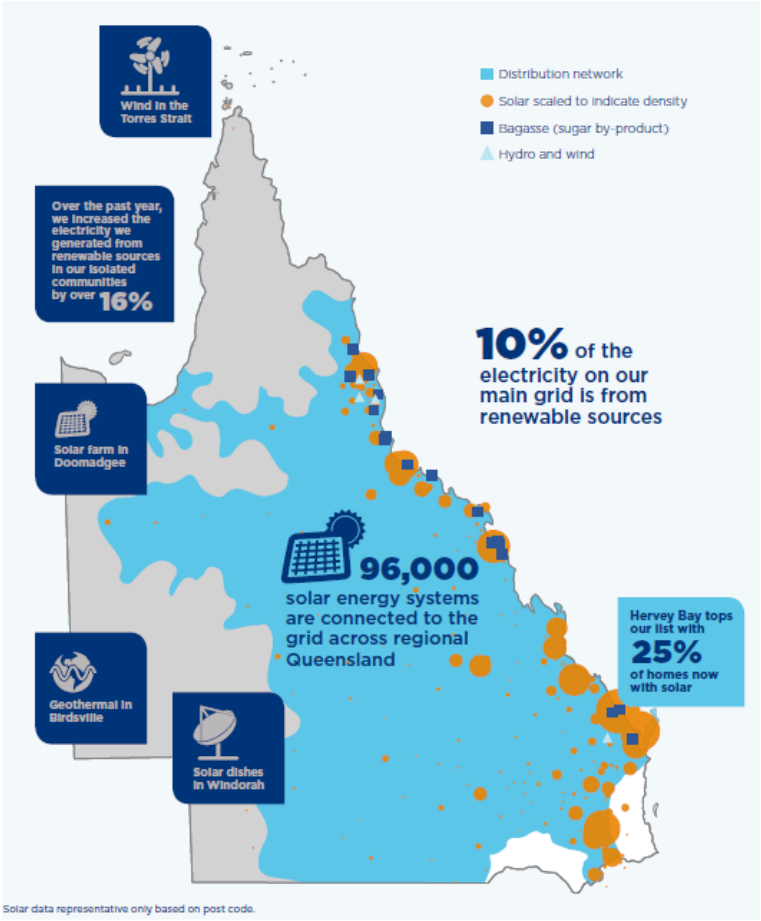

Figure 2: Distributed energy resources connected to the network

[1] Colmar Brunton. 2013. Queensland Household Energy Survey 2013 – Strategic Insights Report. April p 1.

These policies and programs have also contributed to increased electricity prices (to varying levels) due to the cost of funding the program or to encourage a change in consumer behaviour. One of the key contributors to increased electricity prices in recent years has been the Queensland Government's Solar Bonus Scheme (SBS), where participants receive a government mandated solar feed-in tariff that pays eligible customers for the surplus electricity generated from solar PV systems that is exported to the grid. Whilst there are positive electricity bill reductions for those households who install a solar PV, as a result of the SBS, the cost of electricity for all Queenslanders has increased and now represents one of the key contributors to electricity price rises; as recently noted by the Queensland Competition Authority (QCA):[2]

> *The second major costs driver is the Queensland Government's Solar Bonus Scheme (SBS) ... The scheme's impact on network tariffs is expected to peak in 2015-16, at which time about 34% of Energex's network prices will be due to the SBS.*

Solar PV also has a number of adverse technical network impacts, particularly for low voltage (LV) distribution networks. In areas with high penetration levels of solar installations, there are design and cost implications of maintaining appropriate voltage levels on networks so that solar customers' inverters do not switch off due to high network voltages. At the same time higher voltage levels produced by a concentrated presence of solar generation – particularly at lightly loaded times of the day when solar generation is at its maximum – can also have consequences for appliances and equipment at customers' homes. Additionally, small solar PV has a limited effect on reducing peak demand on the network due the time of day that this occurs. Despite the rapid uptake of solar, the amount of peak demand reduction is not significant enough to contribute to any potential deferral of network investment. [3]

Energy storage

Energy storage is emerging as a potential means to support existing electricity networks, improve stability of the grid as it becomes more dependent on intermittent renewable generation sources, and provide for the needs of remote communities. However, it may also provide residential and commercial customers with the ability choose to become self-sufficient i.e. to no longer be connected to the network. Ultimately resulting in increased pressure on prices for those customers still connected to the network.

