



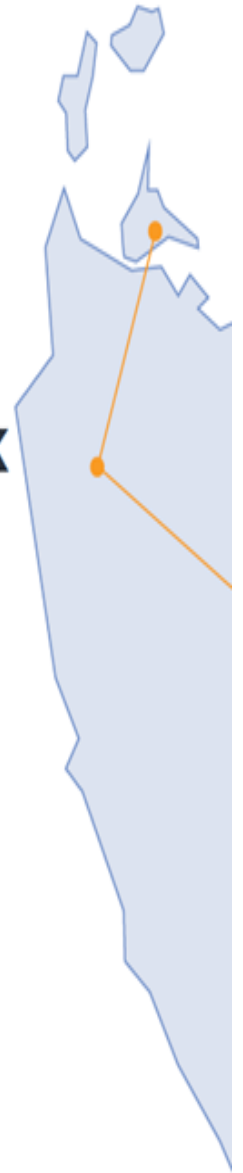
Jim's Plain & Robbins Island
Renewable Energy Parks

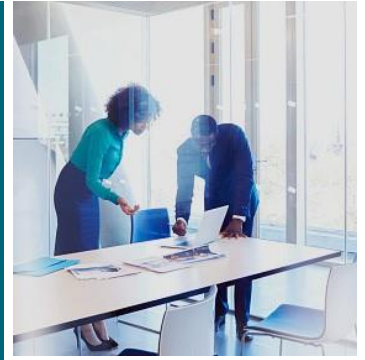
Robbins Island Renewable Energy Park

Appendix CC

Economic Impact Assessment

UPC Robbins Island Pty Ltd





Economic Impact Assessment of the Robbins Island Renewable Energy Park

UPC Robbins Island Pty Ltd

06 October 2020

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1. Introduction

1.1 Project Background

GHD was engaged by UPC Robbins Island Pty Ltd to complete an economic impact assessment of the construction and operational impacts on the proposed Robbins Island windfarm in Tasmania.

1.2 Project Overview

This report assesses the economic impact of the Robbins Island Renewable Energy Parks on the Tasmanian economy. The Robbins Island Renewable Energy Park is a wind farm proposal that involves installing between 74 - 122 WTGs on Robbins Island in north-west Tasmania, each with a generating capacity of between 5 MW – 12 MW, dependant on the final WTG model selected for the Project. The total power generating capacity of the Project will be up to 900 MW.

In addition to the WTGs, the Project includes the following major infrastructure components:

- Electrical infrastructure including multiple substations, a network of underground cables connecting the WTGs to the substations, underground cables from the substations, and multiple transmission conduits through the bridge connecting the Project to mainland transmission infrastructure (forming a separate project).
- A network of roads across Robbins Island for construction and operational use. This will involve both the upgrade of existing tracks on the island and the construction of new roads. Roads will be of a width and grade suitable for accommodating large semi-trailers and oversized construction machinery. The Project also includes the upgrade of Robbins Island Road on mainland Tasmania.
- A bridge over Robbins Passage to enable vehicle access between Robbins Island and mainland Tasmania. This will be a piled structure with on ramps on either side of the passage to maintain the hydrodynamic regime and allow recreational boat access through the navigable sections of Robbins Passage.
- A wharf to avoid the use of the public road network for oversize WTG equipment and other materials and equipment delivery during the construction phase. The wharf will be located on the east coast of Robbins Island.
- A Maintenance and Services (MAS) facility, wash-down bays and meteorological masts.

1.3 Scope of Works

The purpose of this report is to identify the projected direct and indirect economic impact on the Tasmanian economy from the proposed Robbins Island Renewable Energy Park development. The direct and indirect impacts will be identified for both the construction and operational phase for the three projects. The economic impacts for the construction and operational phases of the three projects have been reported in:

- Gross value add
- Full time equivalent employment
- Wages and salaries

1.4 Glossary of Terms

The following table outlines a list of abbreviations used in this report and their meaning.

