

**From:** Garry Stoll  
**Sent:** Monday, 14 October 2019 7:40 PM  
**To:** Tatsiana Bandaruk; Jackie Kruger  
**Cc:** Iwan Davies  
**Subject:** RE: Yanco Solar (SSD 9515) - Request for advice on Submissions Report and Amendment Report

Good afternoon Tatsiana

Thank you for your email.

I wish to advise that last week Council reaffirmed its opposition to the proposed Yanco Solar farm on the basis that it will be sited on highly productive irrigated agricultural farm land that is currently operated as a commercially sustainable horticulture orchard and vineyard and the replacement of this use on this land is a serious misuse of this land within an established irrigation area.

Council also wishes to advise that the EIS does not fully cover the management of all likely waste streams resulting from the development, in particular details on alternate viable disposal methods for the associated packaging material from the solar panels and support structures. Due the likely quantities of this material Council will not approve the receipt and disposal of it at the Leeton Waste Facility.

Please do not hesitate to contact me on should you wish to discuss this matter further.

Regards



**LEETON**  
SHIRE COUNCIL

Garry Stoll | Manager Planning, Building & Health | **Leeton Shire Council**  
[www.leeton.nsw.gov.au](http://www.leeton.nsw.gov.au)

23-25 Chelmsford Place, Leeton NSW 2705

From: Jackie Kruger  
Sent: Monday, 21 October 2019 8:23 AM  
To: Nicole Brewer

Subject: Email 1/3 from Leeton Shire Council re Yanco Solar Farm application

Morning Nicole

The link below provides some history on background on the development of the MIA (Murrumbidgee Irrigation Area). This was a significant nation building exercise and, in today's dollars, is valued at \$9B (pers comm MI Ltd).

It is Leeton Shire Council's strong view that this significant taxpayer funded investment in drought proofing Australia and ensuring food security should be protected and optimised. These schemes would be impossible to replicate today (too costly and environmentally challenging) and it would be negligent for decision makers today to have the scheme's full potential systematically eroded by removing farms from productive use.

Further, formed irrigation schemes that are run responsibly provide for the most efficient use of water. Irrigation areas such as the MIA help ensure every drop counts through minimising transmission losses as the conveyance water can efficiently deliver parcels of productive water to multiple landowners in the same vicinity.

In a dry continent like ours, water is precious and where we do have schemes in place that deliver water efficiently for farming endeavour these should be protected and optimised.

Australia's National Farmers Federation 2030 RoadMap to grow Australian agriculture to \$100B has been endorsed by the Commonwealth Government. Irrigation areas like the MIA will be critical to achieving this result and should be kept in tact.

<https://www.mirrigation.com.au/ArticleDocuments/199/Fact%20Sheet%20System%20Info.pdf.aspx>



# Murrumbidgee Irrigation

## MIA SYSTEM INFORMATION



Burrinjuck Dam



Blowering Dam

### Where does the water used in the Murrumbidgee Irrigation Area (MIA) come from?

The MIA covers an area of 670,000 ha of which an average of 130,000 ha is irrigated. Water for the MIA is supplied by Burrinjuck and Blowering Dams in the upper Murrumbidgee catchment. Blowering Dam stores water that has been released from storages further upstream in the Snowy-Tumut Development section of the Snowy Mountains Hydro-Electric Scheme. Water releases from Blowering and Burrinjuck Dams are managed by Water NSW, to provide for town water supply, irrigation and environmental use requirements. The Snowy Scheme contributes inflows to the Murrumbidgee River of around 25% during average inflow years and up to 60% during drought years.

The water released from Burrinjuck and Blowering dams flows down the Murrumbidgee and Tumut Rivers to their junction east of Gundagai and the combined flow continues down the Murrumbidgee River. Berembled Weir is the main offtake for diverting water into the MIA. Berembled is 386 river kilometres,

or five days flow from Burrinjuck Dam. From Berembled, water moves into Bundidgerry Storage. The Bundidgerry Regulator is the start of the irrigation canal system owned and maintained by Murrumbidgee Irrigation Limited (MI). The Main Canal feeds the supply channels that take the irrigation water to the farm gate. It has a maximum flow capacity of 6,600 ML per day. In total, water takes about seven days to flow from the dams to farms.

The next significant point in the scheme is the Yanco Regulator. This is a major system split where the Gogeldrie Branch Canal diverts off the Main Canal, winds through the back of Yanco and Leeton before finishing at Wamoon. The Main Canal continues on past Leeton, Murrami, Yenda, Beelbangera and Griffith, finishing at Tharbogang.

Water is also diverted into the Mirrool Creek Branch Canal upstream of Yenda.



Berembled Weir



Bundidgerry Storage and Regulator



Yanco Regulator

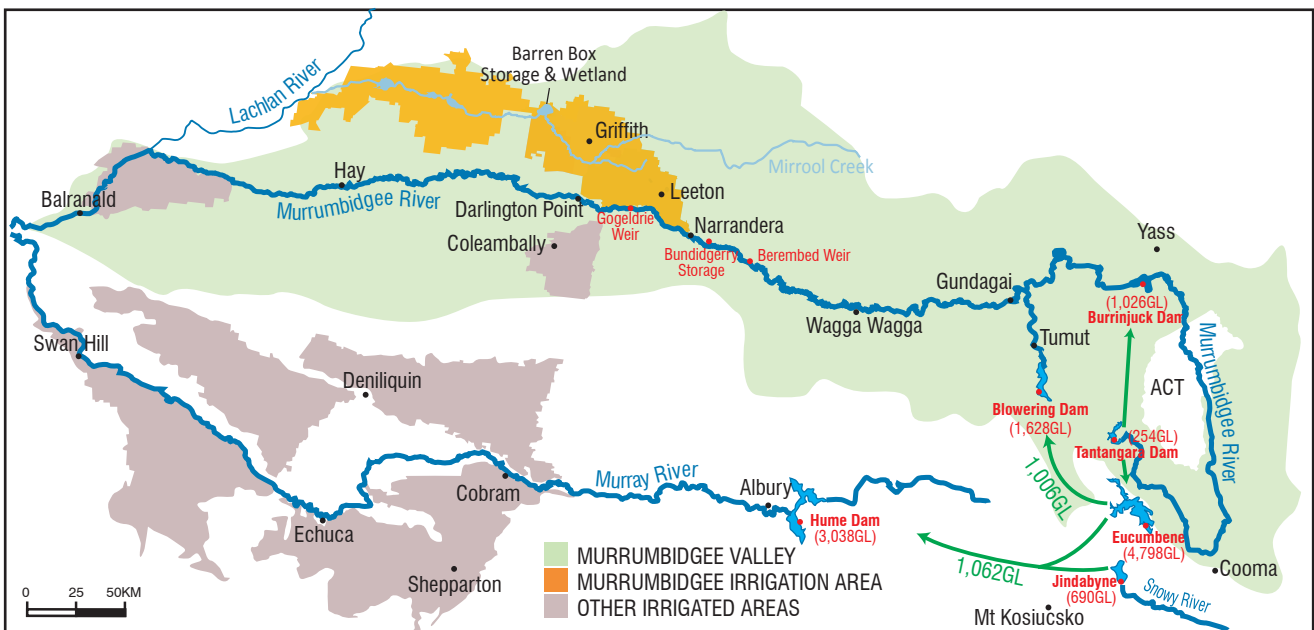


PHOTO TOP: Burrinjuck Dam.

This paper is provided purely as a guide and does not have any legal effect. This paper cannot be relied on in substitution for, and does not affect the interpretation of any contract, rules or other document that is binding on Murrumbidgee Irrigation or a customer.



# Murrumbidgee Irrigation

## MIA SYSTEM INFORMATION

The balance of the MIA's water requirements are diverted at Gogeldrie Weir near Leeton about a further 100 river kilometres downstream, or two days from Berembded Weir. From Gogeldrie Weir, water is directed to the Sturt Canal and supplies farms in the southern and western regions of the MIA.

Drainage water flows via Mirrool Creek towards Barren Box Storage and Wetland. Water from Barren Box is recycled into the Wah Wah irrigation supply system as well as to the Benerembah and Tabbita irrigation districts. Water from the Main Canal is filtered and treated for reticulation to urban residents.



