St Patricks Plains Wind Farm

SOCIAL & ECONOMIC IMPACT ASSESSMENT – FINAL REPORT

ERA Planning and Environment on behalf of Epuron Projects Pty Ltd

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Executive summary

This socio-economic impact assessment (SEIA) evaluates the direct and indirect socio-economic impacts of the St Patricks Plains Wind Farm Project, proposed by Epuron Projects, located in the Central Highlands in Tasmania. The wind farm has 47 proposed turbines, with a maximum generating capacity of 300 megawatts (MW). Construction is anticipated to start in 2023 subject to development consent and grid connection approval and is expected to cost around $575 million in real terms and take two years to construct. Around 14 per cent of total capital expenditure will be spent directly within Tasmania, 19 per cent will be spent in mainland Australia, and 66 per cent will be spent internationally. The high international spend is associated with high-cost pre-constructed elements such as the towers, nacelle and blades.

This project aligns with and responds to the Tasmanian Government's Renewable Energy Target of 200 per cent. This target is part of a bigger vision which includes Marinus Link and The Battery of the Nation. These strategic projects support the nation's transition to renewables and enable, rely upon, and drive investment in wind farms in Tasmania. Any delays in the roll-out of renewable energy generation projects like St Patricks Plains Wind Farm may adversely impact the launch and operation of these strategic projects in their early years of operation.

For infrastructure projects like the St Patricks Plains Wind Farm Project, a SEIA typically evaluates quantifiable and non-quantifiable (qualitative) impacts during the construction and operational phases and considers the relative equity of impacts and how they are distributed across different sections of the community and/or other stakeholders.

Quantitative economic impacts

The quantitative analysis uses Computable General Equilibrium (CGE) modelling. CGE modelling is one of the most robust methods to quantify economic impacts. The key input to a CGE model is an investment; in this instance the investment of St Patricks Plains Wind Farm. The impact of this investment (or 'shock') is then assessed through economic interrelationships occurring between major regional industry groups and other sectors of the economy. This process accounts for resource scarcity (reallocation of resources). The basic steps in quantifying economic impacts via a CGE model are:

- Isolating how the project stimulates the regional economy (direct impacts)
- Generating a region-specific CGE econometric model. For the St Patricks Plains Wind Farm Project, the State of Tasmania was modelled
- Applying the direct project stimulus (by relevant industry group) to the model and recording outputs to estimate direct and indirect regional economic impact including Gross State Product (GSP), Gross Value Added (GVA) and full time equivalent (FTE) jobs.

Planning and capital works associated with St Patricks Plains Wind Farm are planned to take place between 2023 and 2025. The economic impacts of the capital investment, calculated via CGE modelling, is reported in Table 1, along with operational phase impacts for a 15-year period (2026 to 2040). This period was chosen to be conservative, which is preferential for economic impact modelling.

Wind farms have an operational life of around 20-30 years[1], and so the operational phase impacts of St Patricks Plains Wind Farm may be considerably larger than those presented.

Definitions of the elements modelled that will assist interpretation of CGE outputs are below:

- GSP is a measure of value adding that occurs in an economy. It is the State equivalent of Gross Domestic Product (GDP). Broadly speaking, GSP represents the value of all goods and services produced within the State.
- GVA is the difference between the value of output (sales) and the value of intermediate consumption (input costs such as goods, services, energy, etc) and measures the contribution of economic output. For example, to measure the GVA of a manufacturing company, you would calculate the income earned in sales, subtracted by the raw materials and labour costs.
- Household consumption is expenditure on goods and services by persons. In general, an economy wide increase in the value of goods and services consumed by people is advantageous
- Investment is the purchase of machinery, buildings and other elements for business operations. As with household consumption, increased business investment is generally considered advantageous.
- FTE jobs is a unit of measurement equivalent to an individual working full time. For example, 20 people working 50 per cent of a full-time job would be equivalent to 10 FTE workers.
- State and federal government revenue accrue from a range of sources, including personal and company income tax.

TABLE 1: CGE MODELLING OUTPUTS

Impact	2023	2024	2025	2026-2040
Real GSP ($m)	10.1	35.3	19.0	379.1
GVA ($m)	9.0	31.2	18.1	419.8
Real household consumption	3.8	13.5	6.1	76.3
Real investment	96.1	332.9	140.9	96.0
Jobs (FTE)	50	180*	74	Av. of 43 per year
State government revenue ($m)	20.8	73.4	31.6	71.8
Federal government revenue ($m)	6.5	22.1	9.7	9.6

Source: SGS Economics & Planning and Centre of Policy Studies, Victoria University, 2021. Note: *CGE modelling output indicated 170 jobs – this was increased to 180 as Epuron advised there would be an average of 180 direct jobs during the construction phase.

Direct and indirect job impacts

FTE job impacts are distinctly different between the construction phase and operating phase. Most of the impacts in the construction phase are within the construction industry, however, other industries

[1] Clean Energy Council website, accessed February 2022

also experience a net uplift in employment, mainly the manufacturing, retail trade, accommodation and food services, professional services and health care and social assistance industries.

CGE modelling shows that the direct employment of 17 workers during the operation phase (10 in construction and 7 in professional services) will generate an indirect employment impact of around 20 to 25 jobs per year from 2026 to 2040. The indirect job impacts are spread across numerous industries, but primarily in population serving industries such as accommodation and food services and retail trade.

GSP and GVA impacts

GSP is estimated to increase by around $64.4 million over the construction period. Impact peaks in 2024 with a real GSP increase of $35.3 million, driven by the greatest level of capital expenditure in this year.

Unlike GSP, which is only modelled as an aggregate figure via CGE modelling, GVA is modelled by industry. GVA is modelled to sum to $58.3 million in the construction period, with most value added for the construction industry. Other industries driving an increase to Tasmania's GVA include financial and insurance services (adding $25 million), professional services (adding around $13 million), with wholesale trade, healthcare and social assistance and other services each adding around $9 million.

In the operational phase, around 70 per cent of total GVA increase stemming from the development of St Patricks Plains Wind Farm will be driven by structural changes in the electricity, gas, water and waste services industry. This structural change includes shifts in resource allocation and an increase in industry employment.

There are some other important construction related effects of the St Patricks Plains Wind Farm that need to be considered – investment in construction in Tasmania (and Australia more broadly) is currently taking place at high levels, as later discussed in the labour market impacts section. As such, availability of materials, machinery and workers is being stretched. The current demand is driving construction related material prices and construction wages to grow at a rate higher than Australia's average consumer price index (CPI) and wage price index (WPI).

Qualitative socio-economic impacts and opportunities

In addition to the economic impacts, there are a range of social and other impacts of the Project which are more difficult to quantify. This may be due to the impacts being intangible (like amenity), limited data availability, small benefit derived or complexities in valuation method. The approach taken to assess impacts differs by impact type. Community engagement (survey) feedback was considered for all impacts as well as external technical reports.

To summarise, the three most significant negative impacts during the construction stage are:

- Potential skills and workers shortages in the construction industry
- The availability and affordability of housing, and
- Traffic and transport impacts on local road network

It is recommended to optimise the timing of the construction stage and engage with Keystone to manage workforce impacts. It is highly recommended to provide for (temporary) workers accommodation and to manage traffic impacts where possible.

The greatest opportunities during construction and during operation are:

- Significant economic impacts in terms of jobs, value add and revenue to Tasmania as a whole
- Improved local employment opportunities, and
- The ability to attract and retain working age households in the region which is otherwise ageing at a rapid pace

The region has high levels of socio-economic disadvantage, and the abovementioned benefits could help reduce that.

A significant community concern was identified around the ongoing visual impacts of the wind farm by Pitt & Sherry in the survey conducted for Epuron. It is recommended to monitor community concerns over time.

It is recommended to set up an annual community fund to offset some of the ongoing adverse impacts and to support the viability of the local community. Epuron is currently planning this initiative.

Key findings and opportunities are presented within the context of EPA Tasmania's socio-economic impact assessment guidance in Table 2. EPA Tasmania guidance was adopted as the framework for evaluating socio-economic impacts, in the absence of specific legislated socio-economic criteria.

TABLE 2: KEY FINDINGS OF SOCIO-ECONOMIC ISSUES AS PER EPA FRAMEWORK

SEIA requirement	Key finding and opportunities
An estimate of total capital investment for the proposal and where that capital will be expended.	Construction of the St Patricks Plains Wind Farm Project is expected to cost around $575 million and take two years. Around 14 per cent of total capital expenditure will be spent directly within Tasmania, 19 per cent will be spent in mainland Australia, and 66 per cent will be spent internationally. The high international spend is associated with high cost constructed elements such as the towers, nacelles and blades.
Operational expenditures and revenues.	Operational expenditure in 2026-2040 is expected to result in $379.1 million in real GSP and $419.8 million in GVA.
The impacts on local and State labour markets for both the construction and operational phases of the proposal. The number and nature of direct and indirect jobs arising from the proposal must be detailed. Skills and training opportunities should also be discussed.	There will be an average of 180 direct jobs and 98 indirect jobs in the construction phase, with 17 jobs expected in the operational phase. To address the labour/skills shortages in Tasmania and to positively impact the local community, upskilling and training programs for the local community around Bothwell and Hamilton should be considered, to train them for in-demand jobs in both the construction and operational phases.
The impacts on upstream/downstream industries, both locally and for the State.	Direct and indirect economic impacts have been evaluated via CGE modelling, and are reflected via changes to real GSP, which is estimated to increase by around $64.4 million over the construction period. Impact peaks in 2024 with a real GSP increase of $35.3 million, driven by the greatest level of capital expenditure in this year. Meanwhile, GVA is modelled to be $58.3 million in the construction period. Around 63 per cent of total GVA increase will be driven by structural changes within the electricity, gas, water & waste services industry, and 12 per cent in the construction industry. This is for construction and operation. Other key

SEIA requirement	Key finding and opportunities
	industries driving an increase to Tasmania's GSP include financial and insurance services (adding $25 million), professional services (adding around $13 million), with wholesale trade, healthcare and social assistance and other services each adding around $9 million.
The extent to which raw materials, equipment, goods and services will be sourced locally.	14 per cent of total capital expenditure will be spent directly within Tasmania, amounting to $80 million. As mentioned in the skills and training section, there is opportunity to implement an upskilling program for the local community to encourage and prioritise local employment.
A qualitative assessment of impacts on local social amenity and community infrastructure, including recreational, cultural, health and sporting facilities and services. Any proposals to enhance or provide additional community services or facilities should be described.	Epuron will establish a Community Fund to support community initiatives in the local area, aligning with the Clean Energy Council's Best Practice Charter for Community Developments. The fund aims to engage with the local community and share the benefits of the wind farm and could involve supporting community initiatives, event sponsorship, promoting tourism, or improving local sporting facilities and local infrastructure. Epuron proposes to finance $3,000 (indexed) per turbine installed, which for a 47 turbine wind farm would provide upwards of $141,000 annually into the St Patricks Plains Wind Farm Community Fund, amounting to over $3.5 million over 25 years. An annual contribution of $10,000 (indexed) is earmarked specifically for the upkeep of the Steppes Hall (a local community centre), in addition to other initiatives proposed by the local community.
Community demographic impacts (changes to cultural background, occupation, incomes).	During the 2-year construction period, there will be an influx on construction workers who will be of working age and mainly male, which will alter the demographic makeup of the local area, whose working age population has been declining. It will likely temporarily raise the average income. There will be 17 ongoing jobs in the operational period which will slightly shift demographics by bringing a number of working age individuals or families into the locality.
Impacts on land values, and demand for land and housing.	The exact impact on land/property values near the wind farm site is uncertain, especially given the rise in house prices in regional Tasmania following the pandemic. The literature review suggests that in general, the proximity of wind turbines to an area does not negatively impact surrounding house prices. The demand for houses may increase depending on the type of worker accommodation used during the construction period, with local rents expected to rise if worker accommodation relied on renting existing rentals and holiday houses.
Impacts on the local, regional, state and national economies.	14 per cent of total capital expenditure will be spent directly within Tasmania, amounting to $80 million. An additional 19 per cent of total capital expenditure will be spent directly within Australia, amounting to a total of $108 million.
Any publicly funded subsidies or services to be relied upon for the construction or operation of the proposal.	Unknown.
Any impacts on Local, State and Federal Government rate, taxation and royalty revenues.	Owing to increased jobs and economic activity, State Government and Federal Government revenue are modelled to increase throughout the construction period, by around $125.8 million and $38.3 million, respectively.

1. Introduction

1.1 Project brief

SGS Economics & Planning Pty Ltd (SGS) was engaged by ERA Planning and Environment (ERA) on behalf of Epuron Projects Pty Ltd (Epuron) to undertake analysis to assess the socio-economic impacts of the St Patricks Plains Wind Farm Project.

Assessment limitation

The Project design and construction methodology including materials transportation and workforce housing is evolving as the design progresses from concept through to procurement. Consequently, awareness about the Project impacts is also evolving. This report contains a point in time assessment of socio-economic impacts, with the analysis and reporting undertaken in late 2021.

1.2 What is a socio-economic impact assessment?

Major infrastructure projects and changes to the environment can have intended and unintended impacts on the quality of life of individuals and communities. It is important to consider and evaluate these impacts via a socio-economic impact assessment (SEIA) to determine whether the net impact will be positive or negative, as well as to inform actions or steps which may be implemented to maximise project benefits and mitigate or minimise adverse impacts.

For infrastructure projects like the St Patricks Plains Wind Farm Project, a SEIA typically evaluates quantifiable and non-quantifiable (qualitative) impacts during the construction and operational phases:

- The quantifiable component generally measures the degree to which economic stimulus associated with a project accumulates in total economic activity levels. For the St Patricks Plains Wind Farm Project, this refers to the initial construction investment and ongoing costs incurred, and benefits accrued during operations. This method does not necessarily assess whether a project is worth doing from a financial or cost-benefit perspective. Instead, it looks at how a project will affect overall economic activity
- The qualitative assessment considers other aspects that are of appreciable socio-economic significance but difficult to quantify due to lack of empirical data and/or the non-monetary nature of the impact

A SEIA must consider the relative equity of impacts and how they are distributed across different sections of the community and/or other stakeholders. That is, it considers overall project impact, rather than the impact from the perspective of one segment of the community or party with a vested interest.

1.3 Project context

St Patricks Plains Wind Farm, proposed by Epuron, is for a 47-turbine wind farm with a maximum generating capacity of 300 megawatts (MW) in the St Patricks Plains area, in Tasmania's Central Highlands. It will be located in an area with consistently strong winds and is near existing powerline infrastructure. The Project will connect via a new substation to the TasNetworks powerlines from Palmerston to Waddamana, with electricity transmitting in both north and south directions. Construction is anticipated to start in 2023 subject to development consent and grid connection approval. Construction is expected to cost around $575 million and take two years. Epuron is currently planning and developing multiple renewable energy projects in Tasmania; two solar farms are approved in the north, a wind farm north of Stanley (Western Plains Wind Farm), and another two in the northwest of Tasmania (Guildford Wind Farm and Hellyer Wind Farm).

Key elements of the Project are detailed below:

- The overall development will feature 47 turbines which are 230 metres in height with 80 metre blades located across approximately 10,000 hectares of land
- The Project will involve a maximum of 325 over dimensional loads to transport turbine parts (escorted convoy trips), around 15,000 trips each for un-ladened and ladened heavy vehicles to transport raw materials, in addition to general passenger trips for employees

Location context

The St Patricks Plains Wind Farm will be located in the St Patricks Plains/Steppes area in the Central Highlands of Tasmania, which is around 28 kilometres north of Bothwell and roughly the midway point between Hobart and Launceston.

There is low settlement density in the area around the proposed wind farm. Within a 20-kilometre radius there are around 85 residences and shacks and three historic buildings. Three of the residences are within the wind farm property boundary and are involved with the Project. Settlements near the proposed wind farm and their population are outlined in Table 3.