Abbreviations	Definition
ABS	Australian Bureau of Statistics
ANZSIC	Australia and New Zealand Standard Industrial Classification
FTE	Full Time Equivalent
GVA	Gross Value Add
IO	Input-Output

1.5 Disclaimer

This report: has been prepared by GHD for UPC Robbins Island Pty Ltd and may only be used and relied on by UPC Robbins Island Pty Ltd for the purpose agreed between GHD and UPC Robbins Island Pty Ltd as set out in section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than UPC Robbins Island Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer sections 2 and 3.1 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by UPC Robbins Island Pty Ltd and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

2. Assessment Approach

The following section outlines the method used in developing the economic impact assessment. The key assumptions used in developing the construction and operational impacts are outlined.

2.1 Input-Output Analysis Methodology

Estimates of economic change associated with the Project are calculated using input output modelling software on REMPLAN. Input-Output (IO) assessments identify inter-industry relationships of industries within an economy, identifying which purchases by one industry go into producing an output for another industry. IO analysis identifies the direct and indirect (flow-on) impacts of one industry on other industries and the economy. IO modelling can therefore be used to assess the economic impact of an industry on the overall economy and how much the economy relies on the identified industry. IO modelling can also be used to examine a change in final demand of any one industry and the resultant change in activity of its supporting industries. The impacts are measured through:

- **Direct impacts**, which are the first round of effects from direct operational expenditure on goods and services.
- **Flow-on impacts**, the second and subsequent round effects of the increased level of purchases by suppliers in response to increased sales. Flow-on impacts are disaggregated to:
 - **Supply chain effects (type I)**, which represent the production induced support activity as a result of additional expenditure on goods and services, and subsequent round effects of increased purchases by suppliers in response to increased sales.
 - **Consumption effects (Type II)**, which represent the consumption induced activity from additional household expenditure on goods and services resulting from additional wages and salaries being paid within the economy.

The effects can be identified through the examination of four key measures:

- **Output:** The total value of all goods and services produced within the year (the final value of the good/service). This measure results in an overestimate of the economic contribution as it results in double counting of goods/services throughout the supply chain.
- **Value Add:** The value of output after deducting the cost of goods and services inputs in the production process.
- **Incomes:** Level of wages and salaries paid to employees in each industry.
- **Employment:** Level of employment supported by the industry, expressed as full time equivalent (FTE) positions.

2.2 Input-Output Model Limitations

It is recognised that economic multipliers are based on limited assumptions that can result in multipliers being a biased estimator of the benefits or costs of a project. Shortcomings and limitations of multipliers for economic impact analysis include:

- **Lack of supply-side constraints:** The most significant limitation of economic impact analysis using multipliers is the implicit assumption that the economy has no supply-side constraints. That is, it is assumed that extra output can be produced in one area without taking resources away from other activities, thus overstating economic impacts. The actual impact is likely to be dependent on the extent to which the economy is operating at or near capacity.
- **Fixed prices:** Constraints on the availability of inputs, such as skilled labour, require prices to act as a rationing device. In assessments using multipliers, where factors of production are assumed to be limitless, this rationing response is assumed not to occur. Prices are assumed to be unaffected by policy and any crowding out effects are not captured. In summary, IO modelling assumes that prices remain fixed and do not change as a result of the increased demand for a good or service.
- **Fixed ratios for intermediate inputs and production:** Economic impact analysis using multipliers implicitly assumes that there is a fixed input structure in each industry and fixed ratios for production. As such, impact analysis using multipliers can be seen to describe average effects, not marginal effects. For example, increased demand for a product is assumed to imply an equal increase in production for that product. In reality, however, it may be more efficient to increase imports or divert some exports to local consumption rather than increasing local production by the full amount.
- **No allowance for purchasers' marginal responses to change:** Economic impact analysis using multipliers assumes that households consume goods and services in exact proportions to their initial budget shares. For example, the household budget share of some goods might increase as household income increases. This equally applies to industrial consumption of intermediate inputs and factors of production.
- **Absence of budget constraints:** Assessments of economic impacts using multipliers that consider consumption induced effects (type two multipliers) implicitly assume that household and government consumption is not subject to budget constraints.
- **Not applicable for small regions:** Multipliers that have been calculated from the national input output table are not appropriate for use in economic impact analysis of projects in small regions. For small regions multipliers tend to be smaller than national multipliers since their inter-industry linkages are normally relatively shallow. Inter-industry linkages tend to be shallow in small regions since they usually do not have the capacity to produce the wide range of goods used for inputs and consumption, instead importing a large proportion of these goods from other regions.

