Appendix K

Economic Impact Assessment

Hydro Tasmania

Contents

Glossary and abbreviations

Term	Description
ABS	Australian Bureau of Statistics
AEMO	Australian Energy Market Operator
ARENA	Australian Renewable Energy Agency
BaU	Business as Usual (also termed the Base Case)
CGE	Computable General Equilibrium - the modelling technique adopted by the Centre of Policy Studies to estimate the economic impacts of Marinus Link
CoPS	The Centre of Policy Studies at Victoria University
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EIA	Economic Impact Assessment
EIS	Environment Impact Statement
EPA	Environment Protection Authority (Tasmania)
EPBC Act	Environment Protection & Biodiversity Conservation Act 1999
FTE	Full-time equivalent
GRP	Gross Regional Product
GSP	Gross State Product
GVA	Gross Value Added
GWh	Gigawatt-hours
Job-years	A job-year is one full-time equivalent job for one year. One worker employed for five years for construction is counted as five job-years
LGA	Local Government Area
MW	Megawatt
NEM	National Energy Market

Term	Description
PBC	Preliminary Business Case
REZ	Renewable Energy Zone
SA4	Statistical Areas Level 4 (SA4) is defined by the Australian Bureau of Statistics as the largest sub-State regions in the Main Structure of the Australian Statistical Geography Standard (ASGS).
SGS	SGS Economics and Planning
SIA	Social Impact Assessment
TWWHA	Tasmanian Wilderness World Heritage Area
The Project	The Tarraleah hydropower scheme redevelopment project
VRE	Variable Renewable Energy
VURM	The Victoria University Regional Model. The assessment model used in this report

Executive Summary

Executive Summary

Introduction

The Tarraleah hydropower scheme currently generates electricity from a large headwater storage at Lake King William. At over 80 years old, many of the scheme's components have aged and physical and operational constraints make it unsuitable for operation. Ageing canals are also reaching the end of their expected operational life and pose the risk of an environmental incident with potential impact on the adjacent Tasmanian Wilderness World Heritage Area (TWWHA). Significant investment will be required to address these issues within the next 10-15 year.

Hydro Tasmania is proposing to redevelop the Tarraleah hydropower scheme into a more reliable and flexible generation source. In doing so, the Tarraleah Redevelopment Project (the Project) would support needs of a future National Electricity Market (NEM) with a substantially higher portion of variable renewable energy (VRE).

Purpose of this report

The Project, as with all major infrastructure projects, may have intended and unintended economic, social and environmental impacts in the region it is delivered. It is important to assess these impacts to inform the approvals process.

Toward this end, SGS Economics & Planning Pty Ltd (SGS), in partnership with the Centre of Policy Studies (CoPS) at Victoria University, were engaged by Hydro Tasmania to undertake research and analysis to assess the economic impacts of the Project.

Methodology

The methodology applied conforms not only to industry best practice with regard to economic impact assessment for major infrastructure projects but is aligned with SGS's experience aligning analysis for similar projects with Commonwealth and state scoping requirements.

- Modelling framework: Central to the quantitative component is a technical methodology employing Computable General Equilibrium (CGE) modelling, a detailed mathematical representation of Australia's regions, the economic inter-relationships, behaviour of regional agents, and interstate and international trade. The technique also includes explicit modelling of demand for each regional economy's production (i.e., for its interstate and international exports) and of supply into the economy (i.e., of its interstate and international imports).
- Modelling geography: Economic impacts are reported at the regional (South East Tasmania SA4 and Hobart SA4) and state (Tasmania) levels, as defined by Australian Bureau of Statistics (ABS) Statistical Area boundaries.

- **Modelling inputs:** Estimates of impact are derived in the CGE modelling by inputting both timing and capital investment value associated with the construction and ongoing operations of the Project.[1]
- **Modelling outputs:** estimates of impacts are reported in terms of Gross State Product (GSP), Gross Regional Product (GRP), Gross Value Added (GVA) and regional and state employment (in full-time equivalent FTE job-years).
- **Qualitative Assessment and Considerations:** qualitative considerations are also included that reflect other socioeconomic impacts and externalities or economic opportunities that may occur as a consequence of construction and/or operations, e.g., First Nations employment and procurement opportunities, skills and training opportunities, local industry participation, cultural and tourism impacts. SGS's considerations of these issues are supported by other technical assessments and studies, where available (note that other studies are referenced in this report).

Findings

Quantitative economic impacts

In Tasmania, the Project, including its indirect effects, is expected to represent approximately $1.6 billion in GSP above the business-as-usual (BaU) through construction and operations (i.e. over 38 years), of which approximately $298 million is estimated to materialise in South East Tasmania SA4 and Hobart SA4 (i.e., Gross Regional Product), as reported in Table 1.

Table 1: Gross Regional Product and Gross State Product (2024), Year 1-38

Geography	Construction Phase (Year 1 – 8)	Operational Phase (Year 9 – 38)	Total impacts
South East Tasmania SA4 & Hobart SA4	$213 million	$85 million	$298 million
Tasmania (including South East Tasmania SA4 & Hobart SA4)	$1.12 billion	$0.48 billion	$1.60 billion

Source: SGS Economics and Planning and Centre of Policy Studies (2024). Note, numbers may not sum due to rounding.

Economic modelling also demonstrates considerable economic value-added (as measured by GVA) above the BaU from the Project in Tasmania, totalling around $1.34 billion across construction and operations, as reported in Table 2.

[1] Construction has been modelled to commence in 2025 and run for 8 years. Actual construction timing may deviate from this, however, the order of magnitude impacts presented in this report would still be accurate assuming the total capital spend, and distribution of capital spend is as per assumptions presented in this report. The operating period has been modelled for 30 years, which is conservative given the project would be in operation for more than 30 years.

Table 2: Gross Value Added (2024), Year 1-38

Geography	Construction Phase (Year 1 – 8)	Operational Phase (Year 9 – 38)	Total impacts
Tasmania	$0.96 billion	$0.38 billion	$1.34 billion

Source: SGS Economics and Planning and Centre of Policy Studies (2024)
Note: GVA estimation is not available at the North West Tasmania level due to modelling limitations. Note, numbers may not sum due to rounding.

The Project is also estimated to generate demand for substantial employment at the state and regional levels, as shown in Table 3. Modelling outputs indicate that such employment demands span multiple direct and indirect industries including construction, professional services, manufacturing and retail.

Table 3: Labour force impacts (FTE job-years), Year 1-38

Geography	Construction Phase (Year 1 – 8)	Operational Phase (Year 9 – 38)	Total impacts
South East Tasmania SA4 & Hobart SA4	451	64	515
Tasmania (including South East Tasmania SA4 & Hobart SA4)	1,949	254	2,203

Source: SGS Economics and Planning and Centre of Policy Studies (2024)

Qualitative economic impacts, opportunities and externalities

From a qualitative perspective, there are a range of potential socioeconomic impacts, externalities and economic opportunities associated with the project, including:

- First Nations Employment and Procurement Opportunities. Aboriginal People are the original custodians of the land on which the Project's economic benefits will materialise. There is an opportunity for the Project to meaningfully contribute to the advancement of First Nations self-determination and wellbeing by providing access to training and skill development, employment and procurement opportunities. Hydro Tasmania is developing a First Nations participation strategy to support First Nations participation in the construction and operation phases of the project. Hydro Tasmania has also developed a Local Content Framework which seeks to support First Nations access to training, employment and economic development opportunities associated with the project. Hydro Tasmania will also develop detailed employer's requirements relating to First Nations employment and training opportunities, as well as local industry participation goals, which the lead contractor will need to comply with.

- Skills and Training Opportunities. The project presents an opportunity to build and develop a skilled workforce that could take advantage of job opportunities directly and indirectly related to the Project. This includes opportunities in upstream or downstream industries. Hydro Tasmania has developed a Local Content Framework to support local skill development. The Lead contractor will be required to develop a local industry participation plan, and will be required to set employment and training goals for specific target groups (e.g. women, youth). A Social Impact Management Plan (SIMP) is also being developed to support monitoring and evaluation of project impacts and opportunities on workforce participation during the construction phase.
- Impacts on Tourism Industry. Hydro Tasmania will establish construction workforce accommodation at Tarraleah Village (a site which is owned by Hydro Tasmania). Such initiatives are intended to manage and limit tourism industry impacts (along with housing impacts as described below), however, nuanced impacts should be monitored throughout the Project, particularly during construction. As the project site is remote, broader impacts on the tourism industry in the region are not anticipated.
- Local Benefits Sharing. A Local Benefit Sharing Strategy has been developed for the Major Projects of Tarraleah and Cethana. Nearly $1 million will be allocated to a fund for use during the construction period. The Benefits Sharing Strategy will help support enduring and positive socioeconomic outcomes in the region.
- Opportunity to Export Energy to Mainland Australia. The Project is oriented toward contributing to the timely development of additional dispatchable capacity that can benefit both mainland Australia and Tasmania, including energy exports from Tasmania to the mainland. Increased revenues and profits generated by Hydro Tasmania will benefit the Tasmanian economy (as Hydro Tasmania is a Government Business Enterprise), dividends are paid to its majority shareholder, the State of Tasmania. As such, after-tax profits are invested back into the community). It should be noted that this economic benefit, as with the successful operation of the Project itself, is dependent on the construction of further interconnection between the Tasmanian and Victorian (and broader National Electricity Market) electricity systems currently being progressed by Marinus Link. Pty Ltd.
- State Energy Price and Market Implications. By design, the nature of the Project is to generate additional dispatchable capacity to assist in exerting downward pressure on wholesale electricity prices. Under the current circumstances of high and escalating energy costs, downward pressure is a relevant and material benefit to residents of the region and the broader Tasmanian community.
- Impacts on Local Social Amenity and Community Infrastructure. CGE modelling undertaken as part of the project suggests that the project will generate local, state and federal tax revenues. This, along with other initiatives undertaken by Hydro Tasmania via the Local Benefits Sharing strategy, presents an opportunity to invest in and improve the provision of local social amenity and community infrastructure.
- Impacts on Land Values and Demand for Land and Housing. Changes in land values and increased demand for housing in nearby communities can be a significant consequence of investment in major construction-intensive infrastructure projects. Hydro Tasmania will establish a construction workforce accommodation facility to minimise potential effects on residential land values and demand for land and housing in the local area.