MIA farm offtake

### Who uses the water?

Water diverted into the MIA is used to supply the major townships of Griffith and Leeton as well as over 3,300 agricultural landholdings. Irrigated agriculture is the primary industry in the MIA and supports many ancillary businesses such as wineries, juicing factories and processing plants.

Irrigators in the MIA have licences which allow them to use a prescribed volume of water each year. This volume of water may vary depending on rainfall events, and how much water is stored in the dams. Irrigation water is delivered and metered by MI and irrigators pay for the water they use. The Irrigation Industry Basics factsheet has more information about how this process works.



Gogeldrie Weir

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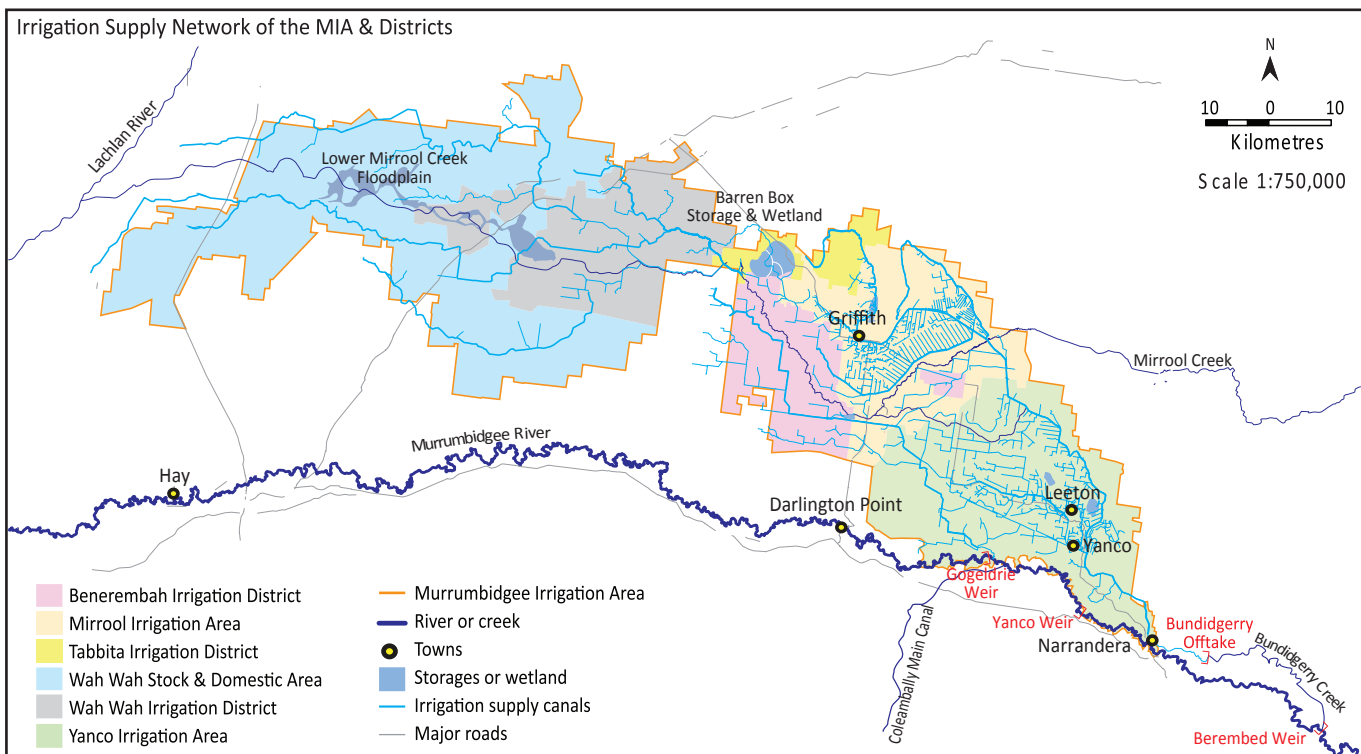


PHOTO TOP: Main Canal at Leeton

**From:** Jackie Kruger  
**Sent:** Monday, 21 October 2019 8:57 AM  
**To:** Nicole Brewer

**Subject:** Email 2/3 from Leeton Shire Council re Yanco Solar Farm application

Hello Nicole

Recent investment of further taxpayer funding into the Murrumbidgee Irrigation Area to support the most efficient delivery of water to and on irrigation farms includes:

\$347M Private Irrigation Infrastructure Operators  
- <http://www.agriculture.gov.au/water/mdb/programs/nsw/piiop-nsw>

\$81.4M On Farm Efficiency Program in Murrumbidgee (via Ricegrowers Association) -  
<http://www.agriculture.gov.au/water/mdb/programs/basin-wide/ofiep>

It makes no sense to be ploughing valuable taxpayers funds into future proofing irrigation farming areas and then eroding those very schemes by allowing irrigation farms to be removed from productive use.

With GVAP estimated to be \$7800 / ha for horticulture and \$280 - \$400 / ha for dryland cropping and grazing, high value irrigation farms should not be removed from productive use. (GVAP Source: draft "Planning for Agriculture Riverina Murray" - NSW Dept Planning (DPIE))

Note - there may be further investment in the MIA not captured in the two examples above.

Regards

Jackie Kruger  
GM Leeton Shire Council

From: Jackie Kruger  
Sent: Monday, 21 October 2019 9:04 AM  
To: Nicole Brewer

Subject: Email 3/3 from Leeton Shire Council re Yanco Solar Farm application - Economic impact assessment

Hello Nicole

Council commissioned an economic analysis which is attached. You will note there is a recommendation that the NSW Dept Planning applies a precautionary principle when reviewing the Yanco Solar Farm proposal.



**Corview**

**Member of RPS Group Plc**

**Solar Farming Development Proposals within the  
Murrumbidgee Irrigation Area**

Summary Economic & Social Assessment

Leeton Shire Council

Version 1.0 | October 2019

## Version Control

Version No	Change History	Author	Reviewer	Approval Date	Issue Date
V1.0	Summary Report	OM	BL	10 / 10 / 19	10 / 10 / 19



# 1 Executive Summary

The Western Riverina<sup>1</sup> includes some of Australia's most highly productive agricultural land and is home to a thriving agribusiness sector. The strength of the region reflects many factors, with perhaps its most distinctive source of strength being the Murrumbidgee Irrigation Scheme and its water supply off the Murrumbidgee River.

An emerging issue for the Western Riverina is reflected in a number of solar farm development proposals which would displace traditional agricultural uses of the land. Because agriculture is integral to the economic and social strength of the Region, this merits particularly careful attention.

In this vein, Corview has been engaged by Leeton Shire Council to undertake a strategic assessment:

- assessing the cumulative impacts associated with land use change from agriculture to solar farming in the Western Riverina and Murrumbidgee Irrigation Area
- considering the implications associated with the Yanco Solar Farm proposal, specifically.

Proponent documentation supporting solar farm applications typically cite local job creation in the construction phase as a key argument for proceeding with a development. However, analysis of impacts typically requires far deeper analysis than is considered within the applications, with many material considerations overlooked.

One such limitation is that applications tend to focus on jobs impacts in the construction phase, paying little attention to how operating phase impacts might play out compared to existing agricultural uses, or whether solar construction activities displace jobs and production elsewhere in the economy.

This scale of difference in ongoing jobs in solar versus agriculture figures suggests consent authorities should pay more attention to the risks of negative impacts in the operating phase, than the upfront impacts in construction.

Overall, it can be said that:

- disrupting and displacing agricultural activities that offer the Western Riverina a key source of its economic and social strength with solar farming poses some key economic and social risks, especially on a cumulative basis
- these risks represent a considerable source of uncertainty for consent authorities in considering applications for development.

These uncertainties and risks suggest applying a 'precautionary principle' for local social and economic impacts, as is more commonly done for environmental risks. Applying this principle would not prohibit solar farming applications outright. Rather, it would place a burden of proof on proponents to demonstrate that no local economic or social harm will result from the proposal.

Factors that would tend to support limited likelihood of local economic or social harm would include:

- agricultural uses have already been abandoned for some extended period of time

<sup>1</sup> The Western Riverina is comprised of the LGAs of Carrathool, Griffith, Leeton, Murrumbidgee and Narrandera.

- agricultural activities, all current staff and water extraction rights will transfer to a superior agricultural site elsewhere in the Region that will increase jobs and output
- the land is not irrigated
- soil quality or other site specific factors mean agricultural value is limited
- evidence that solar profits are highly likely to be reinvested locally.