3. Robbins Island Renewable Energy Park

3.1 Model Assumptions

The following section outlines the processes and assumptions used to develop the inputs and drivers for the Robbins Island Renewable Energy Park’s construction and operational impacts. When the economic analysis was undertaken, the proposed construction schedule was based on a start-up in 2021 and completion in 2025. As of June 2021, this is now more likely to be a start-up in 2023 and completion in 2027. However, this does not change the analysis to a significant extent.

3.1.1 Construction Impacts

Construction costs for the Robbins Island Renewable Energy Park have been made available by UPC Robbins Island Pty Ltd. Construction is separated over two phases, with the first phase having capacity for 350 MW and then stage two bringing the total capacity up to 900 MW. Construction costs estimates for these two stages are¹:

- Stage 1 – total construction cost of \$650 million
- Stage 2 – total construction cost of \$550 million

Construction of stage one is scheduled to commence mid-2021², with a construction period of two and a half years (construction completed by the end of 2023). Construction for stage two is scheduled to commence at the beginning of 2024 with a total construction period of two years (construction completed by the end of 2025).

Based on the quarterly construction periods, GHD has made an assumption around the construction cost profile, and applied an s-curve to construction costs. The annual construction cost estimates for Robbins Island stage one and two are outlined in the table below.

Table 1 Annual Construction Cost Estimates – Robbins Island (\$M, 2018 estimates)

Capex (\$M)	2021	2022	2023	2024	2025
Stage 1	\$97.5	\$325.0	\$227.5	\$0.0	\$0.0
Stage 2	\$0.0	\$0.0	\$0.0	\$330.0	\$220.0

Quarterly Construction cost estimates for Robbins Island are available in **Appendix A**.

A high level breakdown of these construction costs by cost component have been provided by UPC Robbins Island Pty Ltd Australia. The high-level breakdown of costs were identified as:

- Wind turbine generator costs (including turbine components, shipping, port fees and handling, labour costs etc.) – 65% of total capital expenditure
- Civil Balance of Plant (including roads, wharf, bridge, quarrying, cement, steel, fuel supply, labour etc.) – 20% of total capital expenditure

¹ Construction costs are subject to change. Construction costs represented in this assessment are indicative only.

² Subject to project approvals.

- Electrical Balance of Plant (trenching, cable, transformers, labour etc.) – 15% of capital expenditure

Taking into consideration these cost components, benchmarked construction cost splits for other windfarm projects were then used to aid in the allocation of the capital costs to corresponding cost items. These benchmarked construction cost items are outlined in the table below.

Table 2 Benchmarked Capital Cost Distribution and Relevant ANZSIC Classifications for Robbins Island Renewable Energy Park

Project Cost Splits	Split of Costs	ANZSIC Classification
PM / Design and Overheads	10%	
<i>Project Management</i>	70%	<i>Professional, Scientific and Technical Services</i>
<i>Design Costs</i>	30%	<i>Professional, Scientific and Technical Services</i>
Clearing / Access	5%	
Land clearing	30%	<i>Construction Services</i>
Access and port construction	70%	<i>Heavy and Civil Engineering Construction</i>
Turbine Foundations	10%	
<i>Concrete and other construction material costs</i>	25%	<i>Non-Metallic Mineral Product Manufacturing</i>
<i>Heavy civil construction costs</i>	50%	<i>Heavy and Civil Engineering Construction</i>
<i>Transportation costs</i>	25%	<i>Road Transport</i>
Turbine Costs	65%	
<i>Heavy civil installation costs</i>	40%	<i>Heavy and Civil Engineering Construction</i>
<i>Material costs</i>	60%	<i>N/A – Turbines assumed to be manufactured overseas</i>
Electrical	10%	
<i>Electrical installation and electrical services</i>	100%	<i>Construction Services</i>

Further detail of these benchmarks can be found in **Appendix B**.

This distribution has been applied to the annual construction costs for both stage 1 and 2 to identify the annual construction costs per industry, which is used as the basis for modelling the construction impacts.

Any non-Tasmanian and international expenditure (which is identified in Appendix B) has not been included in this assessment as there will be no economic stimulus from this expenditure on the Tasmanian economy.

Annual capital expenditure by ANZSIC classification, and non-Tasmanian expenditure is outlined in the table below.

