APPENDIX P SOCIO ECONOMIC IMPACT ASSESSMENT

HILLS OF GOLD WIND FARM - SOCIO-ECONOMIC IMPACT ASSESSMENT

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Independent insight.

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GLOSSARY

ABS – Australian Bureau of Statistics

ANZSIC – Australian and New Zealand Standard Industrial Classification

ASCO – Australian Standard Classification of Occupations

BIC – Broad Industry Category

CAGR (%) – Compounded Annual Growth Rate

DPIE – Department of Planning, Infrastructure and Environment

GRSP – Greater Sydney Region Plan

GS – Greater Sydney

HR – Human Resource

I-O – Input Output

LEP – Local Environmental Plans

LGA – Local Government Area

NENW – New England North West

POW – Place of Work

PP (%) – Point Percentage

PUR – Place of Usual Residence

SA2 - Statistical Areas Level 2

Subset- Refers to the categories of employment that go deeper than a BIC or 1-digit ANZIC, mostly referring but not limited to 4-digit ANZICs.

TPA – Transport Performance and Analytics

TZP – Travel Zone Projection

VET – Vocational Education and Training

YE – Year End

EXECUTIVE SUMMARY

Proposed development

Hills of Gold Energy is a proposed wind farm located between Hanging Rock and Crawney, approximately 8km south of Nundle and 50km south-east of Tamworth. The wind farm is expected to have a power output of up to 400 megawatts (MW). The layout of the wind farm includes up to 70 wind turbines[1], underground cabling, a substation, meteorological monitoring masts, and ancillary facilities.

The development includes a funding commitment for the Community Enhancement Fund. The fund is $2,500 per wind turbine per year installed and operating up to 35 years. The fund will be established to support local residents close to the development area for opportunities and lifestyle enhancement[2]. Furthermore, a voluntary Neighbour Benefit Sharing Program will be established. Annual payments will range from $1,500 to $6,000 for those living within 5km of turbines built.

The project will be assessed under the State Significant Development planning pathway by the NSW Department of Planning, Industry and Environment (DPIE). The current status of the project is the preparation of an Environmental Impact Statement (EIS) in consideration of the Secretary's Environmental Assessment Requirements (SEARs).

The objective of this study is to conduct a socio-economic assessment of the proposed development. SGS Economics and Planning have used qualitative and quantitative methods to evaluate the social and economic benefits of the project, including:

- Socio-economic profiling of the Tamworth Regional Local Government Area (LGA), Upper Hunter LGA and Liverpool Plains LGA, using ABS Census data
- Strategic policy review
- Literature and case studies review
- Local stakeholder engagement (held end of March/beginning of April 2020)
- Economic impact assessment of construction and operations
- Net community benefit assessment summary.

Key conclusions of the study

Qualitative and quantitative research methods have been used to conduct a socio-economic assessment on the proposed wind farm development.

A net community benefit rating has been applied to the identified social and economic impacts in consideration of the proposed wind farm project and the research conducted, see table below. A rating has been given for current status as either positive/negative and low/medium/high (see column 2). A second rating has also been given as a potential post-mitigation measure if, and as, mitigation measures are rolled out and completed (see column 5).

Ratings were determined by the project team and aim to draw together the various components of research conducted, to provide a concluding assessment on the wind farm project and its potential future impact. In some cases, due to the nature of the impact (e.g. visual amenity and health) no rating was provided.

[1] Someva Renewables, 19/08/2020
[2] Hills of Gold Energy, 2018, https://www.hillsofgoldenergy.com/news-and-updates, date accessed: 22/04/2020

TABLE 1: NET COMMUNITY BENEFIT ASSESSMENT AND RATINGS

Socio-economic impact	Rating	Mitigation measures	Potential post-mitigation rating if measures applied
Social			
Impact on community attitudes and sense of community	Low (negative)	Mitigation measures: Transparency and collaboration during the wind farm development process. Compensation, contributions, careful planning and management of infrastructure between the developer, local residents, the operator and tourism providers during and post-construction. Project: Engagement demonstrated a mix of attitudes are held towards the project within the community (opposition, neutral, support). Division in the community is likely to remain, however the depth of this may reduce overtime. Since engagement was completed, the proponent has continued to collaborate with the community, particularly in the area of road safety, visualisations and compensation.	Low (negative) - neutral
Perceived impact on visual amenity of the surrounding natural landscape	Visual amenity is a site-specific issue (e.g. the turbines will not be visible from many sites) which is difficult to aggregate up into a single rating. See the visual amenity report for more details.		
Impact on local safety and local road infrastructure	Low (negative)	Mitigation measures: Appropriate safety measures should be determined in relevant construction management plans (i.e. Road upgrades such as sealing of Morrison Gap Road to improve road safety and local infrastructure). Project: The key safety concern raised during engagement by 2 respondents was local road safety during the construction period. The proponent is preparing a traffic and transport assessment and has consulted with Morrison Gap Road residents to ensure a balanced distribution of benefits aligned to level of impact.	Low (positive)
Perceived impacts on human health	There is much uncertainty around health impacts as suggested by the literature review, however it is suggested that many health impacts are subjective based on individual human physiology and development context. Adherence to NSW guidelines for wind farm development to reduce potential health impacts. These guidelines are noted as being some of the most stringent in the world.		
Creation of education opportunities	No impact	Mitigation measures: Working with local education providers and authorities to develop future opportunities. Project: UNE Armidale offers degrees in sustainability and environmental science. The literature review indicated there are examples of links made between educational institutions and wind farms. No current links could be determined between this project and developing education opportunities at this point in time. Stakeholders can collaborate in the future to develop opportunities.	Low (positive)

Potential impact on local financial gain (eg: community funds)	Medium (positive)	Mitigation measures: Having appropriate governance structures in place to ensure proper financial management of funds and for benefits realisation for the local community. Project: Community Enhancement Fund Charter has been created to ensure proper management of funds. The Neighbour Benefit Sharing Program has been established. Meetings held with Morrison Road Gap residents to ensure balance distribution of benefits.	High (positive)
Potential negative impact on local businesses	Low (negative)	Mitigation measures: Consideration during the design phase to minimise visual impact to property or land holders. Work with affected stakeholders. Project: One respondent suggested the project could result in direct financial loss. Others felt the project could bring more activity to local business. Economic modelling indicates there may be 430 on-flow jobs during construction and 53 during operational life.	Low-medium (positive)
Creation of local jobs/local skill creation	Low (positive)	Mitigation measures: Working with local authorities to promote and develop relevant skills/programs to engage community in local employment opportunities. Project: Economic modelling indicates in the short term (construction period) the project has potential to introduce 216 direct and 430 on-flow jobs to the local economy. In the long term (operation period) there is potential for 31 direct and 53 on-flow jobs during project life.	Medium (positive)
Impact on existing local tourism	Low (negative)	Mitigation measures: Work with local tourism operators and local authorities to minimise impacts. Project: There was a mix of responses from respondents during engagement as to how the project may impact the current tourism industry.	Neutral
Creation of new tourism opportunities	Medium (positive)	Mitigation measures: Work with local tourism operators and local authorities to develop new opportunities. Project: Would require stakeholders to collaborate to determine opportunities. The Community Enhancement Fund Charter (dated: 15/04/20) indicates one of the social/environmental criteria supports new tourism opportunities. The literature review indication that tourism opportunities can develop in relation to a wind farm.	Medium (positive)
Impact on property prices	Low (negative)	Mitigation measures: Consideration during the design phase to minimise visual impacts to properties. Project: Impact could differ based on whether the property is a residence or lifestyle property. Proponent has been working with the community to provide visual montages.	Neutral
Impact on the local natural environment	Medium (negative)	Mitigation measures: Consideration during the design phase to reduce impact. Adherence to NSW guidelines. Local policy directives state development must be balanced and sensitive to the natural environment and town centres.	Low (negative)

Impact on sustainability/wider environment	Medium (positive)	Mitigation measures: Conduct appropriate planning, design and construction studies to reduce environmental/sustainability impacts. Project: The project will contribute to renewable energy sources in NSW. State and local strategic policy supports the development of renewable energy in the NENW region.	-
Economic			
Increased income (value-add) during construction	Medium (positive)	Project: Estimated to be around $150 million ($100M discounted) in value-add	-
Increased employment during construction	High (positive)	Project: During construction, project is projected to provide around 220 direct and roughly 430 on-flow jobs.	-
Increased income (value-add) during operation	Low (positive)	Mitigation measures: Local stakeholders work to enhance local economy which may capture more skills/investment Project: Estimated to be around $16.0 million per year during operation	Medium (positive)
Increased employment during operation	Low (positive)	Mitigation measures: Local stakeholders work to enhance local economy which may capture more skills/investment Project: During operation, project is projected to provide approximately 30 direct and 50 on-flow jobs	Medium (positive)

The Hills of Gold proposed wind farm, in the short-term (construction phase), would have a significant positive economic impact with guaranteed financial gains. In the longer-term (operation phase), the project would continue to have a positive economic impact on the local economy. The project is expected to include capital expenditure of roughly $370 million (local regional economy) with approximately 650 jobs created during construction and around 80 jobs during its operational life.

Given the current COVID-19 situation and its negative impact on the economy, investment in projects of this kind could be considered positive for NSW and the local economy. Furthermore, socio-economic profiling conducted as part of the study highlighted the relevance of exploring new industries in regional NSW that could provide alternate sources of income for local communities given recent economic downturns as a consequence of drought (reducing agricultural outputs and transport industry movement). This could include wind energy for example. Profiling also indicated that there are local residents who have industrial and construction skillsets that may be relevant to the development of a wind farm locally, noting some specialist skillsets may be required.

Socially, the project has raised a number of differing responses from the community (opposition, neutral and support). During the community engagement some members of the community indicated there has been a reduction in social cohesion within the community as a response to the project. However, it is noted that engagement was a small sample size (11 interviews) and the views may not necessarily represent the breadth of views in the community. Community views can also change towards a major project overtime.

Since engagement was conducted, the proponent has continued to work with the community to, for example, confirm project design and layout, ensure a balance of monetary benefits (Morrison Road Gap residents), Community Enhancement Fund governance measures, provide visual montages to overcome visual amenity issues and confirm traffic, transport and safety measures to overcome any local road safety concerns. This suggests a collaborative approach has/is being undertaken with the community. It was identified in the literature

review that collaboration with the local community is a critical part of any wind farm development project which is therefore a positive outcome for this project.

No clear links have been made for educational opportunities in relation to this project. Respondents had mixed views as to whether the project would impact the local tourism industry. It was noted that the Community Enhancement Fund Charter includes social/environment criteria for the Fund that specifies new tourism opportunities. The literature review did reveal that there are examples education and tourism ventures occurring in conjunction with other wind farms. Local stakeholders would need to work together to leverage the tourism, education and local business opportunities/linkages that a wind farm in the Nundle locality would offer.

Health issues and impact on property prices were raised by some of the respondents during engagement. However, what the literature review has demonstrated is that these impacts can be subjective and are context specific.

At a wider scale, the proposed wind farm project would contribute to positive environmentally sustainable outcomes for not only the region but NSW as a whole, and this aligns strongly with State and local government policy making that supports the development of renewable energy sources in the NENW region, noting local policy supports development that is balanced and sensitive to the natural environment and town centres.

Therefore, the Hills of Gold wind farm project represents a positive addition to the local and wider NSW economy (with strong economic return in the short-term). It also represents an opportunity for NSW to continue to build its renewable energy capabilities and meet State and local policy objectives. Socially, the project has resulted in varying degrees of response from the local community (opposition/neutral/support) in relation to the different social impacts discussed throughout this study.

During the community engagement some members of the community indicated that the project has created some social tension within the community. This maybe the view of only a small number of people within the community. With time, any tension may reduce. Inherently, the project will change the natural and visual landscape near Nundle and this will impact a small number of people within the community to some degree (personal or business). The proponent has demonstrated that measures are being taken to mitigate the degree of these impacts. The project may also result in educational or new tourism opportunities for the local community/economy. Local stakeholders would need to collaborate in the future to develop these opportunities.

Additionally, a Community Enhancement Fund Charter[3] has been created in collaboration with the local community aiming to enhance and enrich community initiatives throughout the local community. The Charter was developed to enhance the community's quality of life and wellbeing. It identifies the roles, member eligibility, election process as well as scope, reporting and administration of the Community Enhancement Fund. There will be two funding rounds per year (projects to be approved May and November each year) and applications must align to one of four themes: community upgrades, social/environment, education, or flexible projects[4]. These themes were derived from community feedback. There will be a written application process and applicants are to prove eligibility against a set framework. Key requirements for projects stipulate they must directly benefit the community within 20km of the project; incorporate social or environmental improvement that could include tourism opportunities; and improve wealth and the lifestyle of the community.

The following sections in this Executive Summary summarise the qualitative and quantitative analysis completed as part of socio-economic assessment.

[3] Version 15/04/20. This is still a draft Charter (13th of October) and it is currently under consultation with Council
[4] Covers emergency projects related to flood, fire or other natural disasters

Socio-economic profile

There has been a decline of the regional NSW economy in recent decades. Consistent periods of drought and climate change are impacting on the agricultural industry and regional communities. As a result, it is pertinent to explore and consider other industries (such as wind energy) that could contribute to regional economies and provide employment.

Between 2006 and 2016, the New England North (NENW) region experienced low population growth compared to the neighbouring Hunter Valley region (excluding Newcastle)[5]. The region also has an ageing profile (which is typical of most regional areas of NSW)[6]. Large regional development projects can be one way of attracting more people, and a younger workforce, to live and work in a region.

All three LGAs have a significant proportion of resident population working in Industrial related jobs (this includes jobs types such as manufacturing, transport and utilities employment)[7]. There are also a fair proportion of people working in Population Serving industries in each LGA which includes construction related jobs[8]. The skillsets of these local residents may be beneficial for the construction of a renewable energy development in the region. People also tend to live and work in close proximity in the region which indicates that new, local job opportunities may be welcomed by local residents[9].

Both Tamworth LGA and the Upper Hunter Shire LGA had more visitors to the region for the purpose of a 'holiday' over 'visiting friends and relatives'[10] (see Section 2.3 - Tourism and 2.5 – Tourism). This indicates that there is a tourist market that is coming to region to explore and see sites, beyond just seeing family[11]. Additional tourist attractions to cater to these visitors may be of value to the region.

Policy context

National policy in relation to renewable energy remains a 'grey' area. In contrast, State and local government policy making for the NENW region has clearly identified renewable energy as an opportunity area.

A number of State and local government policy directives indicate 'green industries' are to be investigated; that NENW is to become a 'renewable energy hub' within NSW; that energy efficiency projects should be implemented; and that this is underlined by the community's view that achieving a sustainable future is imperative (see Sections 3.3 and 3.4). State and local government policy also supports local economic development and growth of local employment opportunities and expansion of tourism in the region.

Within the context of development however, government policy directives also highlight a need for a balanced and sensitive approach to development in the region where the natural environment and town centre environments need to be safeguarded (see Sections 3.3 and 3.4).

Wind farm literature review and case studies

In summary, the literature review revealed there can be a variety of responses and impacts associated with wind farms when considering socio-economic issues.

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[5] See Table 5
[6] See Figures 5, 9 and 13
[7] See Appendix 1 for a breakdown of job type by broad industry category (Industrial, Population Serving, Health and Education, and Knowledge)
[8] See Figure 8, 12 and 16
[9] The rate of self-containment (the proportion of residents that work locally) and self-sufficiency (proportion of local jobs filled by local residents) was high for all three LGAs (between 75-91%) included in the full write-up of the socioeconomic profiling in Appendix 2
[10] For Tamworth LGA this may be the result of the Tamworth Music Festival held in town each year.
[11] Noting the high rate of visitors to Tamworth LGA could be attributed to the major Tamworth Music Festival held in town each year

Social impacts

The literature review indicated that community attitudes to wind farm developments are often complex where an individual can often hold conflicting views. They may understand and, generally support, the growth of renewables as it can produce more sustainable outcomes for society at large. But, at the same time, these individuals can be opposed to having the development in their immediate surrounds[12].

Visual impact is often the most common cited reason for adversity towards wind farms. A study by the CSIRO noted that visual impact however is often subjective and influenced by history, attachment to place, and specification of the development[13].

Safety risks related to wind farms can be windy conditions, risk of falls, electrical risks and skill gaps. In the last two decades however, safety standards have increased in the industry and the number of recorded fatalities is considered low compared to other branches of the energy industry[14].

Concern over wind farms often also forms around exposure to noise. This in turn can result in stress, annoyance and sleep disturbance for individuals[15]. The impact of noise from wind farms however, can be subjective as perception and reaction to sound can vary dependent on human physiology[16]. Sounds produced from a wind farm can also vary depending on the type of turbine used, the distance of the listener to the turbine, landscape, time of day and weather conditions[17]. Several studies into wind turbine infrasound (or low frequency sound) all show that levels are significantly below audible unless the listener was located less than 100 metres from the nearest wind turbine[18].

Shadow flicker is the casting of a moving shadow due to the blades of a wind turbine rotating in front of the sun at certain angles and time of the day/year and can present a significant annoyance to affected residents. Prolonged exposure, of about 60 minutes or more, has been noted to cause transient stress related symptoms such as reduced concentration and elevated heart rates[19]. For shadow flicker to occur however, several of the physical factors must coincide (distance to turbine, day, time of year, angle of sun). This phenomenon can be predicted, therefore mitigation measures (for example micro siting, planting trees) during development should be employed to avoid impacts on local residents.

The Australia Institute notes opposition to wind farms can be skewed towards a vocal minority, and with many of the health impacts being strongly subjective there needs to be consideration of the objective evidence and the benefits that wind energy can lead to in terms of climate change and health[20]. Investment into cleaner energy sources can contribute to 'the greater good' by reducing premature mortality and healthcare costs associated with the negative impacts of fossil fuels.

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[12] Centre for Sustainable Energy UK, 2017, 'Public acceptance and community engagement', Common concerns about wind power, June, p. 59, 61

[13] CSIRO, 2012, Exploring community acceptance of rural wind farms in Australia: a snapshot, https://publications.csiro.au/rpr/download?pid=csiro:EP117743&dsid=DS3, date accessed: 10/03/2020, p. 35

[14] Centre for Sustainable Energy UK, 2017, 'Public acceptance and community engagement', Common concerns about wind power, June, p. 100

[15] Howlett, 2019, Wind Power: Australia's Wind Resources, https://www.integratesustainability.com.au/2019/06/26/wind-power-australias-wind-resources/, date accessed: 17/03/20

[16] Environmental Protection Authority Victoria, 'Wind farms, sound and health', https://ref.epa.vic.gov.au/our-work/environmental-public-health/environmental-health-in-the-community/wind-farms-sound-and-health, dated accessed: 17/03/20

[17] Environmental Protection Authority Victoria, 'Wind farms, sound and health', https://ref.epa.vic.gov.au/our-work/environmental-public-health/environmental-health-in-the-community/wind-farms-sound-and-health, dated accessed: 17/03/20

[18] Centre for Sustainable Energy, 2017, 'Infrasound, wind turbine syndrome and other health concerns', https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 118

[19] Centre for Sustainable Energy, 2017, 'Shadow flicker and epilepsy risk', https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 102

[20] The Australia Institute, 2014, *Wind Energy, Climate and Health*, date accessed: 04/03/2020

Economic impacts

The rent received by local residents from wind farm infrastructure located on their properties can provide a good income stream, particularly for communities impacted by drought or for retirees on property[21]. Conflict can occur however, with neighbouring residents who do not benefit from the rental income but have to live with the infrastructure in close proximity.

Wind farms do create employment (direct and indirect). However, the number of jobs is variable dependent on the stage of the development (construction versus operation) and the need for certain skillsets (such as wind turbine technicians) that may not be present in the local region. Indirect employment benefits can also accrue to local businesses who support the workers, although this depends on the ability of the closest town to be able to support the workforce. Benefits may drift to the closest major town instead if there is insufficient infrastructure to support a growing workforce.

The effect of wind farms on property prices is variable and is dependent on the distance from the property and other factors such as the position of the turbine. A review of several international studies tends to suggest that property prices, on the whole, are not dramatically affected by the presence of a wind farm[22].

The use of renewable energies is supposed to reduce air pollution significantly, in comparison to conventional energy generation technologies such as coal. As such renewables would have a positive effect on human health, and subsequently a reduced economic impact on the healthcare system.[23]

The impact of a wind farm on tourism is context specific and divergent. The size, scale, and distance of the infrastructure from the tourist attraction affects resident perceptions, as well as whether the resident was receiving a financial gain from the development. Views are also divergent as to whether the wind farm can attract tourists. In Germany, a study indicated that the construction of wind turbines had a negative relationship with the tourism industry, particularly locations that were inland[24]. In Portugal, the location of a wind farm 2km from a heritage site resulted in mixed local views[25]. In Scotland, a study stated that 93-99% of tourists surveyed indicated the presence of the wind farm would not affect their future visitation to Scotland. There was no difference between those who had a close experience with a wind farm and those who had minimal[26]. In Australia, there are examples of some wind farm generating visitor/tourism opportunities such as Gullen Range Wind and Solar providing community insight open days and Infigen Energy for Woodlawn Windfarm that holds an open day/fun run[27].

Case studies[28]

Hallett, South Australia

The Hallett Wind Farms consist of four closely located wind farms in the mid-north region of South Australia (167 turbines). The wind farms are located within 20km of the small

[21] CSIRO, 2012, Exploring community acceptance of rural wind farms in Australia: a snapshot, https://publications.csiro.au/rpr/download?pid=csiro:EP117743&dsid=DS3, date accessed: 10/03/2020, p. 40
[22] See Section 4.3 – Property Prices
[23] Jenniches, S.. Worrell, E. and Fumagalli, E, 2019, 'Regional economic and environmental impacts of wind power development: A case study of a German region', Energy Policy, 132, p. 499-514.
[24] Broekel& Alfken, 2015, 'Gone with the wind? The impact of wind turbines on tourism demand' Munich Personal RePEc Archive, https://mpra.ub.uni-muenchen.de/65946/1/MPRA_paper_65946.pdf
[25] Silva & Delicado, 2017, 'Wind farms and rural tourism: a Portuguese case study of residents' and visitors' perceptions and attitudes', Moravian Geographical Reports, pp. 248-256.
[26] Glasgow Caledonian University, Moffat Centre and Cogentsi, 2008, 'The economic impacts of wind farms on Scottish tourism'.
[27] Clean Energy Council 2018, 'Clean Energy Open Day', https://www.cleanenergycouncil.org.au/events/clean-energy-open-day, date accessed: 17/04/2020; Infigen Energy 2020, 'Run with the Wind', https://www.infigenenergy.com/community/run-with-the-wind/, date accessed: 17/04/2020.
[28] See Section 4.4

townships of Hallett and Mount Bryan. The four wind farms have generally not been well received by the local community throughout the construction and operation of the turbines. Socially, objections were generally related to health and visual impact. The development demonstrated the need to assess the visual impact of a wind farm to create a socially acceptable outcome. The development included the establishment of a community benefit fund.

One study of the Hallett wind farms indicated that an average of 98 construction workers had been employed at any given time from 2005 to 2010. It was estimated that the wind farms created up to 2400 full time 'job years' throughout construction and operation (as of 2010)[29]. Indirect benefits accrued to service providers and providers of accommodation in neighbouring towns of Burra, Jamestown and Clare.

Weatherford, Oklahoma, USA

Weatherford is a city of approximately 10,000 people in Western Oklahoma. Located approximately 35 km to the north-west in Custer County is the 'Weatherford Wind Energy Park' (98 turbines).

Studies into the socio-economic impacts of the project found the community was more supportive and aware of renewable energy as a result of the local presence of the Weatherford wind farm and they generally had positive sentiments towards the development. Concerns over loss of civic beauty were also mitigated by an agreement for US $25,000 to be committed by the developer to the improvement of public amenity.

Economic modelling indicated a direct employment benefit of 188 jobs during construction and 13 jobs during operation. Following construction, US$1.7 million in local expenditure is attributed to the wind farm each year, with US$600,000 in additional property tax (this is equivalent to land tax in an NSW context).

Taralga, NSW

The Taralga wind farm is located in the Southern Tablelands of NSW, commissioned in 2015. At the 2016 Census, Taralga was home to 465 people, and is similar in scale and character to Nundle.

There was significant community opposition to the wind farm. Concerned centred around visual impact, noise and ecological impact and resulted in 165 objections to the development proposal. Throughout the legal proceedings, the judge noted a prevailing conflict between the perceived social disbenefits at a local level, and the overall public benefit of renewable energy.

The wind farm resulted in approximately $103 million worth of construction jobs and $10.7 million in operation and maintenance[30]. There were some concerns that it became harder to sell hobby farms in the area since the wind farm's conception[31], although there does remain limited evidence relating to property values of residential or lifestyle properties near turbines[32].

A consistent and overarching lesson suggested by the literature was that collaboration, transparency and careful management of the infrastructure is required between local residents, tourism providers, the developer and operator. Local residents can be more

[29] Sinclair Knight Merz 2010, *Economic Impact Assessment Of the Hallett Wind Farms,* AGL, viewed 5 March 2020, <https://www.agl.com.au/-/media/aglmedia/documents/about-agl/how-we-source-energy/coopers-gap-wind-farm/assessment-and-reports/2011/missing-pdfs/south-australia-economic-impact-report-halletts.pdf?la=en&hash=686A14C92FB2FA0D9C66F3FDC14B5A6C>.

[30] SEREE, https://www.serree.org.au/projects/renewable-energy-trail/taralga-wind-farm/, date accessed: 200820

[31] Community Affairs References Committee 2011, *The Social and Economic Impact of Rural Wind Farms,* viewed 5 March 2020, <http://www.pacifichydro.com.au/files/2012/06/Senate-Enquiry-The-Social-and-Economic-Impacts-of-Rural-Wind-Farms-report.pdf>.

[32] Hall, N, Ashworth, P & Shaw, H 2012, *Exploring community acceptance of rural wind farms in Australia: a snapshot,* CSIRO, viewed 5 March 2020, <https://publications.csiro.au/rpr/download?pid=csiro:EP117743&dsid=DS3>.

receptive to a wind farm development if they are involved in the development process, understand its intent and their issues are solved through design, adherence to guidelines and careful management of the site. Social contributions or rental income also support greater acceptance of a wind farm development.

Community engagement

Eleven separate interviews were conducted over the course of late March/early April 2020. Several participants are Community Consultative Committee (CCC) members and some additional participants were independently selected by SGS to broaden the sample.

At the time of consultation, three out of the eleven respondents supported the windfarm; two respondents felt neutral towards the proposed wind farm. Five of the respondent felt opposed to the wind farm. One respondent did not disclose a position on if they supported, opposed, or felt neutral towards the wind farm.

The results from these engagements, as summarised below, represent a small sample of the community. Therefore, these results may not necessarily reflect the majority of views held in the community towards the project. Furthermore, since March/April 2020, the project has been refined (for example, the final layout produced) and the proponent has continued to inform/collaborate with the community on project developments.

Key issues and impacts discussed with the community during the eleven interviews are summarised as follows:

Social impacts

- *Community:* Nine respondents felt that the principle social impact was the division that the wind farm has created within the community.
- *Visual amenity:* Three respondents suggested that the proposal has had a material impact on wellbeing for some members of the community, especially people who have come to live in Nundle to enjoy natural amenity. Two respondents felt the wind farm was 'industrialising' the natural landscape. In contrast, two respondents felt the wind farm represented progress. Two respondents were awaiting clarification on the final layout of the construction site.
- *Human health:* Two respondents raised mental health and wellbeing as issues. Noise and light pollution were identified as other potential impacts to human health by three respondents. Two respondents raised the issue of local road safety.
- *Education opportunities:* Six respondents suggested skilled workers would be required and are likely to be 'drive-in, drive-out' and that educational opportunities to train unskilled workers were not available in the area.

Economic impacts

- *Direct financial gain:* Two respondents indicated that direct financial gain was not spread evenly amongst adjoining owners and wind farm hosts[33]. A respondent supported the proposal as they would be able to expand and diversify their income stream. Two respondents from adjoining properties to wind farm hosts suggested they would endure net direct financial loss because of the loss of visual amenity and the impact of the industrialised landscape. The Community Enhancement Fund was seen by a respondent as a major positive impact for Nundle. However, two other respondents questioned the governance structure and certainty over the long-term.
- *Job creation and income (value-add):* there were divergent opinions as to whether Nundle would benefit from new job opportunities from the construction and operations of the

[33] Noting the bulk of the consultation was held prior to the 9 April voluntary Neighbour Benefits Sharing Program listing on the Hills of Gold website.

wind farm. Two respondents believed that construction jobs would benefit the Nundle area. While six others believed that workers would be imported for the project and/or that people seeking jobs in Nundle did not possess the necessary skills for such jobs. Five respondents suggested that construction jobs would benefit Tamworth centre over the local centre. Once construction was complete, three respondents agreed that activity to the local area would recede. One respondent believed that operational workers and their families would locate in Nundle.

- *Tourism:* Respondent opinions were highly divergent in relation to the impact on visitation and tourism. Two respondents suggested key tourism operators would close their businesses. Five respondents believed that the wind farm would damage the tourist economy, especially for activities and events that rely on scenic beauty and ambience, such as weddings that overlook pristine natural settings. One respondent felt tourists would continue to come to the area, but it would be at a diminished capacity. Two respondents noted that the fossicking tourism activities are unlikely to be impacted by the proposal. Two other respondents suggested that project workers may consume all available accommodation in the local area leaving tourists no options. Two respondents thought some visitors may come to view the wind farm as a visitation site but it may be a one-off visit.
- *Property prices:* Two respondents agreed there were not enough vacant rentals available to support a population of incoming construction workers. Three respondents felt the windfarm would decrease property prices especially outside the village of Nundle itself where turbines would be highly visible, detracting from the natural amenity and landscape. Although it is important to note that the literature review suggested that property prices, on the whole, are not dramatically affected by the presence of a wind farm
- *Agriculture and revenue:* One respondent supported the proposal because farm hosts for turbines would receive regular lease payments, thereby expanding and diversifying their revenue streams. One respondent felt the wind farm could result in 'no fly zones' which could materially affect aerial farming operations and increase operational costs to farming businesses.

Other issues discussed

- *Sustainable energy:* One respondent expressed their support for sustainable energy. Two respondents accepted the impact of the wind farm as part of the price to be paid for new types of energy and felt that Nundle could not insulate itself from change. Five people believed Nundle was not the right place for a wind farm because of its natural beauty and questioned the reliability of wind farms. One respondent questioned the viability of the wind farm on account of periods of low wind.
- *Environment:* Two respondents expressed their concern about the impact of the development on native endemic flora and fauna and the fragility and uniqueness of the landscape.

Social impact assessment

The social impact assessment (Section 5.3) provides a qualitative review and summary of the literature review, community engagement alongside key policy and socio-economic findings. It also notes some of the additional project changes since engagement was held in March/April 2020.

Community attitudes: Engagement confirmed the findings of the literature review that a 'social gap' can exist in relation to community attitudes towards wind farms[34]. There was

[34] This is the expression of different attitudes towards the broader concept of wind power/renewables (high levels of public support for renewable energy) versus an individual wind farm development (high community opposition to a development application for a wind farm that may impact the individual).

general support expressed by respondents for sustainable energy, but opinions diverged when it was linked to the Nundle context. Community attitudes towards the Hills of Gold proposal were varied (attitudes included support for the proposal from 3 out 11 respondents; 2 were neutral; 5 were opposed; and 1 did not disclose). Engagement suggested the proposal has affected social cohesion and created short-term tension within the community which is a negative outcome. However, in contrast, a key consideration is that engagement was a small sample size (11 interviews) and may not necessarily reflect the broader held community view; local strategic planning policy supports the development of renewable energy in the region; and since engagement was held, a local 'Friends of the Wind Farm' group has commenced. The Wind Farm Commissioner's 2018 Annual Report indicated that in 2017 the number of wind farm related complaint issues reduced in 2017 and increased in 2018, but that this was commensurate with the increased level of wind farm activity/development occurring that year. Complaints had increased in relation to construction, planning processes, natural environment and community engagement but reduced for noise, health, vibration and economic loss[35]. This confirms that there is a need for transparent and inclusive approaches to wind farm developments between the community and developer. The Hills of Gold project has included sustained levels of communication and collaboration with the local community.

Visual amenity: The literature review indicated that visual amenity is one of the most common cited reasons for adversity towards wind farm. Visual amenity was certainly a key issues raised during engagement for this study. There were a variety of responses expressed (support, neutral, opposition). The literature review also indicated that it is a subjective area where changes to the visual landscape produce different outcomes for different residents. Notes provided by the proponent highlight extensive discussions have been held with the community about the provision/location of visual montages to help residents understand the potential visual outcomes of the development. Local strategic planning policy supports balanced development with a sensitive approach to the natural environment and town centres.

Safety: The literature review highlighted that wind farm developments do have safety issues, yet so do all major projects, and in comparison to other renewable technologies, wind farms have vastly improved safety standards in recent years. Concern over local road safety was raised during engagement. However, since this time, mitigation measures have been undertaken, including preparation of a Traffic Impact Assessment and specific consideration of Morrison Gap Road residents with amendments being sought to the Neighbour Agreement.

Human health: Issues with mental health and wellbeing were cited as issues by two respondents, and noise and light pollution an issue with three. The literature review revealed that health impacts from wind farms can be subjective as people have different sensitivities to noise, while for extreme health problems, there is little scientific evidence to support claims.

Education opportunities: The literature review indicated there are examples of wind farm companies supporting education and learning opportunities to build relevant skillsets. For Nundle however, six respondents had little expectation that local skillsets would grow as a result of this development, expecting workers to be 'drive in drive out' workers.

Financial gain: As explored in the literature review, wind farms can be a source of income for land holders. The response from the community was mixed in relation to financial gain (with two respondents indicating they expect they will endure net direct financial loss to their businesses), but the Community Enhancement Fund was viewed positively. Since engagement as completed, a Neighbourhood Benefit Sharing Program was also developed, as well as the Community Enhancement Fund Charter that solidifies the governance arrangement for the Fund. The Fund and Program is a positive outcome for local residents.

[35] Office of the National Wind Farm Commissioner, 2019, Annual Report, https://www.nwfc.gov.au/sites/default/files/nwfc-annual-report-2018.pdf?v=1560410110, date accessed: 22/08/20

Job creation: The variability in local perceptions towards job creation from a wind farm development reiterated the findings from the literature review (that job creation is varied dependent on the stage of project). Socio-economic profiling for the region indicated some local residents have skillsets that maybe beneficial for the construction of a renewable project in the region; while the ageing profile of the region indicates the introduction of a new industry to the region may assist in attracting a younger workforce to live and work locally.

Property prices: The variability in local perceptions reiterated the findings from the literature review. There are many variables that may/or may not affect a property price.

Reduced air pollution: The use of renewables can have a positive impact in that it helps reduce air pollution, and potentially spending on healthcare in the long run. Respondents were generally aware that wind energy is a positive solution to the overarching issue of climate change, however the connection to reducing air pollution was not specifically identified.

Tourism: The literature review indicated that wind farms do have potential to attract visitors but can also conflict with other tourism attractions in the locality. Respondents presented divergent views about the impact of the wind farm on local tourism and events. State and local government support the development of tourism in the region and socio-economic profiling indicates there are visitors coming to the region for the purpose of 'holiday'. Additional tourism attractions may be of value and would require stakeholders to collaborate to produce future opportunities.

Additional visitors can also assist with passive surveillance. Passive surveillance refers to an environment where people can see and be seen through casual observation. Passive surveillance can assist land holders with monitoring for trespassers, thieves, and poachers.

Economic impact

The project is expected to include capital expenditure of around $370 million with ongoing operational expenses of around $19 million not including finance costs. The new layout is up to 70 turbines. This assessment analyses the level of impact the farm with this configuration will have on the local regional economy.

TABLE 2: ESTIMATED CAPITAL AND OPERATIONAL EXPENDITURE ON PROJECT

	Stimulus
Capital Expenditure (total)	$750 million
Capital Expenditure (local region)	$370 million
Annual Operational Costs	$19 million
Total Operational Costs *	$100 million
Turbines constructed	70

* Discounted OPEX 25 yr. at 6% rate

Source: SGS, Someva

The project is expected to produce approximately $160M in direct value-add during the construction phase and $15.8M per year during operation. To provide some context to this number, the broader regional economy[36] is worth $5.2 billion. The total employment impact from the construction and operation of the wind farm is estimated as below in the table. Around 80-85% of the economic benefits from will occur in either the Tamworth Region Area or in Newcastle City Council. The industry breakdown relates to Construction and Professional, Scientific & Technical Services employment.

[36] The Local Government Areas of Tamworth Regional, Gunnedah and Liverpool Plains.

TABLE 3: JOBS SUPPORTED BY THE PROJECT

	Direct jobs	On-flow jobs	Total
Employment during construction	216	430	646
Employment during project life (operation)	31	53	84

Source: SGS

Sensitivity analysis was conducted on the impacts of the wind farm. By altering the intensity of the flow-on effects, lower and upper estimates of the economic impact of the wind farm can be created. Overall impacts have been scaled (25%, 50% and 100%) in order to account for overestimated flow-on effects within the I-O Model. During boom times, 25% would be appropriate. However, if the economic fallout from COVID-19 is worse than expected, there could be more spare capacity in the economy. This will mean that the construction phase stimulus impact of the wind farm could have a much greater effect, more towards the 100% scenario.

TABLE 4: CONSTRUCTION PHASE (2023, 2024)

Impact	Lower (25%)	Middle (50%)	Higher (100%)
Employment (Direct FTE)	110	216	430
Employment (On-Flow FTE)	215	430	859

Source: SGS

In terms of the operational phase, the impact is likely to be at the lower or middle end of the impact. This is due to the local Nundle area having an economy which would have many 'leakages'.

