



DISCUSSION PAPER

The Future of Electricity in Regional NSW

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Foreword



Agriculture is an energy intensive industry, with activities such as irrigation, dairy processing, climate controlled environments and cold storage chains heavily dependent on electricity. New South Wales (NSW) farmers are looking to the future and embracing digitisation and automation of processes to improve productivity and efficiency, which will require greater electrification of farming processes.

The continuing significant rises in electricity prices has direct and indirect impacts on farmers including:

- increased electricity costs on-farm;
- lower farm-gate prices, as processors pass on the increased cost of electricity down the supply chain;
- increased cost of feed, fertilisers and other farm inputs, as suppliers pass on their increased electricity costs to users; and
- deterioration of the sector's international competitiveness, and ability to compete in international markets.

Regional communities already pay the highest prices for electricity in the country and can no longer tolerate escalating electricity costs, or the political and policy uncertainty that is contributing to the crisis around electricity affordability and reliability.

The *Future of Electricity in Regional New South Wales* identifies the challenges and potential solutions for affordable and reliable electricity in regional NSW. The NSW Farmers Association is taking the lead on providing practical solutions to ensure that in the near future the provision of electricity becomes an enabler for the growth of farming and regional communities, not the significant impost that it currently is.

In developing these practical solutions, the Association has consulted widely with affected farming members, policymakers, and energy market players via the *From generation to consumption regional electricity* Roundtable held in July 2017 at PwC Sydney. The Association and its members wish to thank these stakeholders for their contribution, and look forward to working with all levels of government to secure regional NSW's energy future.

A handwritten signature in dark ink, appearing to read 'D. Schoen'.

Derek Schoen

President
NSW Farmers' Association



About the NSW Farmers' Association

The NSW Farmers' Association is Australia's largest State farming organisation representing the interests of its farmer members.

Farmers across New South Wales produce more than \$15 billion worth of food and fibre every year, representing around one quarter of Australia's total agricultural output. Our state's unique geography means a wide variety of crops and livestock can be cultivated and nurtured. NSW Farmers is Australia's only state-based farming organisation to represent the interests of farmers of all agricultural commodities – from avocados and tomatoes, apples, bananas and berries, through grains, pulses and lentils to oysters, cattle, dairy, goats, sheep, pigs and chickens.

Our focus is not just on issues affecting particular crops or animals – it extends to the environment, biosecurity, water, economics, trade and rural and regional affairs. We also have an eye on the future of agriculture; we are advocates for innovation in agriculture, striving to give our members

access to the latest and greatest innovations in research, development and extension opportunities. Our industrial relations section provides highly specialised advice about labour and workplace matters.

Our regional branch network ensures local voices guide and shape our positions on issues which affect real people in real communities. Members are the final arbiters of the policies of the Association – through our Annual Conference and elected forums such as Executive Council, members can lobby for the issues which matter to them and their community to become Association policy. Our issue- and commodity-specific Advisory Committees are elected by members to provide specialist, practical advice to decision makers on issues affecting the sector. We are proudly apolitical – we put our members' needs first.



The policy contact for this matter is Ash Salardini, Chief Economist, NSW Farmers' Association, email: salardinia@nswfarmers.org.au



Summary

The cost of electricity has become a major concern for regional and rural users in NSW. The agricultural sector in particular is heavily exposed to rising energy prices. The doubling of electricity prices over the past decade has compromised the viability and international competitiveness of the sector. A business-as-usual approach to the delivery of electricity can no longer guarantee affordable and reliable electricity into the future.

The *Future of Electricity in Regional New South Wales* discussion provides an overview of the challenges, opportunities and solutions to providing regional NSW with affordable, reliable and sustainable electricity.

Electricity and the agricultural sector

Electricity is already a critical input within the agricultural sectors. Currently, on-farm electricity use centres on large-scale irrigation pumps, cold storage chains, climate controlled environments, and on-farm processing of products, such as dairy. Food processors, such as meat and dairy processors, also use significant amounts of energy and electricity. The next major productivity step-change within the sector will be the increasing digitisation and automation of agricultural production, which requires electrification of farm processes. This will increase the sector's exposure to energy prices.

The continued increases in electricity prices will have significant impacts on the agriculture sector, and in particular farmers, who will be faced with increased electricity input costs on-farm; lower farm-gate prices, as processors pass on the increased cost of electricity down the supply chain; increased cost of feed, fertilisers and other farm inputs, as suppliers pass on their increased electricity costs to users; and deterioration of the sector's international competitiveness, and ability to compete in international markets.

All levels of government, regional communities, the agricultural sector, and the electricity sector must work together to provide more cost-effective alternatives to the provision of electricity to regional NSW.

Barriers in providing affordable and reliable electricity to regional NSW

- The investment uncertainty created by continually changing environmental policies and ad-hoc government interventions have severely reduced investment in generation capacity, increased electricity prices, and created questions around security of supply. This has, and will, negatively impact metropolitan and regional electricity users alike.
- Regional NSW retail electricity markets are not competitive and not providing regional users with a fair deal. The best deal offered by a large retailer to a typical regional household in Dubbo, Tamworth or Albury is \$2396 p.a.¹ If the household was located in Darlinghurst, the same retailer would only charge \$1808 for electricity p.a. This 25% price disparity cannot be explained by the higher costs associated with providing regional networks.
- Consumers find electricity market offers to be complex and market prices to be opaque. Surveys undertaken by Energy Consumers Australia has highlighted that many consumers find electricity market offers to be more complex than financial products, such as insurance. This may contribute to consumers being on inappropriate and expensive market offers.
- Despite paying the highest electricity prices in Australia, regional communities, and in particular farmers, are not getting their fair share of government grants and subsidies relating to electricity. As an example, recent changes to the Renewable Energy Target (RET), means that investments in renewable generation made by farmers receive less than half the subsidy as large-scale projects undertaken by large retailers and generators.
- Similarly, regional communities have largely been neglected in the energy policy debate, with little time or resources being invested in dealing with regional electricity challenges. As an example, the Australian Energy Regulator has mandated the introduction of cost-reflective pricing, which will increase electricity costs for some regional users by 200-300%. Despite these potential significant increases, the requisite investment has not been made in exploring and implementing ways to provide electricity to these users more cost effectively.
- The current method of providing network services to regional and rural communities is inherently expensive. Transmitting and distributing electricity long distances to sparsely populated locations will ensure that remote users always pay higher prices for their electricity. Governments have provided very little resources in exploring alternate cost-effective and reliable approaches to the delivery of electricity to the regions, including the utilisation of distributed energy resources, micro-grids and hybrid solutions.
- There is a real threat of a 'death spiral' in regional electricity networks if users' investment in local sources of electricity generation and storage is not coordinated to optimise network outcomes and leads to wholesale defection from the grid. This will increase the cost of grid electricity, promoting further defections, and will put the whole viability of regional networks into question.

1. A typical household for the purposes of this paper is a household with four occupants, gas connection, no pool, and no demand management or solar heating/generation capacity.

Recommendations



1. Implementation of Finkel Review recommendations

The Finkel Review recommendations must be implemented as soon as practical to address challenges with the electricity system's transition to renewables, including reliability concerns with the increasing use of non-dispatchable variable renewable generation; security of supply issues with the disorderly retirement of generation capacity; and investment uncertainty, and subsequent reductions in generation capacity, due to continued changes to environmental policies.

At the time of printing, The Federal Government introduced some details on its direction on electricity in the form of the National Energy Guarantee (NEG). The Association supports the NEG, particularly in integrating environmental policies within the electricity market, but is dismayed at the lack of a political process in ensuring bipartisanship and state government agreement. The very point of the Finkel Review process was to create an environment of bipartisanship. The electricity problem has never been a lack of good policy; it has always been about the lack of political consensus.



2. Establish NSW Government, agricultural and electricity sector working group on energy

The challenges and opportunities with the provision of regional electricity is poorly understood and very little policy attention or resources have been dedicated in finding solutions to ensuring an affordable, reliable and sustainable provision of electricity to the regions. The establishment of a Regional NSW Energy Working Group would alleviate this policy neglect. The industry-government working group would be tasked with the identification of research and development opportunities in identifying cost-effective methods of delivering electricity, tariffs and incentives to address peak demand and congestion issues on regional networks, and potential regulatory changes to give effect to the Group's work.



