# 10.0 Socio-Economic Assessment

## 10.1 Introduction

This chapter of the EIS provides a summary of the Socio-Economic Impact Assessment for the Coopers Gap Wind Farm (ERM, 2008). The following discussion on socio-economic factors has been updated where necessary to reflect changes to the Project since 2008, and to address issues raised by submitters during the public notification of the Initial Assessment Report in 2011. Details of the public notification are provided in Section 10.5. In response to issues raised by submitters regarding potential health impacts, this chapter also provides a summary of a literature review of wind farms and human health. A copy of this literature review, completed by The Long View Group, is contained in Appendix H, Volume 3.

## 10.2 Scope of assessment

The purpose of the assessment is to assess the social and economic impact of the Project on the local and regional community. The scope includes the following:

- Assessment of the social, economic and cultural area
- Community engagement
- Social baseline study
- Workforce profile and demand profile
- Social impact action plan
- Cumulative impact assessment.

The desired outcomes of the above actions are:

- Defining the Project's social, economic and cultural area of influence
- Engagement with the local community and understanding of their concerns regarding the Project
- Informed baseline of impacts of the Project
- Impacts and mitigation management
- Understanding of the workforce profile and demand for employment within the local area
- Impact of the Project in consideration of concurrent coordinated projects.

Indigenous and historical (non-Indigenous) cultural values, and the potential impact upon them are discussed in Chapter 18 Cultural Heritage.

## 10.3 Legislative context

The following planning documents contain objectives, policies and strategies that drive social and economic development within the land available for development (the Study Area):

- Wide Bay Burnett Regional Plan 2011
- Darling Downs Regional Plan 2013
- Western Downs 2050 Community Plan
- South Burnett Community Plan 2032
- Amended Draft Western Downs Planning Scheme 2016
- Wambo Shire Planning Scheme 2005
- Kingaroy Planning Scheme 2006.

Chapter 11 Land Use and Planning provides a discussion on how the Project is generally in accordance with the objectives, polices and strategies of these plans.

## 10.4 Methodology

The method for the social and economic assessment has been undertaken in general accordance with the Coordinator-General's Social impact assessment guideline (DSD 2013), additional assessment material provided by the Coordinator-General submitted with the final terms of reference for the project, and the Coordinator-General's draft Economic impact assessment guideline for coordinated projects (DSD 2016) in order to describe the likely social impacts (positive and negative) on affected communities, taking into account proposed mitigation measures.

The previous Socio-Economic Impact Assessment for the Project (ERM, 2008) used relevant 2006 Census data for demographic profiles. An Australian census was conducted in 2011 and as such the demographic information provided in this chapter has been updated to reflect the new census information.

The demographic data from the 2011 census does not show a significant change in the population profile and statistics. Therefore, the outcomes of the Socio-Economic Impact Assessment for the Project that was undertaken in 2008 has not significantly changed.

The Kingaroy and Wambo Statistical Local Areas (SLAs) are taken to be representative of the relevant area of study for the Project's socio-economic assessment. The geographic extent of these SLAs, in relation to the Project Site is shown in Figure 10.1, Volume 2.

The Demographic Census data from 2011 for these SLAs has been used to provide a summary of the age profile, household characteristics and employment and income characteristics of their populations.

The literature review of wind farms and human health is intended to provide a fact based presentation of the peer reviewed scientific literature on wind farms and health. Selection criteria were adopted to develop a shortlist of peer reviewed journal articles and publications by public health agencies related to wind farms and health. The assessment included an appraisal of the quality of the available evidence before key findings were presented.

A more recent review of academic, peer reviewed articles, and government publications was undertaken in March 2016 to ascertain whether there have been significant findings in the time elapsed between the first literature review and the present time. This review confirmed that there have been no significant changes in published literature relating to wind farms and impacts on human health.

## 10.5 Community engagement

Public consultation and engagement is a fundamental part of the approvals process. Since becoming proponent of the Project in 2008, AGL has undertaken public consultation and engagement activities for the Project in accordance with relevant guidelines and AGL's broader community engagement strategic approach.

Community engagement activities were commenced early in the Project planning cycle. This approach provided stakeholders, landowners and the broader community multiple opportunities to provide formal feedback (via submissions) to the Initial Assessment Report submitted as part of the previous approval process (now ceased).

The initial round of public consultation was undertaken between November 2010 and April 2011 in order to provide the multiple stakeholders with an opportunity to provide feedback during the early designation stages. This initial consultation involved engaging a broad cross-section of stakeholders including key government agencies, landowners, businesses, and the local community to achieve the following objectives:

- Generate awareness and understanding of the Project and associated impacts
- Generate understanding of the approvals process
- Provide and promote opportunities and channels for interested parties to become informed and provide formal feedback
- Ensure accuracy of reporting stakeholder issues and how these will be considered in subsequent stages of the Project.

The following consultation events and activities have been undertaken to date:

- Community information "drop-in" sessions
- Guided tour to an operational wind farm
- Meeting with local business community regarding tendering requirements for employment opportunities

- Establishment of a Community Consultative Committee with regular meetings to discuss the latest developments with the Project
- Community newsletters
- Individual discussions with nearby landowners (participating and non-participating)
- Consultation with Western Downs and South Burnett Regional Councils
- Consultation with State Government Agencies
- Consultation with State and Federal members of parliament.

Further details of consultation undertaken for the Project are provided in Appendix G in Volume 3. The Project's public consultation approach and associated communication activities will continue during the Project's EIS assessment, construction and operations phases. Additionally, consultation and communication activities will be managed by a dedicated Community Engagement Manager and will continue to monitor and report throughout future phases of the Project.

## 10.6 Existing environment

### 10.6.1 Overview

As identified in Section 10.4, the SLA's encompassing the Study Area are Kingaroy and Wambo. Data presented in the following sections summarises the 2011 census community profiles for these SLAs, but are based on the level of information provided in the Socio-Economic Impact Assessment (ERM 2008). For the purposes of this chapter, the "Project Region" refers to the SLAs of Kingaroy and Wambo.

Kingaroy is within the South Burnett Regional Council LGA. The former Shire of Kingaroy, to which the Kingaroy Planning Scheme still applies, including the townships of Kingaroy, Kumbia and Wooroolin. Peanut and navy bean industries are well-established in the area, in addition to a growing wine industry. Kingaroy is the primary service centre of the former shire, and the area includes a commercial aerodrome, hospital, aged care facilities, a number of shopping areas, government services and a public swimming pool.

The strategic direction within the Kingaroy Shire Planning Scheme encourages growth and development without compromising the current quality of life and rural character of the area.

In December 2011, the South Burnett Regional Council adopted the South Burnett Community Plan 2032. The Community Plan provides a vision to articulate the desired attributes of the local government area in the future and have identified a number of goals and actions around four themes – enhancing community life, enhancing the environment, building the economy and making decisions and implementation. The vision for the South Burnett Regional Council states that South Burnett will be a region of connected communities that celebrates its heritage and enjoys a country lifestyle with sustainable development and growth.