New technologies

An increasing number of motor vehicle manufacturers are investing in the development of electric vehicles, based on a global movement to transition away from motor vehicles powered by petrol and diesel. Whilst electric vehicles are yet to develop a significant presence in the Australian market, analysis indicates EVs could account for around 1 to 2% of sales by 2015. However, if vehicle prices fall, global supply constraints ease and infrastructure availability increases, EV sales are expected to be around 20% of sales by 2020 rising to around 45% of sales by 2030.[4]

Whilst there is likely to be variability in the take up of this technology, EVs represent a key challenge to the network as a single electric vehicle is likely to roughly double the power (kW) and energy (kWh) load of a 'typical' Queensland home.

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[2] QCA. 2014. Final Determination: Regulated Retail Electricity Prices 2014-15. May. p 61.

[3] Ausgrid. 2011. Effect of small solar Photovoltaic (PV) systems on network peak demand: Research Paper. October. (sourced on 30/05/2014 - http://www.ausgrid.com.au/Common/About-us/Newsroom/Discussions/~/media/Files/About%20Us/Newsroom/Discussions/Solar%20PV%20Research%20Paper.ashx)

[4] AECOM. 2012. Impact of electric vehicles and natural gas vehicles on the energy markets. June. p iii.

EVs do not represent a 'normal' electric appliance due to its consumption profile and potential impact on the network. Its energy needs therefore need to be effectively managed.

Third party providers are stepping in to provide innovative energy services

In addition to the new (and existing appliances) that consumers are connecting to the grid, there has also been an increase in the range of energy services available to consumers. The growth in these services has been positively impacted by increasing energy prices and consumer desire to manage consumption and to connect renewable energy options. In turn, this has led to changes in the way that consumers engage – or want to engage – with the energy market.

Businesses – both traditional (retailers and distribution businesses) and non-traditional market participants, such as energy service companies, information service providers, demand aggregators and micro grid managers - have responded to these changes in expectations and technology, by developing new and innovative ways of selling electricity.

Energy efficiency

Over the last decade Government and market participants (namely distributors and retailers) have provided advice (general and targeted) and assistance to consumers on managing electricity consumption, with the overall objective of improving energy efficiency. In recent years this advice has become increasingly targeted (facilitated by an increased proportion of accumulation meters being replaced and data being recorded on a more frequent basis), for example through the introduction of flexible pricing structures (i.e. time of use tariffs and critical peak pricing).

Energy efficiency programs can reduce energy costs for consumers, as lower consumption will result in reduced energy bills, assuming all other components of the delivered cost of energy are held constant. As average electricity prices have increased, consumers have invested more in energy efficient appliances and applied more discipline to the way they consume energy.

In recent years, consumers have become frustrated with the fact that there is no guaranteed relationship between increased energy efficiency (i.e. reduced consumption) and reduced prices. This was noted in the Queensland Household Energy Survey 2013.[5]

> *The majority of Queenslanders self-report that they have actively tried to reduce their electricity consumption in the last 12 months. The primary reason for this is a desire to reduce their electricity bill and save money. … Qualitative research in this category also highlights that some consumers … resent what they are paying for electricity (and) … feel they might as well use it in whatever manner they wish.*

Despite this frustration, a majority of consumers are actively trying to reduce their energy consumption, albeit the number of households exhibiting this behaviour has continued to decline from 2011 levels.[6]

Demand management

Demand management relates to strategies to manage the growth in overall or peak demand for energy services. This includes installing more efficient and intelligent home appliances, such as air conditioners that can detect peak demand and draw less power, generating power locally (eg. solar panels). It also includes rewarding consumers for reducing or shifting their demand from peak times.

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5 Colmar Brunton. 2014. Queensland Household Energy Survey 2013: Strategic Insights Report. April. pp 43, 45.

6 Colmar Brunton. 2014. Queensland Household Energy Survey 2013: Strategic Insights Report. April. pp 43

Each of these measures aim to encourage load growth during off-peak periods, shift demand from peak to off-peak periods, implement efficient alternatives to network augmentation, and postpone the need for network augmentation or the need to construct additional generation capacity. Typically these measures are applied at the network or retail level and require cooperation between energy suppliers and customers.