- Implications on Coal-fired Power Plants and Regional Economies. The Project represents a step-change toward national emissions reduction targets with hydro-supplied dispatchable capacity that is intended to support the planned closure of coal-fired power plants. It is recognised that closure of coal-fired power plants (primarily in Victoria and NSW) can have localised adverse socio-economic impacts. Although managing the full impacts of coal-fired power plants is primarily the responsibility of government through appropriately scaled and funded initiatives, Hydro Tasmania, through the workforce development strategy, , can consider skills alignment and attraction for ex-coal-fired power plant workers to alleviate such adverse impacts.
- Opportunity to Reduce Carbon Footprint. The emission intensity of the Project is modelled to be below the world-wide median emission intensity for hydropower, below solar emission intensity, and far below gas and coal emission intensity. Consequently, the Project is anticipated to deliver GHG emission savings relative to the BaU scenario.
- Opportunity to Support the Feasibility of Other Renewable Energy Projects. The Project is intended to support the achievement of national emissions reduction targets as well as Tasmania's Hydrogen Action Plan. Through the provision of additional dispatchable capacity from such hydro power, the attainment of broader decarbonisation efforts across numerous sectors, such as transport, agriculture and industry, becomes more possible. The timing of when this opportunity may be capitalised upon, however, will depend on broader industry development of the Green Hydrogen sector.
- Local, State and Federal Government Revenues. Analysis undertaken for this EIA estimates that local, State and Federal Government revenues are anticipated to increase (above the BaU) by $13 million[2], $473 million and $477 million, respectively, as a consequence of construction and operations of the Project. This excludes the value of Hydro Tasmania dividends paid to the State Government.

Conclusion

Given the perspectives of the economic impact assessment, the Project is anticipated to deliver significant economic outcomes and opportunities (above the BaU) to the regional economy of South-East and Hobart regions, and for the state. Management of potential positive externalities (e.g. upskilling programs to increase local labour supply) and careful mitigation of potential negative externalities, as being considered by Hydro Tasmania, will enable the affected local communities to benefit from the Project and the opportunities it presents.

[2] Note that the modelled Local Government revenues accrue collectively to LGAs across the State.

1. Introduction

1. Introduction

Hydro Tasmania is proposing to redevelop the Tarraleah hydropower scheme into a more reliable and flexible generation source. SGS Economics and Planning was engaged by Hydro Tasmania to assess the Project's economic impacts. This chapter provides an overview of the Project and outlines the purpose and scope of this Economic Impact Assessment.

1.1 Background and Context

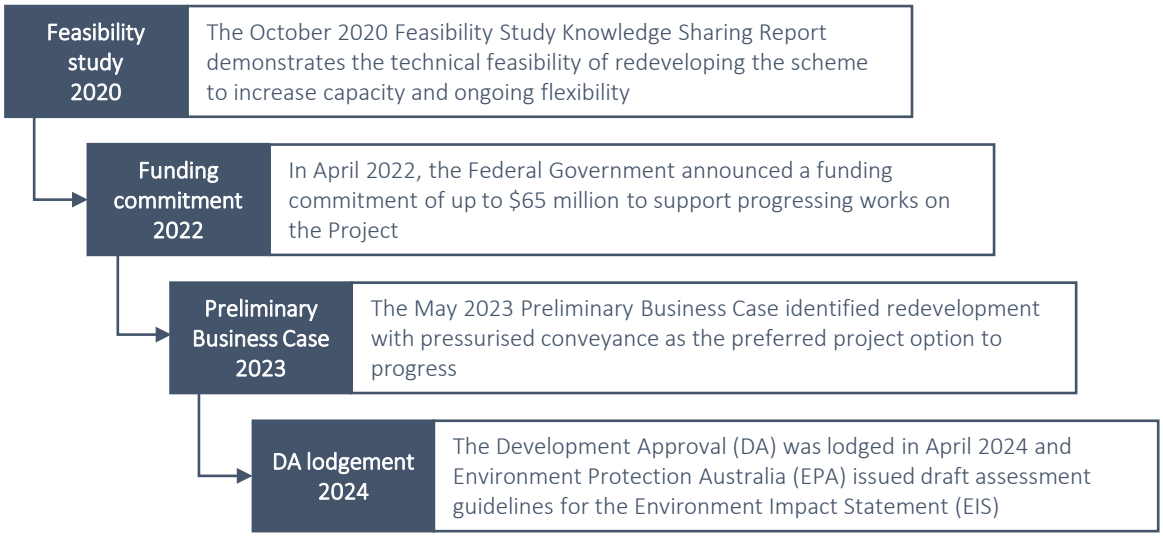
The Tarraleah hydropower scheme currently generates electricity from a large headwater storage at Lake King William. Commissioned in the 1930s, the scheme's three power stations have a total installed capacity of 104-megawatt (MW) (peak capacity of 90 MW) and currently generate around 6.5 per cent of Hydro Tasmania's total energy generation.

At over 80 years old, many of the scheme's components have aged and there are physical and operational constraints which make it less suitable for operation in the future energy market. Further, the ageing canals are reaching the end of their expected operational life and pose the risk of an environmental incident which could impact the adjacent Tasmanian Wilderness World Heritage Area (TWWHA). Their replacement is a priority within the next 10-15 years.

Investment is required to transform the scheme to operate more efficiently, reliably and with a higher energy output. Such an outcome would contribute to Tasmania's transition to reliable renewable energy production and, together with Marinus Link and other Major Projects being led by Hydro Tasmania, would support the needs of a future National Electricity Market (NEM) with a substantially higher portion of variable renewable energy (VRE).

Key completed milestones of the Project are summarised in Figure 1.

Figure 1: Completed Milestones



Source: SGS Economics and Planning (2024). Note: the 2024 DA Lodgement was a 'placeholder' DA, lodged to trigger the EPA review.

1.2 Purpose and Scope

The Project, as with all major infrastructure projects, may have intended and unintended economic, social and environmental impacts in the region it is delivered. It is important to assess these impacts to inform whether the project should be approved to proceed.

To inform approvals processes, SGS Economics & Planning Pty Ltd (SGS), in partnership with the Centre of Policy Studies (CoPS) at Victoria University, were engaged by Hydro Tasmania to undertake research and analysis to assess the economic impacts of the Project.

This Economic Impact Assessment (EIA) assesses quantitative and qualitative impacts during the construction and operation of the Project and considers the relative equity of impacts and how they are distributed across different sections of the community and/or other stakeholders. In essence:

- The quantitative component measures the degree to which economic stimulus (in the form of capital investment value and operational expenditure) associated with the project accumulates in total economic activity levels
- 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.

While understanding these impacts is important, it should be noted that an EIA does not assess the merits of a project in terms of its costs compared to its benefits (such as the findings of a cost-benefit analysis), nor is it a replacement for a business case.

1.3 Project Overview

The preferred project option presented in the Preliminary Business Case (PBC) would see the peak capacity of the Tarraleah Hydropower Scheme increase from 90 MW to approximately 190 MW. Providing a direct pressurised connection between the scheme's headwater and a new power station, operational flexibility and efficiency will be enhanced.

