COTTON AUSTRALIA

Inquiry into the impact of REZs on rural and regional communities and industries in New South Wales.

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January 2025

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Advancing Australian Cotton

Inquiry into the impact of Renewable Energy Zones (REZ) on rural and regional communities and industries in New South Wales

Contents

ABOUT COTTON AUSTRALIA

Cotton Australia is the peak body for Australia's cotton growers, representing up to 1,500 cotton farms mainly in New South Wales and Queensland but also in the Northern Territory and Western Australia. Cotton Australia works with growers and stakeholders to ensure the Australian cotton industry remains viable.

Cotton Australia supports the Australian cotton industry to be globally competitive, sustainable and valued by the community. It drives the industry's strategic direction, retains a strong focus on research and development, promotes strength of the industry, manages sustainability reporting and implements policy objectives.

1. Executive summary

Agriculture is a billion-dollar contributor to the Australian economy. New South Wales cotton growers produce approximately 66% of the Australian cotton crop[1] which in an 'average season' can contribute as much as $2 billion to the NSW economy[2], and see an average of 200,000 (plus)hectares of cotton planted, operating across approximately 1,200 farms and employing around 9,570 people[3].

NSW's cotton growers produce other winter and summer crops, significantly adding to production opportunities and output. Our members also include cotton lint processers or 33 'gins', 19 are located wholly within NSW and a further 5 share the Qld crop being in the northern border region.

Cotton Australia welcomes the opportunity to make a submission to Portfolio Committee No. 4 - Regional NSW's Inquiry into the impact of Renewable Energy Zones (REZ) on rural and regional communities and industries in New South Wales.

Cotton Australia is restricting our submission to only one of the 12 categories listed in the terms of reference[4] as a combined response:

> (a) current and projected socioeconomic, cultural, agricultural and environmental impacts of projects within renewable energy zones in New South Wales including the cumulative impacts.

[1] The Australian cotton crop in 2020-21 generated over $3 billion per year in export earnings "ABS Value of Agricultural Commodities". https://www.abs.gov.au/statistics/industry/agriculture/value-agricultural-commodities-produced-australia/latest-release#data-download

[2] ABARES Dec 2024 Australian Crop Report forecast the next cotton crop (2024-25) nationally to be in the order of 4.2Mtonnes; NSW representing 2.2Mtonnes. They forecast plantings for 2024-25 to be 306 thousand hectares, producing 680 thousand tonnes of lint. The NSW 10-year cotton production average to 2023–24 is 519 thousand tonnes. https://www.agriculture.gov.au/abares/research-topics/agricultural-outlook/australian-crop-report/december-2024#new-south-wales

The price for lint is set by the global market and traded in US dollars. NSW DPI Weekly Commodity Report for 25 January 2025 lists $AUD622.9 per 227kg bale whereas August delivered cotton could be $AUD596 due to other countries' crop also being available. https://www.dpi.nsw.gov.au/agriculture/commodity-report

The cotton lint from one 227kg bale can produce 215 pairs of denim jeans; or 250 single bed sheets; or 750 shirts; or 1,200 t-shirts; or 3,000 nappies; or 4,300 pairs of socks; or 680,000 cotton balls; or 2,100 pairs of boxer shorts. More at https://cottonaustralia.com.au/uses-of-cotton

[3] These figures are taken from industry estimates that NSW produces 60% of the national cotton crop.

[4] https://www.parliament.nsw.gov.au/lcdocs/inquiries/3065/Terms%20of%20reference%20-%20PC%204%20-%20Impact%20of%20Renewable%20Energy%20Zones%20(REZ)%20on%20rural%20and%20regional%20communities%20and%20industries%20in%20New%20South%20Wales%20%20-%20Updated%2010%20September%202024.pdf

2. Recommendations

Cotton Australia growers and gins want to be part of the energy transformation solution; hence we make the following recommendations:

- There is a role for government to play in supporting and stimulating development, importantly to ensure the necessary infrastructure is in place to enable business to flourish.

- All of the state's REZs should be used as precincts that addresses the surrounding regional communities' current and future energy needs.

- The NSW Government must pursue options
  - that capitalize on existing network infrastructure
  - make use of technological solutions to reduce the need for more broadscale facilities
  - that instead use microgrid-like generation for the hosting community's current and future need.

    Doing so would also address a long held policy principle of Cotton Australia:
    - No further loss of agricultural land and the active protection of high value agricultural lands

3. Submission response

3.1. (A) Current and Projected Socioeconomic, Cultural, Agricultural and Environmental Impacts of Projects within Renewable Energy Zones in New South Wales including the Cumulative Impacts

Current Challenges

The increasing global need for clean, green food and fibre makes the outlook for globally traded commodities such as cotton lint and cotton seed[5] bright. However, the objective of Australian farmers and associated industries as price takers, to remain internationally competitive while utilising modern, water-efficient irrigation equipment is put at risk by the reality of high electricity costs.