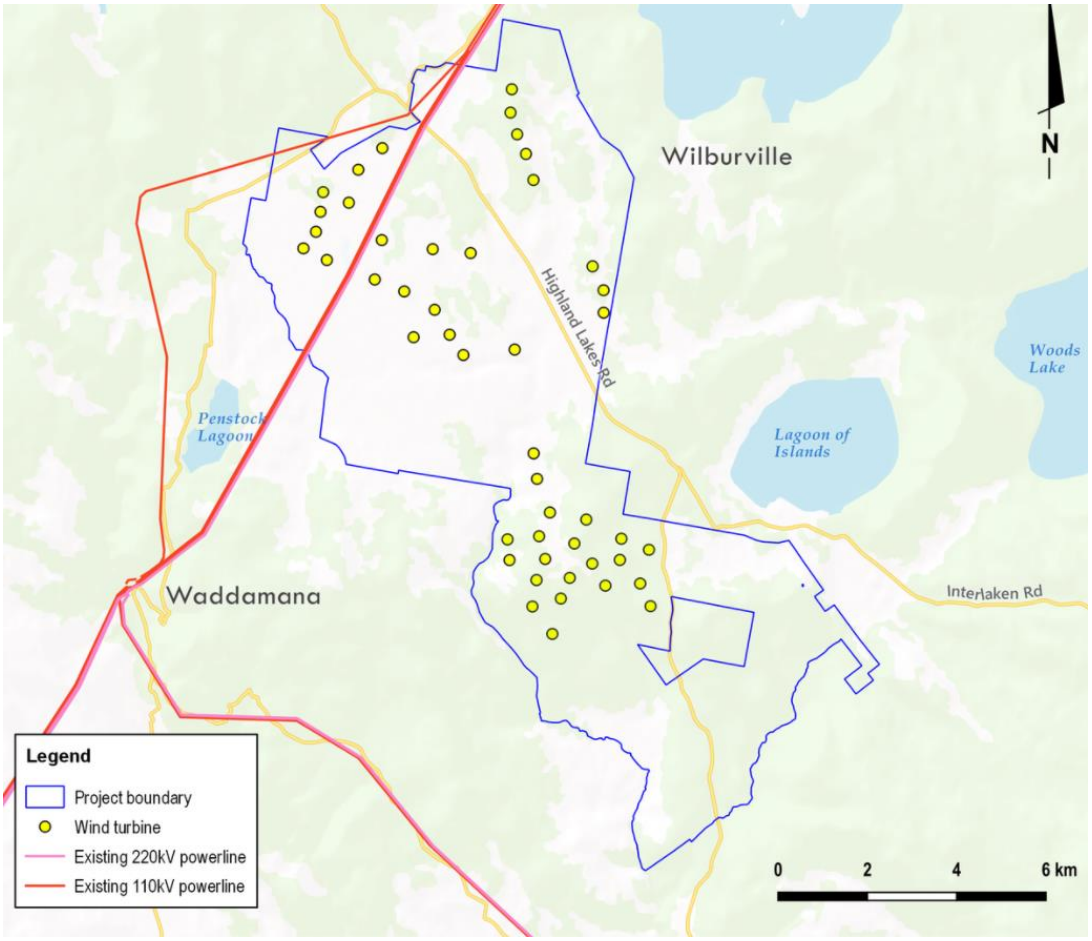
The proposed layout of the wind farm is illustrated in Figure 1, with the broader locational context shown in Figure 2.

TABLE 3: POPULATION CENTRES NEAR ST PATRICKS PLAINS

Settlements near St Patricks Plains	Location from nearest proposed turbine (approximate)	Permanent residents	Shacks/ residences
Flintstone	3km to the north	4	±125
Miena	10km to the north-west	87	±150
Morass Bay	4km to the north-east	4	±40
Penstock Lagoon (Eastern Shore)	4km to the west		±17
Shannon	2km to the west	0	±12
Steppes	2 km to the north-east	0	-
Tods Corner	6.5km to the north	8	±20
Waddamana	8km to the west	4	-
Wilburville	3km to the east	16	±100

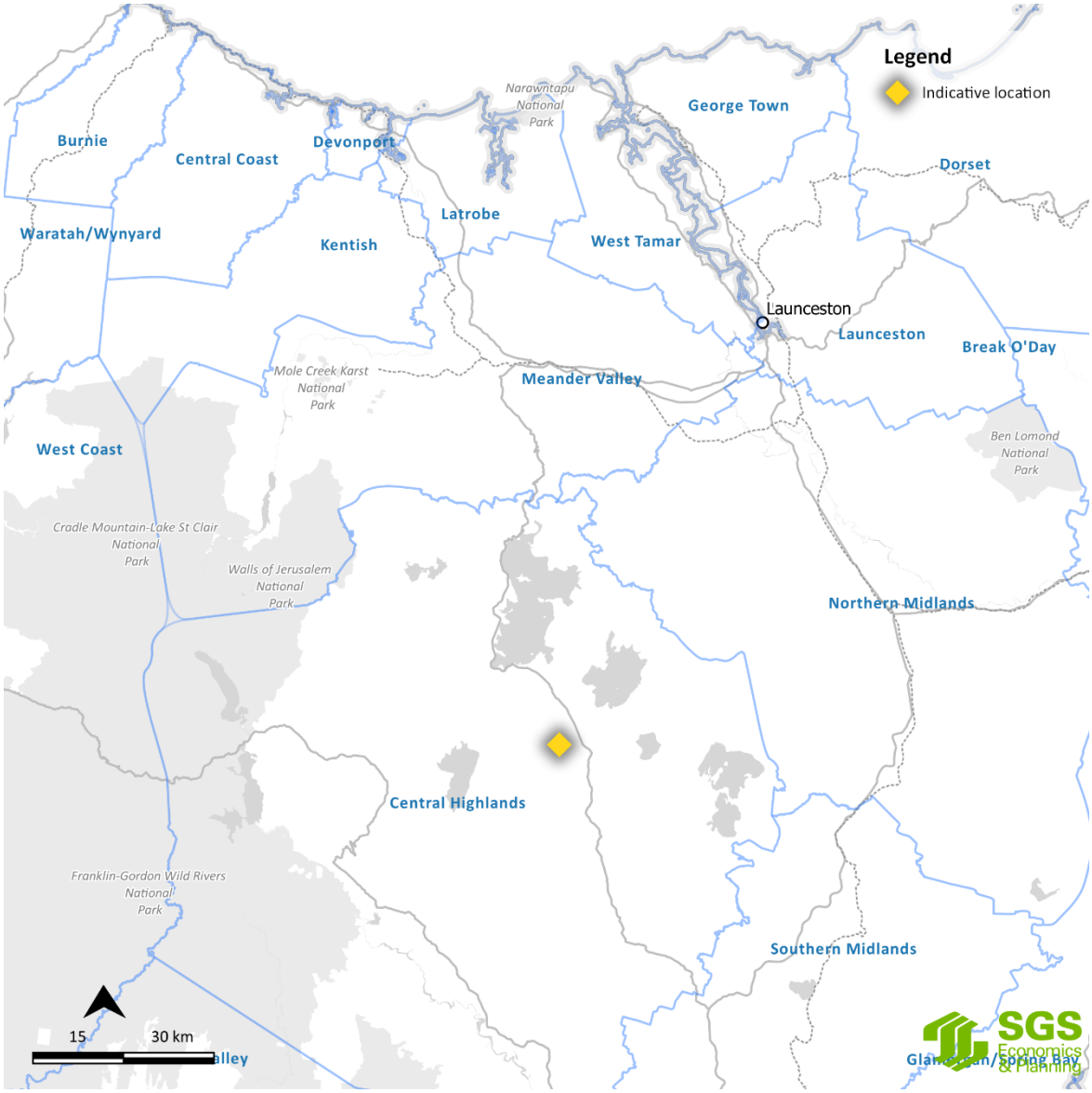
Source: ABS Census 2016, Landscape and Visual Impact Analysis Report

FIGURE 1: PROPOSED LAYOUT OF 47 TURBINES



Source: Epuron website, accessed December 2021

FIGURE 2: LOCATION CONTEXT



Source: SGS Economics & Planning, 2021

1.4 Structure of the report

The report has been structured as follows:

1. Introduction: defines the Project context and study method
2. Method for assessing impacts: define the quantitative and qualitative methods of impact assessment
3. Literature review: review the main socio-economic impacts that wind farms may generate
4. Socio-economic baseline: provides population and employment data in addition to other socio-economic contexts for the surrounding region and a review of the government policy context
5. Socio-economic impact assessment findings: identifies the perceived socio-economic impacts raised during consultation, qualitative assessments and the economic modelling results
6. Conclusion

2. Method for assessing impacts

SGS developed a methodology to evaluate impacts in line with EPA Tasmania's guidance for SEIAs (from the project specific guidelines issued for the Project), to the extent that was possible given the detail available. EPA Tasmania lists the following details that may be assessed as part of a socio-economic impact assessment:

- An estimate of total capital investment for the proposal and where that capital will be expended
- Operational expenditures and revenues
- The impacts on local and State labour markets for both the construction and operational phases of the proposal. The number and nature of direct and indirect jobs arising from the proposal must be detailed. Skills and training opportunities should also be discussed.
- The extent to which raw materials, equipment, goods and services will be sourced locally
- A qualitative assessment of impacts on local social amenity and community infrastructure, including recreational, cultural, health and sporting facilities and services. Any proposals to enhance or provide additional community services or facilities should be described.
- Community demographic impacts (changes to cultural background, occupation, incomes)
- Impacts on land values, and demand for land and housing
- Impacts on the local, regional, state and national economies
- Any publicly funded subsidies or services to be relied upon for the construction or operation of the proposal, and
- Any impacts on Local, State and Federal Government rate, taxation and royalty revenues.

While EPA Tasmania's guidance generally aligns with national best practice for SEIAs, it does focus on impacts only, and does not consider how impacts may be mitigated or managed. As such, SGS has also drawn upon the New South Wales Social Impact Assessment Guidelines for State Significant Projects. This guidance is set out in three phases:

- Phase 1 – which delivers an initial insight into the complexity and extent of social impacts
- Phase 2 – which delivers a final evaluation of social impacts and responses, and
- Phase 3 – if required – which delivers a social impact management plan

This SEIA is being prepared pre-approval, so this report addresses phase one and two only, including recommended mitigation measures that may be refined and implemented by the proponent as the project progresses to detailed design.

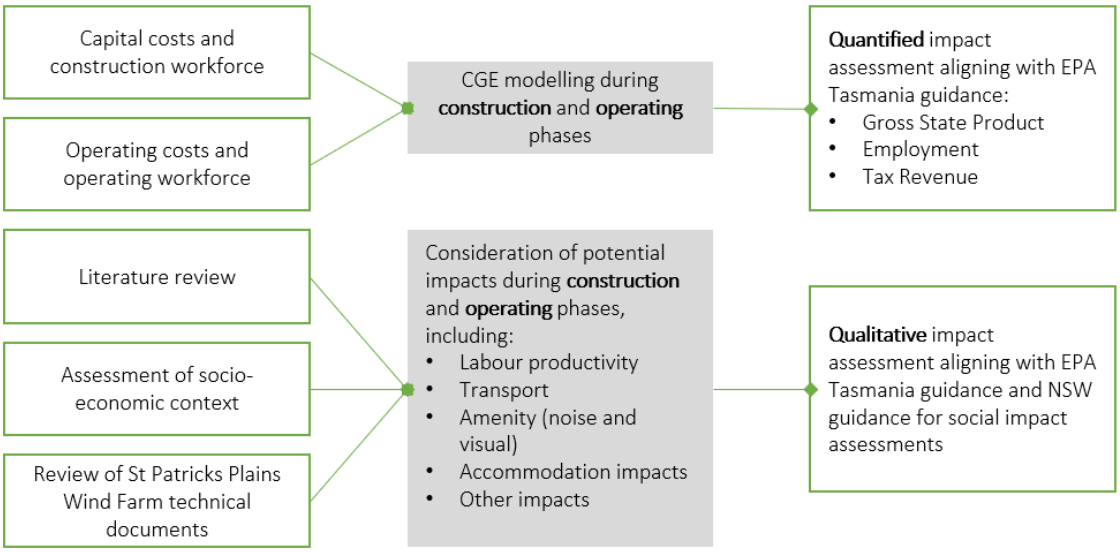
In undertaking the analysis, SGS used qualitative and quantitative assessment methods for the socio-economic assessment. SGS assessed economic and social impacts via five key steps. They were:

1. Literature review of the wind energy sector and general impacts (summarised in Section 3 and detailed in Appendix A)

2. Review the economic and policy context, including socio-economic profiling of Central Highlands and Southern Midlands local government areas (LGAs) (**Section 4**)
3. Computable General Equilibrium (CGE) modelling to understand economic impacts (findings detailed in **Section 5** of this report, and the approach to CGE modelling is provided in **Appendix B**)
4. Analysis of 127 survey responses, which were collected by Pitt & Sherry on behalf of Epuron (summarised throughout **Section 5** and detailed in **Appendix D**)
5. A review of the construction methodology and operation, and review of other technical documentation developed as part of the project.

Figure 3 provides a high-level overview of SGS's evaluation framework for the SEIA.

FIGURE 3: SOCIO-ECONOMIC IMPACT ASSESSMENT OVERVIEW



Source: SGS Economics & Planning, 2021

As shown above, the findings have been categorised into economic and social impacts for the construction and operating phases, as the impacts during these phases affect stakeholders and the economy in different ways.

2.1 Quantitative (economic) impact using CGE modelling

One of the most robust methods to quantify economic impacts is via computable general equilibrium (CGE) modelling, which models the economic interrelationships occurring between major regional industry groups and other sectors of the economy. It is the go-to method, rather than the more simplified input-output modelling, whenever a proposed development is significant in size. The basic steps in quantifying socio-economic impacts via a CGE model are:

- Isolating how the Project stimulates the regional economy (direct impacts)
- Generating a region-specific CGE econometric model. For the Project, the State of Tasmania was modelled.

- Applying the direct project stimulus (by relevant industry group) to the model and recording outputs to estimate direct and indirect regional economic impact including Gross State Product (GSP) and full time equivalent (FTE) jobs.

2.2 Qualitative impact assessment

In addition to the economic impacts, there are a range of social and other impacts of the Project which are more difficult to quantify. This may be due to the impacts being intangible (like amenity), limited data availability, small benefit derived or complexities in valuation method. The approach taken to assess impacts differs by impact type, as set out in Table 4 below. Community engagement (survey) feedback was considered for all impacts as well as external technical reports.

TABLE 4: QUALITATIVE IMPACTS

Impact item	Description and rationale for evaluation	Qualification methodology
Visual amenity impacts	Wind farms may impact views of the landscape.	The qualitative evaluation considers visual amenity impacts during construction and operation.
Noise amenity impacts	Noise impacts to nearby residents may impact on the amenity. These impacts are usually more prevalent during construction, and often minimal during operation, depending on the location of the turbines relative to residents and other users.	Synthesise the noise assessment, background noise assessment and traffic reports.
Heritage impacts	Any new development may impact on Aboriginal and European heritage, depending on the location of the wind farm relative to heritage values.	Evaluating the findings from the historic heritage report.
Community service impacts	Workers at the wind farm, especially during construction, may use community infrastructure and this may impact use by the existing community.	Qualitatively describe potential impacts to the community and mitigation methods.
Availability and affordability of housing	Workers at the wind farm, especially during construction, will need accommodation. This may impact the availability and affordability of housing for the existing community.	Potential additional housing demand by workers, relative to the existing (rental) housing stock.
Transport impacts	The wind farm will generate additional traffic to and in the study area, especially during construction. This will impact road users.	Reviewing the transport impact report.
Tourism impacts	The wind farm may impact on the tourism experience in the region.	Review survey responses and assess the significance of tourism industry and how the wind farm may affect visitation.
Labour market impacts	Large infrastructure projects like St Patricks Plains Wind Farm will likely impact the availability (and cost) of labour across the region – particularly in the construction industry.	Assess the number of jobs the wind farm creates and the number of jobs it likely creates using the local labour force.
Other impacts	Other impacts which are assessed as low or negligible include electromagnetic interference and aeronautical assessment.	Summarising the key takeaway from each respective report.

3. Literature review

A literature review was undertaken to review the main socio-economic impacts that wind farms may generate. The detailed literature review including sources is provided in Appendix A, and a summary of key findings is detailed in Table 5.