The Wambo district is within the Western Downs Regional Council LGA. The former Shire of Wambo, to which the Wambo Shire Planning Scheme still applies, contained the townships of Jandowae, Bell, Kaimkillenbun, Warra, Jimbour, Macalister and Mowbullan. Agricultural uses predominantly include cattle grazing, cotton and grain growing.

The strategic direction contained within the Planning Scheme for Wambo Shire states that the desired direction of the Shire is to protect and enhance the unique natural features and ecological systems, enhance the economy through sustainable use of natural resources and that development in the area contributes to community well-being and the preservation of a high quality lifestyle.

Western Downs Regional Council has produced an Amended Draft Western Downs Planning Scheme (2016) which will eventually replace the multiple planning schemes currently in existence for the local government area. The policy direction of the draft planning scheme is articulated by a strategic framework. This strategic framework seeks to promote a sustainable settlement pattern which is accessible and appropriately serviced by infrastructure, preservation of the natural environment and landscape character, reinforce community identity, promote sustainable economic development and use of natural resources.

Western Downs Regional Council released the Western Downs 2050 Community Plan in 2011 which provides a vision to articulate the desired attributes of the local government area in the future. The purpose of the Community Plan is to put into place a structure to deliver the vision for a community with world class physical attractions, a connected local community and a role for innovation and new industries.

Further information on land use and settlement patterns are provided in Chapter 11 Land Use and Tenure.

### 10.6.2 Demographic profile

#### Age profile

Table 10.1 demonstrates that when compared with Queensland and Australia, the Project Region is characterised by a relatively high proportion of people aged 0-14 and 50+, with a relatively low proportion of people aged 15-49. These population statistics suggest that the Kingaroy and Wambo areas are attractive areas for families with young children. This conclusion is demonstrated in the comparison between household characteristics of Kingaroy and Wambo areas with the State of Queensland and Australia, provided in Table 10.2.

The overall population of the Project Region remained generally static between the two census dates, however the age profile has changed slightly, with an increase in the 60-69 age bracket of 1.44% and a decrease of 1.00% in the 35-49 age bracket.

**Table 10.1 Age profile of the Project Region, Queensland and Australia**

| Age Group | 2006 Census | | | 2011 Census | | |
|---|---|---|---|---|---|---|
| | Project Region | Queensland | Australia | Project Region | Queensland | Australia |
| 0-4 | 7.2% | 6.6% | 6.3% | **7.6%** | 6.9% | 6.6% |
| 5-14 | 15.8% | 14.1% | 13.5% | **15.5%** | 13.3% | 12.7% |
| 15-24 | 11.5% | 13.8% | 13.7% | **11.8%** | 13.6% | 13.3% |
| 25-34 | 11.1% | 13.4% | 13.5% | **10.7%** | 13.6% | 13.8% |
| 35-49 | 21.2% | 21.9% | 22.1% | **20.2%** | 21.3% | 21.2% |
| 50-59 | 13.8% | 12.9% | 12.8% | **12.9%** | 12.6% | 12.8% |
| 60-69 | 9.4% | 8.7% | 8.6% | **10.8%** | 9.9% | 9.9% |
| 70-84 | 8.2% | 7.2% | 7.9% | **8.5%** | 7.2% | 7.9% |
| 85+ | 1.8% | 1.4% | 1.6% | **2.0%** | 1.6% | 1.9% |
| Total | 100% | 100% | 100% | **100.0%** | 100.0% | 100.0% |

Source: ABS 2011 and ABS 2006

#### Household characteristics

Table 10.2 shows that the area is characterised by comparably high property ownership, with a relatively lower proportion of residents owning a mortgage than within Queensland and Australia. The area also contains a higher proportion of family households, and fewer group households than both Queensland and Australia.

**Table 10.2 Household characteristics of the Project Region, Queensland and Australia**

| Characteristic | Project Region | Queensland | Australia |
|---|---|---|---|
| **Ownership** | | | |
| **Fully owned** | 35.51% | 28.99% | 32.06% |
| **Being purchased** | 31.42% | 34.50% | 34.91% |
| **Rented** | 29.38% | 33.18% | 29.61% |
| **Occupancy** | | | |
| **Family household** | 72.84% | 72.44% | 71.53% |
| **Lone person household** | 24.06% | 22.85% | 24.34% |
| **Group household** | 3.09% | 4.72% | 4.14% |

Source: ABS 2011

### Employment

Table 10.3 demonstrates that the Project Region contains a relatively high proportion of managers and labourers, but relatively low proportions of professionals and clerical workers when compared with Queensland and Australia.

**Table 10.3 Occupation characteristics of the work force for the Project Region, Queensland and Australia**

| Occupation characteristic | Project Region | Queensland | Australia |
|---|---|---|---|
| Managers | 20.57% | 12.27% | 13.11% |
| Technicians and Trades Workers | 14.57% | 15.21% | 14.44% |
| Labourers | 14.44% | 10.75% | 9.60% |
| Professionals | 13.84% | 19.26% | 21.74% |
| Clerical and Administrative Workers | 10.25% | 14.95% | 15.03% |
| Sales Workers | 12.65% | 9.97% | 9.55% |
| Machinery Operators and Drivers | 1.85% | 7.46% | 6.68% |
| Community and Personal Service Workers | 7.41% | 10.14% | 9.85% |

Source: ABS 2011

### Property values

Table 10.4 shows the typical range and averages of property sale values in the townships proximate to the Project.

**Table 10.4 Property sale values in nearby townships**

| Characteristic | Kumbia | Dalby | Jandowae | Bell | Kingaroy |
|---|---|---|---|---|---|
| Number of properties for sale | 32 | 656 | 79 | 33 | 709 |
| Typical sale price range | $35,000 to $1.75M | $59,000 to $2.47M | $25,000 to $1.9M | $40,000 to $2.4M | $40,000 to $1.38M |
| Approximate average cost of dwelling | $400,000 | $311,000 | $366,000 | $360,000 | $278,000 |

Source: www.realestate.com (retrieved August 2016)

Table 10.5 shows the typical range and averages of property rental values in the townships proximate to the Project.

**Table 10.5 Property rental values in nearby townships**

| Characteristic | Kumbia | Dalby | Jandowae | Bell | Kingaroy |
|---|---|---|---|---|---|
| Number of properties for rent | 3 | 114 | 5 | 0 | 79 |
| Typical rent price range | $180/week to $230/week | $130/week to $475/week | $180/week to $250/week | N/A | $50/week to $460/week |
| Approximate average rental costs | $213/week | $234/week | $204/week | N/A | $267/week |

Source: www.realestate.com (retrieved August 2016)

### 10.6.3 Social infrastructure

Social infrastructure is a subset of infrastructure that supports a community, generally funded by local or state government and non-government organisations. Social infrastructure generally includes, but is not limited to: childcare, schools, tertiary education centres, community services (including community housing), hospitals, health centres and emergency services. The provision of social infrastructure ensures the community is provided with adequate health care, housing, employment and social support.