Unfortunately, Australia has gone from having the fourth cheapest electricity cost in the OECD in 2004 to being amongst the highest[6], consequently, energy is now a significant input cost. This is also happening along the agricultural supply chain; two cotton related examples are fertiliser manufacture and the eventual spinning of the lint into yarn. It is of no surprise then that the price of energy is often cited as a contributing factor to other large energy using industries considering moving interstate or offshore[7]. As the Australian Industry Group has observed, "the last five years has seen energy intensive industries struggle"[8].

[5] The lint is separated from the fuzzy seed in the ginning process, the seed is used as a supplementary livestock feed 9 https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/96008/white-cottonseed-a-supplementary-feed.pdf) or it's oil extracted for use in cooking, pharmaceuticals and skin care products.

[6] *Australian Competition and Consumer Commission report into retail electricity, 2018,* p23:
"In our Preliminary Report we identified that Australia's position in terms of electricity prices deteriorated from the fourth cheapest in the OECD in 2004 to the 10th cheapest in 2016. The updated 2018 prices in figure 1.20 indicate that this trend has continued, such that Australia has the fourth highest prices among the countries shown."
https://www.accc.gov.au/retail-electricity-pricing-inquiry-final-report

[7] pers comm. Energy Users Association of Australia 23/01/25 and also pers comm. Business NSW 31/01/25

[8] "Australian manufacturing has changed over the last five years. Energy-intensive heavy industries have struggled while light IP-intensive industries have grown. As both sides are important, government needs to offer distinct forms of support for each. A one-size-fits-all manufacturing policy is likely to be one-size-fits-none."
https://www.aigroup.com.au/resourcecentre/research-economics/economics-intelligence/2024/a-manufacturing-centric-federal-budget/#:~:text=Australian%20manufacturing%20performed%20strongly%20coming,any%20point%20since%20the%20GFC

Despite this Cotton Australia's growers and gins, as confirmed by several of our energy research projects[9], want to be part of the energy transformation solution.

2018 Irrigators – the flow on benefits of regionally embedded generation.

Cotton Australia, the Queensland Farmers' Federation and the NSW Irrigators' Council conducted four regional case studies, an online grower survey and a workshop with network businesses to identify the barriers and challenges with installing solar PV on farm and feeding excess electricity into the grid. The Energy Consumers Australia funded research project's objective was to identify

- the unique challenges of growers in regional NSW and Qld with the connection, installation and integration of on-farm solar PV.
- possible policy and regulatory options to improve and simplify the connection process.
- mutually beneficial options for future solar energy projects that can be pursued jointly by growers and network businesses.

2020-22 feasibility study The Flow on Benefits of Microgrids for Agriculture

The Regional and Remote Communities Reliability Fund Round 1 granted funds from the Australian Government's Department of Energy which built on the abovementioned research's findings. The project aimed to assess whether microgrids can offer benefits to electricity consumers and networks such as reduced costs in the rural and agriculture irrigation sector, stable network energy flows, increased network utilisation, and increased uptake of decarbonised and distributed energy systems.

The project explored the feasibility of microgrids as an alternative solution across four different farming scenarios in Queensland and New South Wales, each representing a practical and replicable microgrid archetype.

- Archetype 1: Single Enterprise, Pokolbin NSW, winery
- Archetype 2: Edge of Grid, St George QLD, cotton farm
- Archetype 3: Large Microgrid, Mackay QLD, cane farmer cluster
- Archetype 4: Anchor/Hybrid, Wee Waa NSW, mixed commodity farm

The Project found "considerable underutilisation of substations at each case study location demonstrating the opportunity agriculture microgrids can present to regional grids if appropriately integrated into network revenue models and strategic planning. Acting like energy dams on regional grids, microgrids can offer grid firming services and emergency supply. Enabling state and federal regulation is necessary to unlock the full value stack for microgrids however distribution upgrade deferral payments are a good example of existing valuation mechanisms that could reevaluate their remit and better value microgrids and other dispatchable Consumer Energy Resources (CERs)."

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[9] *Irrigators – the flow on benefits of regionally embedded generation.* the summary factsheets are attached to this submission and the final report is available on request. *The Flow on Benefits of Microgrids for Agriculture* can be found https://www.qff.org.au/projects/microgrids/.

And yet, at the same time, what is also holding them back is the ongoing regional skills shortage.[10] The 2024 Business NSW Workforce Skills Survey describes it as 'a particularly acute shortage'[11] and lists manufacturing being one of the impacted industries.

For example, the skills shortage in the Riverina Murray region has resulted in 88% of employers suffering a skills shortage and for those employers with more than 5 employers the percentage affected rose to 97%, with manufacturing cited as an example industry.

For the convenience of the Portfolio Committee No. 4 an extract from the Business NSW 2024 Workforce Skills Survey p12 follows.