TABLE 5: LITERATURE REVIEW FINDINGS

Section	Key finding
Overview	The St Patricks Plains Wind Farm represents a significant investment in wind farm energy production in Tasmania in that it would increase the current wind farm energy production in the State by around 50 per cent.
Social impacts	– **Community attitudes:** There is broad support for renewable energy, but some proposals fail due to localised community opposition. The risk of this impact can be reduced through consultation. In particular, if residents that will potentially be in close or regular proximity to wind turbines as a result of a project are provided an explanation of the benefits (local and wider), most tend to be more receptive to such developments. – **Visual amenity:** Media analysis conducted by the CSIRO indicates the most common cited reason for adversity towards wind farms is the change to the landscape and visual amenity. However, the visual impact is subjective, with mixed viewpoints that depend on the size, scale and layout of wind farms. – **Safety:** Although there are risks associated with wind farm construction and operation (high wind areas and often remote), the wind industry safety standards have improved over the previous two decades, and the wind industry has one of the best safety records of the energy industry. – **Health (noise):** Concern over wind farms often centres around exposure to noise that in turn can result in stress, annoyance and sleep disturbance. The Victorian EPA 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. – **Health (infrasound):** Negative health effects of infrasound and low frequency noise associated with 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. – **Health (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. This impact can be modelled and therefore mitigation measures can be taken such as adjusting the position of turbines, programming turbines to stop operation at certain times of day, or screening. – **Health (air pollution):** The use of renewable energies reduces air pollution in comparison to conventional energy generation technologies such as coal. As such renewable energy developments also have a net positive effect on human health. – **Education:** Wind farm technicians help operate wind farms day-to-day. They often have a background in mechanical, electrical and engineering fields. Increasing Tasmania's renewable energy portfolio provides an opportunity for increased employment and education in this growing industry.
Economic impacts	– **Direct financial gain:** Wind farm operators pay an annual lease fee to landowners. – **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. – **Property prices**: Analysis from the UK, America and in Australia suggests that in general, the proximity of wind turbines to an area does not negatively impact surrounding house prices, however, there can be some exceptions, and the local context is particularly important. – **Tourism:** Wind farms have been shown to increase some types of tourism, however, they can detract from other types of tourism. The types of tourism within local areas needs to be considered.

4. Socio-economic baseline

This section provides baseline information of the social locality of the project. It is an initial analysis of defining characteristics of the locality including any vulnerable groups.

The section starts with a brief government policy context.

4.1 Government policy context

National government targets and policy

Australia is a signatory to the Paris Climate Agreement[2]. More recently, in October 2021, the Australian Government committed to a net zero emissions target by 2050 plan, alongside a $20 billion investment in renewable energy, primarily in new technology such as clean hydrogen and energy storage.

Renewable Energy Target

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

The RET currently operates at two scales:

- Large-scale renewable energy target (LRET). This is a financial incentive to establish and expand developments such as wind and solar farms.
- Small-scale renewable energy scheme (SRES). This is a financial incentive for installations like rooftop solar panels and air sourced heat pumps.

The LRET is of relevance to the St Patricks Plains Wind Farm.

In 2015, the Australian Government passed the *Renewable Energy (Electricity) Amendment Bill 2015* that reduced the 2020 LRET from 41,000 gigawatt-hours to 33,000 gigawatt-hours, with interim and post-2020 targets also adjusted. However, the annual LRET will remain at 33,000 gigawatt-hours until the scheme ends in 2030[3].

The Clean Energy Regulator, which oversees operation of the RET, advised that the LRET of 33,000 gigawatt-hours was met in the year to 2021. Although the LRET was achieved in 2021 and is not concluding until 2030, the St Patricks Plains Wind Farm is aligned with the intention of the RET in that it adds to the nation's renewable energy production and will contribute to reducing emissions of greenhouse gases in the electricity sector.

[2] A global accord that aims to reduce GHG emissions
[3] Australian Government, Department of Industry, Science, Energy and Resources website, accessed December 2021

National energy policy

The Australian Government's efforts to develop a national energy policy has been impeded by a lack of long-term planning and commitment to decarbonising energy production. In particular, the National Energy Guarantee (NEG), which was proposed in late 2017 as the national energy policy, was abandoned by the Australian Government in 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, with investment falling from a high of 4,500 megawatts in late 2018 to less than 800 megawatts in the first two quarters of 2019[4].

The Australian Government released the Technology Investment Roadmap in 2020, which was communicated as Australia's first low emissions technology statement. While the roadmap seeks to accelerate the development of low emissions technology, it does note that proven technologies like wind are not the focus of the Roadmap, which instead focusses on accelerating uptake of new and emerging technologies.

The St Patricks Plains Wind Farm, while not delivering on the Technology Investment Roadmap because it is a purely renewable energy project, is aligned with the Australian Government's commitment to a net zero emissions target by 2050.

Tasmanian government policy

Tasmania has an ambitious renewable energy plan. Having already met their target to be 100 per cent self-sufficient from renewable electricity, in November 2020 the Government passed legislation to generate 200 per cent of current needs from renewable energy by 2040. The State will export surplus energy to mainland Australia, as outlined in the Tasmanian Renewable Energy Action Plan. This plan includes large-scale infrastructure projects such as Project Marinus (a 1,500-megawatt electricity linkage to the mainland, as discussed below) and Battery of the Nation (improving hydropower capacity). There are many other proposed renewable energy projects in Tasmania being developed alongside the major infrastructure works mentioned. This includes many other wind farms in Tasmania which also now includes plans for offshore wind farms.

On 15 December 2020, the Australian Government and Tasmanian Government signed a bilateral energy and emissions reduction agreement that is targeted to deliver secure, reliable and affordable power for Tasmanians. To this end, Tasmania's strategy involving delivery of Marinus Link and the Battery of the Nation initiative is supported by the Australian Government. Renewable energy projects, including the St Patrick Plains Wind Farm are elementary to ensuring the hydrogen production in Tasmania will be green, rather than blue.

Major projects nearby in the region

Tasmania is preparing the development of another transmission link between Tasmania and mainland Australia. Marinus Link is a proposed 1500-megawatt capacity undersea and underground electricity connection to further link Tasmania and Victoria as part of Australia's future electricity grid.

[4] Clean Energy Council website, accessed December 2021

The increased transmission capacity may be delivered in two 750 MW developments. Marinus Link will be supported by transmission network developments on the North-West Tasmanian electricity network.

In line with this, there are a number of proposed wind farms in the pipeline. The timing and sequencing of these projects will be important with a view on labour availability, workforce capability and training. Already, Keystone Tasmania is working towards ensuring the Tasmanian construction and building industry has a suitably qualified and large enough workforce. Keystone Tasmania is funded by a levy imposed on the cost of building and construction work. It was introduced through the *Building and Construction Industry Training Fund Act 1990*. There is currently work underway to complete a new dashboard that provides projections of the expected construction and building projects and the required skills and capabilities over the next three to five years. This program is called SOFIA (Statistical Optimisation for Industry Advancement).

Tasmania's Office of the Coordinator–General highlighted the Central Highlands, Southern Midlands and Glamorgan Spring Bay in Southern Tasmania as prime locations to develop renewable energy capacity. Additionally, the Midlands is one of Tasmania's three proposed Renewable Energy Zones (REZ), with a potential of 3,400 megawatts generated within the REZ. The Midlands REZ has an existing network capacity of around 480 megawatts which includes the Cattle Hill Wind Farm which became fully operational in 2020, with a capacity of 144 megawatts and 48 turbines.

The development of the Midlands REZ is supported by the construction of the Marinus Link, with potential capacity increases and network augmentation in the region being explored[5]. The Midlands REZ has been identified as one of the best wind energy generation sites within the National Electricity Market, as well as being well suited to hydro electricity production.[6]

4.2 Socio-economic profile

A socio-economic profile of the Central Highlands and Southern Midlands Local Government Area was undertaken. These are the LGAs that are expected to be most impacted (positively and negatively) by the St Patricks Plains Wind Farm project. The wind farm will be located in the Central Highlands. Refer to Figure 2 for locational context of these LGAs.

Population change and demographic profile

The population change and demographic profile for the Central Highlands and Southern Midlands LGAs is shown in Table 6 for the years 2006, 2011 and 2016.

[5] 2020 ISP Appendix 5. Renewable Energy Zones, AEMO
[6] Australian Energy Market Operator 2020 ISP Appendix 5. Renewable Energy Zones.

TABLE 6: POPULATION CHANGE OVER TIME BY AGE GROUP AND TOTAL[7]

Age	Central Highlands				Southern Midlands			
	2006	2011	2016	Change (2006-2016)	2006	2011	2016	Change (2006-2016)
0-4 years	128	162	101	-21%	384	392	306	-20%
5-14 years	288	265	249	-14%	872	859	825	-5%
15-24 years	230	186	162	-30%	618	622	676	9%
25-64 years	1,272	1,252	1,135	-11%	3,134	3,325	3,194	2%
65 years and over	325	395	513	58%	664	866	1,039	56%
Total	**2,243**	**2,260**	**2,160**	**-4%**	**5,672**	**6,064**	**6,040**	**6%**

Source: ABS Census 2006, 2011, 2016

The population of the Central Highlands LGA at the time of the 2016 ABS Census was approximately 2,160 people. This represents a decrease of approximately 83 people over the ten years between 2006 and 2016. The population of the Central Highlands is ageing, with the 65+ cohort the only age group that increased in population between 2006 and 2016 (+58 per cent). The working age population between 25 and 64 decreased by 11 per cent over the same period. The number of youth and children decreased substantially.

The population of the Southern Midlands LGA at the time of the 2016 ABS Census was approximately 6,040 people. This represents an increase of approximately 368 people over the ten years between 2006 and 2016.

In the Southern Midlands, over the ten years between 2006 and 2016, the 65 and older cohort have increased the most as a proportion of population (+56 per cent), followed by the 15–24-year-old cohort (+nine per cent) and 24–64-year-old cohort (+two per cent), with decreases in the under 14 population. While there is an aging population like the Central Highlands, the working age population did grow slightly in the decade to 2016.

During construction there would be an influx of working age individuals in the region and during operation the wind farm would bring additional long-term jobs and working families to a region that is ageing. This would benefit the social sustainability of the community.

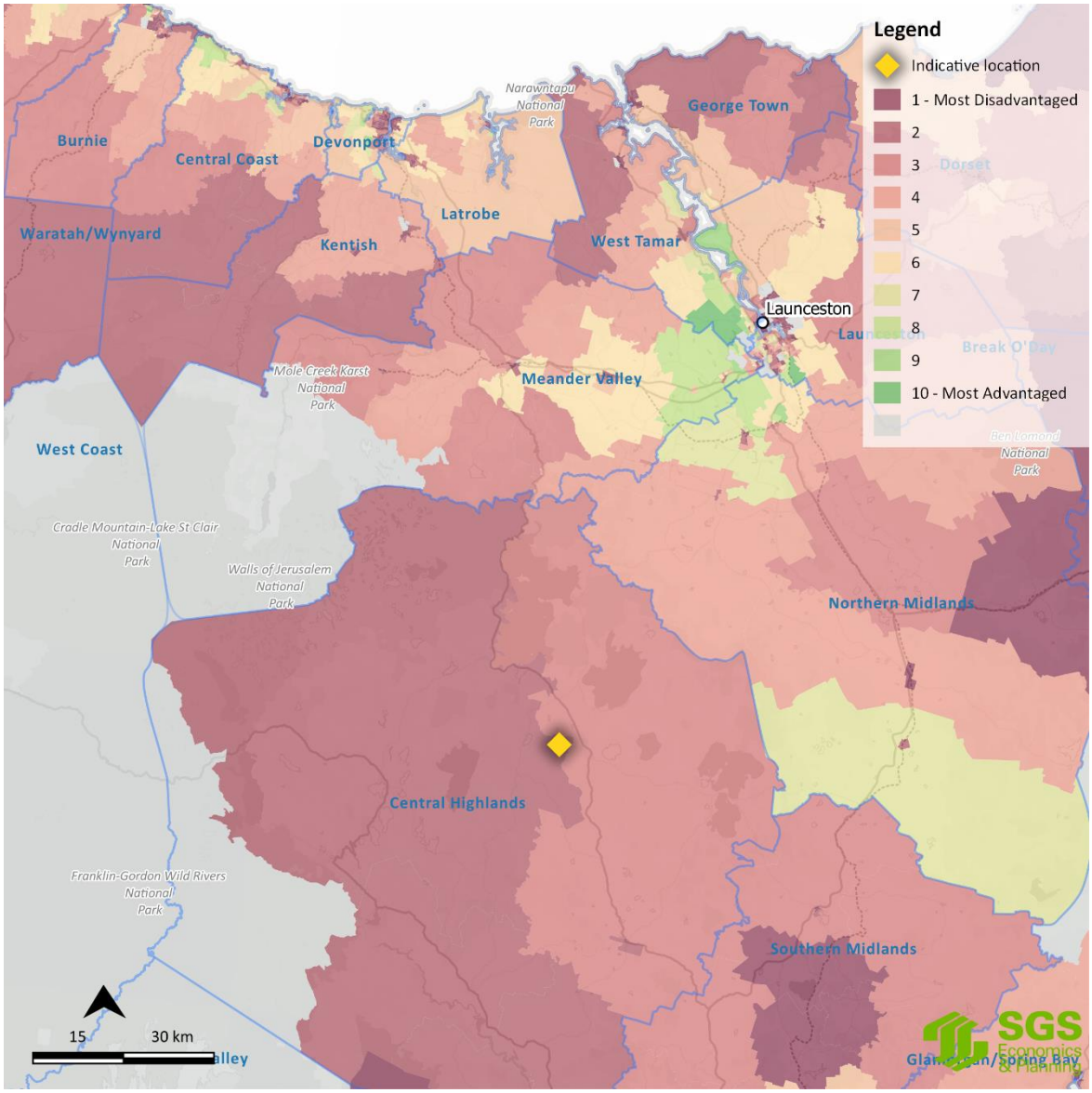
Socio-economic advantage and disadvantage

Socio-Economic Indexes for Areas (SEIFA) measures relative socio-economic advantage and disadvantage in regions. These areas are ranked using 10 deciles, from the most disadvantaged areas (bottom 10 per cent) to the most advantaged areas (top 10 per cent) for a spatial analysis of socio-economic wellbeing. Figure 4 shows the socio-economic advantage and disadvantage around the proposed wind farm site, showing the Central Highland's clear disadvantage with a SEIFA ranging from

[7] Note: There may be slight discrepancies in ABS data as small random adjustments were made to protect the confidentiality of data

the 1 to 4 deciles. The exact area of the wind farm is among the 20 to 30 per cent most socio-economically disadvantaged in Australia. This shows a need for economic stimulus and opportunity for the local community.

FIGURE 4: SOCIO-ECONOMIC ADVANTAGE AND DISADVANTAGE



Source: SGS Economics & Planning, 2021; using ABS data

Rental affordability

Housing affordability considers housing costs relative to the income of households. Whenever households pay 30 per cent of their income or more on rent or mortgage repayments, they are considered to be in a situation of housing stress. This reduces their ability to pay for other primary needs such as food, transport, heating and medical needs.

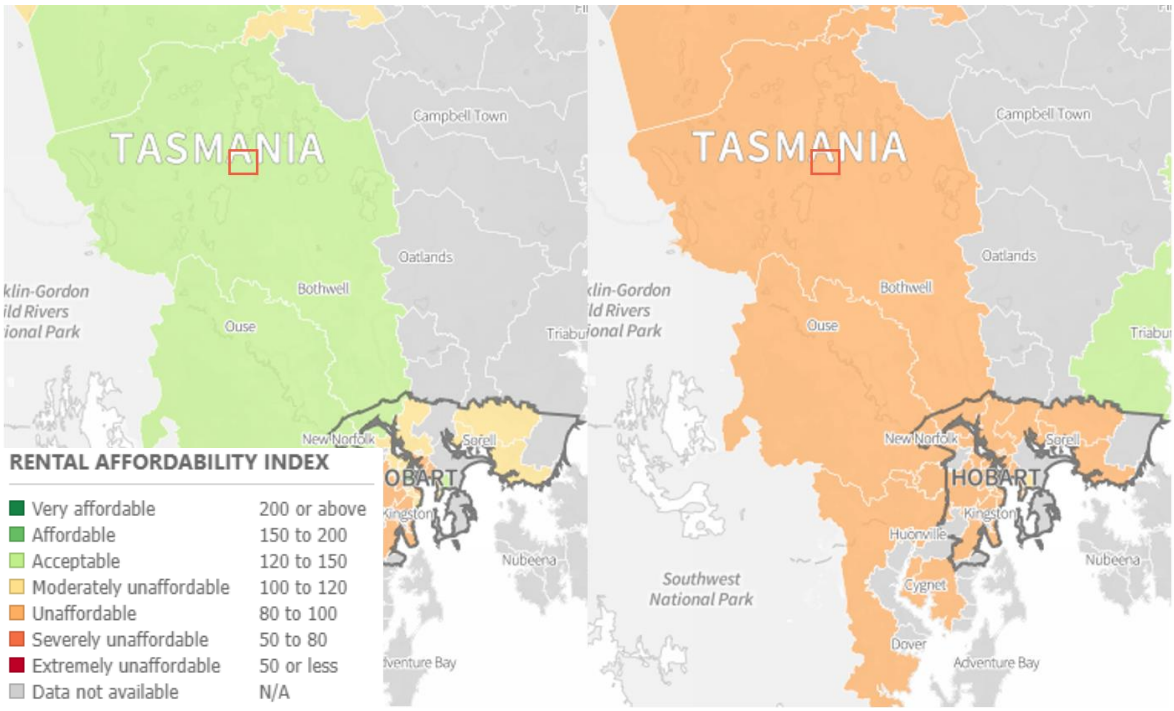
The Rental Affordability Index (RAI) is calculated using the below equation (note that qualifying income refers to the income required to pay rent where rent is 30 per cent of income):

RAI = (Income/qualifying Income)*100

Households paying 30 per cent of income on rent have a RAI score of 100, indicating these households are at the critical threshold level for housing stress.

