ESSENTIAL ECONOMICS

Avonlie Solar Farm Project

Economic Impact Assessment

FINAL

Prepared for

RES Australia

by

Essential Economics Pty Ltd

April 2018

Authorship

Report stage	Author	Date	Review	Date
Draft report	John Noronha Will Keating	30 January 2018	John Noronha	30 January 2018
Final report	John Noronha	12 April 2018		

Disclaimer

Contact details

For further details please contact Essential Economics Pty Ltd at one of our offices:

96 Pelham Street
Carlton
Victoria 3053
Australia
PH +61 3 9347 5255
FAX +61 3 9347 5355

Level 26 / 44 Market Street
Sydney
New South Wales 2000
Australia
PH +61 2 9089 8654

EMAIL mail@essentialeconomics.com
WEB www.essentialeconomics.com

ABN 92 079 850 427

Our Reference: 17281

Contents

EXECUTIVE SUMMARY

RES Australia Pty Ltd (RES) have commissioned Essential Economics Pty Ltd to prepare an Economic Impact Assessment for the proposed 200 Mega Watt (MW) Avonlie Solar Farm development to be located 20kms south of Narrandera, in the Riverina region of New South Wales.

The solar farm will be located across a 550ha property and, subject to planning approval and financing, the facility is expected to be operational by mid-2020.

The main findings of this study are summarised as follows.

Regional Economic Context

1 The Study Area, which comprises the Local Government Areas of Narrandera Shire, Leeton Shire, Wagga Wagga City and Griffith City; has a resident population of approximately 108,000 persons (2016), which is expected to reach approximately 120,000 persons by 2036 representing a modest annual growth rate of 0.6% over the period. Importantly, significant population decline is forecast for Narrandera Shire (-1,180 persons) over the 2016-36 period; therefore, major projects which stimulate new investment and jobs should be encouraged in terms of supporting the regional economy.

2 The Study Area currently has an unemployment rate of 4.7%, which is slightly below the NSW unemployment rate of 4.9% (September 2017). However, the unemployment rate in Narrandera Shire (6.6%) is well above the State average and the Study Area currently includes 2,710 persons who are unemployed. In this regard construction of the Avonlie Solar Farm project provides new short-term employment opportunities for the region's labour force participants, with a small amount of ongoing employment also supported once the facility is operational.

3 The Study Area's occupational and business structures indicate a good base exists to service the needs of the solar farm project, including approximately 16,750 construction-related workers (based on occupation) and approximately 2,000 construction and transport businesses.

4 The townships of Narrandera and Leeton, given their relatively close proximity to the subject site, will service project needs such as commercial accommodation (245 rooms and 4 caravan parks), trade supplies and transport services, machinery hire and repairs, retail services etc. However, the major regional city of Wagga Wagga (approximately an hour's drive from the subject site) will underpin major project needs such as providing metropolitan and interstate worker access via Wagga Wagga Regional Airport, as well as servicing major civil construction, engineering, machinery/equipment requirements, and providing higher-order medical and emergency services. Griffith is also likely to provide a supporting role in delivering some high-order project requirements.

Economic Impact Assessment

5 The Avonlie Solar Farm project will involve approximately $250 million in investment during the construction phase and will support 200 direct and 320 indirect positions over the construction period. Once operational, 4 direct and 12 indirect jobs will be supported by the facility.

6 Allowing for the project to be carefully managed around the region's peak times for harvesting activity and the scheduling of other major infrastructure projects in the region, accessing adequate labour supply should not present an issue for the project, noting the peak local employment requirement for the project (140 jobs) represents less than 1% of workers occupied in construction-related activities in the Study Area (16,750 workers).

7 Concurrent infrastructure projects in the Study Area and broader region – including the Deniliquin Ethanol Plant, Sandigo, Currawarra and Tarleigh solar farms, and a number of regional roads projects – are unlikely to impact on labour and resources required to support the solar farm project, for the following reasons :

- Different construction time frames/ staging associated with competing projects
- The Currawarra and Tarleigh solar farm projects are also being developed by RES; therefore, these projects will be sequenced to ensure they do not impact on resourcing for the construction of the Avonlie facility.
- The large construction-base available in the Study Region (ie 16,760 construction-related workers and 2,000 construction-related businesses) which can support a pipeline of infrastructure projects.

8 The timing of the proposed Avonlie Solar Farm development may overlap with the final stages of construction of the nearby Sandigo Solar Farm. However, given the significant level of resources and labour available in the broader region (especially Wagga Wagga), low occupancy rates observed for local commercial accommodation facilities and relatively high levels of local unemployment, no major cumulative impacts are anticipated. Indeed, construction of the two projects may be sequential, providing for an extended period of economic benefit for the local economy.

9 The project will provide significant participation opportunities for businesses and workers located in the Study Area, having regard for the good match of skills and resources available. In this regard, the proponent and organisations such as the Industry Capability Network might be involved in ensuring maximum local inputs are secured.

10 The 'external' project labour requirement would be expected to generate an accommodation need for 60 project workers at the peak of the project. This represents only 4% of total commercial accommodation rooms in the Study Area and would provide a boost to local accommodation operators, noting that room occupancy rates of only 50% were recorded during 2015/16 for establishments located in Narrandera and Leeton shires.

11 Construction workers would be expected to inject approximately $2.7 million in additional spending into the regional economy over the construction phase, supporting around 13.5 jobs in the service sector in Narrandera and the broader Study Area.

12 Approximately 550ha of productive agricultural land (cropping) will be lost to accommodate the solar farm. However, this represents less than 0.1% of all productive cropping land supply in the NSW Murray Region. Importantly, the host landowners will improve their annual income, as operator payments will be greater than average farm income from the land and the land can be returned to cropping at the end of the solar farms lifecycle.

13 Ongoing economic stimulus associated with new local wage spending and returns to host landowners is estimated at $28.0 million over 25 years (adjusted for CPI @ 2.5% pa).

14 Council rates revenue associated with the solar farm will be subject to negotiations between Narrandera Shire Council and the proponent; however, financial benefits to Council are likely to be significant over the 25-year project lifecycle.

15 The proposed Community Fund would contribute a one off payment of $250,000 at the start of the construction of the project; this can be directed to new community infrastructures and programs.

16 The project has the capacity to supply sufficient clean energy to power approximately 80,000 homes and, in the process, to reduce C02 emissions by 158,000 tonnes per year.

17 Once operational, the Avonlie Solar Farm could potentially support small-scale tourism and educational opportunities in the future.

INTRODUCTION

Background

RES Australia Pty Ltd (RES) have commissioned Essential Economics Pty Ltd to prepare an Economic Impact Assessment for the proposed Avonlie Solar Farm development to be located 20km south of Narrandera, New South Wales.

The proposed development will be situated on a 550ha site which involves two landholdings. The solar farm will have a capacity of 200 MW powered by up to 670,000 photovoltaics panels. Subject to planning approval and financing, construction of the Avonlie Solar Farm is anticipated to start in 2019 with the facility fully operational by mid-2020.

Objectives

The objectives of this project are:

- To highlight likely local and regional economic benefits arising from the project.
- To identify potential impacts associated with the project.

This Report

This report contains the following chapters:

Chapter 1: **Project Context**
Presents a description of site location, project components, policy context and definition of Study Area.

Chapter 2: **Regional Economic Profile**
Presents an overview of population, labour force, occupational structure, business structure and township services, including an audit of available commercial accommodation in the Study Area.

Chapter 3: **Economic Impact Assessment of Proposed Project**
Presents an assessment of the economic impacts of the proposed development including investment, employment, business participation, local wage stimulus, impact on accommodation, impact on agricultural activities, local economic stimulus, financial returns to Council and the community and environmental benefits.

1 PROJECT CONTEXT

1.1 Site Location

The proposed Avonlie Solar Farm will be developed on a site in located approximately 20km south of the township of Narrandera, in the Riverina region of NSW.

The subject site is well connected to a number of major regional centres including:

- Wagga Wagga – approximately an hour's drive to the south-east,
- Griffith – approximately a 90 minute drive to the north
- Deniliquin – approximately a two hour drive to the south-west.

These regional centres, to differing extents, are likely to play important roles in supporting the requirements of the project.

The subject site, which comprises two landholdings, is approximately 550ha in size and is currently used for farming purposes (cropping and grazing) under the Farming Zone (FZ). It is estimated the majority of the site will be utilised for solar farm infrastructure.

The solar farm site is located in the Narrandera Shire Council. The Avonlie Solar Farm is classed as a State Significant project and will require approval by the NSW Department of Planning and Environment.

1.2 Project Description

The project will consist of a Solar Photovoltaics (PV) facility of up to 200MW AC arranged as either a series of fixed or tracker arrays.