> Skills shortages Skills shortages remain a feature of the NSW economy. The 2022 Workforce Skills Survey previously found that 93% of NSW employers struggled to meet their skills needs. This was up from 51% in 2019, and well above the level of 39% in 2017, as shown in Table 1 below.
>
> **Table 1: NSW Employers experiencing a skills shortage[3]**
>
Business in shortage	2017	2019	2022	2024
Yes	39%	51%	93%	77%
No	61%	49%	7%	23%
>
> ** Percentages are of all survey respondents (n=801; 1,259; 644; 425).*
>
> The 2024 survey found that many NSW employers continue to experience a skills shortage, with 77% of survey respondents reporting they had considerable difficulty in recruiting or were unable to recruit the people they need.
>
> This figure was 81% for employers of five or more staff. Shortages were particularly acute in sectors such as healthcare, manufacturing, hospitality, and across the skilled trades. More than 80% of employers in the Hunter, Western NSW, Western Sydney and Riverina Murray regions continue to experience significant difficulty in meeting their skills needs.
>
> The incidence of employers facing a skills shortage in the Mid North Coast, Riverina Murray, New England and North Western NSW was 10% higher for firms with five or more employees, as shown in Table 2 below.

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[10] In the McKell Institute's 2023 publication, "The Up-Skill Battle" P42 displays data that shows the diversity of regional NSW community needs, stating: "Communities across New South Wales will be challenged by an increasing number of job vacancies in a diverse suite of professions over the next five years."

https://mckellinstitute.org.au/wp-content/uploads/2023/07/McKell-%E2%80%94-Regional-Skills.pdf

[11] "The 2024 Workforce Skills Survey found that skills shortages were particularly acute in regional areas, where employers face unique challenges in attracting and retaining skilled workers. Many of these challenges are enduring ones. They also touch on a broader range of issues, including recruitment, training, workplace culture, workforce participation and access to affordable housing and early learning. Responding to these challenges will require a coordinated approach. Recent efforts dedicated to improvement include investment in a new national architecture for skills governance, ongoing commitments through the National Skills Agreement, and consideration of related issues through the recent review of NSW's vocational education and training system…." P11

https://bczsaprodassetstorage.blob.core.windows.net/businessnswmedia/nswbcsharedmedia/businessnsw/media/pdf/bnsw_skills-report_v6.pdf

Table 2: Skills availability across NSW in 2024*

NSW Region	% in shortage	% 5+ in shortage	Example industries in shortage
Riverina Murray	88%	97%	Manufacturing
Western Sydney	86%	86%	Manufacturing
Hunter	81%	81%	Hospitality
Western NSW	80%	84%	Hospitality
Illawarra	77%	83%	Education and training
New England / North-West	74%	84%	Technical services
Mid North Coast	74%	85%	Health care
Northern Rivers	74%	76%	Technical services
Far South Coast	73%	75%	Hospitality
Sydney	71%	71%	Manuf./Health/Hospitality
Central Coast	67%	67%	Manufacturing
Overall	**77%**	**81%**	

Percentages are of all survey respondents (N=425) and of employers facing a skills shortage (n=326).

[3] *Employers were asked if they currently had considerable difficulty in recruiting or were unable to recruit people with the right skills for available roles. Percentages shown in Table 1 are of total survey responses for each year.*

Both Business NSW and the Australian Industry Group[12].... have made recommendations to address this skills shortage, it is Cotton Australia's view that the combination of the energy and input cost price squeeze along with skills shortage need not be catalyst to community decline[13].

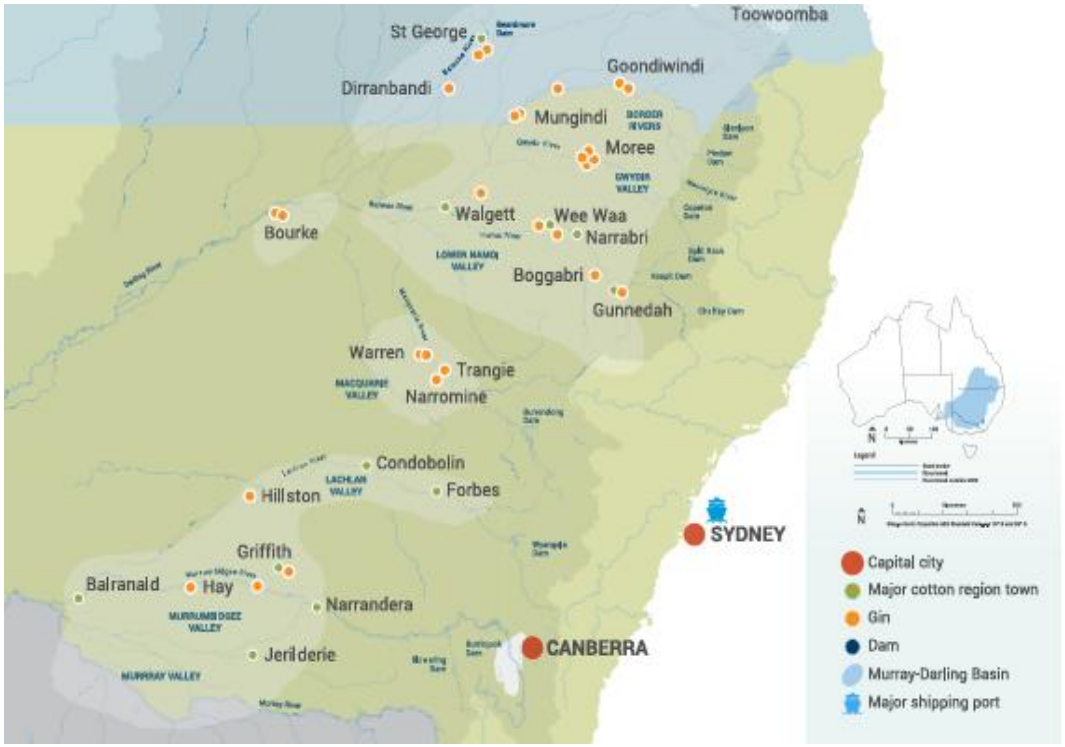
Rather, in Cotton Australia's view there is a role for government to play in supporting and stimulating development, importantly to ensure the necessary infrastructure is in place to enable business to flourish. We see the establishment of the NSW Renewable Energy Zones as a case in point.

