Agriculture Industries Energy Task Force: Submission to ACCC Inquiry into retail electricity supply and pricing

Supporting industry and jobs through accessible and affordable energy

June 2017

Contents

This submission is on behalf of the Agriculture Industries Energy Taskforce: National Irrigators' Council, NSW Irrigators' Council, NSW Farmers Assn, Cotton Australia, National Farmers' Federation, Bundaberg Regional Irrigators Group, Central Irrigation Trust (SA), CANEGROWERS, Winemakers' Federation of Australia, Queensland Farmers Federation, Australian Pork Limited

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Executive Summary

Australia's soaring electricity prices are putting at risk our ability to compete with the world as a provider of food and fibre. For a country which has an abundance of renewable and non-renewable sources of energy and whose primary producers are among the world's most efficient, this is an untenable situation.

Some of Australia's most important agricultural products (for both domestic and export consumption) have production processes that rely heavily on power, in particular, irrigators who pump and pressurise water or producers who process, package or refrigerate food and fibre products. Australia should have a comparative advantage for those producers - offering reasonably priced power from the grid. Instead many food and fibre producers are being forced to consider off grid solutions (ie turning to diesel) or face being uncompetitive and out of production. The end result will be stranded network assets and unsustainable electricity prices for those consumers who are unable to go off grid (ie leading to a death spiral).

When the agricultural sector is asked to consider "modernising" the electricity grid, the first question it raise is, how much will it cost and how many more producers will it drive out of business?

This submission canvasses a number of fundamental concerns the Agriculture Industries Energy Taskforce[1] (the Taskforce) has with the regulation of the National Energy Market and in particular, the cost of network assets which are passed on to agricultural businesses unfairly. Some Taskforce members are intending to provide their own submissions to this inquiry and we encourage the Committee to also take these into account.

The way the electricity grid is valued and the way prices are regulated are core to any discussions around expanding or augmenting the grid.

Under the current system, agricultural consumers are paying inflated prices for (apparently) network congestion that does not exist in their areas. Food and Fibre producers find themselves in an environment where monopoly service providers appear to completely dominate prices, essentially guaranteeing the returns of State Governments at the expense of Australian businesses' competitiveness.

The Taskforce acknowledges that the future electricity grid must be reliable; it needs to cope with the transition to lower carbon emitting sources of energy supply; and it needs to be able to deal with distributed generation.

However, unless the fundamental regulatory obstacles are tackled; unless there are some adjustments in network costs (i.e. a reduction in those costs), it is difficult to see how any additional investment to modernise the grid can come without serious negative impacts on agricultural competitiveness, jobs and the economy.

[1] **Agriculture Industries Energy Taskforce:** National Irrigators' Council, NSW Irrigators' Council, NSW Farmers Assn, Cotton Australia, National Farmers' Federation, Bundaberg Regional Irrigators Group, Central Irrigation Trust (SA), CANEGROWERS, Winemakers' Federation of Australia, Queensland Farmers Federation, Australian Pork Limited

Recommendations:

- Reliability and affordability of energy supply are key concerns of agricultural producers;
- Further investment to enhance network reliability should not come at the expense of affordability.
- Australian agriculture is exposed to global markets and must remain competitive. Where electricity bills have increased by up to 300% over a five-year period, viability and profitability of food and fibre producers are compromised.
- An electricity pricing relief can be achieved through the writing down of distribution network assets which are currently over-valued and under-utilised.
- Grid planning needs to occur to take advantage of renewable, co-generation and tri-generation capacity.
- Installation of smart meters across the network will assist with planning and delivery of future grid needs.
- Network tariffs should be designed to ensure that irrigators and other businesses in non-congested parts of the network are not forced to meet the costs of network investments made to overcome congestion in other parts of the network.
- The governance framework for electricity must be changed. These changes include, but are not limited to, the propose-respond model; calculation of weighted cost of capital and regulated asset base (RAB); access to consumer information and allocation of institutional responsibilities.
- Agricultural producers are making substantial investments in renewable energy sources as a way to control costs. These substantial investments have been made at high capital cost and in many cases the generation capacity is not being fully utilised. Opportunities associated with distributed energy generation should be investigated including peer to peer trading.
- Agricultural industries have made substantial investment in energy R,D&E but despite research and implementation, cost savings can be difficult to achieve. Reform is needed at the electricity grid scale.
- International electricity markets need to be assessed to allow for adoption of best practice in relation to security of generation capacity from renewable; adoption of ‘modern’ regulatory approaches to incorporation of new technologies.

Background

It is unacceptable that in an energy rich country like Australia, weak energy policy is compromising Australia's capacity to be a competitive global food producer and to put fresh food on the tables of Australian households.

The Taskforce seeks through this inquiry, to highlight the impacts of Australia's high electricity prices on our highly efficient agricultural sector. At a time when Australian producers have an opportunity to meet the demand of an ever-increasing global need for clean, green food and fibre, they instead face the risk of industry viability against the reality of high electricity costs. High energy costs are imposing unsustainable cost pressures on the agricultural sector and driving down Australia's competitive edge.

Australia's 135,000 farmers produce enough food to feed 80 million people, providing 93 per cent of the domestic food supply, and support an export market valued at more than AU$41 billion per annum (over 13 per cent of export revenue)[2]. With population growth and rising personal income, the emerging middle class in Asia provides the major market for over 60 per cent of Australian agricultural exports.

Reform of Australia's water resources sector in recent years has resulted in greater competition for water resources. While water savings have been achieved on-farm through investment in infrastructure, the resulting higher use of energy has coincided with a dramatic increase in the cost of electricity. Analyses show that irrigators' and growers' electricity bills have increased in excess of 100% in most cases, and up to 300% for some over the period 2009-2014, mainly due to the rising cost of network charges imposed by the network companies.

Typically, regulated network charges and other costs represent around 50% to 56% of farmers' electricity bills; the actual electricity charges account for around 26%, although this is also changing rapidly. Network charges imposed by the electricity networks continue to have a highly distorting effect on the electricity market. Australian consumers are paying around twice as much for network charges as those in the United Kingdom are around 2.5 times as much as those in the United States.

The Taskforce seeks a comprehensive assessment of the economy-wide costs and benefits of revising the electricity network and transmission businesses' regulated asset base (RAB) to efficient levels. The RABs of Australia's electricity networks have been artificially inflated and inefficiently grown to excessive levels. Over the past fifteen years, the networks' RABs have increased by around 400%. These growth rates now put Australian electricity networks' RAB levels significantly higher than their international counterparts; we know that the RAB per connection levels of Australia's distribution networks are now up to nine times the levels of networks in the United Kingdom. The Taskforce has advocated for a rule change to change the way electricity networks' regulated asset base (RAB) is calculated. If the methodology was changed[3], electricity networks would be entitled only to a return on their useful and used assets, a small step towards real cost reflective pricing.

Australia's agricultural industries play a significant role as economic drivers in local economies and provide flow on benefits to the national economy. Industries include cotton, rice, sugar, wine, almond, horticulture and dairy, all major producers of agricultural product, much of which is exported. Across these commodities, energy is used in a variety of ways such as pumping irrigation water, pasteurisation, cool rooms, processing plants and moving products.

[2] Australian Bureau of Agricultural and Resource Economics and Sciences. (2014). Agricultural Commodity Statistics.

[3] In accordance with the current regulatory framework for gas pipelines.

The Taskforce has long advocated for reform of Australia's National Electricity Market (NEM). It is critical that this inquiry forms part of the process to modernise Australia's electricity grid. This is against the backdrop of the significant momentum now occurring across the energy market, with the closure of coal fired power and the uptake of renewable energy technology as part of the transition to a lower carbon economy. It is also critical that security, reliability, and affordability are embedded in the NEM during this transition and in the progress towards grid modernisation.

The Taskforce recognises the importance of gas supply and its potential role in the electricity grid as we move away from coal supplied power. We appreciate the steps that the Federal Government have taken to sure up domestic gas supply. The Taskforce also support the Vertigan Review recommendations around improvements in competition and access for existing pipeline infrastructure.

Irrigated agriculture users of electricity are forced to operate in a market environment which lacks genuine competition and appears dominated by generators and transmission and distribution infrastructure owners who aim to maximise returns. The absence of competition results in gaming on the spot market which is struggling to cope with the transition to renewables. It is unacceptable that consumers are forced onto the spot market due to an inability to secure quotes from retailers for fixed term contracts. The timely announcement of the Australian Competition and Consumer Commission (ACCC) review of retail electricity prices is welcomed.

The NEM's role and the inquiry's major objective must be to provide affordable and reliable power for consumers. Under current market governance arrangements, existing loopholes are enabling price gouging by network businesses and preventing a fair and effective pricing structure for consumers. It is hoped that the outcomes of this inquiry will feed into the other reviews and inquiries currently underway, including the Finkel Review [4], and that NEM governance arrangements will be addressed as part of this task.

The Committee will no doubt come to appreciate the level of frustration and cynicism felt by the agriculture sector and consumers more broadly, due to the complexity and bureaucracy of the electricity industry. The myriad of regulation has become increasingly divorced from reality and unaccountable, built on abstract theoretical ideas that are beyond the reality of the industry and its consumers. Endeavours by Taskforce members to engage various responsible bodies regarding these challenges have demonstrated the entrenched culture of institutional and blame shifting with governance and regulation of the industry split between many bodies, where prescriptive rules and processes prevent any positive change.

Claims by the institutions, by governments and the industry that they work in the long-term interests of consumers, is not visible in practice. In fact, the evidence of industry profit and soaring prices supports our own observations that shareholders are benefiting at the expense of electricity consumers. It would appear that the owners of the electricity generation, distribution and transmission assets have a dominant voice in driving the policies adopted by the regulatory bodies and take every opportunity to undermine the prospects for energy efficiency and distributed generation, both of which represent competitive threats to their business.