### Specific issues with the economic assessment of the Yanco Solar Farm proposal

Corview recommends the application of the 'precautionary principle' to all solar farm developments on prime agricultural land, including that for Yanco Solar Farm.

Corview has identified significant limitations in the analysis undertaken to support the Yanco Solar Farm proposal:

1. the recent proponent response to comments specifically cites that it makes no representation that the economic analysis suggests the project enhances the welfare of NSW (or the Western Riverina). On this basis, the proposal should not be supported, in light of:
  - a. no evidence to suggest a net advantage for state or regional social welfare
  - b. significant uncertainties posed to the prevailing economic and social strengths and endowments of the region
  - c. directions contrary to the express strategies of the Western Riverina Regional Economic Development Strategy.
2. limited attention is paid to the amount of employment displaced in either the construction or operating phases, nor how the estimates of displacement were derived
3. Specific considerations for displacement in the construction phase should include:
  - a. engineering and construction is a skills scarcity across the Western Riverina, with increased demand from solar construction impacting negatively on existing operational businesses, not just other projects in construction
  - b. headline construction impacts should be adjusted to account for these "displacement effects" – including the impacts on other producers and workers in operating phase businesses, who face lost production and hours until labour is available again.
4. the basis of the estimate of forgone agricultural output is unclear. However, the summary statistics in section 3.7 provide the following headline figures:
  - a. annual fruit production tonnage of 3,500 tonnes – this yield looks low for 205 hectares
  - b. average annual value of production of \$850,000
  - c. which implies a yield of around **\$243 per tonne**
  - d. however, recent market prices for Australian oranges are around **\$800 / tonne**.
5. no consideration is made of alternative agricultural use - whether another operator of the farm for agricultural purposes would extract higher yields – this is inconsistent with evaluating the land at its 'highest and best' base use

6. output estimates should also consider whether current output is constrained by the availability of water extraction licences held by the current operator. An alternative operator may finance acquisitions of water licences, and therefore increase production
7. for the operating phase, displaced agricultural job impacts and supply chain impacts deserve considerably more attention. For example:
  - a. the basis of jobs estimates should be clarified and justified
  - b. expenditure in the supply chain should be estimated and accounted for
  - c. linkages to subsequent production activities – such as beverage manufacturing – should be accounted for, including the loss of production
  - d. flow on consequences, including the support for jobs and production in the broader economy from agricultural and manufacturing production, have not been considered in the same way that flow on consequences for solar production has.
8. **Distributional analysis has not been undertaken, making it impossible for consent authorities and interested members of the community to consider how the balance of benefits and costs are distributed between the local community and interests beyond the Western Riverina.**

Corview is of the opinion that the present evidence and analysis tabled by the proponent of the Yanco Solar Farm proposal is insufficient to support a conclusion that no local economic or social harm will result from the proposal.

## 2 Geographic Context: The Western Riverina Region and Murrumbidgee Irrigation Area

This section of the Report introduces the communities and locations that are the focus of analysis.

### 2.1 The Western Riverina

The Western Riverina is comprised of five local government areas in south western New South Wales (see map right).

The region is a key catchment for social and economic activity within the broader Murray Darling Basin.

The region has a population of around 50,000 people, concentrated in its central hubs of Griffith and Leeton.

Leeton was founded in 1913 as the heart of the Murrumbidgee Irrigation Area. The MIA was initiated by the NSW Government to supply water from the Murrumbidgee River for farming.

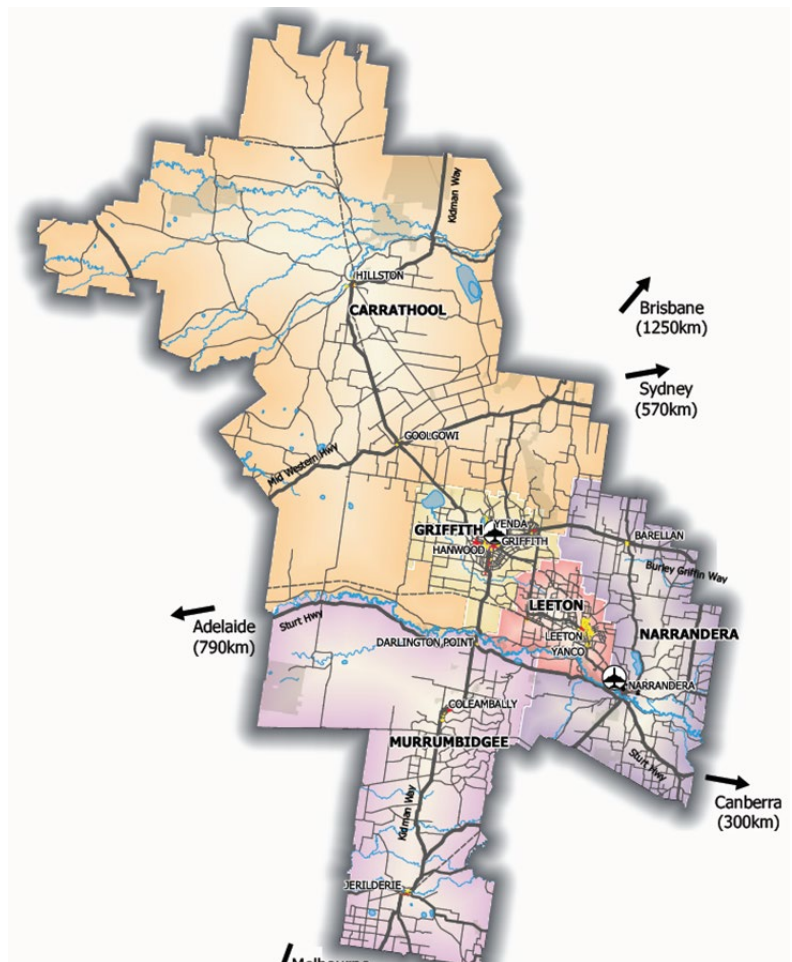
Visitors today can see in Leeton's design a circular road structure and streetscape. As is the case for Canberra, the design reflects the hand of Walter Burley Griffin in shaping the city ahead of the First World War.

Leeton is 560 km from Sydney and 460 km from Melbourne.

Griffith was established in 1916 as part of the New South Wales Government's Murrumbidgee Irrigation Area (MIA)

Griffith is around 450 km north of Melbourne, and 570 km west of Sydney.

The outlying townships of Coleambally, Darlington Point, Goolgowi, Hillston, Jerilderie and Narrandera are integrated socially and economically with the central population hubs.



3.1 Western Riverina Map (source: Corview)

## 2.2 The Murrumbidgee Irrigation Area (MIA)

The Murrumbidgee River is one of the principal watercourses within the broader Murray-Darling Basin and the third longest river in Australia<sup>2</sup>. Its run covers more than 1,300 kilometres, beginning high in Snowy Mountain country, almost 1,400 metres above sea level, before meeting the River Murray.

Established in 1912 to drought proof inland Australia and provide food security for the nation, the Murrumbidgee Irrigation Area covers 660,000 hectares, with about 170,000 irrigated.

The Murrumbidgee Irrigation Area rests off the run of the Murrumbidgee River itself, flowing through the Western Riverina’s heartland – and providing its economic and social lifeblood.