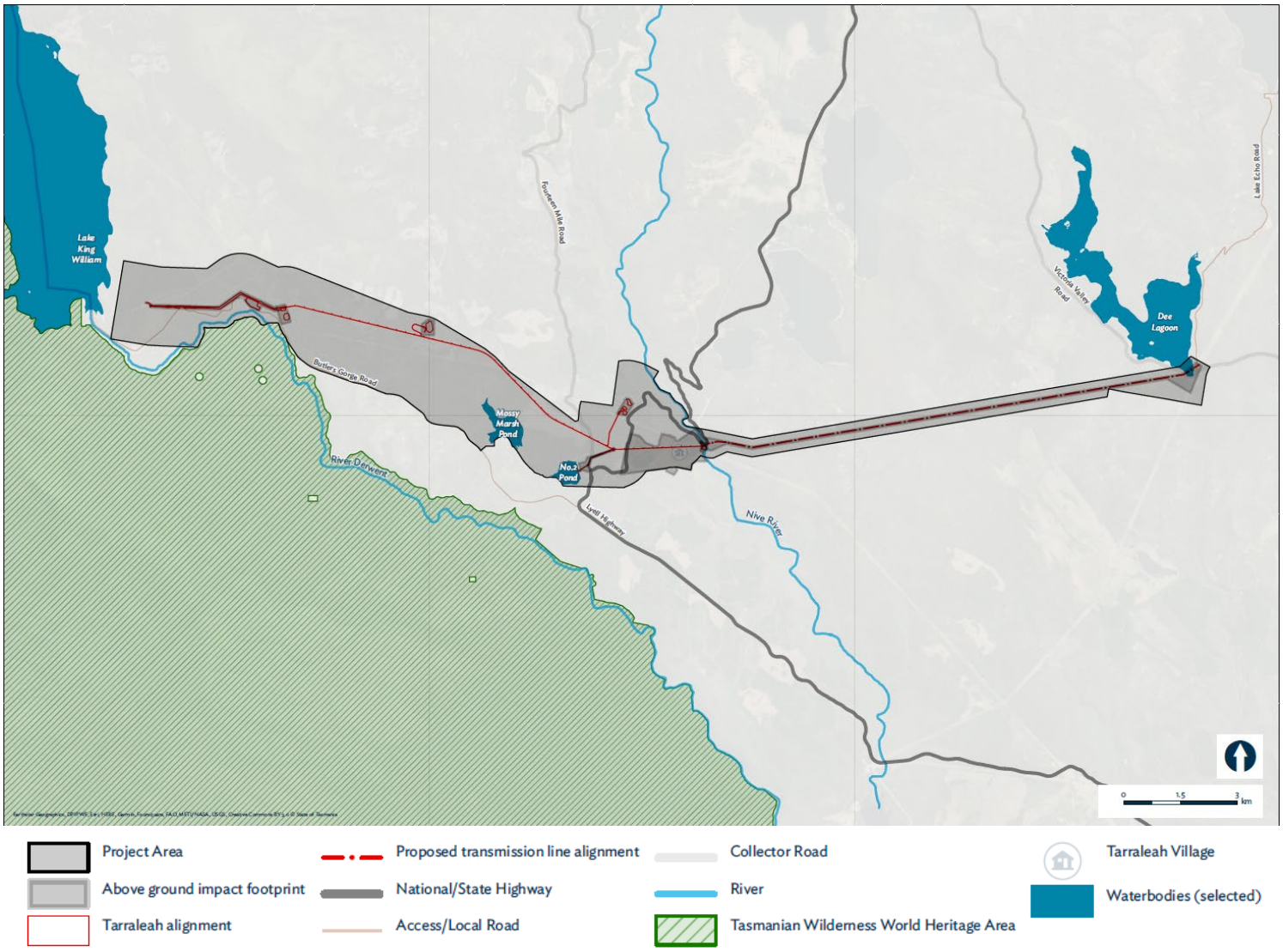
The impact on annual energy generation would be an additional 200 gigawatt-hours (GWh) relative to the current production of 630 GWh, increasing the estimated share of Hydro Tasmania's energy generation to around 8.5 per cent (independent of any other projects added to the portfolio).

The Project would also improve the operational flexibility of the scheme, allowing the station to be turned off for several days or weeks when demand and energy prices are low, while running at full capacity for up to several months during extended periods of high demand and high prices.

The Project involves replacing the existing power station and constructing a new pressurised conveyance that will connect directly to the head storage at Lake King William, bypassing the existing canals which pose a risk of environmental incidents impacting the adjacent TWWHA. Replacing and decommissioning these canals is a key environmental risk management mechanism.

The proposed Project area is shown in Figure 2 below.

Figure 2: Proposed Project Area



Source: Hydro Tasmania

2. Assessment Guidelines

2. Assessment Guidelines

The Project requires approvals from the Commonwealth, State and Local governments. This chapter outlines government guidelines relevant to the approval process, and where they have been addressed in this EIA report, as well as linkages to other associated technical assessments.

2.1 Commonwealth

Under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), an Environmental Impact Statement (EIS) must be completed for the project. The Australian Department of Climate Change, Energy, Environment and Water (DCCEEW) is responsible for publishing project-specific guidelines for completing an EIS, however, at the time of drafting this report, the specific guidelines had not been published for the Project. The Commonwealth did, however, issue a preliminary request for further information, which contained the following points relevant to economic and social matters:

- 8.1 An analysis of the economic and social impacts of the action, both positive and negative
- 8.2 Details of any public consultation activities undertaken and their outcomes
- 8.3 Details of any consultation with Indigenous stakeholders
- 8.4 Projected economic costs and benefits of the project, including the basis of their estimate through cost/benefit analysis or similar studies
- 8.5 Employment opportunities expected to be generated by the project (including construction and operational phases).

Point 8.1 is addressed in Chapter 6 of this report, points 8.2 and 8.3 are considered more relevant to social impacts, point 8.4 is partly addressed via this report noting that the scope of this is an economic impact assessment and not a cost-benefit analysis which will be provided in the final business case, and point 8.5 is addressed in Chapter 5 and Chapter 6 of this report.

2.2 Tasmania

The Environment Protection Authority Tasmania (EPA) issues guidelines to assist proponents in preparing Environment Impact Statements (EIS).[3] Scoping requirements issued by the EPA for the Project and where they are addressed in this report are outlined in Table 4.

The extent to which scoping requirements are addressed throughout the report are reflective of:

- The nature of information and data provided to SGS and CoPS for economic impact modelling,

[3] The EPA has not published specific guidelines for this Project. Therefore, SGS relied on a publicly available document 'Guidelines for Preparing an Environmental Impact Assessment', published by the EPA in May 2023, which contains general scoping guidelines.

- Whether and to what extent scoping requirements can be dealt with quantitatively (e.g., inputs to modelling such as capital investment values for construction) or qualitatively (e.g., characterising downstream industry activities), and
- The extent to which the negative and positive elements of economic considerations could be made given that most technical reports for the Project were being developed concurrent to this EIA.

Table 4: Tasmanian EPA scoping requirements for the Project

Scoping requirement	Section addressed
Include an estimate of total capital investment for the proposal and where that capital will be expended (particularly in relation to the source of large capital items of processing equipment).	Table 7 in Chapter 5 provides an indication of the location of capital spend, however, a breakdown by capital item has not been provided
Describe impacts on local and state labour markets 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.	Quantification of job impacts is in Section 6.1, and skills and training opportunities are described in Section 6.2
Describe impacts on upstream/downstream industries, both locally and for the State.	Total impacts, inclusive of upstream and downstream impacts locally and for the State, are quantified in Section 6.1
Detail the extent to which raw materials, equipment, goods and services will be sourced locally.	The directly employed labour force detailed in Chapter 5 is illustrative of services sourced locally.
Describe impacts on the local, regional, state and national economies.	Economic impacts are quantified in Section 6.1 for the regional and State economies.

Source: SGS Economics and Planning (2024)

2.3 Linkages to Other Technical Assessments

Some of the scoping requirements presented in Section 2.1 and 2.2 may be addressed in part through other technical reports as listed in Table 5.

Table 5: Linkages to other technical assessments, strategies and frameworks

Technical assessment	Relevance to this EIA
Preliminary Business Case – Tarraleah hydropower scheme redevelopment *Version: 24 May 2023*	The Preliminary Business Case (PBC) outlines the case for the project and supports decision-making to prepare a Final Business Case and continue to progress to a final investment decision.
Local Content Framework	This Framework was developed to facilitate improved social and economic outcomes for Tasmanians, particularly those closest to the development. The purpose of the Framework is to provide clear expectations, and guidance to Contractors, of Hydro Tasmania's local content and social procurement commitments related to Hydro Tasmania's Major Projects.
First Nations Participation Strategy (in progress)	The Draft Strategy sets Hydro Tasmania's objectives in relation to delivering opportunities for First Nations peoples. Opportunities relate to a number of themes including, employment and training, business participation, access to country, cultural acknowledgement, knowledge sharing, and natural resource management.
Major Projects Local Benefit Sharing Strategy	The Local Benefits Sharing Strategy aims to treat communities as partners in development, not merely 'hosts' of renewable energy infrastructure. The objective is to share the values derived from hydropower projects with the people and places that host the infrastructure, leaving a positive legacy and embedding Hydro Tasmania projects as productive assets in regional communities.
Tarraleah Project EPBC Act Referral Document (reference 2023/09482)	This describes the likely scope of impacts to matters of national environmental significance under the Environment Protection and Biodiversity Conservation Act (1999) Cwlth
Tarraleah PHES GHG Footprint Analysis (April 2024)	This assesses the lifecycle Greenhouse Gas footprint of the Project across a 100-year time horizon.
Tarraleah Redevelopment Planning Report	This report details planning considerations, such as legislative context and a planning assessment. The Project was deemed to satisfactorily meet the requirements of the planning scheme.
Tarraleah Traffic Impact Assessment	This describes potential truck routes and assesses traffic impacts with reference to the Department of State Growth's Publication Traffic Impact Assessments (TIA) Guidelines and the Tasmanian Planning Scheme. Overall, minimal traffic impacts are expected (thus minimal economic costs of increased transport congestion). However, the report recommends modification to some intersections and road segments to improve transport safety.