The arrays consist of approximately 667,000 1mx2mx0.05m PV panels mounted on steel or aluminum racking. The PV modules for a tracker array are arranged north to south, with the panels tilting around a centre rail to follow the sun's trajectory throughout the day.

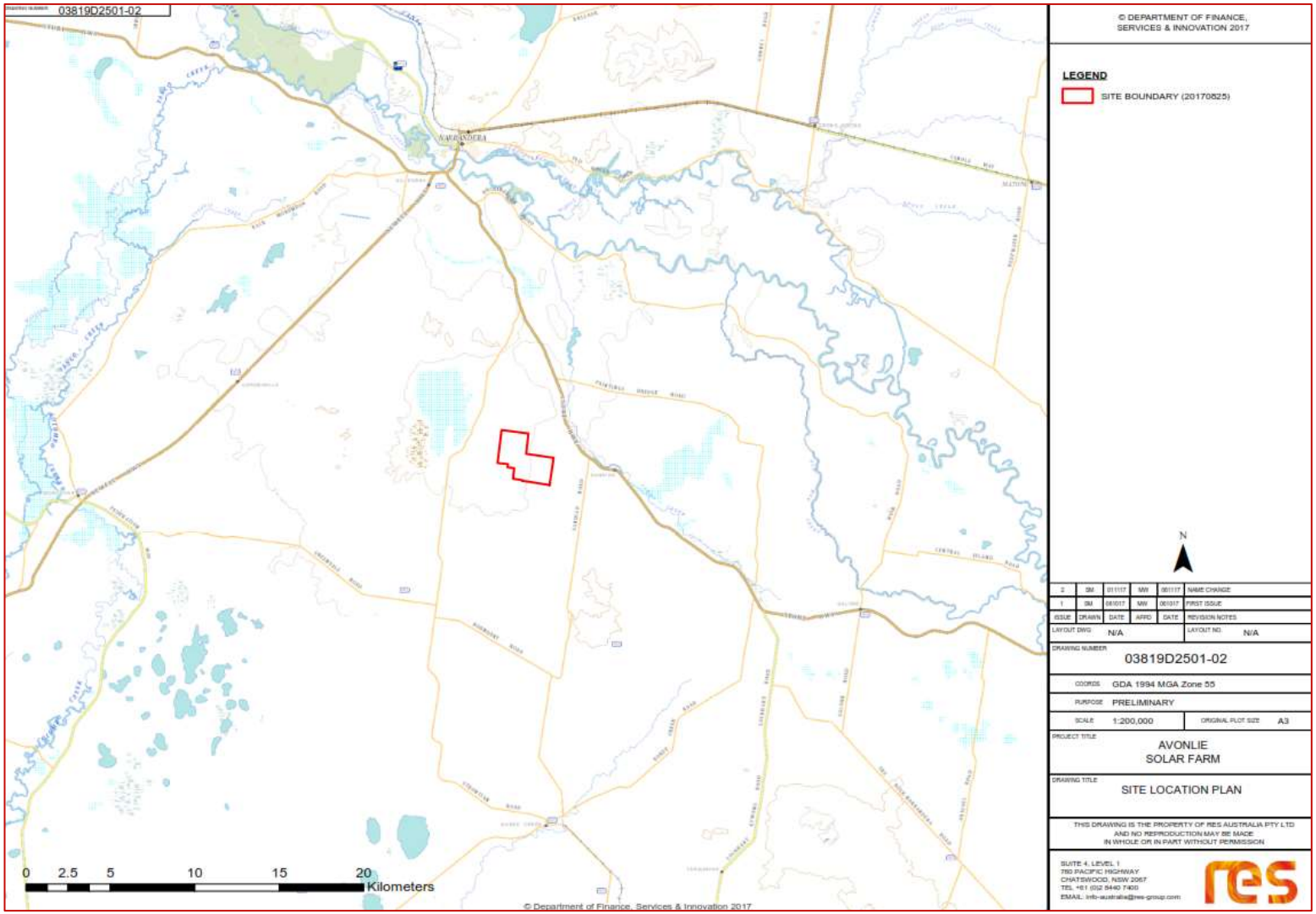
A number of 4m wide graded tracks across the site will allow all-weather access for construction and operational maintenance. An operations and maintenance building with associated carparking will be constructed to service the solar farm.

The solar farm will be connected to the National Grid through an on-site connection into an existing 132kV TransGrid overhead line.

RES are looking to continue grazing on the site, under the solar structure.

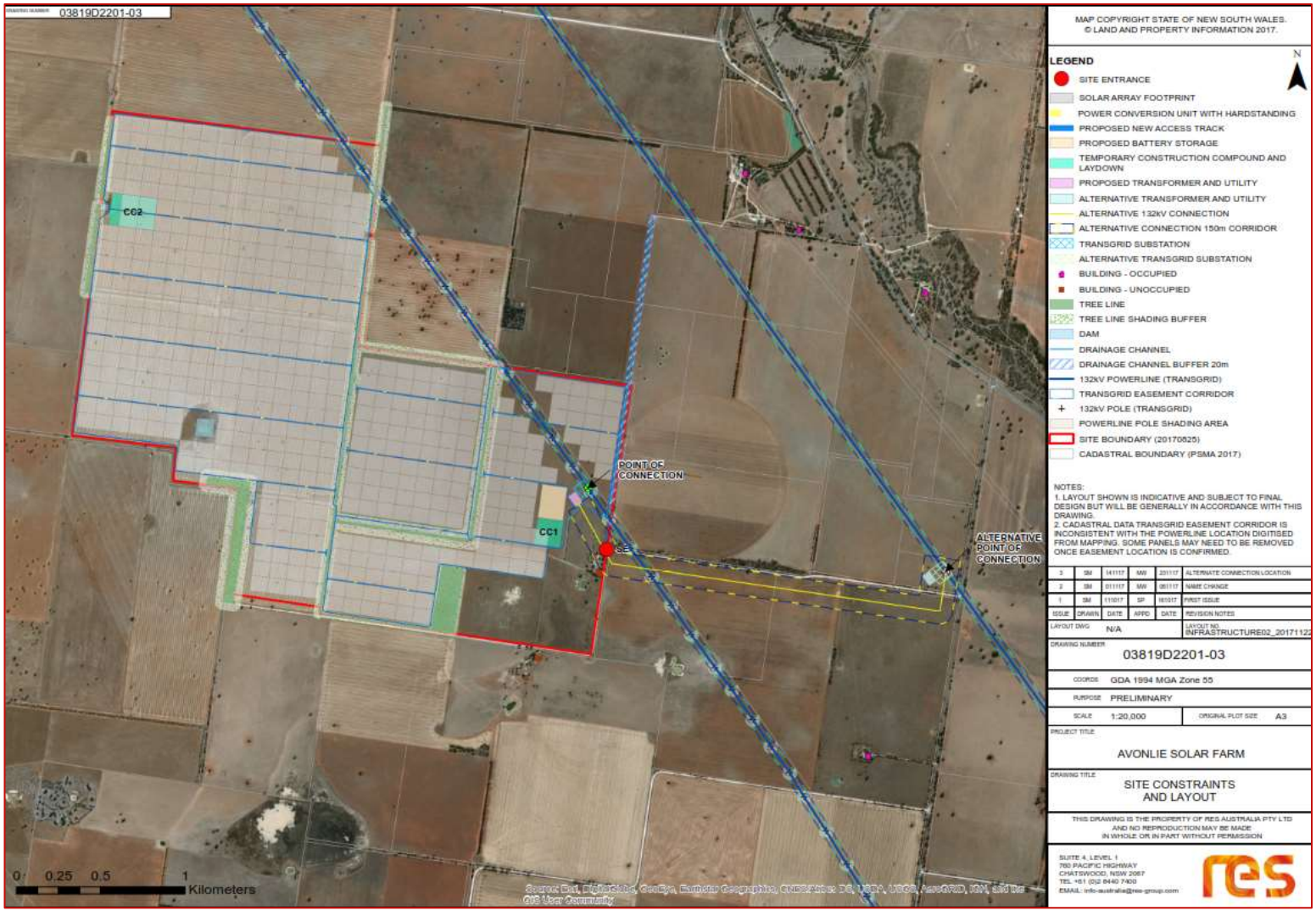
The Avonlie Solar Facility location is outlined in Figure 1.1 and the preliminary site layout is shown in Figure 1.2.

Figure 1.1: Avonlie Solar Farm – Site Location



Source: RES Australia

Figure 1.2: Avonlie Solar Farm – Preliminary Site Layout



Source: RES Australia

1.3 Policy Context

International agreements and Federal and State policy settings are important factors in influencing demand and investment in the renewable energy sector, as noted below.