The social infrastructure available to the residents of the Project Region has been collated using the My Community Directory (My Community Directory, 2016) website; the directory lists social infrastructure by postcode or region. The social infrastructure from the three key postcodes within the Project Region have been included within the sample. Through analysis of the social infrastructure within the Project Region, the impact the Project may create on these services can be assessed. A list of the majority of social infrastructure services within the Project Region is below in Table 10.6.

**Table 10.6 Social infrastructure in Project Region**

| Social infrastructure | Postcode: 4610 | Postcode: 4405 | Postcode: 4410 |
|---|---|---|---|
| Tertiary education | Southern Institute of TAFE - Kingaroy | - | - |
| Schools | Kumbia State School<br>Bell State School<br>Tanduringie State School<br>Kingaroy SHS – Special Education Program<br>Taabinga State School<br>Kingaroy State High School<br>Kingaroy State School<br>Kaimkillenbun State School<br>Crawford State School<br>St John's Lutheran Primary School (Kingaroy)<br>Jimbour State School<br>Coolabunia State School<br>Durong South State School<br>Quinalow Prep-10 State School<br>Wooroolin State School<br>Nanango State High School<br>St Patrick's Primary School (Nanango)<br>Nanango SS – Special Education Program<br>Nanango State School<br>Tingoora State School<br>Burra Burri State School<br>Wondai State School<br>Cherbourg State School<br>Moffatdale State School | Dalby State School<br>Dalby State High School<br>Our Lady of the Southern Cross College (Dalby)<br>Dalby South State School<br>Dalby Christian College<br>Dalby State High School – Bunya Campus | Jandowae Prep-10 State School |
| Child care | Bell Playgroup<br>Country Kids<br>Goomeri Youth Group<br>Crawford Little Learners Playgroup<br>Durong Playgroup<br>Rising Stars Playgroup<br>Yarraman Playgroup<br>Nanango Playgroup<br>Play Smart – Nanango State School Playgroup<br>Little Emu's Playtime Playgroup<br>Cherbourg Family Playgroup | LIFT – Learning is Fun<br>Together Playgroup<br>Wandir Gunde Playgroup | - |

| Social infrastructure | Postcode: 4610 | Postcode: 4405 | Postcode: 4410 |
|---|---|---|---|
| Hospitals | Kingaroy Hospital<br>Jandowae Hospital<br>Nanango Hospital<br>Wondai Hospital<br>Cherbourg Hospital | Dalby Hospital | - |
| Health care | Blue Care – Kingaroy<br>South Burnett CTC – Community Respite Options<br>Haly Health & Skin Medical Centre<br>South Burnett Medical Centre<br>Kingaroy Community Health Centre<br>Disability Services Local Area Coordinator – Nanango<br>Nanango Community Health Centre<br>Wondai Community Health Centre<br>Cherbourg Respite Centre<br>Wunjuada Alcohol and Drug Rehabilitation Centre – Cherbourg | Endeavour Foundation – Dalby Respite Services<br>Vital Health Queensland Community Health and Child Centre – Dalby | - |
| Mental health care | Beyond Blue – Kingaroy<br>Partners in Recovery – Mental Health Services – Kingaroy<br>Mental Health Service – Cherbourg<br>St Mary's Centacare – Special Giants<br>Rural And Remote Mental Health Limited – Kingaroy<br>Community Mental Health – Kingaroy – South Burnett District | Mental Health – Dalby | - |
| Aged Car | Southern Cross Care Queensland – Karinya Aged Care Inc<br>Forest View Residential Care Facility | - | - |
| Community Centres/Service | Endeavour Foundation – Kingaroy<br>Learning and Lifestyle<br>Kingaroy Meals on Wheels<br>Uniting Care Community – Kingaroy<br>Jobmatch Employment Kingaroy<br>CTC Youth & Family Services Emergency Relief<br>Centrelink – Kingaroy<br>Kingaroy Job Board<br>Salvation Army – Kingaroy<br>Endeavour Foundation – Kingaroy Accommodation Services<br>Lifeline – Kingaroy<br>South Burnett Child Safety Service Centre – Kingaroy<br>Disability Services QLD – Kingaroy<br>St Vincent de Paul Society – Family Assistance<br>Alcoholics Anonymous – Kingaroy<br>Centacare – Kingaroy<br>Domestic & Family Violence Protection Service – Kingaroy<br>Australian Red Cross<br>Alcoholics Anonymous – Wondai/Murgon<br>Centrelink Customer Service Centre – | Crisis Support Association Inc – Dalby<br>SkillCentered – Dalby<br>Centrelink Customer Service Centre – Dalby<br>Waminda – Dalby<br>Ozcare – Dalby<br>Myall Youth and Community Network Centre<br>Food Assist – Dalby<br>Dalby Meals on Wheels<br>Western Downs Outreach Project<br>Centacare Toowoomba (Dalby)<br>Dalby Alcoholics Anonymous<br>Dalby Grief Support Group<br>Police-Citizens Youth Club (PCYC) – Dalby | - |

| Social infrastructure | Postcode: 4610 | Postcode: 4405 | Postcode: 4410 |
|---|---|---|---|
| | Cherbourg | | |
| Employment services | Employment Services Queensland – Cherbourg<br>Employment Services – Nanango<br>Employment Services Queensland – Yarraman<br>Redcross Employment Services – Kingaroy<br>Employment Services QLD – Kingaroy<br>Jobmatch Employment – Nanango | MAX Employment – Dalby<br>Employment Services Queensland – Dalby<br>Golden West Employment Solutions – Dalby<br>Bridge Employment – Dalby | - |
| Emergency services | SES – Kingaroy<br>SES – Yarraman<br>Police Link – Kingaroy | SES – Dalby | - |

### 10.6.4 Tourism

Tourism is a potential growth industry in the Western Downs Regional Council and South Burnett Regional Council areas. Presently, notable tourist destinations in the region include:

- Jandowae – an early timber town
- The Bunya Mountains National Park – attracting bush walkers, hikers and country market-goers
- More than 20 wineries and cellar doors.

## 10.7 Potential impacts

The Project has the potential to have a significant influence on the socio-economic environment of the Study Area and Project Region. Potential impacts (both beneficial and adverse) associated with the Project are wide-ranging, and may relate to:

- Population and housing
- Human health
- Land values
- Employment and income
- Local economy
- Agricultural activities
- Tourism.

These potential impacts (both beneficial and adverse) are discussed in the following sections.

### 10.7.1 Population and housing

It is anticipated that all habitable residential dwellings within and adjacent to the Project will remain habitable during the construction and operational phases of the Project.