Table 3 Distribution of Annual Capital Expenditure by ANZSIC Classifications – Robbins Island Renewable Energy Park

ANZSIC Classification (\$M)	2021	2022	2023	2024	2025
Professional, Scientific and Technical Services	\$4.1	\$13.8	\$9.7	\$14.0	\$9.4
Construction Services	\$11.2	\$37.4	\$26.2	\$38.0	\$25.3
Heavy and Civil Engineering Construction	\$14.6	\$48.8	\$34.1	\$49.5	\$33.0
Non-Metallic Mineral Product Manufacturing	\$1.2	\$4.1	\$2.8	\$4.1	\$2.8
Road Transport	\$1.2	\$4.1	\$2.8	\$4.1	\$2.8
Total Tasmanian Expenditure	\$32.4	\$108.1	\$75.6	\$109.7	\$73.2
<i>Non-Tasmanian Expenditure</i>	<i>\$65.1</i>	<i>\$216.9</i>	<i>\$151.9</i>	<i>\$220.3</i>	<i>\$146.9</i>

The expenditure in these industries was applied to REMPLAN's IO model for Tasmania to estimate the direct and indirect impacts of the expenditure.

3.1.2 Operational Impacts

Operational costs over 25 years for the Robbins Island Renewable Energy Park have been made available by UPC Robbins Island Pty Ltd. Because of construction occurring over two stages, two operational cost estimates have been developed to encompass stage 1 and 2. For the operational costs, stage 2 operational costs include stage 1 costs plus the incremental operational expenditure from stage 2. The total operating costs of stage 1 and stage 2 for the Robbins Island Renewable Energy Park are outlined in the table below.

Table 4 25 year Operational Expenditure of Robbins Island Stage 1 and 2

Operational Expenditure Item (\$M)	Stage 1 OPEX	Stage 2 OPEX
Operational property damage insurance	\$29.1	\$66.6
Administration and general overhead costs	\$14.6	\$33.3
Non-wind turbine generator maintenance staff cost	\$29.1	\$66.6
Balance of plant operations and maintenance	\$8.7	\$20.0
Wind turbine generator maintenance cost	\$307.7	\$703.3
UPC service and maintenance agreement	\$115.1	\$263.2

Operational Expenditure Item (\$M)	Stage 1 OPEX	Stage 2 OPEX
Rent of land	\$26.3	\$62.5
Plant office expenses	\$7.0	\$15.9
Mid-life refurbishment of Balance of plant	\$7.2	\$16.4
Corporate social responsibility programs	\$5.1	\$11.6
Agency/Monitoring/Admin Fee/Annual Fee	\$3.9	\$8.9
Connection Fee	\$40.0	\$40.0
TasNetwork operations and maintenance Fees	\$37.5	\$37.5
Rates	\$1.7	\$3.9

To calculate the annual operating expenditure for Robbins Island an average was applied to the total operational expenditure. As a result, the annual operational expenditure for Robbins Island stage 1 and 2 is outlined in the table below.

Table 5 Annual Operational Expenditure of Robbins Island Stage 1 and 2

Operational Expenditure Item	Stage 1 OPEX	Stage 2 OPEX	% expenditure in Tasmania
Operational property damage insurance	\$1.17	\$2.66	25%
Administration and general overhead costs	\$0.58	\$1.33	100%
Non-wind turbine generator maintenance staff cost	\$1.16	\$2.66	50%
Balance of plant operations and maintenance	\$0.35	\$0.80	100%
Wind turbine generator maintenance cost	\$12.31	\$28.13	50%
UPC service and maintenance agreement	\$4.61	\$10.50	50%
Rent of land	\$1.05	\$2.40	100%
Plant office expenses	\$0.28	\$0.64	100%
Mid-life refurbishment of Balance of plant	\$0.29	\$0.66	100%
Corporate social responsibility programs	\$0.20	\$0.47	100%
Agency/Monitoring/Admin Fee/Annual Fee	\$0.15	\$0.36	100%

Operational Expenditure Item	Stage 1 OPEX	Stage 2 OPEX	% expenditure in Tasmania
TasNetworks operations and maintenance fees	\$1.50	\$1.50	100%
Rates	\$0.07	\$0.16	100%

It is noted that the connection fee is a one-off fee in the first year of operation which applies to stage 1 only.