The drive to renewables is progressing in the absence of a Commonwealth-state national plan or governance framework, and is compromising reliability and security. At the same time, there has been

[4] Dr Alan Finkel, Independent Review into the Future Security of the National Electricity Market (Preliminary Report)

a failure to build sufficient synchronous generation into the system, and where there is currently no viable storage capacity that would provide a renewable mix. The agriculture sector would embrace renewable technology providing the right mix of solutions was available at an affordable cost. This may be in the form of network supplied, as well as the installation of generating and/or storage capacity by individual companies and producers. The Finkel Review preliminary report cautions that the "*shift from coal-fired generators to wind and solar PV generators has implications for security and reliability"*.

The current Government related reviews and inquiries regarding Australia's energy challenges must deliver an outcome and a clear transition process that will provide stability and coordination during the modernisation of the electricity grid in Australia and the move to renewables, including to stand-alone systems and micro grids. This will mitigate the trajectory which is leaving irrigated agriculture businesses stranded, when renewable technologies most suitable to the sector, are not yet available nor reliable enough to support peak demand.

A focus on grid transformation and the application of new technologies could open the way for the development of smarter grid solutions. The Electricity Network Transformation Roadmap key concepts report[5], released in December 2016 identifies that "*the next decade to 2027 is likely to see a step change in the rapid adoption of new energy technologies, driven by falling costs and global carbon abatement measures".* The report notes that by 2027 customers will have choice and control of their use of onsite resources including solar and batteries, and that customers will have *"choice, lower costs, high security and reliability and a clean electricity system to 2050".*

The irrigated agriculture sector does not currently have that choice and needs access to appropriate technology now, including smarter grid solutions.

[5] Energy Network Australia and CSIRO, Electricity Network Transformation Roadmap: *http://www.energynetworks.com.au/sites/default/files/key_concepts_report_2016_final.pdf*

Response to Terms of Reference

i. the key cost components of electricity retail pricing in the NEM and how they have changed over time

ii. the existence and extent of any barriers to entry, expansion and/or exit in retail electricity markets

iii. the extent and impact of vertical integration in the NEM

iv. identifying any regulatory issues, or market participant behaviour or practices that may not be supporting the development of competitive retail markets

v. the existence of, or potential for, anti-competitive behaviour by market participants and the impact of such behaviour on electricity consumers

vi. any impediments to consumer choice, including transaction costs, a lack of transparent information, or other factors

vii. the impact of diverse customer segments, and different levels of consumer behaviour, on electricity retailer behaviour and practices

viii. the profitability of electricity retailers through time, and the extent to which profits are, or are expected to be, commensurate with risk, and

ix. all wholesale market price, cost and conduct issues relevant to the Inquiry.

How are the objectives of security, reliability, sustainability and affordability interrelated?
For agriculture, the security, reliability, and affordability of electricity supply is crucially important for the financial viability, economic development and competitive edge of the industry.

The National Electricity Objective, as stated in the National Electricity Law, is:

> *to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to – price, quality, safety, reliability, and security of supply of electricity; and the reliability, safety and security of the national electricity system.*

The Taskforce recognises that electricity supply is complex, however while the National Electricity Law has established an overarching objective, the long-term interests of consumers have been disregarded and ignored for too long.

The establishment of Energy Consumers Australia (ECA) in January 2015 has brought – to some degree - a consumer voice to the vast number of reviews and regulatory determinations that have occurred in the regulatory space since that time. Additionally, the Taskforce is highly supportive of the Consumer Challenge Panel (CCP) which has provided a 'direct line' between consumers and the AER.

The Taskforce acknowledges that the AER engaged a consultant to review the effectiveness of the CCP initiative. However, it is concerning that the AER expressed the opinion that the advice provided by the CCP did not substantially alter the matters or issues considered in their regulatory decision-making process. This is of particular concern when consumers should, by their very nature, be front and centre in the regulatory decisions impacting electricity markets.

Electricity use varies across agricultural businesses depending on industry, intensification of operations, location and structure of the business. Farms that require heating, cooling or irrigation have higher

levels of electricity use. In some industries electricity consumption is stable year-round, in others there can be significant seasonal variability. For some farmers, demand is flexible, providing choice as to when electricity is consumed. For others, demand is often driven by factors beyond individual control, such as streamflow, the weather, and regulations that govern access to water, reducing options for an individual to manage their own demand[6].

In Queensland, varying stakeholder feedback has been provided to the Taskforce on electricity supply in rural areas, highlighting the decreasing electricity-grid reliability experienced by many farmers and ancillary activities, such as processing and pumping of water. In some regional areas, reliability is an ongoing issue and, in some case, it is decreasing. Disruption in electrical supply results in processing down-time, and unnecessary wear and tear on machinery, reducing the life-span of critical assets and infrastructure including energy efficiency measures.

Reliability and affordability are key for agricultural producers – wholesale price spikes and outages can destroy annual returns for some farmers in the space of a few hours. However, overinvestment to enhance reliability comes at the expense of affordability. Efficient investment in, combined with efficient operation and use of, electricity services is crucial for farmers, other consumers and the wider economy.

More than 75% of Australian agriculture produce is exported. A sector that is highly exposed to trade, agriculture must remain competitive in the international market. Consequently, reliable, affordable and sustainable electricity supply are a necessary pre-condition for the economic development of agriculture. It is also key to ensuring farmers remain profitable and can efficiently invest in agriculture.

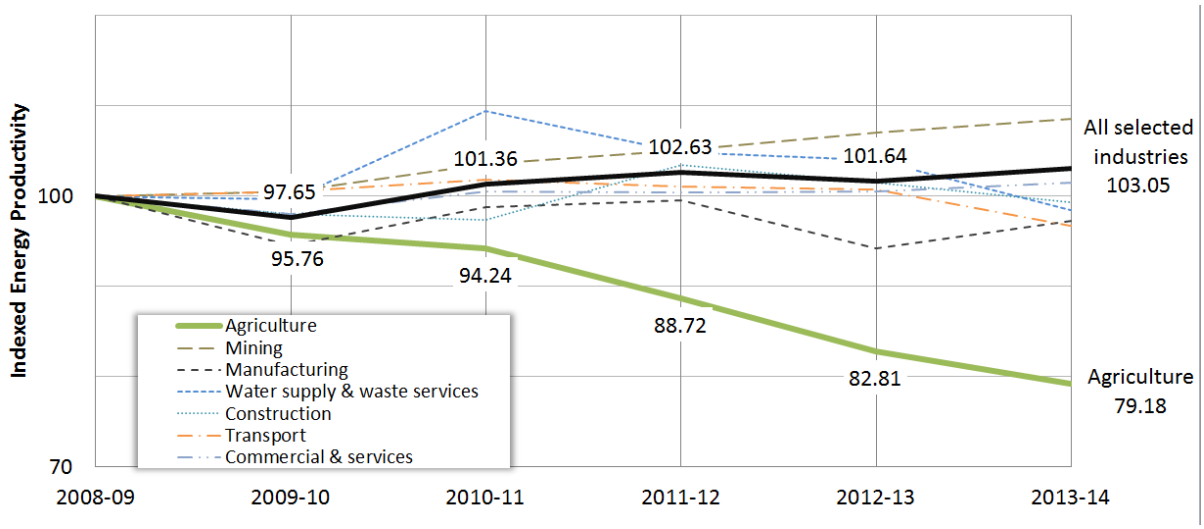
Agricultural energy productivity the lowest of any sector

Most sectors of Australian industry have achieved significant gains in energy productivity over the past decade. The conspicuous exception is agriculture where energy productivity is declining.[7] The chart below shows a decline of 21% since 2008.

[6] National Farmers Federation submission to the Finkel Review, http://www.environment.gov.au/submissions/nem-review/national-farmers-federation.pdf

[7] (Eyre, 2016) http://www.aginnovators.org.au/blog/new-thinking-needed-about-regional-electricity-supply

Figure 1: Indexed energy productivity performance of industry sectors. Agriculture energy productivity has declined 21% since 2008 (Eyre, 2016).



Analysis by NSW Farmers has suggested that reliance on diesel, which is being increased by higher electricity costs as irrigators switch from mains electricity to diesel generators, is the main factor in this low energy productivity.

Improving agricultural energy productivity largely depends on access to affordable electricity. Electrification is a priority for most sectors of agriculture and is a requirement of the new technologies required to achieve general productivity gains (eg precision agriculture, automated control systems, electric vehicles robotics).

Today, however, we are moving in the wrong direction as exorbitant network charges drive irrigators to substitute electricity for diesel and to disconnect from the grid.

What should be the highest priority objectives of a modern grid in Australia?

As stated above, attempting to segregate what needs to form the highest priority objective potentially ignores the diverse needs of consumers and geographic and user density factors that drive the economics of electricity supply in regional areas

The current electricity grid, with its reliance on centralised generation, is an inefficient way to supply electricity to many regional and remote locations. Areas with a low density of users and sharp seasonal demand peaks (ie. in typical of irrigation districts) are the least cost-effective to supply under the current model. At the moment, regional electricity supply is cross subsidised by high demand centres. The move to cost reflective pricing, however, will make already high tariffs out of reach for a majority of irrigation and many other regional customers.

A strategic integrated least cost planning approach is needed to identify more cost effective ways to manage demand, improve service delivery and incentivise agribusiness to stay grid connected.

Pricing is critical in decision making and a driving factor for some of our agricultural users to move off the grid. While water savings have been achieved on-farm through investment in infrastructure, the resulting higher use of energy has coincided with a dramatic increase in the cost of electricity. Analyses shows that irrigators and growers' electricity bills have increased in excess of 100% in most cases, and

up to 300% for some over the period 2009–2014, mainly due to the rising cost of network charges imposed by the network companies.

Typically, government regulated network charges and other costs represent around 50% to 56% of farmers' electricity bills; the actual electricity charges account for around 26%, although this is also changing rapidly.

The high impacts of electricity pricing are not only being felt by the agricultural sector but are being experienced across all grid users. The Energy Consumer Sentiment Survey (ECSS) undertaken by the ECA (published in February 2017) revealed:

- 60-70% of small businesses expressed a 7 out of 10 rating for satisfaction with reliability of electricity services
- Very low levels of satisfaction in relation to value for money for electricity services with consumers ranking electricity behind gas, internet, mobile phone, insurance, banking and water services.