Construction workers are likely to be employed from local areas wherever possible, and any additional workers will be accommodated in local towns in proximity to the Project Site (such as Kumbia, Jandowae, Bell, Kingaroy or Dalby). The vacancy rates of rental properties within larger towns such as Dalby, Kingaroy and Kumbia sit between 2.2% and 3.7% (SQM, 2016). During construction of the Project it is likely that the construction workforce will peak at 350 construction workers; comprising civil, electrical and wind turbine contractors. As local workers will be preferred for construction, it is not expected that the introduction of non-local construction workers will result in anything more than a temporary and minor local impact on the population for the duration of the wind farm construction. As the number of non-local construction workers will be limited, any non-local construction workers will stay within existing hotels, motels and rental accommodation in the community and not within construction workers camps. This is expected to have a beneficial economic impact on the region.

There is considered to be sufficient capacity in existing local infrastructure to accommodate non-local construction workers. AGL has sought details on capacity from local accommodation providers, including the Jandowae Accommodation Park, located approximately 20 minutes from the Project Site, which has the capacity to provide up to 250 individual workforce rooms.

Due to the labour force being sourced from and accommodated largely within the local community, no additional housing is required to be constructed for the Project, and there is not expected to be a significant drain on the rental market. In turn, market rents and house prices are not expected to be affected by the Project. In the event of changes in the local housing marking, AGL will modify housing and accommodation strategies accordingly,

Based on experience in South Australia for the Hallett Wind Farms (SKM, 2010), it is expected that one full-time job will be required for every four to six wind turbines that during operation of the Project. Consequently, it is expected that the Project will generate approximately 15-20 full-time jobs throughout the operational life of the wind farm. These maintenance jobs will be generally offered to local people seeking employment and will be offered suitable training as needed.

### 10.7.2 Human health

During the initial round of public consultation undertaken between November 2010 and April 2011 a number of submissions raised concerns regarding the potential for wind farms to have an adverse impact to human health. In response to the submissions, an independent report by the Long View Group (The Long View Group, 2014) was subsequently commissioned to review the scientific evidence on the human health impacts associated with wind farms. A copy of this report is contained in Appendix H, Volume 3. The scope of the review was to provide a summary of the reviewed literature on the following topics as it relates to human health:

- Noise (audible, infrasound, low frequency sound)
- Shadow flicker
- Electromagnetic radiation.

The assessment included a high level comparison of the Project and the wind farm sites studied in the literature. Whilst there were differences in the size and number of turbines and adjacent population, it was determined that the key findings would be relevant to the Project.

The key findings of the assessment are summarised in the following sections.

**Noise**

In the reviewed literature, the health impacts associated with audible noise from wind farms has attracted the most peer reviewed epidemiological studies in the field, noting that this is still a limited number (six studies published in 11 articles). The overall quality of these epidemiological studies on wind farms and health is rated as low due to methodological issues such as the selection bias of respondents and self-reporting of health impacts.

The key finding from the reviewed literature is that there is no scientific evidence that exposure to wind farm noise causes adverse health impacts. While there is evidence that some people living in proximity to a wind farm may experience annoyance, there is no consistent evidence that wind farm noise directly causes annoyance, and it may be that these people's annoyance stems from a number of factors including negative attitudes to the wind farm. The Australian National Health and Medical Research Council (NHMRC) found that, although individuals may perceive aspects of wind farm noise at greater distances, it is unlikely that it will be disturbing at distances of more than 1.5 km (NHMRC, 2015).

**Infrasound**

The review did not identify any peer reviewed epidemiological studies regarding health impacts associated with infrasound from wind farms. However, a number of peer reviewed acoustic studies have been undertaken.

The key finding from the reviewed literature is that there is no scientific evidence that exposure to wind farm infrasound causes adverse health impacts. Levels of exposure to wind farm infrasound have consistently been found to be below the threshold of human perception (85 G-weighted decibels (dBG)). There is no evidence of physiological effects from infrasound that is below the level of audibility. The infrasound emitted by wind farms has been found to be comparable to a number of other sources including coastlines, urban areas and other industrial processes.

In 2015, the NHMRC determined that exposure to infrasound in a laboratory setting has few, if any, effects on body functions. While this exposure did not replicate all of the characteristics of wind farm noises, the NHMRC

determined that there are unlikely to be significant effects on physical or mental health at distances of greater than 1.5 km from wind farms (NHMRC, 2015).

**Low frequency sound (or noise)**

In the review, the health impacts associated with low frequency sound from wind farms has not identified any peer reviewed epidemiological studies. However, a number of peer reviewed acoustic studies have been undertaken.

The key finding of the reviewed literature is that there is no scientific evidence that exposure to wind farm low frequency noise causes adverse health impacts. The amplitude modulating characteristics of wind farm noise (also referred to as 'swooshing') that have anecdotally been associated with annoyance are in the mid-high frequency range and would be measured through standard dBA noise assessments.

**Shadow flicker**

In the review, the health impacts associated with shadow flicker from wind farms has not identified any peer reviewed epidemiological studies.

The key finding of the review revealed a lack of scientific evidence that wind farm shadow flicker can cause adverse health impacts. There is negligible risk of seizure from modern three bladed wind turbines which rotate at a speed that is below the level to elicit a seizure response in photosensitive individuals.

Guidelines for layout and design of wind turbines are in place to reduce the potential for shadow flicker to cause annoyance.

**Electromagnetic radiation**

In the review, the health impacts associated with electromagnetic radiation (EMR) from wind farms has not identified any peer reviewed epidemiological studies.

The key finding of the reviewed literature is that there is no scientific evidence that wind farm EMR can cause adverse health impacts. There is anecdotal evidence that wind farms generate EMR at the same level as household appliances but no peer reviewed studies are available to confirm that this is the case.

A 2014 study published by the Journal of Environmental Health looked at the measurement of EMR fields around wind turbines in Canada, and stated that no increase in magnetic field could be detected more than two metres away from the base of turbines.

**Summary**

The general consensus of public health agencies and academic researchers identified in the reviewed literature concludes that there is no scientific evidence of an association between exposure to wind farms and adverse health impacts. This applies to noise, low frequency noise, infrasound, shadow flicker and EMR.

The assessment found that the direct evidence represented by epidemiological studies of wind farms and health are in general poor quality and limited in scope.

### 10.7.3 Land values

In response to a number of submissions raising concerns of the potential adverse impacts of wind farms on property values, an independent research report was commissioned to investigate the empirical and peer reviewed studies relating to the potential for property value impacts from wind farms. The full research report, Assessment of the Impact of Wind Farms on Surrounding Land Values in Australia (Robert R Dupont, 2013), is provided in Appendix I, Volume 3. The following provides a summary of this report and in particular the findings for the potential for impacts on property values.