3. Establish a \$5 million p.a. agriculture-electricity innovation fund in NSW

The fund would provide opportunities to undertake large-scale feasibility studies into alternate modes of delivering electricity to the regions more affordably and reliably, pilot projects to roll out innovative cost-saving technologies, and assist in resourcing the programme of the Regional NSW Energy Working Group.



4. IPART to undertake a comprehensive review of the retail electricity market in NSW

The NSW Government must direct IPART to undertake a comprehensive review of NSW's retail electricity market, with specific focus on determining the competitiveness of NSW's retail market as a whole, and specific concerns around the lack of competition in regional and rural markets.



5. NSW Government to lead on reforms to create transparency and disclosure in retail markets

Much like the *National Credit Code* reforms governing the banking sector, electricity retailers must enable electricity consumers to more easily compare market offers and be compelled to provide a standard comparison rate that incorporates all fees and charges in a uniform manner; provide a concise and uniform summary of the retail offer, highlighting key contractual terms and provisions; and produce an in-depth disclosure document of contractual terms, similar to a product disclosure statement in the banking sector.

The Future of Electricity in Regional NSW

The cost of electricity has become a major concern for regional and rural users in NSW. The agricultural sector is heavily exposed to energy prices, and its exposure will increase due to the need for the electrification to take advantage of latest technologies and processes. The doubling of electricity prices over the past decade has significantly compromised the viability and international competitiveness of the sector. A business-as-usual approach to the delivery of electricity can no longer guarantee affordable and reliable electricity into the future.

There are significant problems with the delivery of affordable and reliable electricity across the entire National Electricity Market, and there are unique challenges facing remote and rural communities. The long distances that electricity must be transmitted, the low population density of the user-base, and the often seasonal and inelastic demand profile of intensive electricity users, creates challenges in both providing electricity affordably and reliably to regional and rural users.

To address these challenges, the NSW Farmers' Association brought together representatives from the agricultural sector, electricity network providers, electricity retailers, research organisations, and regional representative groups to participate in the *From generation to consumption regional electricity Roundtable* (the 'Roundtable'), held in July 2017 at PWC premises in Sydney.

The Association has used insights from the Roundtable to inform analysis and findings in this paper. It should be noted that, unless stated otherwise, all views presented in this paper are that of the Association. We wish to thank the following Roundtable participants for their valuable contribution:

- [Fiona Simson](#) – President of National Farmers Federation
- [Peter Strong](#) – Chief Executive of Council of Small Business Australia
- [Tim O'Grady](#) – General Manager, Public Policy and Government Engagement at Origin Energy
- [Lynne Gallagher](#) – Director of Research, Energy Consumers Australia
- [Brendon Crown](#) – Executive Director Economic Policy, Energy Networks Australia
- [Adam Bacon](#) – Executive Director of Services at GE ANZ
- [Steve Whan](#) – Chief Executive of the National Irrigators' Council
- [Roger Marshall](#) – General Manager Stakeholder Engagement at Essential Energy
- [Peter Bereicua](#) – General Manager Asset Management at Essential Energy
- [David Mailer](#) – Farmer and NSW Farmers' Association member representative on energy
- [Stefanie Schulte](#) – Policy Manager, NSW Irrigators' Council
- [Danielle Alexander](#) – Institute of Sustainable Futures
- [Richard Heath](#) – General Manager Research, Australian Farm Institute
- [Ash Salardini](#) – Chief Economist at NSW Farmers' Association

The Association would also like to acknowledge the work and feedback provided by its Business Economics and Trade Committee members including David Mailer, Peter Wilson, Elizabeth Tomlinson, Bruce Reynolds, Richard Croft, Wayne Dunford, Terry Fishpool, Bill McDonnell, Laura Phelps, and Chris Stillard (Horticulture Committee member).



“To reach this **\$100 billion target**, we will need to harness new technologies and move up the agricultural value chain and reach lucrative Asian markets with processed agricultural products.”

– Richard Heath, Australian Farm Institute

The Agricultural Sector & Energy

The agricultural supply chain in New South Wales (NSW), and Australia more generally, is an energy intensive economic activity with significant ambitions to expand and innovate. As such, the cost, efficiency and reliability of energy and electricity are key drivers to the success and growth of the sector. The NSW and Federal Governments have established targets for the agricultural sector to grow in NSW to \$20 billion by 2020 and to \$100 billion by 2030 across Australia. Agribusinesses also contribute a further \$30-40 billion to NSW's gross state product per annum.

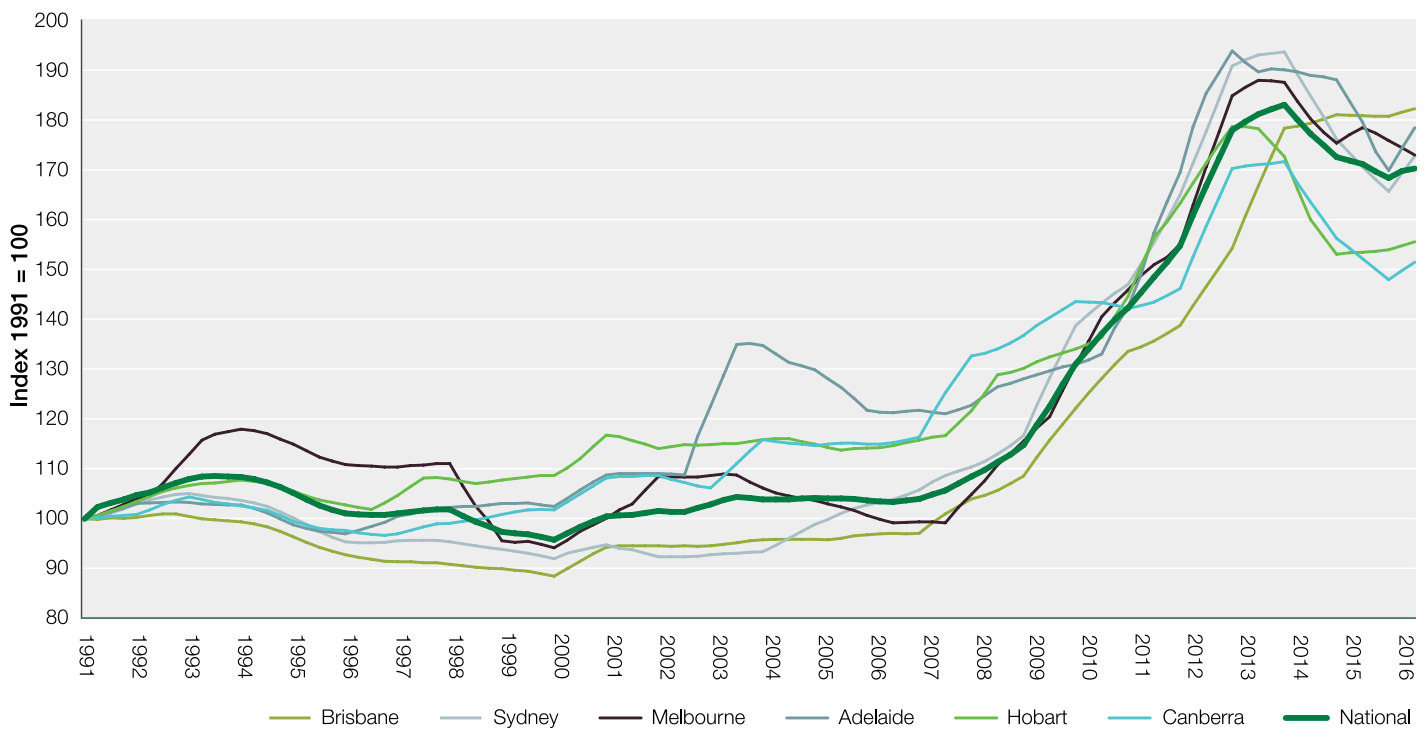
To achieve these ambitious targets, the agricultural sector is seeking to innovate and move up the supply value chain, looking to harness digitisation and automation to improve on-farm productivity, and harness new opportunities to provide value-added products to lucrative Asian and Middle-Eastern markets. This journey towards digitisation and automation is an absolute must for the international competitiveness of our agricultural sector, which in turn is reliant on increased use of energy and the greater need for electrification. Australia's total factor

productivity growth is well behind developing countries such as China, and traditional competitors such as Brazil, who are quickly digitising and automating their agricultural sector. (USDA 2016).