Of further interest, the ECSS and the UMR Strategic research company report indicated that the primary reason consumers are investing in PV panels or behind the meter solutions was to manage consumption and to gain control of costs. The 2017 ECSS results found 34% of households are considering installing solar systems in the next 5 years, while 27% are considering installing battery storage. Small business interest in the technology is also strong, with 51% of small businesses considering installing solar systems and 49% battery storage in the next five years.

Clearly these movements in investment patterns indicate that consideration of prices paid by consumers should be an area of focus by the regulator and across grid planning. This is particularly important given the upcoming pricing trends for electricity that have been earmarked by various institutions engaged in the NEM.

For example, the Australian Energy Market Commission's (AEMC) *2016 Residential Electricity Price Trends* report highlights that electricity bills are anticipated to rise between $28 and $204 by 2018–19.[8] As decisions are made managing the transition away from coal fired generation, the impact of price pass-throughs that will be fed back to consumers requires careful consideration. The CSIRO/ENA *Energy Network Transformation Roadmap* found that more than $16 billion in network investment could be avoided by 2050 if distributed energy resources are optimised. The rate at which technology and the market is evolving also means that non-network solutions, involving less long-lived capital investments that can be adjusted with the circumstances, are preferable. To avoid further flow back of costs, any investment in centralised energy infrastructure must be carefully considered.

Greater focus is needed on the approach to managing peak demand loads across the NEM. Building additional power plants specifically to meet the small number of peak demand periods every year is the most expensive way to deal with potential blackout incidences. A much more sensible policy approach would involve a cross network energy efficiency strategy to lower the overall load that consumers place on the network and encouraging co-generation or tri-generation capacity amongst high energy users.

[8] How much will electricity prices rise in 2017 across Australia, available via: https://www.finder.com.au/how-much-will-electricity-prices-rise-in-2017-across-australia

Co-generation is significantly more efficient than gas and coal fired power generation as it produces heat energy as well as electricity that can be used for industrial processes. Electricity market reform could reduce electricity demand and gas use by encouraging gas cogeneration (as well as renewable energy). Efficiency measures for gas consumption can be encouraged through the State based energy efficiency schemes such as the Victorian Energy Efficiency Target and NSW Energy Savings Scheme; these have recently been broadened to include gas.

There is also opportunity to manage pricing impacts in the network that consumers currently use. In January 2016, Professor Ross Garnaut released a paper[9] stating that *"forcing high network charges on consumers in the face of declining use of the grid would impose a bigger penalty on consumers and businesses than a consumption tax, or even a carbon price. Metrics including the falling cost of renewables, reduced demand levels, should be applied to network assets to ensure that the network was priced properly…..and the first step towards rational pricing is to write down the value of redundant grid capacity".* The role that the RAB plays in ongoing electricity costs paid by consumers is detailed in our response to section two of the terms of reference here.

What are appropriate standards for the security and reliability of the electricity system?

A combination of high reliability standards and poor demand forecasting has been responsible for the over capitalisation and investment in the electricity network. Reliability standards set across the NEM warrants close review. The Institute of Sustainable Futures produces a constraints map of the distribution network and according to the data (provided directly by the networks), there are no areas warranting investment as a result of excessive demand. A similar picture is painted in Queensland where according to Ergon's *2016 Distribution Annual Planning Report,* 98 per cent of the low voltage network has enough spare capacity to meet all forecast peak demand growth for the foreseeable future. This data supports our argument that there has been an inefficient level of capital investment undertaken by the network companies in the previous ten-year period, which has resulted in a 'gold plated' infrastructure network.

To avoid any future network expansion and unnecessary augmentation, a close review of the reliability standards is warranted. In particular, an assessment of consumers' 'willingness to pay' for future grid reliability would be timely in light of alternative energy supply options which potentially provide 'back-up' supply through off-grid solutions and/or the existence of energy storage systems. It can be assumed that given these alternative options, consumers' willingness to pay for high reliability from the grid has diminished to a degree (or will diminish when the technologies are proven to be viable).

Similarly, substantial work is necessary to accurately assess all consumer groups' 'willingness to pay'. For example, Essential Energy used feedback received from (household) customers as a justification for continued high levels of capital expenditure in its network revenue proposal. Members of the Taskforce reviewed the Essential Energy '*Willingness to Pay Study*', noting that the work only took into account household energy users, thereby failing to accurately reflect the views and attitudes of larger energy users (such as irrigators) who face more significant impacts from large increases to network charges. Within the '*Willingness to Pay Study*' the scenarios provided to consumers did not represent an accurate reflection of the actual changes that Essential Energy would face in the event of a reduction in revenue. For example, the scenarios identified were increase network blackouts and slower maintenance response times as a consequence of reduced network charges.

[9] Garnaut, R. (2016). Australia after Paris: Will we use our potential to be the energy super-power of the low-carbon world? Public lecture hosted by the Young Energy Professionals, State Theatre Centre of Western Australia, Perth (21 January 2016).

The exact hours / numbers of service blackouts are hard to estimate as revenue changes and the exact nature of cost implications across a business is complex. As such, providing consumers with numbers that correlate to altered network scenarios may be a misrepresentation of actual network reliability. While we understand that consumers expect a certain level of service, we do not believe that a household-based study can be used as justification for significant ongoing capital expenditure. Other consumers would arguably be far less willing to pay for high reliability standards given the costs imposed under such a system.

In addition, grid stability and reliability can be a factor in the deterioration of pumps and equipment and in the return on investment on the installation of on-site renewable energy infrastructure (i.e. where exporting power is prevented or limited for technical reasons), and even the use of on-site generation is restricted due to factors such as over-voltage which cause inverters to shut down.

ToR 2:
The current technological, economic, community, and regulatory impediments and opportunities to achieving a modern electricity transmission and distribution network across all of Australia, and how these might be addressed and explored

What are the costs associated with an 'outdated' grid?
An outdated and underutilised grid will result in stranded assets, ongoing future costs for consumers as they pay for redundant technology and energy delivery that fails to meet the needs of consumers in the regions and areas where this infrastructure is required.

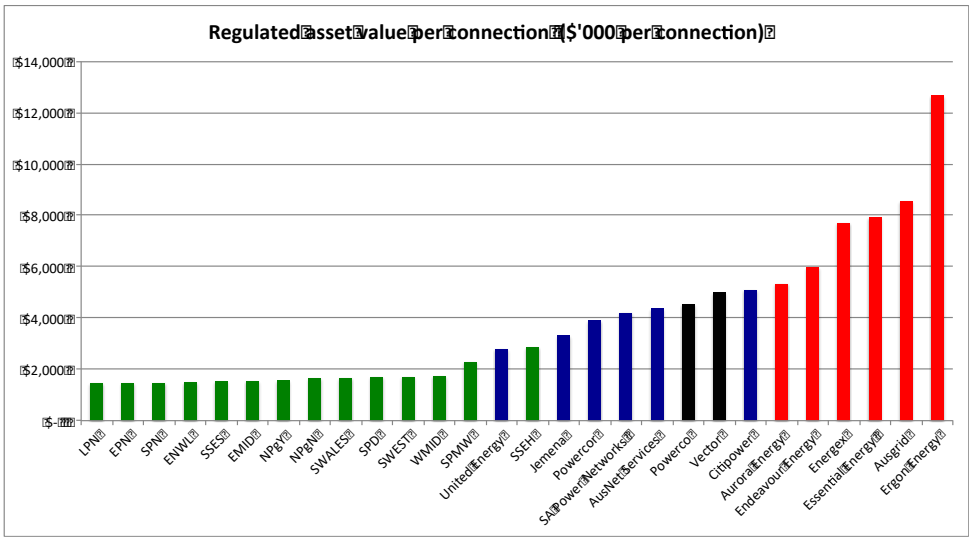
The Taskforce has long highlighted that a review of the RAB of electricity network infrastructure is required in order to deliver real cost reductions to consumers. The approach and points of action on the RAB are outlined below.

Regulated Asset Base (RAB)
There have been countless studies into the drivers of recent electricity cost increases and most of these studies have concluded that the RAB and the Weighted Average Cost of Capital (WACC) have been a driving force behind these increases.

Given the current value of the electricity distribution and transmission businesses' RAB, electricity costs will remain high *unless* there is a fundamental shift in the way the RAB is set and calculated into the future (i.e. reduced to more sustainable levels).

Regulatory asset valuations amongst distributors in the NEM (particularly those in NSW and Qld) are now extremely high by international standards. **Table 1** compares the regulated asset values per connection of Australian government owned distributors (the red bars) with the privately-owned distributors in Australia (the blue bars), New Zealand's two largest distributors (the black bars) and the British distributors (the green bars).

Table 1: Regulated asset value per connection in Great Britain, New Zealand and Australia[10]



Source: regulatory accounts, CME Analysis

A series of contributing factors have led to the inflated RAB values for the distribution network businesses in the NEM, including the state based reliability standards and growth in demand in certain areas. None of these drivers however, have been as important as the regulatory framework governing the setting of the original RAB value and determining the ongoing valuation of the RAB in each regulatory determination.

Under the current regulatory framework, the AER has limited control to adjust the distribution network businesses' RAB, as the valuation methodology has been set within the National Electricity Rules (NER). The inability of the federal regulator to set network prices based on efficient RAB values has been demonstrated by the outcomes of the AER's revenue determinations in recent years, which have resulted in networks' prices remaining unsustainably high for consumers, including irrigators.

In terms of the methodology for determining the RAB, there are several deficiencies, including:

a. The initial regulatory valuations of the distribution and transmission businesses were determined when the networks were established in the mid to late 1990s. A number of valuation methodologies could have been adopted however, the regulator chose to apply the 'Depreciated Optimised Replacement Cost' (DORC) valuation methodology – a methodology that resulted in the highest possible RAB valuation for the networks.
b. The opening RAB methodology required the regulator to subsequently optimise the ongoing RAB value to reflect the efficient value of assets needed to provide the required services. This meant that if the networks invested in more network capacity than required, the regulator was supposed to exclude the value of the excess capacity from the regulatory asset base until such time as the additional network capacity was required. However, in practice, this capacity assessment has rarely been applied. As a result, consumers were faced with:
    - having initial regulatory valuations set at the highest possible levels using the DORC valuation methodology, based on the expectation that the ongoing RAB valuations would be subjected to optimisation; and
    - the regulators not actually applying the required optimisation to the ongoing RAB valuations.