**Background**

The potential for adverse impacts upon property values from the development of a wind farm is a common source of community concern. These perceptions are understandable as visual impacts that alter the aesthetics (i.e. views) of a property, and the surrounding noise levels, are known to be able to positively and negatively affect property values (Simons & Saginor, 2006 cited in Hoen & Wiser, 2008). An example of this are properties with water views generally sell for a higher price than properties under aircraft flight paths in a similar locale (Robert R Dupont, 2013).

The aesthetics of a view of a wind farm are affected by the distance the observer is located away from the wind farm, the positioning of the wind farm and the number of turbines. However, whether the view of a wind farm is

considered to be a negative one or not is largely subjective and studies looking at people's perceptions often find varying opinions (Bond, 2009; RICS, 2004).

While wind farms do influence the visual and acoustic environment, statistical studies analysing sales transaction data to date have not found consistent evidence of obvious discernible negative impacts on property values due to the presence of wind farms (Robert R Dupont, 2013).

Assessing the impact of wind farms is tempered by the fact that there is relatively limited objective information available on this issue.

**Australian experience**

A review of wind farms currently operating in Australia revealed that they have been developed in locations generally removed from densely populated areas. As a result the small sample of sale transactions available for analysis limits the extent to which conclusions can be drawn (Robert R Dupont, 2013).

The major empirical study in Australia (Dupont – PRP, 2009) found that wind farms do not appear to have negatively affected property values in most cases. Forty of the 45 sales investigated at a total of eight established Australian wind farms did not show any reductions in value. Five properties were found to have lower than expected sale prices based on a property market analysis. However, it is noted that property prices at some locations were found to have a higher than expected sale value (Duport – PRP, 2013).

The 2009 Dupont – PRP study also suggested that a property's underlying land use may affect the property's sensitivity to price impacts. No reductions in sale prices were evident for rural properties or residential properties located in nearby townships with views of the wind farm. The results for rural residential properties (commonly known as 'lifestyle properties') were mixed and inconsistent; however, there appeared to be possible reductions in this sector where a perception exists that the visual or acoustic environment were compromised.

There are limited other Australian statistical or transaction based studies and reports. However, the report titled Assessment of the Impact of Wind Farms in Surrounding Land Values in Australia (Robert R Dupont, 2013) has provided a summary of the findings of the existing Australian statistical and transaction based research (see Appendix J, Volume 3). Generally, these studies confer with Dupont – PRP, 2009, showing limited reductions in property values in proximity to wind farms with the greatest potential for impact being on 'lifestyle properties' (properties over 2,000 square metres in size but in use for primarily residential purposes only). Given the Australian context of this study, it is reasonable to expect that the finding that wind farms do not appear to have a negative effect on property is applicable to the Project.

**International experience**

Dupont – PRP (2013) compared Australian studies to independent statistical or transactional based studies throughout the world using countries where wind farms are more established and are generally in higher density areas than Australia, and therefore have a greater amount of data. See Appendix I, Volume 3 for the full summary of these international studies.

Generally, the international statistical and independent studies found little effect on property values from wind farms; however, several of the studies acknowledged that some 'anticipation' stigma is probable. That is, there is a potential for property value reductions in the planning and concept phase but disappearing after time (Robert R Dupont, 2013).

All studies indicate that any effect disappears beyond a distance of 1 km to 2 km between a turbine and residential dwelling. A 2011 German report (Sunak & Madlener) identified a decrease in the order of 10% in property values in close proximity to turbines where the physical and audible effects were present. This decrease was not present at a distance of 2 km from turbines. Other studies indicate that property value impacts due to visual proximity are negligible (Dupont, 2013).

A study conducted in England over a 12 year span found that the price impact of wind farms is comparable to other tall power infrastructure, such as high voltage power lines (Gibbons, 2013). Evidence of a wholly positive or negative impact to property values is still inconclusive.

The study by Gibbons (2013) is in contrast to the findings from other similar studies; however, the author notes that the study is not conclusive and does not look at the whole lifecycle of a wind farm. The study also makes simple assumptions about the visibility of wind farms, when in reality many sites will be hidden from view by buildings, trees and the local landscape.

**Perceptual studies**

In addition to the above research utilising property sales transaction data, there has also been research conducted into local residents' and industry professionals' opinions on the effect of wind farms. Perceptual research generally indicates that a small proportion of the public, both in Australia and internationally, believes that wind farms negatively affect property values (Robert R Dupont, 2013).

While anecdotal evidence of a decrease in values is not supported by empirical or statistical evidence, it is recognised that large statistical studies may not account for all the variables that influence value. A full summary of the salient perceptual studies is provided in Appendix J, Volume 3.

Studies conducted on the perceived impacts of wind farms and how perception effects social acceptance have found that education and early community consultation are key mitigation tools to negate opposition. A study conducted by the CSIRO on Australian wind farms found that a key factor that turned local communities away from wind farms was the lack of power they felt within the decision making process. By engaging the community in each stage of the proposal and subsequent development, a sense of involvement and decision making power was given back to the community, resulting in a more positive output (Hall, Ashworth, 2013). Transparency and trust have been named as some of the most important elements to consider throughout the development process.

There is a social gap between the positive public or 'global' opinion of wind farms, and the often negative perception of wind farms and turbines at a local level. This can often be attributed to NIMBYism (not-in-my-back-yard-ism) (D'Souza, Yiridoe, 2014). This attitude is driven by a lack of understanding and preconceived ideas surrounding wind turbines and their impacts on factors such as health, noise and property value (D'Souza, Yiridoe, 2014). This can also be attributed to what has been termed the 'silent majority'; a vocal minority of people opposed to a development can make themselves heard across multiple platforms, including local community platforms, media and more recently, social media, while the silent majority of supporters or ambivalent members of the community are unheard (D'Souza, Yiridoe, 2014).

The application of this theory, and how perceptions of a wind farm can change between pre and post installation, was conducted on the Roskrow Barton wind farm, in Cornwall, UK. This project consists of two 70 metre tall turbines on a rural property. The proposal was denied in 2002 and 2003 at local levels, with an appeal allowing it in 2004, with construction being completed in 2008. Pre-installation saw a strong opposition to the project, with the majority of concern surrounding visual amenity, noise and property values. Strong opposition was experienced pre-installation. Five years post installation has seen the area turn to a majority supportive or ambivalent attitude toward the turbines (Wilson, Dyke, 2016). A 'U' shaped curve of acceptance has been sighted for this development, with support waning throughout the planning process, flat-lining at the construction phase, and becoming more positive after the installation had occurred (Wilson, Dyke, 2016).

**Summary of potential impacts**

Uncertainty surrounding results appears to be a common finding in many statistical and perceptual studies on the impacts of wind farms on property values. Property market studies will always be influenced by the subjectivity accompanying a property purchase decision. Additionally, a very wide range of (often interacting) property features affect the price paid. These factors often militate against statistical analysis (Robert R Dupont, 2013).