Although the regulatory framework gives distributors the ability to undertake demand management programs/solutions, these incentives are still insufficient to deliver market outcomes that benefit market participants and consumers. In some cases this is due to the low levels of load under management. For example, customer participation in the National Electricity Market (NEM) for demand management is limited, and available mainly to large customers. This has resulted in less than 1% of NEM installed capacity being subject to demand response, the bulk of which was in Victoria and Queensland.[7] The lack of incentives and the need for more direct action, to encourage a demand side, was a key recommendation of the Australian Energy Market Commission's (AEMC) recent Power of Choice Review.

Rising electricity prices have also created additional pressure to implement effective demand management programs. Namely, programs aimed at improving supply efficiency by smoothing the peaks and troughs that occur in daily, weekly and annual demand. This can be achieved through measures that attempt to encourage load growth during off-peak periods and shifting demand from peak to off-peak periods.

Price sensitivity and transparency on the contribution of network costs to price

In recent years there has been a marked step up in Australian household electricity prices. For Queenslanders, since 2007, electricity bills have risen significantly. These increases can be attributed in part to changes in the policy environment for setting retail prices (i.e. the introduction of full retail competition and Benchmark Retail Cost Index (BRCI) and the one-off effects of moving to the N + R framework for setting retail prices[8]), increases in the individual cost components of the delivered cost of energy (particularly network costs) and renewable energy policies (eg. Renewable Energy Target, SBS and Queensland Gas Scheme).

The biggest cost increases in electricity supply in recent years have come from network costs (distribution and transmission), which have grown by more than 100% between 2007-08 and 2012-13.[9] These network costs have been driven by capital expenditure on new and replacement assets in response to an aging network, population growth and the higher reliability standards introduced in response to the Electricity Distribution Service Delivery (EDSD) Review in 2004.[10]

To achieve these increased EDSD Review standards each of the DNSPs had to undertake a number of measures. For Ergon Energy, this included the obligation to achieve N-1 security on bulk supply substations and large zone substations (5MVA and above) and sub-transmission feeders. Steps also needed to be taken to improve network planning processes, improve maintenance programs and better communicate with customers. Whilst it was acknowledged by the EDSD Review panel at the time that these recommendations would result in significant increases in capital and operating expenditure, the impact of these reforms on final electricity prices was not fully understood at that time.

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7 During the 2013-14 summer around 210MW of capacity (representing less than 1% of NEM installed capacity) was assumed to be available through demand side participation, when the spot price was above $1000 per MWh.

8 Notified prices for 2012-13 were the first set of retail tariffs that had been determined on the basis of the N+R methodology.

9 Queensland Government. 2013. Independent Committee on Electricity Sector Reform: Report to Government. May. p 25.

10 Ergon Energy. 2005.2005 Electricity Distribution Review, Electricity Distribution Service Delivery – Submission to the Queensland Competition Authority. 21 January.

The resulting price increases have made consumers become increasingly concerned about the cost of energy. Residential households and business customers have actively pursued and adopted energy efficiency measures to reduce their consumption and in turn their electricity bills, as well as to pursue alternative energy solutions (eg. rooftop solar).

Figure 3 summarises Ergon Energy's customers' feedback on and response to increasing electricity prices.

The cost and affordability of electricity continues to be a significant issue for Queensland households, and they are becoming increasingly price sensitive as a result of substantial ongoing price rises. As consumers have become more concerned about the cost of electricity they have adopted measures to reduce usage. Whilst these measures have resulted in a reduced level of consumption at the household level compared to the forecast, they have not necessarily resulted in reduced retail bills. The load curves indicate that the peak has not reduced, and consumers are increasingly questioning what more they can do to reduce their bills given the impact that the size of the regulated asset base, and distributors' financing and like costs have on overall prices.

Data source: Colmar Brunton. 2014. *Queensland Household Energy Survey 2013: Strategic Insights Report*. April

Figure 3: Consumer impacts

One of the key measures being adopted by residential consumers, to achieve a longer term solution to rising electricity prices, is the installation of solar energy systems. This trend was encouraged by policy measures at both the Commonwealth and State level, through measures such as the SBS. Despite these incentives being largely wound back by Government in recent years, consumers have continued to invest in distributed generation solutions. This continued growth can be attributed to the expectation that electricity prices will continue to increase into the foreseeable future, the reducing unit cost of distributed generation solutions and suppliers of distributed generation solutions adopting more innovative pricing structures (i.e. leasing arrangements). Solar energy represents a significant challenge for Ergon Energy due to the impact it has on network prices through reduced residential consumption and the pass-through of the SBS rebate (see Figures 4 and 5).