Source: SGS Economics and Planning (2024)

3. Policy Alignment

3. Policy Alignment

This chapter provides a review of Commonwealth, State and Local Government targets and policies. The purpose of the review is to gauge alignment and consistency between these strategies and the Project.

3.1 Commonwealth Targets and Policy

The Australian Government has committed to a Net Zero Plan which lays out a timeline for emissions reduction and renewable energy targets through the NEM, with the goal of achieving net zero greenhouse gas emissions by 2050. Targets along this timeline include a 43 per cent emissions reduction by 2030 (compared to 2005 levels), supported by 82 per cent Variable Renewable Energy (VRE) in the nation's electricity grids. In 2023, renewable energy accounted for 39 per cent of Australia's total electricity supply[4], which is below the 2030 target, and suggests additional sources of renewable energy will be required to achieve the 2030 target and longer-term targets.

Beyond the domestic specific targets, the Australian Government is a signatory to the Paris Climate Agreement, meaning the country has broader commitments to reducing emissions and achieving higher levels of renewable energy generation.

The Australian Energy Market Operator (AEMO) has identified Central Highlands in Tasmania as a suitable location for renewable energy generation. The region is categorised as a candidate renewable energy zone (REZ), as well as being noted for experiencing significant seasonal change in transmission limits.

> The Project is very much aligned with Australian Government policy and will support the achievement of domestic targets. The seasonal change in transmission limits of the Central Highlands region as identified by AEMO reinforces the requirement for additional dispatchable electricity generation to provide greater assurance of energy production and grid stability.

3.2 Tasmanian Targets and Major Projects

Having already met their target to be 100 per cent self-sufficient from renewable electricity[5], in November 2020 the Tasmanian Government passed legislation to generate 200 per cent of current needs from renewable energy by 2040.

In addition to supporting the targets, the Project strongly aligns with the State's vision to further expand renewable energy generation within Tasmania to develop future industries such as renewable hydrogen and advanced manufacturing. In doing so, the State seeks to enable clean, affordable and

[4] Clean Energy Council (2024). Clean Energy Australia 2024.
[5] Tasmania Renewable Energy Zones, website accessed 2024.

reliable energy to support Tasmanian communities and facilitate private sector investment and innovation.

Key strategies include the Renewable Energy Action Plan, Renewable Energy Coordination Framework and Tasmanian Renewable Hydrogen Action Plan, which are discussed below.

Renewable Energy Action Plan and Renewable Energy Coordination Framework

Released in December 2022, the Tasmanian Renewable Energy Action Plan establishes the platform to transform Tasmania from being Australia's renewable energy powerhouse into a world leading provider of clean, reliable, and affordable energy. The plan sets clear targets and actions designed to build on Tasmania's natural competitive advantages and attract large-scale investment to significantly grow and expand Tasmania's renewable energy sector.

The Tasmanian Renewable Energy Action Plan includes large-scale infrastructure projects such as Project Marinus and Hydro Tasmania's Major Projects. These projects are summarised below:

- Project Marinus is a proposed 1,500 MW electricity linkage to mainland Australia to enable energy distribution from a diverse range of generation sources to where it is most needed across the NEM. Interconnectors such as Marinus Link are a key feature of the future energy landscape and play a critical role in supporting Australia's transition to a clean energy future as they can increase the resilience of the NEM and make energy more secure, affordable and sustainable for customers.
- Redevelopment of the Tarraleah hydropower scheme (this Project)
- The Cethana Pumped Hydro Energy Storage Project is another major investment under Hydro Tasmania's Major Projects initiative. This investment along with Tarraleah and Project Marinus is likely to provide the greatest additional market capacity, storage and flexibility to support the transitioning NEM.
- North West Transmission Developments[6] are being progressed by TasNetworks. The project includes 240 kilometres of new and upgraded transmission lines and other energy infrastructure that will increase the capacity of Tasmania's electricity network.

There are many other proposed renewable energy projects in Tasmania being developed, including onshore and offshore wind projects and solar power projects. While these projects are necessary to support the achievement of the target of 200 per cent renewable energy by 2040, they are less reliable than traditional energy sources (in particular, they are less effective when the wind is not blowing and the sun is not shining).

> Complementing wind and solar projects with dispatchable hydropower energy – such as that which would be generated by the redeveloped Tarraleah Power Station – will be critical to supporting the achievement of Tasmania's renewable energy plan.

One of the key actions of the plan is the development of the Renewable Energy Coordination Framework, which supports the delivery of Tasmania's renewable energy roadmap.

[6] TasNetworks. North West Transmission Developments.

The Renewable Energy Coordination Framework's 4 pillars of success, shown in Figure 3, align with the Project's objectives. In particular, the Project:

- Utilises the existing Hydro Tasmania portfolio to deliver efficiencies.
- Is a low emissions alternative to other storage solutions.
- Delivers the additional clean on-island capacity to support private sector industry and enable both load and renewable energy investment.
- Supports economic and community benefits by placing downward pressure on wholesale electricity prices.[7]
- Delivers benefits to regional communities and job growth.[8]

Figure 3: Key pillars for success, Renewable Energy Coordination Framework

Source: Renewables, Climate and Future Industries Tasmania (2022)

Tasmanian Renewable Hydrogen Action Plan[9]

The Hydrogen Action Plan highlights that Tasmania has a natural advantage to produce renewable hydrogen due to its abundant and expanding renewable energy resources, which will be firmed by hydropower. From 2030, Tasmania plans to be a significant global supplier of renewable hydrogen for export and domestic use.

This creates opportunities for Hydro Tasmania to expand its hydropower assets. The Project will unlock additional on-island VRE and will allow load growth from the Hydrogen Action Plan as well as other growth drivers to be met.

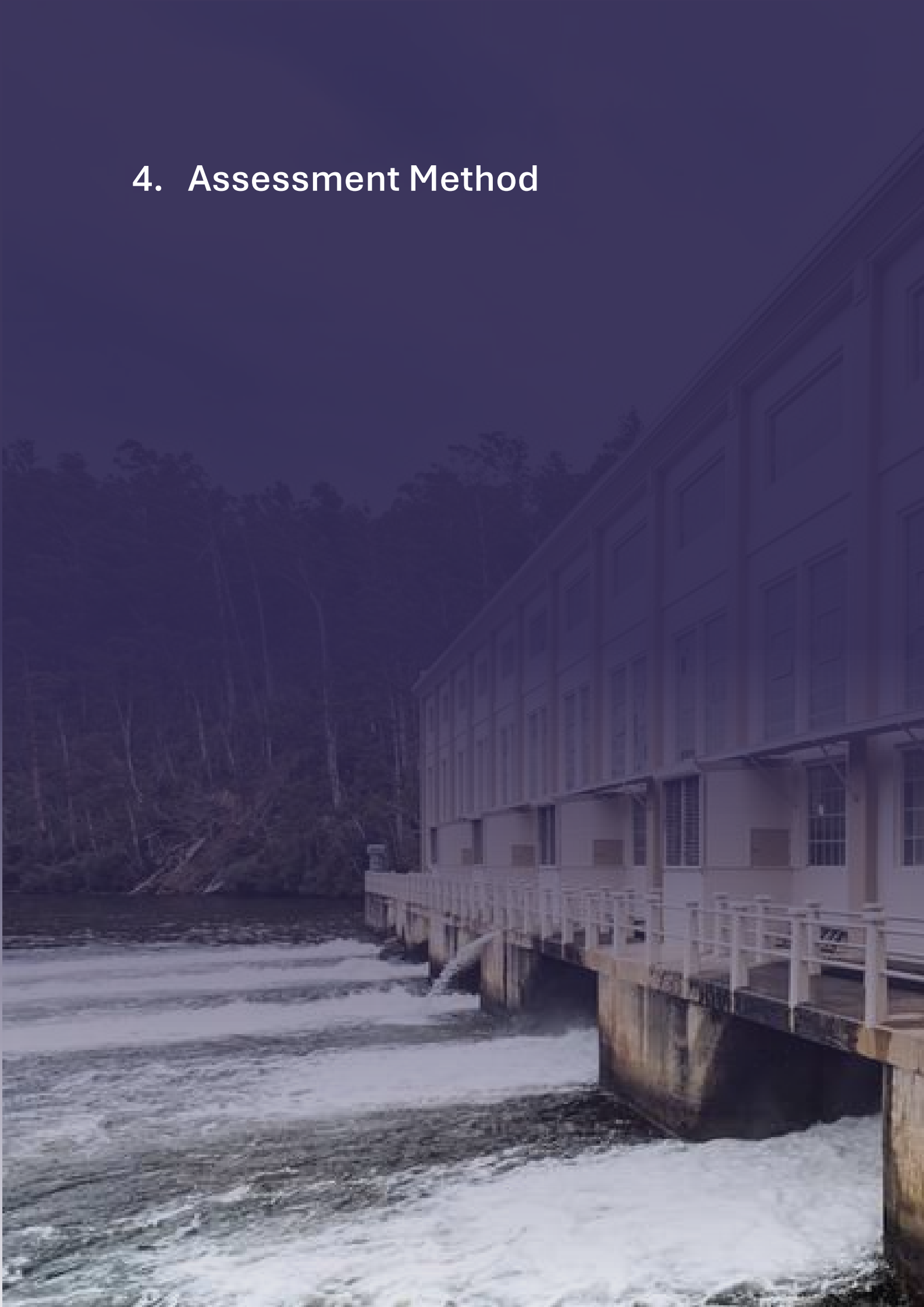
[7] Discussed in Section 6 of Preliminary Business Case - Tarraleah hydropower scheme redevelopment.
[8] Discussed in this report.
[9] Referencing Preliminary Business Case - Tarraleah hydropower scheme redevelopment.