[10] regulatory accounts, CME Analysis

In 2006 the AEMC made amendments to the National Electricity Rules which effectively removed the optimisation requirement, together with changes that ensured that all future CAPEX was automatically rolled into the RAB without any prudency or efficiency review. The removal of the optimisation and ex-post review provisions in 2006 was a major driver of over-investment.

c. The incentives for over-investment were particularly strong for the government-owned networks due to their lower borrowing costs and the additional benefits that they realise from over-investment.

Overall, the Taskforce contends that the network assets are substantially over-valued, not least in light of declining asset utilisation due to lower than expected demand.

The writing down of assets in the competitive market is commonplace and is provided for in International Financial Reporting Standards (IFRS). IAS 36 “Impairment of Assets” seeks to ensure that an entity's assets are not carried at more than their recoverable amount (i.e. the higher of fair value less costs of disposal and value in use)[11]. It also defines how the recoverable amount is determined. Similar rules are implemented in the regulation of gas in Australia and further in the United States a “used and useful” approach is applied in the regulation of utilities.

While several reviews attempted to modify the approach to RAB regulation, to date no changes or recommendations have been made by the AEMC or other Government departments that would change the current approach to valuing the RAB. The Queensland Productivity Commission (QPC), including members seconded from Queensland Government departments, considered reliability performance, the “adverse financial impact” on the state to write down the RAB and regulatory barriers. The adverse financial impact was linked to increased borrowing costs, lower shareholder returns and an adverse effect on the credit rating. The QPC also raised the point that the national electricity rules currently provide no scope for the AER to undertake a RAB write down – this is a principal regulatory barrier[12].

In its final rule determination in 2012 the AEMC blocked a proposed rule change that would have enabled a potential RAB write down. The AEMC concluded that while a RAB write down might result in a greater level of network use, the increased risk to service providers could act as a disincentive for future efficient investment; the increase in the complexity, costs and resourcing of the regulatory process would reduce its efficiency; and would require the regulator to take a too detailed role in approving a service provider's projects and plans. This decision blocked an opportunity to return to the optimisation rules that applied in the original NEM design.

Neither the QPC nor the AEMC conducted a detailed economy-wide analysis of the benefits associated with optimising the RAB and promoting efficient investment in, and operation of, the network identified by Professor Garnaut. Rather, both focused on the potential narrow impacts of such action on the network service providers and their shareholder owners. This is an unacceptable outcome; the risk should not be borne entirely by consumers, but rather equitably shared by the networks’ shareholder owners and consumers. The sharing of risk ensures that the networks continue to aim for further efficiencies.

[11] CANEGROWERS submission to the Finkel Review: http://www.environment.gov.au/submissions/nem-review/canegrowers.pdf
[12] Ibid.

Recommendations:
The Taskforce seeks a comprehensive assessment of the economy-wide costs and benefits of revising the electricity network and transmission businesses' regulated asset base (RABs) to efficient levels.

In addition, the Taskforce seeks a rule change via the Australian Energy Market Commission (AEMC) to change the way electricity networks' regulated asset base (RAB) is calculated during the five yearly pricing determinations process. The regulatory framework for gas pipelines requires the assets to be optimised and the value of unused and redundant assets to be written down. The same should apply to the electricity networks (i.e. used and useful approach)

Finally, develop adequate incentive mechanisms that ensure network businesses consider all options - supply and demand side – to address any impediments to future grid constraints.

What might be the role of new technologies in improving system security, reliability, sustainability and affordability? What is the potential for new technologies to alter the inter-relationships between these objectives?

We are aware of cases across the NEM, where there is an examination of the role of new technologies and their incorporation in the grid. For example, the Queensland Government is working closely with the AEMC and stakeholders to develop new models for grid usage such as virtual net metering, peer to peer trading etc. including but not limited to:

- where a farmer has multiple network connections, they can have renewables connected to the main NMI/account, and credit against consumption at a separate pump connection against the solar generation (with a 'grid transport fee');
- a farm business could generate enough power at one site with a bioenergy plant to cover the consumption at a number of separate (but nearby) sites, by offsetting that consumption against generation at the main site (with a 'grid transport fee).

To allow these new grid usage models to work, the AEMC will need to develop new rules. It is thought that the avenues currently being investigated by the Queensland Government could have been supported via the adoption of the rule change for Local Network Generation Credits (ERC0191) which was rejected by the AEMC in its draft determination. It should be noted that rule changes will be required to allow virtual metering and addition leadership by the COAG Energy Council will be required to facilitate the adoption of decentralised energy generation and greater renewable energy deployment.

Across the grid, considerably higher levels of planning and data collection are required to ensure there is no reoccurrence of historically inaccurate demand predictions. Already, approximately 1.5 million rooftop solar systems are in place, and it is predicted that there will be 1.1 million battery storage systems in place in conjunction with PV panels by 2035[13]. There is no current understanding of the behind the meter investment and as such, the contribution these resources make to energy generation is VERY poorly understood. Smart meters will play an important role in improving the performance and delivery of the National Electricity Objective in the future.

Smart meters at end-user premises, as opposed to simply metering energy use for bulk billing purposes, are required to provide vital information. Smart meters allow both distributor network businesses and

[13] Dr Alan Finkel, Independent Review into the Future Security of the National Electricity Market (Preliminary Report)

electricity end users to have better information on how energy is consumed, and to better control that use, including in the use of end-user generation systems.

According to the Energy Networks Association (ENA) "*As technology and energy markets develop rapidly, smart meters and other devices will benefit individual consumers. Customers should receive practical information and more rewarding tariff structures that match their needs; be able to control their energy use to get better deals and participate in new markets, such as exporting energy to the Grid through solar panels or supporting energy storage options as these develop commercially*"[14].

While rules are now in place that will allow for a very gradual transition of consumers to smart meters i.e. when a meter upgrade is required or following the completion of the solar bonus scheme, we believe that if future grid needs are to be catered for, it is critical that transition to smart meter solutions should occur much more rapidly.

There are still many issues to be resolved to facilitate the roll out of smart meter technology. These include:

- issues of smart meter connectivity in regional areas due to telecommunications blackspots
- data privacy and security concerns associated with smart metering arrangements
- education of consumers so they are aware of the shift away from 'bulk' electricity pricing on to time of use and load based metering
- the transitional arrangements for historical costs associated with older meter installations as metering responsibilities shift away from the network companies and on to retailers; and
- transparency of metering costs for consumers as retailers take on metering responsibilities

In many cases, larger agricultural users have been mandated to 'upgrade' their meters to smart or interval based meters at their own cost. We believe that the challenges associated with a smart meter roll out must be addressed in order to develop a full understanding of our network capacity and the energy needs for the future NEM.

How can the grid better accommodate the rapid pace of technological change, including an increasing level of variable electricity generation?

The energy industry is in the midst of technological disruption, both in the physical technologies for the generation, storage and use of power; and in 'soft' technologies that can monitor, manage and securely trade power. The availability and affordability of these technologies is increasing rapidly.

Broader regulatory reform is required to drive the regulatory change needed within the NEM. The network rules do not allow for localised solutions to evolving within the existing network. The regulatory process needs allow the market to respond quickly to allow for widespread adoption of these technologies that would allow customers to increase the utilisation of electricity networks.

For example, businesses in regional areas would benefit from the ability to 'net-off' their generation and use or trade with nearby sites, paying a small fee for the use of the local network (network transportation fee) rather than full network and retail costs. Solutions such as peer-to-peer trading may offer greater local network utilisation and stability, offering new revenue opportunities for DNSPs and result in less sub-optimal options such as 'do nothing' or eventual independence from the grid.

[14] Changing the Face of Energy Management. Electrical Comms Data. Jan/Feb 2015. Vol. 14 No.6. pp. 32-34.

Distributed energy generation may represent a cost-effective approach to increasing the reliability of electricity supply above current grid levels. It may also be accompanied by cost measure benefits of 'local energy trading system' – where utilities can provide customers with solar and storage and allow their output to be traded in a suburban network. Such approaches require significant changes in the way incumbent utilities (e.g. Ergon, Essential Energy) manage their business models and will require networks to look to a more 'distributed' model, while the implications for centralised generation, and for retailers, will also be significant.

The rule changes required to allow this to occur need to be initiated urgently to ensure that remaining connected to the electricity network is a viable option for regional businesses, and in fact, the preferred option.

What possibilities are there for alternative pricing models (for example, cost-reflective pricing) to better reflect the true cost of services provided by a modern grid?

Tariff Structure

The Taskforce supports a review of network tariffs.

Network tariffs should be designed to ensure that irrigators and other businesses in non-congested parts of the network are not forced to meet the costs of network investments made to overcome congestion in other parts of the network.

The current level of prices and the structure of network tariffs incentivises food and fibre producers in the NEM to consider alternative energy sources – to move off the grid - or forcing them to shut down their high energy intensive irrigation equipment. As demonstrated in the industry case studies highlighted in this submission, the decision not to use high energy equipment significantly reduces productive capacity.

There will be significant pressure to change the current model of electricity tariffs with rapid technology change in energy hardware and software. The market will ultimately need to move to a model where customers will interact with the network in a way that suits them. The centralised grid model will be 'competing' in a market where consumers may be able to cost-effectively 'opt-out' of grid-supplied power unless it provides appropriate reliability and price. A preferred option may be for customers to move to a genuine net-metered model where they are able to trade power between their own and other nearby sites, paying DNSPs for local use of network. This model may increase grid utilisation as customer install optimum generation and storage on their sites, rather than overcapitalising in plant at individual sites with the aim of going off-grid. Accordingly, this model would secure revenue for DNSPs, though in the form of a (time-and-distance-weighted) network transport fee rather than the current network charging regimes.

The incentive to move to alternative energy sources have intensified since a 2014 rule change made by the AEMC which mandated the move to 'cost reflective tariffs'. The 2014 AEMC rule change on distribution network pricing has caused a transition to 'cost reflective' tariffs – demand driven tariffs or Time of Use Tariffs - which has had (and will continue to have) a significant impact on irrigators' and growers' electricity costs. While demand based tariffs are a sensible approach when congestion and constraints exist in the system, it is an absurd strategy to deploy when:

a) There is spare capacity in the National Electricity Market
b) Food and Fibre producers have limited information about their energy use and the tariff structure applicable to them.