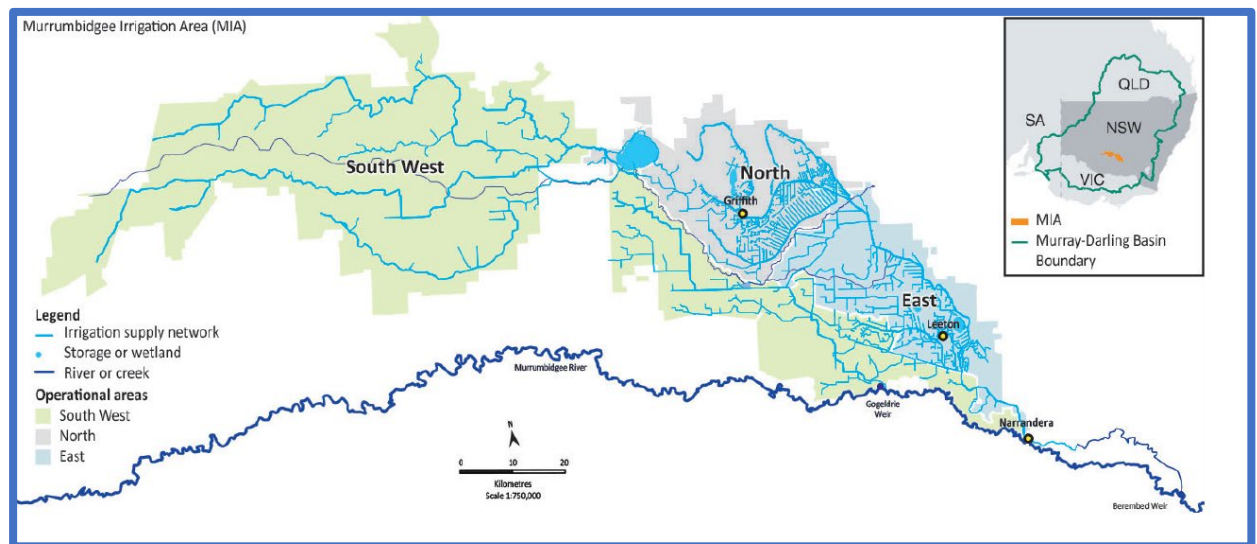
The Murrumbidgee Irrigation Area diversion off the River is a canal to the east of Narrandera (at the eastern extent of the Western Riverina).

The MIA forms part of the Mid Murrumbidgee wetlands, which run for around 300 kilometres between Wagga Wagga (to the east of the Western Riverina) and Carrathool (the north west of the Western Riverina itself).

As diverted water flows east of Narrandera, approaching Leeton, the network begins to fan out into a broad, complex expanse of channels and canals, forming the water distribution network supporting Australia’s most productive food bowl.



3.2 Mid Murrumbidgee Wetlands & MIA (source: MDBA)



3.3 Murrumbidgee Irrigation Area Water Distribution Network (source: Murrumbidgee Irrigation Limited)

<sup>2</sup> Murray Darling Basin Authority (2019) <https://www.mdba.gov.au/discover-basin/catchments/murrumbidgee>

This network is managed by Murrumbidgee Irrigation Limited, one of the largest private irrigation companies in Australia serving over 3,260 land holdings.

Under licence, Murrumbidgee Irrigation Limited diverts the water from the Murrumbidgee River and delivers it to water entitlement holders across the Murrumbidgee Irrigation Area.

Murrumbidgee Irrigation Limited employs around 180 staff with offices in the towns of Griffith and Leeton.

The company is currently undertaking renewal and expansion - replacing aging water delivery infrastructure, relining and refurbishing channels and automating the main supply canals.

These works are aimed at increasing water efficiency, mostly funded by the Australian Government under the Private Irrigation Infrastructure Operators Program.

## 3 Economic Context: The Western Riverina Economy

This section of the Report introduces the composition and relative strengths of the Western Riverina economy. Content draws on the *Western Riverina Regional Economic Development Strategy* developed for and on behalf of the Region and the NSW Government.

### 3.1 The Key Sources of the Western Riverina's Economic Strength

The Western Riverina includes some of the most highly productive agricultural land in the Murray Darling Basin. The variety of landscapes in the region supports a diverse range of agricultural industries that all place a high value on the region's reliable water supplies.

Long known for its dryland cropping and livestock production, the Western Riverina gradually diversified into rice, citrus, wine and other fruit production. More recently, Western Riverina producers have further diversified into higher value, longer term yield crops such as nuts, cotton, olives and vegetables.

Much of the Region's current day economic character can be traced back to the Murrumbidgee Irrigation Scheme and related investments in water infrastructure in the early 1900s. These endowments support the key features of Western Riverina today, especially the scale of its operations and intensity of investment in agribusiness and manufacturing.

The *2018 Western Riverina Regional Economic Development Strategy* documents the region's distinctive "endowments" – the sources of economic strength the regional economy possesses, that present specific local advantages and opportunities its businesses, workers and communities can capitalise on.

Economic principles suggest that these strengths should play a key role in economic development, as they cannot be easily replicated by others and so represent advantages that can be sustained and extended over time.

Some of the key sources of economic strength identified in the *2018 Western Riverina Regional Economic Development Strategy* are reflected overleaf.



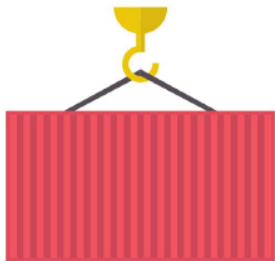
**Arable land** – Western Riverina includes extensive tracts of arable lands applicable for both for agriculture and horticulture.



**Access to water and irrigation systems** – The availability of water is a critical input for agricultural production as well and other consequent value chain activities, like Food and Beverage Manufacturing.



**Proximity to major metropolitan markets** – Western Riverina’s geography provides relative proximity to Melbourne and Sydney, Australia’s two largest capital cities. Both cities have also seen substantial population increases in recent years, affording the Western Riverina large and expanding market opportunities.



**Extensive road and rail freight arterial infrastructure** – Proximity to Melbourne and Sydney is indicative of geographic opportunity for the communities of the Western Riverina. However, generally it is the high quality of the road and rail freight arterial network infrastructure that see that opportunity realised.

4.1 Select Sources of Economic Strength for the Western Riverina Part I (source: Corview)





**Sophisticated water infrastructure** – Horticultural areas of the Western Riverina are marked by extensive private and public water infrastructure networks, with investments in water efficiency substantially increasing yields.



**Private capital equipment** – Many businesses in Western Riverina operate with remarkable productivity by virtue of extensive investments in highly valuable capital equipment. The scale and proficiency of operations sees businesses competing globally by virtue of their first rate equipment and expertise.



**Operational and entrepreneurial capability** – Western Riverina is fortunate to have a number of large private businesses. With a relatively large number of entrepreneurs with relatively strong balance sheets and risk appetite, horizons for investment tend to consider global markets as much as domestic markets.



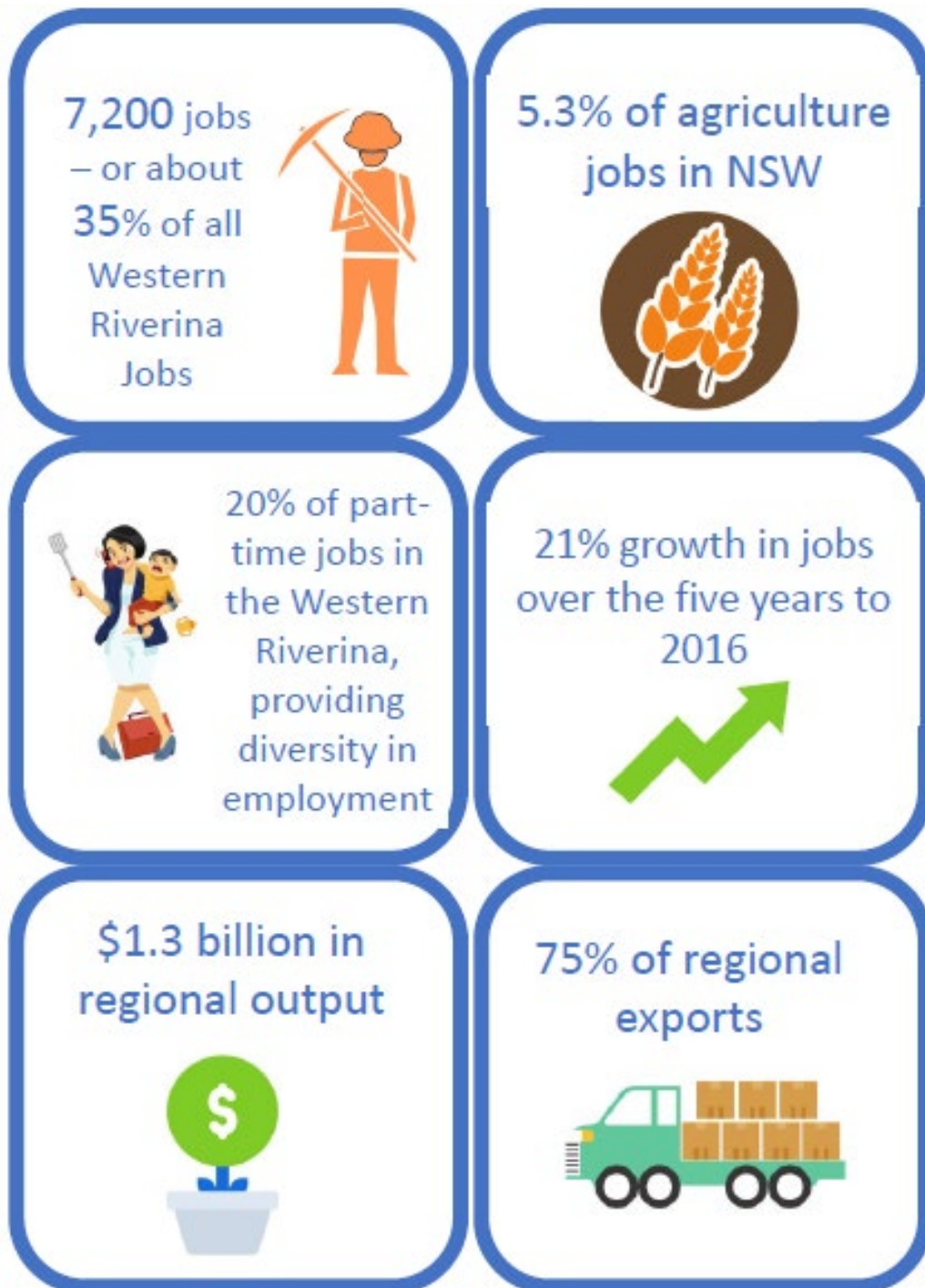
**Water security** – The Murray Darling Basin Plan has reduced the total amount of water available while increasing the security of water entitlements. Production has shifted towards produce offering better returns, like almonds and olives, but requiring more time to yields.