TABLE 5: OPERATIONAL PHASE (PER ANNUM)

Impact	Lower (25%)	Middle (50%)	Higher (100%)
Employment (On-Flow, FTE)	25	53	75

Source: SGS

1. INTRODUCTION

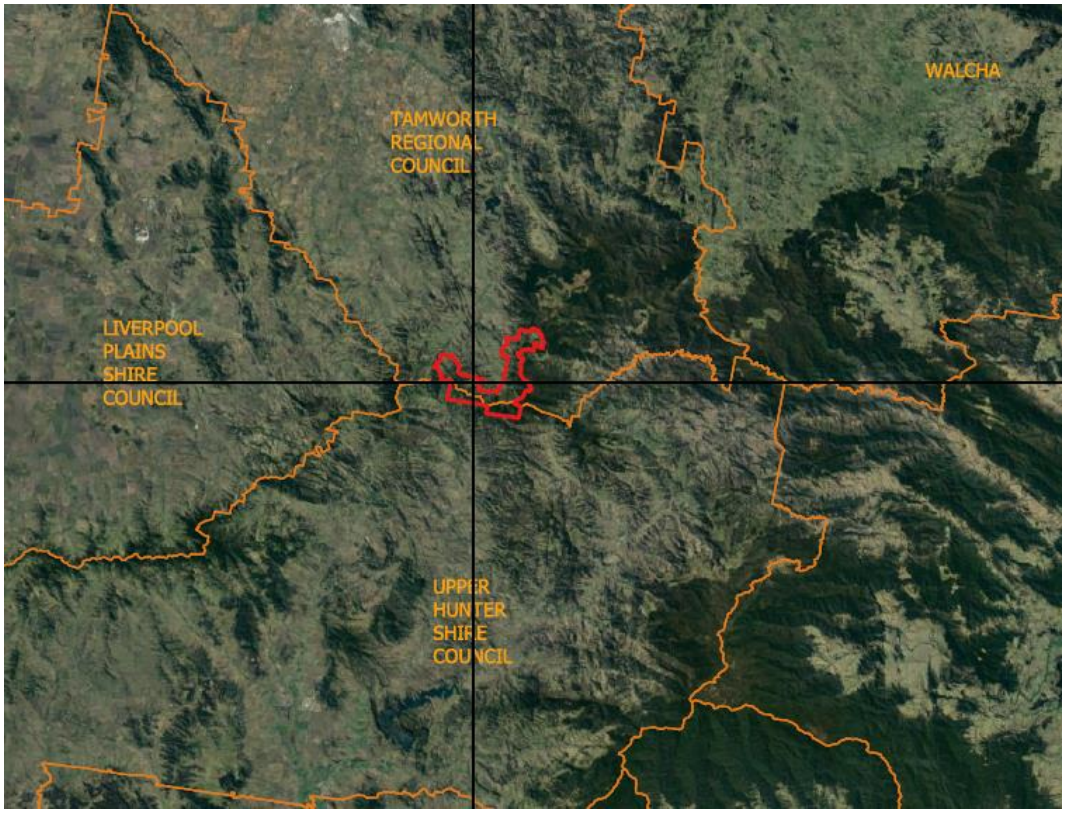
This section introduces the Hills of Gold wind farm project, study objective and method undertaken for the socio-economic assessment.

1.1 Project context

Hills of Gold Energy is a proposed wind farm located between Hanging Rock and Crawney, approximately 8km south of Nundle and 50km south-east of Tamworth, see Figure 1.

The wind farm is expected to have a power output of up to 400 megawatts (MW). The layout of the wind farm includes up to 70 wind turbines[37], underground electrical and fibre optic communications cabling, a substation, meteorological monitoring masts, and ancillary facilities (shed, site office and car parking), dependent on the final design.

FIGURE 1: PROPOSED WIND FARM LOCATION



Source: Hill of Gold Energy, https://www.hillsofgoldenergy.com/about-the-project, 2020

The current proposed wind farm layout is provided at Figure 2.

The development includes a funding commitment for the Community Enhancement Fund. The fund is $2,500 per wind turbine per year installed and operating, over an expected 25-year period. The fund will be established to support local residents close to the development area for opportunities and lifestyle enhancement[38]. Furthermore, a voluntary Neighbour

[37] Someva Renewables, based on updated layout, 31/03/2020
[38] Hills of Gold Energy, 2018, https://www.hillsofgoldenergy.com/news-and-updates, date accessed: 22/04/2020

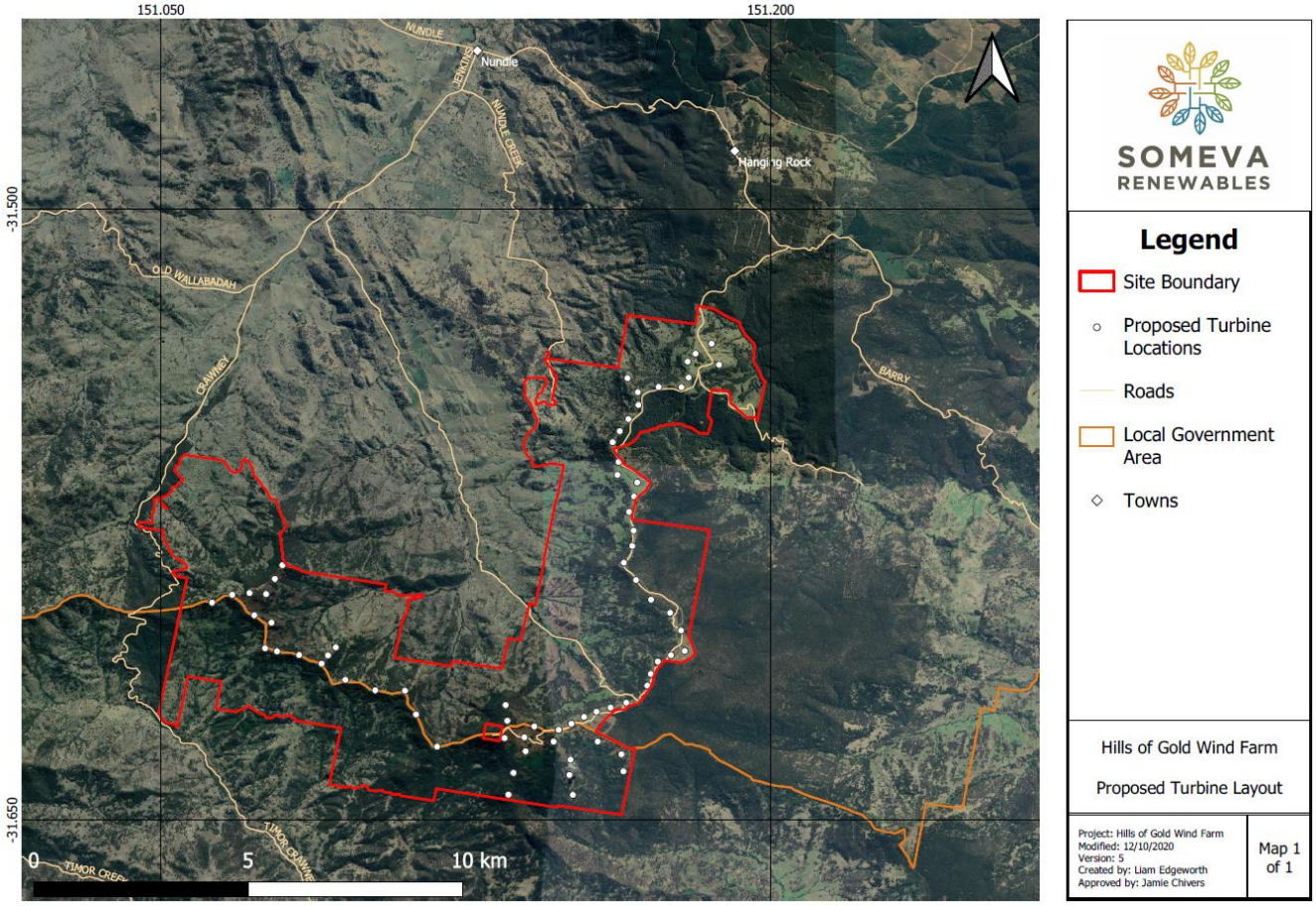
Benefit Sharing Program will be established. Annual payments will range from $1,500 to $6,000. The aim of this program is to share the financial benefits of the development with neighbouring land holders that do not host a wind turbine on their property. Neighbours within 5km are eligible for the voluntary program[39].

The project will be assessed under the State Significant Development planning pathway by the NSW Department of Planning, Industry and Environment (DPIE). The current status of the project is the preparation of an Environmental Impact Statement (EIS) in consideration of the Secretary's Environmental Assessment Requirements (SEARs).

The Preliminary Environmental Assessment indicated the project site will be approximately 6,808 hectares. The site is primarily located on a RU1 – Primary Production zone and is adjacent to RU3 – Forestry and E1 – National Park and Nature Reserve zones. There are approximately 42 confirmed or proposed residences within 3km of the proposed development corridor and there are a number of other non-residential structure located nearby. Of the 42 residential properties, nine have associated landowners, three properties have planning approval and five are holiday properties.

Investigation corridors for the project fall within Tamworth Local Government Area and Upper Hunter Shire Local Government Area. For development footprint and key project components please refer to the project description section of the Environmental Impact Statement.

FIGURE 2: PROPOSED WIND FARM LAYOUT



Source: Someva Renewables, 13/10/20

[39] Hills of Gold Energy, 2019, https://www.hillsofgoldenergy.com/news-and-updates, date accessed: 22/04/2020

1.2 Study objective

The SEARs state the proponent must prepare an assessment for the EIS that considers the social and economic impacts and benefits of the project for both the region and NSW. The assessment should include a consideration of any increase in the demand for community infrastructure services and tourism impacts.

This study is the socio-economic impact assessment for the Hills of Gold wind farm project.

1.3 Method

In preparing the socio-economic assessment, SGS has used qualitative and quantitative methods to evaluative the social and economic benefits of the Hills of Gold project, including:

- Socio-economic profiling of the Tamworth Regional Local Government Area (LGA), Upper Hunter LGA and Liverpool Plains LGA, using ABS Census data
- Literature review of the current strategic planning context and relevant case studies
- Consultation with stakeholders
- Economic impact assessment of construction and operations
- Net community benefit assessment.

1.4 Structure of the report

The report has been structured as follows:

1. **Introduction:** defines the project context, study objective and methods used.
2. **Socioeconomic profile:** provides population and employment data on the three relevant geographies associated with the proposed development – Tamworth Regional, Liverpool Pains Shire and Upper Hunter Shire LGAs.
3. **Policy context:** reviews the national, state, and local strategy planning documents and identified relevant policy directives for the region.
4. **Literature review:** reviews outcomes from domestic and international studies on the key social and economic impacts from wind farm developments.
5. **Community engagement:** presentation the key thematic findings and perceptions on social and economic issues from the engagement held with the local community.
6. **Social impact assessment:** aligns the findings from the literature review and engagement
7. **Economic impact assessment:** economic analysis for construction and operation
8. **Net community benefit assessment:** assesses overall social and economic impact of the proposed development.

2. SOCIO-ECONOMIC PROFILE

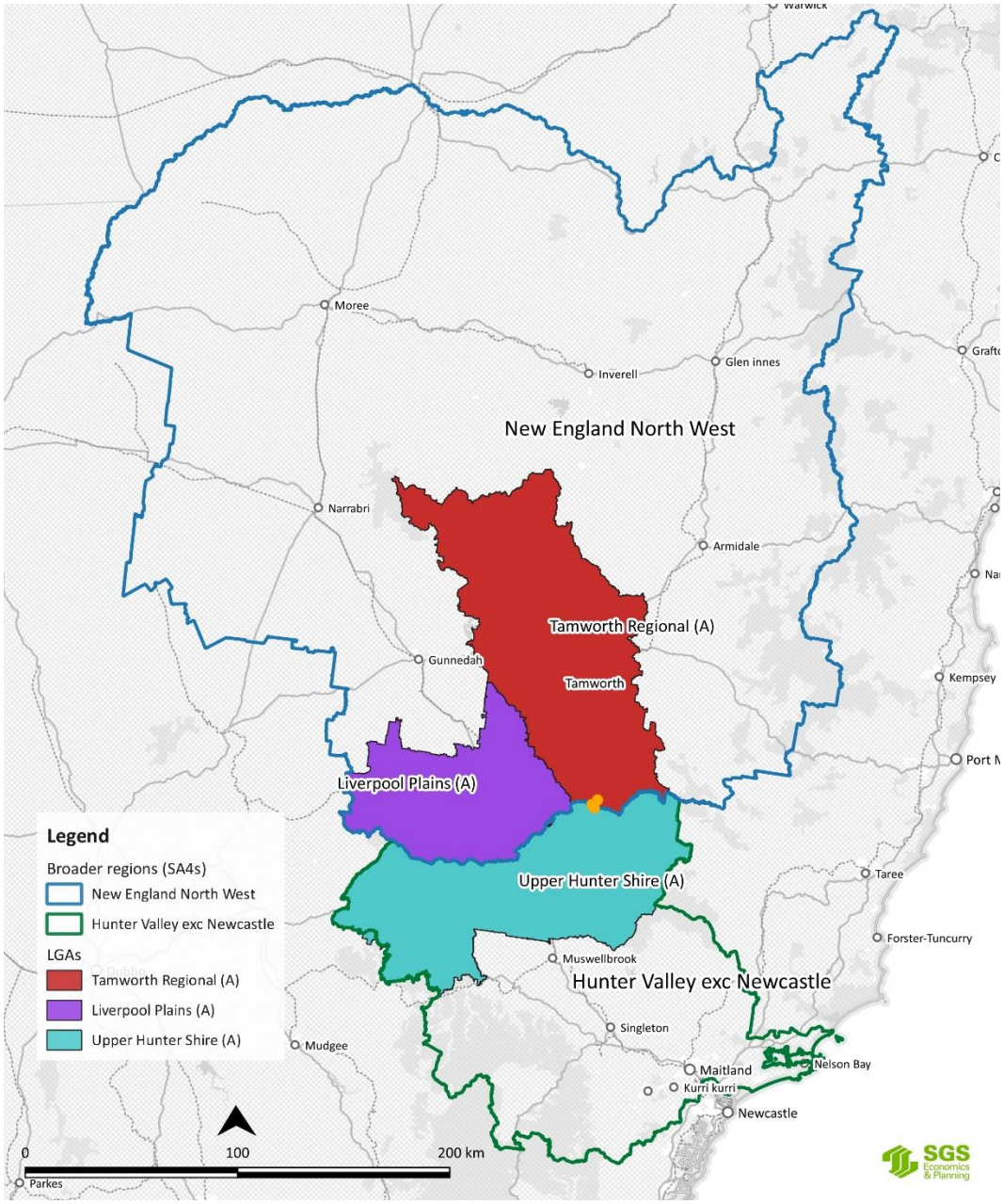
This section presents a summary of the socio-economic profile of Tamworth Regional, Liverpool Plains and Upper Hunter Shire Local Government Areas. Data highlights current context and projected change over time. A complete version of the LGA profiling is at Appendix 2.

2.1 Regional Geographies

The New England North West region refers the northern central portion of NSW[40]. Within this region are Tamworth Regional LGA and Liverpool Plains LGA. A significant portion of the wind farm project falls within the boundary of Tamworth Regional LGA. To the south of the project area is the Hunter Valley region[41] which includes the Upper Hunter Shire LGA, also impacted by the wind farm project. Figure 3 spatially represents these geographies which have informed the following socio-economic profiling.

[40] Department of Planning, Infrastructure and Environment regional classification
[41] The Hunter Valley region excludes the Newcastle core to ensure greater regional consistency when comparing regions.

FIGURE 3: LGA AND REGIONAL NSW PROFILING BOUNDARIES WITH THE APPROXIMATE WIND FARM LOCATION (ORANGE)



Source: SGS 2020

2.2 Regional NSW

Regional NSW contains approximately 40% of the state's population. It is Australia's largest and most diverse regional economy[42]. Between 2018-19, the Gross Domestic Product (GDP) for regional NSW was approximately $152,969 million, far higher than estimates for regional Victoria over the same period at approximately $76,640 million. GDP per capita between 2018-2019 was approximately $55,200 for regional NSW, significantly less than the Sydney region at $86,500[43].

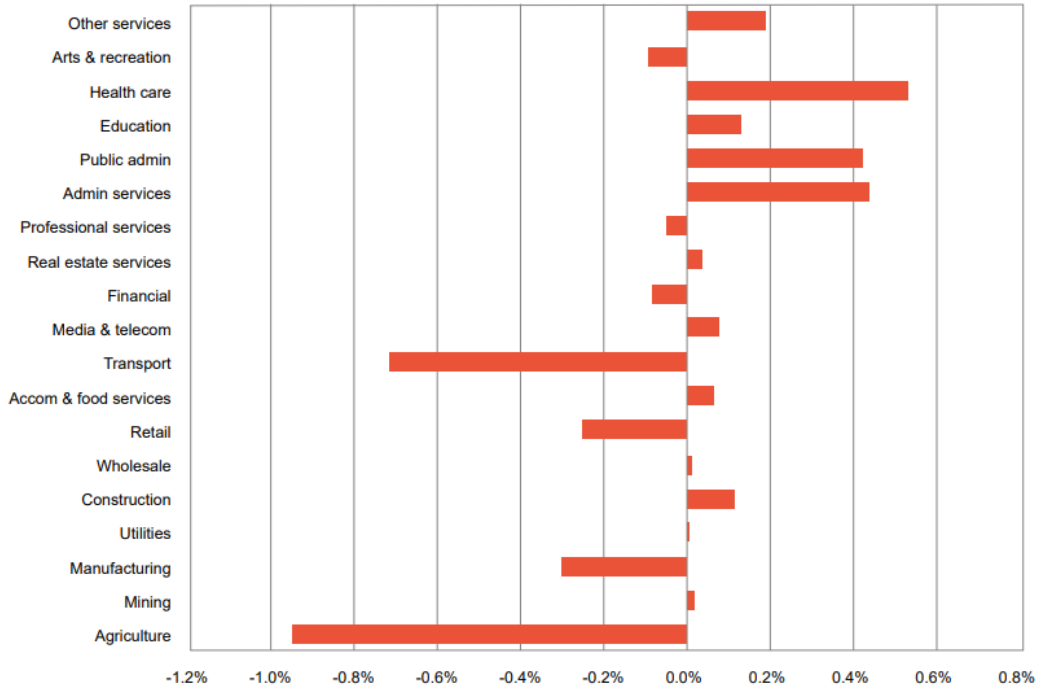
In the 1990's, regional NSW's contribution to Gross Domestic Product (GDP) was approximately 9.2% which dropped to about 5.2% in the 2010s[44]. Decline of the regional NSW

[42] NSW Government, 2018, 20-Year Economic Vision for Regional NSW
[43] SGS, 2019, Economic Performance of Australia's Cities and Regions, p. 12
[44] SGS, 2019, Economic Performance of Australia's Cities and Regions, p. 13

economy is attributed to contractions in agriculture, transport, manufacturing, and retail industries (Figure 4). The impact of drought since 2016-17 has contributed to the downturn in agricultural and transport industries where there is less agricultural produce to transport.

With the decline of the regional NSW economy in recent decades and the impact of drought and climate change on regional communities and agricultural production, the exploration and development of other industries that could contribute to regional economies and provide employment is pertinent.

FIGURE 4: CONTRIBUTION TO REGIONAL NSW GDP GROWTH, 2018-19



Source: SGS, Economic performance of Australia's cities and regions, 2019

2.3 Tamworth Regional LGA

Population Changes

Tamworth Regional was home to 59,662 people as of the Australian Bureau of Statistics (ABS) 2016 Census. The population had grown by +6,070 people in the ten years between 2006 and 2016, representing a Compounded Annual Growth Rate (CAGR) of 5.51%.

Comparatively, the New England North West region grew by only 2.63%, indicating that Tamworth Regional LGA contributes the majority of growth in the region.

TABLE 6: POPULATION CHANGE 2006-16

Geography	2006	2011	2016	Growth	CAGR (%)
Hunter Valley ex. Newcastle	226,784	243,683	264,588	37,804	8.01%
New England North West	172,396	176,249	181,592	9,196	2.63%
Tamworth Regional	53,592	56,291	59,662	6,070	5.51%

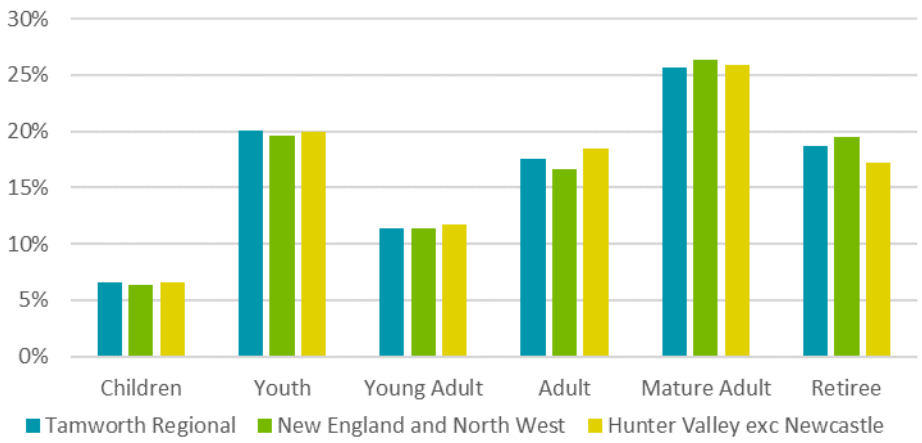
Source: ABS Census TableBuilder (2006, 2011, 2016)

Age Profile[45]

The largest age group in the Tamworth Regional are Mature Adults (25.67%) followed by Youth (20.06%) and then Retirees (18.7%). Retirees have increased the most as a proportion of the population in the LGA (+3.13%), while Youth has declined the most (-2.23%) followed closely by the Adult age cohort.

Given the ageing profile and local resident movement out of the workforce, additional industries that bring a source of income or younger workers into the local economy could be of relevance.

FIGURE 5: POPULATION AGE STRUCTURE 2016



Source: ABS Census TableBuilder (2016)

Labour Force Status

Most of the labour force are employed and working full-time (37.74%) or part-time (18.30%) in Tamworth Regional. There is a significant proportion that are not in the labour force at approximately 37%. At the time of the ABS 2016 Census, about 3.35% of the population were employed away from work; 2.35% were unemployed looking for full-time work; and 1.32% were unemployed looking for part-time work.

Tamworth Regional has a higher percentage of people employed and working full-time, and a slightly lower share of the population who are not in the labour force at all compared to New England North West and Hunter Valley exc. Newcastle.

Between 2006 and 2016, there was an increase in those working part-time for all three regions, with marginal declines in full-time employment.

[45] Age cohort definitions are provided at Appendix 2.

FIGURE 6: LABOUR FORCE STRUCTURE 2016

Source: ABS Census TableBuilder (2016)

Resident Workforce

Broad Industry Categories[46]

Population Serving jobs are the largest broad industry that employs Tamworth Regional's resident workforce (32.13%), followed by Health and Education (25.01%) and Industrial (24.93%).

Hunter Valley exc. Newcastle has a slightly higher proportion of Population Serving (33.53%) and Knowledge Intensive jobs (19.15%). Tamworth Regional has the lowest proportion of Industrial jobs, but the highest proportion in Health and Education.

Industrial jobs have experienced the largest decline in all three areas.

FIGURE 7: RESIDENT WORKFORCE STRUCTURE BY BROAD INDUSTRIES 2016 (PUR)

Source: ABS Census TableBuilder (2016)

[46] The Broad Industry Category employment breakdown is provided at Appendix 1.

Jobs in the LGA

Broad Industry Categories

Of the 21,936 jobs available in the LGA, 31.02% of those are in the Population Serving industry. 27.19% are in Health and Education, and 23.67% are Industrial. Only 18.12% of jobs in the LGA are Knowledge Intensive.

New England North West and Hunter Valley exc. Newcastle both have a much higher share of industrial jobs in their regions (29.57% and 29.82% respectively). Tamworth Regional has a slightly higher share of Health and Education jobs than New England North West, and a much higher share than Hunter Valley exc. Newcastle.

Of the 10 years between 2006 and 2016, Health and Education jobs in Tamworth Regional increased the most as a share of total jobs in the LGA (+5.31%), while Industrial has declined the most (-4.98%).

FIGURE 8: JOBS IN THE LGA STRUCTURE BY BROAD INDUSTRIES 2016 (POW)

Source: ABS Census TableBuilder (2016)

Tourism

Data indicates Tamworth Regional LGA has 584 tourism related businesses, of which, 38% are non-employing, 34% have 1-4 employees, and 21% have 5-19 employees. There was a total of 1,138,000 visitors in 2018, mostly Domestic Day visitors (633,000), Domestic Overnight visitors (492,000).

Approximately 39% of trips to the LGA were attributed to holiday purposes, greater than the 30% for visiting friends and relatives. This indicates that there is a small tourist market that is coming to region to explore and see sites. Additional tourist attractions to cater to these visitors may be of value to the region.

On the Visit NSW website, the town of Nundle (in close proximity to the proposed wind farm) is listed as a small, historic mining village. It is one of the nine stops on the Fossickers Way tour route. Two annual events include a Chinese Easter festival, and the Great Nundle Dog Race. Other sites of interest include Chaffey Dam for outdoor activities, Nundle Woollen Mill and small local boutique stores in town[47].

[47] Visit NSW, 2020, https://www.visitnsw.com/destinations/country-nsw/tamworth-area/nundle, date accessed: 270820

2.4 Liverpool Plains Shire LGA

Population Changes

Liverpool Plains Shire was home to 7,689 people as of the Australian Bureau of Statistics (ABS) 2016 Census. The population has grown by +152 people in the ten years between 2006 and 2016, representing a CAGR (Compounded Annual Growth Rate) of 1.00%, less than Tamworth Regional LGA in the same period.

TABLE 7:POPULATION CHANGE 2006-16

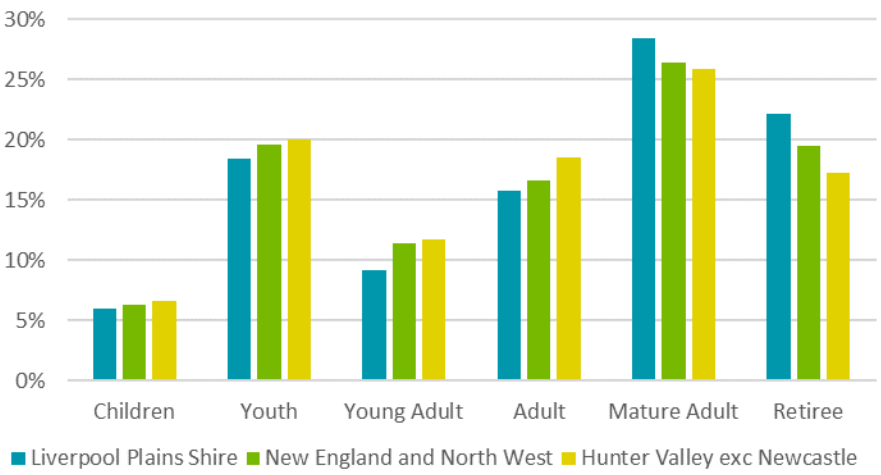
Geography	2006	2011	2016	Growth	CAGR (%)
Hunter Valley exc Newcastle	226,784	243,683	264,588	37,804	8.01%
New England and North West	172,396	176,249	181,592	9,196	2.63%
Liverpool Plains Shire	7,537	7,479	7,689	152	1.00%

Source: ABS Census TableBuilder (2006, 2011, 2016)

Age Profile[48]

The largest age group in the Liverpool Plains Shire LGA are Mature Adults (28.46%) followed by Retirees (22.20%) and Youth (18.39%). However, Retirees have increased the most as a proportion of the population in the LGA (+3.69%), while Adults has declined the most (-2.47%).

FIGURE 9: POPULATION AGE STRUCTURE 2016



Source: ABS Census TableBuilder (2016)

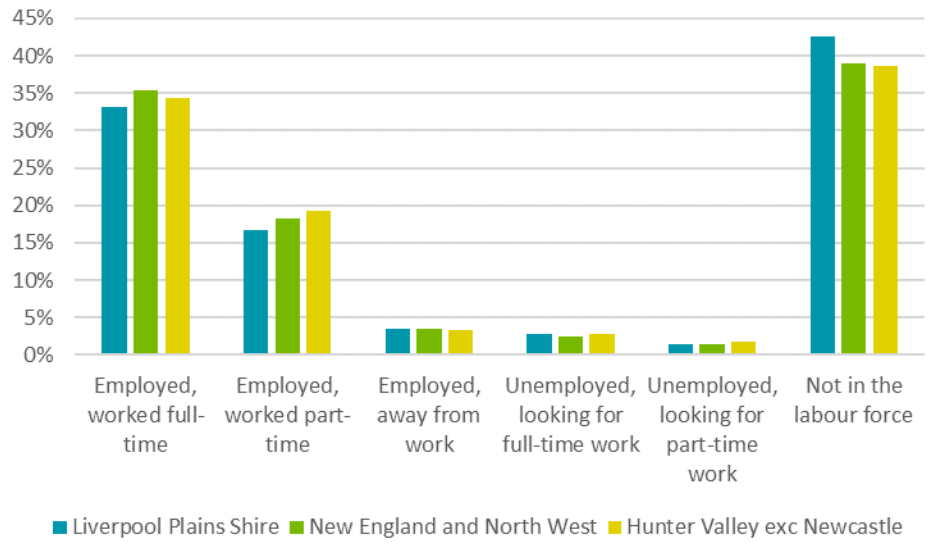
Labour Force Status

Most of the labour force are employed and working full-time (33.07%) or part-time (16.63%). At the time of the ABS 2016 Census, about 3.51% of the population were employed, away from work; 2.79% were unemployed looking for full-time work; and 1.46% were unemployed looking for part-time work. Almost half of the local population is not in the labour force (42.53%).

[48] Age cohort definitions are provided at Appendix 2

Between 2006 and 2016, the proportion of employed and working full-time declined (-0.6%) for Liverpool Plain Shire LGA, while those employed part-time increased (+0.5%)

FIGURE 10: LABOUR FORCE STRUCTURE 2016



Source: ABS Census TableBuilder (2016)

Resident Workforce

Broad Industry Categories

There are 2,878 working residents of the Liverpool Plains Shire LGA. Industrial jobs are the largest broad industry of Liverpool Plains Shire's resident workforce (43.54%), followed by Population Serving (24.36%) and Health and Education (19.84%).

Liverpool Plains Shire has a much higher proportion of Industrial jobs (43.54%) compared to New England and North West (30.19%) and Hunter Valley exc. Newcastle (28.16%). Comparatively, the LGA has the lowest proportion of Knowledge Intensive and Population Serving jobs.

FIGURE 11: RESIDENT WORKFORCE STRUCTURE BY BROAD INDUSTRIES 2016 (PUR)

Source: ABS Census TableBuilder (2016)

Jobs in the LGA

Broad Industry Categories

Of the 2,241 jobs in the LGA, 46.81% of those are Industrial. 21.78% are in Population Serving, and 20.04% are Health and Education. Only 11.38% of jobs in the LGA are Knowledge Intensive.

Between 2006 and 2016, the share of Industrial jobs in the LGA declined as proportion of total jobs at a faster rate (-5.82%) than New England and North West (-3.49%) and Hunter Valley exc Newcastle (-2.85%).

The share of Health and Education jobs in the LGA increased between 2006 and 2016 (by +4.49%) at a faster rate than New England and North West (+4.09%) and Hunter Valley exc. Newcastle (+3.19%).

FIGURE 12: JOBS IN THE LGA STRUCTURE BY BROAD INDUSTRIES 2016 (POW)

Source: ABS Census TableBuilder (2016)

Tourism

The Liverpool Plains Shire LGA is one of the most productive agricultural regions in Australia, with numerous opportunities present in the agri-tourism space. In 2016 the LGA had 33,000 visitors, with an average length of stay of about 2 nights.

There was an approximate spend of $129 per night, and $268 per visitor. Overall, the total value of tourism related output for Liverpool Plains is estimated to be at $13.154 million. Its key attractions included museums, heritage walks, guided agri-tours, and bushwalking.

2.5 Upper Hunter Shire LGA

Population Changes

Upper Hunter Shire was home to 14,112 people as of the Australian Bureau of Statistics (ABS) 2016 Census. The population has grown by +1,138 people in the ten years between 2006 and 2016, representing a CAGR (Compounded Annual Growth Rate) of 4.29%.

TABLE 8:POPULATION CHANGE 2006-16

Geography	2006	2011	2016	Growth	CAGR (%)
Hunter Valley exc Newcastle	226,784	243,683	264,588	37,804	8.01%
New England and North West	172,396	176,249	181,592	9,196	2.63%
Upper Hunter Shire	12,974	13,751	14,112	1,138	4.29%

Source: ABS Census TableBuilder (2006, 2011, 2016)

Age Profile[49]

The largest age group in the Upper Hunter Shire LGA are Mature Adults (26.28%) followed by Youth (20.22%) and Retirees (18.51%). Retirees, however, have increased the most as a proportion of the population in the LGA (+3.03%), while Adults has declined the most (-0.90%).

FIGURE 13: POPULATION AGE STRUCTURE 2016

Source: ABS Census TableBuilder (2016)

Labour Force Status

Most of the labour force are employed and working full-time (38.99%) or part-time (19.33%). At the time of the ABS 2016 Census, about 3.49% of the population were employed, away from work; 1.98% were unemployed looking for full-time work; and 1.14% were unemployed looking for part-time work. Approximately 35.07% were not in the labour force.

Upper Hunter Shire has a higher percentage of people working full-time compared to New England North West and Hunter Valley exc. Newcastle. However, between 2006 and 2016, the proportion of people working full-time declined significantly for the Upper Hunter Shire

[49] Age cohort definitions are provided at Appendix 2

LGA at -3.0%, compared to New England North West and Hunter Valley exc. Newcastle at -0.5% and +1.1% respectively.

FIGURE 14: LABOUR FORCE STRUCTURE 2016

Source: ABS Census TableBuilder (2016)

Resident Workforce

Broad Industry Categories

There are 6,060 working residents of the Upper Hunter Shire LGA. Industrial jobs are the largest broad industry of the Upper Hunter Shire's resident workforce (44.64%), followed by Population Serving (25.87%) and Health and Education (15.87%).

The Upper Hunter Shire has a much higher proportion of Industrial jobs (44.64%) compared to New England North West (30.19%) and Hunter Valley exc. Newcastle (28.16%). The LGA has the lowest proportion of Knowledge Intensive and Population Serving jobs compared to the other regional areas.

FIGURE 15: RESIDENT WORKFORCE STRUCTURE BY BROAD INDUSTRIES 2016 (PUR)

Source: ABS Census TableBuilder (2016)

Jobs in the LGA

Broad Industry Categories

Of the 4,422 jobs in the LGA, 38.42% are in Industrial, 27.16% are Population Serving, and 21.26% are in Health and Education. Only 13.16% of jobs in the LGA are Knowledge Intensive.

Upper Hunter Shire has a higher share of Industrial jobs compared to New England North West (29.57%) and Hunter Valley exc Newcastle (29.82%). This industry experienced decline between 2006 and 2016, at a rate of -5.45%.

The share of Health and Education jobs in the LGA has increased as a proportion over the 10 years between 2006 and 2016 (+4.21%) at a slightly faster rate than New England North West (+4.09%) and Hunter Valley exc Newcastle (+3.19%).

FIGURE 16: JOBS IN THE LGA STRUCTURE BY BROAD INDUSTRIES 2016 (POW)

Source: ABS Census TableBuilder (2016)

Tourism

The Upper Hunter Shire LGA has 167 tourism businesses, of which, 70% are non-employing, 54% have 1-4 employees, and 33% have 5-19 employees.

There was a total of 259,000 visitors in 2018, mostly Domestic Day visitors (136,000), Domestic Overnight visitors (120,000). The total estimated spend in the Upper Hunter Shire LGA for 2018 was $46 million.

Approximately 55% of trips were estimated to be for holiday, while 45% was for visiting friends and relatives. Similar to Tamworth, this suggests that there is a market for additional tourist attractions to cater to these visitors.

2.6 Profiling Summary

- **Regional NSW:** With the decline of the regional NSW economy in recent decades and the impact of drought and climate change on regional communities and agricultural production (see Section 2.2), the exploration and development of other industries (such as wind energy) that could contribute to regional economies and provide employment is pertinent.

- **Population change:** Between 2006 and 2016, the New England North Region has experienced low growth with a compound annual growth rate of 2.63% (Table 6), far lower than the neighbouring Hunter Valley region (excluding Newcastle) at 8.01% (Table 6). Most growth could be attributed to Tamworth Regional LGA which grew by 6,070 persons (Table 6). The Upper Hunter Shire grew by 1,138 persons (Table 8) and Liverpool

Plains Shire grew by only 152 persons (Table 7). Large development projects may help attract more people to live and work in the region.

- **Age profile:** the region has an ageing profile which is typical of most areas in regional NSW. Mature Adults and Retirees make up significant portions of the local populations. For Tamworth Regional, Mature Adults are approximately 26% of the population and Retirees are 18% (Figures 5). For Liverpool Plains, Mature Adults are approximately 28% and Retirees are 23% (Figure 9) of the population of the LGA and for Upper Hunter, Mature Adults are approximately 26% and Retirees are 18% (Figure 13). Retirees have exhibited the most growth as a proportion of the population between 2006 and 2016 for all three LGAs (Figure 32, 46, 60 see Appendix 2). Given the ageing profile of the region, new industries that bring a younger workforce to the region, or provide a source of income for retired land holders, such as wind farming could be positive for the New England North West region.