Rental affordability in 2017 and 2021 is shown in Figure 5. The approximate project area is shown by the red rectangle. As can be seen, rental affordability within the area has changed from 'affordable' to 'unaffordable' over the four years to 2021.

FIGURE 5: RENTAL AFFORDABILITY IN 2017 (LEFT) AND CURRENT (RIGHT)



Source: SGS Economics & Planning, 2021

Around 35 per cent of households within the Central Highlands earn less than $650 per week. Rent is considered extremely unaffordable for this demographic, with a rental affordability index (RAI) score of 47. Coupled with the fact that around 22 per cent of households in the Central Highlands are renters, it is expected that more than a quarter of the population would be vulnerable to a large shock in the local housing/rental market and may be priced out of their region. Such a shock to the housing market is possible if St Patricks Plains Wind Farm workers drive up demand for rental properties within the local region.. This proved to be a temporary issue for a small number of long-term renters in Miena after the construction of Cattle Hill Wind Farm. However, the local housing market has changed since the pandemic with significant rental increases in Regional Tasmania. This means that the overall impact stemming from the construction of the St Patricks Plains Wind Farm project is uncertain.

Employment and businesses

This section outlines:

- Industry of employment by worker within the LGAs (some of these may also live within the LGAs, but it also includes those that travel from other LGAs into Central Highlands and Southern Midlands for work)
- Industry of employment by residents that live within the LGAs (some of these may also work within the LGAs, but they may also travel outside of the LGAs to work in other areas)
- Workforce participation and unemployment for the LGAs

Industry of employment by worker within the LGAs

Industry of employment by worker within Central Highlands and Southern Midlands is shown in Table 7.

TABLE 7: INDUSTRY OF EMPLOYMENT BY WORKER[8]

Industry	Central Highlands			Southern Midlands		
	2006	2016	Change (2006-2016)	2006	2016	Change (2006-2016)
Agriculture, forestry and fishing	302	294	-3%	420	331	-21%
Construction	18	31	72%	37	75	103%
Retail trade	25	26	4%	79	65	-18%
Accommodation and food services	79	78	-1%	38	48	26%
Public administration and safety	60	45	-25%	60	72	20%
Health care and social assistance	16	23	44%	61	81	33%
Education and training	37	26	-30%	111	140	26%
Manufacturing	10	20	100%	68	44	-35%
Transport, postal and warehousing	28	15	-46%	40	42	5%
Other industries[9]	70	73	4%	116	134	16%
Total	**645**	**631**	**-2%**	**1030**	**1032**	**0%**

Source: ABS Census 2006, 2016

Of the 631 jobs accounted for within the Central Highlands LGA, 47 per cent of them are in the agriculture, forestry and fishing industry, however, employment in this industry contracted by three per

[8] Note: There may be slight discrepancies in ABS data as small random adjustments were made to protect the confidentiality of data
[9] Other industries include mining; electricity, gas, water and waste services; wholesale trade; information media and telecommunications; finance and insurance services; rental, hiring and real estate; professional, scientific and technical services; administrative and support services; arts and recreation services; and other services.

cent from 2006-2016. Other large industries within the Central Highlands include the accommodation and food services industry (12 per cent of total employment) and public administration and safety industry (seven per cent of total employment). Major employers in the Central Highlands include fish farms and aquaculture among other agricultural roles.

Of the approximately 790 working residents in the Southern Midlands LGA[10], 32 per cent work in the agriculture, forestry and fishing industry; 14 per cent are in education and training, eight per cent are within the health care and social assistance industry, and seven per cent are in retail trade. The primary agricultural industry subset in the Southern Midlands is sheep and beef cattle farming.

In the Central Highlands, there were large declines in employment within the education and training, and transport, postal and warehousing industries. Meanwhile for the Southern Midlands, there were declines in agriculture, manufacturing and retail trade.

The construction and electricity, gas, water and waste services industries together account for approximately five per cent of local jobs in the Central Highlands, and seven per cent in the Southern Midlands. This suggests there are local residents with relevant industry skillsets that could be employed for the construction and operation phases of the project. However, these people were already employed (as of 2016), so their employment availability for St Patricks Plans Wind Farm is uncertain.

The St Patricks Plains Wind Farm construction workforce will consist of a peak of around 200 workers, which will significantly change the employment structure of the Central Highlands and would increase demand for industries such as accommodation and food services and retail trade. The presence of a retail trade industry with four per cent of total employment and 12 per cent for accommodation and food services in Central Highlands indicates there is a service industry that could, at least in part, support local workers with accommodation, food, retail and other service needs.

From 2006 to 2016, construction jobs increased by 72 per cent in the Central Highlands and 103 per cent in the Southern Midlands, showing the increasing opportunities in that sector for local residents, which would be further stimulated by the St Patricks Plains Wind Farm project.

Industry of employment by local resident within the LGAs

Industry of employment by local resident within Central Highlands and Southern Midlands is shown in Table 8. There is net outflow of workers from the Central Highlands, with 818 Central Highland residents with jobs compared to 631 jobs within the LGA. Since the project will provide more jobs in the region, it may result in a more neutral net flow of jobs.

[10] Using Place of Residence (PUR) data. PUR data are the jobs held by local residents in the study area boundary.

TABLE 8: INDUSTRY OF EMPLOYMENT BY RESIDENT[11]

Industry	Central Highlands			Southern Midlands		
	2006	2016	Change (2006-2016)	2006	2016	Change (2006-2016)
Agriculture, forestry and fishing	338	278	-18%	471	397	-16%
Construction	55	45	-18%	174	254	46%
Retail trade	33	53	61%	237	232	-2%
Accommodation and food services	80	72	-10%	93	127	37%
Public administration and safety	68	54	-21%	173	181	5%
Health care and social assistance	39	67	72%	206	282	37%
Education and training	40	42	5%	148	183	24%
Manufacturing	39	38	-3%	279	186	-33%
Transport, postal and warehousing	40	31	-23%	119	127	7%
Other industries[12]	57	138	142%	402	500	24%
Total	**789**	**818**	**4%**	**2302**	**2470**	**7%**

Source: ABS Census 2006, 2016

Of the approximately 790 working residents in the Central Highlands LGA, 35 per cent work in the agriculture, forestry and fishing industry, nine per cent are in accommodation and food services, eight per cent are from the health care and social assistance industry and seven per cent are in public administration and safety and retail trade, respectively. The primary agricultural industry subset in the Central Highlands is sheep and beef cattle farming.

Of the jobs held by residents of the Southern Midlands LGA, 16 per cent of them are in the agriculture, forestry and fishing industry, 11 per cent are in health care and social assistance industry, 10 per cent are in construction and nine per cent are in retail trade. Major employers include distilleries and fruit orchards.

In the Central Highlands from 2006 to 2016, there were declines in residents working in agriculture, forestry and fishing, construction, accommodation and food services and public administration and safety, while there were increases in retail trade and other industries. In the Southern Midlands, there were declines in residents working in agriculture and manufacturing while there were large increases for construction, healthcare and accommodation and food services industries.

[11] Note: There may be slight discrepancies in ABS data as small random adjustments were made to protect the confidentiality of data
[12] Other industries include mining; electricity, gas, water and waste services; wholesale trade; information media and telecommunications; finance and insurance services; rental, hiring and real estate; professional, scientific and technical services; administrative and support services; arts and recreation services; and other services.

Workforce participation and unemployment

The workforce participation and unemployment levels by local resident are shown in Table 9.

TABLE 9: WORKFORCE PARTICIPATION AND UNEMPLOYMENT OF RESIDENTS[13]

Industry	Central Highlands			Southern Midlands			Tasmania		
	2006	2016	change (2006-2016)	2006	2016	change (2006-2016)	2006	2016	change (2006-2016)
Total employed	851	825	-3%	2373	2600	10%	204,738	216,585	6%
Total unemployed	58	74	28%	162	149	-8%	14,422	16,365	13%
Not in the labour force	799	767	-4%	1,637	1,807	10%	219,160	232,950	6%
Unemployment rate	6.4%	8.2%	-	6.4%	5.4%	-	6.6%	7.0%	-
Labour force participation rate	53%	54%	-	61%	60%	-	60%	59%	-

Source: ABS Census 2006, 2016

Workforce participation and unemployment data shows that residents in the Central Highlands are facing growing unemployment (increase in unemployment rate from 6.4 per cent to 8.2 per cent), potentially as result of overall job numbers declining (total employed reduced from 851 to 825), while the opposite is true for residents in the Southern Midlands. The unemployment rate was 6.4 per cent for both LGAs in 2006. By 2016 this had decreased to 5.4 per cent in the Southern Midlands but increased to 8.2 per cent in the Central Highlands. The fulltime workforce decreased in the Central Highlands, with most unemployed people looking for fulltime work.

Compared to the labour force participation rate of 59 per cent in the rest of Tasmania in 2016, the Central Highlands has a lower participation rate of 54 per cent. Additionally, while the Central Highland's unemployment rate of 6.4 per cent was slightly lower than Tasmania's of 6.6 per cent in 2006, it has grown at a faster rate, reaching 8.2 per cent in 2016, while Tasmania's rate reached 7.0 per cent.

Workforce participation and unemployment data shows the need for more local fulltime jobs in the Central Highlands, and that the St Patricks Plains Wind Farm project could help stimulate opportunities, with an average of around 180 direct jobs throughout the construction phase.

[13] Note: There may be slight discrepancies in ABS data as small random adjustments were made to protect the confidentiality of data

5. Socio-economic impact assessment findings

5.1 Overview

This section details quantitative and qualitative impacts of the St Patricks Plains Wind Farm Project.

Quantitative impacts for the construction and operational phase are outlined in Section 5.2.

Qualitative impacts can be categorised into either construction phase impacts or operation phase impacts. Qualitative impacts discussed within the construction and operation phases are listed in Table 10, and detailed in Section 5.3 and Section 5.4, respectively.

TABLE 10: OVERVIEW OF IMPACTS

Impact	Construction phase	Operation phase
Transport impacts	✓	Not applicable or minimal impact during this phase
Labour market impacts	✓	Not applicable or minimal impact during this phase
Visual amenity impacts	✓	✓
Noise amenity impacts	✓	✓
Availability and affordability of housing/property	✓	Not applicable or minimal impact during this phase
Community services impact	✓	Not applicable or minimal impact during this phase
Tourism impacts	✓	Not applicable or minimal impact during this phase

5.2 Quantitative impacts

Capital works for St Patricks Plains Wind Farm is expected to cost around $575 million (excluding inflation and changes to foreign exchange rates), $64.4 million in real GSP in the 2-year construction period between 2023-25. During the construction phase, there will be an average of around 180 direct jobs, with an expected average of 17 direct jobs during the operational phase.

Construction of the St Patricks Plains Wind Farm project is expected to cost around $575 million and take two years. Around 14 per cent of total capital expenditure will be spent directly within Tasmania, 19 per cent will be spent in mainland Australia, and 66 per cent will be spent internationally. The high international spend is associated with high-cost pre-constructed elements such as the towers, nacelles and blades.

Direct employment impacts will be largest during the construction phase, however, there will be smaller but enduring impacts during the operation phase. Direct employment impacts are detailed below:

- Construction phase: an average of 140 construction jobs and 40 professional service jobs throughout the two-year construction period
- Operation phase: an average of 10 construction sector jobs and 7 professional service jobs each year

Detailed CGE modelling inputs of capital expenditure, operating expenditure, and construction and operation phase employment is provided in Appendix B.

CGE modelling undertaken for the St Patricks Plains Wind Farm Project examines how construction and operation works may impact the economy through upstream and downstream linkages. This CGE modelling is based on Project inputs such as expected expenditure and the location of the spend (within Tasmania, Australia or abroad) as well as expected direct jobs. The assessment traces all the flow-on production and consumption induced effects in the State economy to estimate total effects generated by the Project. For example, construction of the wind farm will require engagement of professional advisory services, bulk earth works, purchase of concrete aggregate and employment of a construction workforce; these are direct effects. These activities have supply chains and linkages to other sectors of the economy, which in turn may have their own supply chains and industry dependencies; these are indirect effects. Given the scale, complexity, and length of construction, an appreciable amount of economic activity is likely to be generated indirectly. While the CGE model captures direct and indirect effects, the outputs are reported as total values; that is, the direct and indirect outputs are not individually reported.

Marinus Link and Battery of the Nation are strategic projects that enable and drive investment in wind farms in Tasmania[14]. Any delays in the roll-out of renewable energy generation projects may adversely impact the launch and operation of the strategic projects in its early years of operation.

[14] CGE modelling describes the relationships between industry sectors and projects like Marinus are contained within sectors.

Planning and capital works associated with St Patricks Plains Wind Farm are forecast to take place between 2023 and 2025. The economic impacts of the capital investment, calculated via CGE modelling, is reported in Table 11, along with operational phase impacts for a 15-year period (2026 to 2040). This period was chosen to be conservative, which is preferential for economic impact modelling. Wind farms have an operational life of around 20-30 years[15], and so the operational phase impacts of St Patricks Plains Wind Farm may be considerably larger than those presented below.

Definitions of the elements modelled that will assist interpretation of outputs in Table 11 are below:

- Gross State Product (GSP) is a measure of value adding that occurs in an economy. It is the State equivalent of Gross Domestic Product (GDP). Broadly speaking, GSP represents the value of all goods and services produced within the State.
- Gross Value Added (GVA) is the difference between the value of output (sales) and the value of intermediate consumption (input costs such as goods, services, energy, etc) and measures the contribution of economic output. For example, to measure the GVA of a manufacturing company, you would calculate the income earned in sales, subtracted by the raw materials and labour costs.
- Household consumption is expenditure on goods and services by persons. In general, an economy wide increase in the value of goods and services consumed by people is advantageous
- Investment is the purchase of machinery, buildings and other elements for business operations. As with household consumption, increased business investment is generally considered advantageous.
- Full Time Equivalent (FTE) jobs is a unit of measurement equivalent to an individual working full time. For example, 20 people working 50 per cent of a full-time job would be equivalent to 10 FTE workers.
- State and federal government revenue accrue from a range of sources, including personal and company income tax.

Note that all values in the below table are net; that is, they include marginal losses in some industries due to structural changes to the Tasmanian economy. Dollar values are also in constant FY2022 values, and so exclude inflation.

[15] Clean Energy Council website, accessed February 2022

TABLE 11: CGE MODELLING OUTPUTS

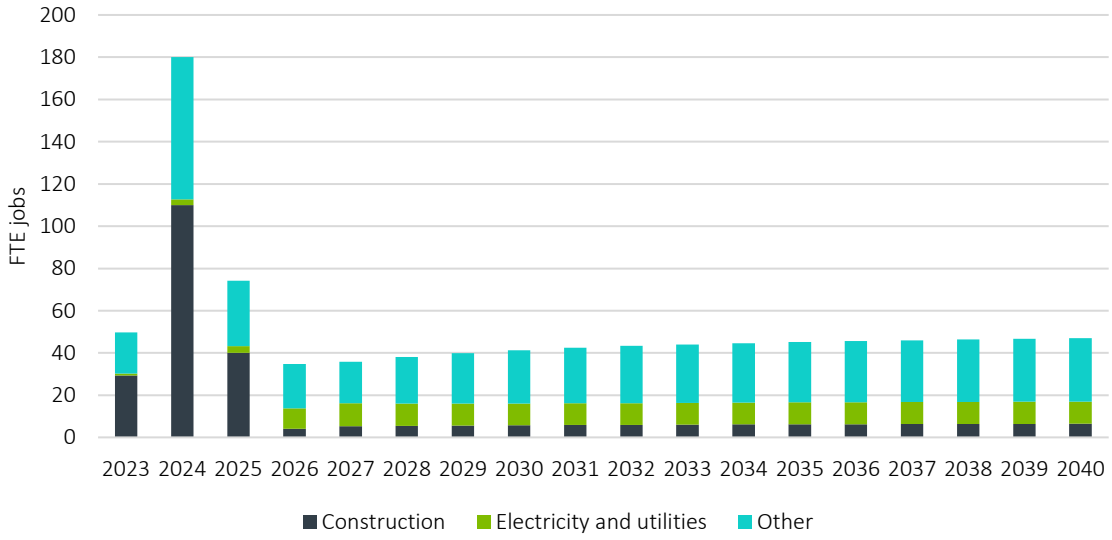
Impact	2023	2024	2025	2026-2040
Real GSP ($m)	10.1	35.3	19.0	379.1
GVA ($m)	9.0	31.2	18.1	419.8
Real household consumption ($m)	3.8	13.5	6.1	76.3
Real investment ($m)	96.1	332.9	140.9	96.0
Jobs (FTE)	50	180*	74	Av. Of 43 per year
State government revenue ($m)	20.8	73.4	31.6	71.8
Federal government revenue ($m)	6.5	22.1	9.7	9.6

Source: SGS Economics & Planning and Centre of Policy Studies, Victoria University, 2021. Note: *CGE modelling output indicated 170 jobs – this was increased to 180 as Epuron advised there would be an average of 180 direct jobs during the construction phase.