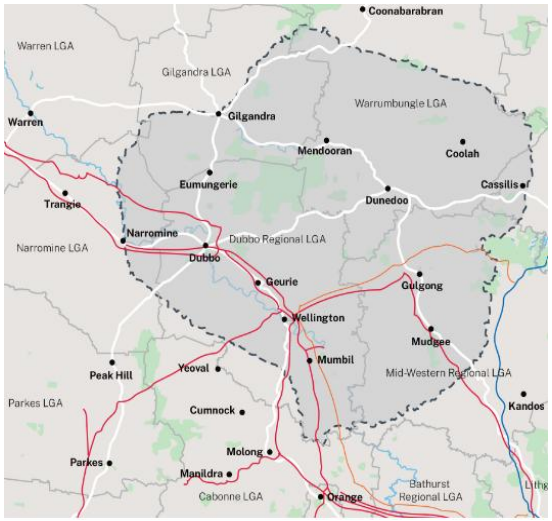
[12] Ibid 8, "….Third, it's all about workforce. Output, margins and investment are all up, but labour shortages are holding our growth prospects back. We shouldn't be promoting investment in new manufacturing jobs without a plan to fill the jobs we already have sitting empty. Fixing the skills pipeline will be as, if not more, important than investment incentives."

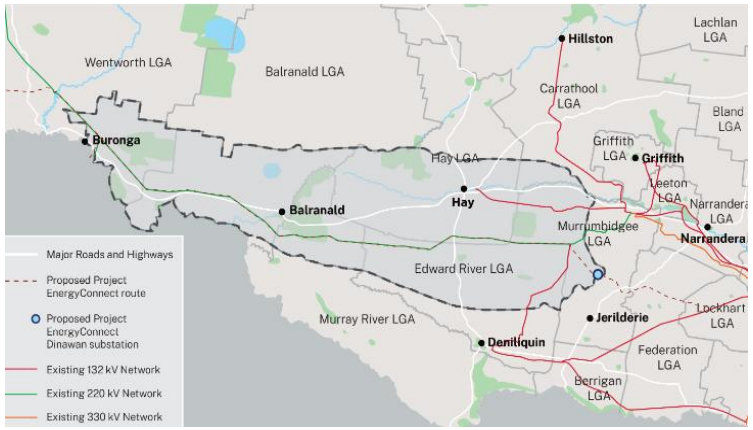
[13] Ibid 10. p45

Gins are co-located in REZs

- Potential for farms + gins to generate & share energy with onsite neighbours using existing network and within the same zone







https://cottonaustralia.com.au/assets/general/Education-resources/CA-resources/Education-map-cotton-growing-in-Australia.pdf

Cotton's REZ opportunity

As the diagram "Gins are co-located in REZs" on the previous page depicts, there are a number of ginning members plus growers residing within and adjacent to the South West (SW) and Central West Orana (CWO) REZs. As a key input for both growers and gins, access to safe, reliable and affordable energy is an imperative. We consider the REZs to be the opportunity to do so, providing the surrounding REZ communities access to cheaper energy and in turn acting as a catalyst, attracting new business and industries in co-located hubs.

The multiple benefits derived from collocated and shared resources is exemplified in the cotton related success story of the Narrabri community, where the rural and research community has swelled. Despite having a population of only 12,754 people[14] it has the Cotton Research and Development Corporation (CRDC), the Australian Cotton Research Institute[15] and the Plant Breeding Institute, collectively employing over 100 people.

Specific to cotton, the CRDC directly employs 16 staff, 11 of these people in Narrabri[16] and supports another 50 plus within the two agricultural research centres. Add to this, supporting services and infrastructure such as the gin processing facilities and inland rail port of Narrabri, which also provide employment for Narrabri and district[17]. CRDC's impact reaches a further 86 research partners[18] located throughout Australia, who in 2023-24 were engaged in 196 CRDC funded research projects.

For an REZ specific example, in the SW REZ in the locality of Hay there are two gins and another two adjacent at Griffith and Hillston. At the same time several members' properties are neighbours to planned renewable energy infrastructure. It is not just that gins as local businesses could benefit from locally generated and therefore cheaper electricity, if a specially define precinct or hub were to be created within the zone. As our research into microgrid feasibility [19] showed, discrete smaller scale solar infrastructure joined up to form a geographically dispersed microgrid could supplement their energy needs during the cotton growing season and supply their surrounding communities out of season. As per the Narrabri hub example, cheaper energy would make the colocation of spinning and weaving attractive.