- **Resident workforce:** all three LGAs have a significant proportion of resident population working in Industrial related jobs (this includes manufacturing, transport and utilities)[50]. There are also a fair proportion of people working in Population Serving industries in each LGA (this job category includes retail trade and food services but also construction jobs). For Tamworth Regional approximately 32% work in Population Serving industries and 25% in Industrial (Figure 7); for Liverpool Plains Shire approximately 24% work in Population Serving and 44% in the Industrial sector (Figure 11); and for Upper Hunter approximately 26% work in Population Serving jobs and 45% in the Industrial section (Figure 15). The skillsets of these local residents may be beneficial for the construction of a renewable energy development in the region.

- **Job in the LGA (Place of work)**: For the Liverpool Plains Shire there are significantly more jobs in the Industrial sector than any other industry type at about 47% (Figure 12). Similarly, Upper Hunter Shire has more Industrial related employment for local residents or people travelling into the LGA than any other industry at 38% (Figure 16). This indicates that local residents or workers commuting into the three LGAs may have skillsets that could be utilised in the development of a renewable energy project. Tamworth has a different profile with a higher presence of Population Serving and Health and Education industries (Figure 8), noting that construction jobs falls into the Population Serving category. The employment profile of Tamworth can be attributed to the major town of Tamworth being located in the LGA. Tamworth regional city is the location of a number of public administration entities (for example Service NSW and a northern office for the Department of Planning, Industry and Environment) which therefore raises the number of Knowledge Intensive jobs in the LGA slightly above that of the greater New England North West region. The rate of self-containment (the proportion of residents that work locally) and self-sufficiency (proportion of local jobs filled by local residents) was high for all three LGAs (between 75-91%, included as part of Appendix 2). This indicates that the propensity to live and work locally is widespread in the region and that new, local job opportunities may be welcomed by local residents.

- **Tourism:** both Tamworth LGA and the Upper Hunter Shire LGA had more visitors to the region for the purpose of a 'holiday' over 'visiting friends and relatives'. For Tamworth, this may be a result of the Tamworth Music Festival held in town each year, however, it also indicates that there is a tourist market that is coming to region to explore and see sites, beyond just seeing family. Additional tourist attractions to cater to these visitors may be of value to the region.

[50] See Appendix 1 for a breakdown of job type by broad industry category (Industrial, Population Serving, Health and Education, and Knowledge)

3. POLICY CONTEXT

This section presents relevant state and local policies and strategic plans for the region.

3.1 National government policy

The national government stance on energy policy has been in a state of flux in recent decades. Key energy policy areas are detailed below.

Renewable Energy Target

In operation since 2001, the Renewable Energy Target (RET) is a national government scheme designed to increase the proportion of electricity derived from renewable sources in Australia.

Initially, the RET aimed to source 2% of Australia's electricity generation from renewables. By 2009, this increased to 20% (41,000 gigawatt-hours).

In 2011, the RET scheme began operating two scales: a large-scale renewable energy target (financial incentives to establish and expand developments such as wind and solar farms), and a small-scale renewable energy target (financial incentives for installations like rooftop solar panels and air sourced heat pumps).

In 2015, the Australian Government passed the *Renewable Energy (Electricity) Amendment Bill 2015* that reduced the RET from 41,000 gigawatt-hours to 33,000 gigawatt-hours for 2020, with interim and post-2020 targets also adjusted.

Owners of the renewable energy source can create large-scale and small-scale certificates for each megawatt hour of power generated. The certificates are then purchased by electricity retailers who supply power to homes and businesses. The Clean Energy Regulator oversees the operation of the RET[51].

National Energy Policy

Since coming to power in 2013, the Government has sought to develop renewable energy policy. The National Energy Guarantee was proposed late 2017 as the national energy policy. However, it was abandoned by the Australian Government with the change of Prime Minister in August 2018.

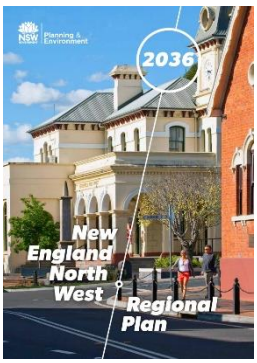
The Clean Energy Council states the lack of long-term policy around energy is affecting investment confidence in large-scale renewable energy sources and storage[52].

3.2 State government policy

State strategic policy supports balanced development for the future of regional areas. Policies identify the protection of agricultural lands, support tourism opportunities and development of safe and healthy town centres. Renewable energy has been identified for some jurisdictions as an opportunity area.

[51] Australian Government, 2018, http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target#:~:text=The%20Renewable%20Energy%20Target%20is,from%20sustainable%20and%20renewable%20sources.
[52] Clean Energy Council, https://www.cleanenergycouncil.org.au/advocacy-initiatives/energy-transformation

New England North West Regional Plan



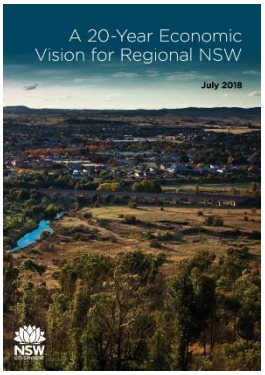
The DPIE Regional Plans identify a framework for future planning and land use across regional NSW. The New England North West (NENW) Plan supports the development of renewable energy in the region, but this must also be balanced with agricultural land use and safe and healthy towns and villages for local communities.

Relevant policy directives for NENW include:

- *Direction 3: Protect and enhance agricultural lands*, including management of the interface between important agricultural and other land use types.
- *Direction 5: Grow NENW as the renewable energy hub of NSW*, where action items support the diversification of the energy sector with identification of renewable energy resource precincts and infrastructure corridors that access the electricity network; and also, the development of small scale renewable energy projects, including wind.
- *Direction 6: Deliver new industries of the future*, such as 'green industries'.
- *Direction 8: Expand tourism and visitor opportunities.*
- *Direction 19: Support healthy, safe, socially engaged, and well-connected communities.*

For the Tamworth Regional area (this includes Nundle) key priorities include promoting wind energy production opportunities and expanding visitor experiences, alongside protection of intensive agriculture clusters.

A 20-Year Economic Vision for Regional NSW



The NSW Government's economic vision for regional NSW is to leverage seven established 'engine' industries. These include agribusiness and forestry, resources and mining, tourism, tertiary education, health and residential care, freight and logistics, and defence; and also, three emerging sectors – advanced manufacturing, technology-enabled primary industries, and renewable energy.

Priority 4 under the strategy is to manage vital energy and water resources sustainably and ensure support meets long-term regional demand. In the next 5 to 20 years, actions items include:

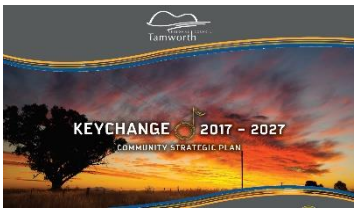
- Investigation 0-5 years: the potential for energy zones and transmission requirements; and research and development investment in energy and water security and resilience, particularly for engine industries.
- Investigation 5-10 years: focus energy projects relevant to engine industries; and climate-resilient water infrastructure options.
- Investigate 10-20 years: ongoing infrastructure to provide safe and secure water to regional communities.

Priority 6 supports increasing regional NSW's knowledge economy and excellence in innovation in several industries, including energy.

3.3 Local government policy

Similar to the strategic intent of the NSW Government, Local Council supports a future that protects the character, heritage and environment of the local area and also supports economic development that includes renewable energy uptake.

Tamworth Regional Council Community Strategic Plan 2017-2027

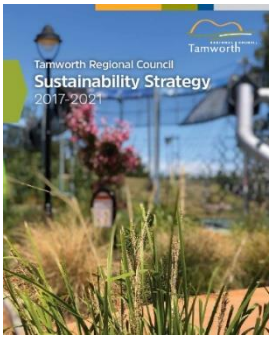


The Community Strategic Plan guides the delivery of services and facilities in the LGA, in alignment with the community's vison for the LGA to 2027.

The overarching vision is to be a region of opportunity and prosperity and a place to call home. Relevant objectives in the Plan include:

- A Spirit of Community
  - C2.1 Preserve and celebrate the character, heritage and culture of our city, towns, and villages
  - C3.1 Create safe environments to live, work and play.
- A Prosperous Region
  - P1.1 Support and facilitate economic development and employment opportunities.
- A Region for the Future
  - F2.1 Protect our natural environment.

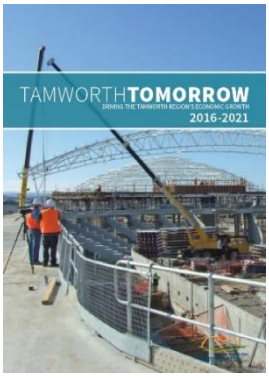
Tamworth Regional Council Sustainability Strategy 2017-2021



The Strategy provides a coordinated approach to advancing sustainability in the region. During preparation of the Strategy, the community identified that sustainability is a key area of concern and interest and that key outcomes are to be a leader in renewable energy and sustainable practices.

In relation to Energy, a key action identified for Council is to implement energy efficiency projects to reduce energy consumption and utilise renewable energy sources. Focus areas include increasing the uptake of renewable energy for Council operations.

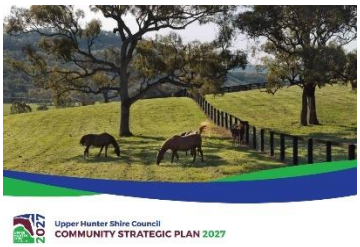
Tamworth Tomorrow: Driving the Tamworth Region's Economic Growth 2016-2021



The Strategy supports economic growth in the region by increasing the population, supporting innovation and investment in key industry pillars such as Access & Infrastructure.

The Access & infrastructure pillar recognises that 'connectivity' contributes to economic growth. The pillar seeks outcomes that support strategic investment in major transport, energy, water and communication infrastructure.

Upper Hunter Shire Council Community Strategic Plan 2027



The Community Strategy Plan identifies what is important to the local community and identifies where the community wants to be in 10 years.

Relevant strategic directions for the LGA include:

- Goal 3: protect the natural environment. Key challenges and opportunities were recognised as minimising impact of development and land use on the environment and reducing pollution.
- Goal 4: plan for a sustainable future where strategies supports planning, facilitating and providing for a changing population for current and future generations.
- Goal 5: a sustainable and prosperous economy by encouraging and supporting innovative industry and business diversity that provide a range of services and employment opportunities for current and future generations.

3.4 Summary

- While national policy surrounding renewable energy remains a 'grey' area, state and local government policy making for the NENW region has clearly identified renewable energy as an opportunity area.

- A number of state and local government policy directives state 'green industries' are to be investigated; that NENW is to become a 'renewable energy hub' within NSW; and that energy efficiency projects should be implemented; and that this is underlined by the community's view that achieving a sustainable future is imperative.

- State and local government policy directives also support the development of the local economic, growth of local employment opportunities, particularly around key industries (renewables identified as one of these). Expansion of tourism opportunities is also highlighted.

- Yet, in addition to growing a renewable energy industry in the region, there are a number of other important factors that must be taken into consideration and safeguarded. These state and local strategic plans also clearly identify that protection of the natural environment from the impact of development is highly important; and that having safe local environments to live, work and play is to be realised.

- Overall, policy directives for the NENW and Tamworth LGA highlight a sensitive and balanced approach is needed for local development. While innovation in renewables and growth of employment opportunities are important, safeguarding of the natural environment and town centre environments is of equal value.

4. LITERATURE REVIEW

This section reviews literature documenting the size of the wind energy sector globally and in Australia, and the reported social and economic impacts associated with wind farms.

4.1 Overview - wind energy sector

As one of the fastest growing and cheapest sources of large-scale renewable energy technologies, wind energy generation (on-shore and off-shore) has increased globally from approximately 7.5 gigawatts (GW) in 1997 to 564 GW at the end of 2018[53]. Wind energy contributes to approximately 6% of global electricity demand.

In the United Kingdom (UK), a 2018 government opinion poll indicated there was up to 74% support amongst the public for onshore wind energy sources[54]. In Australia, a public poll conducted by The Australia Institute indicated 84% of people rank wind energy in the top three preferred sources to meet Australia's future energy needs[55].

As of 2018, wind energy generated about 7% of the total national electricity demand in Australia[56] and provided about 33.5% of its clean energy[57]. There were 94 wind farms that produced approximately 16 GW of wind generation capacity[58].

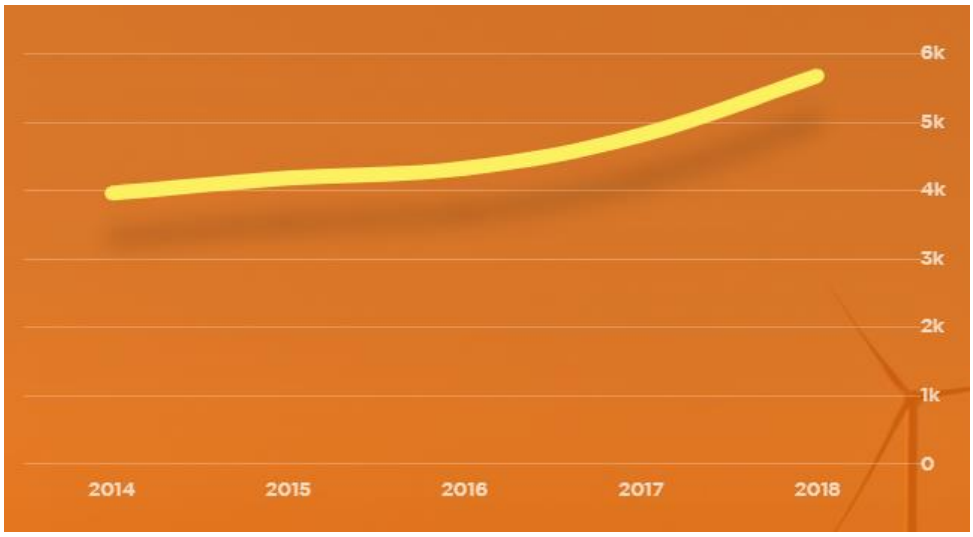
In Australia, nine wind farms were commissioned in 2018 that would add 867 MW of new capacity. This was the highest amount of capacity added in Australia's history. One of the largest wind farms (by MW) is in Macarthur, Victoria at 420MW, commissioned in 2012. The largest project completed in 2018 was the 270 MW Sapphire Wind Farm in South Australia[59]. By way of comparison, the Hills of Gold project is expected to have a power output of 400MW.

The cost of utility-scale wind energy is expected to continue falling with wind farms to approximately deliver electricity at below $50/MWh in 2030[60]. This means wind energy is likely to continue being an attractive option.

There are a number of social and economic impacts associated with wind farms that have to be assessed to ensure any development is appropriate in place.

[53] International Renewable Energy Agency (IRENA), 2019, 'Wind Energy', https://www.irena.org/wind, date accessed: 02/03/2020
[54] Renewable UK, 'Wind Energy', https://www.renewableuk.com/page/WindEnergy, date accessed: 04/03/2020
[55] The Australia Institute, 2014, *Wind Energy, Climate and Health*, date accessed: 04/03/2020
[56] Australian Renewable Energy Agency (ARENA), 2020, 'Wind Energy', https://arena.gov.au/renewable-energy/wind/, date accessed: 02/03/2020
[57] Clean Energy Council, 2020, 'Wind', https://www.cleanenergycouncil.org.au/resources/technologies/wind, date accessed: 03/03/2020
[58] AREANA, 2020, https://arena.gov.au/renewable-energy/wind/, dated accessed: 270820
[59] Clean Energy Council, 2020, 'Wind', https://www.cleanenergycouncil.org.au/resources/technologies/wind, date accessed: 03/03/2020
[60] ARENA, 2020, 'Wind Energy', https://arena.gov.au/renewable-energy/wind/, date accessed: 02/03/2020

FIGURE 17: CUMULATIVE INSTALLED CAPACITY (MW) IN AUSTRALIA



Source: Cleanenergycouncil.org.au

4.2 Social impacts

Community attitudes

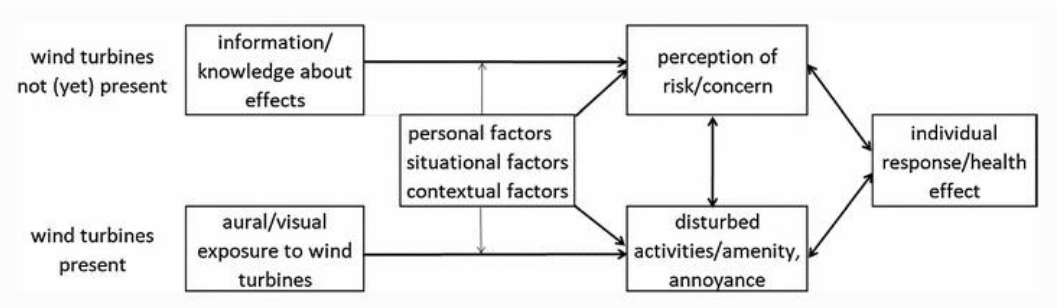
While there may be broad support for renewable energy, the Centre for Sustainable Energy UK highlights the development of wind farm projects can often be met with strong local opposition. The gap between general, high public support (expressed through opinion surveys) and the high level of community opposition (to planning applications) is described as a 'social gap'. This has resulted in a high proportion of failed wind farm development applications in the UK despite general support for wind energy.

Community reactions to wind farms are often a complex mix of reasons related to misconceptions about wind power; adversity to visual changes in the landscape; a strong emotional attachment to place; tension between national policies and local objectives; concern over distributive fairness that benefits and revenue leak away to actors outside the local area; and uncertainty towards climate change impacts. These reasons are then underpinned, conversely, with a sense that wind energy will also contribute to the greater good[61].

Figure 18, taken from Berge and Kamp (2018), demonstrates the extent to which personal characteristics, situational and contextual factors (including particular aspects around decision-making processes) have a bearing on perceived impact of wind turbines beyond the impact itself (noise impacts in this case).

[61] Centre for Sustainable Energy UK, 2017, 'Public acceptance and community engagement', Common concerns about wind power, June, p. 59, 61

FIGURE 18: COMPLEX RELATIONSHIP BETWEEN EXPOSURE TO WIND TURBINES AND PERSONAL RESPONSE



Source: Kamp & Berg, 2018

The Centre for Sustainable Energy argues, in most cases, if those residents in frequent contact with wind turbines are provided an explanation of the benefits (local and wider), most tend to be more receptive to such developments. Collaboration is therefore, considered a key part of the development process (forms of local ownership and municipal leadership); alongside reinvestment of revenue into local social schemes; and transparency of fund distribution.

Collaboration on wind projects, collective learning, increasing awareness and acceptance are not typically part of UK national energy planning efforts, with the use of top-down models more likely. This is in contrast to Scandinavian and Germanic regions that are leading the way with renewable deployment[62].

Visual amenity

Media analysis conducted by the CSIRO about community acceptance of rural wind farms indicated the most common cited reason for adversity towards wind farms is the change to the landscape and visual amenity[63]. Findings from interviews, conducted as part of the CSIRO study, however highlighted that visual impact of wind farms is subjective and can be influenced by the history of place and landscape; personal attachment to place; competing land uses and the length of time since installation. Some respondents find the wind turbines 'impressive' and 'majestic', while others are concerned that the visual impact will affect local income from tourism and business opportunities (such as film locations).

In addition to the mixed viewpoints, interviews also indicated that the size, scale and layout of the wind farm can influence opinions related to visual amenity.

Safety

As with all developments, there are a potential number of hazards to human health. Wind farm construction sites are often in remote locations that are more difficult to access. Consistently windy site conditions can increase the risk of falls, instability of cranes and the possibility of being struck by falling objects. As with all cabling work, there are electrical risks. It is also recognised that given wind energy is a relatively new industry, skills gaps can exist and there is potential for workers to be on-site that are not fully aware of the hazards involved[64]. Furthermore, it is noted that if wind turbines continue to have reliability issues, and as the industry grows as part of national energy infrastructure, the potential for hazards will obviously increase for workers and the public.

[62] Centre for Sustainable Energy UK, 2017, 'Public acceptance and community engagement', Common concerns about wind power, June, p. 59-60, https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, dated accessed: 06/03/2020
[63] CSIRO, 2012, Exploring community acceptance of rural wind farms in Australia: a snapshot, https://publications.csiro.au/rpr/download?pid=csiro:EP117743&dsid=DS3, date accessed: 10/03/2020, p. 35
[64] Laborers' Health & Safety Fund of North America, 2016, 'Wind farms present unique challenges and hazards', https://www.lhsfna.org/index.cfm/lifelines/april-2016/wind-farms-present-unique-challenges-and-hazards/, date accessed" 063/03/2020

Despite the above, the Centre for Sustainable Energy highlights that in the last two decades as the industry has grown, safety standards have become more robust for turbine design; and more studies have been looking at blade throw risks. In general, they note, the wind energy industry could be more open about some of its issues, but overall, it has one of the best safety records of the energy industry[65].

There have been 80 recorded fatalities involving wind energy between 1975 and 2012[66]. This is considered low when compared to other branches of the energy industry. The mortality rate per unit electricity generated has decreased three orders of magnitude since the first commercial expansion of the industry in the 1980s. It is also recognised that wind energy offers a clean, safe form of electricity supply that is lower in cost and risk than fossil fuels and nuclear sources to the general public[67].

Human health

Noise

Concern over wind farms often centres around exposure to noise that in turn can result in stress, annoyance and sleep disturbance[68]. Wind farms can produce a range of sounds depending on the type of turbine used, the distance of the listener to the turbine, landscape, time of day and weather conditions. Generally, an intermittent 'swoosh' can be heard within 300 metres of a turbine, but sounds are often at different frequencies. Wind farms produce more sound when wind speeds are higher, but increased wind speeds can also make other environmental sounds louder as well[69].

The Environmental Protection Authority in Victoria states perception and reaction to sound can be subjective and that sensitivity to noise depends on physiology (natural hearing ability); psychology (general anxiety or beliefs about noise); and externalities (for example life stress). Exposure time to the noise also affects a person's response, as long-term exposure can increase sensitivity and negative associations but can also result in tolerance. Sounds can only impact health when sounds levels are audible. If the sound is not audible, then there is no known way to know whether it affects your health. The Authority states that while noise standards are created to protect a majority, due to the significant human variation in perception and reaction to noise, it is unrealistic to expect that standards will protect everyone from annoyance[70].

A submission by the NSW Government to the 2011 Senate Inquiry into the Social and Economic Impact of Rural Wind Farms stated NSW assessment processes requires proposals for wind farms to comply with South Australian Environmental Noise Guidelines 2003 with NSW wind farm noise criteria some of the most stringent in the world[71]. The 2017/8 Annual Report from the Office of the National Wind Farm Commissioner noted a reduction in noise

[65] Centre for Sustainable Energy UK, 2017, 'Public acceptance and community engagement', Common concerns about wind power, June, p. 100
[66] Centre for Sustainable Energy, 2017, 'Wind turbines and safety', Common concerns about wind power, https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, dated accessed: 06/03/2020, p. 53
[67] Centre for Sustainable Energy, 2017, 'Wind turbines and safety', Common concerns about wind power, https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, dated accessed: 06/03/2020
[68] Howlett, 2019, Wind Power: Australia's Wind Resources, https://www.integratesustainability.com.au/2019/06/26/wind-power-australias-wind-resources/, date accessed: 17/03/20
[69] Environmental Protection Authority Victoria, 'Wind farms, sound and health', https://ref.epa.vic.gov.au/our-work/environmental-public-health/environmental-health-in-the-community/wind-farms-sound-and-health, dated accessed: 17/03/20
[70] Environmental Protection Authority Victoria, 'Wind farms, sound and health', https://ref.epa.vic.gov.au/our-work/environmental-public-health/environmental-health-in-the-community/wind-farms-sound-and-health, dated accessed: 17/03/20
[71] NSW Government, 2011, NSW Government Submission Inquiry into the Social and Economic Impact of Rural Wind Farms; CSIRO Exploring community acceptance of rural wind farms in Australia, https://publications.csiro.au/rpr/download?pid=csiro:EP117743&dsid=DS3, date accessed: 17/03/20

complaints between November 2015 to December 2016 (48 complaints) to January 2017 to December 2018 (35 complaints)[72].

Infrasound and 'wind turbine syndrome'

Generally, sound frequencies between 20-250 Hz are categorised as low-frequency noise. Infrasound can be classed as below 20 Hz and tends to be outside the normal range of human hearing. Infrasound can be audible if the sound pressure level is high enough. The Centre for Sustainable Energy states several studies into wind turbine infrasound all show that levels are significantly below audible unless the listener was located less than 100 metres from the nearest wind turbine[73].

The negative health effects of infrasound and low frequency noise resulting from wind turbines is often cited by groups in opposition to such developments. Studies into infrasound, since the 2000s, have repeatedly indicated that infrasound from wind turbines does not have a demonstrable physiological effect on residents in close proximity and that negative effects on humans are only present when infrasound levels far exceed that generated by operating wind turbines[74].

Kamp & Berg (2018) conducted a narrative review of observational and experimental studies related to wind turbine sound exposure and its health effects in the general population. Reviewing studies between 2009 and 2017, their conclusions indicate that there is little scientific evidence to support the claim that infrasound and low-frequency sound from wind turbines pose health hazards. Wind turbine infrasound is not loud enough to affect balance (excluding people with specific hearing conditions). Dizziness and nausea could result from infrasound but only occur at higher levels than wind turbines produce in residential settings. Vibroacoustic disease and 'wind turbine syndrome' (ill health due to living near a wind farm) are not scientifically supported but stress symptoms related to wind turbine syndrome are evident. Wind turbine sound exposure is more likely to produce annoyance within a population. Sound from wind turbines leads to a higher percentage of those highly annoyed, and other impacts like shadow flicker can then add to noise annoyance within an individual. Annoyance, however, is highly subjective where several personal characteristics, local context and planning conditions for the wind farm contributes to the issue.

Shadow flicker

Shadow flicker is the casting of a moving shadow due to the blades of a wind turbine rotating in front of the sun at certain angles and time of the day or year. Therefore, for shadow flicker to result several of these physical factors must coincide.

Shadow flicker can present a significant annoyance to affected residents. Prolonged exposure, of about 60 minutes or more, has been noted to cause transient stress related symptoms such as reduced concentration and elevated heart rates[75]. It has also been suggested that shadow flicker can impact the small number of epileptics that suffer from photosensitive epilepsy. However, the Centre for Sustainable Energy argues that the most common flickering frequencies (3-30 hertz) that cause photo-epileptic seizures are found in small, building

[72] Annual Report, 2018, Office of the National Wind Farm Commissioner, https://www.nwfc.gov.au/sites/default/files/nwfc-annual-report-2017.pdf?v=1523425280, date accessed: 270820
[73] Centre for Sustainable Energy, 2017, 'Infrasound, wind turbine syndrome and other health concerns', https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 118
[74] Centre for Sustainable Energy, 2017, 'Infrasound, wind turbine syndrome and other health concerns', https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 123
[75] Centre for Sustainable Energy, 2017, 'Shadow flicker and epilepsy risk', https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 102

mounted turbines, not the larger commercial scale wind farm turbines (generally create frequencies below 2 hertz)[76].

The phenomenon can be predicted, therefore mitigation measures can be taken with wind farm developments such as adjusting the position of problematic wind turbines (micro siting); programming the wind turbine to stop operation at a certain time of day; and planting screen trees to disperse light between turbines and affected properties[77]. Some government authorities have also adopted guidelines to limit exposure to shadow flicker.

The Australia Institute, a public policy think tank, notes opposition to wind farms could be skewed towards a vocal minority, and with many of the health impacts being strongly subjective, there needs to be consideration of the objective evidence and the benefits that wind energy can lead to in generally for climate change and then health[78].

On the positive side, investment into cleaner energy sources can contribute to 'the greater good' by reducing premature mortality and healthcare costs associated with the negative impacts of fossil fuels. Wind energy tends to not change water, soil and air quality.

Education opportunities

Wind farm technicians help operate wind farms day-to-day. They often have a background in mechanical, electrical and engineering fields. The Canberra Institute of Technology and Federation University (VIC) provide education for future wind farm technicians. Both universities offer the Global Wind Organisation (Basic Safety Training) Course.

There are opportunities for wind farm companies to support education and learning in this field. For example, Tilt Renewables support the implementation of wind energy education in universities. The Dundonnell Wind Farm project (Victoria) has partnered with the Federation University, Ballarat to support local wind farm education pathways for employment. The wind farm project has provided 3 yearly $3,500 scholarships for 10 years which targets trained mechanics, electricians, and engineers. To be eligible for the scholarship applicants must obtain entry to the Global Wind Organisation Standard Course.

4.3 Economic impacts

Direct financial gain

Wind turbines can be located on existing farms, which in turn then benefits the rural economy. Farming families can continue to work their land with wind turbines taking only a small site on the property. The wind plant owner will then pay rent to the farmer for use of the land[79].

Interviews conducted by the CSIRO exploring community attitudes to rural wind farms in Australia indicated financial gains/rental income for hosting turbines could help:

- 'Drought-proof' farms during difficult periods
- Provide a pension fund and the ability to remain on the land post-retirement,
- Support land protection and conserve biodiversity (running less animals on the farm which puts less pressure on the land)
- Prevent subdivision of large land parcels
- Support local business, community initiatives and local government revenue[80].

[76] Centre for Sustainable Energy, 2017, 'Shadow flicker and epilepsy risk', https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 102
[77] Centre for Sustainable Energy, 2017, 'Shadow flicker and epilepsy risk', https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 101
[78] The Australia Institute, 2014, *Wind Energy, Climate and Health*, date accessed: 04/03/2020
[79] US Office of Energy Efficiency & Renewable Energy, 2020, Advantages and Challenges of Wind Energy, https://www.energy.gov/eere/wind/advantages-and-challenges-wind-energy, dated accessed: 17/03/20
[80] CSIRO, 2012, Exploring community acceptance of rural wind farms in Australia: a snapshot, https://publications.csiro.au/rpr/download?pid=csiro:EP117743&dsid=DS3, date accessed: 10/03/2020, p. 40

In the case of Waubra, Victoria, there are 15 'turbine hosts' earning AUD $8,000 per year for each turbine - 'drought-proofing their farms'. None of the Waubra hosts suffer health problems or are prevented from speaking publicly about their experience[81]. Chapman (2012) argues that complaints against wind farms are rare in communities that financially benefit from communal ownership arrangements and that health complaints tend to result from neighbours of property owners hosting turbines[82].

Job creation and value add

Economic activity, such as planning, building and operating electricity generators, creates employment. Some employment is long-term, some is short-term, some employment is directly associated with the economic activity, while some additional employment occurs indirectly in other sectors of the economy. The direct jobs will come from the employment associated with tasks such as:

- Project development
- Construction of foundations and hardstands
- Construction of access roads between all turbines
- Erecting wind turbines.

While indirect employment is associated with:

- The wind turbine manufacturing companies
- Sub-contractors who develop the turbine components
- Those who transport the equipment.

The production, installation, maintenance of wind turbines and farms can create employment opportunities for communities. Wind farms can result in job creation, usually in relation to the manufacturing of parts, during the wind farm construction phase and related infrastructure works. The CSIRO notes direct jobs tend to be higher during wind farm construction and less for long-term operation.[83]

In the United States, the wind energy sector employed more than 100,000 workers in 2016[84]. Wind turbine technician jobs are thought to be one of the fastest growing jobs in America (57% growth rate projected between 2018-28), second only to solar photovoltaic installers at 63%[85]).

In Australia, the ABS has reported that the wind sector is directly linked to 1,890 full-time equivalent jobs. However as direct employment relates predominately to construction activity, it is therefore more volatile, reflecting the fluctuation of energy infrastructure capital formation.[86]

Not all employment associated with wind farm construction would be generated in Australia. For example, while laying foundations and access tracks for wind turbines needs to occur locally, the wind turbine generator itself (blades and nacelle) are usually manufactured overseas. Together, onshore and offshore wind directly employ 1.16 million people worldwide, up 1% from 2017[87].

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[81] Chapman, S, 2013, 'Wind turbine syndrome farm hosts tell very different story', The Conversation, http://theconversation.com/wind-turbine-syndrome-farm-hosts-tell-very-different-story-18241, date accessed: 17/03/20
[82] Chapman, 2012, 'The sickening truth about wind farm syndrome', New Scientist, https://www.newscientist.com/article/mg21628850-200-the-sickening-truth-about-wind-farm-syndrome/, date accessed: 17/03/20
[83] CSIRO, 2012, Exploring community acceptance of rural wind farms in Australia: a snapshot, https://publications.csiro.au/rpr/download?pid=csiro:EP117743&dsid=DS3, date accessed: 10/03/2020,
[84] Office of Energy Efficiency & Renewable Energy, 2020. 'Advantages and Challenges of Wind Energy', https://www.energy.gov/eere/wind/advantages-and-challenges-wind-energy, date accessed: 04/03/2020
[85] US Bureau of Labor Statistics, 2020, 'Occupational Outlook Handbook', https://www.bls.gov/ooh/fastest-growing.htm, date accessed: 04/03/2020
[86] Australian Bureau of Statistics. 2018, 631.0 - Employment in Renewable Energy Activities, Australia, 2017-18, https://www.abs.gov.au/ausstats/abs@.nsf/mf/4631.0 date accessed: 06/03/2020
[87] international Renewable Energy Agency, 2019, Renewable energy and jobs: Annual review 2019, https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Jun/IRENA_RE_Jobs_2019-report.pdf date accessed: 06/03/2020

Indirect employment benefits will also accrue to local businesses, such as stores and providers of accommodation, who provide services for the workers. Many of these local benefits will be temporary because the construction phase is much more labour intensive that the operations and maintenance phase. Nevertheless, employment in the regions of wind farms could increase somewhat in the longer term and may be bolstered to the extent that rentals paid to host landholders and rates paid to local governments remain in those regions.

In addition to employment effects, wind farms also have impacts on local value-added, through increased profits and worker wages. By applying industry specific statistics, it is possible to calculate the regional value added, generated through the construction and ongoing maintenance phases. A study of the economic impact of the construction of wind power developments with a cumulative capacity of 63.1MW in Aachen, Germany found that the total value-added effects during the construction and installation stage are approximately €3,602,000 (€57,000/MW) measured through increases in profits, incomes and local taxes. In the operation stage, land lease, insurance, and financing lead to regional economic effects of €13,878,000 (€220,000/MW), and the impact of electricity generation are €33,344,000 (€8.5 per MWh electricity generated).[88]

A review of investment and costs (over development, construction, operation and maintenance phases) of windfarms in the UK for 2014 suggested 69% of the total spend is retained in the UK economy (£2.06 million per MW). Approximately 48% was spend in the region - England/Scotland/Wales/Northern Ireland (£1.43 million per MW) and 27% (£0.81 million per MW) of the overall spend was retained in the local government area.

Property prices

Wind farm developments can generate fear and anticipation within the local community that property prices decrease in value. Analysis from the UK and North America suggests, in general, the proximity of wind turbines to an area does not negatively impact surrounding housing prices, but there can be some exceptions and this is largely attributed to the visibility of the wind turbines to properties within several kilometres of the development[89]:

- In 2000-2005, the Royal Institute of Chartered Surveyors analysed 919 property transactions that were located near two wind farms in Cornwall UK. Initial findings suggested there was no linear correlation between the proximity of the wind farm and property prices within 6.4km. For a smaller group of properties within 1.6km of one of the wind farms, the effect of visible turbines was studied in more detail. Results indicated there were positive and negative effects on property prices. For example, front or side views of turbines had a more positive effect, than rear views of turbines for property prices. Overall, however, it was determined that there was no direct relationship between property value and turbine visibility for properties within 1.6km of a wind farm[90].

- A study in the USA used a much larger data set, analysing 51,276 transactions of properties across nine states in relation to 67 wind farms between 1996-2012. Statistical evidence suggested wind turbines did not affect house prices and that housing sales were

[88] Jenniches, S.. Worrell, E. and Fumagalli, E, 2019, 'Regional economic and environmental impacts of wind power development: A case study of a German region', Energy Policy, 132, p. 499-514.
[89] Centre for Sustainable Energy UK, 2017, 'Wind turbines and property prices', Common concerns about wind power, https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 69
[90] Centre for Sustainable Energy UK, 2017, 'Wind turbines and property prices', Common concerns about wind power, https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 70

significant prior to any announcement of the wind farms and well after it became operational[91].

- In 2014, a study looking at rural areas in England and Wales, analysed property transactions between 2000 and 2012. More than 1,700,000 property sales were considered at a distance of 14km from wind farms. It included 148 wind farms with a median of six turbines per wind farm (data was skewed due to the inclusion of some large offshore farms). The results suggested wind farms with 1-10 turbines caused a 5% reduction for property prices within 2km of turbines. This impact would fall to 1.5% by 4km and then would become insignificant thereafter. When the largest wind farms were included, the average price reduction due to visible turbines within 2km was 5-6 %. This fell to below 2% by 4km and less than 1% for a distance of up to 14km[92].

- Another English and Welsh study published in 2014 looked at site specific transactions from 1995 to mid-2013 for properties within 5km of wind turbines compared to average trends for comparable properties across the county. In total, 1,043,000 transactions were analysed. In total, 82,223 sales resulted with properties that were within 5km of a wind farm (2-26 turbines). Results suggested that a wind farm had no effect on property prices. Comparing the county averages to the 82,223 sales suggested the presence of a wind farm had no effect on property prices[93].

The Centre for Sustainable Energy states property owners can experience 'anticipation stigma' during the planning and construction of a wind farm with fears of property value loss but these reverse when the negative affects do not result post-construction[94].

The CSIRO has suggested there does not appear to be a negative impact on neighbouring property prices, drawing on an assessment completed for the NSW Valuer General. The assessment looked at property sales transaction data for 45 properties near six wind farms in Australia. 40 of the 45 properties did not show any reduction in value. For the five properties that had lower than expected sales prices, it was recommended that further work be undertaken to confirm whether the wind farm had impact. The CSIRO, however, does indicate that while the wind farm may not reduce property value, it could limit the market of buyers[95].