Based off the identified operational expenditure items and the percentage of expenditure in Tasmania, the following assumptions have been made in linking these identified cost items to their relevant the ABS ANZSIC classifications.

Table 6 ANZSIC Industry Classifications of Operational Expenditure Items

Operational Expenditure Item	114 Digit ANZSIC Classification
Operational property damage insurance	Insurance and Superannuation Funds
Administration and general overhead costs	Administrative Services
Non-wind turbine generator maintenance staff cost	Construction Services
Balance of plant operations and maintenance	Construction Services
Wind turbine generator maintenance cost	Construction Services
UPC service and maintenance agreement	Construction Services
Rent of land	Transfer Payment
Plant office expenses	Administrative Services
Mid-life refurbishment of Balance of plant	Construction Services
Corporate social responsibility programs	Arts and Recreation Services
Agency/Monitoring/Admin Fee/Annual Fee	Professional, Scientific and Technical Services (Except Computer System Design and Related Services)
Connection Fee	Transfer Payment
TasNetwork operations and maintenance Fees	Repair and Maintenance
Rates	Public Administration

The expenditure in these industries was applied to REMPLAN's IO model for Tasmania to estimate the direct and indirect impacts of the expenditure.

3.2 Economic Impact Assessment

The following section provides the results of the economic impact assessment on both the construction and operational phases of the Robbins Island Renewable Energy Park.

3.2.1 Construction Impacts

The following section outlines the economic impacts associated with the construction phase of the Robbins Island development. This section is broken into two sections, the first provides an aggregate of the total impacts over the whole construction period, with the second section identifying the annual economic impacts of the project during operation.

3.2.1.1 Annual Economic Impact

Table 7 outlines the annual direct and indirect construction impacts of stage 1 and 2 of the Robbins Island Renewable Energy Park. It is expected that 2022 and 2024 will observe the largest annual impacts on Tasmania, corresponding with the peak of stage 1 and stage 2 construction respectively.

Annually, peak employment for the Robbins Island Renewable Energy Park is estimated at 761 full time equivalent employees³ within Tasmania during 2024 (comprised of 285 direct FTE employees and 475 indirect FTE employees⁴), as a result of the commencement of stage 2 construction.

Table 7 Annual Construction Impacts of Robbins Island (2021 to 2025)

Impact (\$M)	2021	2022	2023	2024	2025
Output					
Direct Impacts	\$32.4	\$108.1	\$75.6	\$109.7	\$73.1
Indirect (Type I) Impacts	\$24.7	\$82.4	\$57.7	\$83.7	\$55.8
Indirect (Type II) Impacts	\$16.6	\$55.2	\$38.6	\$56.0	\$37.4
Total Impacts	\$73.7	\$245.7	\$172.0	\$249.4	\$166.3
Value Add					
Direct Impacts	\$12.5	\$41.5	\$29.1	\$42.2	\$28.1
Indirect (Type I) Impacts	\$9.9	\$33.0	\$23.1	\$33.5	\$22.3
Indirect (Type II) Impacts	\$8.9	\$29.6	\$20.7	\$30.0	\$20.0
Total Impacts	\$31.2	\$104.1	\$72.8	\$105.6	\$70.4

³ A full time equivalent employee is defined as one person working full time for one year.

⁴ Direct full time equivalent employees include both the employees on site, as well as employees supported from businesses supplying the construction phase.

Impact (\$M)	2021	2022	2023	2024	2025
Employment					
Direct Impacts	85	281	197	285	190
Indirect (Type I) Impacts	77	258	181	262	175
Indirect (Type II) Impacts	63	210	147	213	142
Total Impacts	225	749	524	761	507
Wages and Salaries					
Direct Impacts	\$6.9	\$23.1	\$16.2	\$23.5	\$15.7
Indirect (Type I) Impacts	\$5.6	\$18.7	\$13.0	\$18.9	\$12.7
Indirect (Type II) Impacts	\$3.8	\$12.6	\$8.9	\$12.8	\$8.5
Total	\$16.3	\$54.4	\$38.1	\$55.2	\$36.8

Note: FTE is an abbreviation for a full time equivalent employee. This is classified one employee working full time for one year

Note: Numbers may not sum due to rounding

3.2.1.2 Total Economic Impact

Based on the expected construction costs and assumptions outlined in section 3.1.1, over the total construction period, stage 1 and 2 of the Robbins Island development will support a total of:

- \$384.2 million in value add to the Tasmanian economy through to 2025.
- A total of 2,766 full time equivalent employee years⁵

The table below outlines the overall economic impact of the total Robbins Island stage 1 and 2 construction phases from 2020 to 2025.