Electricity is already a critical input within the agricultural sectors. Currently, on-farm electricity use centres on large-scale irrigation pumps, cold storage chains, climate controlled environments, and on-farm processing of products, such as dairy. Agricultural food processors, such as meat and dairy processors, also use significant amounts of energy and electricity. Estimates suggest that agriculture consumed 104.4 petajoules of energy in 2016, approximately 3% of total Australian energy use, while food processing and manufacturing accounted for a significant portion of manufacturing energy use of 987.3 petajoules (24% of total use), (Department of Industry, Innovation and Science 2016). It should be further noted that energy use in the agricultural sector is heavily understated, given significant off-grid and behind-the-meter energy generation and use.

Electricity Retail Price Index

Source: Australian Energy Regulator 2017



Energy prices are looming as a critical barrier to the further growth of the sector. Electricity prices have doubled over the past decade, and placed significant financial pressures on electricity dependent operations, such as irrigators, dairy farms, and intensive farming.

Regional and rural users have seen further price rises, due to the historically escalating cost of regional network infrastructure, and due to the lack of competition amongst electricity retailers in regional markets. Continued increases in electricity prices will have significant impacts on the agriculture sector, including farmers and processors.

“Commodity prices are very good at the moment, so to a large extent farmers are simply wearing the cost of higher electricity prices. Once there is a downturn in commodity prices, I dare say this will be a critical political issue.”

– Steve Whan, National Irrigators’ Council

The impacts on farmers are fourfold:

- increased electricity input costs on-farm;
- lower farm-gate prices, as processors pass on the increased cost of electricity down the supply chain;
- increased cost of feed, fertilisers and other farm inputs, as suppliers pass on their increased electricity costs to users; and
- deterioration of the sector’s international competitiveness, and ability to compete in international markets.

These impacts are being felt across the entire agriculture sector. As an example, producers of apples in and around Orange have seen a reduction in farm-gate prices, as their local processor (Appledale) has been forced to pass on some of the rising energy costs to farmers.

Agricultural manufacturers and processors are some of the largest users of energy and electricity, with larger processors having energy bills in excess of \$100 million per annum. Small changes in electricity prices can threaten the viability of operations and ability to compete in international markets.



The impact of energy on the Dairy Industry – Dairy Australia

Analysis undertaken by Dairy Australia suggests that the current cost of energy (electricity and gas in 2016) for dairy processors is in excess of \$170 million, and based on new contracts being negotiated by processors, this cost is set to increase by a further \$100 million in 2017/18.

The increases in processors' energy costs will translate into a 2% decrease in farm-gate milk prices, costing the typical farmer around \$15,000 in lost revenues. This is in addition to the expected \$4500 increase in energy prices for the average NSW dairy farmer, increasing their total energy costs to an average of \$28100. This is a significant burden for what are essentially small-to-medium enterprises.

Of equal concern is the increased risk of supply disruptions, with predictions of blackouts for the summer of 2018. Different sites will be affected differently, for example power blackouts:

- Would cause significant issues at sites that blow-mould their own plastic milk bottles, including significant times required to restart production lines;
- Unfinished dairy products within process lines and storage vats are also likely to become unusable;
- Loss of production at critical times may affect a processor's ability to meet supply contracts, with severe commercial implications; and
- The cost of acquiring and maintaining back-up diesel or gas generation adds significant costs to a business that already operates on small margins.

Barriers to affordable & reliable electricity in regional NSW

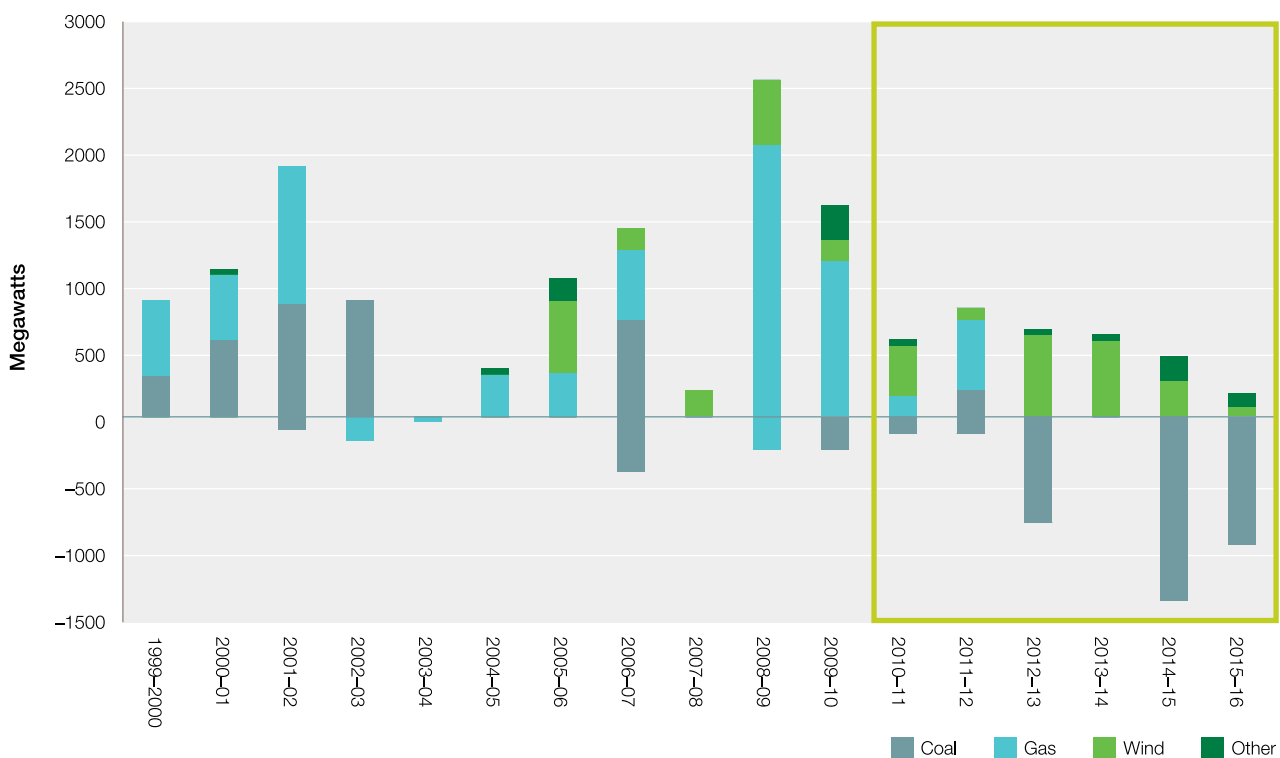
Regional and rural NSW faces many of the problems affecting all electricity users. However, regional and rural NSW also faces unique challenges that have compromised the affordability, reliability and sustainability of electricity above and beyond those faced by users in general.

Issues around peak-demand and security of supply as a result of inadequate transitory provisions from fossil fuel generators to renewables, has had adverse impacts on affordability and reliability of electricity across the National Electricity Market. The disorderly decommissioning of coal power generation, such as the closure of the Hazelwood Power Plant, and the ramping up of variable renewable generation without mechanisms to ensure reliability and security of the system, has impacted regional, rural and urban areas alike.

Policy uncertainty within the electricity market and with climate change policy has created a poor environment for investment in generation capacity. The period between 2010 and 2016 was defined by significant uncertainty including the introduction and repeal of a carbon price, attempts to remove the Renewable Energy Target (RET), and political wrangling over the level of the target. This has coincided with significant decreases in investment in generation capacity. Investors have intimated that they were reluctant to make multi-billion dollar infrastructure investment decisions, where the mechanism for reimbursement was not clear and subject to change.

Investment in new generation and plant retirements

Source: Australian Energy Regulator 2017



“When we talk of investment certainty, we should note that farmers also need the certainty to invest in on-farm electricity generation and energy efficiency.”

– Fiona Simson, National Farmers’ Federation

This lack of investment has potentially exacerbated the problems and costs associated with peak demand, and likely forecast electricity shortages in 2018. Since 2012, we have seen a net reduction in generation capacity. Recent state and federal government intervention in generation capacity is likely to create further investment uncertainty.