3.3 Central Highlands Policy

SGS reviewed major themes of the Central Highlands Economic Development Stimulus Strategy[10] within the project catchment area. The Strategy emphasises furthering the local agricultural industry and supporting infrastructure, with limited mention of local energy production. However, the Project is anticipated to generally support local businesses and provide new infrastructure to the region, and will, therefore, generate outcomes which are aligned with themes of the Central Highlands Economic Development Stimulus Strategy.

[10] Central Highlands Council. (2024). Economic Development Stimulus Strategy.

4. Assessment Method



4. Assessment Method

This chapter outlines the Economic Impact Assessment approach, including the modelling framework, geography, limitations, and qualitative considerations.

4.1 Modelling Framework

Economic modelling was prepared by the Centre of Policy Studies (CoPS), a research centre located at Victoria University, Melbourne. CoPS' suite of Australian economic impact models includes several detailed, dynamic Computable General Equilibrium (CGE) models of Australia, which have been used to analyse many economic policies, including changes in taxes, tariffs, environmental regulations and competition policy.

Specific to evaluating the economic impacts associated with the Project, the Victoria University Regional Model (VURM), is a CGE model of Australia's six states and two territories. Each region is treated as an economy in its own right, with region-specific agents, region-specific prices and region-specific governments. The regions are connected via inter-state trade and the movements of labour and capital.

> The CGE model is a best-practice economic impact assessment tool, delivering the robust results needed for the approvals process.

The modelling framework used by the CoPS for quantifying the economic impacts involved three key steps:

1. Input capital and operational spending related to the Project (this data was provided to SGS by Hydro Tasmania; see Chapter 5.2 for details).
2. Modelling impacts at the state and territory level via the VURM, including for the state of Tasmania.
3. Disaggregating Tasmanian outputs to isolate impacts within the South East Tasmania SA4 and Hobart SA4 regional economy (see Chapter 4.2 below).[11]

Appendix A contains further information about the CGE model, its technical limitations and assumptions.

Modelling Limitations

Beyond the model's technical limitations, it is noted that at the time of writing this report, it was not feasible to quantify some operational impacts from the Project. While estimates of the Project's operational costs were provided to SGS, the following operational outcomes were not available to SGS:

[11] Statistical Areas Level 4 (SA4) is defined by the Australian Bureau of Statistics as the largest sub-State regions in the Main Structure of the Australian Statistical Geography Standard (ASGS).

- Hydro Tasmania revenue estimates from the Project, including the split of revenue from Tasmanian consumption and mainland Australia consumption.
- Quantification of the extent to which energy costs might be reduced for household, commercial or industrial consumers as a result of additional dispatchable capacity from the Project.

As such, it was not possible to estimate the spillover impacts (or consumption-induced impacts) related to such outcomes.

The operational benefits are discussed qualitatively in Chapter 6.2.

4.2 Modelling Geography

As required by the scoping requirements, the EIA was completed to provide outputs that characterise economic impacts at the regional and state levels (**Figure 4**), including:

- South East Tasmania SA4 and Hobart SA4, as defined by the Australian Bureau of Statistics (ABS).
- The entirety of Tasmania.

Figure 4: Modelling Geography

Source: SGS Economics & Planning (2024)

4.3 Interpreting Modelling Outputs

The outputs of the economic modelling provide quantifications of the direct, indirect and total economic impacts triggered by the capital investment and operational spending related to the Project:

- Direct impacts represent one component of total economic impact. It includes activities carried out or contracted out by Hydro Tasmania which relate specifically to the Project. They include labour employed, and wages paid for construction and ongoing operation. Examples of direct impact include activity in sectors such as construction, engineering and professional and technical services, etc., during the construction phase, and professional and technical, IT services, management, etc., during the operational phase.
- Indirect impacts represent the second component of total economic impact. Indirect impacts comprise production induced impacts and consumption induced impacts:
  - The activities associated with direct impacts have supply chains and linkages to other sectors of the economy, which in turn may have upstream supply chains and dependencies. These upstream activities associated with intermediate goods and services are indirect *production induced impacts*.
  - *Consumption induced impacts* are the spending wages that are directly and indirectly induced because of the Project; i.e. it is household consumption on goods and services in the economy which would not occur if the direct impacts do not occur
- Total impacts are the sum of direct and indirect impacts.

Metrics of Impact

The economic impacts related to the Project are reported in terms of the following key impact metrics:

- Gross state product (GSP) represents the value of all goods and services produced within the State. GSP is modelled as an aggregate figure of the multiple components that make it up, which include:
  - Investment which includes the purchase of machinery, buildings and other elements for business operations, both for those businesses directly involved in the Project and for those indirectly stimulated by it. Like household consumption, increased business investment is considered advantageous.
  - Imports is the value of goods and services imported from mainland Australia and overseas. An increase in imports reduces GSP because it is a transfer of wealth out of Tasmania for goods or services produced elsewhere.
  - Exports is the value of goods and services exported from Tasmania to mainland Australia and overseas. An increase in exports is considered advantageous.
  - Household consumption as a result of wages for those directly and indirectly employed as a result of the Project. In general, an increase in the value of goods and services consumed by households across the economy is considered advantageous.
- Gross regional product (GRP) is the regional equivalent of GSP. GRP measures the economic output of a specific geographical region, such as South East Tasmania SA4 and Hobart SA4 in this model, rather than the entire state.

- State gross value added (GVA), which is economic output minus the value of goods and services used as intermediate inputs in the production process. It is also broadly equivalent to the value of profits generated by regional enterprises plus the value of salaries and wages earned by regional workers.
- Regional and state employment in full-time equivalencies (FTE). 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.

  As outputs are provided yearly, this can be measured in *job-years*, which is a year of FTE work. This means that when total FTE is reported as an output, it does not mean that there are that many jobs created over the entire project period. Rather it means that there are that many job-years generated over the project period.

  Note that FTE job years is a measure of the location of the jobs, not the residential location of people who work in those jobs. For example, a Launceston resident commuting to the South East Tasmania SA4 for work in a given year would be captured as 1 FTE job year in the South East Tasmania SA4.
- Local, State and Federal Government revenue which accrues from a range of sources, including GST, payroll tax, conveyance duty and land tax. Note that this excludes the value of Hydro Tasmania dividends paid to the State Government.

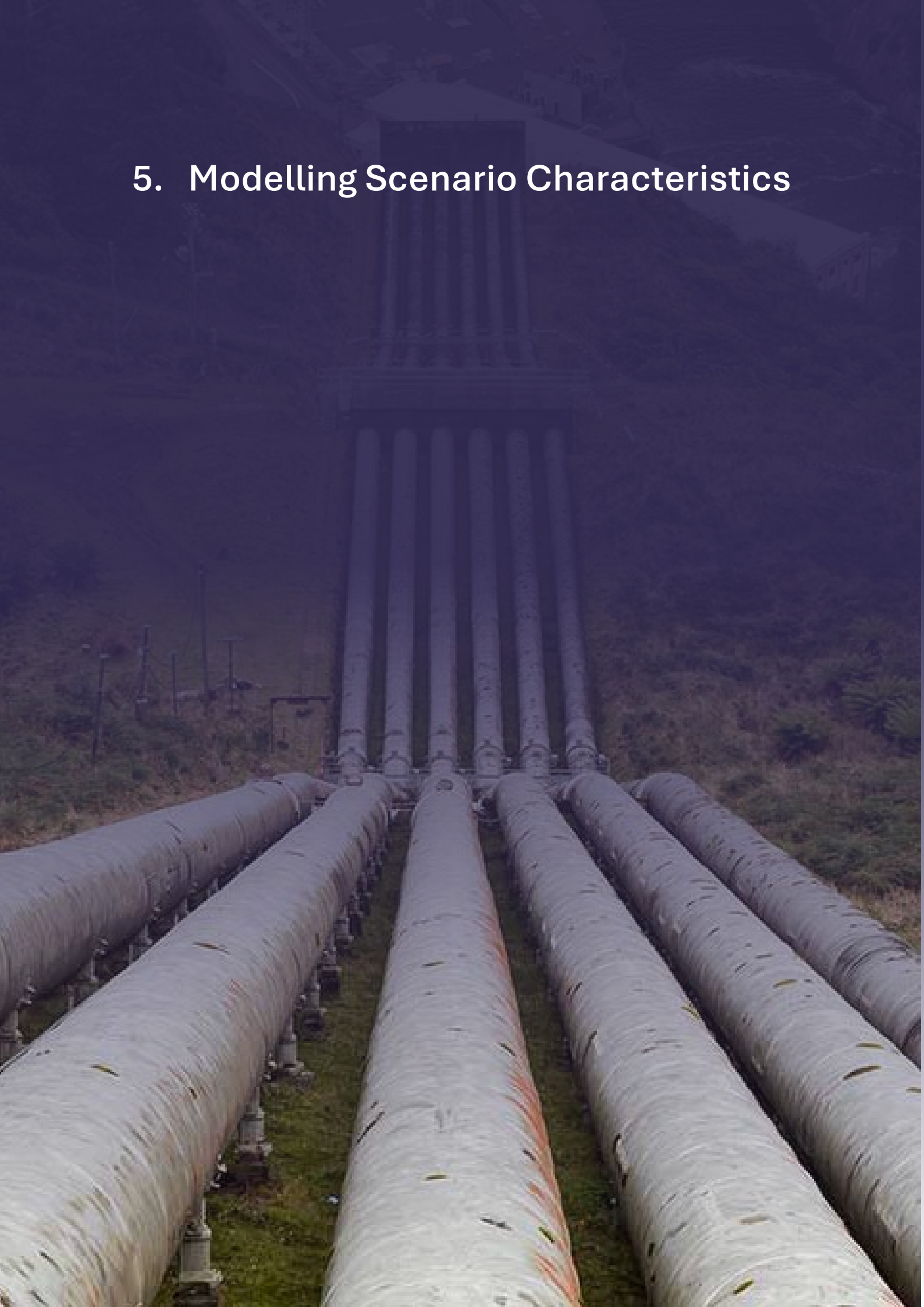
4.4 Qualitative Assessment and Considerations