Reduced air pollution

The use of renewable energies is supposed to reduce air pollution significantly, in comparison to conventional energy generation technologies such as coal. As such renewable energy developments also have a positive effect on human health. According to the World Health Organisation (2014), approximately 13% of deaths worldwide were caused by air pollution in 2012, making it "the world's largest single environmental health risk".[96]

The economic benefits for avoided carbon emissions are calculated by assessing avoided damage costs of air pollution on human health. A study analysed the benefits of wind power in Germany and found that the total economic value of avoided air pollution in the Aachen

[91] Centre for Sustainable Energy UK, 2017, 'Wind turbines and property prices', Common concerns about wind power, https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 70
[92] Centre for Sustainable Energy UK, 2017, 'Wind turbines and property prices', Common concerns about wind power, https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 71
[93] Centre for Sustainable Energy UK, 2017, 'Wind turbines and property prices', Common concerns about wind power, https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 71
[94] Centre for Sustainable Energy UK, 2017, 'Wind turbines and property prices', Common concerns about wind power, https://www.cse.org.uk/downloads/reports-and-publications/planning/renewables/common_concerns_about_wind_power.pdf, p. 71
[95] CSIRO, 2012, Exploring community acceptance of rural wind farms in Australia: a snapshot, https://publications.csiro.au/rpr/download?pid=csiro:EP117743&dsid=DS3, date accessed: 10/03/2020, p. 42
[96] World Health Organization, 2014, '7 million premature deaths annually linked to air pollution', https://www.who.int/mediacentre/news/releases/2014/air-pollution/en/

region, in 2017, ranged from €1,864,000 to €5,480,000. Due to the integrated nature of the power grid and the difficulty in evaluating the spatial distribution of air pollution reductions, emission reductions were considered to take place inside as well as outside the region.[97]

Tourism

Studies suggest there is a mixed response from local stakeholders in relation to nearby wind farm. They are considered by some as detrimental to the local tourism industry, and by others as having potential to develop a new focus for local tourism.

Australia

In 2012, the CSIRO considered the impact of wind farms in rural areas. In relation to tourism, qualitative interviews with rural communities suggested that wind farms can attract tourism but do have the potential to conflict with other tourism activities (for example, nature based tourism, visiting natural scenery), therefore, while being a 'game changer', wind farms should be managed carefully to enhance acceptance because if managed poorly this has the potential for the opposite effect[98].

Tourism/visitor generation

Wind farm sites can generate some limited tourism/visitor opportunities (for example a yearly fun run event)[99]. The Clean Energy Council, in association with the Australia Wind Alliance, held a Clean Energy Open Day across 15 clean energy project sites in Australian in 2019. The community was invited to these sites to 'get-up-close' and learn about the renewable technology. For example, the Gullen Range Wind and Solar (Goulburn) opened its gates this provided the wider community with insights into how wind farms operate and renewable energy works[100]. Infigen Energy who manages the Woodlawn Windfarm which is located near Tarago also held an open day.

The open day included a fun run which includes a 5km and a 10km course that allows people to run around the wind turbines. In 2019 the fun run attracted 505 race competitors and over 100 hundred guests, volunteers, and event organisers. The fun run aimed to empower and inform people about wind energy[101].

[97] Jenniches, S.. Worrell, E. and Fumagalli, E, 2019, 'Regional economic and environmental impacts of wind power development: A case study of a German region', Energy Policy, 132, p. 499-514.
[98] CSIRO, 2012, Exploring community acceptance of rural wind farms in Australia: a snapshot, https://publications.csiro.au/rpr/download?pid=csiro:EP117743&dsid=DS3, date accessed: 10/03/2020
[99] Run with the Wind appears as a yearly event via searches, https://www.runwiththewind.com.au/entry/#schedule
[100] Clean Energy Council 2018, 'Clean Energy Open Day', https://www.cleanenergycouncil.org.au/events/clean-energy-open-day, date accessed: 17/04/2020.
[101] Infigen Energy 2020, 'Run with the Wind', https://www.infigenenergy.com/community/run-with-the-wind/, date accessed: 17/04/2020.

FIGURE 19: RUN WITH THE WIND FUN RUN – TARALGA, NSW

Source: https://www.facebook.com/RunWithTheWindAustralia/photos/rpp.178012392334310/1574749439327258/?type=3&theatre; https://www.runwiththewind.com.au/entry/#schedule

Czech Republic

In 2011, a Czech study considered the impact, perception and potential of two wind farm developments in rural recreational areas in the Czech Republic[102]. As a landlocked country that relies heavily on the appeal of its natural landscape to attract tourists, a change to the rural landscape for this type of development can be seen as highly contentious.

Of the sites studied, one already had an existing wind farm, the other was due for construction. Consultation was held with tourists and local business representatives. Findings suggested:

- Wind turbines are generally not perceived as disturbing in comparison to other infrastructure developments, like factories, mines or telecommunications. The construction of wind turbines in suitable places may have minor or negligible impacts on tourist perceptions and their experience of landscape and choice of destination.

[102] Frantal & Kunc, 2011, 'Wind turbines in tourism landscapes: Czech experience', Annals of Tourism Research, pp. 499 - 519.

- Most tourists (more than three quarters of those studied) do not regard the presence of wind turbines in recreational landscapes as negative for their experience. The attractiveness of nature was the most important aspect for destination choice but only 6% of tourists interviewed were strictly against visiting a place with wind turbines. However, it was noted in the study that at the time in East-Central Europe generally, wind turbines were seen as a new phenomenon, therefore tourists were quite interested in them.

- Socio-demographic characteristics, psychographic (travel behaviour) and geographical variables influence perception of wind turbines. There were varied perceptions towards wind turbines dependent on whether the respondent was a tourist or local resident and that the 'social gap' existed between the acceptance of them as a general idea, as opposed to local acceptance.

Sortelha, Portugal

A Portuguese study conducted in 2017 considered resident and visitor perceptions and attitudes towards wind farms and the perceived impact of wind farms on tourism near the rural village of Sortelha[103]. Approximately 150 residents live in and around the walled medieval citadel which is a heritage site. Two wind farms were developed about two kilometres from the old citadel with a total of 25 wind turbines.

Resident perceptions and attitudes towards the wind farms, and their perception of the impact of the wind farms on tourism, were divergent. Most residents agreed that the wind farms had no impact on local heritage preservation. However, they were critical of the contrast the wind farms created in the surrounding landscape and they had a negative view of its impact on the tourism experience. Similarly, exclusion in the decision-making process also tended to generate more negative attitudes from local stakeholders. In contrast, if economic benefit was derived from the wind farm, this tended to influence resident attitudes and acceptance. The key finding from the study was if there was local actor involvement in the establishment, management and decision-making of the development, this tended to generate a positive perception and attitude towards the wind farm and its impact on tourism from locals.

[103] Silva & Delicado, 2017, 'Wind farms and rural tourism: a Portuguese case study of residents' and visitors' perceptions and attitudes', Moravian Geographical Reports, pp. 248-256.

FIGURE 20: THE CASTLE OF SORTELHA AND IN THE WIND FARM OF TROVISCAL

Source: Silva & Delicado, 2017

Germany

The wind energy industry has rapidly grown in Germany since the 1990s and the density of wind turbines surpasses most other countries in the world.

A 2015 German study sought to build on a number of existing studies that used empirical evidence (interviews) to understand the relationship between wind turbines and tourism in Germany. The 2015 study utilised secondary data sources (such as regional tourism activities, tourist arrivals, accommodation facilities).

Findings reiterated what the earlier German studies had suggested: that the construction of wind turbines had a negative relationship with tourism demand in German municipalities, particularly those inland.

Interventions included ensuring planning coordination between neighbouring regions that would be impacted by the wind farm and collaborating with tourism agencies to understand tourist expectations and demands[104].

Scotland

A study completed in 2008[105] sought to understand the impact of wind farms on tourism in Scotland by analysing the potential number of tourists that would be affected; the reaction of the tourists affected by wind farms; and the economic impact of the reactions. It was noted the country's landscape and natural environment is a major drawcard for Scottish tourism. 92% of visitors stated that scenery was an important part of their choice of Scotland as a holiday destination. The findings of the study were mixed.

[104] Broekel& Alfken, 2015, 'Gone with the wind? The impact of wind turbines on tourism demand' Munich Personal RePEc Archive, https://mpra.ub.uni-muenchen.de/65946/1/MPRA_paper_65946.pdf

[105] Glasgow Caledonian University, Moffat Centre and Cogentsi, 2008, 'The economic impacts of wind farms on Scottish tourism'.

Overall, they stated the literature review did not suggest a serious negative impact from wind farms on tourism. Findings indicated:

- Most sensitive natural locations generally do not receive development approval, and therefore, show little evidence of negative effect.
- A significant number of individuals argue there is a loss of tourism value due to a wind farm development. It is also noted that some individuals think turbines enhance a scene.
- Wind farms were observed as being tourist attractions, but visits tend are not frequent and are an 'unusual occurrence'.
- Overtime, hostility towards wind farms decreases and they become accepted as part of the scenery.
- There is a loss of value for local tourism industries, but it is extremely small.

An intercept survey was conducted with tourists that had recently had an experience with a wind farm. The aim of the survey was to determine whether the experience would alter future return trips to Scotland. Four key tourism areas with rich natural landscapes were chosen as survey sites. A wind farm was either present or in construction.

99% of those tourists surveyed indicated the presence of the wind farm would not affect their future visitation to Scotland. There was no difference between those who had a close experience with a wind farm and those who had minimal. Pylons were the most objectionable component of wind farms and, in general, it was found that there was a dislike towards a large number of wind farms in a landscape.

An internet study was also conducted that sought to determine the proportionate drop in prices paid for accommodation if a view from a hotel gained a view of a wind farm. Six hundred tourists from the UK and US were canvassed. The presence of a wind farm from the hotel resulted in a steep decline in value. Only the 'young' subgroup that was surveyed found wind farm views from the hotels to be more acceptable. Authors suggested the findings may have been impacted by a 'protest vote' and that those consulted as part of the intercept survey would have had a better idea of the scale, dispersion and impact of the wind farms.

Finally, the study included economic multiplier analysis. Using an input-output model it was estimated that the impact of wind farms would generate 211 FTE jobs (equivalent to 0.1% of tourism employment in Scotland) and the equivalent of £4.7 million of gross value add (2007 prices).

4.4 Case studies

Three case studies have been identified to examine the socio-economic impacts of wind farm development on the surrounding communities: two in Australia and one in Oklahoma, USA. The case studies have been selected with contexts and scales similar to the proposed Hills of Gold project.

Hallett, South Australia

Local Context

The Hallett Wind Farms consist of four closely located wind farms in the mid-north region of South Australia, close to the regional centres of Jamestown, Burra and Clare. Together, the four wind farms contain 167 turbines (and associated infrastructure), with a generation capacity of 351 MW.

The wind farms are located within 20km of the small townships of Hallett and Mount Bryan. As of the 2016 Census, these villages were home to 151 and 113 residents respectively.

The turbines are owned and operated by the Australian Gas Light Company (AGL)[106].

FIGURE 21: HALLET WIND FARM AND TURBINE MAINTANENCE

Source: Alchetron; Max Equipment Hire, 2020

TABLE 9: HALLETT WIND FARMS SUMMARY

Farm	Capacity	Operational since
Brown Hill (Hallett)	95 MW	June 2008
Hallett Hill	71 MW	May 2010
North Brown Hill	132 MW	May 2011
Bluff Range (The Bluff)	53 MW	March 2012

Source: agl.com.au

Social Impact

The four wind farms have generally not been well received by the local community throughout construction and operation of the turbines.

Mount Bryan residents appealed the decision to approve the development of a 5th wind farm (Hallett 3) in 2010. Witnesses outlined issues that the other farms/turbines had caused in some weather conditions, emphasising disturbed sleep, hearing issues and an overall increase in stress and reduction in general wellbeing.

Objections to the proposal also related to the visual impact of the turbines on the landscape, including the effect of the turbines of users of the Heysen walking trail. The Environment, Resources and Development Court (SA) ruled against AGL based on visual considerations.

This demonstrates the need to assess visual impact in creating a socially acceptable outcome, particularly when operating in a context of high place-attachment.

Establishment of community benefit funds by AGL is one initiative which has resulted in positive community outcomes, with AGL committing $15,000 p.a. to community organisations for each of its established wind farms.

Economic Impact

In 2010, consultants Sinclair Knight Merz were contracted by AGL to examine the economic impact of the wind farms. This research was also later examined in a 2011 Senate Community Affairs Committee discussion paper. It was found that the Hallett wind farms had employed

[106] AGL n.d., *Hallett Wind Farms,* viewed 5 March 2020, <https://www.agl.com.au/about-agl/how-we-source-energy/hallett wind-farms>.

an average of 98 construction workers at any given time from 2005 to 2010. Based on calculations of the European Wind Energy Association, a multiplier of 3 was used to estimate the level of indirect employment generated by the Hallett farms. Using this, it was estimated that the wind farms created up to 2400 full time 'job years' throughout construction and operation (as of 2010)[107].

Post construction, the Hallett 1 and Hallett 2 wind farms are responsible for an average of 9 and 6 full time jobs respectively (the other wind farms were still under construction at the time of AGL's assessment).

Five of the seven contractors involved in Hallett's development and operation stated they had a policy of employing local contractors where possible, ensuring that some direct employment benefits of the projects were accrued to the local community.

Indirect benefits accrued to service providers and providers of accommodation in neighbouring towns of Burra, Jamestown and Clare. At the time of writing, AGL estimated that $18 million had been spend on 'accommodation, meals and other spending'.

However, it is unknown how much of the resulting economic benefit was realised in the communities of Hallett and Mount Bryan (who were the most directly affected). It is possible that their small size inhibited them from capturing the majority of benefits, with greater numbers of service/accommodation providers in larger centres nearby.

A Wind Farm Information Centre was opened by AGL in Burra, which attracted approximately 9-10 visitors per day between January 2009 and April 2010.

Weatherford, Oklahoma

Local Context

Weatherford is a city of approximately 10,000 people in Western Oklahoma. Located approximately 35 km to the north-west in Custer County is the 'Weatherford Wind Energy Park', consisting of 98 turbines with a capacity to generate 147 MW of energy and covering 5000 acres. The infrastructure is owned and managed by FPL energy.

In 2013, researchers from the University of Oklahoma examined the socio-economic impacts of the project on the city, using economic modelling, surveys, and interviews. This is one of a small number of studies to examine the complete impact of a wind farm on a specific community.

FIGURE 22: FPL ENERGY'S WEATHERFORD WIND FARM

Source: Flickr, Google Image

[107] Sinclair Knight Merz 2010, *Economic Impact Assessment Of the Hallett Wind Farms,* AGL, viewed 5 March 2020, <https://www.agl.com.au/-/media/aglmedia/documents/about-agl/how-we-source-energy/coopers-gap-wind-farm/assessment-and-reports/2011/missing-pdfs/south-australia-economic-impact-report-halletts.pdf?la=en&hash=686A14C92FB2FA0D9C66F3FDC14B5A6C>.

Social Impact

Residents who responded to the survey felt that the community was more supportive and aware of renewable energy as a result of the wind farm. Respondents generally indicated good sentiment towards the wind farm and its economic impact on the city, referencing positive feelings in relation to Weatherford's contribution to renewable energy.

Interviews were undertaken with city officials and several local business owners. Once again, sentiment towards the project was predominantly positive. Officials cited the benefits of increased public revenue, as it had enabled upgrades to community infrastructure. Concerns over loss of civic beauty were also mitigated by an agreement for US $25,000 to be committed by the developer to the improvement of public amenity. Local accommodation and service providers indicated that they had experienced benefits during project construction.

Economic Impact

Economic modelling was used to determine the direct and indirect benefits in terms of local spending and employment.

Results showed a direct employment benefit of 188 jobs during construction and 13 jobs during operation. Following construction, US$1.7 million in local expenditure is attributed to the wind farm each year, with US$600,000 in additional property tax (this is equivalent to land tax in an NSW context).

It was noted by the researchers that the ability for a locality to experience similar benefits was tied to the local community's ability to provide goods and services which can be used during construction of a wind farm[108].

Taralga, NSW

Local Context

The Taralga wind farm is located along ridgelines between 3km and 7km east of Taralga, a village located on the Southern Tablelands of NSW. At the 2016 Census, Taralga was home to 465 people, and is similar in scale and character to Nundle.

The wind farm contains 51 turbines, which generate up to a total of 107MW of electricity. The project was commissioned in 2015[109].

FIGURE 23: TARALGA WIND FARM PROJECT

Source: Taralga Wind Farm, Google Image Social Assessment

[108] Greene, JS & Geisken, M 2013, 'Socioeconomic impacts of wind farm development: a case study of Weatherford, Oklahoma', *Energy, Sustainability and Society*, vol. 3, no. 2, viewed 5 March 2020, <https://energsustainsoc.biomedcentral.com/articles/10.1186/2192-0567-3-2>.
[109] SEREE, https://www.serree.org.au/projects/renewable-energy-trail/taralga-wind-farm/, date accessed: 200820

A 2012 CSIRO study into the community impacts of wind farms in rural Australia investigated the social footprint of the Taralga wind farm in its locality. Similar to the Hallett wind farm, significant community opposition resulted in 165 objections to the development proposal, with an alliance of local community members lodging an appeal against the wind farm's approval in the NSW Land and Environment Court[110].

Concerns were centred around issues of visual impact, noise and ecological concerns. Representations were made to the Court that the appearance of the turbines would alter the village's character and scenic value. Throughout the proceedings, the judge noted a prevailing conflict between the perceived social disbenefits at a local level, and the overall public benefit of renewable energy.

Throughout interviews conducted by the CSIRO, residents also noted their feelings that the consultation between the developer and the community were inadequate, referencing "feelings of secrecy during the negotiations".

Economic Assessment

Although a 2016 NSW Office of Environment and Heritage review did not find a significant relationship between the construction of wind farms and property values, there remains limited evidence relating specifically to property values of residential or lifestyle properties near turbines[111].

The Senate Community Affairs Committee's 2011 discussion paper into the social and economic impact of rural wind farms included consultation with a Goulburn real estate agent regarding the Taralga wind farm. Through this consultation, the agent commented that many properties surrounding Taralga were used as 'hobby farms' or lifestyle properties, which had become harder to sell since the wind farm's conception[112].

Although this does not allow for strong conclusions to be drawn, it does raise a legitimate economic concern surrounding the value impacts in rural areas prized for their lifestyle offerings.

The wind farm resulted in approximately $103 million worth of construction jobs and $10.7 million in operation and maintenance[113].

4.5 Summary

- Public reaction to wind farm developments are complex where an individual can often hold conflicting views. They may understand and generally support the growth of renewables as it can produce more sustainable outcomes for society at large. But, at the same time, these individuals can be opposed to having the development in their immediate surrounds.

- Impact on health and the visual landscape, are two of the major concerns often cited by those in opposition to wind farm developments. Yet, literature suggests both are 'grey' areas and local viewpoints can be subjective. A person's perception of the visual impact a wind farm may have on the landscape can be influenced by their attachment to place, history of the place, length of time since installation, and the scale and size of the installation. Equally, people have different sensitivities to noise

[110] Hall, N, Ashworth, P & Shaw, H 2012, *Exploring community acceptance of rural wind farms in Australia: a snapshot,* CSIRO, viewed 5 March 2020, <https://publications.csiro.au/rpr/download?pid=csiro:EP117743&dsid=DS3>.
[111] Urbis 2016, *Review of the Impact of Wind Farms on Property Values,* NSW Office of Environment and Heritage, viewed 6 March 2020, <https://www.environment.nsw.gov.au/resources/communities/wind-farm-value-impacts-report.pdf>.
[112] Community Affairs References Committee 2011, *The Social and Economic Impact of Rural Wind Farms,* viewed 5 March 2020, <http://www.pacifichydro.com.au/files/2012/06/Senate-Enquiry-The-Social-and-Economic-Impacts-of-Rural-Wind-Farms-report.pdf>.
[113] SEREE, https://www.serree.org.au/projects/renewable-energy-trail/taralga-wind-farm/, date accessed: 200820

which can also be affected by an individual's level of annoyance over the development.

- There is evidence that wind farms can impact human health in relation to stress, annoyance and sleep disturbance. For more extreme health problems, such as dizziness, nausea, photo-epileptic seizures, literature suggests there is little scientific evidence to support the claims and that it is an area for future research, particularly in the area of inaudible sound.

- There are regulations and guidelines in place in Australia to mitigate health impacts and design/operational features can help avoid issues such as shadow flicker. On the positive side, investment into cleaner energy sources can contribute to 'the greater good' by reducing premature mortality and healthcare costs associated with the negative impacts of fossil fuels.

- Of all the renewables, wind can generally be considered more favourable over other options due to falling costs of development, its improved safety record in recent year in relation to installation and it tends to not change water, soil and air quality.

- The rent received by local residents from wind farm infrastructure located on their properties can provide a good income stream, particularly for communities being impacted by drought or for retirees. But conflict can occur with neighbouring residents who do not benefit from the rental income but have to live with the infrastructure in close proximity.

- Wind farms can create employment. However, the number of jobs is variable dependent on the stage of the development (construction versus operation) and the need for certain skillsets (such as wind turbine technicians) that may not be present in the local region (for example, manufacturing of parts overseas). Indirect employment benefits can also accrue to local businesses who support the workers, although this depends on the ability of the closest town to be able to support the workforce. Benefits may drift to the closest major town instead.

- The effect of wind farms on property prices is also variable and is dependent on the distance of the infrastructure from the property but is also dependent on the angle of the turbine to the property. Studies tend to suggest that property prices, on the whole, are not dramatically affected by the presence of a wind farm. However, it is noted that it could limit the market of buyers.

- The impact on tourism from the presence of a wind farm is context specific and divergent. The size, scale and distance of the infrastructure from the tourist attraction affects resident perceptions, as well as whether the resident was receiving a financial gain from the development. Views are also divergent as to whether the wind farm can attract tourists.

- Case studies indicated:
  - Significant economic benefits were experienced in the areas surrounding the Weatherford and Hallett wind farms, although they present very different narratives in terms of community sentiment and levels of social acceptance.
  - Although it is difficult to determine the cause of this discrepancy, it is possible that this is partly due to the fact the communities most directly affected by the Hallett wind farms were not large enough to capture the indirect economic benefits offered by the project.

- Communities in both Australian case studies were opposed to the projects, citing major concerns over noise, landscape impacts and inadequate consultation between the developer and community.
- The impact of wind farms of property values remains a grey area but may have an effect in regions where lifestyle properties are prevalent.

- A consistent and overarching lesson suggested by the literature was that collaboration, transparency and careful management of the infrastructure is required between local residents, tourism providers, the developer and operator. Local residents can be more receptive to a wind farm development if they are involved in the development process, understand its intent and their issues are solved through design, adherence to guidelines and careful management of the site. Compensation, social contributions or rental income also support greater acceptance of a wind farm development.

5. COMMUNITY ENGAGEMENT

This section provides an overview of the local community engagement and the key issues and impacts discussed. Community engagement summary notes are provided in Appendix 3.

Feedback from members of the local community was sought to understand the social and economic implications of the proposed wind farm. The feedback was used to qualitatively understand the community perception about the social and economic impacts of the proposed windfarm.

Eleven separate interviews were conducted over the course of late March/early April 2020. Several participants are Community Consultative Committee (CCC) members and some additional participants were independently selected by SGS to broaden the sample.

The results from these engagements, as summarised below, represent a small sample of the community. Therefore, these results may not necessarily reflect the majority of views held in the community towards the project. Furthermore, since March/April 2020, the project has been refined (for example, the final layout produced) and the proponent has continued to inform/collaborate with the community on project developments.

5.1 Engagement method

Due to the impact of COVID-19, it was not possible to visit the site or hold face-to-face meetings. Instead, eleven phone interviews were conducted over the course of late March/April 2020 with people from the local community and region.

Participants were offered the opportunity to be involved in the engagement by Someva in the first instance. The participants live and work in the local area and are involved in a broad range of industries. Several participants are Community Consultative Committee members. Some additional participants were independently selected by SGS with a view to broaden the sample and respond to key emerging issues.

All interviews were conducted on the basis of full anonymity with no quotations to be attributed to any individual. A general set of questions were used to stimulate discussion. Questions related to:

- Knowledge of the proposed wind farm
- Opinions about the proposed wind farm
- Opinions about its social impacts on Nundle
- Opinions about the impact on the broader region
- Opinions about the economic impacts on Nundle
- Opinions about its potential impact on businesses
- Requests for any data on the local economy or businesses that would assist analysis and modelling.

General and specific comments about the potential impact of the windfarm on Nundle, and its surrounds, were collected during interviews. Interviewees were also free to use the allocated time to express their opinions openly. A summary of the key issues and impacts raised during the engagement were emailed to participants post-interview to ensure consistency in reporting.

The results from these engagements, as summarised below, represent a small sample of the community. Therefore, these results may not necessarily reflect the majority of views held in the community towards the project. Furthermore, since March/April 2020, the project has been refined (for example, the final layout produced) and the proponent has continued to inform/collaborate with the community on project developments.

5.2 Key issues and impacts

There was an acute range of opinions from respondents, particularly in relation to the impact on natural amenity, tourism and local businesses as well as forecast economic benefits of the proposal. The key issues and impacts are summarised below.

Social impacts

Community

Nine respondents stated that the principle social impact was the division that the wind farm has created. There was a divergence of opinion as to whether the windfarm will continue to socially impact the town. Some believed that the social impact would settle down over time. Some respondents suggested they held uncertainty and that there was a breakdown of communication, others believed that the proponent had handled the development well.

Visual amenity

The village amenity of Nundle village itself will not be visually affected by the proposal. However, turbines will be highly visible on roads leading into Nundle, as well as at some tourism businesses, residences and farms in the surrounding area. A respondent suggested that the wind farm would negatively affect the 100km ridgeline views that are located on the Manilla Ranges.

Visual amenity impact has had a material impact on wellbeing for some members of the community, especially people who have come to live in Nundle to enjoy natural amenity. In contrast, the visual impact was also said to not impact others. The possibility that the wind farm would 'industrialise' the natural area was also raised as an issue by two respondents. Two respondents were waiting on a visual impact assessment (digital images) being prepared by the proponent and therefore, were not able to assess the impact by the time the interview was conducted. Environmental impacts, noise pollution, light pollution and traffic congestion were also raised as being as issues.

Respondents were awaiting clarification on the final layout of the construction site, supporting infrastructure (especially roads) and access plans. The full extent of the scale, size and height of the development were raised by some respondents as an issue which should be disclosed by the visualisations which could then be assessed by the community.

Human health

Mental health and wellbeing were cited as issues experienced by two respondents. Two respondents suggested that stress associated with the proposal was identified as an issue. Noise pollution and light pollution (from flashing lights) were also cited as an issue by three respondents. One respondent believed this would have the potential to impact human health. Climate change and drought were also noted as negative impacts to human health by five respondents. Two respondents raised the issue of local road safety.

Education opportunities

Six respondents suggested that skilled workers would be required and that educational opportunities to train unskilled workers were not available in the area, they also suggested that skilled workers would be professional workers that would either "fly-in, fly-out" or "drive in, drive out".

Economic Impacts

Direct financial gain

Two respondents indicated direct financial gain was not spread evenly amongst adjoining owners and wind farm hosts. One respondent supported the proposal because farm hosts for turbines would receive regular lease payments, thereby expanding and diversifying their revenue streams. Two respondents from adjoining properties to the wind farm hosts suggested that they would endure net direct financial loss because of the loss of visual amenity and the impact of the industrialised landscape. Additionally, three respondents identified financial losses to infrastructure, such as roads and fences, that would be required to support the operation and construction of the wind farm.

The Community Enhancement Fund was seen by a respondent as a major positive impact for Nundle. These funds could be used to help the community renew heritage-listed buildings and local infrastructure, and this support the tourist sector. However, two other respondents questioned the governance structure of the fund and whether it could be guaranteed with full certainty over the long-term.

Job creation and value add

There were divergent opinions as to whether Nundle would benefit from new job opportunities from the construction and operations of the wind farm. Two respondents believed that construction jobs would benefit the Nundle area, while six other respondents believed that workers would be imported for the project and/or that people seeking jobs in Nundle did not possess the necessary skills for such jobs. Two respondents felt that construction jobs would benefit Tamworth and that workers would live in Tamworth and commute to the project site, while one questioned the length of the daily commute for people based in Tamworth. Once the construction stage ended, it was agreed by one respondent that activity would recede.

The impact of operations on Nundle was also subject to diverse opinions. One respondent believed that operational workers and their families would choose to relocate to Nundle, boosting the local economy and school numbers. One respondent believed that most operational workers would be highly skilled professionals visiting Nundle on a 'fly-in, fly-out" or a "drive in, drive out" basis. It was also stated that the demographics of the area (ageing population) means that a large proportion of people are not looking for work.

Tourism

Respondent opinions were highly divergent in relation to the impact on visitation and tourism. Two respondents believed that the wind farm would damage the tourist economy, especially for activities and events that rely on scenic beauty and ambience, such as weddings that overlook pristine natural settings. It was noted that the large number of repeat visitors to Nundle would be severely impacted.

Two others suggested that key tourism operators would close business, and this would lead to a loss of investment and commitment of long-term operators making it difficult for Nundle to retain its critical tourism infrastructure and critical mass to attract visitors. The respondents suggested that events would continue to attract people but there would be a diminished attendance and pointed to the absence of alternative local tourist destinations for events and functions as mitigating this impact.

Two respondents noted that fossicking makes up a high proportion of tourist activities in Nundle and felt that this would not be damaged by the wind farm. They cited the Go for Gold festival as the largest annual event and said that this would not be affected. Two others noted

that fossicking was not the sole reason for visits and that natural amenity and ambience also played a part.

Two respondents believed that visits from workers would boost the local economy during the construction stage, although the remoteness of the project site from Nundle was raised as an inhibiting factor. Three respondents suggested that project workers would consume available accommodation, thereby reducing the number of vacancies for genuine tourists. There was divergence on whether there would be project-related visitations during the operations stage. Some believed that visitors would come to Nundle to view the wind farm itself as a major piece of infrastructure, while others felt that this would not happen or that it would happen only once, and Nundle would become a curiosity rather than a destination.

Two respondents raised the issue that the construction phase would increase risk on local roads and could create traffic congestion. In turn, this could potentially lead to negative impacts on the Nundle tourism industry. It was also suggested that the construction period could break the continuity of tourist visits and would inhibit tourism in the future. One respondent mentioned that the major truck movements due to the logging of the state forests for the next five years were said to be comparable to the construction of the windfarm.

Property Prices

Two respondents suggested Nundle has limited housing stock for purchase or rental and that there were not enough vacant rentals available to support a population of incoming construction workers. Clarity on where project workers would be accommodated was sought.

Other respondents believed that the windfarm would not impact property prices particularly if they were not visible from their property. Some respondents who resided in Nundle felt that the windfarm would not have an impact on the price of their property whereas others talked of the project jeopardising their property prices.

Three respondents believed that the windfarm would decrease property prices, especially outside the village of Nundle itself where turbines would be highly visible. Two respondents suggested that plans to further develop the properties would be jeopardised and this would cause a damaging financial loss. This would occur because the windfarms would detract from the country's beauty, ambiance, and amenity. Furthermore, three respondents suggested that noise pollution and light pollution would emanate from the proposed wind farm. A respondent suggested that that light pollution would affect the 24km ridgeline views and would be seen up to 100km towards Manilla Ranges.

Agriculture & revenue

Respondents believed the agricultural sector around Nundle has been hit in recent years by consolidation of the farming sector, reduced employment, drought, bushfire, and climate change. One respondent supported the proposal because farm hosts for turbines would receive regular lease payments, thereby expanding and diversifying their revenue streams. Another respondent suggested the wind farm could result in 'no fly zones' which could materially affect aerial farming operations and increase operational costs to farming businesses.

Other topics raised

Sustainable energy

One respondent supported sustainable energy. Two respondents accepted the impact of the wind farm as part of the price that had to be paid for new types of energy and felt that Nundle could not insulate itself from change.

Five people believed that Nundle was not the right place for a wind farm because of its natural beauty. Two respondents suggested that solar – not wind - was the best technology for their area. One respondent questioned whether Nundle would be an effective location for wind power, due to periods of low wind during the year and that energy output from wind farms is unreliable and expensive and creates inferior supply to that of coal fired generators and hydrogenators.

Environmental Impacts

Two respondents expressed their concern about the impact on native endemic flora and fauna that would be experienced during the construction and operation of the windfarm; it was suggested that the wind farm would displace flora and fauna. The fragility and uniqueness of the landscape was also raised. One respondent noted that the Manilla Ranges (the three ranges, Great Dividing Range, Liverpool Range & Mt Royal Range) where the proposed development will occur is located at the nexus of three indigenous nations, The Kamilaroi Nation, The Geawegal Nation & The Biripi Nation & three river systems flowing to three Council areas, the Peel River to the Namoi System in Tamworth Regional Council, The Isis River to the Hunter River in Hunter Valley Council Region and The Barnard River to the Manning River in the Mid Coast Council Region.

5.3 Social impact assessment

The table below is a qualitative review of the social impacts associated with the proposed development. The first column provides a high-level summary of findings from the literature review (related to Chapter 4). The second column provides a high-level summary of findings from the community engagement (related to Chapter 5). The third column considers the community engagement findings in the context of the literature review, policy review and socio-economic profiling. It also notes any additional project changes since engagement was held in March/April 2020.

Literature review	Engagement outcome	Assessment
Community attitudes		
While there may be broad support for renewable energy, the development of wind farm projects can often be met with strong local opposition. Community reactions to wind farms are often the result of a complex mix of reasons. Communities impacted by a wind farm can experience a 'social gap'. This is the expression of different attitudes towards the broader concept of wind power/renewables (high levels of public support for renewable energy) versus an individual wind farm development (high community opposition to a development application for a wind farm that may impact the individual). Residents tend to be more receptive to a wind farm development if they have been	At the time of interview, there was a variety of responses towards the proposed development. Out of a sample of 11 people interviewed as part of the study – 3 out of 11 supported the wind farm; 2 respondents were neutral; 5 respondents were opposed; 1 respondent did not disclose a position. There was general support expressed by respondents for sustainable energy, but opinions diverged when it was linked to the Nundle context.	The sample size for consultation was small and therefore, may not necessarily reflect the extent to which these views are held within the broader community. Since the time of consultation, a 'Friends of the Wind Farm' group has been established, see images below. Overtime, communities can change their opinion of major developments. Engagement confirmed the findings of the literature review that a 'social gap' can exist in relation to wind farm developments. A 'social gap' is the gap between high levels of public support for renewable energy but also high opposition to individual renewable planning applications. The proposal has affected social cohesion and created short-term tension within the community. It is unsure whether this tension will be sustained into the longer-term.

involved in its development. Collaboration is therefore, considered an important component of a wind farm development process.		For such a small regional community, the impact of the proposal to social cohesion is a negative outcome. Social cohesion within a regional community is important for reasons of wellbeing, inclusion, trust, and to support greater community resilience and productivity[114]. The NSW regional landscape and local communities already experience pressure from ongoing drought and downturns in agricultural productivity and, potentially, subsequent mental health issues. Social cohesion within a regional community would be an important element to help cope with these factors. Since March/April 2020 when interviews were held, the project has been refined (for example, the final layout produced) and the proponent has continued to inform, and collaborate, with the community on the project which is a favourable outcome. Since interviews were held, a 'Friends of the Wind Farm' Facebook group has started to support the proposal, see images below[115]. As an overarching consideration, NSW state government and local government policy is supportive of the growth of renewables in the NENW region, however development must be balanced and sensitive to the needs of the natural and town centre environments.
Visual Amenity		
The most common cited reason for adversity towards wind farms is the change to the landscape and visual amenity. Literature suggests it is a 'grey' area and local viewpoints can be subjective. A person's perception of the visual impact can be influenced by, for example, their attachment to place, history of the place, length of time since installation, and the scale and size of the installation.	Visual amenity impacts were subjective and had a material impact on some, but not for others. Three respondents felt the proposal would impact wellbeing; 2 respondents agreed it was 'industrialising' the landscape. In contrast, 2 respondents felt the proposal represented progress. Two were awaiting final layout clarification.	As suggested in the literature review, visual impact was a common issue raised in the engagement. For Hills of Gold however, there was a variety of responses from those interviewed (positive, negative and neutral). Changes to the visual landscape due to the development proposal is likely to produce different outcomes for different residents. The length of time that this remains an issue/impact for the individual or a business is uncertain.

[114] Australian Human Rights Commission, 2015, Building social cohesion in our communities, https://www.humanrights.gov.au/sites/default/files/document/publication/WEB_Building_social_cohesion_A4_brochure.pdf

[115] https://www.facebook.com/Prime7NewsNorthWest/videos/2968204906640397/

		CCC Meeting Minutes (May 6th 2020[116]) indicate that there has been extensive discussion between the proponent and community for the provision of photo montages. Extensive discussion was held on the process for selecting the locations of the photo montages. Action item from the meeting was that more montage locations were to be provided to the community on an ongoing basis. Local government policy supports a balanced and sensitive approach to development where the natural environment and town centre environments are safeguarded.
Safety		
Wind farm construction sites are often in remote locations that are more difficult to access. Consistently windy site conditions can increase the risk of falls, instability of cranes and the possibility of being struck by falling objects. Wind farms however, compared to other renewables, have vastly improved safety standards and outcome.	Respondents did not identify on-site safety as an issue or an impact. Risk on local roads during and after the construction period was raised by two respondents.	The Transport Planning Partnership is preparing a Traffic Impact Assessment to accompany the EIS. Tamworth Council has been engaged to seek agreement on road works to be undertaken by the project and forming part of the developer contributions (TTPP memo to Tamworth Council, dated: 5 August 2020). Meeting minutes with Morrison Gap Road residents (dated 7th July 2020) noted traffic and transport were concerns raised initially. The logistics of the transport route to carry a blade were discussed; and it was discussed that transportation should be conducted outside of busy times. Notes state that the meeting was productive in discussing the project openly with those closest to the project and seek amendments to the Neighbour Agreement to ensure it has more balanced benefits for residents along Morrison Gap Road.
Human health		
Impact on health is one of the two major concerns often cited by those in opposition to wind farm developments. Health impacts can be a 'grey' area due to subjectivity. People have different sensitivities to noise which affects levels of individual annoyance.	Noise and light pollution the proposed wind farm was cited as an issue with three respondents. Mental health and wellbeing were cited as issues experienced by two respondents due to the potential changes to the natural landscape.	Engagement responses confirmed the findings of the literature review that there can be a diversity of views in relation to health impacts. Given the individual variants and subjectivity of some health impacts, it could be assumed that health impacts on individuals are likely to be varied.