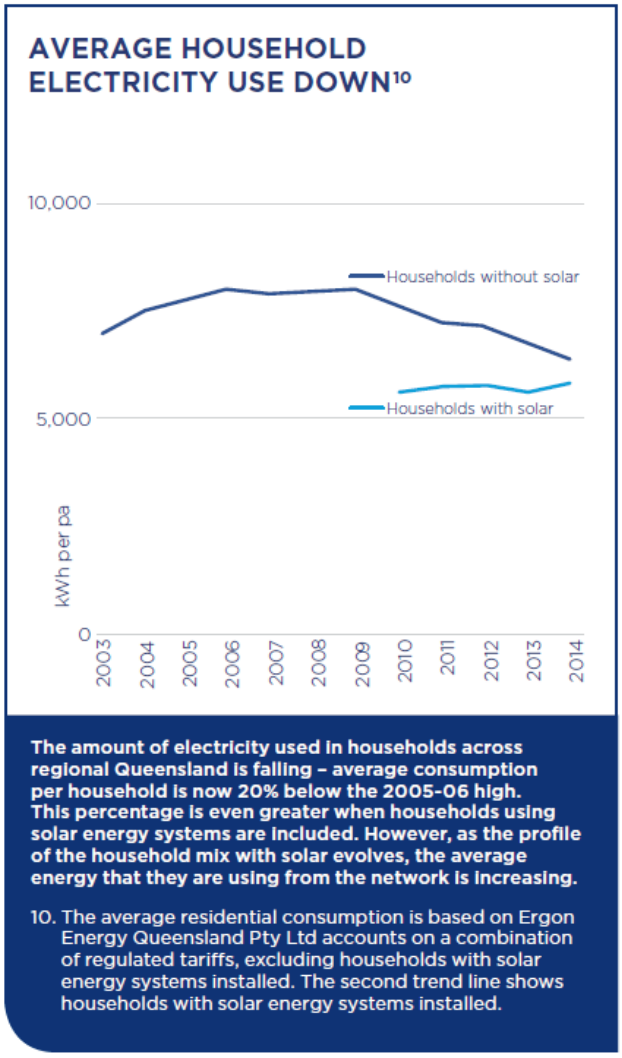
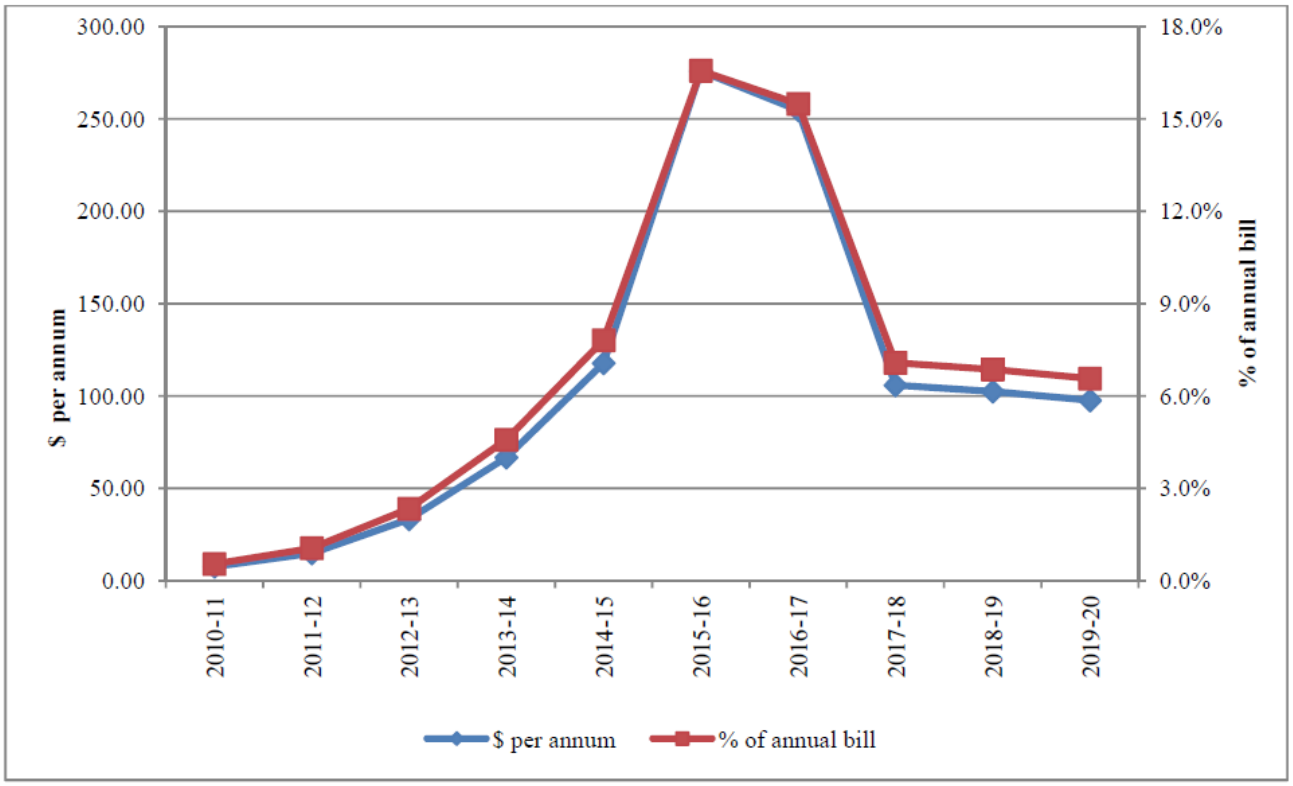