To meet scoping requirements, this aspect of the EIA identifies considerations as to how the Project could economically impact South East Tasmania and Hobart in ways other than size of the economy and employment, including:

- First Nations Employment and Procurement Opportunities,
- Skills and Training Opportunities,
- Impacts on Tourism Industry,
- Local Benefits Sharing,
- Opportunity to Export Energy to Mainland Australia,
- State Energy Price and Market Implications,
- Impacts on Local Social Amenity and Community Infrastructure,
- Impacts on Land Values and Demand for Land and Housing,
- Implications on Coal-fired Power Plants and Regional Economies,
- Opportunity to Reduce Carbon Footprint,
- Opportunity to Support the Feasibility of Other Renewable Energy Projects,
- Local, State and Federal Government Revenues.

Information on these economic impacts is captured in Chapter 6.2 alongside the economic impact assessment modelling.

5. Modelling Scenario Characteristics



5. Modelling Scenario Characteristics

This chapter describes the modelling scenarios used to assess economic impacts of the Project. It characterises a status quo or business-as-usual (BaU) against the Project Case in terms of capital and labour requirements, which inform the inputs to the CGE model.

5.1 Business-as-Usual

In the BaU modelling scenario, the existing Tarraleah scheme would be decommissioned once the asset condition is assessed as untenable. Safe shutdown of the assets and infrastructure has been modelled to occur primarily from 2029 to 2031. From 2031, the assets would not be in operation and therefore would not pose a direct risk of an environmental incident. Expenditure has not been allowed for removal and rehabilitation of assets to restore the scheme footprint to an original state.

From 2031 onwards, a marginal annual operating cost has been assumed to ensure the remaining assets pose no further detrimental community safety or environmental risk.

The decommissioning costs associated with the BaU scenario are provided below.[12]

Table 6: Tarraleah Decommissioning Costs, BaU, 2024-2061

Location	Total
South East Tasmania SA4 and Hobart SA4	$48 million
Rest of Tasmania	N/A
Mainland Australia	N/A
International	$6 million
Total	**$54 million**

Source: Hydro Tasmania

5.2 The Project Case

This section outlines the capital and operational characteristics of the Project, which, as noted above, are direct inputs into the CGE modelling.

[12] Hydro Tasmania advised that the decommissioning case modelled is unlikely and some refurbishment would likely be developed to manage the risks associated with the existing Tarraleah scheme while keeping the power station operational in some capacity. This 'decommissioning case' was assumed because at the time of preparing this report, an alternative option was not sufficiently developed to enable it to be costed and its economic impacts modelled.

5.2.1 Project Overview

The Project involves building a new Tarraleah Power Station, decommissioning three existing power stations[13] and constructing a new pressurised conveyance to bypass the existing No. 1 conveyance. The redeveloped scheme will include the following key works:[14]

- Approved upgrade works currently under construction. This includes a new intake on Lake King William, a 1-kilometre connecting intake tunnel, a new intake tower, a spillway upgrade on Mossy Marsh Lagoon and minor access and road works.
- Connection of the Lake King William intake (upgrade works) to a 4.2-kilometre-long 61 m^3/s capacity surface pipeline, which would connect to a 9-kilometre-long headrace tunnel, incorporating a mid-tunnel surge pond.
- Construction of a 2.5-kilometre-long power tunnel, connecting the headrace tunnel at the base of the surge shaft to the power station. The tunnel will feed directly into a new power station comprising of 2 x 100 MW Francis machines.
- Construction of the new power station on the terrace platform provided by the existing Tarraleah Switchyard with long axis orientated parallel to the Nive River.
- Construction of a surge shaft rising from the power tunnel, connected to a 70-metre-high surge tower providing governing capability and surge protection during load rejections. Water collected by existing catchments downstream of Clark Dam including Derwent Pumps and the Wentworth Diversions would continue to flow into Mossy Marsh and then No. 2 Pond from where they are diverted into the scheme via a pumping station connected into the surge tower.
- A new 16-kilometre transmission line connecting the new power station to the existing Liapootah - Palmerston transmission line.
- Redundant assets are decommissioned and made safe e.g. Nieterana Mini-hydro Power Station, Butlers Gorge Power Station, Tarraleah Power Station, existing Tarraleah conveyances and Tarraleah No. 1 Pond.

5.2.2 Project Construction

The construction phase of the Project is anticipated to commence in 2025[15] and conclude in 2032 (totalling 8 years). Total construction cost is currently estimated to be $1.87 billion. Approximately 60 per cent of capital costs is anticipated to occur within Tasmania, while the remaining costs will be split between mainland Australia and international suppliers and contractors as detailed in **Table 7**.

[13] Tarraleah Power Station, Butlers Gorge Power Station and the Nieterana Mini-Hydro Power Station.

[14] Preliminary Business Case – Tarraleah hydropower scheme redevelopment

[15] Correct at the time of reporting. Modelling is based on 2024$ and demographic data. Actual construction commencement is likely 2027.

Table 7: Project Construction Cost, 2025-2031

Location	Total
South East Tasmania SA4 and Hobart SA4	$0.19 billion
Rest of Tasmania	$0.94 billion
Mainland Australia	$0.50 billion
International	$0.26 billion
Total	**$1.87 billion**

Source: Hydro Tasmania (2024)

Based on annual average FTE workforce inputs provided by Hydro Tasmania and derived from current Project planning, the Project is expected to have a direct construction workforce of 1,330 full-time equivalent (FTE) job-years. Approximately 30 per cent of workers are anticipated to be sourced locally within Tasmania as presented in Table 8. Workforce development analysis undertaken by Hydro Tasmania suggests that a high proportion of mainland Australian workers will be required in part due to local industry capacity constraints, the specific specialised skillsets required (e.g. for tunnelling) and skills shortages in the Tasmanian labour force.

Table 8: Full Time Equivalent (FTE) Job-year Requirements of Project Construction, 2025-2031

Location	Total
South East Tasmania SA4 and Hobart SA4	399
Mainland Australia	931
Total	**1,330**

Source: Based on annual average FTE workforce inputs provided by Hydro Tasmania (2024)
Note: There will be international jobs created during construction phase; however these are not relevant to the economic modelling, therefore have been excluded from the table.

No labour requirements for the BaU scenario were provided. This means that, depending on the labour requirements of such a scenario – though it is not realistic – the incremental FTE requirements of this project may be overstated in Table 8.

5.2.3 Project Operation

Following construction, the Project will have an ongoing impact related to operations and maintenance. These operational requirements include labour and associated wages, as well as payments to suppliers for equipment or contracted services.

The technical model assumes that the operational phase will commence in 2033 and conclude in 2062 (totalling 30 years). This is a conservative modelling period, as the operating life of the Project will be significantly longer than 30 years. The annual operational costs are estimated to be $5 million and will likely be incurred within Tasmania. Total operational costs amount to approximately $144 million over the 30-year operational phase.[16]

Operating revenue was not considered as part of CGE modelling[17], however, the Tarraleah PBC states that the selected option "has a positive net present value under all market scenarios, indicating that it consistently delivers better commercial outcomes than the minimum refurbishment option."

[16] Operational costs have been provided to SGS by Hydro Tasmania.

[17] This information was not contained in the redacted Tarraleah PBC and there are various complexities relating to revenue that could not be accounted for in the CGE model. These complexities relate to uncertainty regarding the future energy production mix in Tasmania and mainland Australia, the delivery of supporting energy infrastructure, and population growth and energy demand.