The agricultural sector has not only felt the pain of increased electricity prices as a result of this policy uncertainty, but seen the financial assumptions underpinning on-farm investments in small-scale renewable generation destroyed.

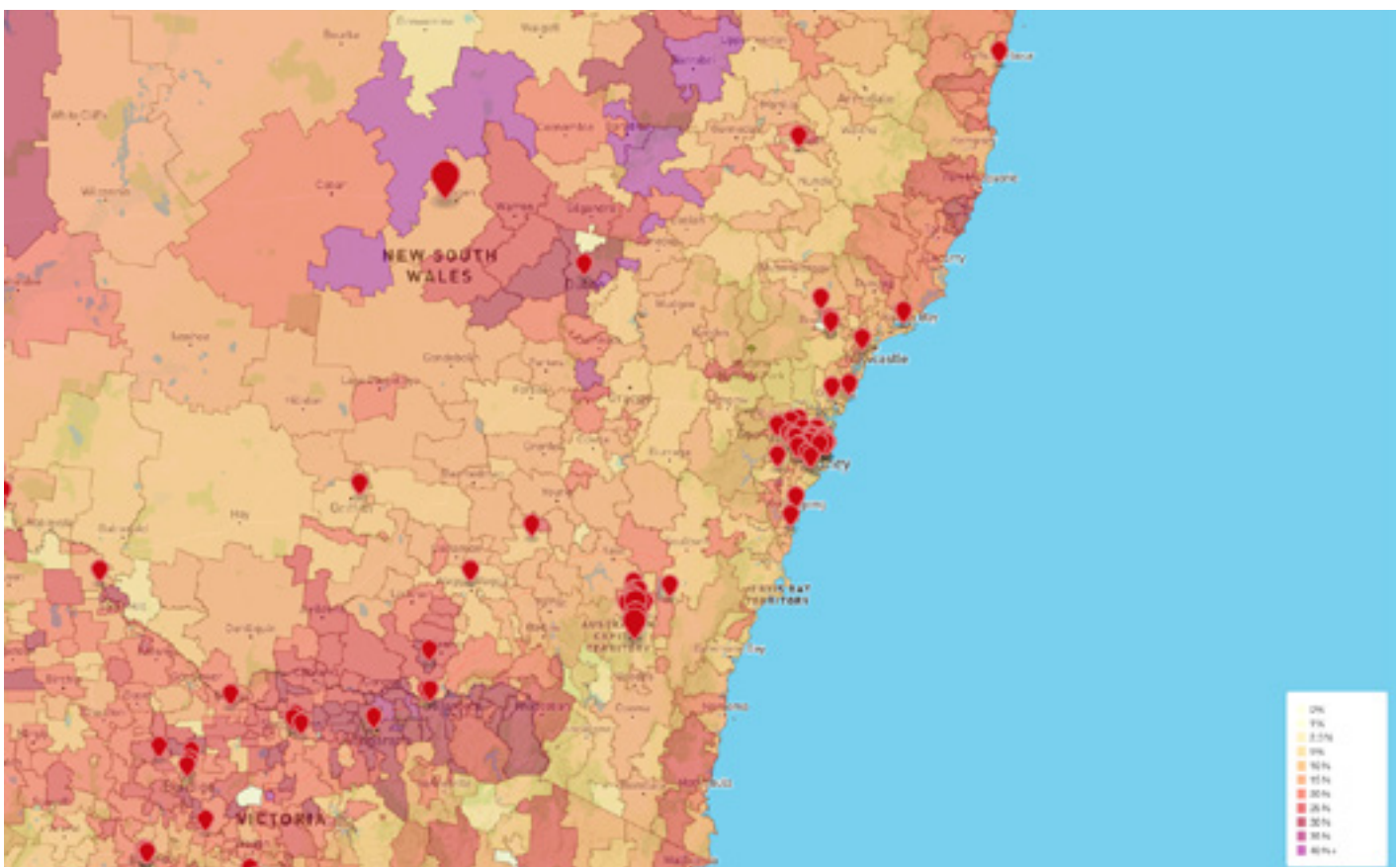
The agricultural sector has been early adopters of renewable energy generation, and the utilisation of renewable generation is greatest in regional and rural areas. As an example, the only local government areas within NSW with more than 30% of users installing PV solar generation were all in regional areas, including Dubbo, Narrabri, Corowa, Warrumbungle and Tweed. Regional NSW’s uptake of PV solar generation ranged generally between 15-40% of all users, while urban uptake generally ranged between 10-20% (darker shades on the map represent greater uptake).

“It is not the role of government to pick one technology over another, government needs to set the frameworks and incentives that will achieve the policy outcome, and let the market pick the most appropriate technology.”

– Adam Bacon, General Electric

Utilisation of Solar PV (as a percentage of total households)

Source: Australian PV Institute 2017



“Governments are simply not interested in small-scale renewable projects anymore, all incentives find their way to large-scale projects.”

– David Mailler, Farmer

Many farmers made considerable investments in on-farm renewable generation hoping to take advantage of state government subsidies for renewable feed-in tariffs and a RET that did not distinguish between small and large scale renewable energy generation. The Federal Government introduction of the Large-scale Renewable Energy Target (LRET) in 2015, with a separate and more modest small-scale renewable energy scheme, has significantly reduced the value of small-scale renewables subsidy (capped at \$40 per mwh). Combined with the phasing out of NSW feed-in subsidies, feed-in tariffs for on-farm solar power has dropped significantly, ensuring that many farmers who invested in renewable generation were left worse off, and stifling future investment in on-farm generation.

The introduction of the LRET is an example of bad policy begetting more bad policy. The original intent of the LRET was to counter the distortions in the renewables certificate market that favoured small-scale renewable projects due to the provision of state based feed-in subsidies for small-scale solar. However, with the removal of most state-based subsidies, we have a situation where the Federal Government is now heavily subsidising large-scale renewables to the detriment of small-scale projects.

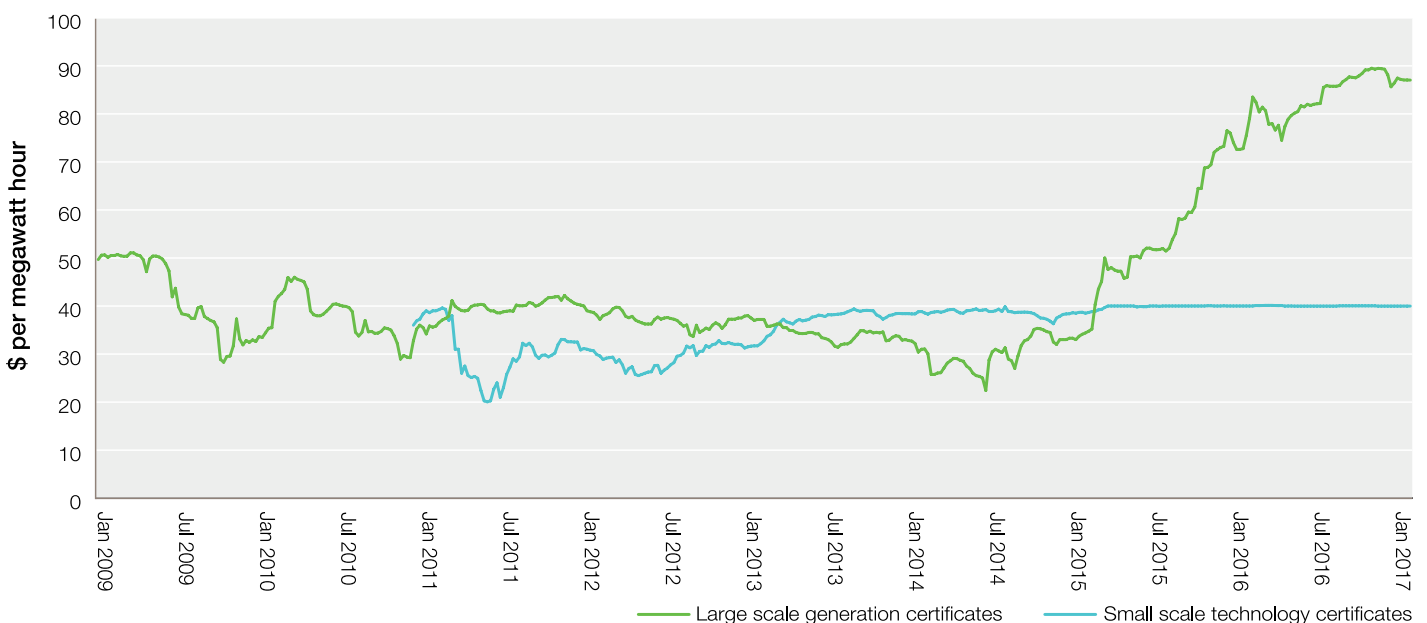
“Governments convinced irrigators on the need for water efficiency through electric irrigation systems, and now irrigators are facing rising water and electricity prices.”