Paris Climate Accord

The Paris Accord is a comprehensive international climate agreement to which Australia is a party. The Accord provides a framework for participating nations to set themselves nationally-determined contributions (NDCs), beginning in 2020 with review at five-year intervals. The agreement sets out a global consensus to limit temperature increases to below two degrees Celsius when compared to pre-industrial levels; an additional goal is to maintain this increase at less than one and a half degrees Celsius. NDCs do not have any set lower limit but are required to progress over time (beginning with the intended NDC pledged during the Paris conference), and to be 'ambitious'. Australia's current targets are a reduction of emissions by five percent from 2000 levels by 2020, and by 26-28 percent below 2005 levels by 2030.

Federal Renewable Energy Target

The Renewable Energy Target (RET) is an Australian Government scheme designed to reduce emissions of greenhouse gases in the electricity sector and encourage the additional generation of electricity from sustainable and renewable sources.

The RET works by allowing both large-scale power stations and the owners of small-scale systems to create certificates for every megawatt hour of power they generate. Certificates are then purchased by electricity retailers who sell the electricity to householders and businesses. These electricity retailers also have legal obligations under the RET to surrender certificates to the Clean Energy Regulator, in percentages set by regulation each year. This creates a market which provides financial incentives to both large-scale renewable energy power stations and the owners of small-scale renewable energy systems.

In June 2015, the Australian Parliament passed the Renewable Energy (Electricity) Amendment Bill 2015. As part of the amendment bill, the large-scale RET was reduced from 41,000 GWh to 33,000 GWh in 2020, with interim and post-2020 targets adjusted accordingly.

Finkel Report

The Independent Review into the Future Security of the National Electricity Market, released in June 2017, is a report commissioned by the Federal Government in order to establish a framework for the development the Australian energy sector. Also known as the Finkel Report, it recommends the use of a Clean Energy Target (CET) scheme to stimulate renewable energy production throughout the National Electricity Market (NEM). This would likely replace the present Federal RET scheme due to expire in 2020, and would result in a more technology-neutral allocation of renewable energy generation certificates; any generator producing energy at a level of pollution below a benchmark rate would be eligible as opposed to only specific technologies as with the RET scheme. The report modelled outcomes utilising this type of scheme to achieve the trajectory committed to by the federal government by 2030 and determined that renewable energy would constitute approximately 42 percent of the NEM at

this time. Other policies including an Emissions Intensity Scheme and lifetime limits on coal-powered generation were considered, with the report deeming CET the most effective based on their model.

The Federal Government recently signalled its response to the Finkel Report, which does not include a CET. The Federal Government's proposal is based on a National Energy Guarantee scheme, involving the following main components:

- No subsidies for renewable or any other kind of energy generators
- Power companies will be forced to guarantee on-demand electricity from coal, gas, hydro or batteries that store renewable energy
- Power companies will also be forced to keep carbon dioxide emissions below a certain level, through the purchase of low emissions generated energy.

Implementation of the proposed National Energy Guarantee scheme will likely require Federal parliamentary legislation and will need the agreement of States and Territories.

New South Wales

The NSW Renewable Energy Action Plan (2013) provides a framework to enable the State to meet the RET target, through a range of 24 actions associated with:

- Attracting investment and projects
- Building community support
- Attracting and growing expertise in renewable energy technology.

While the NSW Government does not mandate a specific renewable energy target for the State (unlike Victoria which recently set a 40% renewable energy target for the State by 2025), it does have an aspirational target of zero emissions by 2050.

The NSW Renewable Energy Action Plan Annual Report monitors implementation of the Plan and reports on progress to meeting the 2020 RET target. The 2016 Annual Report notes that 17 of the 24 actions have been implemented, with the further seven substantially progressed and notes the percentage of renewable energy in the state's electricity mix has more than doubled over the past six years, underpinned by large scale solar projects.

1.4 Study Area

The principal Study Area for the project has been defined as the Local Government Areas (LGAs) of:

- Narrandera Shire Council
- Leeton Shire Council
- Wagga Wagga City Council
- Griffith City Council

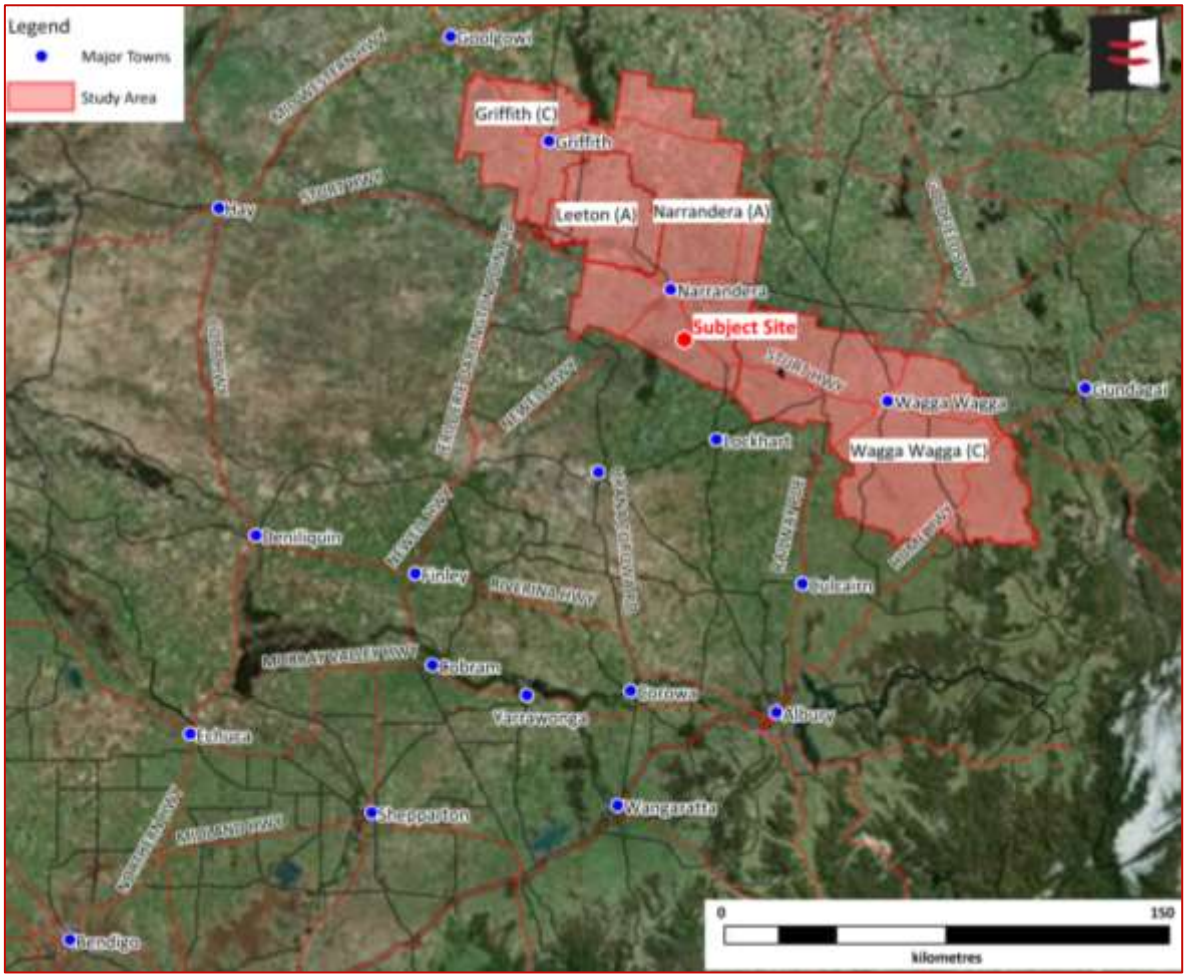
The main townships in these LGAs are generally located within an hour's drive of the subject site.

These LGAs, to differing extents, all have the potential to contribute to the project and derive economic benefits from both the construction and ongoing phases of the project.

It is recognised that smaller settlements in LGAs such as Urana and Lockhart may also benefit from the project, as well as regional centres further afield such as Deniliquin which is a 2 hour drive from the subject site.

This Study Area is illustrated in Figure 1.3.

Figure 1.3: Avonlie Solar Farm – Study Area



Source: Essential Economics

1.5 Summary

1 RES Australia is proposing the construction of the 200 MW Avonlie Solar Farm approximately 20km south of Narrandera and 80km north-west of Wagga Wagga, NSW.

2 The solar farm facility will be located across two properties comprising 550ha in size.

3 Subject to planning approval by the NSW Department of Planning and Environment, it is anticipated construction of the solar farm could start in 2019, and the facility may be operational by mid-2020.

4 The Australian Government's reformed Renewable Energy Target (RET) was legislated in in June 2015 and this has provided greater investment certainty within the sector in the short-term (ie 2020), including for investments in solar power developments such as the Avonlie project. The NSW Government supports the federal RET target and the NSW Renewable Energy Action Plan provides a framework to stimulate investment in the sector. The Federal Government's legislation in response to the Finkel Report findings will determine longer-term policy for the renewable sector.