*4.2 Select Sources of Strength for the Western Riverina Part II (source: Corview)*

### 3.2 Agribusiness: The Western Riverina's Key Economic Strength

A unique combination of water, water infrastructure, water security, arable lands, private initiative, infrastructure and capability, proximity and access to major metropolitan markets and gateways make Agriculture and Manufacturing the key "Engines of Growth" of the Western Riverina economy.

Statistics summarising the role of Agriculture & Manufacturing in the regional economy are shown below.

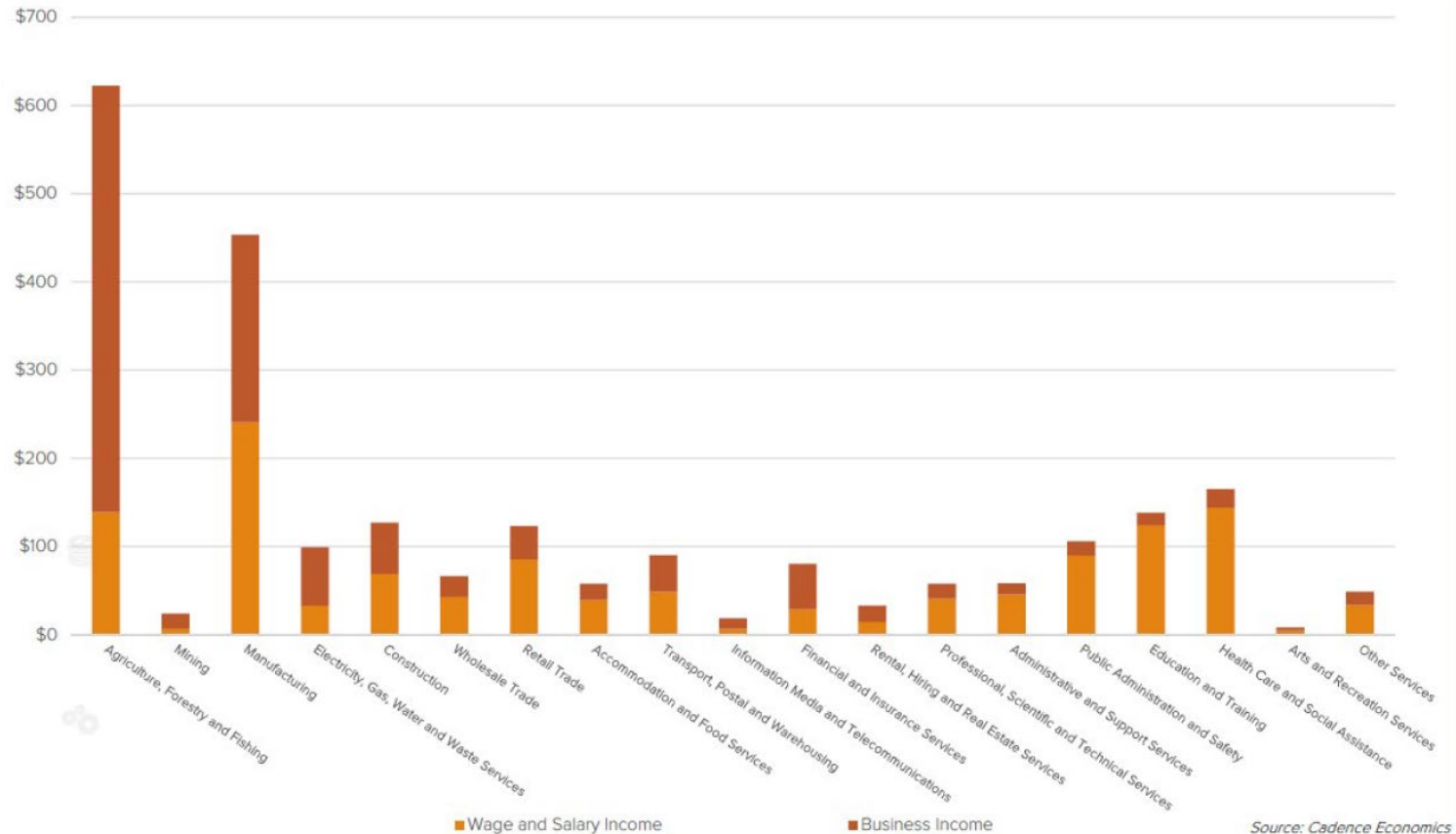


4.3 Key Contributions from Agriculture & Manufacturing to the Western Riverina Economy (source: Corview)

Regional output analysis reflects that agriculture and manufacturing contribute:

- more than a billion dollars of regional output
- agriculture, forestry and fishing (\$634 million)
- manufacturing (\$465 million)
- 42 per cent of the regional economy
- 75 per cent of exports
- above 60 per cent of business income.

### Western Riverina Output by Industry and Income, 2016



Since 2001, both the Agriculture and Manufacturing sectors have reflected significant increases in specialisation in the Western Riverina.