Based on Dupont – PRP's 2013 analysis of independent studies, the majority of wind farms erected in Australia appear to have had no quantifiable effect on land values. A relatively small number of residences and 'lifestyle' type properties located very close (less than 500 metres) to wind farms in Victoria were found to have lower than expected sale prices, and it is possible that audio and visual aspects of wind farms contributed to this (Robert R Dupont, 2013).

It is noted that any effect on property values that may be apparent will be predominantly determined by the proximity of a turbine to an actual residence. Proximity to a property boundary does not appear to have any quantifiable effect (Robert R Dupont, 2013).

Current evidence suggests that any such wind farm related impacts on land values can be readily alleviated by ensuring a suitable separation distance between the wind turbines and any nearest residential dwellings. A general consensus of this distance is that within the 1 km to 2 km range any impact is mitigated, although this can differ from project to project and site to site (Robert R Dupont, 2013).

Robert R Dupont (2013) notes that an increase in the time it takes to sell a property might be a possible effect of wind farm developments. As opinions around wind farms can be polarised, with some in support and some

refusing to live near one, the potential market may be reduced. However, this does not seem to be translated into reduced sale prices for the majority of sales data investigated (Robert R Dupont, 2013).

A number of studies have identified a 'perception' stigma, usually manifesting itself in the initial or planning stages of a project when uncertainty is at its highest. This stigma generally subsides as the project progresses to the stage where the economic benefit starts to flow to the community and property values can actually increase at a rate greater than 'unaffected' land (Robert R Dupont, 2013).

With appropriate controls and mitigation measures in place, it is anticipated that land values will not be adversely affected in the long-term. Mitigation will include the application of operational noise criteria and appropriate setbacks from residences.

### 10.7.4 Employment and income

**Employment**

The Project is expected to create approximately 350 full-time jobs during the peak construction phase (although the employment follows a bell curve with fewer people being employed at the start and end of the project), while approximately 15-20 full-time jobs are likely to be created for the operational phase. AGL seeks to employ local people for the construction and operational jobs where possible, and is committed to ensuring these workers are skilled-up where necessary.

In order to assist the construction contractor to use local suppliers, contractors, employees and engage with local businesses, information about local business capabilities will be sourced and provided. AGL will also require the construction contractor to engage with local businesses and the local community to facilitate engagement between the construction contractor and local businesses and wider community. This aims to assist in matching available local skills and resources with opportunities during construction and operation of the Project. Technicians, trade workers, labourer, machinery operators and drivers account for approximately 30% of the Project region's occupations (Section 10.6.2), enabling recruitment from the local area. There are not anticipated to be any labour supply issues or requirements for a fly-in-fly-out (FIFO) or drive-in-drive-out (DIDO) workforce. There are no anticipated impacts on Queensland or national workforces from the Project.

The Toowoomba and Surat Basin Enterprise (TSBE) is an independent regional economic development organisation formed by forward-thinking business and industry leaders to empower the local business community and promote sustainable economic growth. AGL will work with TSBE to assist in establishing local procurement processes and developing the necessary training programs to up-skill local employees where necessary.

Aleis Pty Ltd (Aleis) invent, design and manufacture radio-frequency identification (RFID) readers for the livestock industry and maintains its head office in Jandowae, and a research and development operation at Niagara Road, Jandowae, at the property known as *Kincorra*. Aleis has local employees and conducts research and development activities at *Kincorra*. The research and development activities will not be impacted by the Project and therefore there will be no impact to the research and development activities, and employees, of Aleis. For further information regarding electromagnetic interference refer to Chapter 7 Electromagnetic Interference.

Impacts upon existing agricultural practices within the Study Area are anticipated to be minimal, and largely restricted to the sites of installed infrastructure. Construction activities will need to be coordinated with the landowners directly involved (AGL has agreements with these landowners) with the Project to minimise disruptions to their existing agricultural activities. In the long-term, these landowners will benefit from improved access around their properties due to the access roads constructed for the Project. The Project is therefore not expected to adversely impact on employment in the Agricultural sector.

**Income**

Land owners that are involved with the Project (i.e. those with turbines on their property) will receive financial benefits from the proponent during the construction and operation of the Project. These financial benefits will be in addition to those generated from their agricultural activities, and will be administered through agreements to lease. This additional income may increase the level of spending by landowners within the region.

The construction and operational workforce employed for the Project will experience a direct income benefit and may also provide some localised financial benefits to the local area, through spending on goods and services.

### 10.7.5 Local economy

ERM (2008) estimates that the Project will contribute approximately $4 million annually to the local economy throughout its lifetime. This figure is based on anticipated licence payments, rates, community support and employment salaries.

The capital cost value of the Project is estimated to be approximately $500 million, inclusive of turbine components, civil and electrical installation costs, and supply of equipment. Whilst wind turbines are imported from overseas, a significant proportion of the capital cost would be spent within the surrounding region.

A 2010 study for the Hallett Wind Farms (SKM, 2010) suggested that accommodation and food service providers experienced increased sales, local contractors have been employed, and overall business expenditure in the region was more buoyant with additional people and expenditure as a result of the wind farm development.

It is expected that the Project will have a positive impact on the local economy throughout construction and operational phases.

### 10.7.6 Social infrastructure

It is expected that the majority of employees for the construction and operational phases of the Project will come from the local community. It is therefore unlikely that an impact upon social infrastructure will be felt. In addition, the social infrastructure within the Project Region amply provides for the social needs of the community. Within 50 km of the Project Site there are; 13 child care centres, 31 schools, six hospitals, seven mental health service centres and 31 various community services.

AGL's corporate citizenship program, Energy for Life, is just one way AGL is partnering with the community. Established in 2003, Energy for Life delivers support to the community through strategic partnerships, and gives AGL employees the opportunity to get involved in causes they are passionate about by participating in matched workplace giving and paid volunteering leave programs. AGL invested over $2.7 million in the community during Financial Year 2015.

AGL will establish a fund to contribute to the Project's local community through financial support for community based initiatives, projects and events. The Community Fund targets a range of community needs including: health, social welfare, safety, environment, education and youth, sport, recreation, culture, arts and economic development.

The Community Fund Program aims to:

- Deliver community wide benefits and to strengthen AGL's existing links with the local community
- Support the work of existing and future community organisations
- Encourage local community innovation and support for issues of community significance
- Promote local awareness and education supporting the benefits of sustainable renewable energy
- Continue to build and maintain strong relationships with the local and wider communities.

### 10.7.7 Agricultural activities

Agricultural, forestry, farming and related activities are a predominant local employer (ERM, 2008) and have a flow on economic effect through agricultural supplies and contracting. Changes to the viability of agricultural businesses may have impact on local employment and economy.

Agricultural activities in the area can be broadly divided into 'cropping and horticultural activities' and 'grazing and animal husbandry'.