Table 8 Total Construction Impacts of Robbins Island (Total Impacts across the life of the construction periods)

Impact	Output (\$M)	GVA (\$M)	Incomes (\$M)	Employment (FTE)
Direct Impacts	\$399.0	\$153.3	\$85.3	1,038
Flow-on (Type I) Impacts	\$304.4	\$121.8	\$69.9	953
Flow-on (Type II) Impacts	\$203.8	\$109.1	\$46.6	775
Total Impacts	\$907.2	\$384.2	\$200.8	2,766

Note: FTE is an abbreviation for a full time equivalent employee. This is classified one employee working full time for one year

⁵ Where a full time equivalent employee year is defined as one employee working full time for one year, where one employee works full time for two years, this would be defined as 2 employee years etc. This measure can be used to aid in understanding multi-year employment estimates.

Note: Numbers may not sum due to rounding

As can be seen in the table above, the total direct impacts of the Robbins Island construction phase over the total construction period is estimated to generate:

- \$153.3 million in value add
- \$85.3 million in local incomes
- 1,038 full time equivalent employee years

The total flow-on impacts from the Robbins Island construction phase is estimated to generate:

- \$230.9 million in value add – comprised of \$121.8 million from type I flow-on impacts and \$109.1 million from type II flow-on impacts
- \$116.5 million in local incomes – comprised of \$69.9 million from type I flow-on impacts and \$46.6 million from type II flow-on impacts
- 1,728 full time equivalent employee years – comprised of 953 FTE employee years from type I flow-on impacts and 775 FTE employee years from type II flow-on impacts

3.2.2 Operational Impacts

Based on the expected operational expenditure and assumptions outlined in section 3.1.2, the operational impacts of Robbins Island stage 1 and 2 have been estimated.

Operational impacts of Robbins Island stage 1 are estimated to occur for two years, whilst stage 2 is being constructed. Annually over these two years, Robbins Island stage 1 development will support a total of:

- \$12.9 million annually in value add to the Tasmanian economy.
- 101 full time equivalent employee positions annually within Tasmania annually.

Table 9 Annual Operational Impacts of Robbins Island – Stage 1

Impact	Output (\$M)	GVA (\$M)	Incomes (\$M)	Employment (FTE)
Direct Impacts	\$12.8	\$4.8	\$2.7	40
Flow-on (Type I) Impacts	\$11.4	\$4.4	\$2.4	35
Flow-on (Type II) Impacts	\$6.8	\$3.7	\$1.6	26
Total Impacts	\$30.9	\$12.9	\$6.7	101

Note: FTE is an abbreviation for a full time equivalent employee. This is classified one employee working full time for one year

Note: Numbers may not sum due to rounding

As can be seen in the table above, the annual direct impacts of the operational phase for Robbins Island stage 1 is estimated to generate:

- \$4.8 million in value add to Tasmania.
- \$2.7 million in local incomes in Tasmania.
- 40 full time equivalent employees in Tasmania.

Flow-on impacts from the operational phase of the Robbins Island stage 1 is estimated to generate:

- \$8.1 million in value add – comprised of \$4.4 million from type I flow-on impacts and \$3.7 million from type II flow-on impacts in Tasmania.

- \$4.0 million in local incomes – comprised of \$2.4 million from type I flow-on impacts and \$1.6 million from type II flow-on impacts in Tasmania.
- 61 full time equivalent employees – comprised of 35 FTE employees from type I flow-on impacts and 26 FTE employees from type II flow-on impacts in Tasmania.

Operational impacts of Robbins Island stage 2 are estimated to occur from 2026 onwards. The total operational period for Robbins Island stage 2 is 25 years. Operational impacts are calculated annually, and are based on real 2018 dollar results. Once fully constructed, Robbins Island stage 2 is estimated to annually support a total of:

- \$27.4 million annually in value add to the Tasmanian economy.
- 215 full time equivalent employee positions within Tasmania annually.