– Stefanie Schulte, NSW Irrigators Council

In effect the Federal Government is providing subsidies of around \$90 per megawatt hour to developers of large scale renewable generation, but only a \$40 per megawatt hour subsidy for those installing small-scale generation on their property. The additional \$50 per megawatt hour provided to large scale generation is ultimately passed through to consumers through higher electricity tariffs.

Renewable Energy Target – Certificate Prices

Source: Australian Energy Regulator 2017





“We are essentially doing the same as conventional agriculture, turning the abundant sunshine into a usable energy; food and fibre in traditional farming, and electricity in solar farming.”

– Dave Mailler, Livestock and Grain Grower

Dave Mailler – Livestock and Grain Grower – Uralla

Dave Mailler is a farmer from New England & Northwest NSW with over thirty years of farming experience. In response to spiralling business energy costs and the emerging opportunities from renewables, in 2012 Mr Mailler enrolled in a Bachelor Sustainability at UNE to gain a better understanding of the threats facing agriculture, informing his keen interest in renewable sources of energy, and after graduating has set up a solar construction business.

“It was not a big step from farming to starting the Solar Farms business. We are essentially doing the same as conventional agriculture, turning the abundant sunshine into a usable energy; food and fibre in traditional farming, and electricity in solar farming,” stated Mr Mailler.

Given the historic rises in electricity costs, and recent price rises for gas, solar is becoming viable for many farmers.

“The solar farms I have built to date are all funded by regional investors, and mostly by farmers. Our projects to date are grid connected solar projects and receive no government subsidy; this is an indication of how the business model has changed for solar.”

Mr Mailler feels that the biggest challenges to an affordable, reliable and sustainable regional electricity network are a centralised grid system built to deal with last century’s electricity market, regulations that perpetuate this centralised system, and uncertainty due to continually changing environmental policies

“We no longer have one option for electricity generation, yet the grid network and regulations are still stuck in the 1950s and perpetuating this network that is reliant on centralised generation. Looking back will not provide affordable energy. We need to look to the future and have a vision for 2050.”

“Environmental policies at a state and federal level have not helped engender confidence in terms of investing in generation capacity. Partisan politics dominates current debate and policy changes as often as a used tissue by someone with a cold. This is creating so much uncertainty, particularly for small-scale renewable projects”

Network costs

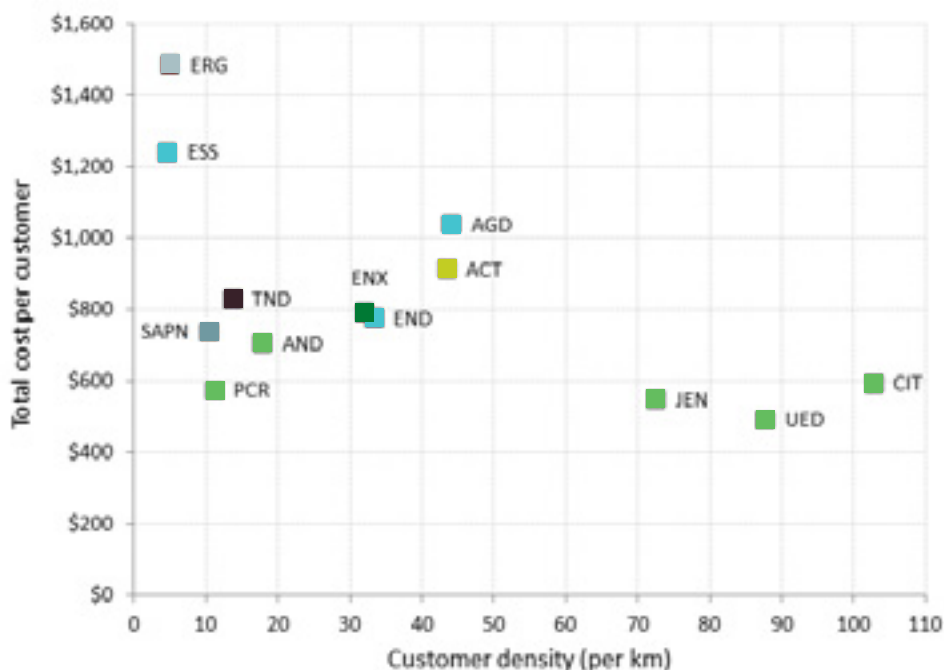
The provision of network infrastructure to regional and rural areas is inherently expensive. The large distances that need to be covered requires greater capital investments, maintenance and staffing resources, and other operational issues are often more challenging in regional and rural areas. Furthermore, this increased cost is spread across a smaller numbers of users, meaning that individual users pay significantly more for network services. Essential Energy is largely responsible for the provision of network services in NSW, and has one of the lowest customer densities in Australia per kilometre

of network provided. As a result, up to 40% of a regional users electricity bill can be made of network charges (Ag-Innovators 2014).

It should be noted that historical overinvestment by regional network providers, and lower levels of productivity compared to other industry participants, has also contributed to higher network costs in regional NSW (AER 2016). This overinvestment has led to investments in capital that has not been used or significantly underutilised.

Total cost per customer (2015 prices) against customer density (average of years 2011-2105)

Source: Australian Energy Regulator 2016



According to Sapere Research Group (2017), there is significant overcapacity across all NSW networks, including regional providers like Essential Energy and Endeavour. This overcapacity has been blamed on changing demand patterns, and the cost passed on to consumers, with the unneeded investments rolled into the regulatory asset base (the RAB). However, the overinvestment in capacity, and the subsequent overcapacity, was largely predictable and logical consequence of state and federal environmental policies.

Consumers have been burdened with the cost and risk of over-capacity due to rule changes that simply rolls forward the value of the RAB to the next determination period, with no adjustments for the efficacy of investment in matching capacity with demand. Network providers have essentially been freed from the burden and cost of overcapacity, yet

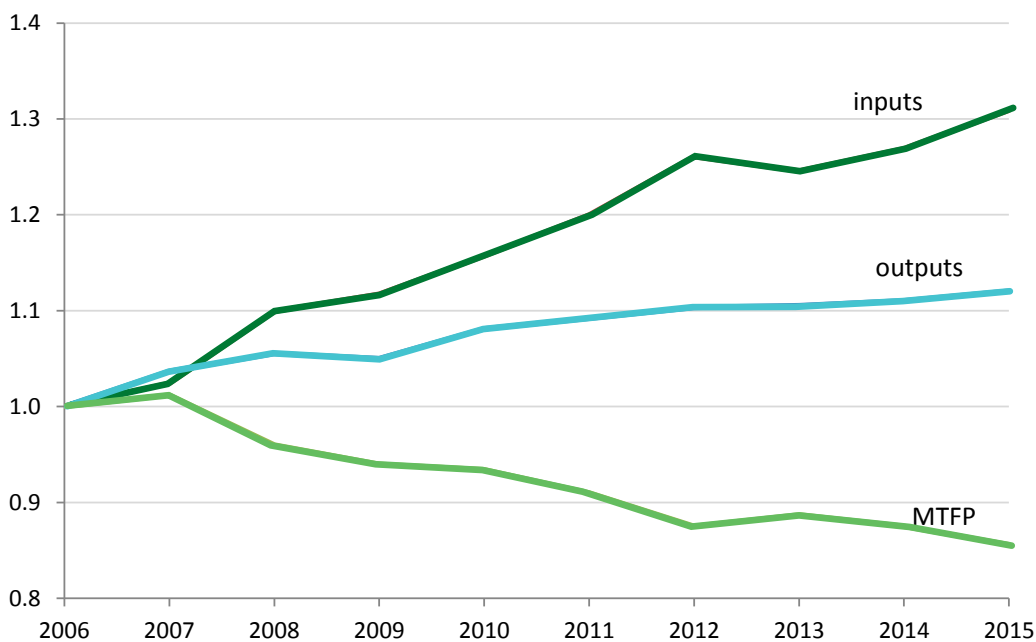
there does not seem to be any corresponding reduction in their allowed cost of capital to account for this significant reduction in business risk.