5 This economic impact study will provide an understanding of potential economic benefits arising for the local and regional economies and communities through the construction and operational stages of the Avonlie Solar Farm project.

2 REGIONAL ECONOMIC PROFILE

2.1 Population

The population of the Study Area totalled approximately 107,910 persons as of June 2016 (ABS Estimated Resident Population).

Over the period 2016-2036 population growth in the Study Area is expected to be very modest at just +0.6% pa (or +12,6900 persons over 20 years) compared to the NSW growth rate of 1.3% pa over the 20-year period. These estimates, which are shown in Table 2.1, are based on official population forecasts prepared by the NSW Government.

Population growth in the Study Area is underpinned by the Wagga Wagga City Council whose population is forecast to increase by +13,860 persons over the 20-year period, offsetting population losses in the Study Area's other three LGAs. Of particular note is the projected population contraction in the Narrandera Shire Council area of -1,180 persons over the period, representing a decline in population of -1.1% pa over 20 years. Population growth is also projected to be virtually static between 2016 and 2036 in the municipalities immediately north on Narrandera Shire ie Leeton Shire (+0.1% pa) and Griffith City (-0.1% pa).

These population projections for Narrandera, Leeton and Griffith LGAs highlight economic trends experienced in many rural areas over recent years, especially those with a high reliance on the agricultural sector and which have been negatively impacted variously by drought, an uncompetitive exchange rate, and an ageing labour force.

In this context the proposed Avonlie Solar Farm will provide an alternative drought- proofed, guaranteed income to the host farms for 25 to 30 years; while the construction and operational phases of the project will provide an economic stimulus (jobs, project contracts, new spending etc) to the regional economy, including small towns and rural settlements.

Table 2.1: Population – Study Area, 2016-2036

Municipality	2016[1]	2036[2]	Change 2016-36	AAGR 2016-36
Narrandera Shire Council	5,980	4,800	-1,180	-1.1%
Leeton Shire Council	11,420	11,700	+280	+0.1%
Wagga Wagga City Council	64,090	77,950	+13,860	+1.0%
Griffith City Council	26,420	26,150	-270	-0.1%
Study Area	**107,910**	**120,600**	**+12,690**	**+0.6%**
New South Wales	**7,739,270**	**9,925,550**	**+2,186,280**	**+1.3%**

Source: [1] ABS, 3218.0 Regional Population Growth, Australia; [2] 2016 New South Wales State and Local Government Area Population Projections (Main Series), NSW Department of Planning & Environment

Notes: AAGR = Annual Average Growth Rate
Figures rounded

2.2 Labour Force

As of September 2017 (latest available) the Study Area had an unemployment rate of 4.7% which is slightly below the NSW unemployment rate of 4.9%.

However, the unemployment rate in Narrandera Shire, in which the project is to be located, is relatively high (6.6%) in the context of the Study Area overall and with respect to state averages.

As Table 2.2 shows, in September 2017 the Study Area's labour force totalled 54,570 persons, including 2,710 persons who were unemployed.

The Avonlie Solar Farm project is likely to require 200 workers (at peak), with some of these workers being sourced from outside the Study Area (eg management, specialists). In the context of the relatively large labour market and the number of job seekers currently unemployed, the Avonlie Solar Farm project is unlikely to cause labour supply issues, rather provide new short-term opportunities for labour force participants (including existing unemployed persons – subject to appropriate skills match).

It is recognised; however, that part of the Study Area is underpinned by the agricultural sector and that significant labour resources are required on a seasonal basis for harvesting and related activities. Additionally, a number of major infrastructure projects will potentially be developed at the same time as the construction of the Avonlie Solar Farm and implications will also need to be considered in terms of regional labour supply.

These labour supply factors are further explored in Chapter 3.

Table 2.2: Labour Force – Study Area, September 2017

Municipality / Area	Employed	Unemployed	Total Labour Force	Unemployment Rate
Narrandera Shire Council	2,690	190	2,880	6.6%
Leeton Shire Council	5,460	290	5,750	5.0%
Wagga Wagga City Council	32,860	1,650	34,500	4.8%
Griffith City Council	13,560	580	14,140	4.1%
Study Area	**54,570**	**2,710**	**57,270**	**4.7%**
New South Wales	**3,834,000**	**199,000**	**4,033,000**	**4.9%**

Source: Australian Government Department of Employment, *Small Area Labour Markets – September Quarter 2017*
Figures rounded

2.3 Occupational Structure

The skills base of the Study Area is reflected in its occupational structure, as shown in Table 2.3. ABS Census data for 2016 shows 35% of Study Area workers were occupied in activities generally associated with the types of skills required for the construction of a solar farm (ie technicians and trades workers, machinery operators & drivers, and labourers).

The Study Area's representation in these occupations is well above the State averages of 28%, indicating a generally suitable occupational base for the proposed project.

In total numbers, approximately 16,760 workers in the Study Area are occupied in construction-related activities highlighting the strong worker base available to support the project.

Table 2.3: Occupational Structure – Study Area, 2016

	Narrandera Shire Council		Leeton Shire Council		Griffith City Council		Wagga Wagga City Council		Study Area		NSW
Occupational Type	No.	Share	No.	Share	No.	Share	No.	Share	No.	Share	Share
Managers	499	21.5%	738	15.7%	1,804	15.4%	3,634	12.2%	6,675	13.7%	13.5%
Labourers	393	16.9%	902	19.1%	2,098	17.9%	3,072	10.3%	6,465	13.3%	8.8%
Technicians and Trades Workers	289	12.4%	650	13.8%	1,611	13.8%	4,667	15.6%	7,217	14.9%	12.7%
Professionals	277	11.9%	632	13.4%	1,547	13.2%	5,877	19.7%	8,333	17.2%	23.6%
Clerical and Administrative Workers	242	10.4%	511	10.8%	1,373	11.7%	3,657	12.3%	5,783	11.9%	13.8%
Community and Personal Service Workers	222	9.6%	382	8.1%	1,036	8.8%	3,868	13.0%	5,508	11.3%	10.4%
Machinery Operators and Drivers	206	8.9%	442	9.4%	800	6.8%	1,627	5.5%	3,075	6.3%	6.1%
Sales Workers	154	6.6%	357	7.6%	1,240	10.6%	3,061	10.3%	4,812	9.9%	9.2%
Not stated /inadequately described	40	1.7%	99	2.1%	206	1.8%	374	1.3%	719	1.5%	1.9%
Total	**2,322**	**100.0%**	**4,713**	**100.0%**	**11,715**	**100.0%**	**29,837**	**100.0%**	**48,587**	**100.0%**	**100.0%**

Source: ABS Census of Population and Housing 2011

2.4 Business Structure

One of the more tangible benefits of a major investment project, such as the proposed Avonlie Solar Farm, is the extent to which local businesses can participate in the project through project contracts and other service provision.

ABS Business Count data for 2016 (latest available) shows the Study Area includes 1,550 construction businesses and a further 500 businesses associated with transport, postal and warehousing service, with these two sectors contributing 2,000 businesses or 20% of all businesses located in the Study Area.

This data, which is included in Table 2.4, indicates a strong presence in the Study Area of the types of firms that are likely to be well-placed to service aspects of the project. This opportunity is explored in more detail in the following Chapter.