Direct and indirect job impacts

Total FTE jobs for two key industries (construction and electricity/utilities) is provided in Figure 6, along with the aggregate FTE impact of all other industries.

FIGURE 6: FTE JOBS BY INDUSTRY DURING CONSTRUCTION AND OPERATION



Source: SGS Economics & Planning and Centre of Policy Studies, Victoria University, 2021.

FTE job impacts are distinctly different between the construction phase and operating phase. Most of the employment impacts in the construction phase are within the construction industry, however, other industries also experience a net uplift in employment, mainly the manufacturing, retail trade, accommodation and food services, professional services and health care and social assistance industries as a result of the increased economic activity.

CGE modelling shows that the direct employment of 17 workers during the operational phase (10 in construction and 7 in professional services) will generate indirect employment of around 20 to 25

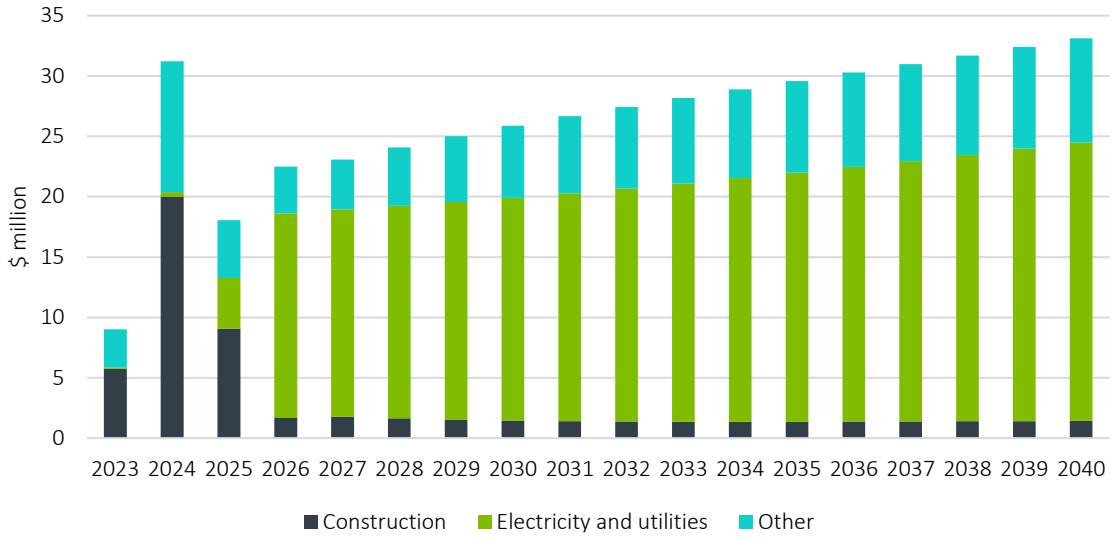
additional jobs per year from 2026 to 2040. The indirect job impacts are spread across numerous industries, but primarily in population serving industries such as accommodation and food services and retail trade.

GSP and GVA impacts

GSP is estimated to increase by around $64.4 million over the construction period. Impact peaks in 2024 with a real GSP increase of $35.3 million, driven by the greatest level of capital expenditure in this year.

Unlike GSP, which is only modelled as an aggregate figure via CGE modelling, GVA is modelled by industry. GVA by two key industries (construction and electricity/utilities) is provided in Figure 7, along with the aggregate impact of all other industries.

FIGURE 7: GVA BY INDUSTRY THROUGHOUT CONSTRUCTION AND OPERATION



Source: SGS Economics & Planning and Centre of Policy Studies, Victoria University, 2021.

GVA is modelled to sum to $58.3 million in the construction period, with most value added for the construction industry.

In the operation phase, around 70 per cent of total GVA increase will be driven by structural changes within the electricity, gas, water and waste services industry (additional jobs and investment), and five per cent in the construction industry. This structural change includes shifts in resource allocation and an increase in industry employment. Other industries driving an increase to Tasmania's GVA include financial and insurance services (adding $25 million), professional services (adding around $13 million), with wholesale trade, healthcare and social assistance and other services each adding around $9 million.

There are some other important construction related effects of the St Patricks Plains Wind Farm that need to be considered – investment in construction in Tasmania (and Australia more broadly) is currently taking place at high levels, as later discussed in the labour market impacts section. As such, availability of materials, machinery and workers is being stretched. The current demand is driving

construction related material prices and construction wages to grow at a rate higher than Australia's average consumer price index (CPI) and wage price index (WPI).

This results in a variety of impacts, such as adverse effects on export focused industries that cannot easily pass on cost increases. The agricultural, forestry and fishing industry has been modelled to experience the greatest adverse impact, with an industry specific real GVA change of around -$2.3 million between 2023 and 2040 (this is a small impact of around $100,000 per year). Mining is the only other industry that is modelled to be adversely affected during the construction phase with a small decrease of around $100,000. These impacts, which suggest some displacement of constrained resources (labour, materials, capital), are marginal within the context of broader economic uplift.

Tax revenue impacts

Owing to increased jobs and economic activity resulting from the Project, State Government and Federal Government revenue are modelled to increase throughout the construction period by around $125.8 million and $38.3 million, respectively.

5.3 Qualitative impacts during construction

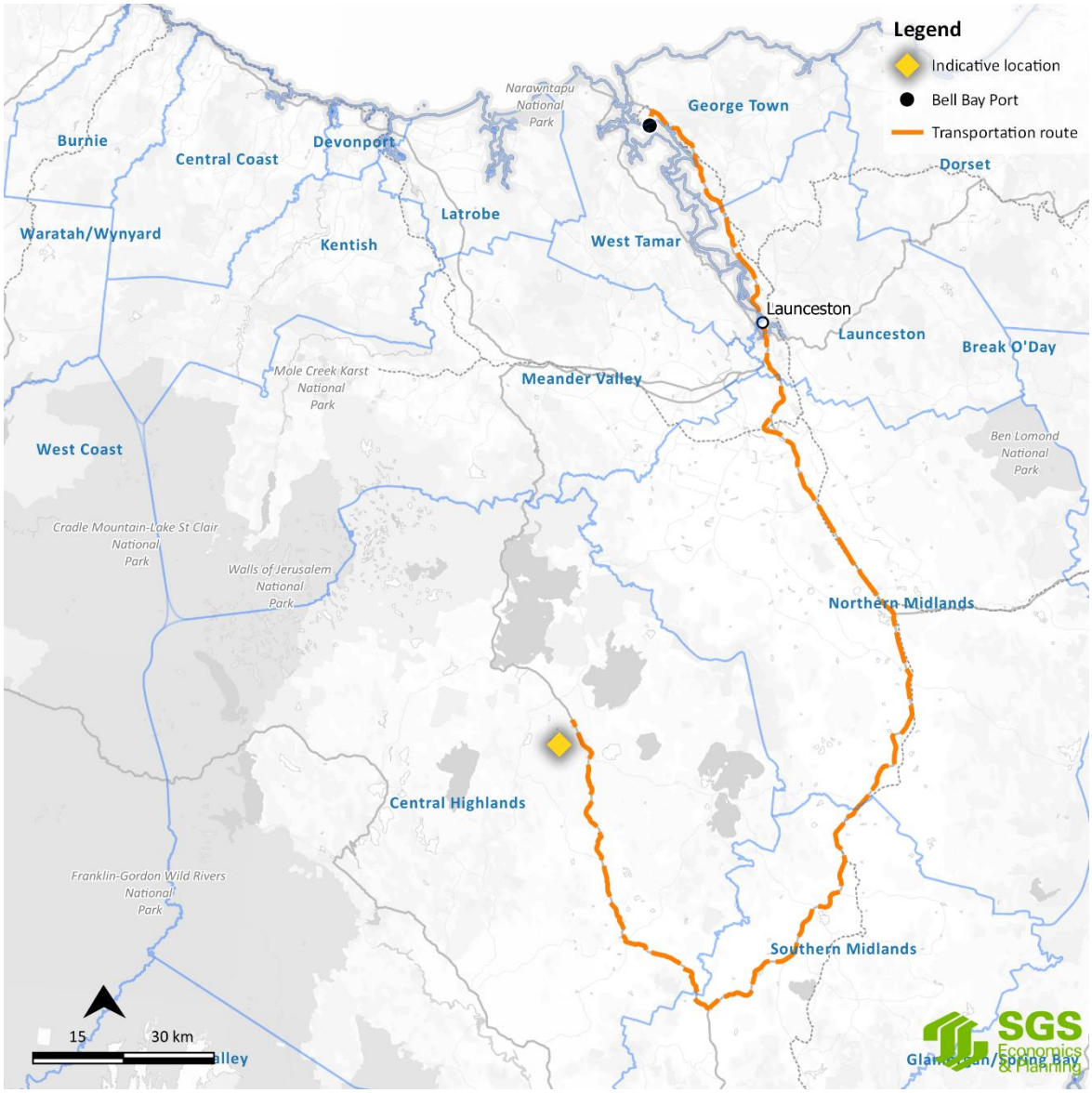
Transport impacts

Transport impacts during the construction phase are associated with additional heavy vehicle movements within the construction area, adding to congestion, as well as elevating visual, noise and air quality impacts. The analysis in this section is based on the Traffic Impact Assessment Report prepared by Hubble Traffic.

The transportation of oversized/overweight turbine components and other construction components will cause traffic disruptions and delays along the routes. Over-dimensional transport requires an escorted convoy as mandated by the Department of State Growth, with an estimated total of 325 escorted vehicle movements to transport turbine components. Each escorting trip from Bell Bay to the construction site causes approximately 5-6 minutes of delay for oncoming and following road users, which is deemed acceptable. These trips will need to be managed and planned in conjunction with Department of State Growth, as they will involve road closures and other logistical issues in addition to any other activities involving large disturbances to traffic.

The transport route for large turbine elements is shown in Figure 8.

FIGURE 8: TRANSPORT ROUTE FOR LARGE TURBINE ELEMENTS



Source: SGS Economics & Planning, 2021; based on Traffic Impact Assessment Report prepared by Hubble Consulting

The main road route used to transport large turbine elements originates at Bell Bay Port and was used successfully without adverse impacts or safety issues for Cattle Hill Wind Farm. Each of the 47 turbines have 13 oversized components that need transporting, with an estimated 325 oversized/overweight components expected to be transported on this route, which are all state highways or Department of State Growth managed roads. Significant roads on this 254-kilometre route include:

- Bell Bay Road
- East Tamar Highway
- Midland Highway
- Highland Lakes Road

There is an alternate route for overseas components expected to exceed 5.4 metres (loaded height), as outlined in Rex's Andrews Route Study.

- Bell Bay Road
- East Tamar Highway
- Midland Highway
- Highland Lakes Road

Additionally, there are vehicle trips associated with construction including machinery, supplies and employee transport, with around 15,000 trips to transport raw materials each for un-ladened and ladened heavy vehicles. Overall, Hubble Traffic predicts around 150,000 total trips generated by the project in a worst-case scenario including 120,000 local passenger trips which will significantly vary depending on the type of workers accommodation chosen. These total vehicle trips will slow average travel speeds, increase average travel times and exacerbate uncertainty relating to travel time in the local region and in the transport routes used. The impact will affect occupants of all vehicles. However, most of the trips are expected outside of peak commuter periods, and so there is minimal impact to commuter times of local residents and workers.

Survey respondents highlighted construction traffic and heavy vehicle access as one of the potential negative consequences of wind farm construction, showing the need for community engagement and further mitigation. Comments elaborated on negative and disruptive experiences from construction traffic during the development of a nearby wind farm (Cattle Hill Wind Farm), despite Hubble Traffic deeming it successful.

Mitigation methods to reduce the impact of transport outlined in the Traffic Impact Assessment Report prepared by Hubble Traffic include:

- Managing truck movements so they occur outside of peak travel periods as specified in the report, to alleviate the impact of truck movements.
    - For over-dimensional trips specifically, loads should leave Bell Bay and pass Launceston before 6:00am, thereby traveling on the Highlands Lake Road after peak morning traffic. Stops need to be timed to avoid coinciding with commuter and school bus traffic.
- Making the community aware of any potential traffic disruptions or blockages in advance
- Vehicle movements should be limited to daytime hours where possible to reduce disturbance to local residents
- Pull-over areas by the Highland Lakes Road need to be improved (including widening, adding tapers, etc) for over dimensional convoys.

Further transport impacts and mitigation opportunities are detailed in the Transport Impact Assessment Report prepared by Hubble Traffic, and precise transport impacts cannot be understood until the construction methodology is further developed.

TABLE 12: TRANSPORT IMPACTS

Stakeholder group	Duration	Impact type & direction	Approach to mitigating, managing and monitoring impact
Freight operators/other road users	Throughout construction period, although most trips are expected outside commuter periods	Low negative	Temporary closures and delays on highly used transport routes may impact freight operators. Informing them of closures/delays in advance will mitigate impacts and travelling at off-peak hours.
Residents		Medium negative	Inform local residents who live along the transport routes and near the St Patricks Plains Wind Farm site about any road disruptions in advance. Avoid closures at peak periods.
Workers		Low negative	Constructing workers accommodation with a bus commute to the worksite would reduce the traffic impact to workers and residents.

Labour market impacts

The Tasmanian Government's 2021 Workforce Action Plan highlights the disconnect between the state's ambitious infrastructure projects and the availability of local skilled workers, with a labour and skills shortage predicted. The plan highlights the need to upskill and train the Tasmanian community to stimulate the local economy and avoid bringing in temporary labour from the mainland or elsewhere.

A large-scale construction project like St Patricks Plains Wind Farm will impact Tasmania's labour market, in particular within the construction industry. There will be around 200 workers at the peak of the construction of the wind farm and an average of 180 workers. This large influx of workers will significantly alter the composition of the local labour market during the construction phase.

To minimise the adverse effects of the wind farm project on any skills shortages in Tasmania, it is important to firstly consider an optimal timing of the construction stage relative to other, already committed projects, and secondly, engage with Keystone to optimise the use of the local labour market. Keystone has the ability to liaise with the construction industry and the education and training providers.

TABLE 13: LABOUR MARKET IMPACTS

Stakeholder group	Duration	Impact type & direction	Approach to mitigating, managing and monitoring impact
Tasmanian construction workers	Throughout construction period, and to a lesser extent in the operational phase	High positive	This will be a positive impact as this project will come with more job opportunities.
Local unskilled workers/unemployed people		High positive	The impact will be positive if local upskilling programs are implemented.
Tasmanian construction industry		Medium negative	There will likely be a medium negative impact to the construction industry if this project exacerbates the worker/labour shortage. Mitigation should focus on timing of construction phases and engagement with Keystone to address any skill and capability impacts.

Visual amenity impacts

The visual impact of construction works such as the removal of vegetation, construction lay-down areas, construction sites, construction screening and additional lighting to facilitate night-time works may have adverse socio-economic impacts on residents and other stakeholders. The removal of remnant vegetation for construction will temporarily reduce screen potential of turbines and work sites until it grows back, as outlined in the Landscape and Visual Impact Analysis Report. This impact is especially relevant in the Central Highlands, which is known for its nature; visible construction works will disturb this visual amenity and disturb residents and tourists.[16]

TABLE 14: VISUAL AMENITY IMPACTS

Stakeholder group	Duration	Impact type & direction	Approach to mitigating, managing and monitoring impact
Tourists/residents	Throughout construction period	Medium negative	Reduce the amount of vegetation to be cleared.[17] Avoid particularly disruptive works during the peak holiday season.