6. Economic Impact Assessment

6. Economic Impact Assessment

This chapter details both quantitative results and qualitative considerations to the economic impacts associated with undertaking the Project.

6.1 Quantitative economic impacts

This section details the outputs of the economic modelling for the Project. It discusses the impacts on regional and state economies in terms of Gross State Product (GSP) and Gross Regional Product (GRP), Gross Value-Added (GVA) and Full-Time Equivalent (FTE) jobs. Refer to Chapter 4.3 for the definition of these metrics.

6.1.1 Gross State Product (GSP) and Gross Regional Product (GRP)

This section provides details of the modelled GSP and GRP for the Project.

Gross State Product (GSP)

The Project is expected to increase GSP over the BaU by approximately $1.6 billion through construction and operations across the state (Table 9).

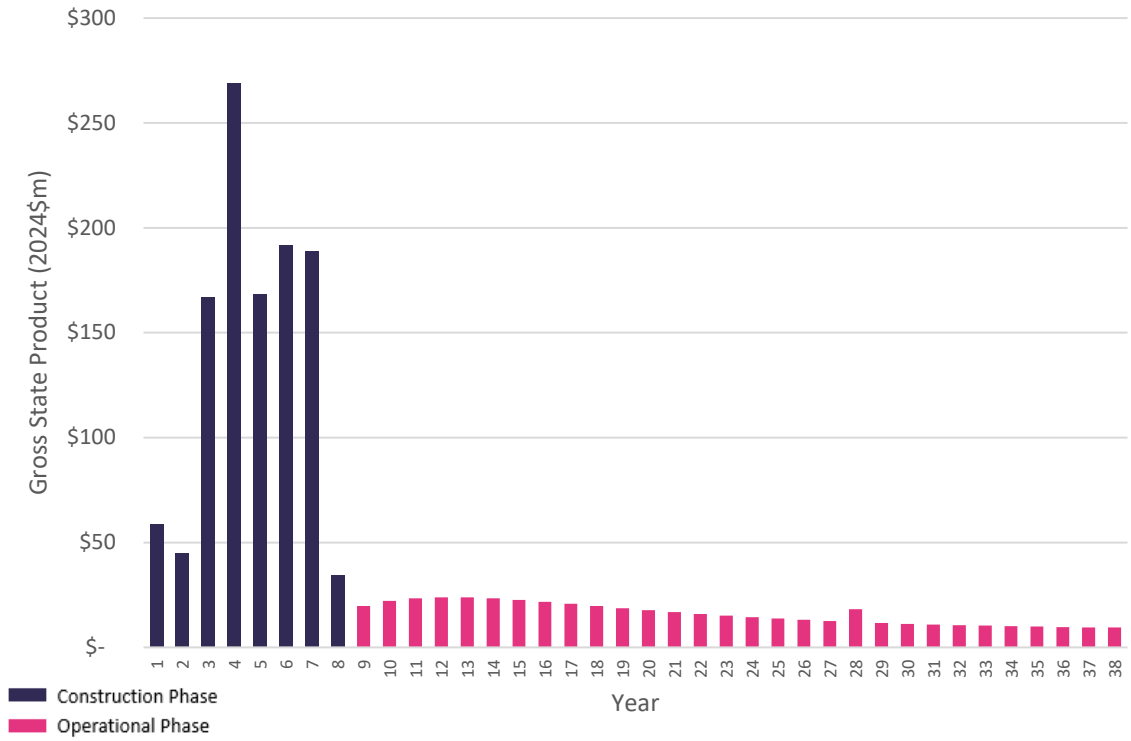
- During the 8-year construction phase, the Project is expected to increase GSP above the BaU by approximately $1.12 billion, at an average of $140 million per annum.
- During 30 years of modelled operations, the Project is expected to increase GSP above the BaU by approximately $0.48 billion ($480 million), at an average of $16 million per annum.
- In terms of peak economic activity, the economic modelling indicates that capital investment related to construction in Year 4 generates the most impact, with over $320 million in GSP generated in the state (Figure 5).

Table 9: Gross State Product (2024), Tasmania, Year 1-38

Tasmania	Total GSP	Average Annual GSP
Construction Phase (Year 1 – 8)	$1.12 billion	$140 million
Operational Phase (Year 9 – 38)	$0.48 billion	$16 million
Total impact	**$1.60 billion**	-

Source: SGS Economics and Planning and Centre of Policy Studies (2024)

Figure 5: Gross State Product (2024$m), Tasmania, Year 1-38



Source: SGS Economics and Planning and Centre of Policy Studies (2024)

Contributions to GSP

Contributing to total GSP are a few main components of economic activity (Table 10):

- Investment – generally equivalent to direct capital investment associated with the Project, as well as other related investments that are made by indirect industry for the purchase of equipment, for example, or the acquisition of goods and services that function as inputs to the delivery of the Project. In Tasmania, total investment is comprised of the capital investment associated with construction and operations of the project, as well as investment made by indirect industry. This amounts to $2.41 billion over construction and operations.
- Imports – goods or services imported from outside the state economy that are required to deliver the Project. This amounts to $1.31 billion over construction and operations.
- Exports – the direct investment in the Project is expected to reduce the demand for goods and services exported from the state by approximately $0.14 billion ($140 million) over construction and operations.
- Household consumption – spending by households associated with employment in the direct and indirect industries linked to the delivery of the Project. Household consumption includes spending on the full range of retail goods and services, finance and insurance, education, healthcare, etc. This amounts to approximately $0.65 billion ($650 million) million over construction and operations.

Table 10: Contributions to Total GSP (2024), Tasmania, Year 1-38

	Impact on GSP	Construction Phase	Operational Phase	Total impacts
Investment	Positive	$2.06 billion	$0.35 billion	$2.41 billion
Imports	Negative	$1.10 billion	$0.22 billion	$1.31 billion
Exports	Positive	-$0.28 billion	$0.14 billion	-$0.14 billion
Household Consumption	Positive	$0.44 billion	$0.21 billion	$0.65 billion
Gross State Product	-	**$1.12 billion**	**$0.48 billion**	**$1.60 billion**

Source: SGS Economics and Planning and Centre of Policy Studies (2024)
Note: not all numbers sum due to rounding

Gross Regional Product (GRP)

In the South East Tasmania SA4 and Hobart SA4, the Project is expected to increase GRP above the BaU by approximately $298 million across construction and operations (Table 11).

- During the 8-year construction phase, the Project is expected to increase GRP above the BaU by approximately $213 million, at an average of $27 million per annum.
- During 30 years of modelled operations, the Project is expected to increase GRP above the BaU by $85 million, at an average of around $3 million per annum.
- The peak annual impact occurs in Year 4, with over $50 million generated in the region in that year (Figure 6).

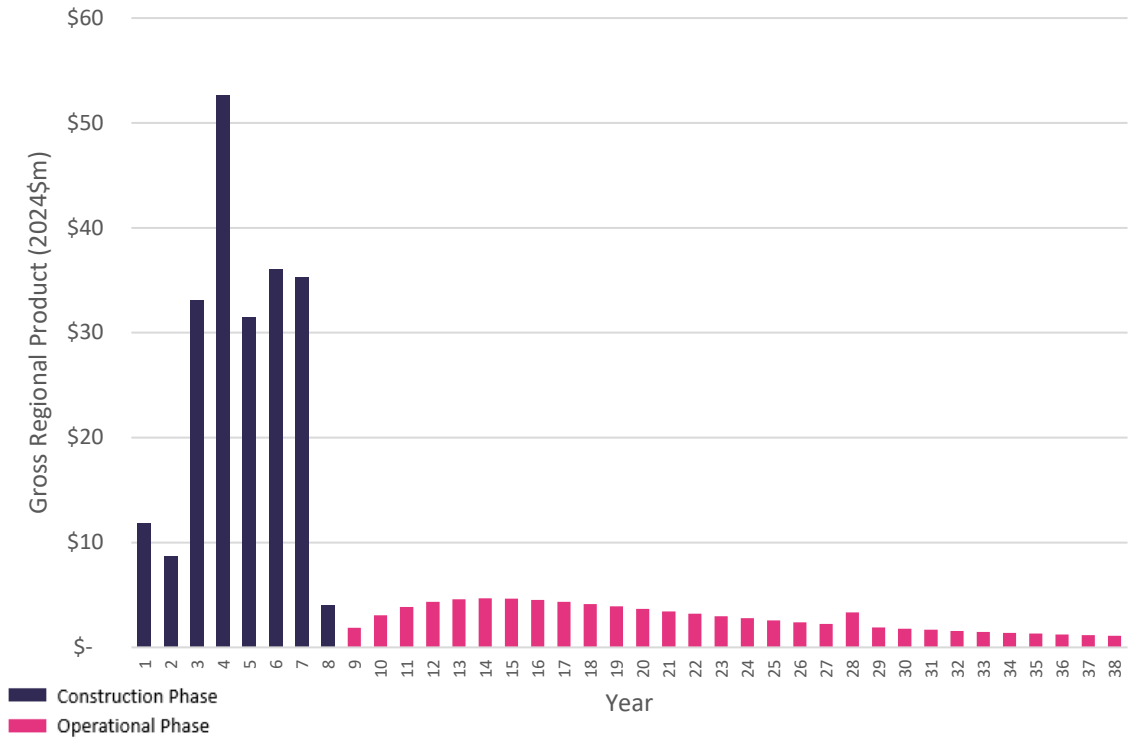
Gross regional product breakdown by household consumption, investment, exports and imports is not available at the South East Tasmania SA4 and Hobart SA4 level due to modelling limitations.