Table 2.4: Business Structure – Study Area, 2016

	Narrandera Shire Council		Leeton Shire Council		Griffith City Council		Wagg Wagga City Council		Study Area		NSW
Industry Sector	No.	Share	No.	Share	No.	Share	No.	Share	No.	Share	Share
Agriculture, Forestry and Fishing	237	40.4%	219	26.2%	1,095	34.0	991	18.0	2,542	25.0%	7.3%
Mining	0	0.0%	3	0.4%	6	0.2	3	0.1	12	0.1%	0.2%
Manufacturing	13	2.2%	39	4.7%	139	4.3	197	3.6	389	3.8%	3.6%
Electricity, Gas, Water and Waste Services	3	0.5%	4	0.5%	14	0.4	20	0.4	41	0.4%	0.3%
Construction	72	12.3%	143	17.1%	390	12.1	947	17.2	1,552	15.3%	15.5%
Wholesale Trade	12	2.0%	26	3.1%	116	3.6	143	2.6	297	2.9%	3.8%
Retail Trade	34	5.8%	67	8.0%	185	5.7	303	5.5	588	5.8%	6.1%
Accommodation and Food Services	31	5.3%	42	5.0%	98	3.0	239	4.3	410	4.0%	4.2%
Transport, Postal and Warehousing	41	7.0%	46	5.5%	123	3.8	290	5.3	499	4.9%	6.3%
Information Media and Telecommunications	0	0.0%	3	0.4%	8	0.2	17	0.3	28	0.3%	1.2%
Financial and Insurance Services	20	3.4%	40	4.8%	195	6.1	526	9.6	782	7.7%	9.1%
Rental, Hiring and Real Estate Services	33	5.6%	52	6.2%	354	11.0	545	9.9	984	9.7%	11.1%
Professional, Scientific and Technical Services	22	3.7%	37	4.4%	144	4.5	322	5.8	525	5.2%	13.0%
Administrative and Support Services	16	2.7%	18	2.2%	72	2.2	143	2.6	249	2.4%	4.0%
Public Administration and Safety	0	0.0%	0	0.0%	10	0.3	15	0.3	25	0.2%	0.4%
Education and Training	3	0.5%	6	0.7%	17	0.5	52	1.0	79	0.8%	1.4%
Health Care and Social Assistance	17	2.9%	28	3.3%	94	2.9	362	6.6	501	4.9%	5.9%
Arts and Recreation Services	6	1.0%	10	1.2%	6	0.2	58	1.0	80	0.8%	1.3%
Other Services	24	4.1%	50	6.0%	135	4.2	278	5.0	486	4.8%	4.0%
Industry not classified	3	0.5%	4	0.5%	24	0.7	55	1.0	86	0.8%	1.4%
Total	**587**	**100.0%**	**837**	**100.0%**	**3,225**	**100.0**	**5,505**	**100.0**	**10,154**	**100.0%**	**100.0**

Source: ABS Counts of Australian Businesses, including Entries and Exits, June 2012 to June 2016

2.5 Township Services Capacity

Commercial Accommodation

The ability to accommodate non-local workers (ie those who are not resident in the Study Area or not living within a daily commutable distance) is a key consideration for major construction projects, especially in regional and rural areas underpinned by agricultural activity that are subject to seasonal demand for labour (eg harvesting). Concurrent infrastructure projects also need to be considered when assessing the adequacy of accommodation for a particular construction project (refer to section 3.3).

As Table 2.5 highlights, the Study Area has a reasonable supply of commercial accommodation as measured by the ABS Tourism Accommodation series for year ending June 2016. This data, which identifies supply for hotels, motels and apartments with 15 rooms or more, shows the Study Area contained 49 establishments and 1,450 rooms as of June 2016.

Room occupancy rates in the Study Area (61%) can be considered below average compared to the NSW average room occupancy rate of 68%, indicating the solar farm project will boost the commercial accommodation sector, especially during off-peak periods.

Importantly, room occupancy rates for establishments located in Narrandera Shire (52%) and Leeton Shire (45%), which would be the most convenient locations to house the non-local project workforce, are well below the State average. This indicates a specific opportunity exists for these particular businesses to improve trading over the 18 month construction period of the project.

Accommodation requirements and impacts associated with the project are further discussed in section 3.5.

Table 2.5: Hotel, Motel and Apartments Accommodation (with 15 Rooms or more) – Study Area, Year Ending June 2016

	No. of Establishments	No. of Rooms	Room Nights Available	Room Nights Occupied	Room Occupancy Rate
Narrandera Shire Council	5	130	48,000	25,000	52.1%
Leeton Shire Council	4	115	42,000	19,000	45.2%
Wagga Wagga City Council	30	860	315,000	204,000	64.8%
Griffith City Council	10	342	125,000	77,000	61.6%
Study Area	49	1,447	530,000	325,000	61.3%
NSW	**1,424**	**75,235**	**27,212,000**	**18,573,000**	**68.3%**

Source: Destination NSW – based on ABS Tourism Accommodation, Australia 2015-16

In addition to commercial accommodation outlined above, the Study Area also provides a range of additional options which might be used for worker accommodation, including the following options close to the subject site:

- Caravan/ Holiday parks providing cabins, such as:

  - Narrandera Caravan Park, Narrandera
  - Lake Talbot Tourist Park , Narrandera
  - Leeton Caravan Park, Leeton
  - Oasis Caravan Park, Leeton
- Bed and Breakfast facilities
- Guest houses
- Pubs/hotels

Private Accommodation

Private accommodation is often used to support construction worker needs, this could be through leasing of holiday homes and investment properties, either privately or through real estate. ABS Census data for 2016, indicates the Study Area has an above average level of vacant dwellings – which is consistent with a well visited region including many holiday homes. As Table 2.6 shows, 10.6% of Study Area dwellings were unoccupied at the Census, which is above the average for NSW (9.9%). Of particular importance is the relatively high dwelling occupancy rate in Narrandera Shire (15.0%) in which the solar farm project is located, indicating potential private accommodation opportunities for local homeowners.

Shared private housing accommodation is one potential option for the solar farm project, and this is further explored in section 3.5.

Table 2.6: Unoccupied Dwellings – Study Area, June 2016

	Occupied Dwellings	Unoccupied Dwellings	Total Dwellings	Unoccupied Dwelling Share
Narrandera Shire Council	2,150	380	2,530	15.0%
Leeton Shire Council	3,860	510	4,370	11.7%
Wagga Wagga City Council	22,390	2,540	24,930	10.2%
Griffith City Council	8,500	940	9,440	10.0%
Study Area	**36,900**	**4,370**	**41,270**	**10.6%**
New South Wales	**2,604,320**	**284,740**	**2,889,060**	**9.9%**

Source: ABS Census of Population and Housing, 2016

Township Services

In addition to accommodation, workers locating temporarily to the Study Area will require a wide range of other convenience services, and the project will also need to source trade and other services from businesses located in the immediate region. The following paragraphs provide an overview of the services located in the main townships and regional centres in the Study Area – Narrandera, Leeton, Wagga Wagga and Griffith. Other smaller settlements such as Yanco, Whitton, and Lockhart are likely to support the project in some capacity, especially with regard to labour supply.

Narrandera

Figure 2.1: Images of Narrandera Town Centre

Source: www.bing.com

Narrandera, with a population of approximately 3,750 persons, is the main service centre for the municipality and provides a range of services likely to be required to support a major infrastructure project such as the proposed solar farm. The Narrandera Township is located approximately 20km north of the subject site, or a 15-minute drive along the Sturt Highway.

Narrandera's key services include:

- Freight and transport services (Days Transport and Logistics, Paul Duncan Transport, Patersons Transport, Plummer's Freight Service, Hayllar Transport)
- Auto mechanics (Narrandera Auto Repairs, N & T Automotive Repairs)
- Construction firms (Holcim Australia, Area Pre-Mix Concrete)
- Engineering services (Rombola Engineering)
- Trade Suppliers (Mitre 10, Home, Timber & Hardware)
- Fuel supplies (Mobil, Shell, Metro Petroleum)
- Commercial and private accommodation (see above Tables)
- Retail services - including Coles and IGA supermarkets
- Cafes and restaurants
- Entertainment (hotels, clubs, sports and recreational facilities)
- Banks and financial institutions (Bendigo Bank and Commonwealth Bank)
- Real estate agents (Narrandera Real Estate Services, Elders, Ray White Temora & Narrandera)
- Postal services (Australia Post)
- Employment agencies (Summit Employment and Training)

- Medical and emergency services including:
  - Narrandera District Hospital, with an emergency department
  - Narrandera Medical Centre
  - NSW Fire & Rescue Services
  - Narrandera Police Station
  - Narrandera State Emergency Services (SES) unit.

Leeton

Figure 2.2: Images of Leeton Town Centre

Source: www.bing.com

The Leeton Township has a population of approximately 6,900 persons and is located approximately 50km north of the subject site, or a 35-minute drive along the Sturt Highway.

Leeton's key services include:

- Freight and transport services (Leetons Fast Freight, Preston's Leeton, De Paoli Transport)
- Auto mechanics (Leeton Auto Electrics, Russell Auto Electrical, Lanhams of Leeton)
- Construction firms (Leeton Equipment Hire, Cregan Crane Hire, David Boots Sand and Gravel, Area Pre-Mix, Milbrae Quarries)
- Engineering services (Associated Civil & Mechanical Engineering Enterprises, Barraclough Engineering, Southern Central Engineering)
- Trade Suppliers (Leeton Mitre 10, Leeton Builders Supplies & Concrete Manufacturers)
- Fuel supplies (Mobil, Shell, Caltex, Shell, BP)
- Commercial and private accommodation (see above Tables)
- Retail services - including Woolworths and IGA supermarkets
- Cafes and restaurants

- Entertainment (hotels, clubs, sports and recreational facilities)
- Banks and financial institutions (Westpac, St. George, NAB, and ANZ)
- Real estate agents (Amato Real Estate, Glen Preston Real Estate, Raine & Horne, Breed & Hutchinson)
- Postal services (Australia Post)
- Employment agencies (Sureway Employment and Training, Eworks Employment Solutions)
- Medical and emergency services including:
  - Leeton District Hospital, with an emergency department
  - Leeton Medical Practice
  - NSW Fire & Rescue Services
  - Leeton Police Station
  - Leeton State Emergency Services (SES) unit.