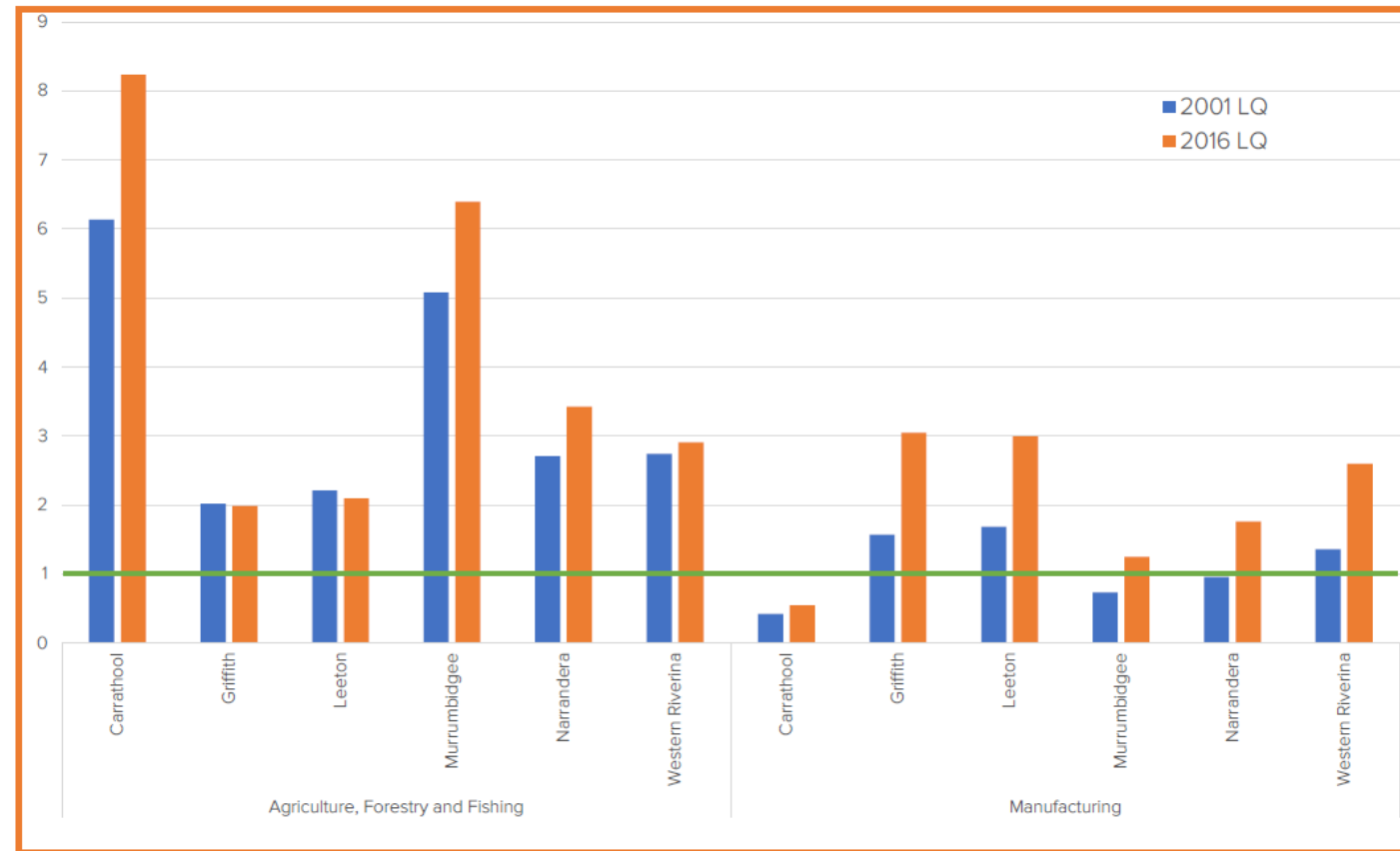
This is true both relative to other economies, and within the structure of the Western Riverina economy.

For example, the relative representation of manufacturing rose sharply over the 15 years to 2016, with the increased concentration focused in the central hubs of Leeton and Griffith, doubling over the period

By contrast, the outlying local government areas – Carrathool, Murrumbidgee and Narrandera – each became more specialised in Agriculture.

Taken together, these developments can be taken to suggest not only rising specialisation in both activities, but also increased supply chain integration with the region.

## Key 'Engines of Growth' Industries - Location Quotients 2001 - 2016



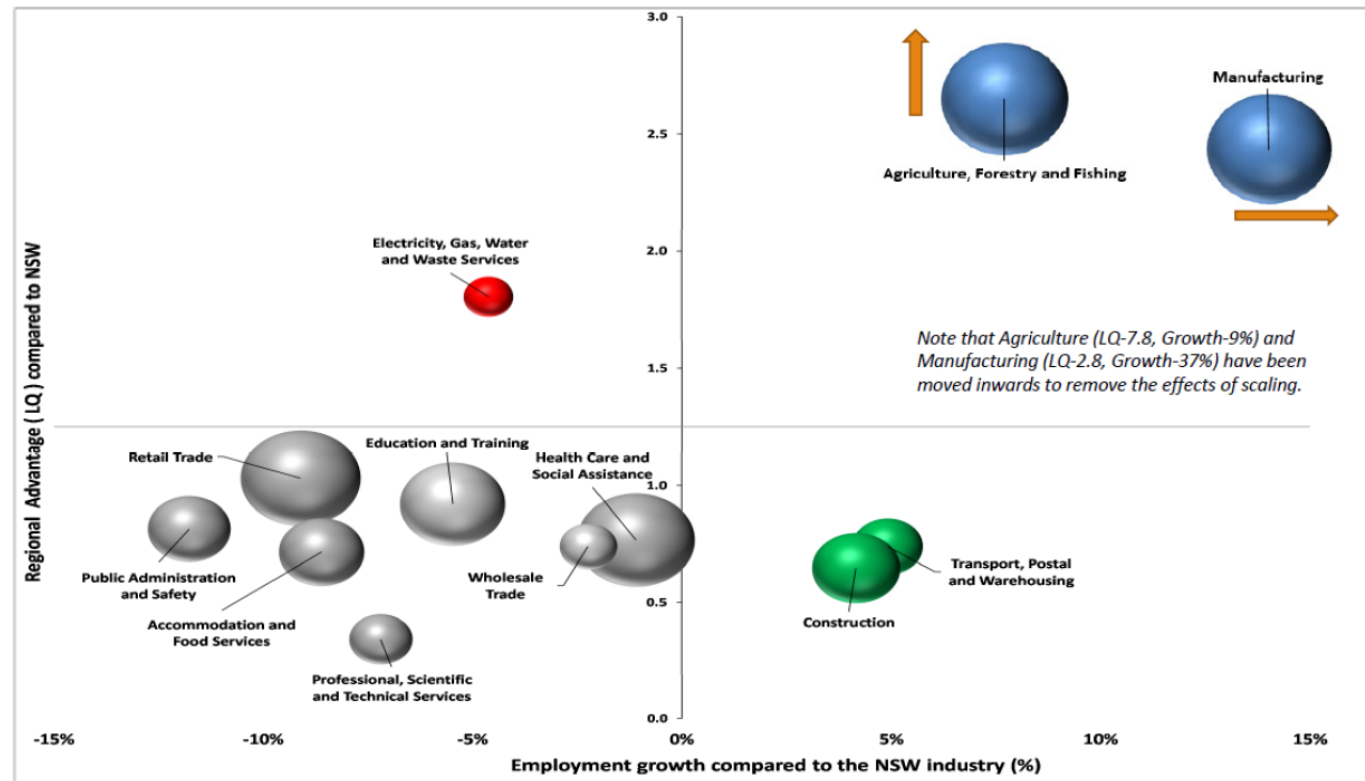
The Western Riverina's two distinguishing specialisations have dramatically outperformed their counterparts in other regions of NSW.

Both agriculture and manufactured goods are tradable commodities, usually subject to the pressures of international competition.

The combination of a high dollar due to the mining boom and a prolonged series of droughts made the trading period since 2000 challenging for both the agriculture and manufacturing sectors.

Despite these pressures, the Western Riverina's businesses dramatically outstripped their counterparts in regions elsewhere. The figure right is highly suggestive of the fact the rising specialisation in these sectors seen on the previous page is the source of outperformance in jobs created since 2011.

### Western Riverina: Economic Specialisations and Relative Jobs Growth



### 3.3 Key Regional Economic Development Strategies

The Western Riverina region has extensive tracts of arable land, superior access to water and irrigation systems and other sophisticated water infrastructure, scale and proficiency in agriculture/manufacturing operations, proximity to major metropolitan markets and extensive road and rail freight arterial infrastructure.

To make the most of these advantages, the *Western Riverina Regional Economic Development Strategy 2018-2022* concluded three strategies merited special priority:

1. **Develop and grow its Agricultural and Manufacturing 'Engines of Growth', emphasising better connections to external markets and enabling greater supply chain integration within the Region**
2. **invest in skills and the supply of key utilities critical to 'Engines of Growth' production processes, noting in particular energy network constraints**
3. **Grow the Western Riverina population and labour pool to support greater output, specialisation and productivity through increasing housing supply and enhancing services and liveability.**

### 3.4 Impact of Irrigation on Farm Productivity

The transformative effects of irrigation on farm productivity have long been understood, as reflected in the initial decision to establish the Murrumbidgee Irrigation Area in the early 1900s.

A number of more recent studies have documented the extent of increases in farm production supported by irrigation. One of the landmark studies is a 2006 joint study by the Productivity Commission and the Australian Bureau of Statistics, *Characteristics of Australia's Irrigated Farms*, which drew some significant headline conclusions:

1. irrigated agricultural activities accounted for only 0.5 per cent of all agricultural land, but made up about one-quarter of agricultural production
2. irrigated farms accounted for just above 30 per cent of all farms
3. on average, irrigated farms generated 55 per cent more output per farm than farms that were not irrigated, despite the average size of irrigated farms being smaller than the average size of non-irrigated farms.