The recognition of a lack of congestion, which provides the reasoning for cost reflective tariffs, is well recognised through available data sources. In a report produced by Sapere, it was concluded that network congestion data used by Ergon in its tariff proposal overstates congestion by a factor of approximately 375. The scale of this pricing distortion added up to $1.8 billion over five years.[15] Similar congestion modelling of NSW networks undertaken by the Institute of Sustainable Futures, using data provided by the networks, indicates similarly nil to low numbers of areas / regions impacted by network congestion. It is anticipated therefore that the pricing distortion being paid by consumers would be somewhat similar to the levels experienced by the Queensland networks.

However, despite the information available in relation to congestion, in reality it is very difficult to make appropriate assessments about what constitutes an appropriate tariff (and pricing) structure when so little is known about individual consumption patterns or investments behind the meter. As highlighted by the recent review into the Security of the National Electricity Market:

> *'The growing number of distributed energy resources could also impact on power system security. They are not centrally controlled or visible to AEMO and there is currently no formal national framework for collecting information on them (such as their location, date of installation, controller settings, brand, model and real time energy statistics). This means that power system models and forecasts are less accurate than in the past, particularly when the output from distributed energy resources is high and fluctuating'*.[16]

Given the inaccuracy of AEMO energy forecasting historically, it is concerning that these forecasts will become progressively more unreliable.

However, irrespective of the increased challenges to forecasting demand, the regulatory framework governing network charges is having real impact on food and fibre producers now:

In the case of Queensland, QFF has modelled the impacts of moving towards cost reflective tariffs[17] on irrigators in the St George district. Based on our analysis, implementation of demand tariffs on irrigators in St George will increase electricity bills between 200% and 300%. In one example, an irrigator who currently is on Tariff 62 (with an associated bill of $150,000 per year) would be forced to pay $450,000 under the new tariff arrangements despite no alternation in his electricity use. Such an exponential increase in input costs cannot be absorbed by a cotton producer or any agricultural business in a similar circumstance.

In the case of NSW, 185 primary producers will be forced to switch to 'Time of Use' or 'Demand Driven Tariffs' which will result in cost increases of up to 100 per cent with no corresponding change in electricity use. The resulting cost pressure is significant and illustrates the

[15] Sapere. (2016). Errors in Australian Energy Regulator's Draft Decision on Ergon Energy's 2016 Tariff Structure Statement, November 2016. Commissioned by CANEGROWERS Launched on 15 February 2017. See http://files.canegrowers.com.au/queensland/web-CANEGROWERS-Sapere-Report-Launch-document.pdf
[16] Dr Alan Finkel, Independent Review into the Future Security of the National Electricity Market (Preliminary Report)
[17] As per the Australian Energy Market Commission rule change in 2014 on the distribution network pricing arrangements.

vulnerability of irrigators to the current regulatory framework governing electricity producers where the AEMC rules require a shift to cost reflective tariffs.

The introduction of 'cost reflective tariffs[18]' on agricultural producers results in severe reductions in farm profitability and is leading to perverse operational outcomes. The tariffs and associated costs are pushing food and fibre producers to alternative energy sources – moving them away from the electricity grid – or forcing them to shut down their electricity intensive irrigation equipment.

Incentives must be available to growers to remain on the grid and utilise the existing grid most optimally. Without the acknowledgement of the requirements of consumers, irrigators may abandon the grid which will have significant implications for those who do not have the choice or ability to move off the grid. These impacts will be particularly amplified for rural and regional communities or in 'end of line' scenarios. In these situations, rural communities may often be reliant on large industrial users paying for electricity to maintain their electricity infrastructure and generation capacity. While the Taskforce supports investigation of alternative solutions for 'end of line' scenarios, a complete abandonment of the grid is not in the interest of broad rural and regional consumers.

Driving prices – through network tariffs - towards a scenario where electricity from the grid becomes unviable, is in no-one's interest. There continues to be no modelling or understanding of the broad impacts that will occur through these high prices forcing large customers to seek off grid solutions.
Recommendation:

Future tariff structure should be around:

- **A supply charge that is connection-specific and does not vary with consumption. The value of the supply charge should be high enough to recover individual specific customer costs – such as meter reading and supply charges that are not shared with other consumers and which do not vary with consumption or demand.**

- **Consumption charges per kWh consumed. These charges should be set to cover costs that are variable in the short term and also make a contribution to the recovery of sunk costs. The design of consumption charges should also reflect the following:**
    - **It may be sensible to have consumption charges that vary by time of day (i.e. peak vs shoulder vs off-peak and where applicable should reflect seasonal variations.**
    - **The difference between peak, off-peak and shoulder should reflect the existence of temporary defined capacity constraints and consumers temporally varying elasticity of demand.**
    - **If there are to be significant differences between peak and off-peak rates then it is important that the peak rates apply for limited intervals so that irrigators can respond to those prices by reducing their consumption.**

In addition, it should be assessed whether a network transport fee, payable by customers who may generate power at one site and consume at another is established. The fee could include a consideration of distance and a peak time component consistent with the points above.

[18] Cost reflective tariffs in most cases refer to demand based tariffs. These already apply to consumers that use over 160 mWh in NSW. In Queensland consumers are being transitioned to demand based tariffs with the transition to be complete in 2020. In Queensland demand based tariffs apply to consumers who use over 100 Mwh.

What opportunities are there to improve governance and regulation in the grid?

Despite the attempts by various review processes to disentangle the regulatory structure of the Australian Energy Markets, the Taskforce continues to hold the view that the current governance structure is highly complex and provides little opportunity for individual consumers or stakeholder representative bodies to engage effectively with the three entities that are the focus of this review: Australian Energy Regulator (AER), Australian Energy Market Commission (AEMC) and the Australian Energy Market Operator (AEMO).

Furthermore, the tiered overview of the various governance bodies, regulators and COAG committees, does not provide a clear picture of the roles and responsibilities of these entities. There is a lack of transparency and clear delineation of responsibilities which makes it virtually impossible for food and fibre producers to fully engage with the governance bodies.

Opportunities to improve the regulatory processes undertaken by the AER

Changes need to be made to the propose-respond model

The 'propose-respond' arrangement creates a significant advantage for network businesses relative to the regulator, and effectively places the onus of proof on the regulator to demonstrate that the businesses' proposals are incorrect or flawed. While the AER is able to interrogate and question various aspects of network submissions during the pricing determinations, and seek information, the regulator is not free to set the agenda.

This process leaves the regulator constrained and enables network businesses to effectively inundate the regulator through the weight of material it provides. This was clearly observed in relation to the last round of regulatory proposals (see **Table 2**). As observed in the Table the vast weight of materials presented to the regulator by the networks made it virtually impossible for the regulator to consider all available information.

Table 2: Analysis of size / volume of distributor regulatory submissions to the 2014–2019 network determinations

Network service provider	Size of submission (Mega Bytes)	Number of documents and spreadsheets	Number of consultancy reports	Number of pages of revenue proposal (excluding spreadsheets)
Networks New South Wales	270 MB	41	29	AusGrid – 22,600 Endeavour – 6,580 Essential 15, 209
Energex	232 MB	101	At least 16	2,697
Ergon	949 MB	560	At least 18	8,549
SA Power Networks	1000 MB	542	34	16,807

This weight of material also disadvantages consumers and organisations such as the various members of the Taskforce who do not have the resources to adequately review and respond to this material. As such, consumers (rightly or wrongly) place an additional expectation on the AER to provide clarity on the proposals, their decisions and to also answer any queries that arise, particularly where there is a range of conflicting views presented.

Changes to consideration of the weighted cost of capital (WACC)

The RAB and the WACC for distribution and transmission businesses in the NEM are the drivers of unsustainable electricity costs for consumers, including irrigators.

The calculations of the WACC must change to drive decreases in costs and ensure a sustainable long term grid that is affordable for all consumers.

The Taskforce contends that the determination of the WACC for the electricity distribution and transmission businesses – an issue that is largely but not completely within the AER's discretion - is based on what the AER considers to be an adequate rate of return of a 'benchmark efficient transmission or distribution service provider'. The calculation of the WACC, by its very design, is meant to be abstracted by the actual cost of capital of regulated monopoly businesses.

As the Taskforce argued in its 2014 joint submission to the Senate inquiry into electricity network companies, distribution network businesses have promoted their interests on the WACC calculations by arguing that:

a. their debt is of 'high risk' (i.e. a BBB rating). In addition, they have claimed that the credit rating of their debt determines their borrowing costs. There is evidence however that the actual yields on network bonds and the price paid for bank debt shows that network businesses' actual borrowing costs are much lower than imposed by their credit rating. This is due to the fact that lenders recognise that networks are monopoly businesses and are willing to lend money at much rates than implied by their credit ratings. The evidence provided by Energy Users Rule Change Committee to the AEMC in 2011 shows that actual network borrowing costs, even during the peak of the financial crisis, were lower than suggested by the networks' credit ratings.
b. their imputation credits should be calculated on favourable imputation credits. As highlighted in the Taskforce's submission to the Senate Inquiry (above), an example from the Queensland distributors, Energex and Ergon shows that the full income tax of these government-owned distributors is paid directly to the Queensland Government. The imputation of their dividends is therefore completely irrelevant. It is still not clear to the Taskforce whether the taxation allowance for privately owned distributors properly represents their actual tax costs.
c. their debt and equity raising costs are higher than is actually the case. In particular, government owned network businesses incur nowhere near the costs of a comparative 'benchmark service provider. Government-owned network businesses do not incur equity raising costs – as they are government owned – and their debt is arranged by the respective state treasuries, at a rate lower than the network businesses seek to recover from their customers. This outcome arises from the incorrect assumption by the regulator that these businesses are 'privately' owned.

We note that the AER supports the 'benchmark efficient' approach to calculating the distribution and transmission businesses WACC and has accepted many of the network businesses' claims despite compelling evidence that they are not supported by the evidence of actual costs.