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[14] As of 3 Sept 2024 https://www.nema.gov.au/

[15] Established "….in 1958, NSW Department of Primary Industries owns and operates the ACRI, but facilities at the site are shared with the CSIRO's agriculture and food department; playing a vital role in ensuring the cotton and broadacre cropping industries…." https://narrabricourier.com.au/2023/05/18/celebrating-65-years-of-primary-industries-research-in-narrabri-2/

[16] CRDC Annual Report 2023-24 p55.

[17] Cotton Research & Development Corporation (2019) Export Control Amendment (Banning Cotton Exports to Ensure Water Security) Bill 2019 Submission response

[18] CRDC Annual Report 2023-24 P 13, Full details in Appendix 6 CRDC 2023–24 Project List (as at 30 June 2024) p62.

[19] The Flow on Benefits of Microgrids for Agriculture (2023) was funded by the Australian Government's Regional and Remote Communities Reliability Fund. https://www.qff.org.au/projects/microgrids/

> "The Project found considerable underutilisation of substations at each case study location demonstrating the opportunity agriculture microgrids can present to regional grids if appropriately integrated into network revenue models and strategic planning. Acting like energy dams on regional grids, microgrids can offer grid firming services and emergency supply. Enabling state and federal regulation is necessary to unlock the full value stack for microgrids however distribution upgrade deferral payments are a good example of existing valuation mechanisms that could revaluate their remit and better value microgrids and other dispatchable Consumer Energy Resources (CERs)."

At a smaller footprint but with no less an impact is the hub that has been created at Whitton adjacent Southern Cotton's gin; which now includes[20] The Malthouse complete with award winning craft malsters[21] plus: a purpose built restaurant, event and accommodation facility, including 14 one and two bedroom villas, an onsite golf range and fishing facilities, that have also been tourism award finalists[22]. Consider the possibilities of other such community minded innovation, when the barrier to safe, reliable and affordable energy is removed.

In Cotton Australia's view the REZs in NSW should be more than a resource to fill the energy gap the elderly coal fired power stations currently supply. All of the state's REZs should also be used thus - as a precinct that addresses the surrounding regional communities' current and future energy needs. Importantly that need not be by creating more broadscale facilities but actually less using microgrid-like ones. Doing so would also address a hold held policy principle of Cotton Australia:

- No further loss of agricultural land and the active protection of high value agricultural lands

Furthermore, it would increase the use of existing network infrastructure, a view that even the Net Zero Commission holds.[23] It would certainly minimise perverse outcomes such as:

- the loss of agricultural land resulting in loss of productivity or commodity adaptation and in turn reducing the viability of agri-processing facilities (e.g. animal processors and cotton gins), the efficient utilisation of assets, and ultimately the agricultural profitability of a region
- the 'PV heat island effect' where there is a warming effect across the landscape, having the potential to influence biodiversity and wildlife habit, ecosystem functions and human health as well as agricultural land values of properties directly adjacent to these facilities.[24]

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[20] https://whittonmalthouse.com.au/

[21] https://rdariverina.org.au/news/2022/3/7/new-south-wales-based-craft-maltsters-voyager-craft-malt-awarded-worlds-best-pale-ale-malt

[22] https://www.irrigator.com.au/story/7613480/whitton-malt-house-reflects-following-award-nomination/

[23] Net Zero Commission, Annual Report p18: " In addition to dedicated renewable energy zones, NSW needs to make greater use of existing transmission and distribution networks.
https://www.netzerocommission.nsw.gov.au/2024-annual-report

[24] Barron-Gafford, G. A. et al. (2016). The Photovoltaic Heat Island Effect: Larger solar power plants increase local temperatures. Sci. Rep. 6, 35070; doi: 10.1038/srep35070. [https://www.nature.com/articles/srep35070] This study determined that temperatures around a solar PV plant were regularly 3–4°C warmer. It went on to state:

> "As with the Urban Heat Island (UHI) effect, large PV power plants induce a landscape change that reduces albedo so that the modified landscape is darker and, therefore, less reflective. Lowering the terrestrial albedo from ~20 per cent in natural deserts to ~5 per cent over PV panels alters the energy balance of absorption, storage, and release of short- and long-wave radiation".

And other publications since:
https://www.researchgate.net/publication/387516474_Empowering_Rural_Farming_Agrovoltaic_Applications_for_Sustainable_Agriculture
https://www.researchgate.net/publication/387381684_Global_disparity_in_synergy_of_solar_power_and_vegetation_growth

A final example from NSW is that of the community of Hay Shire Council (HSC) within the Riverina's Renewable Energy Zone. Cotton Australia understands that HSC is making its own submission to this Inquiry, so our comments will be brief.