Noise amenity impacts

Construction activities, including transport movements, have the potential to increase noise levels, which could have social impacts. Vehicles delivering material from the north will travel via the Midland Highway and Highland Lakes Road, passing residential areas and impacting noise amenity. Residences near the access roads will be especially disturbed, and the over-dimensional transport convoys will impact noise amenity. The Transport Impact Assessment Report prepared by Hubble Traffic estimated a worst-case scenario of around 150,000 total trips or almost 500 a day.

The Environmental Noise Assessment undertaken by Marshall Day Acoustics states that in addition to transport movements, construction activities will generate surface noise and vibration which will impact residents and visitors within the immediate vicinity of the construction area as well as off site. This will include a range of activities on-site such as connection infrastructure, construction of access tracks, turbine foundations and erection of the turbines. These construction activities are proposed to occur between 7am and 7pm on Mondays to Saturdays, however specific activities may be limited to certain hours in accordance with the *Tasmanian Environmental Management and Pollution Control (Noise) Regulations 2016* (EMPC).

This impact is likely to be more temporary than noise impacts of transport movements and impact less people due to the remoteness of the site.

[16] As suggested in the Landscape and Visual Impact Analysis Report
[17] As suggested in the Landscape and Visual Impact Analysis Report

TABLE 15: NOISE AMENITY IMPACTS

Stakeholder group	Duration	Impact type & direction	Approach to mitigating, managing and monitoring impact
Residents/tourists	Throughout construction period	Medium negative	Avoid night-time transport trips and contain loud construction activities to daytime hours. Follow guidelines on maximum noise levels/construction activities timing.[18]

Availability and affordability of housing

During construction, there will be a peak of approximately 200 workers and an average of 180 workers onsite at a time. This translates into approximately 100 dwellings, assuming there are 2 workers per dwelling. According to State Growth Tasmania, there are currently approximately 200 rentals being rented by resident households in the Central Highlands. Even when taking into account additional holiday house rentals in the region, the local (rental) housing stock is very limited. Relative to the local (rental) housing stock, it is unlikely these accommodation needs can be met from the existing housing stock. Without managing this impact, the already unaffordable rents would deteriorate further, and local residents may be pushed out of the market and forced to relocate. This is especially true for the substantial segment of the population that lives on a low income. It is therefore recommended to provide (temporary) worker accommodation and/or organised worker transport from elsewhere[19]. Additionally, discussion with the construction companies used by the nearby Cattle Hill Wind Farm is recommended – they housed their workforce locally with minimal long-term impacts.

There is community concern about the potential devaluation of land and housings to nearby properties stemming from the wind farm, with several survey comments expressing concerns relating to the devaluation of land and shacks in proximity to the proposed site. However, it is worth noting that the literature review highlights that analysis from the UK, America and in Australia suggests that in general, the proximity of wind turbines to an area does not negatively impact surrounding house prices (with some exceptions).[20]

TABLE 16: AVAILABILITY AND AFFORDABILITY OF HOUSING/PROPERTY

Stakeholder group	Duration	Impact type & direction	Approach to mitigating, managing and monitoring impact
Local residents who rent or are low-income	Throughout construction period	High negative	Having purpose-built workers accommodation and/or organised worker transport from elsewhere.
Property owners nearby the wind farm	In the operational stage	Low negative	Minimise visual impacts where possible as outlined in the Landscape and Visual Impact Report.

[18] As outlined in the Environmental Noise Assessment by Marshall Day Acoustics
[19] Please also consider the housing capacity at these more remote settlements.
[20] As outlined in the Environmental Noise Assessment by Marshall Day Acoustics

Community services impact

Pressure on the availability of community services to support the influx of construction workers may arise. There are limited major/emergency health care services nearby, with small clinics like Central Highlands Community Health Centre (Ouse), Doctors Surgery (Bothwell) and Central Highlands Pharmacy (Bothwell) nearby, and larger centres such as Midlands Multi-Purpose Health Centre an hour away.

5.4 Qualitative impacts during operation

Tourism impacts

Tourists are primarily attracted by the natural landscape of the Central Highlands, with many hikers, shooters, anglers and bird watchers visiting. Arthurs Lake, Penstock Lagoon and Shannon Lagoon are very well-known to anglers as some of Tasmania's best recreational fishing spots.

Tourism data available for the Central Highlands LGA from 2018, collated by Tourism Research Australia shows that there were 66,000 visitors to the Central Highlands LGA who participated in domestic overnight travel, 95,000 for domestic day travel and 7,000 international tourists. Tourism for this period resulted in $25 million of expenditure for Central Highlands. Comparatively, Tasmania earned $3,848 million of tourist spending in the same period, with total visitors increasing by 11 per cent and tourist spending increasing by 13 per cent from the previous year.

The literature review in Appendix A showed that wind farms had mixed impacts on tourism: they have been shown to increase some types of tourism, however, they detract from other types of tourism. This should be carefully monitored in the Central Highlands, as the literature review suggests that nature-based tourism such as visiting natural scenery is susceptible to be negatively impacted by wind farms.

However, the Central Highland's historical industrial importance is promoted by Tourism Tasmania, with visitors encouraged to visit power stations and learn about the legacy of the Central Highland's hydropower generation in the "Highlands Power Trail" and the "Heartlands" tour, showing that industrial infrastructure in the region is a driver of tourism.

A high proportion of surveyed stakeholders identified as shack owners and regular visitors to St Patricks Plains. Fishing was found to be the most common reason that people were drawn to the area, with many surveys indicating the prominence of fly fishing. Holidaying at shacks was another popular activity, correlating with the high proportion of stakeholders who owned a shack in the St Patricks Plains area. Other highly rated activities were primarily experiential or nature-based, such as hunting, camping, bushwalking, passive recreation and bird watching. Many comments from the survey indicated that the area's natural beauty and tranquillity were seen as important drawcards for visitation. The potential development of a wind farm in this location was viewed by many survey respondents as detracting from its aesthetic appeal and visual amenity, possibly impacting tourism. The next section will delve into a technical analysis of the visual amenity impacts.

TABLE 17: TOURISM IMPACTS

Stakeholder group	Duration	Impact type & direction	Approach to mitigating, managing and monitoring impact
Tourists	Throughout the operating period	Low-medium negative	Continue with the "Heartlands" and "Highlands Power Trail" theme of tourism in the Central Highlands, and integrate the wind farm into the historical industrial narrative of the Central Highlands.

Visual amenity impacts

The area of highest concern for surveyed stakeholders was the visual impact of the proposed wind farm, with 100 out of 125 respondents noting its potential for negative impacts upon the character of the landscape.

As outlined in the Landscape and Visual Impact Analysis Report, the Central Highlands Interim Planning Scheme 2015 (Scheme 18) does not specifically mention landscape or scenic amenity protection and does not use the Scenic Landscape code apart from briefly mentioning in the Planning Scheme Objectives in clause 3.0.6 Natural Environment: Regional Objectives: "one desired outcome is to recognise and protect the significant values of the region including its scenery"[21]. The area around St Patricks Wind Farm (the Central Plateau) is considered as having a low-moderate scenic quality.

TABLE 18: VISUAL IMPACTS FOR KEY STAKEHOLDERS

Settlements/areas near St Patricks	Number of turbine blade tips visible (maximum)	Stakeholder impacted	Level of impact
Arthurs Lake	Up to 30	Tourists (primarily anglers) and shack owners/visitors	Low-moderate
Flintstone	1-10	4 permanent residents, shack owners/visitors	Low-moderate
Morass Bay	1-10	4 permanent residents, shack owners/visitors	Low-moderate
Miena	Unseen	87 permanent residents	Low-moderate
Penstock Lagoon (Eastern shore)	<10 and up to 50 (depending on location of Shack)	Tourists (primarily anglers)	Moderate
Shannon settlement	Up to 50	Shack owners/visitors (note: Shannon has 0 permanent residents)	Low
Steppes Hall Historic Site	Up to 50 tips, up to 30-48 hubs (theoretically, in the absence of vegetation)	Tourists	Moderate
Wilburville	1-10	16 permanent residents and shack owners/visitors	Low-moderate

Source: Landscape and Visual Impact Analysis Report, Inspiring Place, October 2021. Notes: 50 turbines is the unmitigated number, final number is 47. Visibility numbers presume absence of current tree coverage screening views.

[21] For further information, refer to the Landscape and Visual Impact Analysis Report

According to the Landscape and Visual Impact Analysis Report, the turbines would be most visible within a five-kilometre radius from the Highland Lakes Road, along Waddamana Road and Poatina Road, the historical heritage buildings of Steppes Homestead and the Steppes Hall, the residences at Shannon and from Penstock Lagoon. Additionally, some turbines will be visible from nearby recreational sites including boat ramps, campgrounds and recreational fishing lakes and tourist routes. Table 18 gives an overview of the wind farms visibility in nearby settlements, with a map of visibility in Appendix C. Steppes Hall Historic site is the only location which had a high-moderate level of scenic concern (with the rest being low or moderate) as it is a heritage site highlighting the historical remoteness of the homestead settlement, the effect of which could be diminished by the wind turbines. However, it is acknowledged that the site has a relatively low number of visitors, and one of the mitigation responses outlined in the Landscape and Visual Impact Analysis report was to remove 3 turbines nearest to the road in the vicinity of Steppes homestead and hall and reduce the height of the turbines to 230 metres to maintain the areas visual amenity. This mitigation recommendation was implemented, lowering the visual impact at Steppes Hall to moderate. A further turbine was relocated further from the road to mitigate visual impact.

From over 20 kilometres away, it is unlikely that an entire tower could be seen with lower portions of the towers screened by adjacent vegetation or landform, and by distance. In addition, the visual amenity impact of the wind farm will change intermittently as there are nearby private timber reserves, meaning when logging occurs, the screening value of the trees/vegetation is eliminated or diminished before regrowth occurs.

There is already significant built infrastructure in the region. In addition to the newly built Cattle Hill Wind Farm nearby, there is prominent hydro-electricity infrastructure in the area, with the lakes acting as storage for electricity generation and transmission lines visible from some properties and roads. Establishing the wind farm near existing infrastructure mitigates the overall impact, by reducing the need for additional transmission cables. As mentioned earlier, this infrastructure is highlighted for tourists visiting. Other mitigation methods already implemented include placing the turbines on flat ground and avoiding night lighting.

Overall, the magnitude of impact is assessed as low to moderate depending on the location in which its viewed, with a few road locations assessed as moderate to high impact. The overall impact of the proposed wind farm has been mitigated through acceptance of the suggestions at 9.2.1 of the Landscape and Visual Impact Analysis Report, removing three turbines and relocating a fourth, lowering all the impacts to low-moderate.

Further suggested mitigation includes:

- Minimising clearing of native vegetation and developing a vegetation rehabilitation plan
- Locating operational buildings in existing disturbed areas
- Using a semi-matt finish on turbine towers, nacelles and blades to reduce glint
- Including measure in the construction contract to protect existing vegetation and to minimise disturbance[22]
- Potentially reducing the height of another 20 turbines to reduce visual impact.

[22] Further information is available in the Landscape and Visual Impact Analysis Report

It is worth noting that the information from the Landscape and Visual Impact Analysis Report investigates the previous plan featuring 50 turbines (and prior to that, 67 turbines). Thus, the visual impact would now be slightly lower, as the number of turbines has been revised down to 47 and some of the turbines have been repositioned, in acceptance of the mitigation recommended from this report.

TABLE 19: VISUAL IMPACTS

Stakeholder group	Duration	Impact type & direction	Approach to mitigating, managing and monitoring impact
Tourists	Throughout the operating period	Low-medium negative	Minimise clearing vegetation and consider adjusting the positions of the turbines and heights of the turbines.[23]
Residents	Throughout the operating period	Low-medium negative	

Noise amenity impacts

Noise was seen as a key area of concern to the survey respondents.

- The St Patricks Plains Wind Farm Environmental and Background Noise Assessment reports by Marshall Day Acoustics found that with 47 turbines, the environmental and background noise level was in accordance and compliant with NZS 6808, as referenced in the Tasmanian EPA publication Noise Measurement Procedures Manual (even when taking into account the noise generated by the nearby Cattle Hill Wind Farm).
- If the wind farm is approved for development, the noise modelling should be redone with the final wind farm design and technical specifications, as required by the standard. The Environmental Noise Assessment concludes that the site is predicted to be compliant, with no mitigation required.

TABLE 20: NOISE IMPACTS

Stakeholder group	Duration	Impact type & direction	Approach to mitigating, managing and monitoring impact
Residents	Throughout the operating period	Low-medium negative	As required, noise modelling will be undertaken based on the final Project design

Transport impacts

- The Transport Impact Assessment Report estimates that operation of St Patricks Plains Wind Farm will have a minimal impact on the local network. This will hold true for day-to-day operations; however, any significant renewal works that require transportation of large turbine elements via over dimensional vehicles will need to be planned out as per the construction phase. This will be a

[23] Further information is available in the Landscape and Visual Impact Analysis Report

minor impact given that renewal works requiring delivery of large turbine elements will be infrequent or non-existent.

- Internal access roads within the St Patrick Plains Wind Farm site used for maintenance and operations will be an estimated 47 kilometres long, with 32.5 kilometres of new roads. The roads will be around six metres wide, with the road network linking turbine locations to the substation, switch yard, and operations building.

Other impacts

- Heritage impacts
  - The Historic Heritage Assessment Report by Cultural Heritage Management Australia included a heritage management plan, notably for Steppes Hall which was within the boundary of the study area. Since Steppes Hall is one kilometre from any turbine and 500 metres away from any new road infrastructure, there are no threats. The report included an unanticipated discovery plan in case of a find. Many survey respondents highlighted potential Indigenous issues arising from the proposal as an issue, noting the important Indigenous connections to place and the cultural heritage significance of the landscape.
  - The Aboriginal heritage report found two new isolated Aboriginal artefacts within the site, and these are to be avoided if possible. There is low potential for undetected Aboriginal sites to be present across the proposed Project footprint.
- Electromagnetic interference impact
  - According to the Electromagnetic Interference Study by WSP, there will be limited electromagnetic disturbance. Radar and meteorological services did not find adverse impacts and are to be informed of any planned shutdowns or variations to St Patricks Plains Wind Farm in advance. The site is in an area of marginal to no television coverage, a ground survey of TV signal strength is recommended prior to construction to determine if there has been any interference from the wind farm. Mitigation options are recommended to address any impacts if they occur from the wind farm.
- Aeronautical impact
  - The Aeronaturical Impact Assessment by Landrum & Brown Worldwide finds that the wind farm does not have adverse impacts on aeronautical activities. In fact, it may be useful as it provides a prominent visual navigation feature. It will likely not require obstacle lighting at night as it is located far enough away from aerodromes.

6. Conclusion

The three most significant negative impacts during the construction stage are:

- Potential skills and workers shortages in the construction industry
- The availability and affordability of housing
- Traffic and transport impacts on the local road network.

It is recommended to optimise the timing of the construction stage and engage with Keystone to manage workforce impacts. It is highly recommended to provide for (temporary) workers accommodation and to manage traffic impacts where possible.

The greatest positive impacts and opportunities during construction and during operation are:

- Economic benefits in terms of FTE jobs added and GVA, as informed by CGE modelling
- Improved local employment opportunities
- The ability to attract and retain working age households in the region which is otherwise ageing at a rapid pace.

The region has high levels of socio-economic disadvantage, which the abovementioned benefits could help reduce.

A key community concern exists around the visual impacts of the wind farm during operation. It is recommended to continue to monitor community concerns.

It is recommended to set up an annual community fund to offset some of the ongoing adverse impacts and to support the viability of the local community[24]. It is understood this is proposed by Epuron.

Key findings and opportunities are presented within the context of EPA Tasmania's socio-economic impact assessment guidance in Table 21. EPA Tasmania guidance was adopted as the framework for evaluating socio-economic impacts, in the absence of legislated socio-economic criteria.

[24] Further information on the plans for the Community Fund can be found in Appendix E.