The propensity to overinvest in capital, and lower comparative productivity performance must be addressed, however, it should be noted that network costs in regional NSW have actually trended downwards since 2015.

Productivity across all network providers has been deteriorating and placing upward pressures on electricity prices. The following graph demonstrates that network providers as a whole are achieving less outputs per dollar invested (the growing gap between the red and blue lines). This productivity issue must be addressed as a part of the network revenue determination processes undertaken by the AER.

Industry input, output and total factor productivity (TFP) indices for 2006-15

Source: Australian Energy Regulator 2016



Cost reflective locational pricing within networks

The AER has indicated that network businesses need to move to cost-reflective locational pricing, and as such the network costs for some regional users is likely to rise significantly. Cost-reflective pricing refers to electricity pricing that charges the individual user the full cost of providing them with electricity. Currently, all users pay similar tariffs regardless of the cost they create for the network, with low-cost users subsidising high-cost users. Thus users with higher costs, generally those at the end of networks, will now have to pay the full cost for providing them with network services, despite previous policy goals around the universal provision of electricity.

Work undertaken by the Agricultural Industries Energy Task Force (2017) suggests that users near the end of networks will see their electricity costs increase by as much as 200-300%. For affected large irrigator, this could mean electricity cost increases of up to three hundred thousand dollars per annum. Clearly transitory arrangements are required to avoid social and economic dislocation as a result of significant cost increases.

“We need to work through all the various policy and regulatory issues. What happens to those who can’t afford solar panels and are stuck on an ever more expensive grid, there is a social equity issue here.”


– Dani Alexander, Institute of Sustainable Futures

Availability of alternates to grid electricity in regional NSW and the ‘death spiral’

The increasing cost of regional electricity also creates unique challenges for regional network providers. Unlike urban electricity users, many regional and rural users have the option to invest in and utilise their own electricity generation capacity, and switch to other forms of energy generation, such as those harnessing solar or fossil fuels. The potential switch to off-grid energy solutions, particularly those reliant on fossil fuels, should be a critical concern for regional communities, stakeholders and all levels of government.

The move to off-grid generation could trigger wholesale defection from regional grids, significantly increasing network costs for remaining users, and in turn could trigger further defection. Ultimately this could create a ‘death spiral’ in regional networks, with the remaining user base unable to afford the cost of infrastructure, and network owners being left with stranded assets. Given the essential nature of electricity services, such a scenario would require significant and costly government intervention to provide this essential service.

The move to on-farm fossil fuel electricity generation poses further risks, increasing regional emissions, reducing the efficiency and reliability of agricultural energy productivity and use, and will create significant health hazards for regional communities through increased particulates pollution.



“I understand we had a bit of luck in having a gas line so close to our property, if we didn’t have that option, and given the way electricity prices have gone, we would probably go diesel.”

– Chris Stillard, Farmer

Electricity substitutability in regional NSW – Chris Stillard – Farmer

Fourth generation Riverina farmer Chris Stillard, and wife Belinda, are continuing the family’s farming tradition that started over a century ago. The Stillards’ 160-hectare property is being used for multiple farming purposes including orchards, and seasonal flood irrigation for producing cereals.

In 2010, the Stillards decided to explore their energy options, given the significant energy costs associated with irrigation pumping. At the time the call to move operations between diesel, gas and electricity was a line-ball call. The Stillards decided to explore the options of gas and electricity, given concerns around the secure storage of diesel and issues around theft on-farm.

In the end, the gas provider made the Stillards an offer that was too good to refuse. While the cost of getting a grid connection would have run into the tens of thousands of dollars, the gas provider offered to bring a connection to the Stillard property for free, noting the utilisation benefit for the pipeline, given that the Stillard’s use would mainly be during off-peak periods.

Mr Stillard does note that there is greater up-front and maintenance costs associated with a gas motor, but he has been more than compensated by lower energy bills since 2010.

“I understand we had a bit of luck in having a gas line so close to our property, if we didn’t have that option, and given the way electricity prices have gone, we would probably go diesel” concludes Mr Stillard.”

The Aginnovators website provides real-world case studies on the financial decision making process for investment in various on-farm energy solutions (<http://www.aginnovators.org.au/>).



The Retail electricity market

The focus and examples provided in this section draw upon consumer and small-business experience with retail electricity markets as information and analysis is more readily available for these segments. Energy Consumers Australia (ECA) has undertaken work, via their *Small Business Tariff Tracker* project, to provide greater transparency in the small business segment of the retail market. The Association fully supports this ECA initiative. It should further be noted that many farmers in NSW are both small businesses, and residential users of electricity.

The retail electricity market in NSW is highly concentrated with the three large vertically integrated generator/retailers ('gentailers') accounting for more than 90% of the NSW market (IPART 2016). This is a highly concentrated market, where the large incumbents have significant market and supply chain power. Despite calls from user representatives, IPART to date has suggested that retail markets in NSW are competitive and achieving improved electricity services for consumers.

Many electricity stakeholders have suggested that the retail electricity market is un-competitive. An indication of this is the lack of innovation within the market, including the very slow introduction of energy efficiency and demand management schemes and mechanisms. Retailers point to the myriad of market offers (over 100 residential market offers in NSW) as price innovation. Given the similarities across these offers, this may actually contribute to price opaqueness and unlikely to be viewed by consumers as innovation. It is likely that most consumers would forego the opportunity to have a myriad of retail offers, for guaranteed lower tariffs.

Another indicator that retail electricity markets are not functioning adequately is the lack of consumer engagement (68% of consumers did not shop around for energy deals – IPART 2016), despite significant savings to be had from actively participating in the market. The complexity of the market could be a key factor contributing to this lack of engagement. Surveys conducted by Energy Consumers Australia highlighted that many consumers felt that electricity offers were more complex than financial products. Survey participants also suggested that the lack of information and transparency impedes their ability to actively participate in the market (Energy Consumers Australia 2017).

The fact that between one million and two million users are on standing offers (default market rates with no discounts), suggests that the market is too complex for many users.

“We need transparency and more information so small businesses can undertake forward planning with respect to electricity”

– Peter Strong, Council of Small Businesses Australia

The Independent Review into the Electricity and Gas Retail Market in Victoria (2017) also noted that the principles of competitive markets do not provide best outcomes for electricity consumers, as consumers cannot choose to leave the market when prices become too high given the essential nature of electricity. The Review noted that competition had significantly increased the focus on customer acquisition and retention, leading to an arms race in terms of spend on retention activities. However, given the essential nature of electricity services, these costs are eventually passed onto consumers, who have no choice but to accept the associated price rises. Overall these practices do not leave consumers better off.

The Review further noted that retailers have unilateral powers to change the level of discounting and terms of their retail offers, often with very little notice to the customer, quickly reducing and recouping potential savings that the consumer assumed they would receive from switching providers.

The preliminary report on the ACCC's inquiry into electricity prices (2017), pointed to the concentration of market power in the hands of a few vertically integrated generators as a key barrier to a functioning electricity market. Despite significant contestability within the retail electricity market, competition has yielded little benefits for consumers.

While it is difficult to definitively determine whether retail electricity markets as a whole are uncompetitive, the Association's analysis (NSW Farmers' Association 2017) indicates that in all likelihood, regional retail electricity markets are significantly less competitive than metro markets. Analysis undertaken in June 2017 by the Association using the Federal Government's *Energy Made Easy* comparison website shows that a typical household² in a regional area (Essential Energy network), such as Dubbo or Tamworth, are paying 25-30% more than those living in metropolitan areas. This difference cannot be explained by the differential in network costs.