As the Shire would be hosting nine of the 20 planned developments with the Riverina Zone, the council proactively worked with the community to set out documented principles for its negotiations with developers. Their resilience planning framed the REZ as being a 30-year relationship with the renewable industries who would be hosted by their community. That meant not just an annual income boosting Council's equity but also a means of attracting new capital and intensive industries and hence diversification for a largely primary industry reliant Shire[25]. We understand the community co-design process also identified long term community investment opportunities, the potential of cheaper electricity for the whole town and long-term projects for education, housing and healthcare[26].

4. Conclusion

Cotton Australia commenced this submission outlining the energy and skill shortage challenges facing out members, we then provided four regional community examples that created a hub for employment and economic diversity within NSW. As the experience of the Hay Shire's community to create a 10 year Economic Transition Roadmap shows, our regional communities can view REZs as a positive and prosperous opportunity. However, governments at all levels need to play a part, providing the necessary infrastructure for businesses and the community.

Furthermore, the NSW Government already has within reach the ability to boost the REZ opportunity by making use of existing and under-utilized energy network infrastructure. Research Cotton Australia has undertaken, demonstrates there is a role for microgrids with the REZs (once the energy gap of coal fired power stations is addressed) to provide discretely located but complementary resources for the current and future energy users within the REZ. Doing so would also address the growing co-existence tension between competing land use opportunities.

Thank you for the opportunity to make this submission. If you would like more information concerning the matters raised in this submission, please do not hesitate to contact me on 02 9669 5222 or via email: jenniferb@cotton.org.au

[25] https://www.hay.nsw.gov.au/Portals/0/Fundamental%20Principles%20for%20Successful%20Renewal%20Development%20in%20Hay%20LGA.pdf

[26] https://www.abc.net.au/news/2024-09-22/renewables-nsw-town-embraces-wind-solar-to-boost-economy-farms/104355706

FACT SHEET

IRRIGATORS

The flow on benefits of regionally embedded generation

Cotton Australia, the Queensland Farmers' Federation and the NSW Irrigators' Council conducted four regional case studies, an online grower survey and a workshop with network businesses to identify the barriers and challenges with installing solar PV on farm and feeding excess electricity into the grid.

To find out more about the project, read the factsheet or visit the Energy Consumer Austalia website.

This project was funded by Energy Consumers Australia Limited (www.energyconsumersaustralia.com.au) as part of its grant process for consumer advocacy projects and research projects for the benefit of consumers of electricity and natural gas.

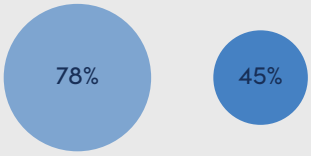
Electricity is an important input for irrigated agriculture, however rising costs have constrained NSW and Qld growers and impacted their profitability, competitiveness and on-farm operations.

As a result of the increases in electricity prices, growers have investigated a range of options to reduce their electricity costs, including the use of on-farm solar PV and other related technologies. The growth in solar PV is evident by the increasing number of small, medium and large solar sites across NSW and Qld and the increasing number of connection applications (AEMO 2018).

The abundance of land and sunshine in regional Australia, provides an opportunity for growers to explore options for on-farm solar PV in order to reduce electricity costs, increase productivity and utilise a clean source of energy.

78% of growers nationwide say they do not have control over energy costs

45% of growers are currently using solar (without battery)[1]



Despite the interest and growth in farm-solar PV, growers have encountered a range of barriers and challenges in the installation and utilisation of solar energy on-farm.

Motivation for the project

To explore these barriers and challenges, Cotton Australia, the Queensland Farmers' Federation (QFF) and the NSW Irrigators' Council (NSWIC) have conducted further research. A research project titled *Irrigators – the flow on benefits of regionally embedded generation* was initiated and sought to:

1. Identify the challenges experienced by growers who have installed (or were planning to install) solar energy on-farm with the intention to feed excess energy back into the electricity grid.
2. Analyse network connection application processes and the associated barriers that limit growers from feeding on-farm generated solar energy back into the electricity grid.
3. Assess the previous amendments to NER (Chapter 5A) to determine if it had improved the connection process for solar PV generators under 5MW to connect to the electricity grid.

The objective of the project was to identify the unique challenges of growers in regional NSW and Qld with the connection, installation and integration of on-farm solar PV. The project also tried to identify possible policy and regulatory options to improve and simplify the connection process. It also tried to identify mutually beneficial options for future solar energy projects that can be pursued jointly by growers and network businesses.

[1] https://www.commbank.com.au/content/dam/commbank/assets/business/can/agribusiness/agri-insights-9.pdf

Barriers and Challenges

Growers identified a range of barriers and challenges with the planning, design, installation and connection of on-farm solar PV systems.