Figure 4: Average household consumption



Data source: QCA. 2013. *Estimating a Fair and Reasonable Solar Feed-in Tariff for Queensland: Final Report*. March. p 64.

Figure 5: Indicative impact of Solar Bonus Scheme on the typical Tariff 11 customer's bill (other costs held constant at 2013-14 levels)

As electricity prices continue to rise, the cost of distributed generation solutions decrease and the use of distributed generation is 'normalised', a 'tipping point' could ultimately be reached where consumers no longer see value in being connected to the grid (i.e. opt to bypass the network) or continue to be connected to the grid but only for back-up power supply (i.e. when they are unable to generate on-site or store sufficient electricity to meet their energy needs).

The increased penetration of distributed resources and the associated need to avoid building additional network capacity that is only used for short periods each year to meet peak demand will necessitate network and retail tariff reform complemented by non-price network initiatives to manage peak demand.

3. Adjusting Ergon Energy's business model to the 'new normal'

The way Ergon Energy approaches the increasing role for distributed resources connected to the distribution network is central to its long-term sustainability and relevance to the customer. Ergon Energy's current business model does not adequately address this new level of integration.

For the foreseeable future, Ergon Energy will have an obligation to supply and will be subject to regulation under the NER. Ergon Energy will also be required to provide high levels of reliability, even if customers have the ability to meet their own power requirement from time to time. Until Ergon Energy's legislative and regulatory obligations are adjusted to reflect a more diverse supply chain and evolving consumer expectations, any adjustment to the current business model must be carefully managed to ensure ongoing compliance with all legislative and regulatory obligations.

The objective of Ergon Energy's new business model is to create a network platform that addresses the interaction between the various parties using our network. Our approach supports value-based interactions through a set of rules – including protocols, rights and pricing terms – that standardise and facilitate the interaction between the multiple parties.