TABLE 21: KEY FINDINGS OF SOCIO-ECONOMIC ISSUES AS PER EPA FRAMEWORK

SEIA requirement	Key finding and opportunities
An estimate of total capital investment for the proposal and where that capital will be expended.	Construction of the St Patricks Plains Wind Farm Project is expected to cost around $575 million and take two years. Around 14 per cent of total capital expenditure will be spent directly within Tasmania, 19 per cent will be spent in mainland Australia, and 66 per cent will be spent internationally. The high international spend is associated with high cost constructed elements such as the towers, nacelles and blades.
Operational expenditures and revenues.	Operational expenditure in 2026-2040 is expected to result in $379.1 million in real GSP and $419.8 million in GVA.
The impacts on local and State labour markets for both the construction and operational phases of the proposal. The number and nature of direct and indirect jobs arising from the proposal must be detailed. Skills and training opportunities should also be discussed.	There will be an average of 180 direct jobs and 98 indirect jobs in the construction phase, with 17 jobs expected in the operational phase. To address the labour/skills shortages in Tasmania and to positively impact the local community, upskilling and training programs for the local community around Bothwell and Hamilton should be considered, to train them for in-demand jobs in both the construction and operational phases.
The impacts on upstream/downstream industries, both locally and for the State.	Direct and indirect economic impacts have been evaluated via CGE modelling, and are reflected via changes to real GSP, which is estimated to increase by around $64.4 million over the construction period. Impact peaks in 2024 with a real GSP increase of $35.3 million, driven by the greatest level of capital expenditure in this year. Meanwhile, GVA is modelled to be $58.3 million in the construction period. Around 63 per cent of total GVA increase will be driven by structural changes within the electricity, gas, water & waste services industry (changes to sector employment and investment), and 12 per cent in the construction industry. Other key industries driving an increase to Tasmania's GSP include financial and insurance services (adding $25 million), professional services (adding around $13 million), with wholesale trade, healthcare and social assistance and other services each adding around $9 million.
The extent to which raw materials, equipment, goods and services will be sourced locally.	14 per cent of total capital expenditure will be spent directly within Tasmania, amounting to $80 million. As mentioned in the skills and training section, there is opportunity to implement an upskilling program for the local community to encourage and prioritise local employment.
A qualitative assessment of impacts on local social amenity and community infrastructure, including recreational, cultural, health and sporting facilities and services. Any proposals to enhance or provide additional community services or facilities should be described.	Epuron will establish a Community Fund to support community initiatives in the local area, aligning with the Clean Energy Council's Best Practice Charter for Community Developments. The fund aims to engage with the local community and share the benefits of the wind farm and could involve supporting community initiatives, event sponsorship, promoting tourism, or improving local sporting facilities and local infrastructure. Epuron proposes to finance $3,000 (indexed) per turbine installed, which for a 47-turbine wind farm would provide upwards of $141,000 annually into the St Patricks Plains Wind Farm Community Fund, amounting to over $3.5 million over 25 years. An annual contribution of $10,000 (indexed) is earmarked specifically for the upkeep of the Steppes

SEIA requirement	Key finding and opportunities
	Hall (a local community centre), in addition to other initiatives proposed by the local community.
Community demographic impacts (changes to cultural background, occupation, incomes).	During the 2-year construction period, there will be an influx on construction workers who will be of working age and mainly male, which will alter the demographic makeup of the local area, whose working age population has been declining. It will likely temporarily raise the average income. There will be 17 ongoing jobs in the operational period which will slightly shift demographics by bringing a number of working age individuals or families into the locality.
Impacts on land values, and demand for land and housing.	The exact impact on land/property values near the wind farm site is uncertain, especially given the rise in house prices in regional Tasmania following the pandemic. The literature review suggests that in general, the proximity of wind turbines to an area does not negatively impact surrounding house prices. The demand for houses may increase depending on the type of worker accommodation used during the construction period, with local rents expected to rise if worker accommodation relied on renting existing rentals and holiday houses.
Impacts on the local, regional, state and national economies.	14 per cent of total capital expenditure will be spent directly within Tasmania, amounting to $80 million. A further 19 per cent of total capital expenditure will be spent directly within Australia, amounting to $108 million.
Any publicly funded subsidies or services to be relied upon for the construction or operation of the proposal.	Unknown.
Any impacts on Local, State and Federal Government rate, taxation and royalty revenues.	Owing to increased jobs and economic activity, State Government and Federal Government revenue are modelled to increase throughout the construction period, by around $125.8 million and $38.3 million, respectively.

Appendix A: 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.

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 GW in 1997 to 735 GW in 2021[25]. Today, wind energy contributes around 10 per cent of global electricity demand.

In Australia, a public poll conducted by The Australia Institute indicated 84 per cent of people rank wind energy in the top three preferred sources to meet Australia's future energy needs[26].

The Australia Institute 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 produce in general for climate change and for health outcomes[27].

Wind energy provides about 36 per cent of Australia's clean energy. Wind energy generated power is slightly higher in Tasmania than Australia as a proportion of overall electricity demand, at around 12 percent of total energy production in Tasmania, compared to 10 percent for the Australian average. [28]

Operational wind farms in Tasmania include:

- Granville Harbour Wind Farm (112 MW)
- Musselroe Wind Farm (168 MW)
- Cattle Hill Wind Farm (144 MW)
- Bluff Point Wind Farm (65 MW)
- Studland Bay Wind Farm (75 MW)

These wind farms sum to around 564 MW of wind farm power generating capacity in Tasmania. St Patricks Plains Wind Farm would add an additional output of up to 300 MW of electricity in Tasmania, an increase of around 53 per cent.

25 International Renewable Energy Agency (IRENA), 2019, 'Wind Energy'; Global Wind Energy Council
26 The Australia Institute, 2014, Wind Energy, Climate and Health
27 The Australia Institute, 2014, Wind Energy, Climate and Health
28 Clean Energy Council, 2021, 'Wind'

Social impacts

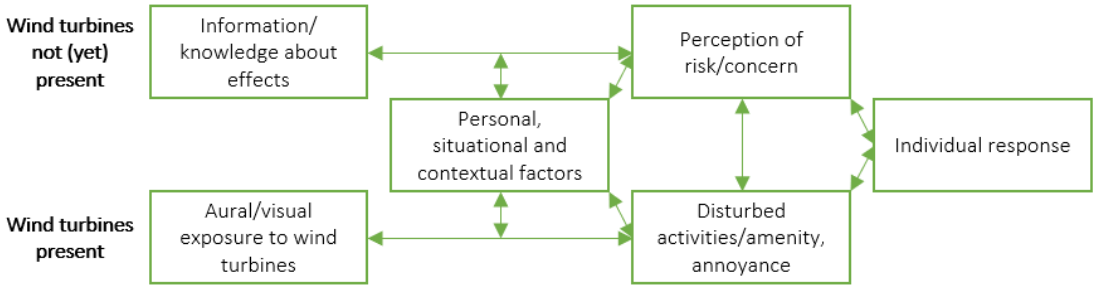
Community attitudes

While there may be broad support for renewable energy, the Centre for Sustainable Energy UK highlights that 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 of 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[29].

Figure 9 demonstrates the extent to which personal characteristics, situational and contextual factors (including particular aspects around decision-making processes) have a bearing on perceived individual impact of wind turbines beyond the impact itself.

FIGURE 9: COMPLEX RELATIONSHIP BETWEEN EXPOSURE TO WIND TURBINES AND PERSONAL RESPONSE



Source: SGS Economics & Planning, based on Kamp & Berg, 2018

The Centre for Sustainable Energy UK 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[30].

[29] Centre for Sustainable Energy UK, 2017, 'Public acceptance and community engagement', Common concerns about wind power
[30] Centre for Sustainable Energy UK, 2017, 'Public acceptance and community engagement', Common concerns about wind power

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[31]. 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 number of potential 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[32].

Despite the above, the Centre for Sustainable Energy UK highlights that in the last two decades as the industry has grown, safety standards have become more robust for turbine design. In general, they note that the wind energy industry has one of the best safety records of the energy industry[33]. Further, the mortality rate per unit electricity generated has decreased three orders of magnitude since the first commercial expansion of the industry in the 1980s.

Human health

Noise

Concern over wind farms often centres around exposure to noise that in turn can result in stress, annoyance and sleep disturbance[34]. Wind farms can produce a range of sounds depending on: the type of turbine used, the distance of the listener to the turbine, the landscape, time of day and weather conditions. Generally, an intermittent 'swoosh' can be heard within 300 metres of a turbine, but sound frequencies may vary, so generalisations cannot be made. Wind farms produce more sound when wind speeds are higher, but increased wind speeds regardless of the presence of a wind farm can also make other environmental sounds louder as well[35].

The Environmental Protection Authority (EPA) in Victoria states perception and reaction to sound can be subjective and that sensitivity to noise depends on physiology (natural hearing ability); psychology

[31] CSIRO, 2012, Exploring community acceptance of rural wind farms in Australia: a snapshot
[32] Laborers' Health & Safety Fund of North America, 2016, 'Wind farms present unique challenges and hazards
[33] Centre for Sustainable Energy UK, 2017, 'Public acceptance and community engagement', Common concerns about wind power
[34] Howlett, 2019, Wind Power: Australia's Wind Resources
[35] Environmental Protection Authority Victoria, 'Wind farms, sound and health'

(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. The EPA 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[36].

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 UK 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[37].

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[38].

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.

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[39].

[36] Environmental Protection Authority Victoria, 'Wind farms, sound and health'
[37] Centre for Sustainable Energy, 2017, 'Infrasound, wind turbine syndrome and other health concerns
[38] Centre for Sustainable Energy, 2017, 'Infrasound, wind turbine syndrome and other health concerns
[39] Centre for Sustainable Energy, 2017, 'Shadow flicker and epilepsy risk'

Shadow flicker can be predicted, therefore mitigation measures can be taken with wind farm developments such as adjusting the position of particular 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[40]. Some government authorities have also adopted guidelines to limit exposure to shadow flicker.

Air pollution

The use of renewable energies reduces air pollution in comparison to conventional energy generation technologies such as coal. As such renewable energy developments also have a positive effect on human health.

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.

[40] Centre for Sustainable Energy, 2017, 'Shadow flicker and epilepsy risk'

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 amount of land on the property. The wind farm owner will then pay rent to the farmer for use of the land[41]. Interviews conducted by the CSIRO exploring community attitudes to rural wind farms in Australia indicated financial gains/rental income for hosting turbines could help to:

- '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 fewer animals on the farm which puts less pressure on the land)
- Prevent subdivision of large land parcels, and
- Support local business, community initiatives and local government revenue[42.]

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 lower for long-term operation.[43]

[41] US Office of Energy Efficiency & Renewable Energy, 2020, Advantages and Challenges of Wind Energy
[42] CSIRO, 2012, Exploring community acceptance of rural wind farms in Australia: a snapshot
[43] CSIRO, 2012, Exploring community acceptance of rural wind farms in Australia: a snapshot

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.[44]

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 than 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 community fund contributions 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, much of which is retained within the local economy due to localised spending.

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.[45]

The Centre for Sustainable Energy UK states property owners may 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[46].

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[47].

Reduced air pollution

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 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

[44] Australian Bureau of Statistics. 2018, 631.0 - Employment in Renewable Energy Activities, Australia, 2017-18
[45] Centre for Sustainable Energy UK, 2017, 'Wind turbines and property prices', Common concerns about wind power
[46] Centre for Sustainable Energy UK, 2017, 'Wind turbines and property prices', Common concerns about wind power
[47] CSIRO, 2012, Exploring community acceptance of rural wind farms in Australia: a snapshot

evaluating the spatial distribution of air pollution reductions, emission reductions were considered to take place inside as well as outside the region.[48]

Tourism

Studies suggest there is a mixed response from local stakeholders in relation to nearby wind farms. 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. 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' for reaching renewable energy targets, wind farm impacts on communities should be minimised on an ongoing basis[49].

[48] 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
[49] CSIRO, 2012, Exploring community acceptance of rural wind farms in Australia: a snapshot

Appendix B: CGE model used to quantify benefits and CGE model inputs

CGE model overview

The Victoria University Regional Model (VURM) is a CGE model of Australia's six states and two territories. It is regularly used to analyse economic policies, including changes in taxes, tariffs, environmental regulations and competition policy. VURM is a bottom-up model, meaning that it treats the economies of regions as economies in their own right, with region-specific industries, region-specific households, region-specific prices, etc. The core CGE equations tend to be neo-classical in spirit, often assuming cost-minimising behaviour by producers, average-cost pricing, and household demands based on optimising behaviour. However, VURM also has the ability to make allowance for non-market clearing (price adjustment), imperfect competition and non-price influences of demand.

VURM's database has three parts:

- Tables of transaction values, showing, for example, the value of imported oil used by the Victorian petroleum refining industry. Usually, the database is presented as an input-output table or as a social accounting matrix. In either case, it covers the whole economy of a region, and distinguishes several sectors, commodities, primary factors and types of households. Sectoral coverage ranges from relatively simple representations of capital, labour and intermediates to highly-detailed representations of specific sub-sectors.
- Values for dimensionless parameters that capture behavioural responses. Examples of such parameters include: interstate and international export demand elasticities, which specify by how much export volumes might fall if export prices went up; interstate and international import demand elasticities, which show whether products of different regions are close substitutes; and income elasticities of demand, which show how household demands respond to income changes.
- Values for miscellaneous items associated with the government's fiscal accounts (taxes and other items of revenue and expenditure) of each jurisdiction; and with the Australian economy's external balance of payments (exports, imports, foreign capital transfers, etc.)

VURM is dynamic and can explicitly trace each variable through time—often at annual intervals. This makes VURM more challenging to construct and solve— it requires for instance that future changes are predicted for all exogenous variables, not just those affected by a possible policy change. The dynamic elements may arise from partial adjustment processes or from stock/flow accumulation relations: between capital stocks and investment, and between foreign debt and trade deficits.

CGE model inputs

Fundamental to modelling economic impacts effectively is developing appropriate inputs. SGS worked with ERA Planning & Environment and Epuron to develop and confirm CGE modelling inputs. The inputs are detailed below.

TABLE 22: CONSTRUCTION COST (ITEMISED BREAKDOWN BY CONSTRUCTION YEAR)

Cost element	Construction year 1	Construction year 2	Total
WTG (Nacelle, towers and Blades) - salaries	$2,240,761	$746,920	$2,987,681
WTG (Nacelle, towers and Blades) - other costs	$221,835,314	$73,945,105	$295,780,419
Transport - salaries	$0	$0	$0
Transport - other costs	$50,859,506	$16,953,169	$67,812,675
Electrical BoP - salaries	$884,626	$884,626	$1,769,253
Electrical BoP - other costs	$28,602,922	$28,602,922	$57,205,843
Civil BoP - salaries	$3,302,155	$1,100,718	$4,402,874
Civil BoP - other costs	$62,740,948	$20,913,650	$83,654,597
Crane & Installation - salaries	$699,374	$2,098,121	$2,797,495
Crane & Installation - other costs	$13,288,101	$39,864,304	$53,152,405
SCADA - salaries	$0	$0	$0
SCADA - other costs	$0	$600,368	$600,368
Road and power alterations	$3,500,000	$0	$3,500,000
Total	**$387,953,707**	**$185,709,903**	**$573,663,610**

TABLE 23: CONSTRUCTION COST (ITEMISED SPEND BY REGION)

Cost element	% spend in Tasmania	% spend in main land Australia	% spend internationally
WTG (Nacelle, towers and Blades) - salaries	10%	90%	0%
WTG (Nacelle, towers and Blades) - other costs	0%	0%	100%
Transport - salaries	0%	0%	100%
Transport - other costs	25%	10%	65%
Electrical BoP - salaries	40%	60%	0%
Electrical BoP - other costs	30%	50%	20%
Civil BoP - salaries	40%	60%	0%
Civil BoP - other costs	30%	50%	20%
Crane & Installation - salaries	40%	60%	0%
Crane & Installation - other costs	30%	50%	20%
SCADA - salaries	0%	0%	100%
SCADA - other costs	0%	0%	100%
Road and power alterations	100%	0%	100%

TABLE 24: JOBS DURING THE CONSTRUCTION PERIOD

Jobs by sector	Construction period
Construction sector jobs (Tas workforce)	130
Construction sector jobs (Aus workforce)	10
Construction sector jobs (total)	140
Professional service jobs (Tas workforce)	30
Professional service jobs (Aus workforce)	10
Professional service jobs (total)	40
Total jobs	180[50]

[50] Average of 180 jobs, peak of 200 jobs

TABLE 25: ANNUAL OPERATING COSTS (ITEMISED SPEND BY REGION)

Cost element	% spend in Tasmania	% spend in main land Australia	% spend internationally
Total operating cost	35%	55%	10%

Appendix C: Visual analysis

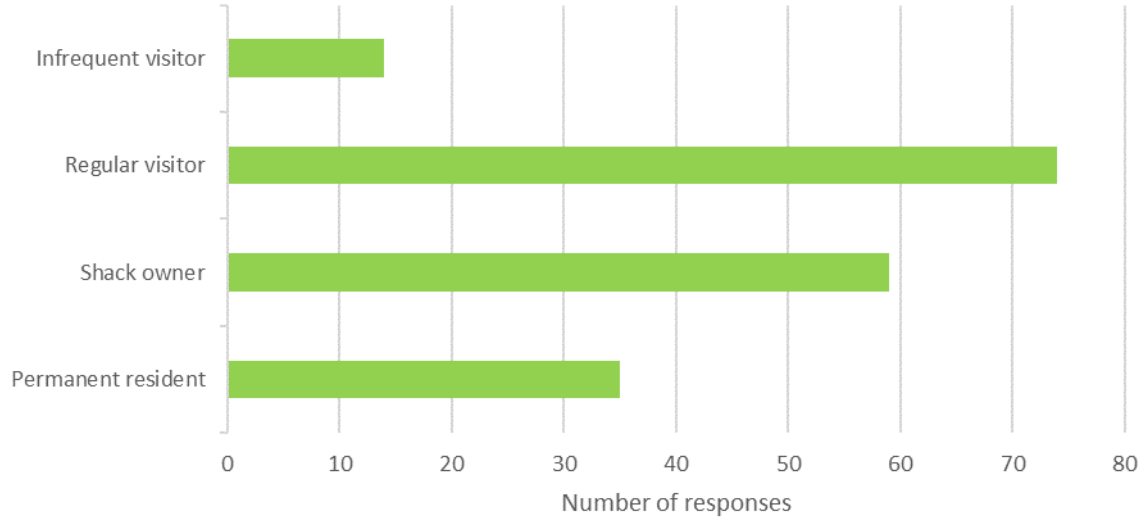
Source: St Patricks Plains Wind Farm- Landscape and Visual Impact Analysis

Appendix D: Detailed survey results

Community consultation was done by Pitt & Sherry for Epuron in the form of survey questions to the key stakeholders outlined in Figure 10. They distributed them throughout the community, to the general public in local stores and specifically to people who were previously nominated as a stakeholder. Over 100 survey responses were from individual members of the community, business operators and organisations, such as the No Turbine Action Group (NTAG), fishing and hunting groups. These responses are synthesized and discussed in the later section.