Wagga Wagga

Figure 2.3: Images of Wagga Wagga Town Centre

Source: www.bing.com

Wagga Wagga is a major regional centre and the largest inland city in NSW, with a resident population of approximately 48,000 people (Urban Centre).

Wagga Wagga is located approximately 75km south-east of the subject site or a 60-minute drive time via the Sturt Highway. Wagga Wagga has a major regional airport which provides 120 flights between Wagga Wagga, Sydney and Melbourne each week and will be beneficial for metropolitan and interstate project workers. In view of the City's relatively close location to the subject site and important regional role, Wagga Wagga is likely to provide a wide range of key services to the project.

Wagga Wagga's key services include:

- Wagga Wagga Regional Airport including car rental services (Avis, Budget, Hertz, Thrifty)

- Freight and transport services including the Riverina Freight and Logistics Hub, and major operators such as Camdec Logistics and Toll Regional
- Large range of commercial and private accommodations options
- Wide range of construction and civil engineering firms, including firms specialising in major construction projects such as ICG and Ladex Construction Group
- Major trade suppliers (Bunnings Warehouse, Mitre 10)
- Major automotive mechanics
- Employment agencies (Workforce on Tap, Sureway Employment & Training, GTES, Workfront People Solutions)
- Major retail services including shopping centres and department stores
- Entertainment (hotels, clubs, sports and recreational facilities)
- All major banks and financial institutions
- All major medical and emergency facilities, including Wagga Wagga Base Hospital

Griffith

Figure 2.4: Images of Griffith Town Centre

Source: www.bing.com

Griffith is a major regional centre located in the Murrumbidgee Irrigation District in the north-western part of the Riverina, with a resident population of approximately 19,000 people (Urban Centre).

Griffith is located approximately 105km north of the subject site or a 90-minute drive time via the Sturt Highway. Given the City's regional role, Griffith is likely to provide a range of key services to the project.

Griffith's key services include:

- Good range of commercial and private accommodations options
- Freight and transport services (Griffin Transport, Rodneys Transport Services, Pacific National)

- Construction firms (MIA Crane Service, Asset Building Systems, GNC Concreting, Area Pre-Mix Concrete)
- Auto mechanics (Gradys Automotive, Wyangan Automotive)
- Trade suppliers (Bunnings)
- Employment agencies (Sureway Employment & Training, Workfront People Solutions)
- Good range of retail services including supermarkets and shopping centres
- Most major banks and financial institutions
- Major medical and emergency facilities

2.6 Conclusions

The key findings of this Regional Economic Profile are as follows:

1 The Study Area has a resident population of approximately 108,000 persons (2016), which is expected to reach approximately 120,000 persons by 2036 representing a modest annual growth rate of 0.6% over the period. Importantly, significant population decline is forecast for Narrandera Shire (-1,180 persons) over the 2016-36 period; therefore, major projects which stimulate new investment and jobs should be encouraged in terms of supporting the regional economy.

2 The Study Area currently has an unemployment rate of 4.7%, which is slightly below the NSW unemployment rate of 4.9% (September 2017). However, the unemployment rate in Narrandera Shire (6.6%) is well above the State average and the Study Area currently includes 2,710 persons who are unemployed. In this regard construction of the Avonlie Solar Farm project provides new short-term employment opportunities for the region's labour force participants, with a small amount of ongoing employment also supported once the facility is operational (refer to section 3.2, following).

3 The Study Area's occupational and business structures indicate a good base exists to service the needs of the solar farm project, including approximately 16,750 construction-related workers (based on occupation) and approximately 2,000 construction and transport businesses.

4 The townships of Narrandera and Leeton, given their relatively close proximity to the subject site, will service project needs such as commercial accommodation (245 rooms and 4 caravan parks), trade supplies and transport services, machinery hire and repairs, retail services etc. However, the major regional city of Wagga Wagga (approximately an hour's drive from the subject site) will underpin major project needs such as providing metropolitan and interstate worker access via Wagga Wagga Regional Airport, as well as servicing major civil construction, engineering, machinery/equipment requirements, and providing higher-order medical and emergency services. Griffith is also likely to provide a supporting role in delivering some high-order project requirements.

3 ECONOMIC IMPACT ASSESSMENT

3.1 Project Investment

The total construction cost for the Avonlie Solar Farm project is estimated to be approximately $250 million, according to information provided by RES. The major investment cost is associated with the purchase of PV panels and associated equipment, although significant investment is also required for civil, electrical and grid connection works. Additional investment will be required with regard to project management, financing, insurance and other project costs.

3.2 Project Employment

Construction Phase

Project employment is assessed in terms of **Direct** jobs (ie, site-related) and **Indirect** (or flow-on) jobs in the local and wider economies (ie, jobs that are generated by the employment multiplier as funds circulate around the economy between various industry sectors).

Direct Construction Employment

RES have indicated that 200 jobs will be generated as part of the Avonlie Solar Farm, over the lifetime of the construction phase which is expected to be approximately 18 months. These jobs include full time, part-time and casual labour employed on the project.

Construction-related jobs are expected to be associated with a wide-range of on and off-site activities, including:

- Installation of PV support structures
- Fabrication
- Vehicle and equipment hire
- Earthworks
- Foundations
- Engineering services
- Roads and access tracks
- Transport and logistics
- Assembly and installation of PV panels
- Electrical works (cabling and connections)
- Installation of monitoring equipment

- Fencing
- Landscaping
- Trade services
- Fuel supplies
- Security
- Waste disposal
- Business, finance and administrative services.

As indicated in Chapter 2, the business structure of the Study Area indicates that a good mix of these types of services is available, principally in Wagga Wagga and Griffith. It is reasonable to expect, therefore, that local and regional businesses will be well-positioned to secure contracts during the construction phase of the project.

Indirect Construction Employment

In addition to direct employment, significant employment will be generated indirectly through the employment multiplier effect. By applying an industry-standard multiplier for the construction industry of 2.6 (based on ABS Input-Output tables), the project is estimated to generate an additional 320 jobs over the construction period.

Indirect or flow-on jobs (which capture industry and consumption effects) include those supported locally and in the wider economy (including in other states), as the economic effects of the capital investment flow through the economy. Indirect employment creation within the region would include jobs supported through catering, accommodation, trade supplies, fuel supplies, transportation, food and drink etc.

Total Construction Employment

In summary, approximately 520 jobs (200 direct jobs and 320 indirect jobs) are expected to be generated by the Avonlie Solar Farm project during the 18-month construction phase.

The amount of local employment required at the peak of the project is estimated by the proponent to be approximately 140 jobs. This represents less than 1% of the Study Area's labour force who are occupied in construction-related activities (16,060 persons) and this should not present a constraint to labour supply for the project.

Operational Phase

Direct Operational Employment

RES Australia indicate that around 4 jobs will be supported on an ongoing basis through the operation and maintenance of the Avonlie Solar Farm, including employment supported in the Study Area and supported centrally at Head Office.

Indirect Operational Employment

A number of additional jobs will also be supported indirectly through the employment multiplier effect. By applying an industry-standard multiplier for the electricity industry of 3.9 (based on ABS Input-Output tables) to the direct operational and maintenance jobs, a further 12 permanent jobs (rounded) would be generated in the wider State and national economies, but some of these jobs would be generated locally through existing supply chains.

Operational-related employment is for the lifetime of the project (ie, at least 25 years); therefore, while job creation is relatively small, it represents new long-term employment opportunities at a local, regional and state-wide level.

For the purposes of this assessment we assume 75% of direct jobs and 25% of indirect jobs are created in the Study Area. This equates to approximately 6 ongoing new positions created in the Study Area through the Avonlie Solar Farm project.

Total Operational Employment

In summary, approximately 16 jobs (4 direct and 12 indirect) are expected to be generated by the Avonlie Solar Farm project through its ongoing operations, of which 6 positions are expected to be created locally.

3.3 Concurrent Infrastructure Projects in the Study Area

The Avonlie Solar Farm project may need to compete for labour and resources with proposed infrastructure projects in the Study Area and broader region over the coming years. These projects include:

- Sandigo Solar Farm
- Deniliquin Ethanol Plant
- Tarleigh Park Solar Farm
- Currawarra Solar Farm
- Regional road projects

It appears that these projects do not represent a major challenge for the Avonlie Solar Farm project, either in terms of resource requirements or timing conflicts with other major regional project (as described below).

Based on the timing of identified infrastructure projects in the Study Area, the Avonlie Solar Farm project will add to the pipeline of important construction projects to be delivered over the coming few years and in doing so provide an ongoing stimulus to the construction sector and regional economy.