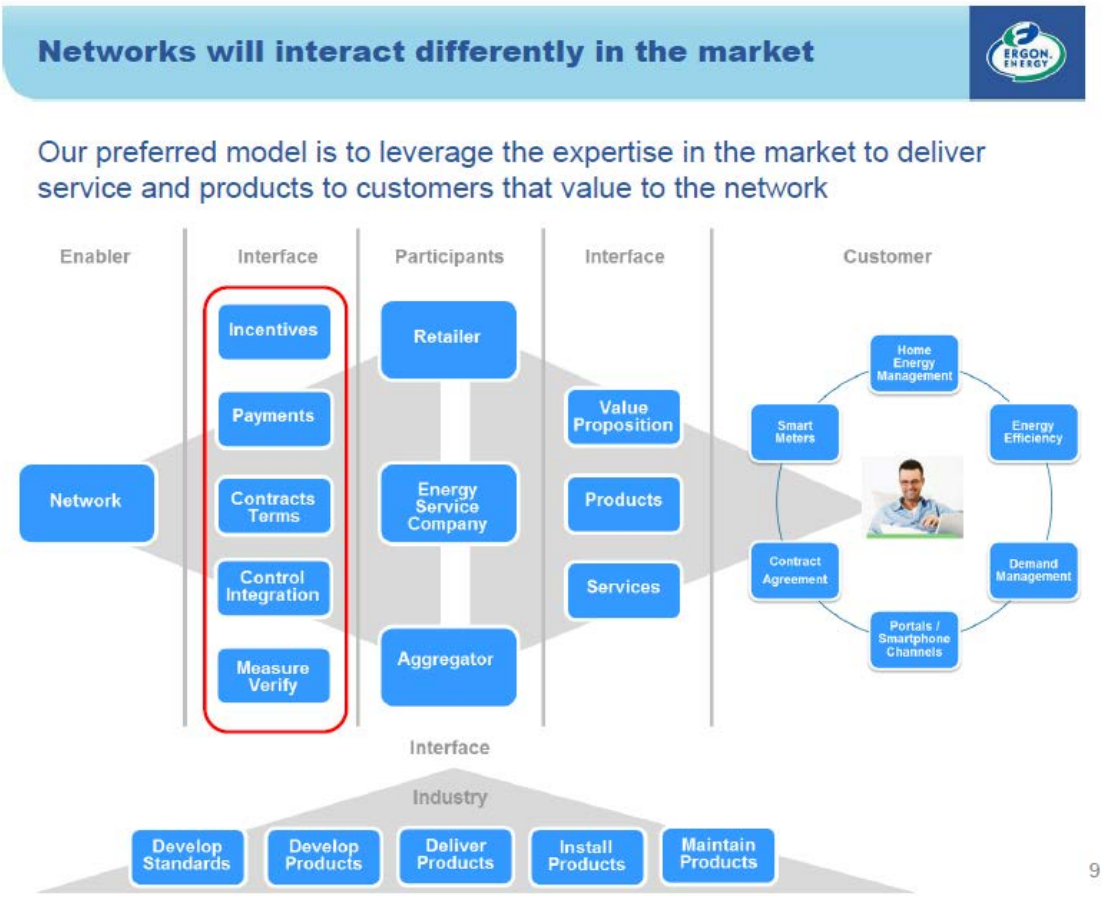


Figure 6: Adjusting Ergon Energy's business model to the 'new normal'

The process of setting the terms and conditions for accessing the network platform described above is essential as it can increase innovation and competition by:

- reducing transaction costs
- increasing transparency in relating or comparing the value of services provided by different types of assets
- enabling and empowering the creation of integrated solutions that are built up from readily combined but heterogeneous modules.

Ergon Energy will promote changes in the electricity industry, such as smarter pricing and regulation, a smarter electricity grid and more competition that over time will make it easier and more cost-effective for buyers and sellers to use the Ergon Energy distribution network to do business together. This includes customers, small generators, solar and battery installers, application developers, energy efficiency providers and product manufacturers. Ergon Energy will also work to ensure customers value being connected to the grid and choose to stay, even if they have the option to disconnect.

Restructuring the way Ergon Energy charges for the use of its distribution network is one way to ensure we remain relevant to our customers and are able to maintain a viable network for our customers into the future.

These changes will help Ergon Energy's customers see the costs associated with their demand on the electricity network and will provide greater choice and control in how customers use the electricity network to deliver value.

Consistent with our Network Tariff Strategy, from 2014-15 Ergon Energy is starting to move network tariffs away from 'energy charges' to an appropriate mix of fixed and demand based charges. To start this journey Ergon Energy has introduced new network tariff structures for small customers, effective July 2014. At the same time Ergon Energy is moving to reduce reliance on charges based on the volume of electricity used.

Ergon Energy started its conversation with customers, electricity retailers and those representing regional Queensland's energy users on the Networks Tariff Strategy in mid-2013 through a separate engagement process. Ergon Energy will continue to engage with customers, electricity retailers and energy user representatives, through these established communication channels, as the reform process continues.

Additional information

For further information go to:

www.ergon.com.au/futureinvestment

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