[116] https://www.hillsofgoldenergy.com/ccc

There is evidence that wind farms can promote stress, annoyance and sleep disturbance. These can then result in additional health concerns (such as elevated heart rates and lack of concentration). For more extreme health problems, such as dizziness, nausea, photo-epileptic seizures, literature suggests there is little scientific evidence to support the claims and that it is an area for future research, particularly in the area of inaudible sound.		Adherence to guidelines and appropriate measures should be undertaken when developing the proposal to ensure positive health outcomes for the community.
Education opportunities		
Wind farm technicians often have a background in mechanical, electrical engineering fields. There are examples where wind farm companies support education and learning opportunities, see 4.3 – Education opportunities.	Respondents suggested that skilled workers would be required and that they would either "drive-in, drive-out" or "fly-in, fly-out" (six respondents).	There are examples of wind farm developments supporting education opportunities, see 4.3 – Education Opportunities. However, in the case of Nundle, local residents expect little local skills growth, with skilled workers being temporarily brought in from elsewhere. In this scenario, there would be limited skills growth in the area and invariable outcomes. UNE Armidale is noted as offering course in sustainability and environmental science (no engineering courses were noted).

Economic impacts

Literature Review	Engagement	Assessment
Financial gain		
Wind turbines can be located on existing farms, which in turn benefits the local landholder. Farming families can continue to work their land with wind turbines taking only a small site on the property. The wind plant owner will then pay rent to the farmer for use of the land.	Direct financial gain and biodiversity offset programs were mentioned by respondents as positive outcomes. Two respondents indicated that direct financial gain was not spread evenly. Two respondents from adjoining properties to turbine hosts suggested they would endure net direct financial loss due visual and landscape impacts. The Community Enhancement Fund was seen by one respondent as a major positive impact for Nundle. These funds could be used to help the community renew heritage-listed buildings and local infrastructure, and this support the tourist sector. The governance structure and whether it could be guaranteed with full certainty	Engagement has suggested that the community perceives there is possibility for direct and indirect financial gains for some landholders and also the community as a whole as a result of the proposed development. It is also noted that after the majority of the consultation was conducted a Neighbour Benefit Sharing Program was also listed on the Hills of Gold Project Updates website (9 April 2020). This suggests there would be positive financial outcomes for the community and landholders hosting turbines and their affected neighbours (within 5km of the project site). A Community Enhancement Fund Charter has been created to govern the Fund (version seen dated 15 04 20). The Charter covers roles and

	over the long-term was questioned by 2 respondents.	responsibilities of members; funding eligibility criteria; governance, administration and finance processes. This will help support proper financial management of the Fund so that the benefits are realised for the local community.
Job creation and value add		
Wind farms can create employment. However, the number of jobs is variable dependent on the stage of the development (construction versus operation) and the need for certain skillsets that may not be present in the local region (for example, manufacturing of parts overseas). Indirect employment benefits can also accrue to local businesses who support the workers, although this depends on the ability of the closest town to be able to support the workforce. Benefits may drift to the closest major town instead.	There was divergent opinions as to whether Nundle would benefit from new job opportunities from the construction and operations of the wind farm. Two respondents believed construction jobs would benefit Nundle. Five respondents believed Tamworth would benefit over the local area for construction jobs. Three respondents believed activity would decrease post-construction. One believe things would return to normal, and two felt the local community would be damaged by the proposal. The impact of operations on Nundle was also subject to diverse opinions. One respondent believed that operational workers and their families would choose to relocate to Nundle, boosting the local economy and school numbers. Six respondents believed that most operational workers would be highly skilled professionals who would come to the region on a temporary basis, while two believed construction jobs would benefit Nundle.	The variability in local perceptions reiterated the findings from the literature review that there can be employment creation from a wind farm development, however this varies between different contexts and stages of the development. Socio-economic profiling highlighted some local residents have skillsets that maybe beneficial for the construction of a renewable energy development in the region; and that new industries may assist in bringing a younger workforce to live and work in a region that has an ageing profile.
Property prices		
The effect of wind farms on property prices is variable and is dependent on the distance of the infrastructure from the property but is also dependent on the angle of the turbine to the property. Studies tend to suggest that property prices, on the whole, are not dramatically affected by the presence of a wind farm. However, it is noted that it could limit the market of buyers. A case study suggested that the impact of wind farms on property values remains a 'grey area" but may have an effect in regions	Three respondents believed that the development would decrease property prices, especially outside the village of Nundle itself where turbines would be highly visible. This would occur because the wind farm would detract from the country's beauty, ambiance, and amenity. Others believed that the wind farm would not affect their property prices.	The variability in local perceptions reiterated the findings from the literature review. There are many variables that may/or may not affect a property price.

where lifestyle properties are prevalent.		
Reduced air pollution		
The use of renewable energy can reduce air pollution significantly, in comparison to conventional energy generation technologies such as coal. As such renewable energy developments also have a positive effect on human health and reduce spending for healthcare in the long run.	Reduced air pollution was not mentioned specifically. However, respondents agreed that climate change was an issue and renewable energy was a sign of progress and positive change. One respondent suggested that wind farms are expensive and not economically viable and non-renewable energy production approaches such as coal power are better at increasing energy output.	Respondents are generally aware that wind energy is a positive solution to the overarching issue of climate change, however the connection to reducing air pollution was not specifically identified. This may be because air pollution is not a pertinent concern for regional areas in general.
Tourism		
Wind farms can attract tourism but do have the potential to conflict with other tourism features, therefore, while being a 'game changer', wind farms should be managed carefully to enhance acceptance. If managed poorly this has the potential for the opposite effect. The impact on tourism is context specific and divergent. The size, scale and distance of the infrastructure from the tourist attraction affects resident perceptions, as well as whether the resident was receiving a financial gain from the development. Views are also divergent as to whether the wind farm can attract tourists.	There were very high levels of divergence about the impact on visitation and tourism. Five respondents believed that the wind farm would damage the tourist economy, especially for activities and events that rely on scenic beauty. One respondent believed that events would continue to attract people but there would be a diminished attendance. Two suggested fossicking activities would not be affected. Two respondents believed visitors would be attracted to visit the wind farm, others felt it may only be a once off visit.	Again, the variability in local perceptions reiterated the findings from the literature review. There are many variables that may/or may not affect the tourism industry. The attraction of visitors to the area due to the proposed development was somewhat acknowledged but was viewed as having limited potential. Both state and local government policy supports the development of tourism opportunities in the region. Socio-economics profiling indicated there are visitors coming to the region for the purpose of a 'holiday', additional tourism attractions in the region may be of value.

FIGURE 24: FRIENDS OF THE WIND FARM LOCAL SUPPORTERS

Source: Someva Renewables

6. ECONOMIC IMPACT

This section presents the economic impact of construction and operation of the proposed development.

In essence, the economic impact is trying to quantify the number of jobs and the value of wages and profits (referred to as gross value added) that is generated from the project - a job linked directly to the wind farm (e.g. maintenance) or indirectly link to the project. For example, a maintenance worker purchases a meal in Nundle. To prepare that meal for the worker, fresh food is purchased from a local grocery and butcher. This increases the revenue of these businesses who then might employ more workers. With more money in their pockets, the grocer and butcher may spend more money at the local café. This then increases the profits of that local business. Another example of the indirect economic impact is local building work funded by Community Enhancement Fund, it can support employment of local trades which helps to inject money into the economy.

To understand the economic impact an input/output approach is used. This is a statistical method to understand the supply chain of different types of purchases and how money flows through the economy. Sometimes money is lost to the local economy as there are other businesses to 'capture' that spending. For example, the turbines are built overseas so that money is 'lost' overseas.

The economic areas impacted for the purpose of this study are identified as the Local Government Area Tamworth Regional Council, Newcastle City Council, Greater Sydney and NSW as a whole.

Method

A regional Input/Output (IO) table was constructed for these regions identified above. A more detailed methodology is provided at Appendix 4.

In constructing an (IO) table for an area as small as the Local Region (in relation to population), it is important to validate the results of the statistical model to ensure that the results accurately represent the real world.

The IO table is constructed by applying a Residual Allocation System (RAS) also known as iterative proportional fitting algorithm, to the nation IO account table produced in the Australian Bureau of Statistics (ABS 5209.0.55.001) to allocate the national data to state level based on the state level geospatial distribution of workers in the 2016 ABS Census of Population and Housing.

The state totals that are produced are the allocated down to smaller geographies (such as a municipality of a capital city) based on relative location quotients (LQ). This data is then used to produce multipliers used in the Economic Impact Assessment (EIA).

Data from the ABS on wages & salaries and business profits are used to estimate the level of capital expenditure required to produce a job within these areas as a measure of the employment impacts of the project.

The EIA utilises capital inputs for a given project and using the multipliers produced from the I-O modelling quantifies the economic impacts of the given project in the categories of Output, Value-Add and Employment. This gives deeper insight into the interaction the given project has as an exogenous impact to the local economy (defined during the I-O modelling) beyond the base capital expenditure of the project.

Economic Stimulus

Capital

Table 10 below outlines the estimated economic stimulus of the wind farm project. The project is expected to include a minimum capital expenditure of $370 million with ongoing operational expenses of $19 million not including finance costs, see Figure 25. The farm will include a configuration of up to 70 turbines, all outcomes of the impact assessment are only linked to a configuration with this number of turbines (70).

TABLE 10: CAPITAL EXPENDITURE ON PROJECT

	Stimulus
Capital Expenditure (total)	$750 million
Capital Expenditure (local region)	$370 million
Annual Operational Costs	$19 million
Total Operational Costs *	$100 million

Source: SGS, Someva, 2020

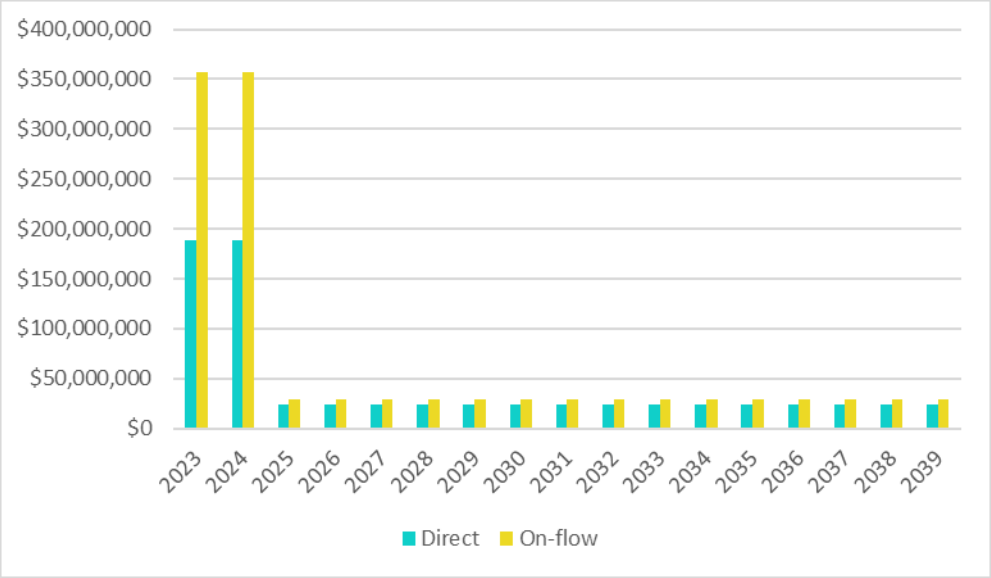
FIGURE 25: MINIMUM CAPITAL EXPENDITURE BY YEAR

Source: SGS

Output

Changes in output (e.g. the turnover within the economy) are estimated from the direct capital injection from the project, this value is identified in Table 10. The output is primarily front in-line with the capital expenditure, extrapolating the construction phase impacts and operational phase impacts across the total economic impacts can be expected to range between $1.01-$1.14B by 2040.

FIGURE 26: OUTPUT - DIRECT AND ON-FLOW BY YEAR

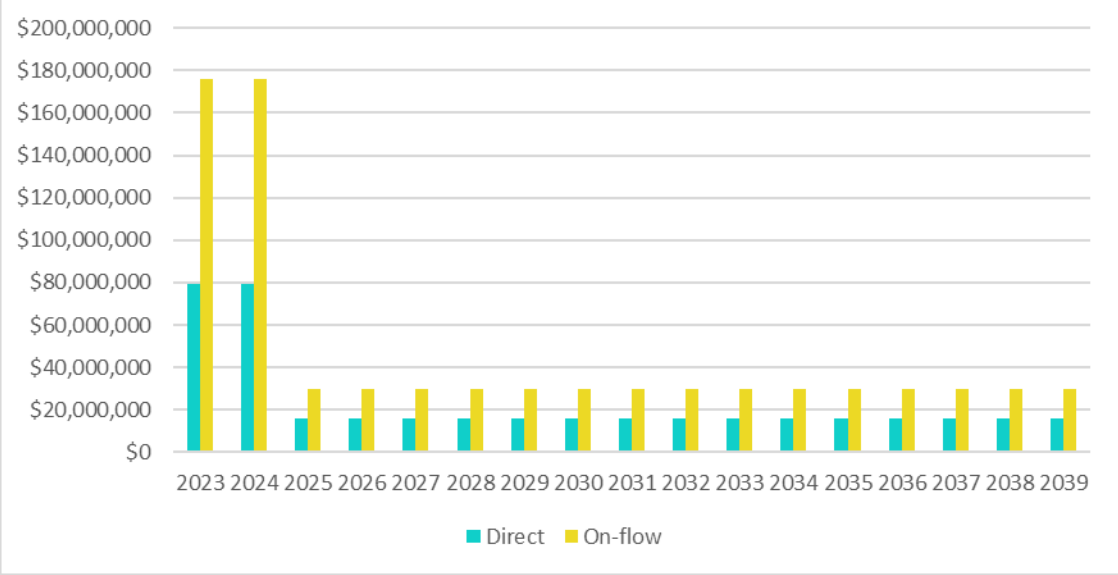


Source: SGS

Value-Add

The addition value-add (e.g. wages and profits) produced by the project directly is shown in Figure 27. It can be seen from the data in this graph the project is expected to produce around $160M in direct value-add during the construction phase and $15.8M per year during operation. The on-flow value add is worth $175M per year in the construction phase and about $30M per year during operation. To provide some context to this number, the broader regional economy is worth $5.2 billion [117].

FIGURE 27: VALUE-ADD DIRECT AND ON-FLOW BY YEAR



Source: SGS

[117] Local Government Areas of Tamworth Regional, Gunnedah and Liverpool Plains.

Employment

The total employment impact from the construction and operation of the wind farm is estimated to be:

- 646 Full Time Equivalent (FTE) jobs created across both years of construction phase.
  - 376 FTE jobs in the construction industry
  - 270 FTE jobs in professional, scientific and technical roles associated with the project.
- Ongoing employment is estimated to increase by 84 ongoing FTE jobs in the professional, scientific and technical industry sector.

Around 80-85% of the economic benefits from will occur in either the Tamworth Regional or in Newcastle City LGAs.

The employment impacts are split by industry and are identified below in Table 11.

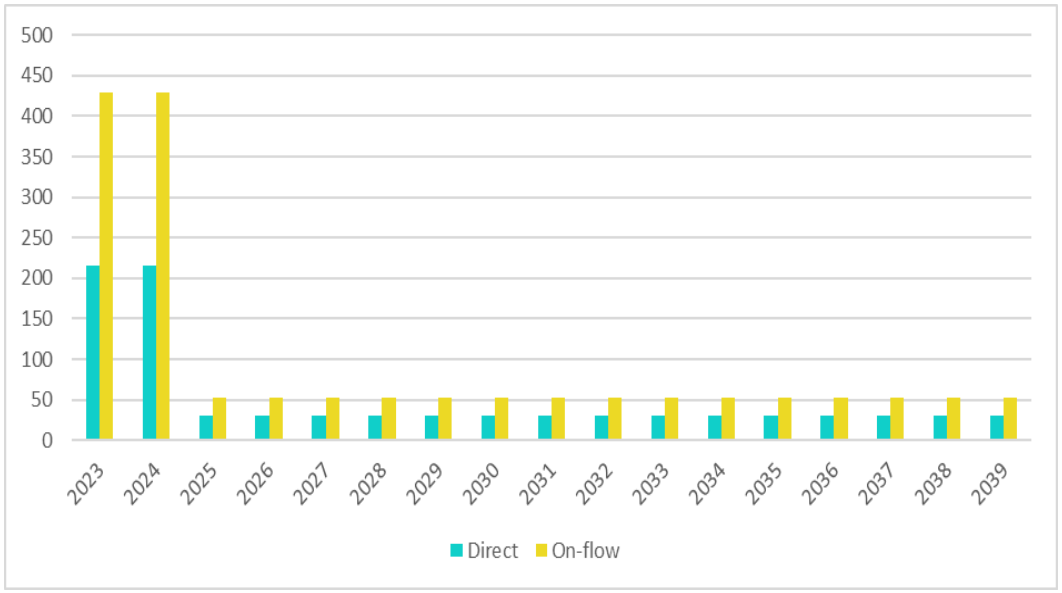
TABLE 11: EMPLOYMENT BY PHASE, INDUSTRY AND TYPE

	Construction Phase			Operation Phase		
Industry Type	Direct jobs	On-flow jobs	Total	Direct jobs	On-flow jobs	Total
Construction	120	256	376	-	-	-
Professional, Scientific & Technical Services	96	174	270	31	53	84
Total	216	430	646	31	53	84

Source: SGS

Figure 28 provides an overview of the impact on employment overtime.

FIGURE 28: EMPLOYMENT, DIRECT AND ON-FLOW BY YEAR



Source: SGS

Sensitivity analysis

By altering the intensity of the flow-on effects, lower and upper estimates of the economic impact of the wind farm can be created. Table 12 and Table 13 presents the results for construction and operational impacts respectively.

By holding inputs constant, there is quite a variance in the total impacts with employment value-add and output significantly lower under the scenario where only 10% of potential on-flow occurs. The lower scenario can be seen as the lower limit of the economic impact of the project and the higher scenario the upper limit.

Overall impacts have been scaled down by 25%, 50% and 100% in the model validation in order to account for overestimated flow-on effects within the I-O Model.

During boom times 25% would be appropriate (this is based on comparison of I-O Model results and the results from computable general equilibrium (CGE) models). CGE Models account for the price effects and constraints within the economy which the I-O Model. For the same stimulus an IO Model would produce $100 of benefits and a CGE Model would produce $25 of economic benefits.

However, if the economic fallout from COVID-19 is worse than expected, there could be more spare capacity in the economy. This will mean that the construction phase stimulus impact of the wind farm could have a much greater effect, more towards the 100% scenario.

TABLE 12: CONSTRUCTION PHASE (2023, 2024)

Impact	Lower (25%)	Middle (50%)	Higher (100%)
Output (Direct $, m)	$189	$377	$755
Output (On-Flow $, m)	$178	$356	$713
Value-Add (Direct $, m)	$80	$159	$318
Value-Add (On-Flow $, m)	$88	$176	$352
Employment (Direct FTE)	110	216	430
Employment (On-Flow FTE)	215	430	859

Source: SGS

In terms of the operational phase, the impact is likely to be at the lower or middle end of the impact. This is due to the local Nundle area having an economy which would have many 'leakages'. That is, work is done by 'drive-in-drive-out' workers of business. So, the stimulus is not captured by the local community.

TABLE 13: OPERATIONAL PHASE (PER ANNUM)

Impact	Lower (25%)	Middle (50%)	Higher (100%)
Employment (On-Flow, FTE)	25	53	75

Source: SGS

Table 14 provides some insights into the construction and operational impacts on spending in the Nundle economy. There are some possible declines (both the literature review and consultation both suggest that the outcome is very unclear) in tourism activity but then there is the guaranteed increase in local spending from the Community Enhancement Fund.

As a result, the operational phase would be likely towards the lower estimate of 25 jobs. Of which 10-20% would be in Nundle, 30-40% in the surrounding LGAs and the balance in the rest of NSW.

TABLE 14: ECONOMIC IMPACTS OF SPENDING SECTOR

Sector	Possible Outcome	Impact
Construction workers	Can assume some workers will spend money in Nundle. Some will stay in Nundle.	More local spending
Construction workers	Stay in Tamworth	Increase in spending for local accommodation and food services Other parts of the tourism industry will not be positively impacted
Operational period	Possible downtown in total tourist economy. Literature and consultations both confirm that the outcome is very unclear.	Unclear
Introduction of alternative tourism activities	Offset the loss of people seeking natural amenity.	More local spending
Operational period	Multi-purpose visits: people come to Nundle for a variety of reasons and old-style ambience. The local centre has a critical mass to retain visitors for 2-3 days or even 1 week in the caravan park. Opponents feel that Nundle will lose some of this multi-purpose value and ambience.	Less local spending
Operational period	Fossicking will continue (50% of tourism market comes from fossicking)	Continued local spending
Operational period	Country music festivals	No change (Continued spending)
Operational period	Fishing	No change (continued spending)
Operational period	Nature walkers	Less local spending (higher spending people will stop coming to Nundle for this reason alone)
Operational period	Biker tourism	No change (continued spending)
Operational period	It was suggested during consultation that the DAG could be impacted due to the doors opening onto the turbines reducing the number events being held there. It is understood that the Visual Impact assessment does not identify the DAG as being significantly impacted based on the NSW Wind Energy Visual Assessment Bulletin and without this there is not a strong evidence base to support less events being held at the DAG.	No clear change to local spending
Turbine tourism	Visitors to view turbines will be a one off. Fun runs, open day potential.	More/less local spending

7. SUMMARY OF IMPACTS

This section provides a summary and concluding assessment of the socio-economic impacts of the project.

7.1 Net community benefit assessment

Qualitative and quantitative research methods have been used to conduct a socio-economic assessment on the proposed wind farm development. Research highlighted a number of social and economic impacts relevant to wind farm developments.

A net community benefit rating has been applied to the identified social and economic impacts in consideration of the proposed wind farm project, see table below. A rating has been given for current status as either positive/negative and low/medium/high (see column 2). A second rating has also been given as a potential post-mitigation measure if, and as, mitigation measures are rolled out and completed (see column 5).

These qualitative descriptions are defined as follows:

High: the impact is expected to have a significant effect that could be local or throughout the wider catchment, driven by the provision of services or infrastructure not currently within the catchment.

Medium: the impact is expected to have a moderate impact through the catchment and be driven by a marginal change in infrastructure or services already provided.

Low: the impact is likely to have negligible impact, be appropriately mitigated to remove its impact or have local or temporary impacts.

Ratings were determined by the project team and aim to draw together the various components of research conducted, to provide a concluding assessment on the wind farm project and its potential future impact. In some cases, due to the nature of the impact (e.g. visual amenity and health) no rating was provided.

TABLE 15: SUMMARY OF IMPACTS AND MITIGATION MEASURES

Socio-economic impact	Rating	Mitigation measures	Potential post-mitigation rating if measures applied
Social			
Impact on community attitudes and sense of community	Low (negative)	Mitigation measures: Transparency and collaboration during the wind farm development process. Compensation, contributions, careful planning and management of infrastructure between the developer, local residents, the operator and tourism providers during and post-construction. Project: Engagement demonstrated a mix of attitudes are held towards the project within the community (opposition, neutral, support). Division in the community is likely to remain, however the depth of this may reduce overtime. Since engagement was completed, the proponent has continued to collaborate with the community,	Low (negative) - neutral

		particularly in the area of road safety, visualisations and compensation.	
Perceived impact on visual amenity of the surrounding natural landscape	Visual amenity is a site-specific issue (e.g. the turbines will not be visible from many sites) which is difficult to aggregate up into a single rating. See the detailed visual amenity report for more details.		
Impact on local safety and local road infrastructure	Low (negative)	Mitigation measures: Appropriate safety measures should be determined in relevant construction management plans. (i.e. Road upgrades such as sealing of Morrison Gap Road to improve road safety and local infrastructure). Project: The key safety concern raised during engagement by 2 respondents was local road safety during the construction period. The proponent is preparing a traffic and transport assessment and has consulted with Morrison Gap Road residents to ensure a balanced distribution of benefits aligned to level of impact.	Low (positive)
Perceived impacts on human health	There is much uncertainty around health impacts as suggested by the literature review, however it is suggested that many health impacts are subjective based on individual human physiology and development context. Adherence to NSW guidelines for wind farm development to reduce potential health impacts. These guidelines are noted as being some of the most stringent in the world.		
Creation of education opportunities	No impact	Mitigation measures: Working with local education providers and authorities to develop future opportunities. Project: UNE Armidale offers degrees in sustainability and environmental science. The literature review indicated there are examples of links made between educational institutions and wind farms. No current links could be determined between this project and developing education opportunities at this point in time. Stakeholders can collaborate in the future to develop opportunities.	Low (positive)
Potential impact on local financial gain (eg: community funds)	Medium (positive)	Mitigation measures: Having appropriate governance structures in place to ensure proper financial management of funds and for benefits realisation for the local community. Project: Community Enhancement Fund Charter has been created to ensure proper management of funds. The Neighbour Benefit Sharing Program has been established. Meetings held with Morrison Road Gap residents to ensure balance distribution of benefits.	High (positive)
Potential negative impact on local businesses	Low (negative)	Mitigation measures: Consideration during the design phase to minimise visual impact to property or land holders. Work with affected stakeholders. Project: One respondent suggested the project could result in direct financial loss. Others felt the project could bring more activity to local business. Economic modelling indicates there may be 430 on-flow jobs during construction and 53 during operational life.	Low-medium (positive)
Creation of local jobs/local skill creation	Low (positive)	Mitigation measures: Working with local authorities to promote and develop relevant skills/programs to engage community in local employment opportunities.	Medium (positive)

		Project: Economic modelling indicates in the short term (construction period) the project has potential to introduce 216 direct and 430 on-flow jobs to the local economy. In the long term (operation period) there is potential for 31 direct and 53 on-flow jobs during project life.	
Impact on existing local tourism	Low (negative)	Mitigation measures: Work with local tourism operators and local authorities to minimise impacts. Project: There was a mix of responses from respondents during engagement as to how the project may impact the current tourism industry.	Neutral
Creation of new tourism opportunities	Medium (positive)	Mitigation measures: Work with local tourism operators and local authorities to develop new opportunities. Project: Would require stakeholders to collaborate to determine opportunities. The Community Enhancement Fund Charter (dated: 15/04/20) indicates one of the social/environmental criteria supports new tourism opportunities. The literature review indication that tourism opportunities can develop in relation to a wind farm.	Medium (positive)
Impact on property prices	Low (negative)	Mitigation measures: Consideration during the design phase to minimise visual impacts to properties. Project: Impact could differ based on whether the property is a residence or lifestyle property. Proponent has been working with the community to provide visual montages.	Neutral
Impact on the local natural environment	Medium (negative)	Mitigation measures: Consideration during the design phase to reduce impact. Adherence to NSW guidelines. Local policy directives state development must be balanced and sensitive to the natural environment and town centres.	Low (negative)
Impact on sustainability/wider environment	Medium (positive)	Mitigation measures: Conduct appropriate planning, design and construction studies to reduce environmental/sustainability impacts. Project: The project will contribute to renewable energy sources in NSW. State and local strategic policy supports the development of renewable energy in the NENW region.	-
Economic			
Increased income (value-add) during construction	Medium (positive)	Project: Estimated to be around $150 million ($100M discounted) in value-add	-
Increased employment during construction	High (positive)	Project: During construction, project is projected to provide around 220 direct and roughly 430 on-flow jobs.	-
Increased income (value-add) during operation	Low (positive)	Mitigation measures: Local stakeholders work to enhance local economy which may capture more skills/investment Project: Estimated to be around $16.0 million per year during operation	Medium (positive)
Increased employment during operation	Low (positive)	Mitigation measures: Local stakeholders work to enhance local economy which may capture more skills/investment	Medium (positive)

		Project: During operation, project is projected to provide approximately 30 direct and 50 on-flow jobs	

Additionally, a Community Enhancement Fund Charter[118] has been created in collaboration with the local community aiming to enhance and enrich community initiatives throughout the local community. The Charter was developed to enhance the community's quality of life and wellbeing. It identifies the roles, member eligibility, election process as well as scope, reporting and administration of the Community Enhancement Fund. There will be two funding rounds per year (projects to be approved May and November each year) and applications must align to one of four themes: community upgrades, social/environment, education, or flexible projects[119]. These themes were derived from community feedback. There will be a written application process and applicants are to prove eligibility against a set framework. Key requirements for projects stipulate they must directly benefit the community within 20km of the project; incorporate social or environmental improvement that could include tourism opportunities; and improve wealth and the lifestyle of the community.

7.2 Conclusion

The Hills of Gold proposed wind farm, in the short-term (construction phase), would have a significant positive economic impact with guaranteed financial gains. In the longer-term (operation phase), the project would continue to have a positive economic impact on the local economy. The project is expected to include capital expenditure of roughly $370 million (local regional economy) with approximately 646 jobs created during construction and around 84 jobs during its operational life.

Given the current COVID-19 situation and its negative impact on the economy, investment in projects of this kind could be considered positive for NSW and the local economy. Furthermore, socio-economic profiling conducted as part of the study highlighted the relevance of exploring new industries in regional NSW that could provide alternate sources of income for local communities given recent economic downturns as a consequence of drought (reducing agricultural outputs and transport industry movement). Profiling also indicated that there are local residents who have industrial and construction skillsets that may be relevant to the development of a wind farm locally, noting some specialist skillsets may be required.

Socially, the project has raised a number of differing responses from the community (opposition, neutral and support). During the community engagement some members of the community indicated there has been a reduction in social cohesion within the community as a response to the project. However, it is noted that engagement was a small sample size (11 interviews) and the views may not necessarily represent the breadth of views in the community. Community views can also change towards a major project overtime.

Since engagement was conducted, the proponent has continued to work with the community to, for example, confirm project design and layout, ensure a balance of monetary benefits (Morrison Road Gap residents), Community Enhancement Fund governance measures, provide visual montages to overcome visual amenity issues and confirm traffic, transport and safety measures to overcome any local road safety concerns. This suggests a collaborative approach has/is being undertaken with the community. It was identified in the literature review that collaboration with the local community is a critical part of any wind farm development project which is therefore a positive outcome for this project.

No clear links have been made for educational opportunities in relation to this project. Respondents had mixed views as to whether the project would impact the local tourism industry. It was noted that the Community Enhancement Fund Charter includes social/environment criteria for the Fund that specifies new tourism opportunities. The literature review did reveal that there are examples education and tourism ventures occurring

[118] Version 15/04/20. This is still a draft Charter (13th of October) and it is currently under consultation with Council
[119] Covers emergency projects related to flood, fire or other natural disasters

in conjunction with other wind farms. Local stakeholders would need to work together to leverage the tourism, education and local business opportunities/linkages that a wind farm in the Nundle locality would offer.

Health issues and impact on property prices were raised by some of the respondents during engagement. However, what the literature review has demonstrated is that these impacts can be subjective and are context specific.

At a wider scale, the proposed wind farm project would contribute to positive environmentally sustainable outcomes for not only the region but NSW as a whole, and this aligns strongly with State and local government policy making that supports the development of renewable energy sources in the NENW region, noting local policy supports development that is balanced and sensitive to the natural environment and town centres.

Therefore, the Hills of Gold wind farm project represents a positive addition to the local and wider NSW economy (with strong economic return in the short-term). It also represents an opportunity for NSW to continue to build its renewable energy capabilities and meet State and local policy objectives. Socially, the project has resulted in varying degrees of response from the local community (opposition/neutral/support) in relation to the different social impacts discussed throughout this study.

During the community engagement some members of the community indicated that the project has created some social tension within the community. This maybe the view of only a small number of people within the community. With time, any tension may reduce. Inherently, the project will change the natural and visual landscape near Nundle and this will impact a small number of people within the community to some degree (personal or business). The proponent has demonstrated that measures are being taken to mitigate the degree of these impacts. The project may also result in educational or new tourism opportunities for the local community/economy. Local stakeholders would need to collaborate in the future to develop these opportunities.

APPENDIX 1 - BROAD INDUSTRY CATEGORIES (BIC) DEFINITION

SGS Economics and Planning has categorised ANZSIC Divisions into four broad Industry Groups (also known as Broad Industry Categories – BIC). The following table illustrates the classification.

TABLE 16: ANZSIC AND BIC INDUSTRY GROUPS

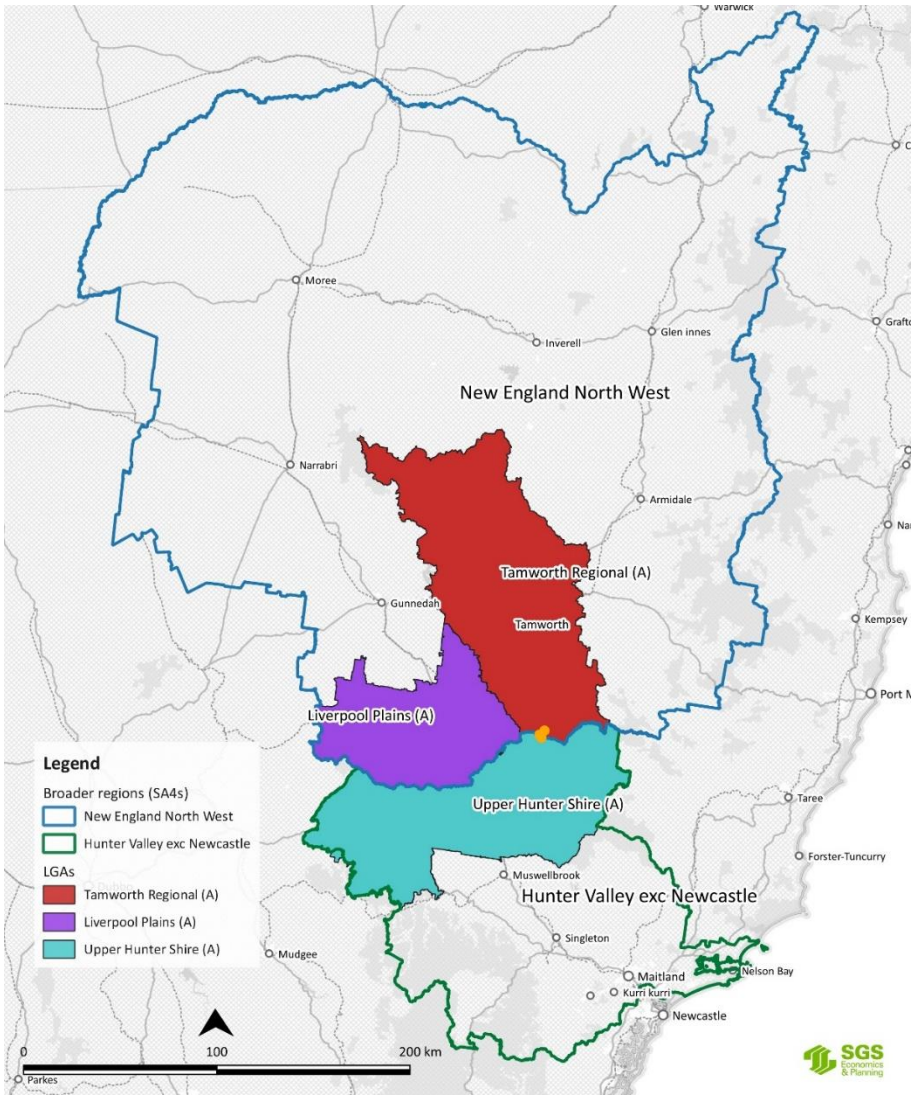
ANZSIC 2006 Division Code	ANZSIC 2006 Division Title	Group
J	Information Media and Telecommunications	Knowledge Intensive
K	Financial and Insurance Services	Knowledge Intensive
L	Rental, Hiring and Real Estate Services	Knowledge Intensive
M	Professional, Scientific and Technical Services	Knowledge Intensive
N	Administrative and Support Services	Knowledge Intensive
O	Public Administration and Safety	Knowledge Intensive
P	Education and Training	Health and Education
Q	Health Care and Social Assistance	Health and Education
E	Construction	Population Serving
G	Retail Trade	Population Serving
H	Accommodation and Food Services	Population Serving
R	Arts and Recreation Services	Population Serving
S	Other Services	Population Serving
A	Agriculture, Forestry and Fishing	Industrial
B	Mining	Industrial
C	Manufacturing	Industrial
D	Electricity, Gas, Water and Waste Services	Industrial
F	Wholesale Trade	Industrial
I	Transport, Postal and Warehousing	Industrial

APPENDIX 2 – SOCIO-ECONOMIC PROFILING

Regional geographies

The New England North West region refers the northern central portion of NSW[120]. Within this region are Tamworth Regional LGA and Liverpool Plains LGA. A significant portion of the wind farm project falls within the boundary of Tamworth Regional LGA. To the south is the Hunter Valley region[121] which includes the Upper Hunter Shire LGA, also impacted by the wind farm project. Figure 29 spatially represents these geographies which have informed the following socio-economic analysis.