## 4 Strategic Assessment of Land Use Changes Towards Solar Farming in the Murrumbidgee Irrigation Area

This section of the Report provides an assessment of the strategic implications of solar farm developments in the Western Riverina and Murrumbidgee Irrigation Area.

### 4.1 Solar Farm Development Applications in the Western Riverina

There are five solar farms either operating, approved or proposed across the Western Riverina.

In total, these farms would account for 517 hectares (0.3 per cent) of the 170,000 hectares of highly valuable irrigated land. Details of each solar farm proposal are outlined below.

Solar farm	LGA	Area (ha)	Power generation	Development status
Griffith	Griffith	125	36	Operating
Riverina	Griffith	110	40	Approved
Leeton	Leeton	37	25.77	Approved
Yoogali	Griffith	45	15	Proposed
Yanco	Leeton	200	60	Proposed
<b>Total Area</b>	517 hectares			

*6.1 Solar Farm Projects in the Western Riverina (source: Leeton Shire Council)*

### 4.2 Implications of Changes in Land Use from Agriculture to Solar Farms

The specific sources of local specialised strength (including arable land, entrepreneurialism, excellent networks for water distribution, and easy access to markets) mean that the Western Riverina's agriculture and manufacturing sectors are exceptionally productive and prosperous.

Shifts in land use away from these acknowledged areas of local specialisation and exceptional economic strength will in general run contrary to generally accepted economic development principles.

Of itself, strong specialisations should not preclude Council or other consent bodies from approving applications for alternative uses.

For example, an important general principle is that land-owners should generally have the opportunity to make best use of their assets to pursue advantages as they see fit. However, an important qualification to the rights of property holders is that the planning assessment system is specifically designed to take account of the broader social, economic and environmental implications of changes in land use.

Because so much of the social and economic fabric of the MIA and Western Riverina today is closely associated with its agricultural and manufacturing sectors, changes that could undermine those strengths and advantages deserve especially close attention.

## 4.3 Potential Impacts on Local Employment from Solar Farming Approvals

Proponent documentation supporting solar farm applications typically cite local job creation in the construction phase as a key argument for proceeding with a development. However, analysis of impacts typically requires far deeper analysis than is considered within the applications, with many material considerations overlooked.

One such limitation is that applications tend to focus on jobs impacts in the construction phase, paying little attention to how operating phase impacts might play out, or whether this displaces activity elsewhere in the economy.

### Construction Phase Local Job Impacts

In the construction phase, local impacts are relatively modest. This is because construction periods are relatively short, with the panels constructed elsewhere, and the installation and assembly relatively straightforward.

For example, proponent documentation supporting the Yanco Solar Farm suggests<sup>3</sup>:

- up to 120 employees for the 3- to 4-month peak of construction
- 60% of the construction jobs are likely to be sourced from the local area and will benefit the community of the Leeton LGA and surrounds. This is estimated to equate to \$1.0 million in wages (2018 dollars).

The proponent figures imply as many as 72 Leeton workers would yield about \$14,000 each for between 12 to 16 weeks work. However, this analysis appears to make no allowance for the fact that engineering and construction is a skills scarcity across the Western Riverina, and so these workers would be employed anyway, with solar construction impacting negatively on existing operational businesses, not just other projects in construction.

This means that the headline construction impacts of the project does not reflect actual gains for the Region. Other producers and workers in operating phase businesses across the Region will face lost production, hours and other negative impacts while they wait for the construction and engineering labour attracted away to become available again. These risks to production were specifically identified in the consultation processes undertaken supporting the Western Riverina Regional Economic Development Strategy.

By implication, the construction phase job impacts, cited by the proponent as a key reason to proceed with the project, cannot be accepted at face value as benefits.

### Operating Phase Local Job Impacts

Operating phase impacts from solar farming are markedly different to those for agriculture.

For example, section 4 reflected that agriculture and the manufacturing it supports employs large numbers of residents of the Western Riverina and is also a key source of employment diversity.

For example, existing land uses for agriculture include 1,530 people employed in sheep, cattle and grain farming, 750 people employed in fruit and tree nut growing and 215 people employed in poultry farming. Manufacturing in 'downstream' activity creates even more employment opportunities, which have seen significant expansion in the Western Riverina, contrary to broader trends of losses of manufacturing jobs.

<sup>3</sup> lb vogt (2019), *Yanco Solar Farm Response to Submissions*.



Land repurposed for solar farming is far less labour-intensive, accommodating very few workers during the operational phase. A reconnaissance of operational employment at solar farms across the State has revealed an average employment density of around 70 hectares per worker<sup>4</sup> as reflected in the table below.

The table below reflects the jobs yield in the operating phase. For example, the Yanco Solar Farm in Leeton Shire is expected to employ only three people once the farm is fully operational and will displace 'prime agricultural land'<sup>5</sup>.

Solar farm	LGA	Area (ha)	Operational jobs	Employment density (hectares per worker)
Colleambally Solar Farm	Murrumbidgee	570	7	81
Gunnedah Solar Farm	Gunnedah	304	8	38
Yanco Solar Farm	Leeton	204	3	68
West Wyalong Solar Farm	Bland	560	3	187
Narrabri South Solar Farm	Narrabri	190	5	38
<b>Average employment density</b>		1,828	26	<b>70</b>

6.2 Employment and Employment Densities from Solar Farm Proposals

These figures underline solar farming is a relatively capital-intensive activity in its operating phase.

When comparing current employment that agriculture supports to solar operating impacts, redevelopment of agricultural land for solar farming purposes in the Western Riverina has the potential to have significant disruptive effects on the pattern of local employment. This also carries consequences for the broader local economy and community.

While the impact of smaller solar farming proposals on local employment may be modest, the cumulative impacts of multiple projects replacing jobs-intensive activities with capital intensive activities could have serious implications for the Region.

**In summary, average figures suggest ongoing operating phase jobs from agriculture could be around 10 times the levels for solar farms.** This scale of difference in ongoing jobs supported in solar versus agriculture figures suggests consent authorities should pay more attention to the risks of negative impacts in the operating phase than the upfront impacts in construction.

These figures are based on average impacts that may not fairly represent every proposal. For example:

- water reforms made in the early 2000s also mean that the separation of land title and water rights can see the scarcest resource, the water itself, redeployed to other irrigated farmland where it may be just as employment-intensive and productive, meaning no net impact on the local economy overall
- it could be the case that farm workers will easily find alternative employment nearby, or the existing owner may even re-deploy them to another site of farming operations close nearby. That is, the amount of agriculture jobs displaced from the Region could be zero, with the social costs of economic adjustment relatively low, even if large numbers of jobs are displaced from a particular site is high.

<sup>4</sup> Derived using ABS Place of Work data by destination zone.

<sup>5</sup> Yanco Solar Farm Preliminary Environmental Assessment, NGH Environmental (July 2018).

These factors could see limited direct impacts on the local economy and community from land use change in favour towards solar farming.

The comparison of jobs from solar farming against agriculture above is also conservative, in the sense it only accounts for direct employment effects, and does not include how much 'downstream' economic activity and employment could be disrupted and lost from the local economy due to:

- reduced inputs for food or beverage manufacturing
- reduced demand for local logistics or other enabling support services
- reduced local expenditure and employment because workers' incomes and producers' profits leave the Region.

A particular risk arises where the owners of the capital invested in solar farming live outside the Region, as this means:

- the investors have no particular connection to the Region, and likely as not will seek to re-invest their profits on the solar farm elsewhere
- the people who would otherwise work in agriculture in the Region may move on elsewhere, with both their direct and indirect social and economic contributions lost.

Overall, it can be said that:

- disrupting and displacing agricultural activities that offer the Western Riverina a key source of its economic and social strength with solar farming poses some key economic and social risks, especially on a cumulative basis
- these risks represent a considerable source of uncertainty for consent authorities in considering applications for development.

Where these risks and uncertainties eventuate as negative impacts on jobs, the impacts are a 'negative externality' from a local perspective. In other words, there can be significant localised costs that undermine any strategic or economic benefits that the development would achieve for parties external to the Region or the individual land holder seeking to re-develop the land.

Each consent authority will need to form their own views about the balance of beneficial strategic outcomes against risks posed to the local jobs, economy and community. In considering their options, consent authorities should also take into account some of the significant uncertainties associated with solar farm development proposals, compared to the relative certainty of ongoing agricultural uses.