Table 10 Annual Operational Impacts of Robbins Island – Stage 2 (full operation)

Impact	Output (\$M)	GVA (\$M)	Incomes (\$M)	Employment (FTE)
Direct Impacts	\$27.2	\$10.2	\$5.9	85
Flow-on (Type I) Impacts	\$24.1	\$9.4	\$5.2	74
Flow-on (Type II) Impacts	\$14.6	\$7.8	\$3.3	56
Total Impacts	\$65.9	\$27.4	\$14.4	215

Note: FTE is an abbreviation for a full time equivalent employee. This is classified one employee working full time for one year

Note: Numbers may not sum due to rounding

As can be seen in the table above, the annual direct impacts of the operational phase for Robbins Island stage 2 is estimated at

- \$10.2 million in value add
- \$5.9 million in local incomes
- 85 full time equivalent employees

Flow-on impacts from the operational phase of the Robbins Island stage 2 is estimated at:

- \$17.4 million in value add – comprised of \$9.4 million from type I flow-on impacts and \$7.8 million from type II flow-on impacts
- \$8.5 million in local incomes – comprised of \$5.2 million from type I flow-on impacts and \$3.3 million from type II flow-on impacts
- 130 full time equivalent employees – comprised of 74 FTE employees from type I flow-on impacts and 56 FTE employees from type II flow-on impacts

3.3 Summary of Impacts

Figure 1 below provides an overview of the annual direct and indirect value add to Tasmania as a result of the Robbins Island construction and operation through to 2048. Construction impacts are projected to result in an increase to Tasmania's value add by over \$70 million annually between 2022 and 2025, before decreasing to \$27.4 million during the operational phase.

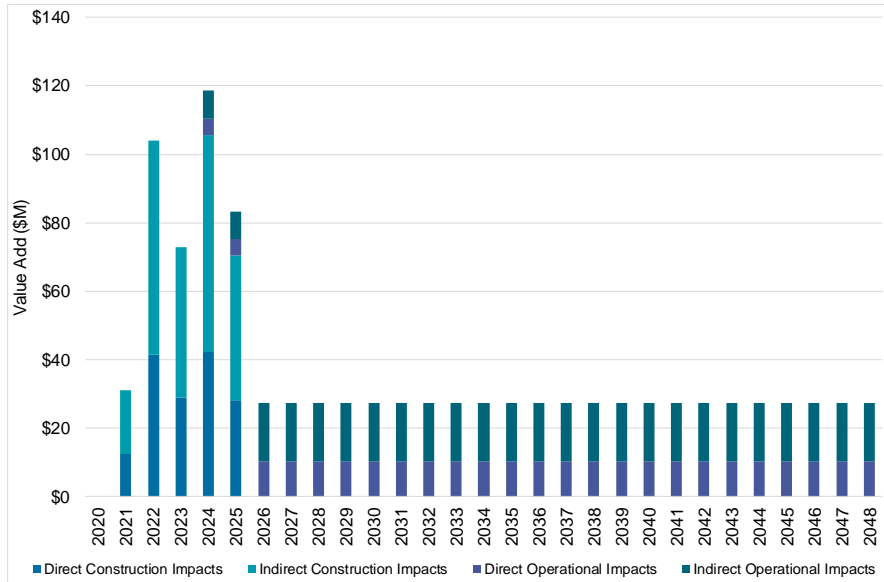


Figure 1 Annual Impact to Tasmania's Value Add from Robbins Island Stage 1 and 2

Figure 2 below provides an overview of the direct and indirect employment benefits arising from the construction and operational phases of the Robbins Island Renewable Energy Park stage 1 and 2 developments. During the construction phase (occurring between 2021 and 2025), the total employment supported is estimated to be above 500 FTE employees annually. Post construction, the total employment supported by the operational phase is estimated to decrease to 215 direct and indirect FTE employees annually for the remainder of the renewable energy park's life.