Cropping and horticulture generally relies on areas of uninterrupted high quality agricultural soils. The Project will not be located on intensive cropping and horticultural properties and therefore the Project is unlikely to impact upon the viability of these agricultural activities and businesses.

The Project will be located on properties which are predominantly used for grazing and animal husbandry activities. Wind turbines, roads and associated infrastructure will occupy in the order of 1% of the combined land area of properties they are located on. This represents a minor reduction in land that could be used for agricultural purposes. Access roads constructed as part of the Project will benefit agricultural activities through improved access for day to day operations and by providing fire breaks and improved firefighting access. Wind turbines may provide additional benefits for livestock such as shade and shelter.

Formal research into livestock and horses is limited, partly because there is very little evidence of wind farms adversely impacting large mammals. Some overseas research has been conducted into the impact of wind turbines in other ungulates such as elk and semi-domestic reindeer. Expert opinions from Germany have concluded that wind turbines have negligible impacts on horses (Garrad Hassan, 2011).

The scarcity of formal research into the impact of wind turbine on livestock and horses is reflective of the fact that these animals have resided harmoniously alongside wind turbines for a long time, in many locations and there has therefore been no pressing need to conduct research in this area (Garrad Hassan, 2011). Therefore, it is considered that there is unlikely to be a negative impact on the long term viability of grazing and animal husbandry in the Study Area.

It is not expected that the Project will have a negative impact on agricultural businesses and activities and therefore no impact is likely to occur upon local employment and the aspects of the local economy that are directly and indirectly reliant on agricultural businesses and activities.

### 10.7.8 Tourism

ERM (2008) state that the Project is likely to have a positive impact on tourism within the region. However, it is noted that tourism at the Project Site will be a secondary outcome. The financial success of the Project will not be reliant on tourism visitations. The Australian Wind Energy Association (AusWEA) provide examples from 2002 that indicate tourist interest in wind farms in Australia. These include examples such as:

- Albany (Western Australia) – The Albany Wind Farm has become a popular tourist attraction, which is open to the public every day of the year, and entry is free. The wind farm features a large car-parking area, and many boardwalks complemented by artwork and information panels (Verve Energy, 2006). Approximately 100,000 people visited the wind farm in 2003 (ERM, 2008).
- Codrington (Victoria) – As one of Victoria's first wind farms, the Codrington Wind Farm has proved to be a popular tourist attraction. The wind farm includes a large car park and viewing platform. Tourist interest in the wind farm has instigated the Codrington Wind Farm Tours, which run up to six days per week, and offer tourists an informative insight into the daily operations of the wind farm, and a detailed history of the original farm on which the wind farm is installed.
- Woolnorth (Tasmania) – A visit to the Woolnorth Wind Farm in Tasmania is part of a number of tours that are run throughout the year and take tourists to places of interest in the north-west of the state.
- Toora (Victoria) – The Toora Wind Farm in South Gippsland includes a viewing area which is frequented often by busloads of tourists.

The Project will be the largest wind farm in Queensland and one of the largest in Australia. As such, it is anticipated that the level of tourist interest in the Project will be high, and is likely to reflect the examples provided above. It is expected that the Project will become an additional attraction for tourists within the South Burnett and Western Downs Regional Council areas, and that local enterprise opportunities will exist for business owners that would like to capitalise on the likely influx of tourists into the area.

## 10.8 Mitigation measures

The Project is not expected to have any significant adverse social or economic impacts. Notwithstanding this, a stakeholder communication plan will be implemented during the construction and early operation of the Project to provide details on the wind farm and construction activities and to provide a forum for discussing and managing any community concerns.

AGL is committed to the ongoing economic, physical and social health of the Project Region community. A key aim of the Project is to utilise local industry and resident participation, driving ongoing positive community outcomes. The Project aims to provide ongoing direct and indirect investment into the local community. This will be achieved through a Local Industry Participation Plan (LIPP) and Indigenous Participation Plan (IPP). The Resources and Energy Sector Code of Practice for Local Content does not apply to the Project as AGL has committed to preparing a LIPP.

The LIPP entails:

- Attempting to purchase, where possible, local goods and services to benefit the regional economy
- Employing, where possible, local personnel to benefit the regional economy

- Encouraging contractors to utilise goods and services where possible to benefit the regional economy
- Tenders to include an IPP, including number of Indigenous employees projected to be included, expected expenditure with Indigenous businesses, and Indigenous communications plans
- Tenders to include a Local Content Plan, detailing plans for local employment and supply chain participation.

In addition to the LIPP, impact and mitigation action plans will be prepared for the project including a Workforce Management Action Plan, Housing and Accommodation Action Plan, Stakeholder and Community Consultation and Engagement Action Plan, and Social Infrastructure, Community Health and Well Being Action Plan. These plans will be developed in consultation with the local councils to ensure that the plans are successfully implemented. The aforementioned plans will be refined during detailed design and the tendering process. Should there be changes in local workforce or housing availability, Project plans may be amended accordingly.

AGL subscribes to EAP (employee assistance program) which provides a hotline and confidential support services for the health and wellbeing of employees. This will be accessible to all employees during operations.

The Project is not expected to have an adverse impact on tourism in the region. Conversely, it has the potential to enhance tourism which will be promoted by making material available at local tourist information centres.

## 10.9 Residual impacts

Potential social and economic impacts resulting from the Project are considered to be largely beneficial. The application of mitigation measures identified in Section 10.8 will promote the likely beneficial impacts of the Project within the region. Any residual adverse impacts are not considered to be significant and will be captured through an adaptive stakeholder communication strategy.

## 10.10 Cumulative impacts

The aim of conducting a cumulative social impact assessment is to assess the cumulative impact of concurrent large projects on the Project Region. Consideration of cumulative social impacts include possible labour drain, housing shortages and strain on community and social services.

Many of the projects listed in Table 10.7 may run concurrently with the Project, with some having dedicated housing, health and recreational facilities provided in camps for their employees. However, these projects may still pose some impact upon health, education, employment and social services within the Project Region and therefore consideration of potential cumulative effects is necessary.

This socio-economic assessment has shown that the Project workforce will be sourced largely from the local community, who are already accounted for in the provision of social infrastructure. It is therefore considered that the Project will not exacerbate strain on the above mentioned social infrastructure.

Information to inform the cumulative social impact assessment is based on descriptions of other similar scale projects to the extent that such data was publicly available at the time of this assessment. The cumulative situation may change as applications are made or withdrawn. Therefore, the cumulative assessment is current as of July 2016. Should a major construction project commence during the Project's construction, AGL would be open to participating in joint community consultations with other proponents where appropriate. AGL would endeavour to minimise any potential cumulative impacts on social services (including health and emergency services), local roads and other infrastructure, and reduce potential disruptions to the local community in conjunction with other proponents.