Similarly, the discounts achieved for regional consumers from participating in retail electricity markets are much less than those that can be achieved by metropolitan consumers. A regional consumer in NSW can only achieve a 32% saving from switching from the default standing market offer to the best market offer available. In contrast, a metropolitan consumer can achieve a 51% saving. It should be noted that the *Energy Made Easy* site might not have access to all advertised market offers, and as such skew results of our analysis.

% difference between market standing offer and best available market offer

Source: NSW Farmers Association IPART submission 2017

	Percentage Difference
Essential Energy Network (not adjacent to other networks)	32%
Essential Energy Network (adjacent to Endeavour Network)	36%
Essential Energy Network (adjacent to Actew AGL Network)	41%
Endeavour Network	50.7%
AusGrid Network	51%

The greatest indication of lack of regional retail competition is that in regional NSW where ActewAGL operate (ActewAGL's prices are regulated by the ACT regulator) the best market offering provided by other retailers was significantly lower than NSW regional areas where ActewAGL did not provide services. This cannot be due to differing network charges, as all market offers were assessed based on being on the Essential Energy network.

Agricultural sector ignored in the energy policy debate

As discussed, regional NSW and the agricultural sector will be disproportionately impacted by increasing electricity prices and electricity sector reforms such as the

introduction of cost-reflective locational pricing. Despite this disproportionate impact, regional NSW and the agricultural sector has largely been ignored from a policy perspective.

Regional NSW is on the front line of the transition from a centralised fossil fuel based network, to a decentralised network with a mix of generation technologies. As the Finkel Review (2017) noted, policy measures to ensure a smooth transition between these two systems have been lacking, thereby imposing needless social and economic costs on users. This is particularly the case for the agricultural sector.

2. A typical household for the purposes of this paper is a household with four occupants, gas connection, no pool, and no demand management or solar heating/generation capacity.



“This energy transition needs to have an element of fairness about it; we can’t leave people and whole communities behind to pick up the costs.”

– Brendon Crown, Energy Networks Australia

As an example, the Australian Renewable Energy Agency’s (ARENA) \$400 million *Regional Australia’s Renewables* program (ARENA 2017) did not fund agricultural related programs, despite nine separate projects being submitted by the sector. The bulk of the funds went to activities related to exploring renewables for mining operations.

The introduction of the LRET has also disadvantaged regional NSW in achieving affordable, reliable and sustainable electricity. As previously discussed, the LRET heavily subsidises large scale projects to the detriment of small-scale renewable projects. These large scale projects operate in the traditional centralised one-way grid system, and as such perpetuate the factors that create significant network costs for regional users.

Energy Networks Australia (2017), the peak industry body for network providers, has noted that Australia’s renewable energy policy has failed to optimise and utilise the benefits of distributed renewable energy resources (which are largely small-scale projects) to reduce networks costs. This is a significant missed opportunity.

While the NSW Climate Change Fund (CCF) has had the requisite focus on regional NSW, it too is slowly shifting focus away from small-scale renewables to large-scale projects, particularly with the phasing out of the Solar Bonus Scheme, and the CCF’s appetite to invest in large-scale projects, such as AGL’s solar farm projects in NSW (NSW Office of the Environment and Heritage 2017).

Energy demand and generation profiles in agricultural & agribusiness sectors poorly understood

As a by-product of this policy neglect, current and future demand profiles of regional electricity users are poorly

understood. While regional network providers have an understanding of grid connected localised generation capacity, and electricity demand drawn from the grid, there is little understanding of the true demand profiles of regional users given the existence of significant off-grid generation capacity. This makes it extremely difficult to predict and invest in activities to reduce network congestion, or utilise DER effectively to co-optimize the supply of electricity and minimise network costs.

This lack of understanding has been acknowledged by work undertaken by the Federal Department of Industry (2013) who state that “very little information is published on the size and composition of off-grid electricity demand and supply” in rural and remote areas. Feedback from regional network providers suggests that a better understanding of the actual current and future supply and demand of regional electricity (including grid and off-grid) is a priority. Where possible the analysis will be undertaken through existing modelling and determination processes, however, network businesses do not have significant R&D resourcing to undertake such work.

This lack of regional context also creates significant service issues for regional electricity users. As an example recent *Power of Choice* reforms will hand control of metering to retailers. However, there has been little thought or discussion as to the quality of service provision in regional and rural areas once Essential Energy ceases to provide metering services. Currently, Essential Energy is the only organisation who can provide reliable metering services and maintenance to the sparsely populated areas covered by its network. It is unlikely that these reforms were formulated with the regional user in mind.



“We need policy certainty and implementing the Finkel Review Recommendations as a priority will go a long way to achieving this.”

– Fiona Simson, National Farmers Federation

Potential Solutions

Support for Finkel Review recommendations

It is beyond the scope of this paper to provide wholesale comment on the Finkel Review, however, we support recommendations highlighting the need for a more orderly transition from fossil fuel to renewable generation. The unplanned retirement of large-scale coal generators, such as Hazelwood, with very little contingencies, cannot be repeated.

Similarly, the wholesale move to variable non-dispatchable renewable generation without consideration of impacts on reliability and capacity needs to be addressed. As such, we support recommendations that place obligations on generators in terms of ensuring reliability and capacity.

There is also support for a Clean Energy Target (CET), particularly in terms of addressing the distortions created by the LRET. A CET would reduce the cost of implementing environmental policies, by utilising the lowest cost generation technology, regardless of whether the technology is of a large or small scale, renewable or fossil fuel based.

“The pace of regulatory change is not keeping up with the needs of the market. We support 50 of the 50 Finkel Review recommendations, and we need to find ways to be the circuit breaker to overcome some of the political impasses on energy.”

– Lynne Gallagher, Energy Consumers Australia

Given the historic uncertainty around environmental policies, it is disappointing to see the Federal Government deferring decisions on implementing Finkel Review recommendations relating to the CET.



3Ds for regional NSW

Traditional one way electricity networks that are reliant on centralised generation and a passive user base are struggling to provide electricity reliably and affordably to regional users. With improvements in technologies that facilitate demand response, demand management and distributed energy resources (the '3Ds'), alternate modes of electricity delivery are likely to be better equipped to ensure affordable and reliable services to regional and rural users.

1. Demand response refers to shifting or reducing energy use during periods of peak demand or network congestion.
2. Demand reduction generally refers to energy efficiency programs that reduce total energy used.
3. Distributed energy resources refer to localised electricity generation capacity and associated battery storage technologies.

The Institute of Sustainable Futures (2017) has estimated that the network-cost savings of demand management and energy efficiency alone could be between \$4.3 billion and \$11.7 billion across Australia, when combined with efficient price signals, such as tailored electricity tariffs.

To date, little work has been done in NSW to investigate investment in, or the utilisation of, existing 3D resources to reduce the need for maintenance and upgrades of network infrastructure in congested parts of the electricity networks. Agricultural sector participants have invested heavily in 3D resources and are willing to work with network providers to provide alternative modes of electricity distribution that maximises affordability and reliability.

The NSW Government must provide funding in this area and work with the agricultural sector and network providers to identify these opportunities for new modes of electricity distribution. Yesterday's solutions can no longer achieve outcomes with respect to expectations on the provision of electricity services. Given the current climate, these 3D resources are not seen as an opportunity but a cost.

"We understand the need to transition to a two-way grid, and accommodate distributed energy resources on our networks, but you have to realise that applications for new solar connections are rising exponentially and this causes integration costs that we have to deal with."

– Peter Bereicua, Essential Energy

NSW Government must work with the agricultural sector to develop responses and programmes that can harness the 3Ds to ensure affordable and reliable electricity. Stakeholders involved must be incentivised to make investment in such resources and work cooperatively to improve network outcomes; any benefits must be shared amongst owners of the 3D resources, network providers, and users more generally. This requires changes in economic and market regulations.

Greater transparency in the retail markets

To date, IPART has suggested that competition in the retail electricity markets has been competitive, and that it has aided in providing consumers with a better service:



“Our overall finding is that competition for residential and small business customers in the NSW retail electricity market is delivering customers greater choice, service innovations and prices consistent with a competitive market. We also consider that the recent price changes retailers announced in July 2016 reflect changes in the underlying market costs of supplying small customers, and are therefore consistent with a competitive market. On the basis of these findings, in our view a detailed review of retail prices and profit margins is not necessary.”