Sandigo Solar Farm

The Sandigo Solar Farm is a utility scale renewable energy project with an output measuring up to 100 megawatts (MW) that will generate clean and renewable electricity from the power of the sun.

The $125 million-dollar project is located over 28km southeast of the township of Narrandera and 85km west of Wagga Wagga. The site is currently used for agricultural purposes, mainly cropping activities. The project site was chosen as it has proximity to the TransGrid network, access from the Sturt Highway and relatively flat land.

The solar farm will cover an area of approximately up to 230 hectares and comprise approximately 310,000 solar photovoltaic modules.

The Avonlie Solar Farm project will be located approximately 10km north-west of the Sandigo Solar Farm site. In view of the close proximity of the sites and the potential for the projects to be constructed at the same time, a cumulative assessment has been prepared (refer to section 3.4).

Deniliquin Ethanol Plant

Dongmun Greentec Pty Ltd is proposing to construct and operate an ethanol plant at Deniliquin, on Barham Road. The site is located approximately 5 km south-west of Deniliquin and comprises three lots on approximately 120 hectares of land.

The ethanol plant will process up to 300,000 tonnes of low grade locally grown wheat grain to produce up to 115 megalitres of fuel grade ethanol per annum. The ethanol product can be blended with petrol to produce E10 petrol which produces less greenhouse gas emissions. By-products of the process will include a dried distiller's grain with solubles (DDGS), distiller's syrup and liquid fertiliser. All of the by-products are proposed to be sold to regional feedlot, dairy operations and nationally through other agricultural markets as feed material.

The NSW Department of Planning & Environment approved the project on 1 July 2016. The project is now undergoing construction approvals and detailed design process. An estimated 350 jobs will be created during the construction phase of the $170 million project. The proponent expects the major construction phase (ethanol plant) to commence in late 2017 and be completed by the end of 2018. Ancillary shedding and offices will be constructed at a later stage. Should this schedule be delivered, the ethanol plant would be completed around the time the Avonlie Solar Farm commences construction.

Tarleigh Park Solar Farm

The Tarleigh Park Solar Farm project (RES Australia) is a proposed 90MW facility to be located 23km south-east of Deniliquin. Subject to planning approval and financing, construction of the solar farm is expected to commence in late 2018 and be completed within 12 months. Approximately 150 workers will be required during the construction phase of the project.

Currawarra Solar Farm

The Currawarra Solar Farm project (RES Australia) is a proposed 175MW facility to be located 2.5km north-east of Deniliquin. Subject to planning approval and financing, construction of the solar farm is expected to commence in late 2018 and be completed within 18 months. Approximately 200 workers will be required during the construction phase of the project.

The Tarleigh Park and Currawarra solar farms are located just 16km apart, and it is the intention of RES to construct both facilities concurrently which will enable efficient use of labour and other resources. In this regard it would be expected that RES would schedule the construction phases of the Avonlie Solar Farm to maximise efficiencies across the three projects located in this broad region.

Regional Roads Projects

The following projects located in the Study Area have recently been funded under the NSW Fixing Country Roads Program (Round Three):

- Griffith Southern Industrial Link (stages 5b, 6a & 6b) - $5.9 million
- Leeton Bridge Upgrade – Whitton Darlington Point Road - $1.5 million
- Upgrade of Corbie Hill and Borre Road – $1.2 million (Narrandera and Leeton shires)
- Wagga Wagga – Burns Road to Riverina Intermodal Freight and Logistics Upgrade – $0.9 million

These projects are generally small scale requiring limited resources, therefore are unlikely to impact on labour resources for the Avoline project. Additionally a condition of grant funding is that the projects are 'shovel ready 'and can be completed within two years of receiving funding; therefore, the projects may be completed or be close to completion by the time the main construction phase of the solar farm project commences.

3.4 Cumulative Assessment

The timing of the proposed Avonlie Solar Farm development may overlap with the final stages of construction of the Sandigo Solar Farm. Cumulative impacts may include community impacts such as combined demand that may strain local resources (e.g. accommodation and local services).

However, given the significant level of resources and labour available in the broader region (especially Wagga Wagga), low occupancy rates observed for local commercial accommodation facilities (refer to section 2.5) and relatively high levels of local unemployment (refer to section 2.2), no major cumulative impacts are anticipated.

Construction of the two projects may also be sequential, depending on actual development timing, and in this case the project stream will provide an extended period of economic benefit for local economy.

3.5 Industry and Business Participation Opportunities

In terms of cost efficiencies (lower transport, labour costs etc), many large construction projects located in regional areas are (where possible) serviced from within the same region.

As identified above, the Study Area comprises approximately 2,000 construction firms and many other businesses associated with activities likely to be required for the project, such as transport operators, trade suppliers, vehicle and machinery hire, auto mechanics etc.

Within the Study Area the major regional centres of Wagga Wagga and Griffith have many firms of sufficient scale to compete for project contracts. Examples include Wagga Wagga based ICG whose projects include the Wagga Wagga Airport Terminal Extension and the construction of the Murrumbidgee Irrigation Workshop and Administration Buildings.

In order to maximise local business participation, a number of strategies might be considered such as widespread advertising of contracts in local media and directly through the RES website etc.

The Industry Capability Network (ICN) is another organisation that often plays an important business facilitation role for major infrastructure projects, such as the proposed solar farm. The ICN is an independent, non-profit organisation funded by the Federal Government to support business opportunities, including linking suppliers to project contracts at a local level through its ICN Gateway website where details of work packages are advertised.

3.6 Housing and Commercial Accommodation Sector Impacts

Information supplied by RES Australia indicates that up to 60 non-local staff may need to be accommodated in the region at the project's peak. These staff will include occupations such as general management, project management and supervising engineers. Contract lengths will vary. This highlights the need for a number of types of accommodation which would be expected to range from higher-end options for professional staff on longer contracts, to convenient low-cost options for those on short-term contracts.

As highlighted in Chapter 2, the Study Area has a capacity of around 1,450 rooms in commercial accommodation establishment (hotels, motels and apartments with 15 rooms or more). Assuming each non-local worker requires individual accommodation, only approximately 4% of total accommodation stock would be required at peak times to service the project. This requirement is likely to be even lower as some workers may choose to be accommodated in Caravan /Holiday Parks (cabins), B&Bs, private rentals (holiday homes) or with family or friends – none of these categories are included in the accommodation audit. Additionally, some workers may share motel rooms/ cabins etc to reduce personal costs.

ABS Tourism Accommodation data for the year ending June 2016 (refer to Table 2.6), shows across Narrandera and Leeton shires the commercial accommodation occupancy rate was approximately 50% indicating significant capacity exists to host project workers locally. Narrandera and Leeton also provide additional cabin accommodation across four caravan/holiday parks, all of which are within easy access to the subject site.

This data indicates that adequate capacity exists in the Study Area to accommodate the relatively small numbers of non-local workers expected at the peak of the solar farm project, even allowing for increased demand from other regional infrastructure projects and seasonal demands (holiday periods, harvesting etc). Importantly, the influx of these workers will support higher occupancy rates and revenues for local accommodation operators (especially in Narrandera and Leeton) over the construction period, particularly during off-peak periods.

3.7 Local Wage Spending Stimulus

RES estimate that 30% of the 200 jobs in construction (60 jobs) are likely to be sourced from outside the Study Area, particularly specialist and management positions.

This level of employment would equate to $4.8 million in wages (2017 dollars) on the basis that each non-local worker is employed for 12 months across the 18 month project and earns the average construction wage of $80,000 pa including on-costs (source: ABS, *Average Weekly Earnings 6302.0*, May 2017).

A considerable portion of these wages would be spent in the Study Area, where the workers will be based. An estimated $2.7 million in wages (2017 dollars) would likely be directed to local and regional businesses and service providers during the construction period. This estimate is based on reference to the ABS *Household Expenditure Survey* which indicates that approximately 75% of post-tax wages are likely to be spent by workers in the regional economy in view of the wide range of goods and services available in the Study Area. This spending would include the following:

- Housing expenditure, including spending on accommodation at hotels, motels, caravan/holiday parks B&Bs, and private rental dwellings
- Retail expenditure, including spending on supermarket items, clothing, books, homewares etc
- Recreation spending associated with day trips and excursions, gaming (lottery, sports betting, etc), purchases in pubs and clubs (although noting that expenditures at restaurants is included in the retail category)
- Personal, medical and other services, such as local prescriptions and GP fees, fuel, vehicle maintenance and so on.

This level of personal spending would support approximately 13.5 jobs in the services sector (based on 1 job allocated for every $200,000 of induced spending), supporting jobs in the Study Area associated with retail, accommodation, trade supplies, cafes and restaurants etc. These jobs are included in the 'indirect employment' estimates outlined in Section 3.2 above.