Recommendation:
The calculation of the WACC for the transmission and distribution businesses must be based on evidence of the real borrowing costs and operating conditions of these businesses and not on a 'benchmark' comparative business.

Transmission and Distribution businesses must be required to disclose their actual borrowing costs.

Changes to consideration of the RAB of the network companies

See response presented in section two, part one of the terms of reference.

Changes to the level of access to information provided by the network companies

Under the current arrangements, networks and retailers must be able to provide consumers with two years of meter data in a standardised (spread sheet) format on request. They are also required to provide the data to third parties at the request of consumers. However, based on the experience of Taskforce members, the actual delivery of this information is a lengthy and protracted process, often taking in excess of 12 months to turn this information to consumers of a third-party representative.

To make informed decisions, food and fibre producers must have access to comprehensive and easily accessible (and usable) data and information on their current electricity use and demand profile (past and current). A detailed description of the retail and network tariffs they are subject to, must also be provided. Food and fibre producers must also be informed about the options to transfer to any other tariffs that may be more cost effective or more suitable for their business operation.

Data portability is increasingly important for consumer decision making and while websites such as 'Energy Made Easy' provide some information for residential consumers, a similar tool is not currently available for food and fibre producers.

The Green Button and Orange Button initiatives that are currently available to consumers in the United States may provide an avenue for assisting with consumer and food and fibre decision making in relation to selection of optimal electricity tariffs.

Furthermore, the Taskforce believes that information should be provided around the transition towards smart meters, including who is responsible for their installation and the costs to be absorbed by consumers associated with the transition.

Overall, the current regulatory structure for electricity pricing is highly complex, multi-layered and not transparent for customers and stakeholder representative bodies. Complexity in particular, arises due to the various bodies that are responsible for assessing and determining different components of electricity charges and tariffs. Such a multi-layered regulatory approach causes information to be widely dispersed and not easily accessible for consumers who aim to gain a better understanding of how prices are derived and the reasons behind the recent price increases.

Recommendation:
Customers must have access to comprehensive and easily accessible (and usable) data and information on the current electricity use and demand profile as well as their tariff structure and meters.

Changes to institutional responsibilities in the NEM

There are significant changes that must occur in the roles and responsibilities within the NEM. This was highlighted by the ECA in their recent submission to the Finkel Review:

> "*AEMO as the institution charged with national transmission planning and maintaining security and reliability of supply. The current arrangements, where key reliability functions reside within the AEMC's Reliability Panel and transmission planning is done by AEMO in Victoria, but*

transmission businesses in other jurisdictions, does not support the whole-of-system approach needed to run a highly complex, integrated national network."

There is also clear bifurcation of roles and responsibilities by AEMC and the AER. It is interesting to note that the AEMC has not once approved a rule change put forward by consumers. For its part, the AER views its role narrowly, as a regulator that oversees compliance with those rules. The AER appears not to take an active role in proposing rule changes despite having a clear role in doing so and receiving significant advice from its own Customer Challenge Panel of the deleterious effect of existing rules. The AER has also received strong customer feedback over the impact of the resulting electricity price spiral on the international competitiveness of their businesses.

Additional proposed Improvements:

The Taskforce is dissatisfied with the existing regulatory arrangements. Fundamental reform is needed, not the sort of minor 'fine-tuning' that has characterised so much of the regulatory debate to date, despite the clear evidence of very major failures.

The Taskforce proposes the Inquiry consider the following reforms:

1. The Competition Principles Agreement should not apply to state government monopoly electricity networks. The application of this agreement to electricity networks is obviously contrary to the legitimate commercial and economic purpose of this agreement for government owned businesses that provide services in competitive markets. No longer subsuming the network monopolies under this agreement will mean that the economic regulation of the government owned monopolies will recognise the state government's ownership, and regulatory allowances for the cost of capital will be established accordingly.

   This will bring the regulation of government owned networks back into line with the long-established practice in Australia (which prevailed until the Competition Principles Agreement) and will mean that the economic control of government owned network monopolies in Australia will be consistent with the approaches adopted in the economic regulation of government owned networks in other countries including the United States, Germany, Austria and Scandinavian countries.

2. Government owned network monopolies must be economically regulated by the state governments that own them. This is the long-established tradition in Australia until the reforms that led to economic regulation initially by state government regulators and subsequently by the AER. The outcomes delivered by these ostensibly independent regulators have, as we have shown, been highly unsatisfactory. Political accountability for the prices charged by state government distributors must rest with the governments that receive their profits and taxes.

3. The excessive asset valuation must be addressed through write-down of the networks' assets. This is a complex issue and the appropriate mechanism to achieve this will need to be studied carefully.

4. The AEMC should NOT have any role in the economic regulation of networks. The bifurcation of economic regulation between the AER and AEMC is a unique model internationally.

5. The form of regulation (specifically periodic price/revenue controls as opposed to other forms of regulatory control) should be reviewed. Such a review would be undertaken anyway if our

second recommendation is pursued. This (fifth) recommendation therefore relates primarily to the economic regulation of privately owned distributors by the AER.

We recognise that our recommendation on regulatory design (and even more so institutional responsibilities) is a big change from the 'reforms' that led to the current arrangements around fifteen years ago. However, the evidence justifies such fundamental changes.

Finally, in the context of possible privatisations of the transmission and distribution businesses in NSW and Qld, the question arises how partially privatised distributors should be regulated. This is a complex issue, but our view is that if 'privatisation' takes the form of minority private shareholder participation, and governments continue to retain majority ownership and control, then the network should be regulated by the government, not by the AER.

What opportunities are there for consumers to benefit from the modernisation of the grid? How can we ensure that these benefits are able to be shared equitably by all consumers?
What sort of community attitudes or concerns will need to be addressed in order to successfully modernise the electricity grid?

Australian agricultural businesses and the Australian electricity consumer have now experienced a number of years of significant price increases based in part on Government driven or mandated investment in the electricity grid. Consumers would be concerned that an agenda that seeks to address the modernisation of Australia's electricity grid, will result in greater costs passed back to consumers, while at the same time building in further generous long term returns for the governments that provide any finance as part of this task.

There is a long history in most states of governments' intentions regarding the upgrading of networks and improving reliability. The Taskforce views this as further attempt at 'gold plating' while building in costs ultimately to be met by consumers.

If modernising the grid means building or changing the grid to better cope with distributed generation, or reduce the fixed charges applicable to energy consumers and businesses who actively manage their demand or to more appropriately plan to deal with the few areas that actually experience congestion, then transparency is necessary for the community to understand how 'modernisation' will impact on prices.

Innovation in the agriculture sector

If governments are looking to Australian companies to drive jobs, innovation and opportunities, both at a national large scale level and at a regional level, reliable and affordable power on demand is a fundamental component of that endeavour. Regulatory failure in Australia's energy sector is resulting in many industries being priced out of the market and forced to find their own affordable and sustainable energy solutions.

In some cases, productivity gains are largely overshadowed by the high cost of electricity faced by the sector, putting upward pressure on prices and downward pressure on Australia's international competitiveness. This is undermining Australia's capacity to be a competitive global food producer and to put fresh food on the tables of Australians households.

Rural industries impacted by the high cost of electricity play a key role as economic drivers in local economies and nationally. They include the cotton, rice, sugar, wine, almond, horticultural and dairy

industries, all major producers of Australian agricultural product much of which is exported. These industries provide employment and flow on benefits for regional communities and the nation. Across these commodities, energy is used in a variety of ways such as pumping irrigation water, pasteurisation, cool rooms, processing plants and moving products.

It is also important to appreciate the link between the efforts of the irrigated agriculture sector to improve productive output with less water while at the same time being undermined by the high cost of electricity. Reform of Australia's water resources sector in recent years has resulted in greater competition for those resources. While water savings have been achieved on-farm through investment in infrastructure, the resulting higher use of energy has coincided with a dramatic increase in the cost of electricity.

The water energy nexus is well documented globally. Optimal water efficiency in irrigation can only be achieved by piping irrigation networks and pressurising delivery, ideally regulated using smart, automated control systems. Operating such systems however, involves far higher energy usage than flood and other gravity based systems. *(David Eyre, 2014)*

State and federal governments have invested significant funds in water efficiency programs without addressing the energy part of the equation. We therefore argue that a national irrigation energy productivity program is needed to develop and incentivise adoption of irrigation systems that optimise both energy and water usage. In addition to increasing energy and broader agricultural productivity, the program would help reduce pressure on national bulk water resources, and in so doing may reduce water allocation conflict in the Murray Darling Basin and other irrigation catchments.

Such a program would include R&D, demonstration pilots, extension and outreach, and training for service providers, linked to a capital fund where farmers could access new infrastructure. Funding criteria would incorporate the portfolio of measures required to optimise energy productivity and sustainability and would not be restricted to renewables. Funded works would include digital control systems, pump and layout optimisation and hybrid energy solutions (eg network energy supplemented by solar). The program would also cover energy planning for irrigation districts to identity demand management, load shifting and distributed generation opportunities.

Incentives to take up renewable technology

The sector is demonstrating that it will embrace renewable technology provided that the right mix of solutions is available at an affordable price. It is critical that the Finkel review, the Electricity Network Transformation Roadmap and other energy related inquiries currently underway in Australia collectively deliver a coordinated plan that provides the right policy levers and a framework designed to underpin confidence, stability and affordability during Australia's transition to renewables. The aim must be to mitigate the trajectory which is leaving irrigated agriculture and agribusiness stranded, when renewable technologies which may be the most suitable for the sector, are not always available and/or sufficiently reliable to support peak demand.

Many farmers have made the decision to invest in technology that enables a shift away from wholesale dependence on the electricity grid. This applies to the installation by individual companies and producers of their own generating capacity. Major hurdles to taking that step are cost and the current lack of viable storage capacity that would provide a renewable mix. Grid transformation incorporating new technologies will open the way for the development of smarter grid solutions.

Technically there is no limit to the volume of water that can be pumped using solar power as a solar array can be sized to meet any scale of power demand. The business case for solar powered irrigation

on a given farm depends on factors including the number of months pumping per year, water storage capacity, the time of day when irrigation occurs and the potential to utilise or export and sell excess energy.