FIGURE 29: LGA AND REGIONAL NSW STUDY AREA BOUNDARIES



Source: SGS 2020

[120] Department of Planning, Infrastructure and Environment regional classification
[121] The Hunter Valley region excludes the Newcastle core to ensure greater regional consistency when comparing regions.

Age cohorts

The age profile indicator reports the breakdown of the population age profile by age cohort. While not an economic indicator, age profile is an important consideration in the development of an economic strategy as age profiles are closely tied to the need for future health and other social infrastructure related services.

The following age profile definitions and reasoning has been applied:

- Children 0-5 years (still out of school system)
- Youth 5-20 years (mostly still living with parents)
- Young Adult 20-30 years (starting to move out, becoming independent, saving for deposit)
- Adult 30-45 years (starting a family, buying a house)
- Mature Adult 45-65 years (moving to better neighbourhoods, settling long term, less mobile)
- Retirees 65+ years (mainly out of work force).

Regional NSW

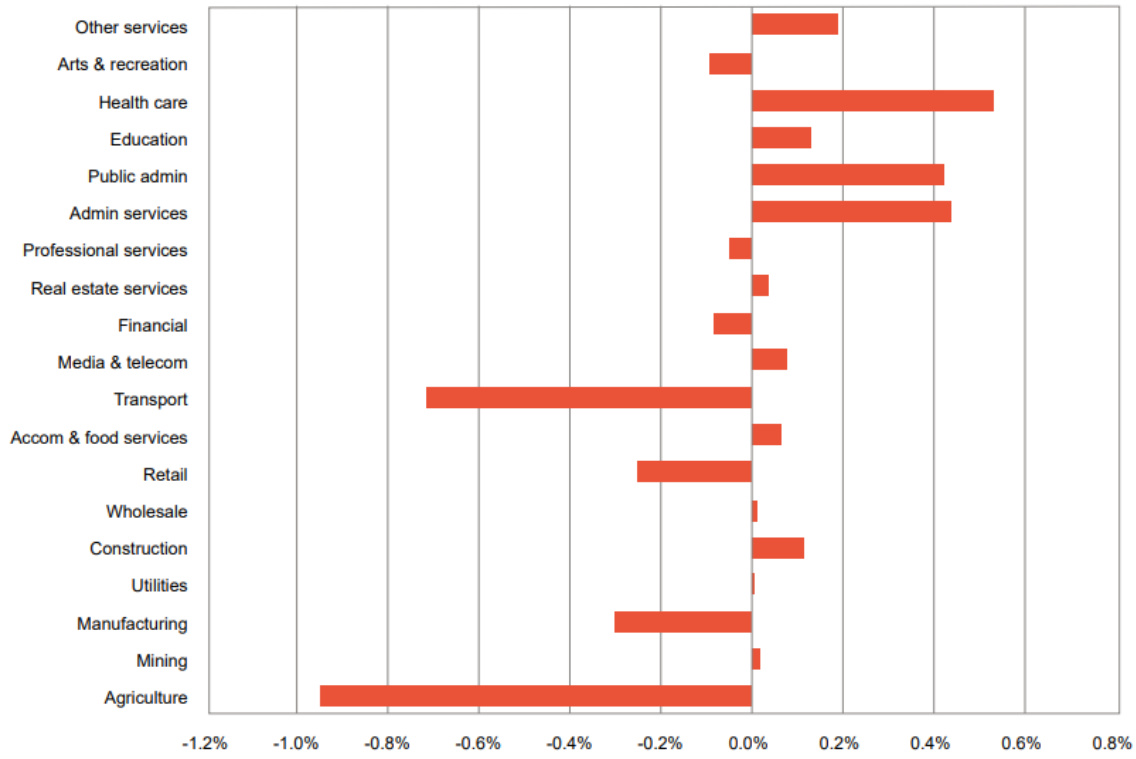
Regional NSW contains approximately 40% of the state's population. It is Australia's largest and most diverse regional economy[122]. Between 2018-19, the Gross Domestic Product (GDP) for regional NSW was approximately $152,969 million, far higher than estimates for regional Victoria over the same period at approximately $76,640 million. GDP per capita between 2018-2019 was approximately $55,200 for regional NSW, significantly less than the Sydney region at $86,500[123].

In the 1990's, regional NSW's contribution to Gross Domestic Product (GDP) was approximately 9.2%. This dropped to 5.2% in the 2010s. Decline of the regional NSW economy is attributed to contractions in agriculture, transport, manufacturing, and retail industries (Figure 30). The impact of drought since 2016-17 has contributed to the downturn in agricultural and transport industries where there is less agricultural produce to transport.

With the decline of the regional NSW economy in recent decades and consistent issues of drought and climate change impacting regional communities and agricultural production, the exploration and development of other industries that could contribute to regional economies and provide employment is pertinent.

[122] NSW Government, 2018, 20-Year Economic Vision for Regional NSW
[123] SGS, 2019, Economic Performance of Australia's Cities and Regions, p. 12

FIGURE 30: CONTRIBUTION TO REGIONAL NSW GDP GROWTH, 2018-19



Source: SGS, Economic performance of Australia's cities and regions, 2019

Tamworth Regional LGA

Population change

Tamworth Regional was home to 59,662 people based on the Australian Bureau of Statistics (ABS) 2016 Census. The population has grown by +6,070 people in the ten years between 2006 and 2016, representing a Compounded Annual Growth Rate (CAGR) of 5.51%.

Comparatively, the New England North West region grew by only 2.63%, while Hunter Valley (ex. Newcastle) grew by 8.01%.

TABLE 17:POPULATION CHANGE 2006-16

Geography	2006	2011	2016	Growth	CAGR (%)
Hunter Valley ex. Newcastle	226,784	243,683	264,588	37,804	8.01%
New England North West	172,396	176,249	181,592	9,196	2.63%
Tamworth Regional	53,592	56,291	59,662	6,070	5.51%

Source: ABS Census TableBuilder (2006, 2011, 2016)

Age profile[124]

The largest age group in the Tamworth Regional are Mature Adults (25.67%) followed by Youth (20.06%) and then Retirees (18.7%). Retirees have increased the most as a proportion of the population in the LGA (+3.13%), while Youth has declined the most (-2.23%) followed closely by the Adult age cohort.

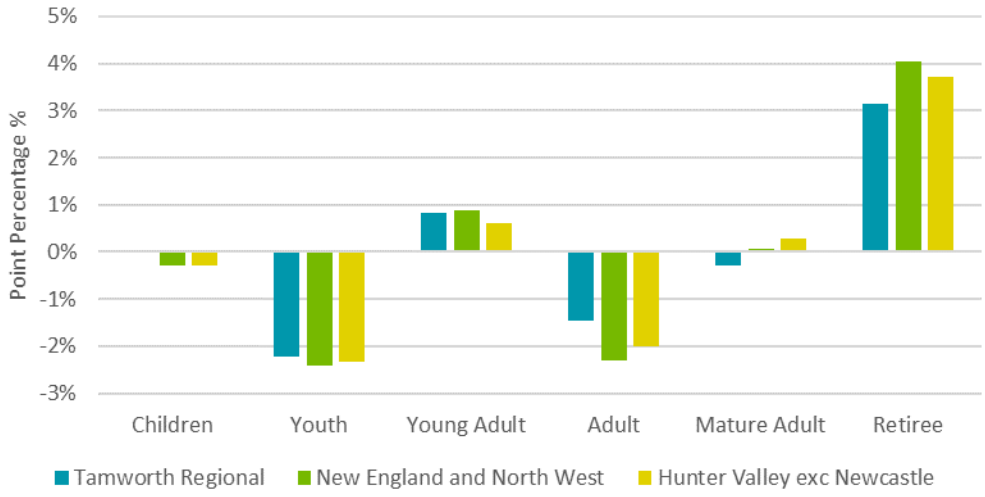
[124] Age cohort breakdown at Appendix 1

New England North West and Hunter Valley (ex. Newcastle) have similar demographics, with New England North West containing a slightly higher proportion of Mature Adults (26.29%), and Hunter Valley (ex. Newcastle) containing a slightly lower proportion of Retirees (17.23%).

FIGURE 31: POPULATION AGE STRUCTUE 2016

Source: ABS Census TableBuilder (2016)

FIGURE 32: CHANGE IN POPULATION AGE STRUCTURE 2006-16



Source: ABS Census TableBuilder (2006, 2011, 2016)

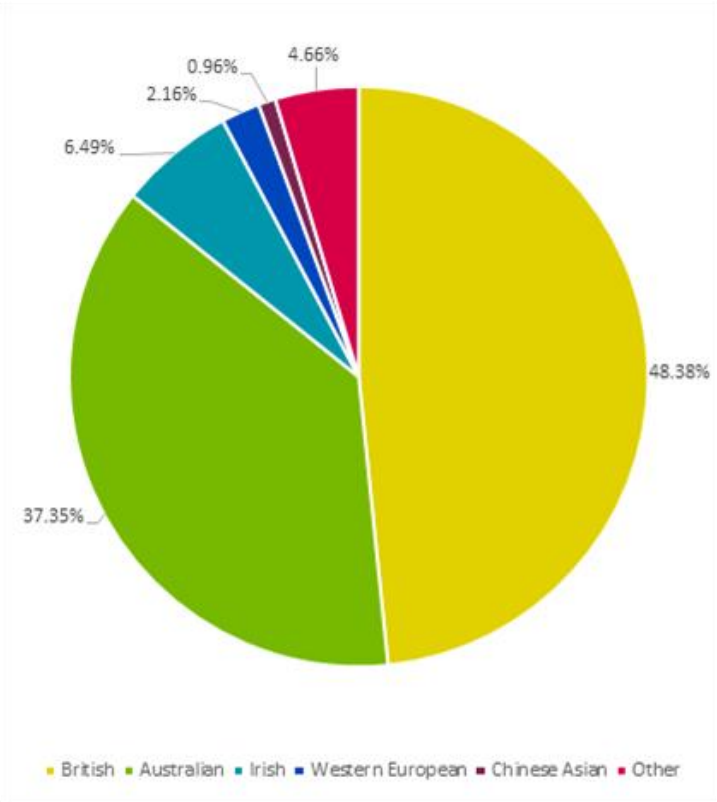
Ancestry

The largest ancestry in the Tamworth Regional LGA is British (48.38%), followed by Australian (37.35%), Irish (6.49%), Western European (2.16%) and Chinese Asian (0.96%).

Those identifying as Australian have declined the most as a proportion of the ancestries in the LGA over the ten years between 2006 and 2016 (-6.99%), followed by Western European (-0.44%) and Southern European (-0.02%).

The ancestries of the comparative NSW regional areas are similar, with Hunter Valley exc. Newcastle containing a slightly higher proportion of British (51.70%).

FIGURE 33: ANCESTRIES OF THE TAMWORTH REGIONAL LGA



Source: ABS Census TableBuilder (2016)

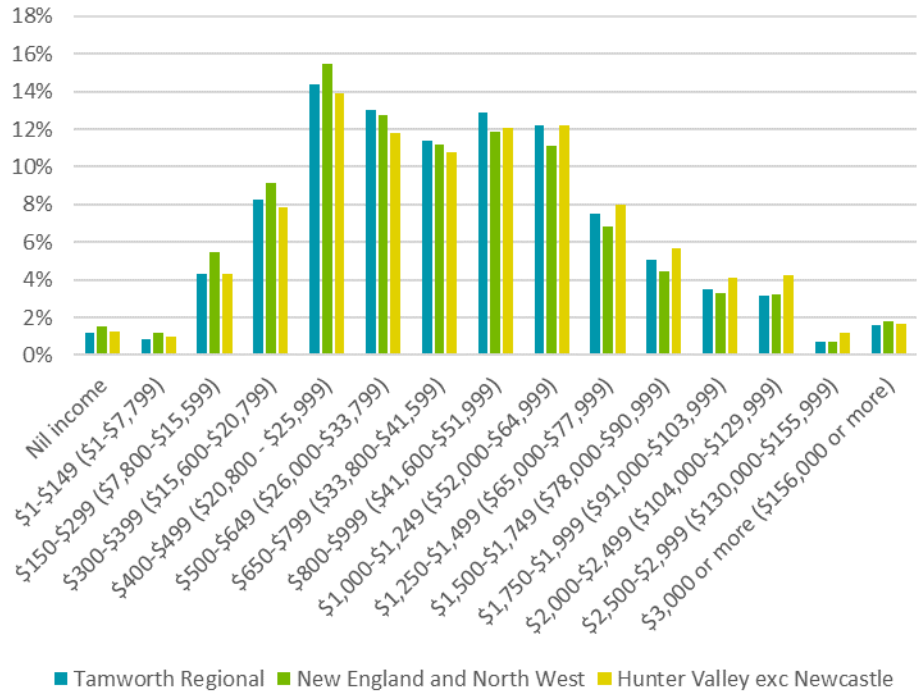
Household Equivalised Income

Most households in Tamworth Regional are earning between $20,800 - $65,000 per year.

Household earnings of $20,800 - $25,999 per year is the most prevalent bracket (14.38%), closely followed by $26,000 - $33,799 (13.02%), $41,600 - $51,999 (12.89%), $52,000 - $64,999 (12.18%) and $33,800 - $41,599 (11.42%).

Comparatively, there are similar incomes in New England North West and Hunter Valley exc. Newcastle, with the share of households earning $20,800 - $25,999 per year in New England North West higher (15.49%).

FIGURE 34: EQUIVALISED HOUSEHOLD INCOME 2016



Source: ABS Census TableBuilder (2016)

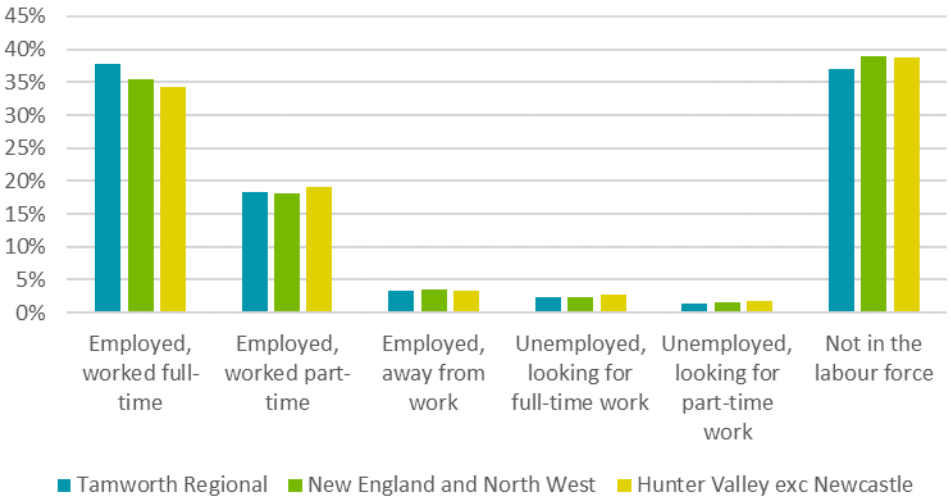
Labour force status

Most of the labour force are employed and working full-time (37.74%) or part-time (18.30%) in Tamworth Regional. There is a significant proportion that are not in the labour force at approximately 37%. At the time of the ABS 2016 Census, about 3.35% of the population were employed away from work; 2.35% were unemployed looking for full-time work; and 1.32% were unemployed looking for part-time work.

Comparatively, Tamworth Regional has a higher percentage of people employed and working full-time, and a slightly lower share of the population who are not in the labour force at all to New England North West and Hunter Valley exc. Newcastle.

Between 2006 and 2016, the proportion of employed and working full-time rose for Tamworth Regional (0.7%), while in New England North West and Hunter Valley exe. Newcastle the proportion fell at -0.6% and -1.3% respectively. There was an increase in those employed and working part-time for all three regions.

FIGURE 35: LABOUR FORCE STRUCTURE 2016



Source: ABS Census TableBuilder (2016)

FIGURE 36: LABOUR FORCE STRUCTURAL CHANGE 2006-16

Source: ABS Census TableBuilder (2006, 2011, 2016)

Resident workforce (industries)

Broad Industry Categories[125]

There are 24,907 working residents of the Tamworth Regional LGA. Population Serving jobs are the largest broad industry of Tamworth Regional's resident workforce (32.13%), followed by Health and Education (25.01%) and Industrial (24.93%).

Comparatively, Hunter Valley exc. Newcastle has a slightly higher proportion of Population Serving (33.53%) and Knowledge Intensive jobs (19.15%). Tamworth Regional has the lowest proportion of Industrial jobs compared to New England North West and Hunter Valley exc. Newcastle. It does, however, have the highest proportion of Health and Education jobs amongst their respective resident workforces.

Industrial jobs have declined the most as a proportion of total jobs in all three areas at a similar rate (approx. -4%), while Health and Education jobs have grown in all three areas.

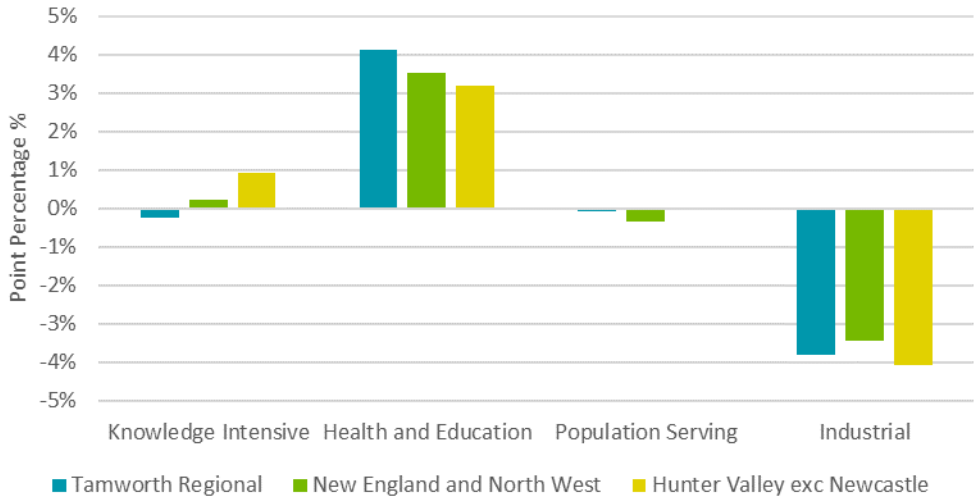
[125] Broad Industry Category breakdown at Appendix 2

Tamworth Regional has experienced the highest proportional increase in Health and Education jobs compared to New England North West and Hunter Valley exc. Newcastle.

FIGURE 37: RESIDENT WORKFORCE STRUCTURE BY BROAD INDUSTRIES 2016 (PUR)

Source: ABS Census TableBuilder (2016)

FIGURE 38: RESIDENT WORKFORCE STRUCTURAL CHANGE BY BROAD INDUSTRIES 2006-16 (PUR)



Source: ABS Census TableBuilder (2006, 2011, 2016)

ANZSIC Industries of Employment[126]

In terms of Australia and New Zealand Standard Industry Classifications (ANZSIC) industries of employment, for Tamworth Regional, Health Care and Social Assistance is the largest employer of working residents in the LGA (15.7%), followed by Retail Trade (11.6%) and Education and Training (9.4%). The smallest employers are Arts and Recreation Services (1%), Information Media and Telecommunications (1%) and Electricity, Gas, Water and Waste Services (1%).

Health Care and Social Assistance has increased the most as a proportion of total jobs taken by resident workers over the 10 years between 2006 and 2016 in the LGA (+3.1%), followed

[126] ANZSIC codes have been developed for use in Australia and New Zealand for the production and analysis is industry statistics. An individual business entity is assigned to an industry based on its predominant activity. Business entities can be companies, non-profit organisations, government departments and enterprises.

by Construction (+1.3%), Education and Training (+1%), Administrative and Support Services (+0.8%) and Mining (+0.8%).

Manufacturing has declined the most as a proportion (-2.3%), followed by Agriculture, Forestry and Fishing (-1.3%) and Retail Trade (-1%).

Tamworth Regional LGA has a self-containment rate of 91%, meaning of the entire resident workforce, 91% are also working locally within the LGA while 9% travel outside the LGA for work.

TABLE 18: RESIDENT WORKFORCE STRUCTURE BY ANZSIC INDUSTRIES (PUR)

Geography	Tamworth Regional	Tamworth Regional	Tamworth Regional	New England and North West	New England and North West	New England and North West	Hunter Valley exc Newcastle	Hunter Valley exc Newcastle	Hunter Valley exc Newcastle
	2006	*2011*	*2016*	*2006*	*2011*	*2016*	*2006*	*2011*	*2016*
Agriculture, Forestry and Fishing	8.3%	6.8%	6.9%	17.3%	15.1%	14.8%	4.5%	3.5%	3.5%
Mining	0.3%	0.8%	1.1%	0.5%	1.5%	2.2%	7.0%	9.3%	9.3%
Manufacturing	10.1%	9.5%	7.8%	7.2%	6.7%	5.6%	11.3%	10.4%	7.0%
Electricity, Gas, Water and Waste Services	1.0%	1.2%	1.0%	0.9%	1.1%	1.0%	1.7%	1.7%	1.7%
Construction	6.9%	7.7%	8.2%	6.2%	6.6%	7.0%	7.9%	8.0%	8.8%
Wholesale Trade	3.7%	3.6%	3.0%	3.2%	3.1%	2.5%	3.2%	3.0%	2.1%
Retail Trade	12.6%	11.7%	11.6%	11.5%	11.2%	10.4%	12.3%	11.0%	10.5%
Accommodation and Food Services	7.0%	7.2%	7.1%	6.6%	6.8%	6.9%	7.8%	8.0%	8.4%
Transport, Postal and Warehousing	5.3%	5.2%	5.0%	4.5%	4.5%	4.1%	4.5%	4.5%	4.6%
Information Media and Telecommunications	1.4%	1.2%	1.0%	1.1%	0.9%	0.8%	0.9%	0.7%	0.7%
Financial and Insurance Services	2.7%	2.4%	2.0%	2.0%	2.0%	1.7%	1.9%	1.7%	1.9%
Rental, Hiring and Real Estate Services	1.4%	1.5%	1.5%	1.2%	1.2%	1.2%	1.6%	1.6%	1.6%
Professional, Scientific and Technical Services	3.6%	3.6%	3.8%	3.9%	3.9%	4.0%	4.2%	4.3%	4.2%
Administrative and Support Services	2.5%	2.7%	3.3%	2.2%	2.2%	3.1%	2.8%	3.2%	3.8%
Public Administration and Safety	6.5%	6.1%	6.3%	6.0%	5.9%	5.9%	6.8%	6.5%	7.0%
Education and Training	8.4%	8.9%	9.4%	9.9%	10.1%	10.8%	6.2%	6.2%	7.0%
Health Care and Social Assistance	12.5%	14.6%	15.7%	10.7%	12.2%	13.3%	9.7%	10.5%	12.2%
Arts and Recreation Services	0.9%	1.0%	1.0%	0.8%	0.9%	0.8%	1.1%	1.1%	1.1%
Other Services	4.7%	4.5%	4.3%	4.2%	4.1%	4.0%	4.4%	4.9%	4.7%
Total	*22,835*	*24,364*	*24,907*	*70,798*	*73,907*	*72,958*	*93,468*	*105,331*	*107,258*

Source: ABS Census TableBuilder (2006, 2011, 2016)

Resident workforce (occupations)

Professionals is the largest occupation of residents living in the Tamworth Regional LGA (17.81%), followed by Technicians and Trade Workers (14.62%), Labourers (14.38%) and Managers (13.29%). Machinery Operators and Drivers is the smallest occupation group of the resident workforce (6.98%).

Community and Personal Service Workers has grown the most as a proportion of total occupations in the LGA (+2.04%), followed by Professionals (+1.33%). Managers have declined the most (-2.06%). Comparatively, the proportion of Managers in the New England North West region is much higher than both the Tamworth Regional LGA and Hunter Valley exc. Newcastle regional area (17.26%). The Tamworth Regional LGA, however, has the higher proportion of Professionals and Labourers.

FIGURE 39: RESIDENT WORKFORCE OCCUPATION STRUCTURE 2016 (PUR)

Source: ABS Census TableBuilder (2016)

FIGURE 40: RESIDENT WORKFORCE OCCUPATION STRUCTURAL CHANGE 2006-16 (PUR)

Source: ABS Census TableBuilder (2006, 2011, 2016)

Jobs in the LGA (industries)

Broad Industry Categories

Of the 21,936 jobs in the LGA, 31.02% of those are in the Population Serving industry. 27.19% are in Health and Education, and 23.67% are Industrial. Only 18.12% of jobs in the LGA are Knowledge Intensive.

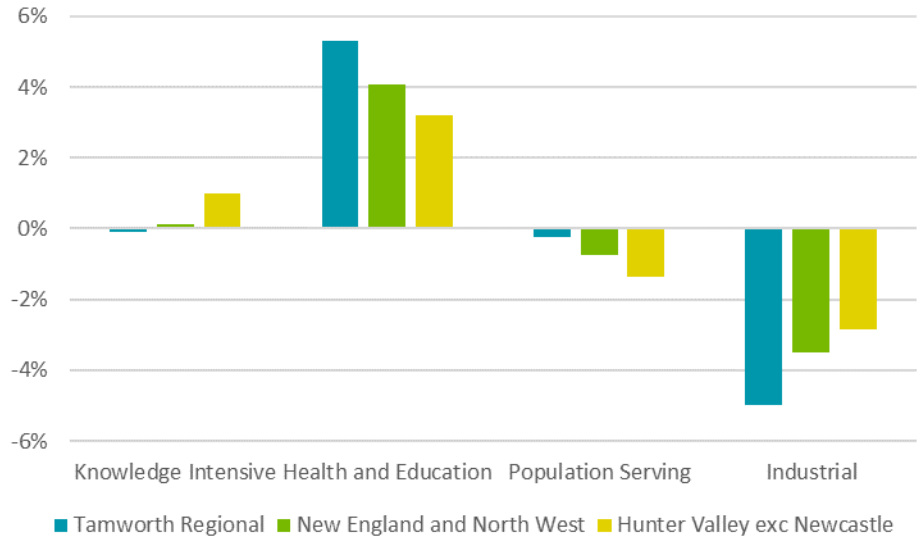
Comparatively, both New England North West and Hunter Valley exc. Newcastle have a much higher share of jobs in their regions that are Industrial (29.57% and 29.82% respectively). Tamworth Regional has a slightly higher share of Health and Education jobs compared to New England North West (25.65%) and a much higher share than Hunter Valley exc. Newcastle (18.48%).

Of the 10 years between 2006 and 2016, Health and Education jobs in Tamworth Regional have increased the most as a share of total jobs in the LGA (+5.31%), while Industrial has declined the most (-4.98%). Knowledge Intensive and Population Serving industry share of jobs have not changed much in the LGA (-0.10% and -0.23% respectively). Compared to the regions, Industrial jobs in Tamworth Regional declined at a slightly faster rate, while the decline of Population Serving jobs was greatest in Hunter Valley exc. Newcastle (-1.35%). Health and Education had the fastest proportional increase in Tamworth Regional compared to the regions.

FIGURE 41: JOBS IN THE LGA STRUCTURE BY BROAD INDUSTRIES 2016 (POW)

Source: ABS Census TableBuilder (2016)

FIGURE 42: JOBS IN THE LGA STRUCTURAL CHANGE BY BROAD INDUSTRIES 2006-16 (POW)



Source: ABS Census TableBuilder (2006, 2011, 2016)

ANZSIC Industries of Employment

In terms of ANZSIC industries of employment, Health Care and Social Assistance is the largest employer of jobs within the LGA (17.3%), followed by Retail Trade (12.1%), Education and Training (9.9%) and Manufacturing (7.9%). The smallest industries within the LGA are Mining (0.2%), Information Media and Telecommunications (1.0%) and Arts and Recreation Services (1.0%).

Health Care and Social Assistance has increased the most as a proportion of total jobs locally within the LGA over the 10 years between 2006 and 2016 (+4.0%), followed by minor increases in Education and Training (+1.3%) and Construction (+1.0%).

Manufacturing has decreased the most as a proportion of jobs in the LGA (-2.4%), followed by Agriculture, Forestry and Fishing (-1.4%) and Retail Trade (-1.1%).

The Tamworth Regional LGA has a self-sufficiency rate of 94%, meaning 94% of jobs in the LGA are taken by people who both live and work in the LGA.

TABLE 19: JOBS BY GEOGRAPHIC STRUCTURE AND BROAD INDUSTRIES 2016

Geography	Tamworth Regional	Tamworth Regional	Tamworth Regional	New England and North West	New England and North West	New England and North West	Hunter Valley exc Newcastle	Hunter Valley exc Newcastle	Hunter Valley exc Newcastle
	2006	*2011*	*2016*	*2006*	*2011*	*2016*	*2006*	*2011*	*2016*
Agriculture, Forestry and Fishing	8.3%	6.5%	6.9%	17.1%	15.1%	14.6%	4.7%	3.7%	3.6%
Mining	0.2%	0.2%	0.2%	0.4%	1.2%	2.1%	7.7%	10.3%	11.0%
Manufacturing	10.3%	9.6%	7.9%	7.2%	6.6%	5.6%	12.2%	11.3%	7.7%
Electricity, Gas, Water and Waste Services	1.1%	1.2%	1.1%	1.0%	1.1%	1.0%	1.6%	1.5%	1.7%
Construction	5.2%	5.6%	6.2%	4.9%	4.9%	5.3%	6.5%	6.9%	7.0%
Wholesale Trade	3.7%	3.6%	3.1%	3.2%	3.1%	2.5%	2.6%	2.5%	2.0%
Retail Trade	13.2%	12.3%	12.1%	12.1%	11.6%	10.9%	13.1%	11.3%	10.6%
Accommodation and Food Services	7.2%	7.5%	7.3%	6.8%	7.1%	7.2%	8.5%	8.4%	9.0%
Transport, Postal and Warehousing	5.0%	4.7%	4.5%	4.2%	4.2%	3.8%	3.9%	3.6%	3.7%
Information Media and Telecommunications	1.3%	1.2%	1.0%	1.0%	0.9%	0.8%	0.6%	0.5%	0.4%
Financial and Insurance Services	2.9%	2.7%	2.0%	2.1%	2.1%	1.8%	1.5%	1.4%	1.3%
Rental, Hiring and Real Estate Services	1.5%	1.6%	1.5%	1.2%	1.3%	1.2%	1.7%	1.8%	1.6%
Professional, Scientific and Technical Services	3.5%	3.7%	3.9%	3.9%	3.9%	4.1%	4.1%	4.2%	4.0%
Administrative and Support Services	2.3%	2.4%	2.9%	1.9%	1.9%	2.5%	2.3%	2.7%	3.3%
Public Administration and Safety	6.7%	6.6%	6.7%	6.3%	6.3%	6.2%	8.1%	8.1%	8.8%
Education and Training	8.7%	9.3%	9.9%	10.5%	10.9%	11.6%	7.0%	6.8%	7.7%
Health Care and Social Assistance	13.2%	15.8%	17.3%	11.1%	12.7%	14.1%	8.3%	9.0%	10.8%
Arts and Recreation Services	0.9%	1.0%	1.0%	0.9%	0.8%	0.7%	1.1%	1.1%	1.0%
Other Services	4.9%	4.6%	4.4%	4.3%	4.2%	4.1%	4.5%	5.0%	4.7%
Total	*21,521*	*21,977*	*21,936*	*65,484*	*66,273*	*64,315*	*79,627*	*89,931*	*87,049*

Source: ABS Census TableBuilder (2006, 2011, 2016)

Jobs in the LGA (occupations)

Of all the jobs in the LGA, the most common occupation is Professionals (19.55%). This is followed by Managers (13.83%), Labourers (13.62%), and Clerical and Administrative Workers (13.03%). The smallest occupation group is Machinery Operators and Drivers (5.59%).

Comparatively, New England North West has a higher proportion of Managers employed within its region (17.93%), with similar splits across the rest of the industries to that of Tamworth Regional. Hunter Valley exc. Newcastle has a higher proportion of Technicians and Trades Workers (17.81%) and Machinery Operators and Drivers (11.54%).

Over the 10 years between 2006 and 2016, Professionals has increased the most as a proportion of total jobs in the Tamworth Regional LGA (+2.34%), closely followed by Community and Personal Service Workers (+2.27%). All other occupations have experienced little change, ranging from -0.3% to -1.8%, with Managers declining the most at -1.83%.

FIGURE 43: JOBS IN THE LGA OCCUPATION STRUCTURE 2016 (POW)

Source: ABS Census TableBuilder (2016)

FIGURE 44: JOBS IN THE LGA OCCUPATION STRUCTURAL CHANGE 2006-16 (POW)

Source: ABS Census TableBuilder (2016)

Tourism

The Tamworth Regional LGA has 584 tourism businesses, of which, 38% are non-employing, 34% have 1-4 employees, and 21% have 5-19 employees. Only 7% have 20 or more employees.

There was a total of 1,138,000 visitors in 2018, mostly Domestic Day visitors (633,000), Domestic Overnight visitors (492,000) and some International visitors (13,000). The average stay for international visitors is 27 days.

The average spend per trip ($) is $263. International visitors spend significantly higher than the average ($1,188 per night). Domestic Overnight visitors spend $361 per night, and Domestic Day visitors $169 per night.

The total estimated spend in the Tamworth Regional LGA for 2018 was $300 million.

Approximately 39% of trips were estimated to be for holiday, while 30% was for visiting friends and relatives.

33% were solo travellers, 31% were couples, and 18% travelled as a family or in groups.

42% of visitors stayed at the home of friends or relatives, with only 22% staying in hotels or similar accommodation.

Liverpool Plains Shire LGA

Population change

Liverpool Plains Shire was home to 7,689 people based on the Australian Bureau of Statistics (ABS) 2016 Census. The population has grown by +152 people in the ten years between 2006 and 2016, representing a CAGR (Compounded Annual Growth Rate) of 1.00%.

Comparatively speaking, the New England and North West region grew by 2.63%, while Hunter Valley exc Newcastle grew by 8.01%.

TABLE 20:POPULATION CHANGE 2006-16

Geography	2006	2011	2016	Growth	CAGR (%)
Hunter Valley exc Newcastle	226,784	243,683	264,588	37,804	8.01%
New England and North West	172,396	176,249	181,592	9,196	2.63%
Liverpool Plains Shire	7,537	7,479	7,689	152	1.00%

Source: ABS Census TableBuilder (2006, 2011, 2016)

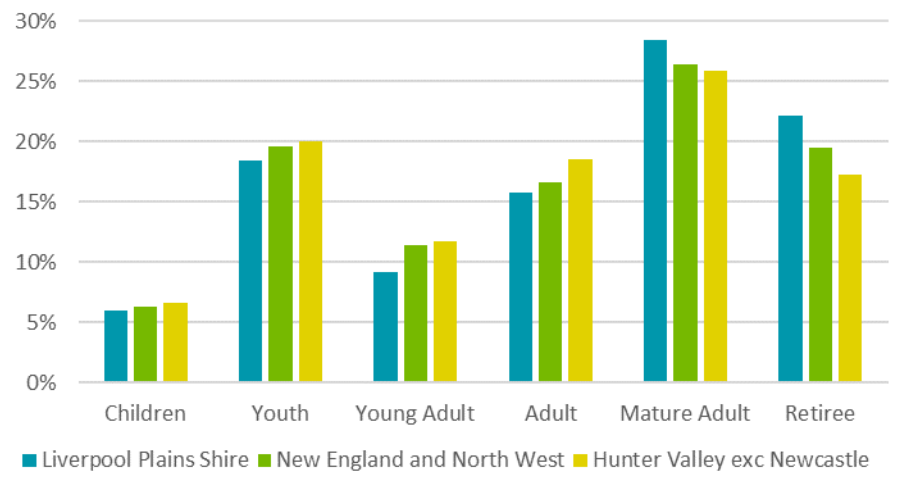
Age profile[127]

The largest age group in the Liverpool Plains Shire LGA are Mature Adults (28.46%) followed by Retirees (22.20%) and Youth (18.39%). Retirees, however, have increased the most as a proportion of the population in the LGA (+3.69%), while Adults has declined the most (-2.47%).

Generally speaking, Liverpool Plains Shire has a higher proportion of older age groups, particularly for Mature Adults and Retirees; higher than Hunter Valley exc Newcastle by 2.56% and 4.97% respectively. However, the LGA has lower proportion in younger age groups; particularly in Young Adults, which is behind Hunter Valley exc Newcastle by 2.56%.