**Table 10.7 Coordinated projects within and surrounding the Project Region**

| Project name | Location | Description | Distance & direction from site boundary | Consideration in the cumulative social impacts |
|---|---|---|---|---|
| Tarong Northern Land Ash Emplacement Project | North-west of Yarraman (between Tarong and Yarraman State Forests) | Construction of an additional ash storage facility to service both the Tarong and Tarong North power stations. It will ultimately be approximately 50 m high with a moderate slope of 1:8 (height: width). The project is currently proceeding (due for completion by 2030) | Approximately 60 km east of the Project Site boundary | **No**:<br>The Tarong Northern Land Ash Emplacement project has been taken into account when assessing the level of housing stock, social service usage and employment in the region. The Project is not expected to impose significant impacts to the region's labour force or housing stock when considered in conjunction with this project. |
| New Acland Coal Mine Stage 3 | 35 km north-west of Toowoomba | Expansion of the existing New Acland open-cut coal mine, from 4.8 million tonnes per annum (Mtpa) to up to 7.5 Mtpa The project is currently proceeding | Approximately 89 km south east of the Project Site boundary | **No:**<br>The New Acland project has been taken into account when assessing the level of housing stock, social service usage and employment in the region. The Project is not expected to impose significant impacts to the region's labour force or housing stock when considered in conjunction with this project. |
| South Burnett Coal Project | Approximately 6 km south Kingaroy and 17 km north-west of Nanango. | Proposed development of a thermal coal mine producing up to 10 Mtpa of coal. The project was a declared a 'coordinated project' in August 2016. | Approximately 35 km east of the Project Site | **No:**<br>The South Burnett Coal Project has been taken into account when assessing the level of housing stock, social service usage and employment in the region. The Project is not expected to impose significant impacts to the region's labour force or housing stock when considered in conjunction with this project, particularly as the South Burnett Coal project is proposing to accommodate workers in camps.<br>The South Burnett Coal project proposes to utilise the D'Aguilar Highway via Kilcoy during construction. The indicative transport route for the Coopers Gap |

| Project name | Location | Description | Distance & direction from site boundary | Consideration in the cumulative social impacts |
|---|---|---|---|---|
| | | | | Project Site is the Warrego Highway via Dalby. Cumulative impacts on the road network are not expected to be significant, however, should the South Burnett coal project obtain approvals and finance to proceed, and an overlap of construction phases occurs, AGL will work with local councils and the Department of Transport and Main Roads to manage potential impacts to the road network. |
| Wetalla Water Pipeline | The pipeline will run from the Wetalla Wastewater Reclamation Facility in Toowoomba to the New Acland coal mine | A 45 km underground water pipeline to supply treated wastewater to the New Acland coal mine. The project is currently proceeding and is due to be completed in 2017 | Approximately 106 km south east the Project Site boundary | **No:** The Wetalla Water Pipeline project has been taken into account when assessing the level of housing stock, social service usage and employment in the region. The Project is not expected to impose significant impacts to the region's labour force or housing stock when considered in conjunction with this project. |
| Australia Pacific Liquefied Natural Gas (LNG) (Origin) | Between the Walloons gas fields (from Injune to Millmerran) and Gladstone | Development of an integrated liquefied natural gas project in Queensland comprising three principal elements:<br>- further development of its coal seam gas (CSG) resources in the Walloons gas fields stretching from Injune to Millmerran;<br>- construction of a 450 km underground gas pipeline from the gasfields to Gladstone; and<br>- development of an LNG processing plant and export terminal on Curtis Island near Gladstone | Approximately 140 km west of the Project Site boundary | **No:** The operational impact of this development and the Project would be experienced separately due to the large distance between them; therefore cumulative impacts are not expected. |

| Project name | Location | Description | Distance & direction from site boundary | Consideration in the cumulative social impacts |
|---|---|---|---|---|
| | | comprising four gas trains with a total capacity of up to 18 million tonnes per annum of LNG.<br>- Project ongoing (due for completion 2035) | | |
| Surat Gas Project | Dalby, Chinchilla, Kogan, Jandowae, Miles | Ongoing development of an integrated liquefied natural gas project in Queensland comprising further development of its coal seam gas (CSG) resources with associated gas well and processing infrastructure | Approximately 30 km west of the Project Site boundary. | **No:**<br>The Surat Gas project has been taken into account when assessing the level of housing stock, social service usage and employment in the region. The Project is not expected to impose significant impacts to the region's labour force or housing stock when considered in conjunction with this project. |
| Queensland Curtis LNG | Between the Surat Basin and Gladstone | An integrated liquefied natural gas project in Queensland comprising:<br>- expansion of coal seam gas operations in the Surat Basin to provide gas for two liquefied natural gas plants or trains and gas for domestic markets;<br>- development of a gas and water pipeline network of approximately 800 km; and<br>- development of the LNG processing and export facility on Curtis Island, near Gladstone.<br>The Coordinator-General decided that the project can proceed subject to certain conditions contained in the report | Approximately 40 km west of the Project Site boundary | **No:**<br>The Queensland Curtis LNG project has been taken into account when assessing the level of housing stock, social service usage and employment in the region. The Project is not expected to impose significant impacts to the region's labour force or housing stock when considered in conjunction with this project. |
| Toowoomba Second Range Crossing | New highway north of Toowoomba | New second range crossing, with tunnel to bypass Toowoomba | Toowoomba (130 km) south east the Project Site boundary | **No:**<br>The operational impact of this development and the Project would be experienced separately due to the large distance |

| Project name | Location | Description | Distance & direction from site boundary | Consideration in the cumulative social impacts |
|---|---|---|---|---|
| | | | | between them; therefore cumulative impacts are not expected. |
| Warrego Highway Upgrades | Upgrades through sections of Toowoomba, Chinchilla and Dalby | Various upgrades to the Warrego Highway are proposed in the vicinity of Toowoomba, Chinchilla and Dalby. This includes a number of duplication projects | Toowoomba-Charlton (130 km); Chinchilla (90 km); Dalby (60 km) | **No**: The Warrego Highway Upgrades project has been taken into account when assessing the level of housing stock, social service usage and employment in the region. The Project is not expected to impose significant impacts to the region's labour force or housing stock when considered in conjunction with this project. |

## 10.11 Summary and conclusions

The Project is expected to have a positive economic stimulus within the region including employment, income, business development and tourism within the surrounding area.

No long-term impacts on land values are anticipated to result from the construction or operation of the Project.

A literature review of scientific, peer-reviewed publications does not provide any evidence that noise, shadow flicker or electromagnetic interference has an adverse effect on human health. Therefore, it is not anticipated that the operation of the Project will cause adverse health impacts.

Being a relatively significant Project within the region and the State, there is opportunity for the wider community to benefit from the Project through up-skilling and employment during construction and operation.

From a regional, State and national perspective, the Project will contribute to the achievement of legislation and policy around renewable energy generation and ecologically sustainable development.

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