The scalability of solar power and its ability to be integrated with mains electricity are among its greatest strengths. Many different configurations are possible, including full replacement of mains electricity or diesel, hybrid solutions that combine mains and solar power, and installations that provide power for only part of an irrigation system, such as a transfer pump that is used year round.

Australia has been slow to build sufficient synchronous generation and storage into the system. The *Independent Review into the Future Security of the National Electricity Market* (Finkel) preliminary report notes that the '*shift from coal-fired generators to wind and solar PV generators has implications for security and reliability'*. Irrigated agriculture businesses are experiencing the negative impacts of this shift where the drive to renewables is moving ahead, without the appropriate policy and governance framework (Commonwealth and state) in place and compromising reliability and security.

Case Studies

NSW Farmers Association case study

NSW farmers has delivered a wide range of energy innovation program since 2013, including the federally funded "Farm Energy Innovation Program"[19] and a number or energy projects in collaboration with the NSW Office of Environment & Heritage, including the Solar Powered Pumping Initiative[20] and the Water and Energy Nexus, research project[21]. In addition, NSW Farmers chairs the Agricultural Sector Working Group of the Australian Alliance to Save Energy.[22]

In delivering audits for farmers across all sectors, and working on financial feasibility assessment for investment in efficiency measures and renewable generation, NSW Farmers has identified a common theme, which is the pressing need for collaboration between farmers, irrigation corporations, processors, and electricity distributors in developing distributed generation and demand management solutions.

Irrigation SMEs seldom have load profiles that warrant investment in sufficient renewable energy generation capacity to cover total energy needs.

The ability to integrate solar power with mains electricity opens the way for many options for the sector. There is capacity for electricity generated by a solar array, and not used for irrigation off season, to be allocated to other farm uses or exported to the network. Energy generated on farm can be used to replace expensive day time mains electricity, enabling access to lower tariff structures when negotiating power contracts.

Solar Photovoltaics (PV) technology is evolving and improving with the efficiency of solar cells increasing over the years. Some of these improvements are enabling transfer to commercial cells with solar modules now achieving efficiencies in the range of 18–20 percent.

[19] http://www.aginnovators.org.au/project/farm-energy-innovation-program-eeig
[20] http://www.aginnovators.org.au/project/solar-powered-pumping-initiative
[21] http://www.aginnovators.org.au/sites/default/files/Water%20and%20energy%20nexus.pdf
[22] http://a2se.org.au/

Solar PV system design is contributing to the price of energy storage. Battery technologies are improving and as production and design improves, the cost of batteries continues to fall, however as noted here, there is currently no viable storage capacity available that would provide a renewable mix. As this technology becomes more affordable, the business case for solar PV will change, and it may become more cost effective to size solar systems with storage to cover additional loads of a property, rather than supplementing an existing electrical grid connection. Existing solar PV systems can be upgraded with additional panels to generate additional power.

In NSW and most Australian states, exported excess power generated from a new renewable energy system can be rewarded through feed-in-tariffs [23] However, the solar bonus scheme has been closed to new entrants, so in NSW the revenue offered per kWh of exported energy is reflective of the wholesale price of electricity, around 3 to 8 cents/kWh, depending on the location. For new renewable systems, every kWh that is generated can lead to 25-3.5 cents per kwh of savings if the energy is used on-site.

Cotton industry case study

Gunnedah farmer, Scott Morgan grows cotton, wheat and other grain on his 730 hectare Liverpool Plains property. Mr Morgan has installed 160 amorphous silicon solar panels to power his bore lift pump.[24] His dependence on bore water, requiring significant energy to lift, focused his attention on ways to save energy. He installed a travelling irrigator fed by a two-kilometre pipeline which has eliminated the need for two lift pumps and at the same time installed the solar array to power the remaining lift pump.

Figure 2: Cotton farmer, Scott Morgan, is keen to help drive regional energy innovation

Mr Morgan reports the system is working well, noting the capacity for solar as a good technology for agriculture. A key challenge for irrigators is the seasonal nature of electricity demand where irrigators generally only pump high volumes of water three months of the year. While he is keen to go fully solar, viability of the system would depend on receiving income for generation capacity off season. His current system has shaved $18,000 off his power bill. The price of solar panels has come down dramatically where a system that was close to $60,000 would now cost around $20,000.

[23] *(IPART, 2013).*

[24] http://www.aginnovators.org.au/initiatives/energy/information-papers/solar-power-irrigation-overview

Electricity demand is increasing in the Liverpool Plains region. An electrician by training, with a technical understanding of the challenges involved in electricity distribution, Mr Morgan is interesting in working with the local electricity distributor and other local farmers and processors to develop demand management solutions that enable on-farm generation to supplement regional supply in peak periods. He suggests that instead of installing new high voltage infrastructure to meet peak load from the national energy market, the network could be exploring ways to work with farmers to reduce load and/or supply power.

Sugar industry case study

The high cost of electricity was a key factor in Bargara (Qld) canefarmer Kelvin Griffin investing $100,000 in a solar system designed to power his farm's high-pressure irrigation pumps. To reduce their electricity costs, the family was irrigating off the head pressure on the SunWater system and using grid power sparingly on weekends or at night using cheaper tariffs. This approach however, was holding back their production and as electricity prices rose, production dropped by around 15% on the area which required high pressure irrigation.

In 2014, the family made the decision to move to solar powered high-pressure irrigation. The initial outlay was $20,000 to install concrete slab bases for the solar panels. The system was completed over an eighteen-month period, with some changes along the way driven by the need to find the right technology.

The Griffins are confident of significant savings and a boost in production over the system's 25-year life. Had the family remained with the electricity grid and the ever-increasing cost of power, they would have faced a power bill of around $40,000 to $50,000. Instead, they aim to be debt-free in around five years while at the same time boosting production by 10% to 20%.

Australian Cotton industry

A study of Australian cotton undertaken by Sandell et al (2014) found the application of alternative energy sources to be limited, due to high cost associated with some alternatives and limited data available of more promising and less mature technologies.

Liquified Petroleum Gas (LPG) injection into pumping drive systems has a similar cost to diesel when expressed in per GJ of energy output. LPG has the added advantage of lower emissions than traditional diesel or grid powered energy sources.

Biofuels and blended fuels at the time of the study were deemed uncompetitive on the basis that users were unable to claim the fuel excise rebate ($0.38/litre) on these fuel types. Cotton Gin Trash (CGT) is an emerging source of biomass fuel used to generate electrical or thermal energy. Cotton industry research is working to understand potential applications of this resource and the merits of manufacturing biochar from CGT to compliment or substitute synthetic fertiliser use.

Australian dairy industry case study

In 2012, Dairy Australia received $1 million in funding from the Department of Industry and Science to deliver the project [25] *'Smarter energy use on Australian dairy farms'*, aimed at helping dairy farmers use energy more efficiently. The project enabled 900 Australian dairy farmers access to personalised on-farm energy assessments, workshops and information resources. Due to the success of the project,

[25] Dairy Australia, Smarter Energy use on Australian dairy farms, http://frds.dairyaustralia.com.au/events/smarter-energy-use/

Dairy Australia received an additional $721,000 to extend project delivery to a further 500 farmers until June 2015. As of June 2015, 21% (1,399) of Australia dairy farmers had completed an energy assessment through this project.

Many of the farmers who have had energy efficiency assessments at the dairy are reaping the benefits of having identified areas for improvement, and are investing in changes. The assessments found that while no two dairies are the same, milk cooling, milk harvesting and hot water production are the areas of highest energy use. The assessment recommendations could range from small changes to existing equipment that can be implemented immediately, to advice on new technology and long term investment options.

While funding for the program closed on 30 June 2015, case studies and fact sheets developed through this program are available to the industry.
Like many other irrigated agriculture industries, the dairy industry is reporting an increased use of diesel generators, where the use of grid electricity is no longer a viable option.

Australian pork industry case study
Blantyre farms near Young, NSW, runs a 2,000 sow piggery, and at any point around 20,000 pigs on hand. A methane digestion system has been installed at both the breeder site and the grower site on the farm. Blantyre farms is first in the Australian pig industry to complete a commercial digestion system.

Methane from piggeries is released into the atmosphere from the anaerobic decomposition of pig manure in settling ponds. A methane digestion system captures this gas under a pond and burns the methane, following which the methane gas is converted to carbon dioxide.

To develop the anaerobic digester, a new dam was constructed at both sites, with each dam holding 50 days-worth of effluent. Each dam is covered with 2mm low density poly ethylene. A trench was used to anchor the cover, which was then backfilled. Large PVC pipe capped at the ends and filled with water helps to anchor the cover.

A flare on each pond provides back-up for the generators and will burn the methane, if the generators stop. The gas runs from the pond through a scrubber, which cleans the gas of impurities and then a chiller which removes condensation, it is then piped to the generator.

The methane gas is a fuel source for a converted diesel engine, which is coupled to a generator. Blantyre has three 3X80kWh generators. A further advantage is – both separate digestion systems are connected with a pipe that runs for 3.8 km under a main road. This allows flexibility and will keep the gas up to the breeder site which uses the most power, but produces less gas. A heat exchanger on the generators exhaust is used to heat water which is reticulated through weaner rooms and the farrowing house to provide heat to piglets. Prior to this project, heating had been generated using power and LPG.

Generators are controlled by computer which can be accessed remotely. An auto alarm sends text messages signalling any problems with the generator.

Blantyre expects the project will have a 2-3 year payback period, with a significant saving in producing power for the farm's own use, where electricity charges were about 20 cents/kW. A further advantage is the power that is sold to the grid at the rate of around 3.5 cents/kW.

It is worth noting that the infrastructure operating on the Blantyre property is economically feasible for piggeries with greater than 500 sows.

Australian wine industry case study

A number of wine producers and grape growers have taken steps in recent year to mitigate the unsustainable cost of electricity. Many are considering the cost effectiveness of alternatives and moving off grid in an effort to regain control of their rising cost of production. A large number of wine businesses have invested heavily in solar systems as a result, with some utilising alternatives such as diesel generation in order to reduce reliance on Australia's energy grid.