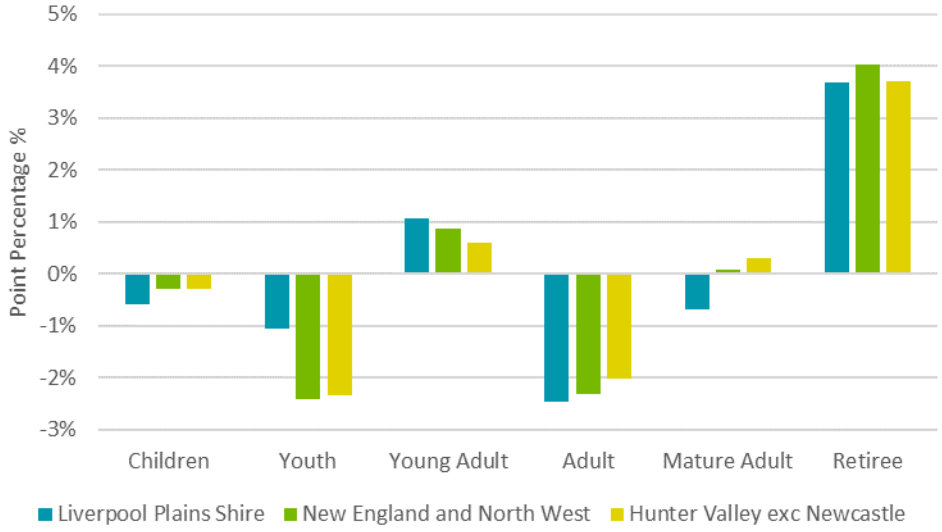
[127] Age cohort breakdown at beginning of section

FIGURE 45: POPULATION AGE STRUCTURE 2016



Source: ABS Census TableBuilder (2016)

FIGURE 46: CHANGE IN POPULATION AGE STRUCTURE 2006-16



Source: ABS Census TableBuilder (2006, 2011, 2016)

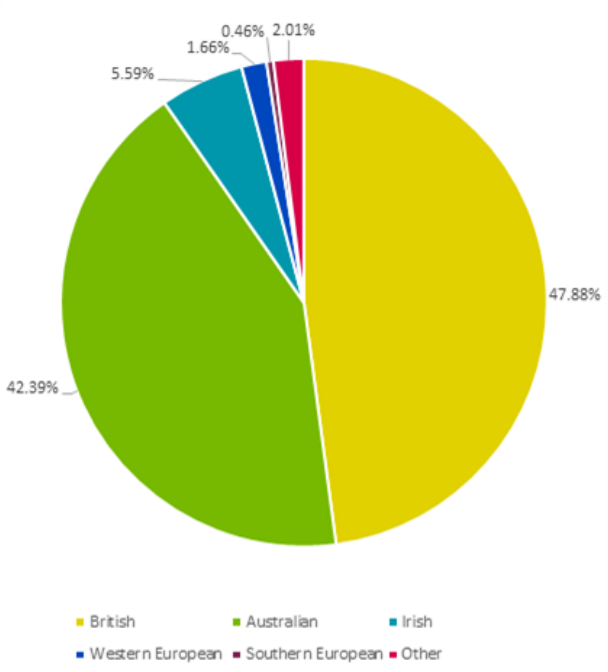
Ancestry

The largest ancestry in the Liverpool Plains LGA is British (47.88%), followed by Australian (42.39%), Irish (5.59%), Western European (1.66%) and Southern European (0.96%).

Australian Peoples have declined the most as a proportion of the ancestries in the LGA over the ten years between 2006 and 2016 (-6.99%), followed by Western European (-0.44%) and Southern European (-0.02%).

The ancestries of the comparative NSW regional areas are similar, with Hunter Valley exc Newcastle containing a slightly higher proportion of British (51.70%).

FIGURE 47: ANCESTRIES OF THE LIVERPOOL PLAINS SHIRE LGA



Source: ABS Census TableBuilder (2016)

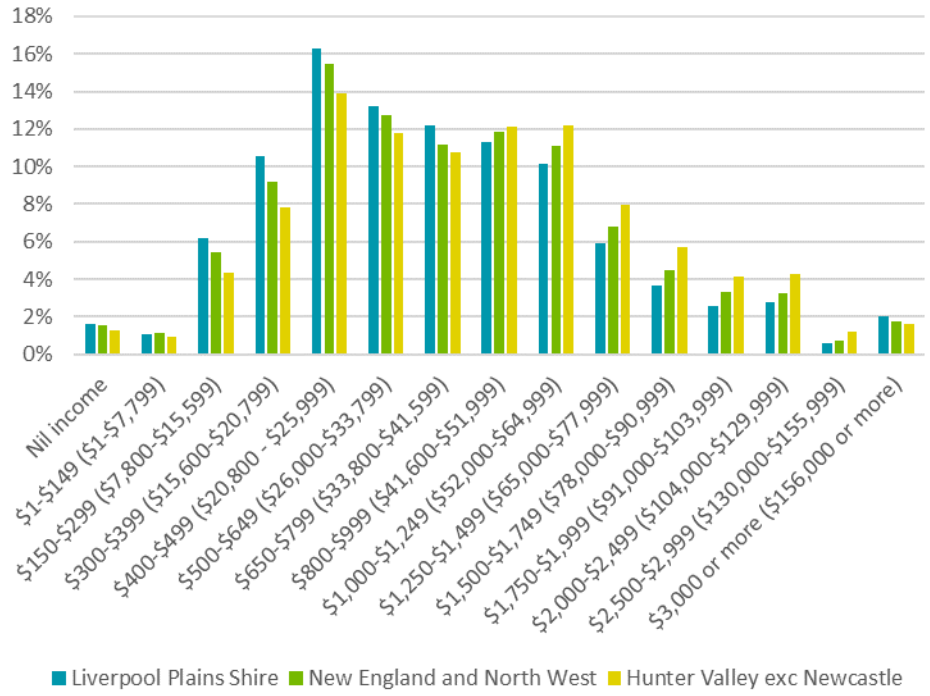
Household Equivalised Income

Most households in the Liverpool Plains Shire are earning between $20,800 - $65,000 per year.

Of that broader bracket, $20,800 - $25,999 per year is the most significant bracket (16.27%), followed by $26,000 - $33,799 (13.25%), $33,800 - $41,599 (12.16%), $41,600 - $51,999 (11.31%) and $15,600 - $20,799 (10.57%).

Comparatively speaking, Liverpool Plains Shire LGA has a higher share of households earning relatively lower incomes (up to $41,599), while both the New England and North West and Hunter Valley exc Newcastle regional areas have relatively higher incomes from $41,600 - $155,990. The LGA, however, has a relatively higher share of households earning $156,000 or more.

FIGURE 48: EQUIVALISED HOUSEHOLD INCOME 2016



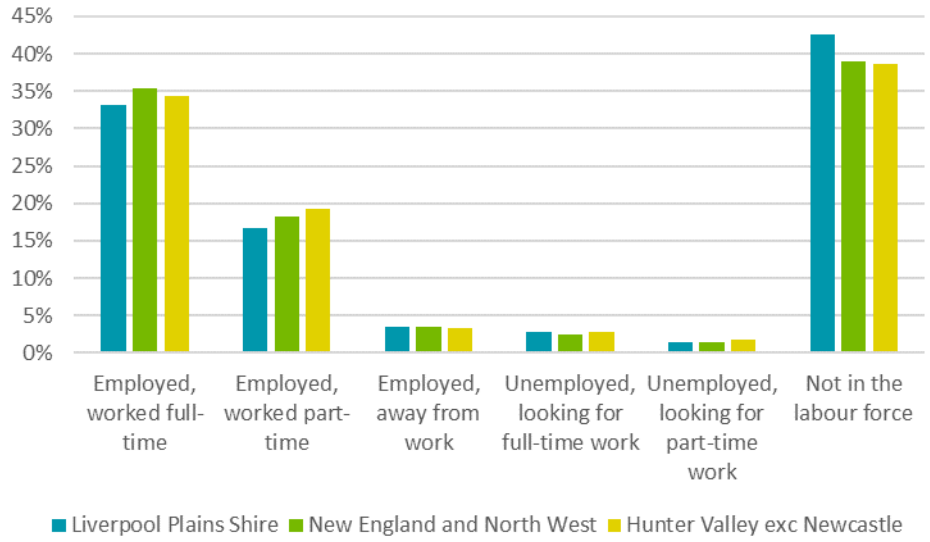
Source: ABS Census TableBuilder (2016)

Labour force status

Most of the labour force are employed and working full-time (33.07%) or part-time (16.63%). At the time of the ABS 2016 Census, about 3.51% of the population were employed, away from work; 2.79% were unemployed looking for full-time work; and 1.46% were unemployed looking for part-time work. Almost half of the local population is not in the labour force (42.53%).

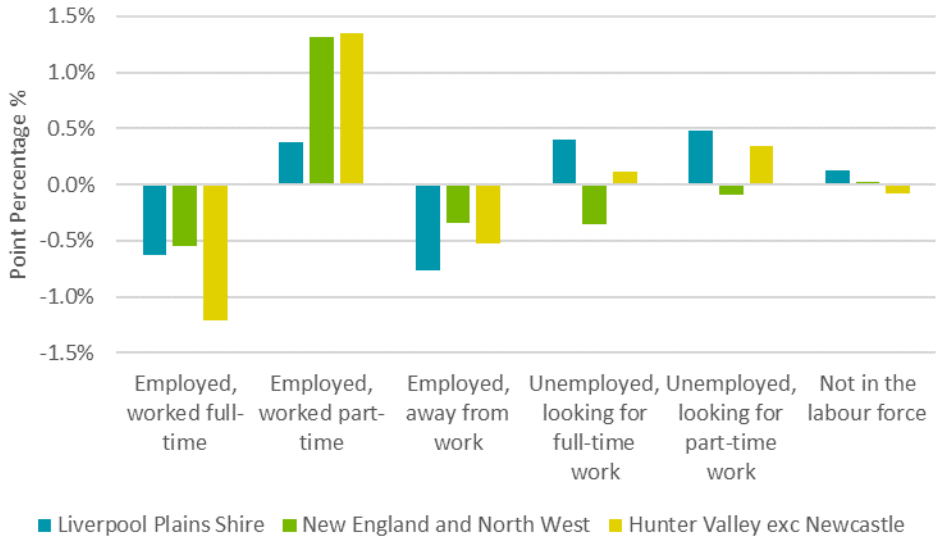
Between 2006 and 2016, the proportion of employed and working full-time declined (-0.6%) for Liverpool Plain Shire LGA, while those Unemployed full-time and part-time both increased (+0.4% and +0.5% respectively).

FIGURE 49: LABOUR FORCE STRUCTURE 2016



Source: ABS Census TableBuilder (2016)

FIGURE 50: LABOUR FORCE STRUCTURAL CHANGE 2006-16



Source: ABS Census TableBuilder (2006, 2011, 2016)

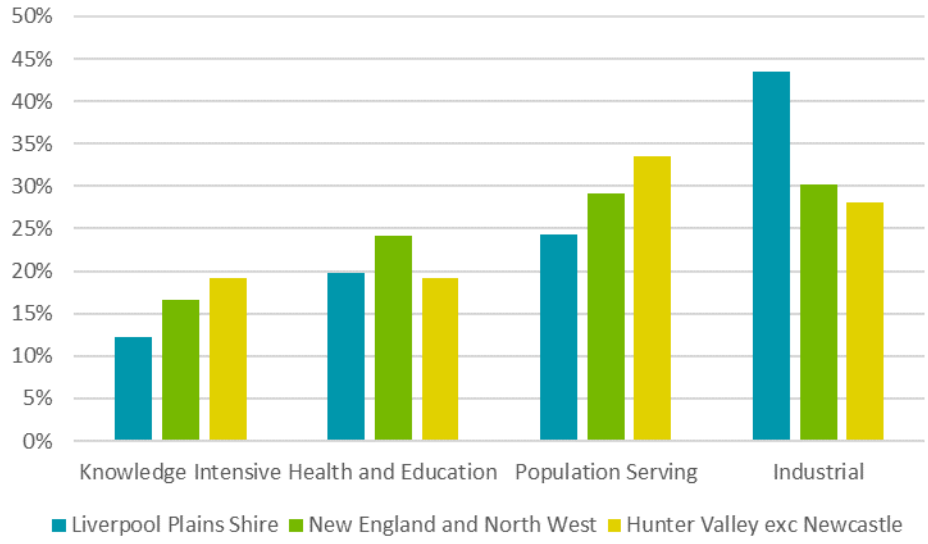
Resident workforce (industries)

Broad Industry Categories

There are 2,878 working residents of the Liverpool Plains Shire LGA. Industrial jobs are the largest broad industry of Liverpool Plains Shire's resident workforce (43.54%), followed by Population Serving (24.36%) and Health and Education (19.84%).

Comparatively speaking, Liverpool Plains Shire has a much higher proportion of Industrial jobs (43.54%) compared to New England and North West (30.19%) and Hunter Valley exc Newcastle (28.16%). The LGA has the lowest proportion of Knowledge Intensive and Population Serving jobs compared to the regional areas. New England and North West continues to have the highest proportion of Health and Education jobs (24.12%).

FIGURE 51: RESIDENT WORKFORCE STRUCTURE BY BROAD INDUSTRIES 2016 (PUR)



Source: ABS Census TableBuilder (2016)

FIGURE 52: RESIDENT WORKFORCE STRUCTURAL CHANGE BY BROAD INDUSTRIES 2006-16 (PUR)

Source: ABS Census TableBuilder (2006, 2011, 2016)

ANZSIC Industries of Employment

In terms of ANZSIC (Australia and New Zealand Standard Industry Classifications) industries of employment, Agriculture, Forestry and Fishing is the largest employer of working residents in the LGA (25.6%), followed by Health Care and Social Assistance (12%) and Retail Trade (8.2%). The smallest employers are Information Media and Telecommunications (0.5%), Financial and Insurance Services (0.8%) and Rental, Hiring and Real Estate Services (0.8%).

Health Care and Social Assistance has increased the most as a proportion of total jobs taken by resident workers over the 10 years between 2006 and 2016 in the LGA (+2.6%), followed by Mining (+2.1%), Construction (+1.1%) and Accommodation and Food Services (+1.1%).

Agriculture, Forestry and Fishing has declined the most as a proportion (-3.1%), followed by Manufacturing (-1.6%) and Electricity, Gas, Water and Waste Services (-1%).

The Liverpool Plains Shire LGA has a self-containment rate of 75%, meaning of the entire resident workforce, 75% are also working locally within the LGA. 25% travel elsewhere for work.

TABLE 21: RESIDENT WORKFORCE STRUCTURE BY ANZSIC INDUSTRIES (PUR)

Geography	Liverpool Plains Shire	Liverpool Plains Shire	Liverpool Plains Shire	New England and North West	New England and North West	New England and North West	Hunter Valley exc Newcastle	Hunter Valley exc Newcastle	Hunter Valley exc Newcastle
	2006	*2011*	*2016*	*2006*	*2011*	*2016*	*2006*	*2011*	*2016*
Agriculture, Forestry and Fishing	28.8%	25.0%	25.6%	17.3%	15.1%	14.8%	4.5%	3.5%	3.5%
Mining	1.4%	2.8%	3.5%	0.5%	1.5%	2.2%	7.0%	9.3%	9.3%
Manufacturing	5.6%	6.4%	4.0%	7.2%	6.7%	5.6%	11.3%	10.4%	7.0%
Electricity, Gas, Water and Waste Services	1.8%	1.2%	0.9%	0.9%	1.1%	1.0%	1.7%	1.7%	1.7%
Construction	5.3%	5.5%	6.4%	6.2%	6.6%	7.0%	7.9%	8.0%	8.8%
Wholesale Trade	3.0%	3.9%	2.2%	3.2%	3.1%	2.5%	3.2%	3.0%	2.1%
Retail Trade	8.7%	8.9%	8.2%	11.5%	11.2%	10.4%	12.3%	11.0%	10.5%
Accommodation and Food Services	4.2%	5.1%	5.4%	6.6%	6.8%	6.9%	7.8%	8.0%	8.4%
Transport, Postal and Warehousing	7.7%	7.4%	7.3%	4.5%	4.5%	4.1%	4.5%	4.5%	4.6%
Information Media and Telecommunications	0.8%	0.6%	0.5%	1.1%	0.9%	0.8%	0.9%	0.7%	0.7%
Financial and Insurance Services	1.0%	1.2%	0.8%	2.0%	2.0%	1.7%	1.9%	1.7%	1.9%
Rental, Hiring and Real Estate Services	0.7%	0.7%	0.8%	1.2%	1.2%	1.2%	1.6%	1.6%	1.6%
Professional, Scientific and Technical Services	3.0%	3.3%	2.7%	3.9%	3.9%	4.0%	4.2%	4.3%	4.2%
Administrative and Support Services	1.8%	1.9%	2.1%	2.2%	2.2%	3.1%	2.8%	3.2%	3.8%
Public Administration and Safety	5.3%	5.0%	5.4%	6.0%	5.9%	5.9%	6.8%	6.5%	7.0%
Education and Training	7.4%	7.1%	7.9%	9.9%	10.1%	10.8%	6.2%	6.2%	7.0%
Health Care and Social Assistance	9.3%	9.6%	12.0%	10.7%	12.2%	13.3%	9.7%	10.5%	12.2%
Arts and Recreation Services	0.6%	0.9%	1.0%	0.8%	0.9%	0.8%	1.1%	1.1%	1.1%
Other Services	3.6%	3.5%	3.5%	4.2%	4.1%	4.0%	4.4%	4.9%	4.7%
Total	*2,921*	*2,987*	*2,878*	*70,798*	*73,907*	*72,958*	*93,468*	*105,331*	*107,258*

Source: ABS Census TableBuilder (2006, 2011, 2016)

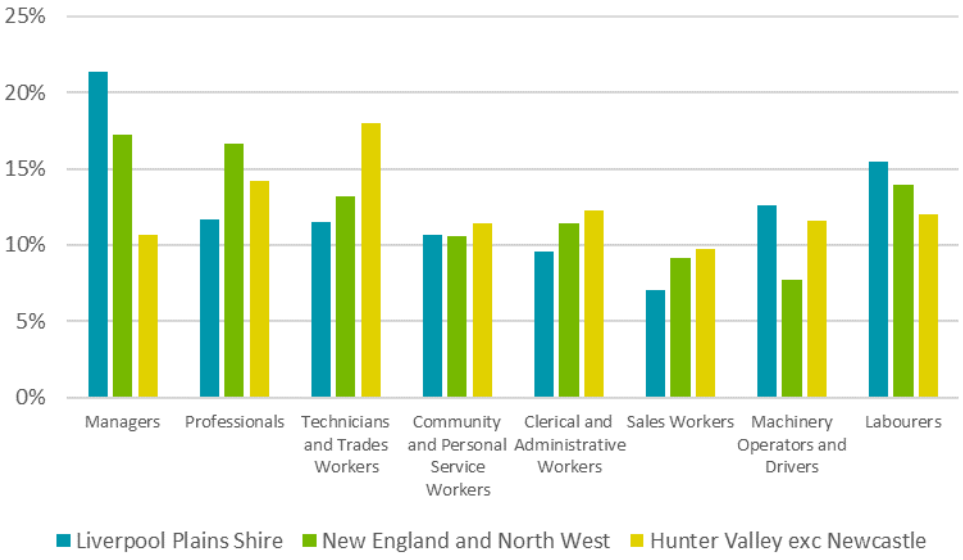
Resident workforce (occupations)

Managers is the most popular occupation of residents living in the Liverpool Plains Shire LGA (21.33%), followed by Labourers (15.51%) and Machinery Operators and Drivers (12.63%). Sales Workers is the least popular occupation of the resident workforce (7.08%).

Comparatively speaking, the proportion of Managers in the LGA is much higher than both New England and North West (17.26%) and Hunter Valley exc Newcastle (10.69%) regional areas. The LGA also has a comparatively higher share of Machinery Operators and Drivers.

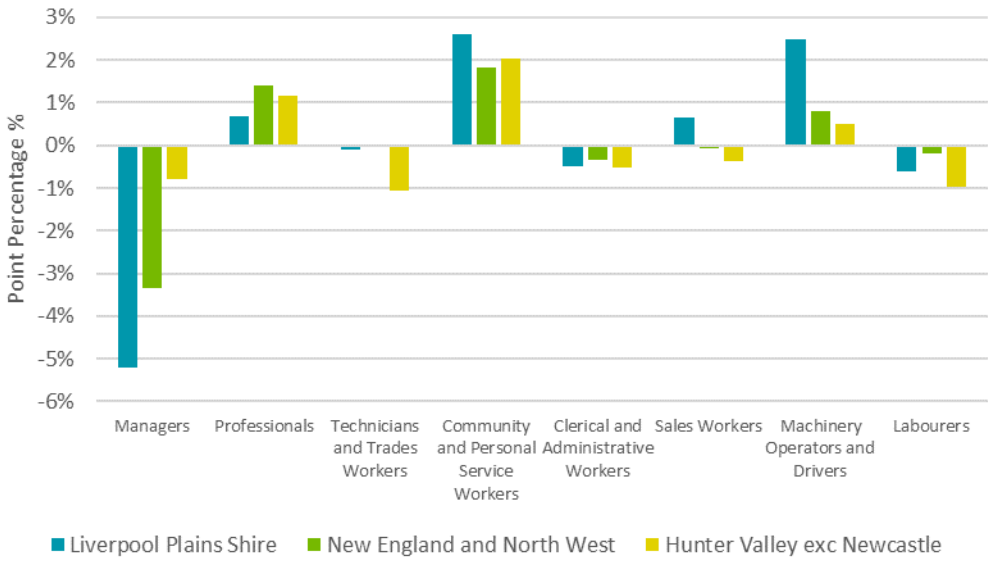
Managers has declined the most as a proportion of resident workforce occupations (-5.21%), while Community and Personal Service Workers has increased the most (+2.6%), closely followed by Machinery Operators and Drivers (+2.48%).

FIGURE 53: RESIDENT WORKFORCE OCCUPATION STRUCTURE 2016 (PUR)



Source: ABS Census TableBuilder (2016)

FIGURE 54: RESIDENT WORKFORCE OCCUPATION STRUCTURAL CHANGE 2006-16 (PUR)



Source: ABS Census TableBuilder (2006, 2011, 2016)

Jobs in the LGA (industries)

Broad Industry Categories

Of the 2,241 jobs in the LGA, 46.81% of those are Industrial. 21.78% are in Population Serving, and 20.04% are Health and Education. Only 11.38% of jobs in the LGA are Knowledge Intensive.

Comparatively speaking, Liverpool Plains Shire has a much higher share of Industrial jobs in the LGA (46.81%) compared to New England and North West (29.57%) and Hunter Valley exc Newcastle (29.82%). However, Hunter Valley exc Newcastle has a higher share of Population Serving jobs (32.28%) compared to the LGA. The same can be said for the Knowledge Intensive industry. The share of Health and Education jobs in the LGA (20.04%) is relatively lower compared to New England and North West (25.65%), but higher than Hunter Valley exc Newcastle (18.48%).

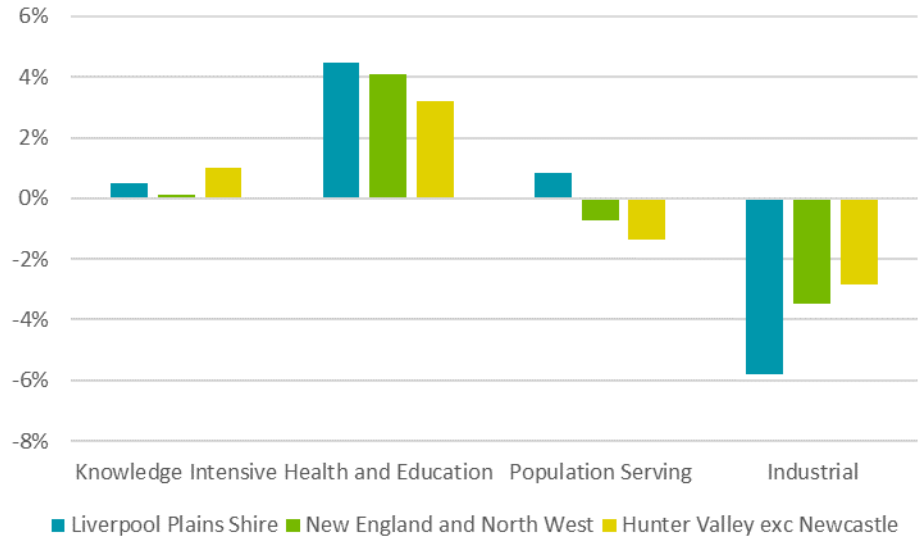
Over the 10 years between 2006 and 2016, the share of Industrial jobs in the LGA have declined as proportion of total jobs at a faster rate (-5.82%) compared to New England and North West (-3.49%) and Hunter Valley exc Newcastle (-2.85%).

On the other hand, the share of Health and Education jobs in the LGA have increased as a proportion over the 10 years between 2006 and 2016 (by +4.49%) at a faster rate than New England and North West (+4.09%) and Hunter Valley exc Newcastle (+3.19%).

FIGURE 55: JOBS IN THE LGA STRUCTURE BY BROAD INDUSTRIES 2016 (POW)

Source: ABS Census TableBuilder (2016)

FIGURE 56: JOBS IN THE LGA STRUCTURAL CHANGE BY BROAD INDUSTRIES 2006-16 (POW)



Source: ABS Census TableBuilder (2006, 2011, 2016)

ANZSIC Industries of Employment

In terms of ANZSIC industries of employment, Agriculture, Forestry and Fishing is the largest employer of jobs within the LGA (28.5%), followed by Health Care and Social Assistance (10.9%), and Education and Training (9.1%). The smallest industries within the LGA Information Media and Telecommunications (0.2%) and Electricity, Gas, Water and Waste Services (0.5%).

Health Care and Social Assistance has increased the most as a proportion of total jobs locally within the LGA over the 10 years between 2006 and 2016 (+3.1%), followed by minor increases in Mining (+2.2%), Accommodation and Food Services (+1.6%) and Education and Training (+1.4%).

Agriculture, Forestry and Fishing has decreased the most as a proportion of jobs in the LGA (-3.6%), followed by Electricity, Gas, Water and Waste Services (-1.7%) and Wholesale Trade (-1.1%).

The Liverpool Plains Shire LGA has a **self-sufficiency rate of 84%,** meaning 84% of jobs in the LGA are taken by people who both live and work in the LGA.

TABLE 22: JOBS IN THE LGA STRUCTURE BY BROAD INDUSTRIES 2016

Geography	Liverpool Plains Shire	Liverpool Plains Shire	Liverpool Plains Shire	New England and North West	New England and North West	New England and North West	Hunter Valley exc Newcastle	Hunter Valley exc Newcastle	Hunter Valley exc Newcastle
	2006	*2011*	*2016*	*2006*	*2011*	*2016*	*2006*	*2011*	*2016*
Agriculture, Forestry and Fishing	32.2%	26.7%	28.6%	17.1%	15.1%	14.6%	4.7%	3.7%	3.6%
Mining	2.4%	4.6%	4.6%	0.4%	1.2%	2.1%	7.7%	10.3%	11.0%
Manufacturing	4.4%	5.9%	3.7%	7.2%	6.6%	5.6%	12.2%	11.3%	7.7%
Electricity, Gas, Water and Waste Services	2.2%	1.4%	0.5%	1.0%	1.1%	1.0%	1.6%	1.5%	1.7%
Construction	4.3%	4.7%	4.4%	4.9%	4.9%	5.3%	6.5%	6.9%	7.0%
Wholesale Trade	3.2%	4.2%	2.1%	3.2%	3.1%	2.5%	2.6%	2.5%	2.0%
Retail Trade	8.2%	8.2%	7.3%	12.1%	11.6%	10.9%	13.1%	11.3%	10.6%
Accommodation and Food Services	4.3%	4.9%	5.9%	6.8%	7.1%	7.2%	8.5%	8.4%	9.0%
Transport, Postal and Warehousing	8.2%	8.3%	7.3%	4.2%	4.2%	3.8%	3.9%	3.6%	3.7%
Information Media and Telecommunications	0.4%	0.3%	0.2%	1.0%	0.9%	0.8%	0.6%	0.5%	0.4%
Financial and Insurance Services	1.1%	0.7%	0.9%	2.1%	2.1%	1.8%	1.5%	1.4%	1.3%
Rental, Hiring and Real Estate Services	1.0%	0.7%	0.6%	1.2%	1.3%	1.2%	1.7%	1.8%	1.6%
Professional, Scientific and Technical Services	2.5%	2.7%	2.7%	3.9%	3.9%	4.1%	4.1%	4.2%	4.0%
Administrative and Support Services	1.0%	1.3%	1.7%	1.9%	1.9%	2.5%	2.3%	2.7%	3.3%
Public Administration and Safety	4.9%	4.8%	5.3%	6.3%	6.3%	6.2%	8.1%	8.1%	8.8%
Education and Training	7.7%	8.2%	9.1%	10.5%	10.9%	11.6%	7.0%	6.8%	7.7%
Health Care and Social Assistance	7.8%	8.0%	10.9%	11.1%	12.7%	14.1%	8.3%	9.0%	10.8%
Arts and Recreation Services	0.6%	0.8%	0.6%	0.9%	0.8%	0.7%	1.1%	1.1%	1.0%
Other Services	3.5%	3.5%	3.6%	4.3%	4.2%	4.1%	4.5%	5.0%	4.7%
Total	*2.567*	*2,591*	*2,241*	*65,484*	*66,273*	*64,315*	*79,627*	*89,931*	*87,049*

Source: ABS Census TableBuilder (2006, 2011, 2016)

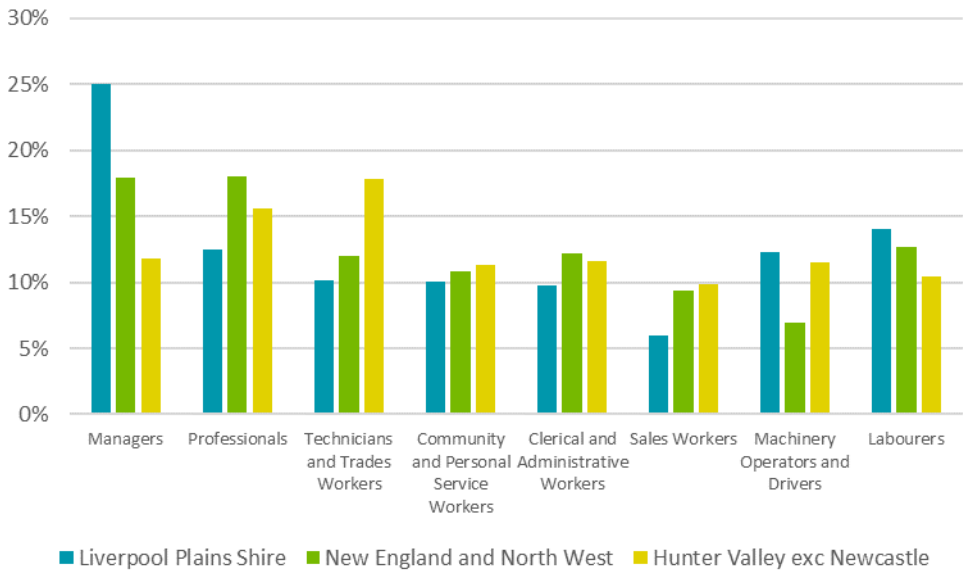
Jobs in the LGA (occupations)

Of all the jobs in the LGA, the most popular occupation is Managers (25.07%). This is followed by Labourers (14.09%), Professionals (12.51%), and Machinery Operators and Drivers (12.29%). The least popular occupation is Sales Workers (5.99%).

Comparatively speaking, Liverpool Plains Shire has a relatively higher share of Managers within its LGA compared to the regional areas, and a relatively lower proportion of Sales Workers.

Over the 10 years between 2006 and 2016, however, Managers has decreased the most as a proportion of total occupations in the Liverpool Plains Shire LGA (-4.93%). Community and Personal Service Workers has increased the most (+3.24%).

FIGURE 57: JOBS IN THE LGA OCCUPATION STRUCTURE 2016 (POW)



Source: ABS Census TableBuilder (2016)

FIGURE 58: JOBS IN THE LGA OCCUPATION STRUCTURAL CHANGE 2006-16 (POW)

Source: ABS Census TableBuilder (2016)

Tourism

The Liverpool Plains Shire LGA is one of the most productive agricultural regions in Australia, with numerous opportunities present in the agri-tourism space.

In 2016 the LGA had 33,000 visitors, with an average length of stay of about 2 nights. There was an approximate spend of $129 per night, and $268 per visitor.

Overall, the total value of tourism related output for Liverpool Plains is estimated to be at $13.154 million. Its key attractions included museums, heritage walks, guided agri-tours and bushwalking.

The industries with the greatest output attributable to tourism in the Liverpool Plains in 2016 were:

- Accommodation and Food Services ($5.5 million)
- Retail Trade ($2.2 million)
- Transport, Postal and Warehousing ($2.2 million)
- Wholesale Trade ($0.8 million)
- Arts & Recreation Services ($0.7 million)

Upper Hunter Shire LGA

Population change

Upper Hunter Shire was home to 14,112 people based on the Australian Bureau of Statistics (ABS) 2016 Census. The population has grown by +1,138 people in the ten years between 2006 and 2016, representing a CAGR (Compounded Annual Growth Rate) of 4.29%.

Comparatively, the New England North West region grew by 2.63%, while Hunter Valley exc. Newcastle grew by 8.01%.

TABLE 23:POPULATION CHANGE 2006-16

Geography	2006	2011	2016	Growth	CAGR (%)
Hunter Valley exc Newcastle	226,784	243,683	264,588	37,804	8.01%
New England and North West	172,396	176,249	181,592	9,196	2.63%
Upper Hunter Shire	12,974	13,751	14,112	1,138	4.29%

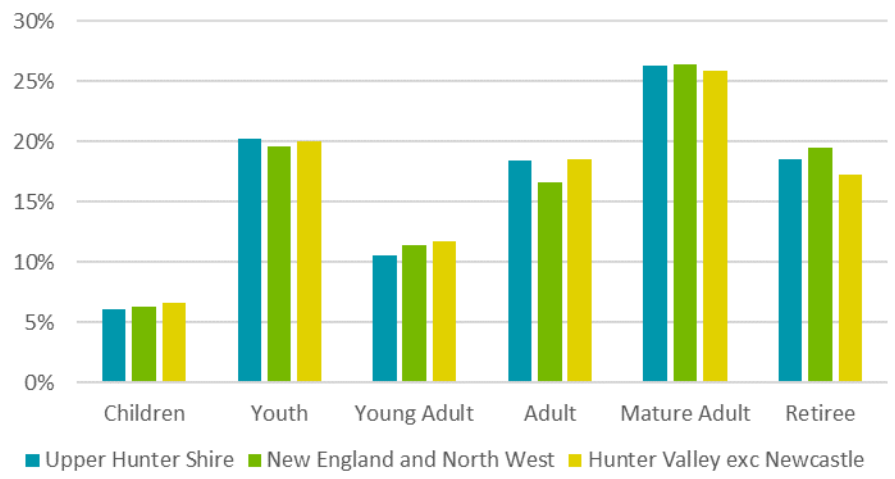
Source: ABS Census TableBuilder (2006, 2011, 2016)

Age profile

The largest age group in the Upper Hunter Shire LGA are Mature Adults (26.28%) followed by Youth (20.22%) and Retirees (18.51%). Retirees, however, have increased the most as a proportion of the population in the LGA (+3.03%), while Adults has declined the most (-0.90%).

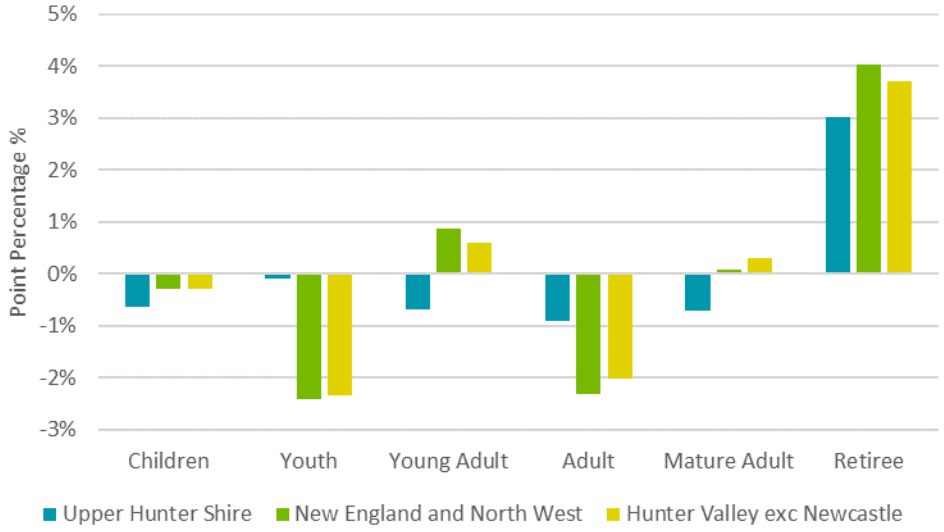
The Upper Hunter Shire has similar age proportions to the New England North West and Hunter Valley exc. Newcastle regional areas. In terms of Retirees, the Upper Hunter Shire has a slightly lower proportion (18.51%) compared to New England North West (19.54%), but a higher proportion than Hunter Valley exc. Newcastle.

FIGURE 59: POPULATION AGE STRUCTUE 2016



Source: ABS Census TableBuilder (2016)

FIGURE 60: CHANGE IN POPULATION AGE STRUCTURE 2006-16



Source: ABS Census TableBuilder (2006, 2011, 2016)

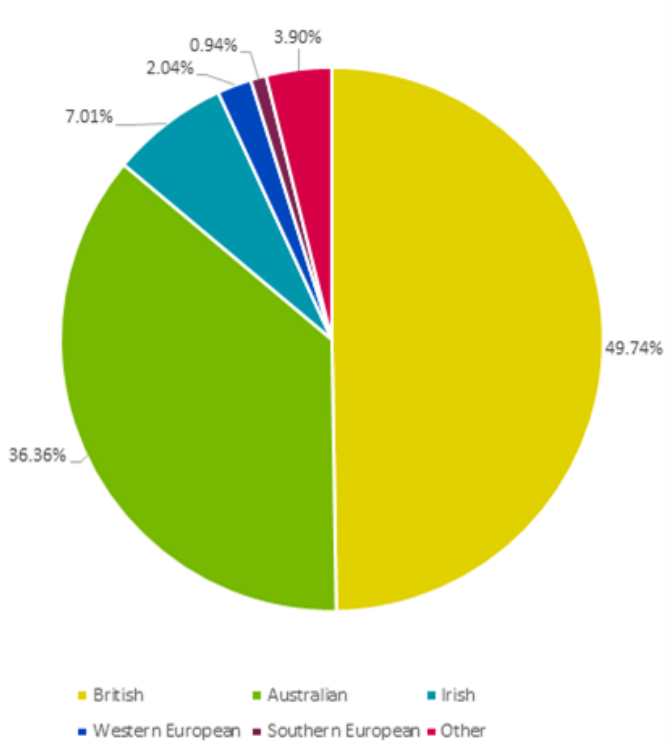
Ancestry

The largest ancestry in the Upper Hunter Shire LGA is British (49.74%), followed by Australian (36.36%), Irish (7.01%), Western European (2.04%) and Southern European (0.94%).