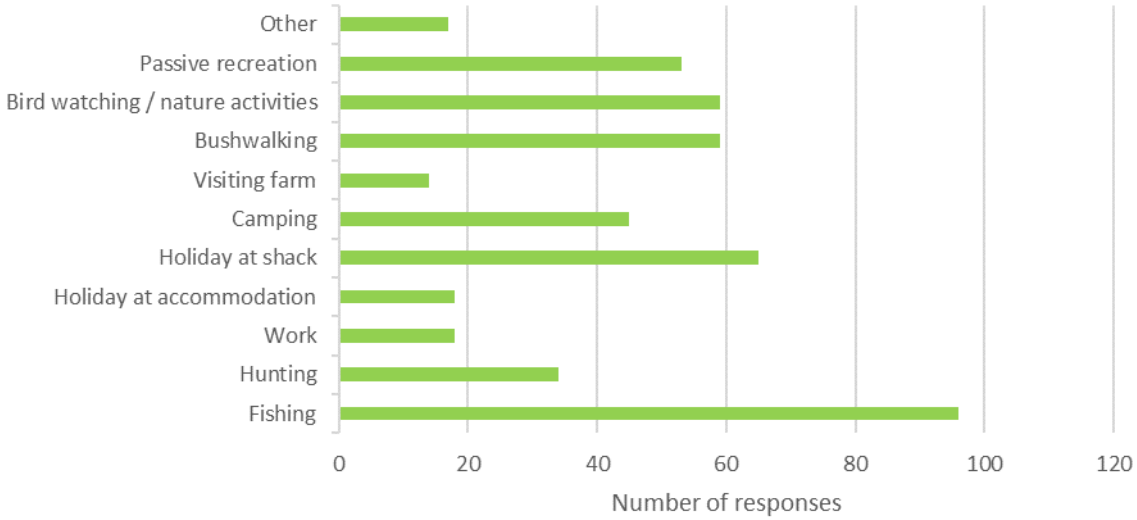
Stakeholder Profiles

FIGURE 10: STAKEHOLDER TYPE



A large proportion of surveyed stakeholders identified as shack owners and regular visitors to the area. There was only a small amount of infrequent visitors recorded in the survey, which implies that the stakeholder consultation comprised a range of people who spent a decent amount of time within the area, or had vested interests in it. The relatively high number of property owners could correlate with survey responses demonstrating concern about the effects of the proposed wind farm on their property values or lifestyles.

FIGURE 11: REASONS FOR VISITING

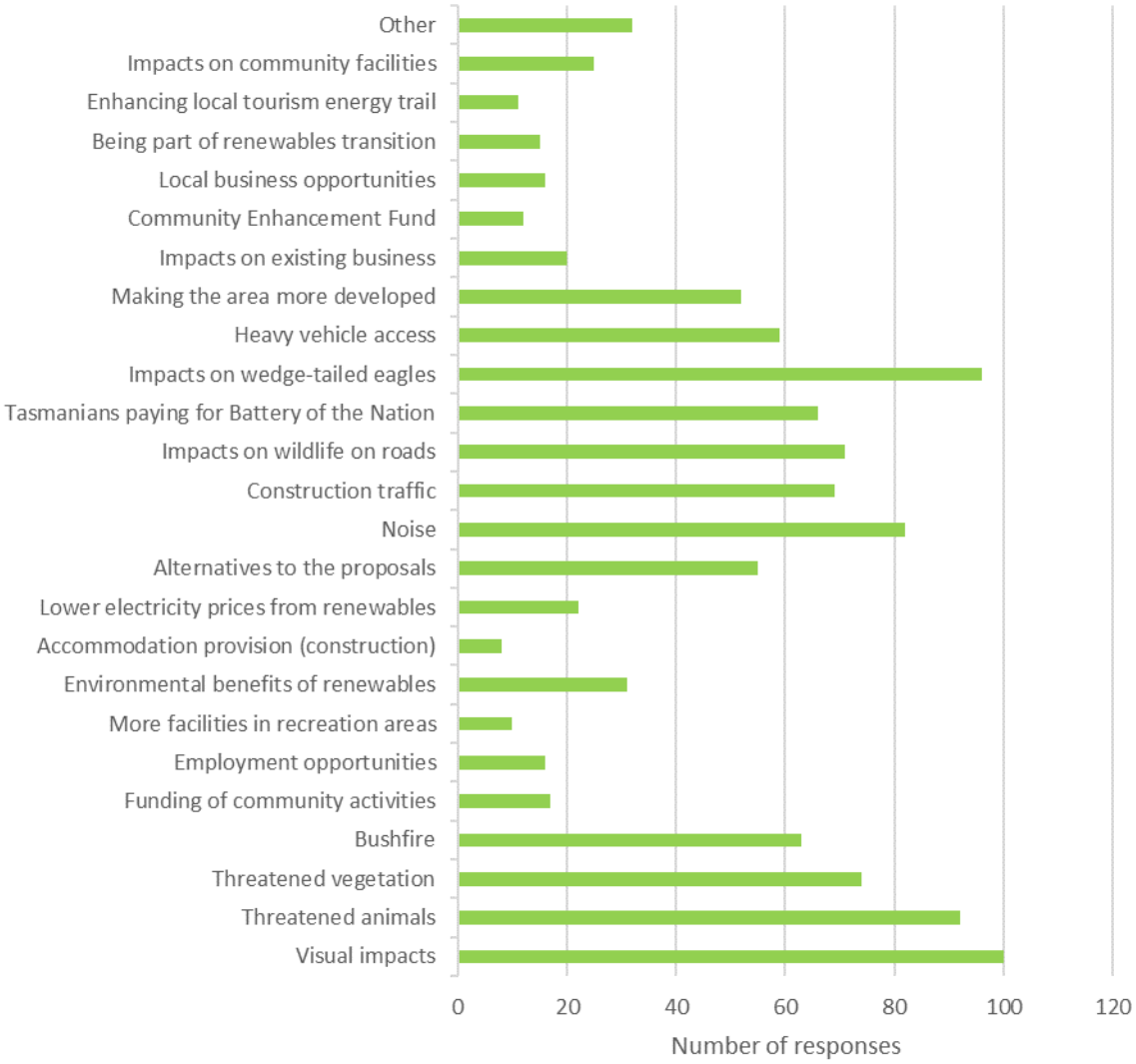


Fishing is shown to be the most common reason people visit the area, with many indicating that the area was well-known for its fly fishing. Holidaying at shacks was also rated as a popular activity, correlating with the high proportion of stakeholders who owned a shack in the St Patricks Plains area. The next highest rated activities were found to be experiential or nature-based, and included hunting, camping, bushwalking, passive recreation and bird watching or other nature-based activities.

The least frequently recorded responses related to working, visiting family and holidaying at accommodation. This could indicate that the region is not as well known for its local employment opportunities. It could also demonstrate that a large proportion of visitors are more intimately connected to the area, electing to either camp in nature or reside in their own property (shacks) instead of rented or temporary accommodation.

Key Survey Findings

FIGURE 12: AREAS OF INTEREST / CONCERN



The area of highest concern for surveyed stakeholders was the visual impact of the proposed wind farm. 100 out of 125 respondents saw the views of the turbines and towers as a disruptor to the character of the landscape. Other key concerns are linked to wildlife protection issues, with 96 out of 125 stakeholders citing threats to wedge-tailed eagles as a specific concern.

Noise and making the area more developed were also seen as key areas of concern, which alongside visual impacts, were perceived to disrupt the serene beauty of the landscape. These elements of natural beauty and tranquility were seen by many stakeholders as playing a major role in encouraging high levels of visitation to the areas. It was indicated in survey responses that the development of the wind farm might detract from this, possibly diminishing the areas appeal and its tourist base.

Construction traffic and heavy vehicle access were also seen as negative consequences of wind farm construction. Comments elaborated on negative and disruptive experiences from construction traffic during the development of a nearby wind farm.

Opportunities relating to funding for Council and community activities (such as the Community Enhancement Fund), employment opportunities, benefits to local businesses, and more facilities in recreational areas were not commonly accepted by survey respondents. Several comments indicated that they supported the development of the wind farm, if it meant they were able to gain employment. Other commenters expressed disbelief and skepticism that the wind farm development would provide any of the above criteria for locals, feeding into concerns of Tasmania paying for the Battery of the Nation which would benefit the mainland without posing any direct risks or impacts.

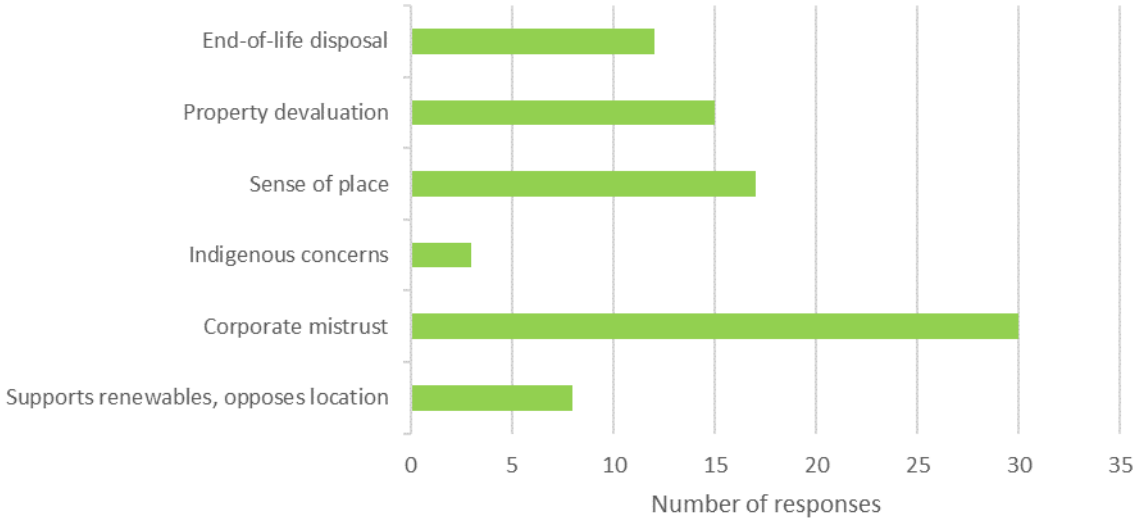
55 of 125 respondents indicated in the survey that they were interested in alternatives to the proposal, whether that be the relocation of the proposal to a different site, or potentially another form of renewable energy generation. Solar and hydro were commonly mentioned alternatives.

Key themes emerging from comments

86 per cent of respondents' comments indicated that they opposed the proposition of the wind farm, with only 14 per cent voicing support.

The comments also provided some additional areas of concern, as outlined in Figure 13.

FIGURE 13: ADDITIONAL THEMES FROM COMMENTS



Support for renewables in general was indicated in the comments, however these respondents also indicated that they thought the proposed location was inappropriate. Several indicated alternative local areas for implementation of the wind farm which could potentially lessen negative impacts upon natural heritage and landscape views, although others simply made it clear that they did not want the development in their backyard.

This could be linked to the relative resistance to Tasmania paying for the 'Battery of the Nation', which approximately half of respondents (66 out of 125) noted as a key area of interest or concern. Many

comments specified that they were opposed to the idea of wind farms having negative impacts on them personally, whilst providing benefits to mainland Australians who would not suffer from any of the negatives.

These fears of Tasmanian locals and wildlife paying the price for something which they perceived would not benefit locals in return feeds into the sense of corporate mistrust, which was the most frequent additional recurring theme noted in the comments. Respondents were dissatisfied with the way in which Epuron had handled community consultations and did not think there was a lot of transparency involved in the overall process. Many respondents noted that Epuron was planning to on-sell the wind farm and expressed concerns that off-shore investors would be greatly benefitted from the profits of the wind farm, and would not have any interests in the social, economic, cultural, environmental or aesthetic context or disruptions that occurred at St Patricks Plains.

Corporate mistrust can also be linked to the end-of-life disposal of the wind farm and its materials. Many comments highlighted the relatively short lifespan of wind farms and were concerned about the waste and emissions caused by the clean-up and disposal of these structures. Commonly associated with this is the incidence of Epuron selling on the wind farm. Several commenters expressed concerns that off-shore investors would abandon the project once its timeframe had completed, leaving locals to deal with a 'white elephant' on their own.

Many of the comments also described concerns in relation to the devaluation of shacks and land in proximity to the proposed site. This can be correlated with the relatively high incidence of shack owners who participated in the stakeholder consultation.

The disruptions to sense of place, can be related to fears from a majority of surveyed stakeholders around the negative visual impacts that the wind farm might have upon the landscape. However, this criteria goes beyond purely aesthetic concerns and is tied to the intrinsic local identity imbued within the landscape, and the feelings that it evokes within residents and visitors.

A few of the comments noted that they were concerned about Indigenous issues resulting from the construction and development of the proposed wind farm. They noted the important Indigenous connections to place, and the cultural heritage significance of the landscape, which they felt had not been adequately addressed.

Appendix E: Community Fund

Epuron has plans to establish a Community Fund to support community initiatives in the local area, aligning with the Clean Energy Council's Best Practice Charter for Community Developments. The fund aims to engage with the local community and share the benefits of the wind farm and could involve grant funding of such things as local community initiatives, event sponsorship, promoting tourism, or improving local sporting facilities and local infrastructure. Epuron proposes to contribute $3,000 (indexed) per turbine installed, or, for a 47-wind turbine wind farm, over $141,000 annually into the St Patricks Plains Wind Farm Community Fund. This amounts to more than $3.5 million over 25 years. An annual contribution of $10,000 (indexed) is earmarked specifically for the upkeep of the Steppes Hall (a local community centre), in addition to other initiatives proposed by the local community.

So far, community suggestions proposed for the fund include:

- Provision of health services
- Purchase of local fire truck
- New facilities for anglers
- Support for heritage places and projects
- Education scholarships
- Environmental projects
- Benefits for local sporting or recreation clubs

The survey shows that only 13.6 per cent of respondents consider the funding proposed for Council and community activities (such as the Community Enhancement Fund) as an area of interest. This indicates low awareness of the Community Enhancement Fund. There is an opportunity to increase community support through additional community engagement and consultation.

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