3.8 Impact on Agricultural Land

The potential impact of the Avonlie Solar Farm on agricultural activity is noted as follows:

- Approximately 550ha of productive farming land will be unable to be used during the lifetime of the solar farm.

- This will affect land used principally for cropping, with the site being extensively cropped and grazed over many years.
- The NSW Murray Region, the broad region in which the Study Area is located, contains approximately 910,000ha of productive agricultural land supply, of which 770,000ha are used for cropping. In this regional context, the loss of agricultural land associated with the Avonlie Solar Farm amount to just 0.06% of all productive agricultural land supply and 0.07% of total cropping supply.
- The property owners will be compensated for hosting the solar farm through annual payments from the solar farm operator. It is understood that these payments would result in significantly higher farm incomes compared with continuation of cropping activities across the subject site.
- RES are looking to continue grazing on the site, under the solar structure.
- The land can be rehabilitated to its original condition at the end of the project when all above ground infrastructure is removed, allowing cropping (or other farming activities) to recommence.

3.9 Ongoing Economic Stimulus

RES advise that the solar farm will be located across two properties, providing annual income returns to these landowners over the hosting period.

These new income streams can be particularly important in supporting the financial sustainability of large rural farms.

As noted earlier, securing a guaranteed 25 to 30 year drought-proofed income stream (indexed to CPI) also allows farming families more flexibility in the long-term planning for their farming operations, including succession planning and providing ongoing income for future generations or new landowners.

Additionally, an estimated 6 permanent local jobs will be created through the project in the Study Area (refer to section 3.2), and wage spending associated by these jobs will benefit local businesses and communities.

Based on data provided by RES relating to potential host landowner returns and the consultants calculations of new wage spending, the Study Area's economy will receive an estimated stimulus of $28.0 million over 25 years (adjusted for CPI @ 2.5% pa) through these effects.

3.10 Returns to Council and the Community

Council Rates Revenue

Unlike other states (such as Victoria), NSW does not currently have in place a legislative framework to guide rates payable for electricity generating facilities.

Revenues payable to Narrandera Shire Council associated with the operation of the Avonlie Solar Farm therefore, will be subject to negotiation between Council and RES.

By way of illustrating potential revenue benefits to Council from the solar farm, if the proposed facility was developed in neighbouring Victoria, an estimated $11.7 million would be generated in Council rates over 25 years (includes CPI adjustment of 2.5% pa) under Victorian State guidelines.

This level of potential income presents an important increase in the rates base for the municipality – especially in an environment of rate pegging and forecast population decline in Narrandera Shire, which further erodes the amount of rates revenue collected in the future.

Unlike a new residential development (where Council incurs costs such as garbage collection; maintenance of parks, open space, roads, footpaths; provision of community services; etc) the cost to Council of providing resources for the solar farm site is likely to be relatively small and would be limited to road maintenance, garbage removal etc. Therefore, rates revenues generated from the operation of the solar farm will represent a substantial net return to Council.

Importantly, this revenue can be re-invested in infrastructure and services, which will benefit the community more generally.

Community Fund

RES is committed to providing a one-off $250,000 payment into a Community Fund at the start of the construction phase of the project. The Community Fund could be used to support a range of projects which might include environmental and local community projects.

A fund of this type will assist with the delivery of community infrastructure and programs, which, as noted above, are especially important in rural areas with relatively small rates revenue bases (which are subject to rate pegging).

The Community Fund would likely be managed by a local community group(s) or Narrandera Shire Council, which RES would help facilitate.

3.11 National Grid Supply Benefits

The Avonlie Solar Farm has the potential to provide sufficient renewable energy to support the annual electricity needs of approximately 80,000 NSW households. This calculation is based on:

- 200 MW capacity x 24 hours per day x 365 days per year x 27% capacity factor = 473,040 MWh / by average household energy use of 5,920kwh (Source: Australian Energy Regulator).

In a regional context, the Study Area currently contains approximately 40,750 dwellings (ABS Census 2016); therefore, the Avonlie Solar Farm has the potential to provide the annual electricity needs of the Study Area twice over, highlighting the importance of the facility from a clean electrical generation perspective.

3.12 Environmental Benefits

Once fully-operational, the Avonlie Solar Farm will result in the reduction of an estimated 158,000 tonnes in carbon dioxide (CO2) emissions on an annual basis compared to the same level of electricity generation using fossil fuels. This calculation is based on:

- 473,040 MWh x 0.33372 tonnes/MWh = 157,863 tonnes saved per year (assuming generation would otherwise be sourced from brown coal with a carbon factor = 0.33372 tonnes per MWh (Source: Department of the Environment National Inventory Report).

This reduction on CO2 emissions is the equivalent of taking approximately 56,400 cars off the road annually, based on an average of 14,000km travelled with CO2 emissions of 200g/km (or 2.8 tonnes of CO2 emissions per car pa).

3.13 Tourism Opportunities

In the longer-term, the Avonlie Solar Farm could provide opportunities to attract new visitors to the area, if suitable arrangements can be put in place regarding access to the site.

Potential visitor types include:

- Environmentalist
- Researchers
- Eco-tourists
- School and educational groups

Benefits of attracting new visitors to the region include increased expenditures on accommodation, food and beverage, fuel, retail, entertainment etc, all of which will support businesses and employment, especially in nearby Narrandera.

3.14 Conclusions

1 The Avonlie Solar Farm project will involve approximately $250 million in investment during the construction phase and will support 200 direct and 320 indirect positions over the construction period. Once operational, 4 direct and 12 indirect jobs will be supported by the facility.

2 Allowing for the project to be carefully managed around the region's peak times for harvesting activity and the scheduling of other major infrastructure projects in the region, accessing adequate labour supply should not present an issue for the project, noting the peak local employment requirement for the project (140 jobs) represents less than 1% of workers occupied in construction-related activities in the Study Area (16,750 workers).

3 Concurrent infrastructure projects in the Study Area and broader region – including the Deniliquin Ethanol Plant, Sandigo, Currawarra and Tarleigh solar farms, and a number of

regional roads projects – are unlikely to impact on labour and resources required to support the solar farm project, for the following reasons :

- Different construction time frames/ staging associated with competing projects.
- The Currawarra and Tarleigh solar farm projects are also being developed by RES; therefore, these projects will be sequenced to ensure they do not impact on resourcing for the construction of the Avonlie facility.
- The large construction-base available in the Study Region (ie 16,760 construction-related workers and 2,000 construction-related businesses) which can support a pipeline of infrastructure projects.

4 The timing of the proposed Avonlie Solar Farm development may overlap with the final stages of construction of the nearby Sandigo Solar Farm. However, given the significant level of resources and labour available in the broader region (especially Wagga Wagga), low occupancy rates observed for local commercial accommodation facilities and relatively high levels of local unemployment, no major cumulative impacts are anticipated. Indeed, construction of the two projects may be sequential, providing for an extended period of economic benefit for the local economy.

5 The project will provide significant participation opportunities for businesses and workers located in the Study Area, having regard for the good match of skills and resources available. In this regard, the proponent and organisations such as the Industry Capability Network might be involved in ensuring maximum local inputs are secured.

6 The 'external' project labour requirement would be expected to generate an accommodation need for 60 project workers at the peak of the project. This represents only 4% of total commercial accommodation rooms in the Study Area and would provide a boost to local accommodation operators, noting that room occupancy rates of only 50% were recorded during 2015/16 for establishments located in Narrandera and Leeton shires.

7 Construction workers would be expected to inject approximately $2.7 million in additional spending into the regional economy over the construction phase, supporting around 13.5 jobs in the service sector in Narrandera and the broader Study Area.

8 Approximately 550ha of productive agricultural land (cropping and grazing) will be lost to accommodate the solar farm. However, this represents less than 0.1% of all productive cropping land supply in the NSW Murray Region. RES are looking to continue grazing on the site, under the solar structure. Importantly, the host landowner will improve their annual income, as operator payments will be greater than average farm income from the land and the land can be returned to cropping at the end of the solar farms lifecycle.

9 Ongoing economic stimulus associated with new local wage spending and returns to host landowners is estimated at $28.0 million over 25 years (adjusted for CPI @ 2.5% pa).

10 Council rates revenue associated with the solar farm will be subject to negotiations between Narrandera Shire Council and the proponent; however, financial benefits to Council are likely to be significant over the 25 to 30 year project lifecycle.

11 The proposed Community Fund would contribute a one off payment of $250,000 at the start of the construction of the project; this can be directed to new community infrastructures and programs.

12 The project has the capacity to supply sufficient clean energy to power approximately 80,000 homes and, in the process, to reduce C02 emissions by 158,000 tonnes per year.

13 Once operational, the Avonlie Solar Farm could potentially support small-scale tourism and educational opportunities in the future.