Those identifying as of Australian descent have declined the most as a proportion of the ancestries in the LGA over the ten years between 2006 and 2016 (-7.68%), followed by Western European (-0.38%) and South Eastern European (-0.02%).

The ancestries of the comparative NSW regional areas are similar, with Hunter Valley exc. Newcastle containing a slightly higher proportion of British (51.70%).

FIGURE 61: ANCESTRIES OF THE UPPER HUNTER SHIRE LGA



Source: ABS Census TableBuilder (2016)

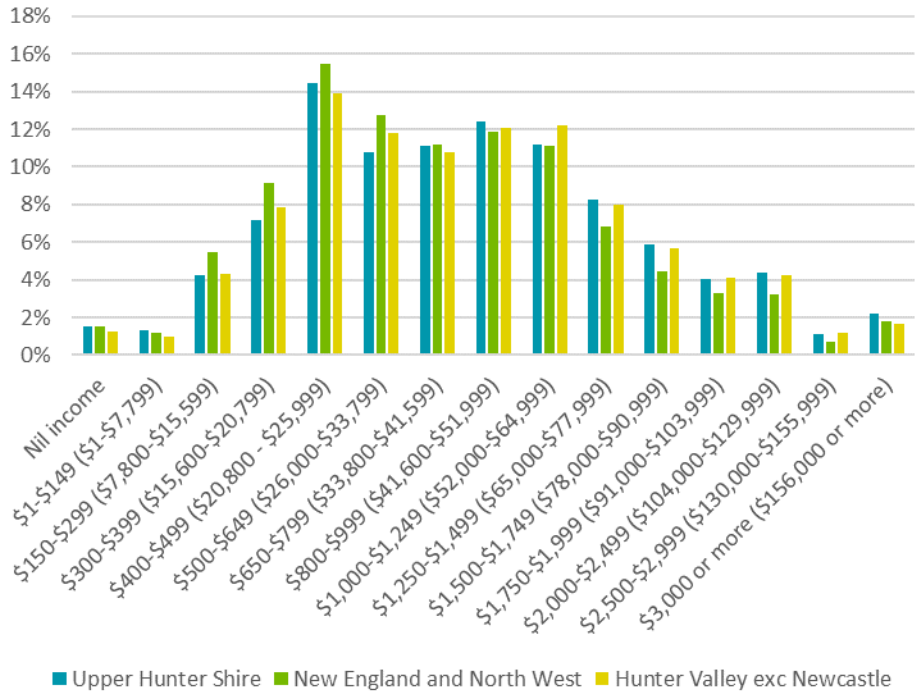
Household Equivalised Income

Most households in the Upper Hunter Shire are earning between $20,800 - $65,000 per year.

Of that broader bracket, $20,800 - $25,999 per year is the most significant bracket (14.44%), followed by $41,600 - $51,999 (12.41%), $52,000 - $64,999 (11.17%), $33,800 - $41,599 (11.13%) and $26,000 - $33,799 (10.80%).

Compared to New England North West, the Upper Hunter Shire LGA has a higher share of households earning relatively higher incomes (from $65,000 and onwards).

FIGURE 62: EQUIVALISED HOUSEHOLD INCOME 2016



Source: ABS Census TableBuilder (2016)

Labour force status

Most of the labour force are employed and working full-time (38.99%) or part-time (19.33%). At the time of the ABS 2016 Census, about 3.49% of the population were employed, away from work; 1.98% were unemployed looking for full-time work; and 1.14% were unemployed looking for part-time work. Approximately 35.07% were not in the labour force.

Upper Hunter Shire has a higher percentage of people employed and working full-time compared to New England North West and Hunter Valley exc. Newcastle, and a lower share of the population who are not in the labour force at all (35.07%).

Between 2006 and 2016, the proportion of employed and working full-time declined significantly for the Upper Hunter Shire LGA at -3.0%, much higher when compared to New England North West and Hunter Valley exc. Newcastle at -0.5% and +1.1% respectively. In contrast, those employed and working part-time increased during the same period (+2%).

FIGURE 63: LABOUR FORCE STRUCTURE 2016

Source: ABS Census TableBuilder (2016)

FIGURE 64: LABOUR FORCE STRUCTURAL CHANGE 2006-16

Source: ABS Census TableBuilder (2006, 2011, 2016)

Resident workforce (industries)

Broad Industry Categories

There are 6,060 working residents of the Upper Hunter Shire LGA. Industrial jobs are the largest broad industry of the Upper Hunter Shire's resident workforce (44.64%), followed by Population Serving (25.87%) and Health and Education (15.87%).

The Upper Hunter Shire has a much higher proportion of Industrial jobs (44.64%) compared to New England North West (30.19%) and Hunter Valley exc. Newcastle (28.16%). The LGA has the lowest proportion of Knowledge Intensive and Population Serving jobs compared to the other regional areas. New England North West continues to have the highest proportion of Health and Education jobs (24.12%).

Over the 10 years between 2006 and 2016, the structural share of employment for Upper Hunter LGA across the four industries have not changed much, with changes ranging from -1.2% to 1.5%.

FIGURE 65: RESIDENT WORKFORCE STRUCTURE BY BROAD INDUSTRIES 2016 (PUR)

Source: ABS Census TableBuilder (2016)

FIGURE 66: RESIDENT WORKFORCE STRUCTURAL CHANGE BY BROAD INDUSTRIES 2006-16 (PUR)

Source: ABS Census TableBuilder (2006, 2011, 2016)

ANZSIC Industries of Employment

In terms of ANZSIC (Australia and New Zealand Standard Industry Classifications) industries of employment, Agriculture, Forestry and Fishing is the largest employer of working residents in the Upper Hunter Shire LGA (19.4%), followed by Mining (12.1%), Health Care and Social Assistance (8.1%), Education and Training (7.8%) and Retail Trade (7.7%). The smallest employers are Information Media and Telecommunications (0.4%), Financial and Insurance Services (1%) and Rental, Hiring and Real Estate Services (1%).

Mining has increased the most as a proportion of total jobs taken by resident workers over the 10 years between 2006 and 2016 in the LGA (+4.69%), followed by Education and Training

(+1.36%), Administrative and Support Services (+0.96%) and Accommodation and Food Services (+0.57%).

Manufacturing has declined the most as a proportion (-2.96%), followed by Retail Trade (-2.21%) and Agriculture, Forestry and Fishing (-1.37%).

The Upper Hunter Shire LGA has a self-containment rate of 67%, meaning of the entire resident workforce, 67% are also working locally within the LGA. 33% travel elsewhere for work, mostly to Muswellbrook (22%).

TABLE 24: RESIDENT WORKFORCE STRUCTURE BY ANZSIC INDUSTRIES (PUR)

Geography	Upper Hunter Shire	Upper Hunter Shire	Upper Hunter Shire	New England and North West	New England and North West	New England and North West	Hunter Valley exc Newcastle	Hunter Valley exc Newcastle	Hunter Valley exc Newcastle
	2006	*2011*	*2016*	*2006*	*2011*	*2016*	*2006*	*2011*	*2016*
Agriculture, Forestry and Fishing	20.8%	19.5%	19.4%	17.3%	15.1%	14.8%	4.5%	3.5%	3.5%
Mining	7.4%	11.2%	12.1%	0.5%	1.5%	2.2%	7.0%	9.3%	9.3%
Manufacturing	8.6%	6.4%	5.7%	7.2%	6.7%	5.6%	11.3%	10.4%	7.0%
Electricity, Gas, Water and Waste Services	2.4%	2.2%	1.9%	0.9%	1.1%	1.0%	1.7%	1.7%	1.7%
Construction	6.8%	6.6%	6.4%	6.2%	6.6%	7.0%	7.9%	8.0%	8.8%
Wholesale Trade	2.8%	2.9%	2.2%	3.2%	3.1%	2.5%	3.2%	3.0%	2.1%
Retail Trade	9.9%	8.6%	7.7%	11.5%	11.2%	10.4%	12.3%	11.0%	10.5%
Accommodation and Food Services	5.9%	6.7%	6.5%	6.6%	6.8%	6.9%	7.8%	8.0%	8.4%
Transport, Postal and Warehousing	3.6%	3.6%	3.3%	4.5%	4.5%	4.1%	4.5%	4.5%	4.6%
Information Media and Telecommunications	0.4%	0.3%	0.4%	1.1%	0.9%	0.8%	0.9%	0.7%	0.7%
Financial and Insurance Services	1.4%	1.2%	1.0%	2.0%	2.0%	1.7%	1.9%	1.7%	1.9%
Rental, Hiring and Real Estate Services	0.9%	0.9%	1.0%	1.2%	1.2%	1.2%	1.6%	1.6%	1.6%
Professional, Scientific and Technical Services	3.9%	4.0%	3.8%	3.9%	3.9%	4.0%	4.2%	4.3%	4.2%
Administrative and Support Services	1.7%	1.9%	2.6%	2.2%	2.2%	3.1%	2.8%	3.2%	3.8%
Public Administration and Safety	4.7%	4.3%	4.7%	6.0%	5.9%	5.9%	6.8%	6.5%	7.0%
Education and Training	6.5%	6.7%	7.8%	9.9%	10.1%	10.8%	6.2%	6.2%	7.0%
Health Care and Social Assistance	8.0%	7.9%	8.1%	10.7%	12.2%	13.3%	9.7%	10.5%	12.2%
Arts and Recreation Services	1.7%	1.6%	1.7%	0.8%	0.9%	0.8%	1.1%	1.1%	1.1%
Other Services	20.8%	3.5%	3.5%	4.2%	4.1%	4.0%	4.4%	4.9%	4.7%
Total	*6,022*	*6,369*	*6,060*	*70,798*	*73,907*	*72,958*	*93,468*	*105,331*	*107,258*

Source: ABS Census TableBuilder (2006, 2011, 2016)

Resident workforce (occupations)

Technicians and Trade Workers is the most significant occupation of residents living in the Upper Hunter Shire LGA (17.08%), closely followed by Managers (16.66%) and Labourers (16.11%). Sales Workers is the smallest occupation group of the resident workforce (7.27%), closely followed by Community and Personal Service Workers (7.73%).

Comparatively, the proportion of Machinery Operators and Drivers in the LGA is much higher than both New England North West (7.74%) and Hunter Valley exc. Newcastle (11.63%) regional areas. The LGA also has a comparatively higher share of Labourers.

Machinery Operators and Drivers has grown the most as a proportion of total occupations in the LGA (+2.41%), closely followed by Professionals (+1.72%). Labourers have declined the most (-2.64%).

FIGURE 67: RESIDENT WORKFORCE OCCUPATION STRUCTURE 2016 (PUR)

Source: ABS Census TableBuilder (2016)

FIGURE 68: RESIDENT WORKFORCE OCCUPATION STRUCTURAL CHANGE 2006-16 (PUR)

Source: ABS Census TableBuilder (2006, 2011, 2016)

Jobs in the LGA (industries)

Broad Industry Categories

Of the 4,422 jobs in the LGA, 38.42% are in Industrial, 27.16% are Population Serving, and 21.26% are in Health and Education. Only 13.16% of jobs in the LGA are Knowledge Intensive.

Comparatively, Upper Hunter Shire has a higher share of Industrial jobs compared to New England North West (29.57%) and Hunter Valley exc. Newcastle (29.82%). However, Hunter Valley exc. Newcastle has a higher share of Population Serving jobs (32.28%) compared to the LGA. The same can be said for the Knowledge Intensive industry. The share of Health and Education jobs in the LGA (21.26%) is relatively lower compared to New England North West (25.65%), but higher than Hunter Valley exc. Newcastle (18.48%).

Over the 10 years between 2006 and 2016, the share of Industrial jobs in the LGA have declined as proportion of total jobs at a faster rate (-5.45%) compared to New England North West (-3.49%) and Hunter Valley exc. Newcastle (-2.85%).

On the other hand, the share of Health and Education jobs in the LGA have increased as a proportion over the 10 years between 2006 and 2016 (by +4.21%) at a slightly faster rate than New England North West (+4.09%) and Hunter Valley exc. Newcastle (+3.19%).

FIGURE 69: JOBS IN THE LGA STRUCTURE BY BROAD INDUSTRIES 2016 (POW)

Source: ABS Census TableBuilder (2016)

FIGURE 70: JOBS IN THE LGA STRUCTURAL CHANGE BY BROAD INDUSTRIES 2006-16 (POW)

Source: ABS Census TableBuilder (2006, 2011, 2016)

ANZSIC Industries of Employment

In terms of ANZSIC industries of employment, Agriculture, Forestry and Fishing is the largest employer of jobs within the Upper Hunter Shire LGA (26.6%), followed by Retail Trade (10.9%), Manufacturing (9.3%), Education and Training (8.7%) and Health Care and Social Assistance (8.4%). The smallest industries within the LGA Information Media and Telecommunications (0.3%) and Electricity, Gas, Water and Waste Services (0.5%).

Agriculture, Forestry and Fishing has increased the most as a proportion of total jobs locally within the LGA over the 10 years between 2006 and 2016 (+2.4%), followed by Manufacturing (+1.7%) and Retail Trade (+1.4%).

Education and Training has decreased the most as a proportion of jobs in the LGA (-2.5%), followed by Health Care and Social Assistance (-1.7%) and Accommodation and Food Services (-1.6%).

The Upper Hunter Shire LGA has a self-sufficiency rate of 83%, meaning 83% of jobs in the LGA are taken by people who both live and work in the LGA.

TABLE 25: JOBS IN THE LGA STRUCTURE BY BROAD INDUSTRIES 2016

Geography	Upper Hunter Shire	Upper Hunter Shire	Upper Hunter Shire	New England and North West	New England and North West	New England and North West	Hunter Valley exc Newcastle	Hunter Valley exc Newcastle	Hunter Valley exc Newcastle
	2006	*2011*	*2016*	*2006*	*2011*	*2016*	*2006*	*2011*	*2016*
Agriculture, Forestry and Fishing	24.3%	25.7%	26.6%	17.1%	15.1%	14.6%	4.7%	3.7%	3.6%
Mining	0.4%	0.5%	0.9%	0.4%	1.2%	2.1%	7.7%	10.3%	11.0%
Manufacturing	7.6%	7.1%	9.3%	7.2%	6.6%	5.6%	12.2%	11.3%	7.7%
Electricity, Gas, Water and Waste Services	0.5%	0.6%	0.5%	1.0%	1.1%	1.0%	1.6%	1.5%	1.7%
Construction	4.6%	5.1%	4.9%	4.9%	4.9%	5.3%	6.5%	6.9%	7.0%
Wholesale Trade	2.0%	2.2%	2.6%	3.2%	3.1%	2.5%	2.6%	2.5%	2.0%
Retail Trade	9.6%	10.3%	10.9%	12.1%	11.6%	10.9%	13.1%	11.3%	10.6%
Accommodation and Food Services	8.0%	8.4%	6.4%	6.8%	7.1%	7.2%	8.5%	8.4%	9.0%
Transport, Postal and Warehousing	3.6%	4.0%	3.8%	4.2%	4.2%	3.8%	3.9%	3.6%	3.7%
Information Media and Telecommunications	0.1%	0.2%	0.3%	1.0%	0.9%	0.8%	0.6%	0.5%	0.4%
Financial and Insurance Services	1.2%	1.3%	1.3%	2.1%	2.1%	1.8%	1.5%	1.4%	1.3%
Rental, Hiring and Real Estate Services	0.8%	0.9%	0.7%	1.2%	1.3%	1.2%	1.7%	1.8%	1.6%
Professional, Scientific and Technical Services	4.0%	4.0%	3.9%	3.9%	3.9%	4.1%	4.1%	4.2%	4.0%
Administrative and Support Services	2.1%	1.2%	1.1%	1.9%	1.9%	2.5%	2.3%	2.7%	3.3%
Public Administration and Safety	4.9%	4.8%	4.5%	6.3%	6.3%	6.2%	8.1%	8.1%	8.8%
Education and Training	11.2%	9.5%	8.7%	10.5%	10.9%	11.6%	7.0%	6.8%	7.7%
Health Care and Social Assistance	10.1%	9.0%	8.4%	11.1%	12.7%	14.1%	8.3%	9.0%	10.8%
Arts and Recreation Services	1.7%	2.0%	2.3%	0.9%	0.8%	0.7%	1.1%	1.1%	1.0%
Other Services	3.2%	3.2%	2.6%	4.3%	4.2%	4.1%	4.5%	5.0%	4.7%
Total	*4,422*	*4,612*	*4,623*	*65,484*	*66,273*	*64,315*	*79,627*	*89,931*	*87,049*

Source: ABS Census TableBuilder (2006, 2011, 2016)

Jobs in the LGA (occupations)

Of all the jobs in the LGA, the most significant occupations are Managers (19.54%) and Labourers (19.51%). This is followed by Professionals (15.12%), and Technicians and Trade Workers (12.87%). The smallest occupation group in the LGA is Machinery Operators and Drivers (4.57%).

Comparatively, the Upper Hunter Shire has a relatively higher share of Labourers within its LGA compared to the regional areas, and a relatively lower proportion of Machinery Operators and Drivers

Over the 10 years between 2006 and 2016, Managers has decreased the most as a proportion of total occupations in the Upper Hunter Shire LGA (-42.83%). Professionals has increased the most (+2.8%).

FIGURE 71: JOBS IN THE LGA OCCUPATION STRUCTURE 2016 (POW)

Source: ABS Census TableBuilder (2016)

FIGURE 72: JOBS IN THE LGA OCCUPATION STRUCTURAL CHANGE 2006-16 (POW)

Source: ABS Census TableBuilder (2016)

Tourism

The Upper Hunter Shire LGA has 167 tourism businesses, of which, 70% are non-employing, 54% have 1-4 employees, and 33% have 5-19 employees. Only 13% have 20 or more employees.

There was a total of 259,000 visitors in 2018, mostly Domestic Day visitors (136,000), Domestic Overnight visitors (120,000) and some International visitors (4,000). The average stay for international visitors, however, is 27 days.

The average spend per trip ($) is $177. International visitors spend significantly higher than the average ($1,915 per night). Domestic Overnight visitors spend $225 per night, and Domestic Day visitors $89 per night.

The total estimated spend in the Upper Hunter Shire LGA for 2018 was $46 million.

Approximately 55% of trips were estimated to be for holiday, while 45% was for visiting friends and relatives.

30% were solo travellers, 45% were couples, and 26% travelled as a group of friends or relatives.

38% of visitors stayed at the home of friends or relatives, with only 22% staying in hotels or similar accommodation.

APPENDIX 3 – COMMUNITY ENGAGEMENT NOTES

1. What do you know about the proposed wind farm? (for example: location, number of turbines, size of turbines etc.)

- Participants seemed to know about the proposal. It was noted that the wind farm was a proposal and would not at this stage ready for assessment, further turbine layout was not confirmed, visual impact documentation had also not been released.
- There was conjecture and misinformation about the number of turbines and the layout of the proposed project.
- The project has been mentioned for a decade.

2. How do you feel about the proposed wind farm?

- Supporters mentioned that supporting the windfarm was realism, that the wind farm represented sustainability, progress, renewable energy, and change.
- Proximity was identified as negative.
- People who did not support the wind farm suggested that the proposed development would be negative because of the following factors:
    - Visual amenity, the scale of the project, environmental impacts, light pollution and traffic congestion, health and wellness issues (stress), diminishing property values, environmental impacts, traffic congestion and biodiversity loss.
    - The wind farm would affect the 100km ridgeline views that are located on the Manilla Ranges.
- Others suggested that they were unsure/neutral about the impact and needed to understand and see the visual montages and noise forecasts to arrive at a decision.
- The Community Fund was a positive and was identified as coming directly to the community.
- The construction period will break the continuity of tourist visits – which may not be re-established.
- Some tourist operators will just close business. Nundle will lose the collective IP, investment and commitment of long-term operators. This will make it hard for Nundle to retain the critical mass to attract visitors.
- The wind farm will cause irreparable damage to the community and families.
- Respondents suggested that the development of the wind farm would compromise the ecological value of the area, this was suggested because the boundary of the wind farm was said to border the Ben Halls Nature Reserve. The nature reserve has been identified as an area that contains endangered and threatened flora and fauna.

3. Do you feel it would have social impacts on Nundle?

- There is division in community, creating a sense of loss.
- Tourism operators who rely on the natural amenity of the area and who would suffer from the proposal may choose to leave.
- There was a divergence of opinion as to whether the windfarm was irreparable or would settle down over time.
- Construction phase would increase traffic and create delays.

- It was suggested that visual amenity impact was based on a subjective assessment. Some believed that the visual amenity impacts would be far reaching whilst others were neutral, and some were not fazed by a windfarm.
- It was noted that the Manilla Ranges (where the proposed development will occur) is located at the nexus of three indigenous nations.
- People need natural landscapes particularly as Australia becomes more industrialised and Nundle will no longer be known for is natural landscape – this will be detrimental for Nundle.

4. What about the impact on the broader region if it goes ahead?

- It will be positive for the region; construction of the windfarm would translate to positive investment and jobs and growth; this would be beneficial for the wider region.
- Some felt that construction jobs would benefit Tamworth and that workers would live in Tamworth and commute to the project site.
- The wind farm would damage property prices and the tourism industry.
- The wind farm would have negative environmental impacts including biodiversity loss.
- A respondent suggested that that light pollution would affect the 24km ridgeline views and would be seen up to 100km towards Manilla Ranges.

5. Do you feel there would be economic impacts on Nundle itself?

- Positive impacts on business and tourism.
- Negative impacts on business and tourism.
- The proposed windfarm would positively impact the economy.
- The benefits would diminish after the construction phase.
- Service type industries, such as cafes, would be positively impacted whereas tourism industries that rely on natural amenity and rural setting would feel a negative impact.
- Concerns were raised about the Community Enhancement Funds, some believed it would be used to help the community, other believed that the Fund had created an unrealistic expectation that the funds would not be able to be financed.

6. Do you think it would affect your own business – positively or negatively?

- It would be a positive for the business.
- Neutral - it would not have an impact on many agricultural businesses.
- It would negatively impact on the agricultural industry and lead to increases in maintenance costs.
- Impacts on agricultural practices, such as aerial fertilizing and feeding, could be diminished this would lead to negative impacts on business.
- An increase in the amount of infrastructure to support the wind farm such as fencing would mean that ongoing costs would be negative for the business.
- Neighbouring properties will suffer from visual amenity issues but will not receive any financial benefit.
- The wind farm could severely impact property prices and tourism industry.
- It could impact the price of property.
- For industries such as accommodation and food services it could be positive.
- The wind farm would negatively impact tourism especially those tourism industries that rely on highly scenic views.
- The visual impact of a wind farm was said to be a subjective matter.
- It would not have an impact on the fossicking industry.

7. Do you have any data on the local economy or your business that would help us?

- There are around 120 beds in town excluding the Airbnb's.
- Hills of Gold hotel and the guest house can sleep 40 people.
- There has been a decline in tourism (with lower visitation rates), production (smoked trout, wool), agriculture and visitation rates in the town.
- Bushfires, drought, and the impact of COVID-19 have impacted health, wellbeing, and income.
- Fossicking makes up 50% of the tourism industry in Nundle.
- The energy output for wind farms is unreliable and expensive and creates inferior supply to that of coal fired generators and hydrogenators.

8. Does the town and region need an economic boost in your opinion? [e.g. Would extra money help the local pub; would extra workers boost the accommodation sector]

- Some agreed that Nundle did, others believed that a boost would be nice whereas others believed that the wind farm and the Community Enhancement Fund would not benefit Nundle.
- Some believed that the community Enhancement Fund was misleading and would not benefit the wind farm.
- People were worried the that Community Enhancement Fund would be spent by the regional council.

9. Would you have a more positive or negative opinion if I told you that construction for the project was worth over $300 million?

- The $300 million project was seen as a positive thing a good thing.
- This gives me a positive feeling. That kind of dollar should mean sustainability.
- This seems a good thing and that it would lead to road upgrades.
- Neighbourhood benefits – a road upgrade.
- Neighbourhood agreements.

10. Would you have a more positive or negative opinion if I told you that new employment from this project in the region would be: +200 FTE jobs during construction and 100-150 FTE permanent jobs supporting operations (+$15m/year)?

- People had neutral, positive and negative opinions.
- There was conjecture about the new employment opportunities from the project.
- It would attract a younger workforce.
- Jobs would attract people from Tamworth not Nundle.
- Others believed that most operational workers would be highly skilled professionals who visited Nundle on a 'fly-in, fly-out" or "drive-in, drive-out" basis.
- Jobs would be positive for the region.
- Families would not be attracted to the town.
- It would be an attractive place for a family.
- Construction would support the town.
- The demographics of the area (ageing population due to relocation of retirees into the area) means that a large proportion of people are not looking for work in Nundle in Hanging Rock.

11. Can you see any positive or negative impacts to your own business from this level of economic impact?

- It will provide positive impacts to the business.
- The impact from the wind farm will be damaging for tourism and the property market.

- The property market in Nundle is unique and so is its heritage significance.
- The agricultural properties have a high and distinctive rainfall, a high carrying capacity, and a food $/hectare output that is not available elsewhere. The proposed wind farm would compromise this uniqueness.
- The wind farm could result in 'no fly zones' which could materially affect aerial farming operations and increase operational costs to farming businesses.
- The windfarm would not detract from tourism in Nundle because it would not be visible from Nundle.
- There would be negligible impact on the windfarm.
- If the wind farm is not visible from Nundle, then there will not be an impact on the tourism economy of Nundle.
- Positive environmental outcomes would result from the biodiversity offset scheme.
- The wind farm will enhance visitation as people would be interested in seeing it.

APPENDIX 4 – REGIONAL I/O TABLE

SGS Regional Input Output Table

Input Output Tables

In order to measure the upstream and downstream linkages in the economy, it is important to first have a detailed "picture" of the dynamics of the economic geography. For this purpose, the Australian Bureau of Statistics (ABS) collects various data that represents the flow of goods and services between industries at a national level and publishes this data in the form of an input-output (IO) table.

To quote the ABS (1995, cat no. 5246.0 p.1):

> *"Input output tables provide a detailed dissection of intermediate transactions in an economy, and are thereby a means of describing the supply and use of the products of an entire economic system. They provide detailed statistics underlying the national accounts for a specified economy and period and so enable more comprehensive analysis of the productive system than do standard national income and expenditure accounts, which are concerned only with the end result of production, rather than the intermediate flows*".

The structure of an IO table is presented in Figure A1. Each column in the table represents a specific source of demand, while each row shows a specific source of supply. For analytical purposes, the table is often presented as four quadrants:

⇒ **Intermediate Usage** measures the flow between industries in the national economy. Each column represents the total demand of the industry in terms of the value of goods and services it requires from other industries to operate. For instance, a cell within Quadrant 1 represents the value of goods and services purchased by agriculture from manufacturing.

⇒ **Final Demand** represents sections of the economy that buy goods and services from industries, but which do not form industries themselves. Two examples are exports outside of the Australian economy and private household consumption expenditures.

⇒ **Primary Inputs to Production** are the opposite of Final Demand, i.e. the components of industry demand that are attributable to sections of the economy but which are not industries, such as imports, wages and salaries, taxes, etc.

⇒ **Primary Inputs to Final Demand** measures the remainder of the economy, such as the amount of private household expenditure that is spent on taxes.

Once an IO table is constructed, it can be used to study the various linkages between industries. For example, by cross-referencing the Agriculture column with the Manufacturing row, we know how much of total Agricultural production is supplied by the Manufacturing industry, and thus have a measure of the downstream linkage between Agriculture and Manufacturing.

Figure A1: Input Output Table Structure

STRUCTURE OF AUSTRALIAN INPUT-OUTPUT TABLES

Direct allocation of imports, Basic prices, Recording of intra-industry flows

	To / *From*	*Row prefix*	*Intermediate Uses*					*Intermediate uses (sub-total)*	*Final Uses*							*Final Uses (sub-total)*	*Total supply (grand total)*
			Agriculture, etc	*Mining*	*Manufacturing, etc*	*Construction*	*Services*		*Final consumption expenditure — household*	*Final consumption expenditure — government*	*Gross fixed capital formation — private*	*Gross fixed capital formation — public enterprises*	*Gross fixed capital formation — general government*	*Changes in inventories*	*Exports of goods and services*		
	Column prefix		0101-0400	1100-1500	2101-3701	4101-4102	4501-9601		Q1	Q2	Q3	Q4	Q5	Q6	Q7		
Intermediate uses	Agriculture	0101-0400	QUADRANT 1 INTERMEDIATE USE						QUADRANT 2 FINAL USE								
	Mining	1100-1500															
	Manufacturing, etc.	2101-3701															
	Construction	4101-4102															
	Services	4501-9601															
	Intermediate uses (sub-total)																
Primary inputs	Compensation of employees	P1	QUADRANT 3 PRIMARY INPUTS TO PRODUCTION						QUADRANT 4 PRIMARY INPUTS TO FINAL USE								
	Gross operating surplus and mixed income	P2															
	Taxes on products (net)	P3															
	Other taxes on production (net)	P4															
	Imports	P5															
	Australian production																

The shaded areas correspond to aggregates shown in the Gross Domestic Product Account.

corresponds to aggregates shown as the components of gross domestic product, income approach.

corresponds to aggregates shown as the components of gross domestic product, expenditure approach.

Hills of Gold Wind Far

State Input Output Simulation

By using the Australian IO table as a base it is possible to synthesise a State IO Table by using Victorian specific data (such as employment and population). The first step in this process is to consider only the total supply column and production row of the Australian IO table.

If the total supply column and production row are to represent a valid description of the economy, two properties must hold:

1. *Total supply in the entire economy must equal total demand, and*
2. *The total supply provided by an industry must equal the total production generated by that industry.*

Using these properties, industry employment and regional population data, a set of assumptions can now be developed for adjusting the total supply column and total production row to the State level (refer Figure D2).

Of all these assumptions, the one with the most profound effect on the State economy is the calculation of exports. These can be estimated using the location quotient method, as follows:

Industry Location Quotient =
(State Industry Employment / Total Regional Employment) /
(National Industry Employment / Total National Employment)

If the Location Quotient is greater than or equal to one, then the Industry is said to be over-represented in the area, and is therefore supplying commodities for inter-state export. To find the amount of export generated jobs, the following formula is utilised:

Inter-Regional Export Generated Jobs =
(Industry Location Quotient – 1) / (Industry Location Quotient)
****
State Industry Employment

Inter-state Exports can then be calculated by assuming that industry production per employee is the same as at the national level.

Inter-state Exports =
Inter-state Export Generated Jobs * Industry Production per Employee

International exports from the State can also be found using the following formula:

International Exports from State =
International Exports from a National Level *
(Total State Employment / Total National Employment)

Therefore, to calculate total State exports:

State Exports = Inter-state Exports + International Exports from State

FIGURE A2: SCALE ASSUMPTIONS

Total Supply Column Assumptions (Adjustments)

1. Industry Supply is scaled down using State industry employment (e.g. State Industry Production = National Industry Production / National Industry Employment *State Industry Employment).
2. Household Consumption is scaled down using State Population.
3. Government Consumption is scaled down using State Population.
4. Private Gross Fixed Capital Formation is scaled down using State Employment.
5. Public Gross Fixed Capital Formation is scaled down using Government Employment.
6. Government Gross Fixed Capital Formation is scaled down using Government Employment.
7. Consumption due to Change in Inventories is scaled down using State Employment.
8. State Exports is calculated using the Location Quotient Method (described above).

Total Production Row Assumptions (Adjustments)

9. Industry Production equals Industry Supply (by definition).
10. Employee Compensation is scaled down using State Employment.
11. Gross Operating Surplus and Mixed Income are scaled down using State Employment.
12. Taxes less subsidies on production is scaled down using State Employment.
13. Taxes on imports equates to 37.4% of Total International Imports (as in proportion to the National Industry Flow Table).
14. Total Imports is chosen so that total State supply equals total State production.

To create the regional input output model detailed employment data is required for the local region and New South Wales. This information can be drawn from the Australian Bureau of Statistics Census of Population and Housing.

As a result the detailed employment data had to be estimated using data from the 2016 and 2006 Census. This data was:

- Employment by industry within the Tamworth Regional and Liverpool Plains from the 2016 Census.
- Employment of residents of the Tamworth Regional and Liverpool Plains from the 2016 Census.
- Employment of residents of the Regional NSW and Greater Sydney from the 2016 Census.

The Calculation of Inter-Industry Flow

Using the assumptions in Figure A2, it is possible to down scale the total supply column and demand rows of the Australian IO table, i.e. so that they represent the region under study. However, how the demand and supply flows between these sources and destinations is still unknown, e.g. how much of Agricultural Production in the region is used as raw materials by the region's Manufacturing Industry?

This is estimated via the RAS method. The RAS method is a common procedure used to manipulate industry flow tables, and is also used by the ABS to update historic industry flow tables to the current year given only a small amount of information. A complete description of

the RAS method can be found in Appendix A of the ABS publication 5209.0 "1996-97, Input-Output Tables, Australia".

Essentially the SGS model applies the RAS method by using the existing Australian IO table as a base, and generates a State IO table that satisfies the total production row and total supply columns described above. Mathematically speaking, this is achieved by minimising the error between the two tables, while satisfying the column and row totals of the matrix. This is achieved via an iterative process, which starts from an initial guess based on the column and row totals, adjusting the guess in the direction that has the least amount of error until the optimal solution is found.

It has been noted in the literature that the structure of the economy in a specific area will be similar structure to those regions surrounding it. For this reason, it would make more sense to generate the Input-Output table for Melbourne based on the Victorian economy structure rather than basing it from the National Input-Output table directly. Therefore, for regional analysis the SGS Regional Input-Output model undertakes a layered approach.

For example, to calculate the Input-Output table for the Northern Region of Melbourne:

1. The Victorian Input-Output Table is derived from the National Table.
2. The Melbourne Metropolitan Regional Table is derived from the Victorian Table.
3. The Northern Region of Melbourne's Table is derived from the Melbourne Metropolitan Table

The final result of the procedure is a fairly close approximation to the required region's Industry Flow table.

Generating Regional Multipliers

An IO table represents the inter-linkages in an economy in its present state. To evaluate how any economic stimulus will impact on the regional economy, it is necessary to derive and subsequently use a set of 'multipliers'. These multipliers summarise the total effect to the economy after the flow on consumption and production effects have been accounted for, as follows:

Total Effects =	*(Initial Effect) +*	*(Flow On Effects)*
=	*(Initial Effect) +*	*(Production Induced Effects + Consumption Induced Effects)*

The first step in generating multipliers is to create the 'Direct Requirements' matrix. This matrix is found by dividing every column in the IO table by the industries column total. The downstream linkages in the Direct Requirements matrix now represent the amount of production supplied by other industries on a per dollar basis. Therefore, cross-referencing the Agriculture column with the Manufacturing row in the Direct Requirements matrix will give the amount of production that must be supplied by the Manufacturing industry for each dollar increase in production in Agriculture. This is also known as the First Round effect.

However, as a result of the demand generated by the first round, another round of increased production will occur in supplier industries to service this demand. This round will produce yet another round of effects, and so forth. Fortunately, a mathematical procedure exists that can calculate every multiplier in a single step, assuming an infinite number of rounds. This is known as the Leontief Inverse and can be calculated using matrix algebra.[128]

[128] A full description of the Leontief Inverse procedure is described in ABS Cat No. 5246.0, "Information Paper, Australian National Accounts, Introduction to Input Output Multipliers".

Mathematically, to find the total multipliers, the starting point is with the Intermediate Usage quadrant of the Direct Requirements matrix (which is used to analyse production induced effects). The household consumption column and wages and supplements row (to analyse the consumption induced effects) is appended to this to produce matrix A. The Leontief Inverse is found by subtracting matrix A from an identity[129] matrix I (to prevent double counting the industry under study), and then finding the inverse of this matrix, to find the Leontief inverse $(I-A)^{-1}$. By inverting the matrix the set of multipliers that must exist to make the current economy possible is derived[130].

The final result of the Leontief Inverse procedure as used in the Australian IO table is presented in Table A1. Regional table derived multipliers follow the same format but will have smaller effects due to the fact that some production generated will be lost to external producers (imports) and consumers might literally spend their dollars outside the region.[131]

The multipliers in Table A1 can be interpreted as follows:

⇒ **Output Multipliers** – for every additional dollar earned in Australia's Agriculture, Hunting & Trapping industry, the level of national output increases by $2.411.

⇒ **Employment Multipliers** – at present each $1 million in Australia's Agriculture, Hunting & Trapping industry supports 12 jobs. For each $1 million increase in output by the Agriculture, Hunting & Trapping industry, total national employment is expected to rise by 22 jobs.

⇒ **Value Added Multipliers –** for every extra dollar of output generated in the Agriculture industry, 50.7¢ is attributable to and increase in income (wages, salaries, and supplements) and gross operating surplus in the Agriculture industry. Nationally, total income and gross operating surplus will increase by $1.157.

[129] A matrix where all the diagonal elements are 1, and all other elements are 0, i.e. cross referencing the same industry column and row would result in the value of 1.

[130] This procedure is known as a demand side model, and therefore assumes that demand influences supply but supply does not influence demand.

[131] It is possible (but unlikely) that due to the mathematics involved in deriving regional output multipliers, that the derived regional total multiplier will be greater than the National/ State Multipliers for heavily export-based industries. In this case, all flow on production due to that industry is likely to remain inside the region. Therefore, in this case, the SGS model will report the National Industry Multipliers instead of the derived regional values.

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