– IPART 2016

In light of recent findings by the Victorian retail review and the Australian Consumer and Competition Commission’s review of the retail electricity sector, IPART’s position to ignore calls for a review in NSW seems untenable. Greater transparency is required in this market.

The Association seeks that IPART provide a comprehensive review of NSW’s retail electricity market, with a particular focus around the competitiveness of regional retail markets. The Association contends that electricity prices in retail markets are above and beyond what can be justified by the higher costs associated with the provision of network services. A thorough review will aid in developing appropriate policy responses for the retail market.

As an immediate response to concerns on retail market transparency, the Association seeks that retailers be compelled to present market offers in a uniform manner that assists in comparing market offers for consumers. Much like the *National Credit Code* reforms governing the banking sector, electricity retailers must be compelled to:

- provide a standard comparison rate that incorporates all fees and charges in a uniform manner;
- a concise and uniform summary of the retail offer, highlighting key contractual terms and provisions; and
- more in-depth disclosure of contractual terms, similar to a product disclosure statement in the banking sector.

Feedback from the Association’s members suggests the need for a full break down of costs by components (retail costs, generation costs, distribution costs, transmission costs, environmental policy costs etc.). This information would provide greater clarity for users in engaging with the sector in achieving more affordable and reliable electricity. As an example, Association members were largely unaware of significant network charge decreases since 2015, given significant retail and wholesale price increases. There are also concerns that retailers fail to pass on the full cost-savings achieved.

Recommendations

Implementation of Finkel Review recommendations, including the Clean Energy Target

The Finkel Review recommendations must be implemented as soon as practical to address challenges with the electricity system's transition to renewables, including:

- reliability concerns with the increasing reliance on non-dispatchable variable renewable generation;
- security of supply issues with the disorderly retirement of generation capacity; and
- investment uncertainty, and subsequent reductions in generation capacity, due to continued changes to environmental policies.

To this end, the Association urges the Federal Government to fully support and implement recommendations around the Clean Energy Target. This commitment will provide greater investment certainty in generation, provide a technology neutral and lower cost framework for emissions reduction, and will be an opportunity to address the distortions created by the Renewable Energy Target, particularly with respect to disincentives towards small-scale renewables.

The Association further recommends that any mechanism that provides subsidy to low-emissions technologies should be phased-out over time, to allow for market mechanisms to efficiently guide investment in generation capacity.

Establish NSW Government, agricultural and electricity sector working group on energy

Regional and rural NSW have disproportionately felt the financial impacts of rising electricity prices, and future electricity market reforms, such as the introduction of cost-reflective pricing, will have a greater negative impact on rural and remote users.

As discussed, the challenges and opportunities with the provision of regional electricity is poorly understood and very little policy attention or resources have been dedicated to finding solutions to ensuring an affordable, reliable and sustainable electricity system. The establishment of a Regional NSW Energy Working Group (the 'Working Group') would alleviate this policy neglect, and demonstrate the NSW Government's and electricity sector's commitment to regional users.

The Working Group would comprise of government, agricultural and agribusiness representatives, network providers, retailers, and technology providers, who would be tasked with the identification of:

- research and development opportunities in utilising demand response, demand management, and distributed energy resources (the '3Ds') to address challenges associated with reliability and affordability of electricity;
- incentives targeted at regional and agricultural users, including tailored electricity tariff design, that will encourage alternate approaches (including the 3Ds) in dealing with issues of peak demand and network congestion;
- potential regulatory changes required to give effect to the Working Group's programme; and
- funding needs to execute the Working Group's programme via existing or new sources of government and/or industry funding.

Establish a \$5 million p.a. agriculture-electricity innovation fund in NSW

As discussed, regional NSW has largely been neglected from the electricity policy debate, and this neglect has translated into minimal government investment into research and development and pilot projects to investigate new ways of delivering electricity affordably and reliably.

This lack of understanding of regional electricity problems and solutions has meant that the agricultural sector in NSW has largely missed out on funding and co-investment available from the likes of ARENA and the Clean Energy Finance Corporation.

The fund would provide opportunities to undertake large-scale feasibility studies into alternate modes of delivering electricity to regional, rural and remote areas more affordably and reliably, pilot projects for innovative technologies electricity systems, and assist in resourcing the programme of the Regional NSW Energy Working Group.

Funding may be allocated through existing programmes, such as the NSW Climate Change Fund. The priority is to ensure that resources are available to tackle the energy challenges facing regional NSW.



‘Transactive’ Micro-grids in New York City

An American energy start-up, Transactive Grid, has established a micro-grid in Brooklyn, allowing neighbours to buy and sell electricity generated from their solar panels locally. Using block-chain technology, any electricity sold or bought is instantaneously tracked and contracts reconciled in real-time, negating the need to work through middle-men, such as retailers.

The benefits of the trial include:

- the local community gaining the full financial benefits of the electricity they generate (as opposed to current feed-in tariffs where retailers gain the line-share of benefits);
- greater resilience during extreme weather, where micro-grids can be isolated to ensure some power remain available; and
- potentially greater reliability for remote and rural micro-grid set ups, given the significant maintenance challenges posed by remote and rural spur lines.

The reliability and self-sufficiency of such micro-grids is likely to be significantly improved by the improvements and cost competitiveness of battery-storage technology. In time, ‘transactive’ micro-grids backed-up with battery storage should reduce transmission and network costs for users.

‘Transactive’ micro-grids that use existing networks pose significant challenges for network providers. Network providers have intimated that they believe such users are ‘free-riding’, using the network to ensure reliability and security of supply, particularly during times of peak

demand where local supply is inadequate, thereby contributing to network congestion without paying the associated network costs.

Providers are seeking to impose fixed flat charges on such users to maximise cost-recovery, increasing the financial barriers to transactive micro-grids. This would be a reactionary move by network providers using untested assumptions that such arrangements would add to network congestion, capacity constraints and peak demand use. Conversely, micro-grids could be optimised and incentivised to draw on network power during periods of low congestion and demand, thereby reducing network constraints and costs.

An overly negative and punitive approach by network providers, and associated economic regulations, may encourage users to go completely off-grid, increasing network costs for remaining users, further facilitating grid defection (‘network death spiral’).

Other issues include the need for smart-meters to enable transactions, a significant barrier given Australia’s low uptake and slow rollout of smart-metering technologies.

The Brooklyn micro-grid pilot has been expanded to include 130 homes.

Source: ENA, Electricity Policy.com, Brooklyn Microgrid



IPART to undertake a comprehensive review of the retail electricity market in NSW, with a particular focus on the competitiveness of regional markets

In light of the findings of the Victorian and ACCC reviews into Electricity Retail Markets, IPART's position that "the NSW retail electricity market is delivering customers greater choice, service innovations and prices consistent with a competitive market" is untenable.

As such, the NSW Government must direct IPART to undertake a comprehensive review of NSW's retail electricity market, with specific focus on:

- determining the competitiveness of NSW's retail market as a whole;
- specific concerns around the lack of competition in regional and rural retail markets;
- actions to redress any identified competition issues; and
- the efficacy of solutions and recommendations suggested by the Victorian and ACCC reviews.

Government to lead on transparency and disclosure reforms in retail markets

As an immediate response to issues around retail market transparency, the Association seeks that the NSW Government promote the need for reforms compelling

electricity retailers to present market offers in a uniform manner that assists market comparability for consumers. While it would be ideal for such reforms to be uniform across state jurisdictions, NSW can act to implement such reforms if there is a lack of will across all jurisdictions.

Much like the *National Credit Code* reforms governing the banking sector, electricity retailers must be compelled to:

- provide a standard comparison rate that incorporates all fees and charges in a uniform manner;
- a concise and uniform summary of the retail offer, highlighting key contractual terms and provisions; and
- more in-depth disclosure of contractual terms, similar to a product disclosure statement in the banking sector.

In addition to disclosures that promote comparability, the Association seeks that retail bills be broken down by cost components (retail charges, generation charges, distribution charges, transmission charges, environmental policy costs etc.). This provides users and user representative with a better understanding of factors contributing to electricity costs, and an improved ability to focus efforts and resources on addressing factors that are driving electricity price rises. It will also address concerns around whether retailers are passing on cost-savings achieved by network or transmission providers to consumers.



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