Technical

- Integration of the solar PV system with existing on-farm equipment
- Identification of an optimal location for the solar PV system to connect to dispersed on-farm infrastructure assets
- Understanding the export capacity of the grid to size the on-farm solar PV system accordingly
- Management of local network constraints.
- Standardisation of the services provided by solar suppliers and installers
- Acceleration of technological advances in solar PV systems and battery storage

Economic

- Determination of the value of on-farm solar PV systems if it is not continuously used throughout the year and/or when export opportunities are limited
- Change in electricity tariffs creating uncertainty about future energy costs and the viability of the on-farm solar PV systems
- Management of large upfront costs for a high quality solar PV system and technical expertise
- Address potential additional augmentation costs to enable export opportunities
- Understanding the connection fees and other ancillary charges

Information

- Access to quality information, expert advice and quality assurance processes to be confident the on-farm solar system is fit for purpose and operates efficiently with the existing on-farm equipment
- Engagement between growers, network businesses and suppliers to ensure the regulatory and operational environment is understood
- Transparency of the network decision-making process for connections, export capacity and the interaction between different solar PV applications
- Consistency of information and technical advice (networks and suppliers)
- Unclear determinations of export thresholds for large-scale solar farms and smaller connections

Although some of the barriers and challenges exist due to the complexity of the network connection process, there is a significant lack of grower expertise which prevents them from effectively engaging with the network companies. Growers are also often not able to scrutinise the advice of the solar PV supplier/installer. The unclear determination of the connection process and the lack of a quality assurance scheme for solar PV panels and installations has also generated a lack of trust in growers. This has also led to additional costs and delays.

A Case for Change

- Improve the hosting capacity of the networks to enable more connection opportunities for growers.
- Impose accreditation requirements for solar PV installers with the Clean Energy Council to allow growers to identify suitable solar PV suppliers/installers.
- Review NER Chapter 5 amendments to assess more broadly whether improvements to the connection process have been realised for growers in regional areas.
- Improve the communication and engagement between growers, network businesses and solar PV suppliers/installers to ensure a clear and transparent information flow. This would also ensure technical requirements and operational constraints are understood.

Case Studies

New South Wales

An established irrigated cotton farm in Gunnedah (NSW) extended two existing 10kW on-farm solar PV systems with a further 100 kW grid-connected single-axis PV system. The system is designed to power a pump with a submersible motor that will run constantly during the 3-4 cropping months.

Although the overall project was a success, it took 18 months to complete. Extensive planning and design were required to select the right system for the local environment (flood-prone land and high winds) and minimise the footprint on valuable agricultural land. The grower also faced high upfront costs and additional expenses for technical equipment and grid connection ability.

After completion, the network business only approved export of 50% of the system's capacity back to the grid without a detailed explanation about the decision.

"Economics don't stack up unless you contribute a lot of personal effort... I feel like a pioneer in the industry."

Queensland

An innovative solar PV project in the Bundaberg region has been operational since 2018. The project 'Adapting Renewable Energy Concepts to Irrigated Sugar Cane Production at Bundaberg' has been led by the Bundaberg Regional Irrigators Group (BRIG) with the funding support of the Australian Renewable Energy Agency (ARENA).

The aim of the project is to reduce irrigators' dependence on grid-supplied electricity through the installation of a large-scale solar PV system capable of delivering a comparable irrigation supply to the established distribution system.

The project faced challenges and delays due to a number of compliance issues with innovative new equipment and the grid connection standard. In particular, the grid connection specifications for all inverters and similar technologies to AS/NZ4777.2: 2015 Grid connection of energy systems via inverters was a serious impediment to the installation and operation of the solar PV system.

Despite these challenges, data obtained from the project indicate that the new integrated solar PV system has led to a 70 per cent reduction in grid-supplied electricity use and a reduction in irrigation cost from $1.30 to $0.39 per tonne of sugarcane. The PV system also has potential for productivity gains on farm including the full utilisation of water allocations and additional cropping opportunities.

"The more we understand about the ins and outs of how it works and what it can do, the better value that we can get out of it."

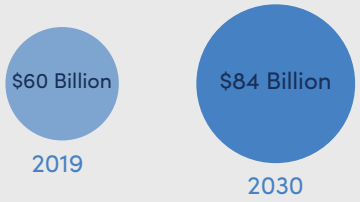
Grower-to-grower recommendations

- Know your needs and the limitation of the site
- Be informed about the supplier, the quality of the installation, and the technical/legal/regulatory requirements
- Explore all opportunities and consider building your on-farm solar footprint slowly and strategically
- Know the process for connecting to the grid and prepare for extensive waiting periods and factor in additional costs

Why do these challenges and barriers need to be addressed? Simply because agriculture is important!

Agriculture contributes $60 billion dollars to Australia's economy.

Based on its current trajectory, the agricultural industry is forecast to grow to $84 billion by 2030 (ABS 2017).



Australian growers are an important part of regional Australia, supporting local businesses and communities. Their financial viability and productivity are important to grow regional Australia.

The project undertaken by Cotton Australia, NSWIC and QFF has shown that there are several barriers and challenges facing the installation of solar PV in regional NSW and Qld. Change is required to realise untapped opportunities. The changes include:

- Streamlining the connection process
- Improving the information flow between the network business, solar installers and growers.

Australian growers continue to see opportunities in the renewable space - all that is needed now is that the regulatory and policy setting to be an *enabler* and not a *constrainer.*

For more information:

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Queensland Farmers' Federation
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NSW Irrigators' Council
02 9251 8466

This project was funded by Energy Consumers Australia Limited (www.energyconsumersaustralia.com.au) as part of its grant process for consumer advocacy projects and research projects for the benefit of consumers of electricity and natural gas.