In light of the significant uncertainties and existing land use being consistent with the established strengths of the Region, consent authorities may conclude it is appropriate to invoke a 'precautionary principle' in considering applications for solar farming.

The precautionary principle is an approach to risk management that states that if an action or policy poses a risk of harm, the onus or burden of proof shifts onto the proponent to show the development will not be harmful.

The Land and Environment Court of NSW has held that decision-makers who are required to have regard to the public interest in development decision-making are obliged to have regard to the principles of ecologically sustainable development, including the precautionary principle, where issues relevant to those principles

arise<sup>6</sup>. While the precautionary principle is usually invoked in relation to environmental risks, the same conceptual framework can be applied to the social and economic dimensions of a decision.

The Chief Justice of the New South Wales Land & Environment Court, the Honourable Justice Brian John Preston SC, has described the precautionary principle and its application as consisting of three elements<sup>7</sup>:

1. a threat of serious or irreversible damage
2. the lack of (scientific) certainty about outcomes from development
3. a shift of the burden of proof onto the party seeking change.

In the case of solar farm development, the threat or risk of significant social and economic damage is clear, with considerable uncertainties evident in the impacts that might eventuate.

This would suggest that consent authorities considering would be right to consider asking proponents of development to meet the burden of proof that no local economic or social harm will result from the proposal.

## 4.4 Other Considerations

The uncertainties associated with solar farming applications do not begin or end with impacts on local employment. For example, in some cases, even where solar farming is approved, the relatively modest gains such development might bring will not always eventuate are projected.

In particular, review of some approvals across the State suggest that projects receiving planning consent may still face significant obstacles in obtaining the financial backing required to see solar farms go ahead.

This means in the worse possible case, Council could approve a solar farm development, sterilising a present agricultural use and impacting on the community, without offsetting benefits for jobs and the environment from solar operations.

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<sup>6</sup> For example, see *BGP Properties v Lake Macquarie City Council* [2004] NSWLEC 399; (2004) 138 LGERA 237, 262 [113]; *Telstra Corp Ltd v Hornsby Shire Council* [2006] NSWLEC 133; (2006) 67 NSWLR 256, 268 [124]; *Minister for Planning v Walker* [2008] NSWCA 224; (2008) 161 LGERA 423, 451 [42]–[43]

<sup>7</sup> Preston CJ (2017), 'The Judicial Development of the Precautionary Principle', Presentation to the Queensland Government.

## What conditions would suggest changing land use from agriculture to solar will deliver more local benefits than costs?

For the local community and economy, the risk and uncertainties of reduced ongoing job opportunities and reduced local expenditure represents a potentially significant “negative externality” of solar farm development compared to agricultural uses. Average figures suggest ongoing operating phase jobs from agriculture could be around 10 times the levels for solar farms.

In light of this uncertainty, consent authorities should consider a ‘precautionary principle’ that means the onus should shift to the applicant to show that either:

- negative local externalities are either not as large as is typically the case, and / or
- broader social benefits more than offset the local social and economic costs.

Circumstances where local negative externalities are likely to be limited include:

- agricultural uses have already been abandoned for some extended period of time
- agricultural activities, all current staff and water extraction rights will transfer to a superior agricultural site elsewhere in the Region that will increase jobs and output
- the land is not irrigated
- soil quality or other site specific factors mean agricultural value is limited
- evidence that solar profits are highly likely to be reinvested locally.

Figure 6.3 Considerations limiting local impacts on jobs and the economy (source: Corview)

## 4.5 Summary Assessment

### General Issues with Land Use Change from Agricultural to Solar Farming Uses

The Western Riverina’s agriculture and manufacturing sectors are exceptionally productive and prosperous. Shifts in land use away from these acknowledged areas of local specialisation and exceptional economic strength will in general run contrary to generally accepted economic development principles.

Proponent documentation supporting solar farm applications typically cite local job creation in the construction phase as a key argument for proceeding with a development. However, analysis of impacts typically requires far deeper analysis than is considered within the applications, with many material considerations overlooked.

One such limitation is that applications tend to focus on jobs impacts in the construction phase, paying little attention to how operating phase impacts might play out compared to existing agricultural uses, or whether solar construction activities displace jobs and production elsewhere in the economy.

Compared to agriculture, solar farming is far less labour-intensive, accommodating very few workers during the operational phase. In summary, average figures suggest ongoing operating phase jobs from agriculture could be around 10 times the levels for solar farms.

This scale of difference in ongoing jobs in solar versus agriculture figures suggests consent authorities should pay more attention to the risks of negative impacts in the operating phase, than the upfront impacts in construction.

Overall, it can be said that:

- disrupting and displacing agricultural activities that offer the Western Riverina a key source of its economic and social strength with solar farming poses some key economic and social risks, especially on a cumulative basis

- these risks represent a considerable source of uncertainty for consent authorities in considering applications for development.

These uncertainties and risks suggest applying a 'precautionary principle' for local social and economic impacts, as is more commonly done for environmental risks. This would not prohibit solar farming applications outright. Rather, it would place a burden of proof on proponents that no local economic or social harm will result from the proposal.

Factors that would tend to support limited likelihood of local economic or social harm would include:

- agricultural uses have already been abandoned for some extended period of time
- agricultural activities, all current staff and water extraction rights will transfer to a superior agricultural site elsewhere in the Region that will increase jobs and output
- the land is not irrigated
- soil quality or other site specific factors mean agricultural value is limited
- evidence that solar profits are highly likely to be reinvested locally.

#### **Specific issues with the economic assessment of the Yanco Solar Farm proposal**

Corview recommends applying the 'precautionary principle' to all solar farm developments on prime agricultural land, including that for Yanco Solar Farm.

Corview has identified a number of significant limitations in the economic analysis undertaken to support the Yanco Solar Farm proposal:

- 1. the recent proponent response to comments specifically cites that it makes no representation that the economic analysis suggests the project enhances the welfare of NSW (or the Western Riverina). On this basis, the proposal should not be supported, in light of:**
  - a. no evidence to suggest a net advantage for state or regional social welfare
  - b. significant uncertainties posed to the prevailing economic and social strengths and endowments of the region
  - c. directions contrary to the express strategies of the Western Riverina Regional Economic Development Strategy.
2. the economic impact assessment is largely written from the perspective of the impact of regional economy on the project; it should instead address the project's impact on the regional economy
3. limited attention is paid to the amount of employment displaced in either the construction or operating phases, nor how the estimates of displacement were derived
4. specific considerations for assessing displacement in the construction phase should include:
  - a. engineering and construction is a skills scarcity across the Western Riverina, with solar construction impacting negatively on existing operational businesses, not just other projects

- b. headline construction impacts should be adjusted to account for these “displacement effects” – including the impacts on other producers and workers in operating phase businesses, who face lost production and hours until labour is available again.
5. the basis of estimating lost agricultural output is unclear, but provide the following headline figures:
  - a. annual fruit production tonnage of 3,500 tonnes – this yield looks low for 205 hectares
  - b. average annual value of production of \$850,000
  - c. which implies a yield of around **\$243 per tonne**
  - d. however, recent market prices for Australian oranges is around **\$800 / tonne.**
6. no consideration is made of whether another operator of the farm for agricultural purposes would extract higher yields – this appears inconsistent with evaluating the land at its ‘highest and best’ use
7. output estimates should also consider whether current output is constrained by the availability of water extraction licences held by the current operator. An alternative operator may finance acquisitions of water licences, and therefore increase production
8. for the operating phase, agricultural job impacts and supply chain impacts deserve considerably more attention. For example:
  - a. the basis of jobs estimates should be clarified and justified
  - b. expenditure in the supply chain should be estimated and accounted for
  - c. linkages to subsequent production activities – such as beverage manufacturing – should be accounted for, including the loss of production
  - d. flow on consequences, including the support for jobs and production in the broader economy from agricultural and manufacturing production, have not been considered in the same way that flow on consequences for solar production has.
9. Distributional analysis has not been undertaken, making it impossible for consent authorities and interested members of the community to consider how the balance of benefits and costs are distributed between the local community and interests beyond the Western Riverina.

Corview is of the opinion that the present evidence and analysis tabled by the proponent of the Yanco Solar Farm proposal is insufficient to support a conclusion that no local economic or social harm will result from the proposal.