In December 2016, Yalumba Family Vignerons in South Australia installed one of Australia's largest photovoltaic systems in a winery. The decision to install the 1.4MW system was taken against the backdrop of projected increased business energy costs of around 85% between 2015 and 2017. The system has the ability to deliver up to 20% of the businesses electricity needs and will help to alleviate this pressure. Installing the system required significant investment by Yalumba. The decision was taken as an alternative to cutting production costs through cutting jobs or passing these costs through to consumers through increased price of wine.

Redmud Green Energy [26] based in the Riverland, South Australia is an initiative of Yates Electrical Services which offers land-owners the opportunity to re-purpose their properties for the construction and implementation of large scale Solar Farms. Utilising vacant land titles with a footprint of approximately 1.2 acres, Redmud Green Energy Solar Farms are designed solely to export generated energy into the grid, enabling energy to be sold on the National Electricity Market while simultaneously generating Large Generation Certificates.

Redmud Green Energy are focused on making the process and installation of these Solar Farms as seamless as possible by engaging farmers, primary producers and investors to work with us in offering a standardised turn-key Solar Farm solution. Redmud Green Energy notes the project's aim is to provide growth and prosperity in several key areas simultaneously by:

- the generation of maintenance and constructions jobs
- Providing supplementary income to land and property owners
- Strengthening the local economy
- Utilisation of current government incentives through STC and LGC creation
- Introduction of new innovative industry to the Riverland and surrounding regions.

The project enables money remaining within the local community, providing the economy the assets to improve infrastructure, and create a stronger and much more sustainable population. The quality of education of the need for a greener planet for the next generation of innovators will increase significantly, with our region being at the epicentre of contemporary thinking.

Redmud also aims to expose the Riverland and surrounding regions to the National Electricity Market, and enable generators the ability to trade their power generation, increase local revenue, and create a new industry for the Riverland.

ToR 3:
International experience and examples of electricity grid modernisation in comparable jurisdictions

[26] Redmud Green Energy, available via: http://www.redmud.net.au/index.php

Key similarities and differences between the electricity system in Australia and those of other countries?
How does Australia compare with other countries in the rate of adoption of variable electricity generation and other new technologies?
How does Australia compare with other countries in progress towards electricity grid modernisation?
What are the examples of best-practice governance and regulation in other countries?

While the grid remains a key part of the delivery of electricity, it must change to accommodate new forms of supply and consumption. This will require innovation to enable the growing range of new energy technologies and services with capacity to incorporate VRE (variable renewable electricity) in Australia. This will include comprehensive network planning, operation and intelligence systems to enable integration, as well as micro grids with customer distributed energy resources.

There is also an urgent need for reform in Australia's energy regulatory framework and provision for a range of market-based mechanisms that will attract customers with distributed energy resources.

The right set of policies to support the development and implementation of grid connection codes is necessary for successful integration of VRE generators and for underpinning the security in the electricity system. Australia is no different from many countries around the world with the declining demand for electricity, and an increasing availability of renewable energy accompanied by incentives. The annual load factor of conventional electricity generators is reduced, yet they remain necessary to maintain system security and complement variable renewables.

Some European countries and Northern America are modernising their market design and regulatory framework to allow high shares of VRE (variable renewable electricity) generation while aiming to ensure security of electricity supply.

The catastrophic energy failure experienced in South Australia in September 2016 and February 2017 clearly demonstrates that weather dependent electricity generation such as wind and solar can be impacted by weather events. Denmark, Ireland, Spain and Germany have achieved integrating large shares of VRE generation without any negative impact on electricity security. These countries are operating power systems with high shares of VRE which can create operational challenges such as short-term flexibility, network congestion and system security. These challenges can be addressed through market and operational measures. Markets must be designed that are fit for purpose for high shares of renewables. Achieving cost-effective and secure integration of VRE generators through the transformation of electricity systems better integration of VRE generators and development of flexible technologies. This system transition includes:

- Improved short term system and market operations to ensure efficient dispatching and ensure security of electricity supply
- Ensuring resource adequacy in the long term, including system-friendly VRE deployment to maximise the benefits of VRE and investment in additional flexible resources
- Better coordinating policies and actions across jurisdictions on a regional basis, and
- Accessing the potential of distributed resources to boost retail competition and supply security: micro generation, demand response, storage, behind the meter.[27]

[27] Independent Review into the Future Security of the National Electricity Market, Preliminary Report, December 2016

Examination of global jurisdictions

A report titled *Insights from Global Jurisdictions, New Market Actors and Evolving Business Models* [28] came out of a review undertaken by Accenture in collaboration with Australia's energy networks and CSIRO. They looked at seven global jurisdictions and seven diverse 'New Market Actors' (NMAs), including Australia, examining the most relevant and innovative electricity business models and market constructs that can inform the future of electricity markets to 2027.

The review sought to identify events and trends around the world, to inform energy market stakeholders across the value chain and electricity distribution network operators with findings and insights for transmission and distribution businesses, energy retailers (established and new), regulatory bodies and policy makers.

The jurisdictions were chosen based on criteria that included comparability to the Australian market. The jurisdictions included New York, California, Texas, Hawaii, Netherlands and the United Kingdom.

The focus of the review included:

- The global jurisdictions which have commenced major transformations in response to disruptive trends
- The New Market Actors that have the potential to drive industry disruption
- The learnings and insights inform the evolution of business models out to 2027.

The report notes that while Australian electricity networks will need to respond to their own unique circumstances under the 'no one size fits all' principle, and no 'optimal final state' business model suitable for all networks, it did identify four broad business model approaches:

- Platform Enabled
- Intelligent Grid
- Beyond-the-Meter Services and,
- Information Services.

The report also noted that the most progressive utilities globally are planning multiple evolutions of their business models.

European Commission focus

The European Commission Joint Research Centre (JRC)[29] focusing on smart electricity systems and interoperability, is examining smart grid projects which are growing in number, size and scope throughout Europe. The JRC manages and updates a comprehensive inventory of Smart Grid projects in Europe.

The 2014 edition of JRC survey noted 459 smart grid projects, launched from 2002. Among other findings, the project results provide an encouraging indication of how Smart Grids can help integrate more renewables, give more control to consumers over their energy consumption, avoid blackouts and restore power quickly when outages occur.

[28] A collaboration between Accenture, Australia's energy networks and CSIRO, August 2016: Insights from Global Jurisdictions, New Market Actors and Evolving Business Models

[29] Joint Research Centre, Smart Electricity System and Interoperability, https://ses.jrc.ec.europa.eu/we-nutshell

Other International focus

The Preliminary Report of the Independent Review into the *Future Security of the National Electricity Market* (Finkel) notes that small power systems low levels of synchronous inertia can lead to increased rates of change of frequency, which can be a challenge during contingency situations:

- UK has developed the system operability framework and from the findings established a new market for enhanced frequency response to mitigate the operational impact of lower levels of synchronous inertia.
- Independent System Operators and Regional Transmission Operators in the US operate their systems with a high resolution, including five-minute internal dispatching and a-nodal pricing, to help improve system operations.
- The European design of markets is more decentralised, with day ahead and intraday markets playing a key role for market participants (particularly renewable generators) to compensate forecast errors close to real time.

Electricity Network Transformation Roadmap

The Electricity Network Transformation Roadmap, a partnership between CSIRO and Energy Networks Australia, is designed to establish a pathway for the transformation of the electricity network industry and to support better customer outcomes as the sector accommodates rapid adoption of new technologies.

The Transformation Roadmap identified in its key concepts report in December 2016[30] that 'the next decade to 2027 is likely to see a step change in the rapid adoption of new energy technologies, driven by falling costs and global carbon abatement measures'. It notes that by 2027 customers will have choice and control of their use of onsite resources including solar and batteries.

The agriculture sector does not currently have that choice and needs access to appropriate technology now, including smarter grid solutions.

The Roadmap final report released in late April 2017[31], identifies an integrated program of actions and measures out to 2027 and 2050 respectively. The final report commits to putting the customer at the centre of the transformation process, seeking an outcome that will deliver:

- Lower bills for valued services
- Fairness and incentives
- Services being safe, reliable and secure
- Clean energy transition.

The Roadmap final report also notes: *Urgent regulatory and policy changes will be required to maintain power system security, while reducing customer costs by enabling the efficient use of distributed energy resources, stand-alone systems and micro-grids. Timely development of technical standards and new platforms will animate new distributed energy resource markets and permit more efficient customer services and participation.*

[30]Energy Networks Australia and CSIRO, Electricity Network Transformation Roadmap, http://www.energynetworks.com.au/sites/default/files/key_concepts_report_2016_final.pdf

[31] Energy Networks Australia and CSIRO, Electricity Network Transformation Roadmap (final report), http://www.energynetworks.com.au/sites/default/files/entr_final_report_april_2017.pdf

Progress on the commitments made within the Transformation Roadmap will only be fair and successful if genuine engagement occurs with the agriculture sector to fully understand the challenges faced and the future needs of the sector.

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References:

Agricultural Industry Energy Taskforce – Submission to Senate Inquiry into the performance and management of electricity network companies (December 2014)

Grant, H, Assets or Liabilities? The need to apply fair regulatory values to Australia's electricity networks (May 2016)

CME , Irrigator Tariff Analysis in the National Electricity Market (December 2015)

NSW Irrigators' Council - Submission to Department of Industry and Science (Energy Division) Review of Governance Arrangements for Australian Energy Markets (Issues Paper), (May 2015)

Canegrowers Submission to Independent Review into the Future Security of the National Electricity Market (Preliminary Report) (February 2017)

Joint Submission (Cotton Australia and NSW Irrigators' Council), Independent Review into the Future Security of the National Electricity Markets (Preliminary Report) (February 2017)

Energy Networks Australia and CSIRO, Electricity Network Transformation Roadmap, Key Concepts Report (December 2016)

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

NSW Farmers and NSW Office of Environment and Heritage, Solar Powered Pumping, Irrigation solutions (May 2015)

Finkel A., Independent Review into the Future Security of the National Electricity Market (Preliminary Report)

Sapere. (2016). Errors in Australian Energy Regulator's Draft Decision on Ergon Energy's 2016 Tariff Structure Statement, (November 2016); commissioned by CANEGROWERS