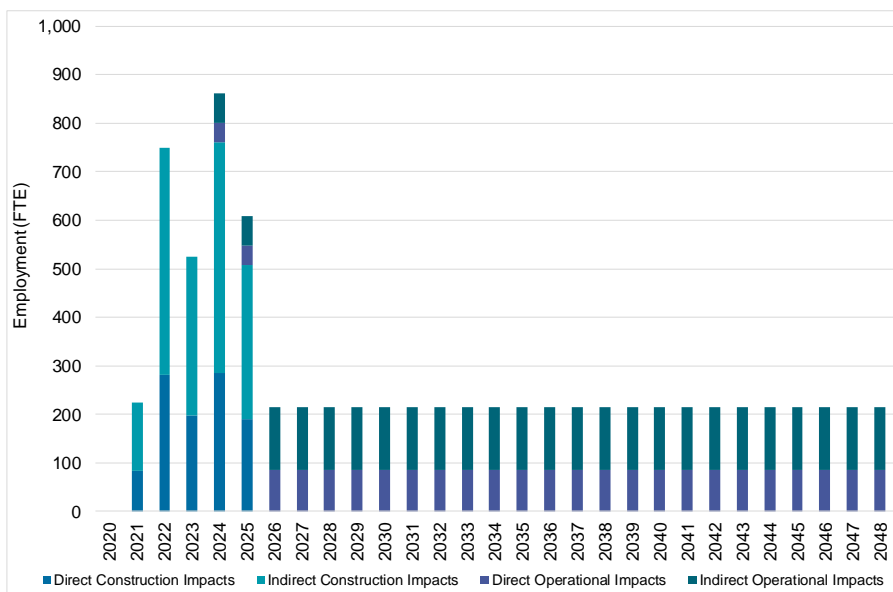


Figure 2 Annual Impact to Tasmania's Employment from Robbins Island Stage 1 and 2

Appendices

Appendix A Quarterly Construction Cost Estimates

Quarterly Capital Cost Estimates– Robbins Island Windfarm

Quarter	Robbins Island Stage 1	Robbins Island Stage 2
Q1 2020	\$0.0	\$0.0
Q2 2020	\$0.0	\$0.0
Q3 2020	\$0.0	\$0.0
Q4 2020	\$0.0	\$0.0
Q1 2021	\$0.0	\$0.0
Q2 2021	\$0.0	\$0.0
Q3 2021	\$32.5	\$0.0
Q4 2021	\$65.0	\$0.0
Q1 2022	\$65.0	\$0.0
Q2 2022	\$65.0	\$0.0
Q3 2022	\$97.5	\$0.0
Q4 2022	\$97.5	\$0.0
Q1 2023	\$65.0	\$0.0
Q2 2023	\$65.0	\$0.0
Q3 2023	\$65.0	\$0.0
Q4 2023	\$32.5	\$0.0
Q1 2024	\$0.0	\$27.5
Q2 2024	\$0.0	\$82.5
Q3 2024	\$0.0	\$110.0
Q4 2024	\$0.0	\$110.0
Q1 2025	\$0.0	\$0.0
Q2 2025	\$0.0	\$0.0
Q3 2025	\$0.0	\$0.0

Quarter	Robbins Island Stage 1	Robbins Island Stage 2
Q4 2025	\$0.0	\$0.0

Appendix B Construction Cost Distributions

Construction Cost Distribution Estimates– Robbins Island

Project Cost Splits, Windfarms	Split of Costs	Costs not occurring in Tasmania	Reasoning
PM / Design and Overheads	10%		
<i>Project Management</i>	70%	50%	Company not based in Tasmania, costs incurred outside as a result
<i>Design Costs</i>	30%	75%	Limited engineering and design consultant depth in Tasmania
Clearing / Access	5%		
Land clearing	30%	0%	
Access and port construction	70%	0%	
Turbine Foundations	10%		
<i>Concrete and other construction material costs</i>	25%	50%	Material will come from mainland Australia
<i>Heavy civil construction costs</i>	50%	0%	
<i>Transportation costs</i>	25%	50%	These include shipping and transport costs outside of Tasmania
Turbine Costs	65%		
<i>Heavy civil installation costs</i>	40%	75%	No Tasmanian based cranes suitable for the wind farm erection
<i>Material costs</i>	60%	100%	Material purchased from outside of Tasmania - no production in Tasmania
Electrical	10%		
<i>Electrical installation and electrical services</i>	100%	0%	

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Rev.No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Draft A	H Jones					
Draft B	H Jones					
Final	H Jones					