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NSWIC

IRRIGATORS

The flow on benefits of regionally embedded generation

Strategic Plan and Priorities

Practical "on the ground" measures

- Prepare a solar PV "decision tree" to guide growers through the assessment, installation and connection process. The aim is to ensure growers ask the right questions and are able to scrutinise the advice of solar PV suppliers/installers.
- Document the actual solar PV connection process as a case study.
- Promote the Solar Retailer Code of Conduct more broadly amongst growers.
- Seek a meeting with the AER/AEMC to gain a better understanding of whether funding through the Demand Management Incentive Scheme (DMIS) and Demand Management Innovation Scheme (DMIA) could be used for these types of trial projects.
- Arrange grower workshop with the Distribution Network Service Providers (DNSPs) to discuss mutually beneficial opportunities for future solar PV installations across regional NSW and Qld as well as obtain a commitment from the DNSPs to improve the visibility and public information on current/likely future network constraints.
- Seek funding through Federal/State agencies to conduct a project with growers on solar battery installations on the farm (e.g. in light of the upcoming elections). The aim is to assess whether the identified challenges of the project: *Irrigators - the flow on benefits of regionally embedded generations* can be overcome and/or mitigated.

Regulation

- Seek public disclosure of grid constraints and remaining export capacity that is updated at a regular interval.
- Seek third-party accreditation requirements through the Clean Energy Council. The aim is to ensure a consistent level of service provisions and quality assurance for any installation/ maintenance.
- Seek an AER led or independent review of the National Electricity Rule (NER) Chapter 5 amendments to determine whether the previous legislative amendments have been effective from a growers' perspective. If not, seek further amendments to Chapter 5 (e.g. through a consortium of organisations and ECA) and ensure regular reviews of Chapter 5 amendments are conducted.
- Seek a review of the planning laws to ensure that they are effective and efficient in protecting high quality agricultural land plus drive further investment in on-farm solar PV where it is sensible.
- Seek legislative amendments to ensure agricultural land is restored post the life of a solar PV project (more relevant if the land is leased).
- Seek a change of the NER to improve grid monitoring and enable the development of a database to facilitate PV projects in regional NSW and Qld.
- Amend NER to enable network augmentation costs that would resulting from solar PV connection applications to be shared so that it does not 'crowd-out' potential investment in solar PV.

Guide

- **High priority** Achievable and/or inexpensive
- **Medium priority** Challenging and/ or potential resource intensive
- **Low priority** Difficult and/or resource intensive

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Policy

- Seek a meeting with the AEMC/AER to discuss whether current consumer protection is sufficient in the context of solar PV installations (lease arrangements; adequate installation etc).
- Lobby for the AER or AEMC to design a 'One-stop-shop' website that includes advice on solar grid connection process for growers (e.g. rules & regulation, protection & recourse, barriers & challenges, case studies, advice on who to speak to, a reference to codes and key issues).
- Lobby for a review the Energy Network Australia (ENA) model connection process via the Agricultural Industries Energy Taskforce to develop clear performance benchmarks for future evaluating the voluntary codes.
- Lobby for a review of the Australian Standard AS 4777 - Grid Connection of Energy Systems via Inverters.
- Lobby for an optimal solar feed-in tariff to give growers greater certainty for their investment decisions in on-farm solar PV systems.
- Lobby state governments or AEMC to host an online register and/or FAQ with information on past connection issues. Also, seek assistance from state governments to improve the interaction between growers, DNSPs & solar PV installers/suppliers.

Other

- Seek funding to undertake further investigation into related solar PV connection challenges in order to develop a science/evidence-based research base and construct a data-set for growers (e.g. CEFC to drill down into the finance data).
- Seek funding (through DMIS and other opportunities) to improve the hosting capacity of the network (and seek a meeting with AEMC/AER to determine how DNSPs can access funding for upgrades) – particularly in low-voltage networks.
- Seek funding to investigate opportunities for peer-to-peer trading in regional NSW and Qld (in partnership with state governments/ARENA and DNSPs).
- Seek funding to investigate opportunities to achieve more 'value from solar installations' – including through PPA agreements; using other technologies as another energy storage instead of investing batteries; investigate options for electric tractors to be used on-farm.

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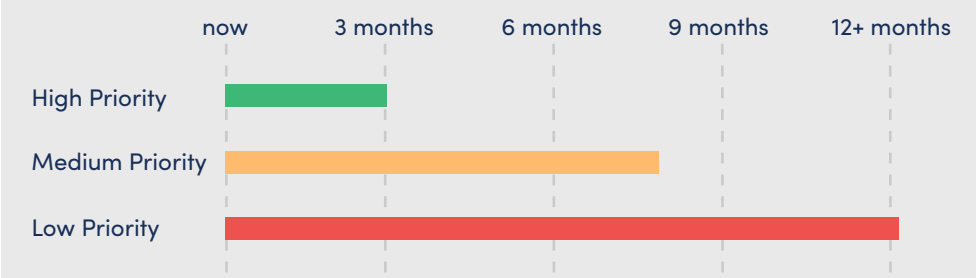

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