Table 11: Gross Regional Product (2024), South East Tasmania SA4 & Hobart SA4, Year 1-38

South East Tasmania SA4 & Hobart SA4	Total GRP	Average Annual GRP
Construction Phase (Year 1 – 8)	$213 million	$27 million
Operational Phase (Year 9 – 38)	$85 million	$3 million
Total impact	**$298 million**	-

Source: SGS Economics and Planning and Centre of Policy Studies (2024)

Figure 6: Gross Regional Product (2024$m), South East Tasmania SA4 and Hobart SA4, Year 1-38



Source: SGS Economics and Planning and Centre of Policy Studies (2024)

6.1.2 Gross Value Added (GVA)

In Tasmania, the Project, including its indirect effects, is expected to contribute **$1.34 billion** above the BaU to the state economy through construction and operations (**Table 12**).

- During the 8-year construction phase, the Project is expected to add approximately $0.96 billion ($960 million) to the state economy, at an average of $120 million per year.
- During 30 years of operations, the Project is expected to add $0.38 billion ($380 million) to the state economy, at an average of $13 million per year.
- The peak annual impact occurs in Year 4, with an annual contribution of $230 million (**Figure 7**).

Given the capital-intensive nature of the project, approximately 60 per cent of the value added (or $780 million) is contributed by the construction industry. This amount dwarfs the contributions across all other industries.

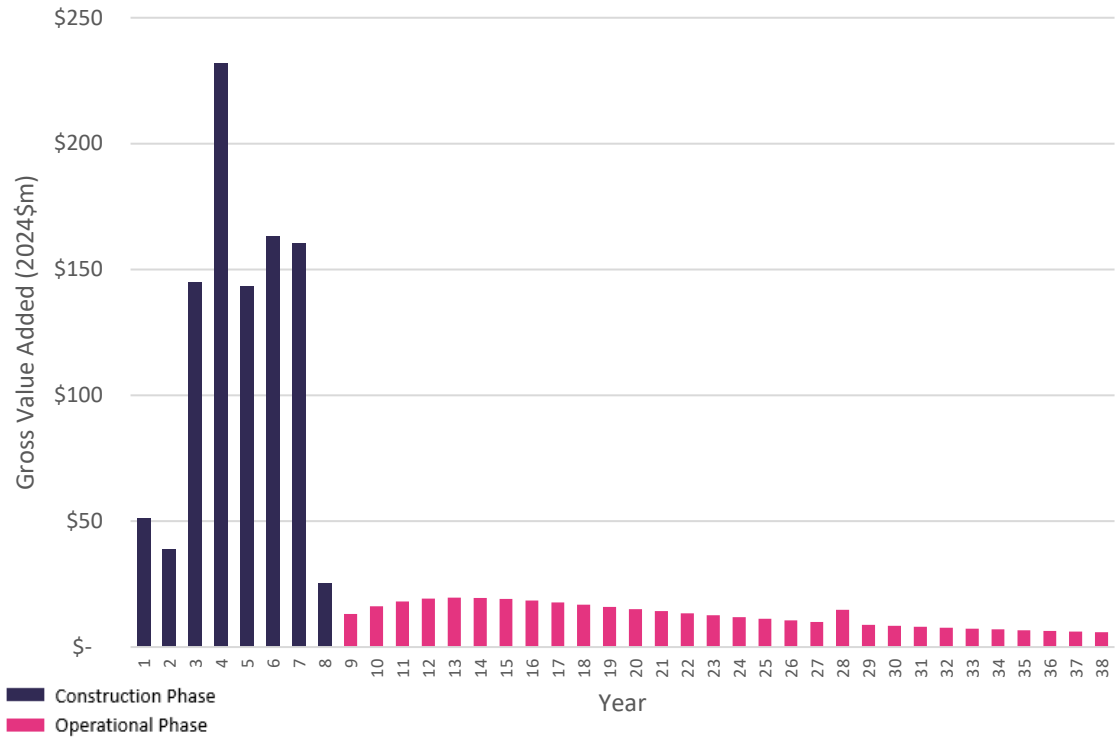
Gross value added estimation is not available at the South East Tasmania SA4 and Hobart SA4 level due to modelling limitations.

Table 12: Gross Value Added (2024), Tasmania, Year 1-38

Tasmania	Total GVA	Average Annual GVA
Construction Phase (Year 1 – 8)	$0.96 billion	$120 million
Operational Phase (Year 9 – 38)	$0.38 billion	$13 million
Total impact	**$1.34 billion**	-

Source: SGS Economics and Planning and Centre of Policy Studies (2024)

Figure 7: Gross Value Added (2024$m), Tasmania, Year 1-38



Source: SGS Economics and Planning and Centre of Policy Studies (2024)

6.1.3 Full Time Equivalent Jobs

In Tasmania, the Project, including its indirect effects, is expected to generate approximately 2,203 FTE job-years over construction and operations, of which approximately 515 FTE job-years will be added to South East Tasmania SA4 and Hobart SA4 workforce. As explained in Section 4.3, a job-year is defined as one full-time equivalent job employable for one calendar year. As an example, one worker employed full time for five years during construction would be reported as five FTE job-years.

Labour force impacts in Tasmania

In Tasmania, the Project including its indirect effects is expected to generate approximately 2,203 FTE job-years over construction and operations (**Table 13**).

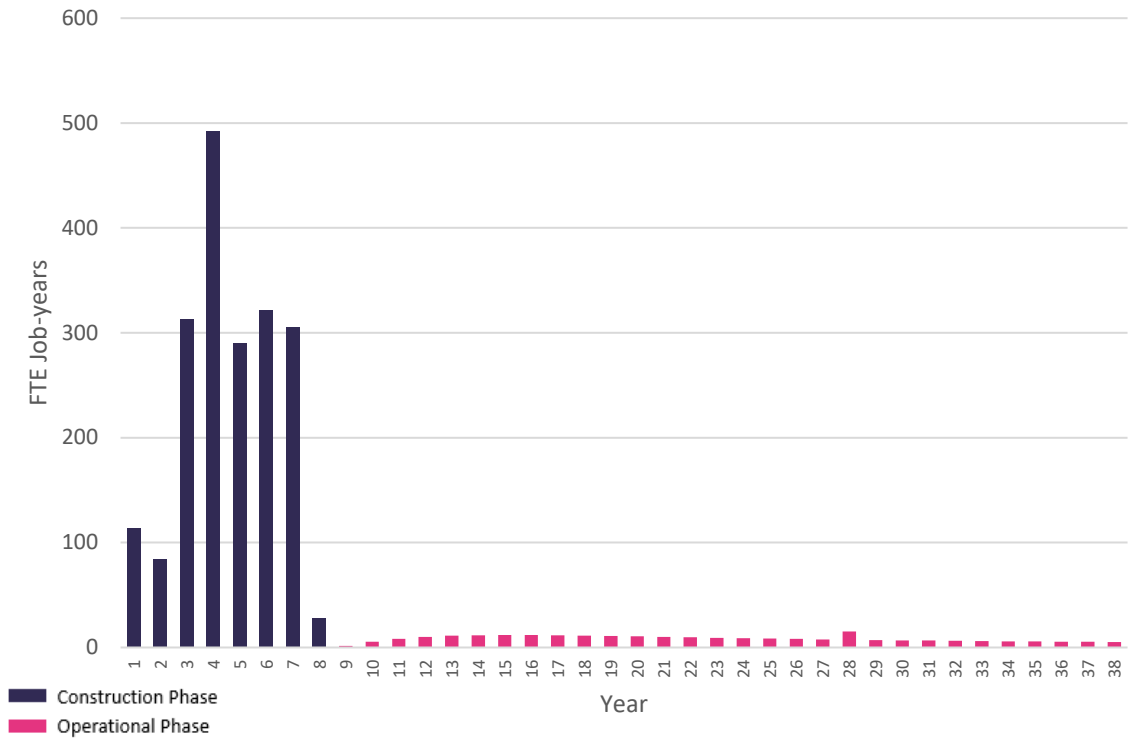
- During the 8-year construction phase, the Project is expected to generate 1,949 FTE job-years, at an average of approximately 244 FTE jobs per annum.
- During 30 years of modelled operations, the Project is expected to generate approximately 254 FTE job-years, at an average of 8 FTE jobs per annum.
- The peak annual impact occurs in Year 4, with over 490 FTE jobs generated in the state economy in that year (**Figure 8**).

Table 13: Labour force impacts (FTE job-years), Tasmania, Year 1-38

Tasmania	Total FTE job-years	Average Annual FTE job-years
Construction Phase (Year 1 – 8)	1,949	244
Operational Phase (Year 9 – 38)	254	8
Total impact	**2,203**	-

Source: SGS Economics and Planning and Centre of Policy Studies (2024)

Figure 8: Labour force impacts (FTE job-years), Tasmania, Year 1-38



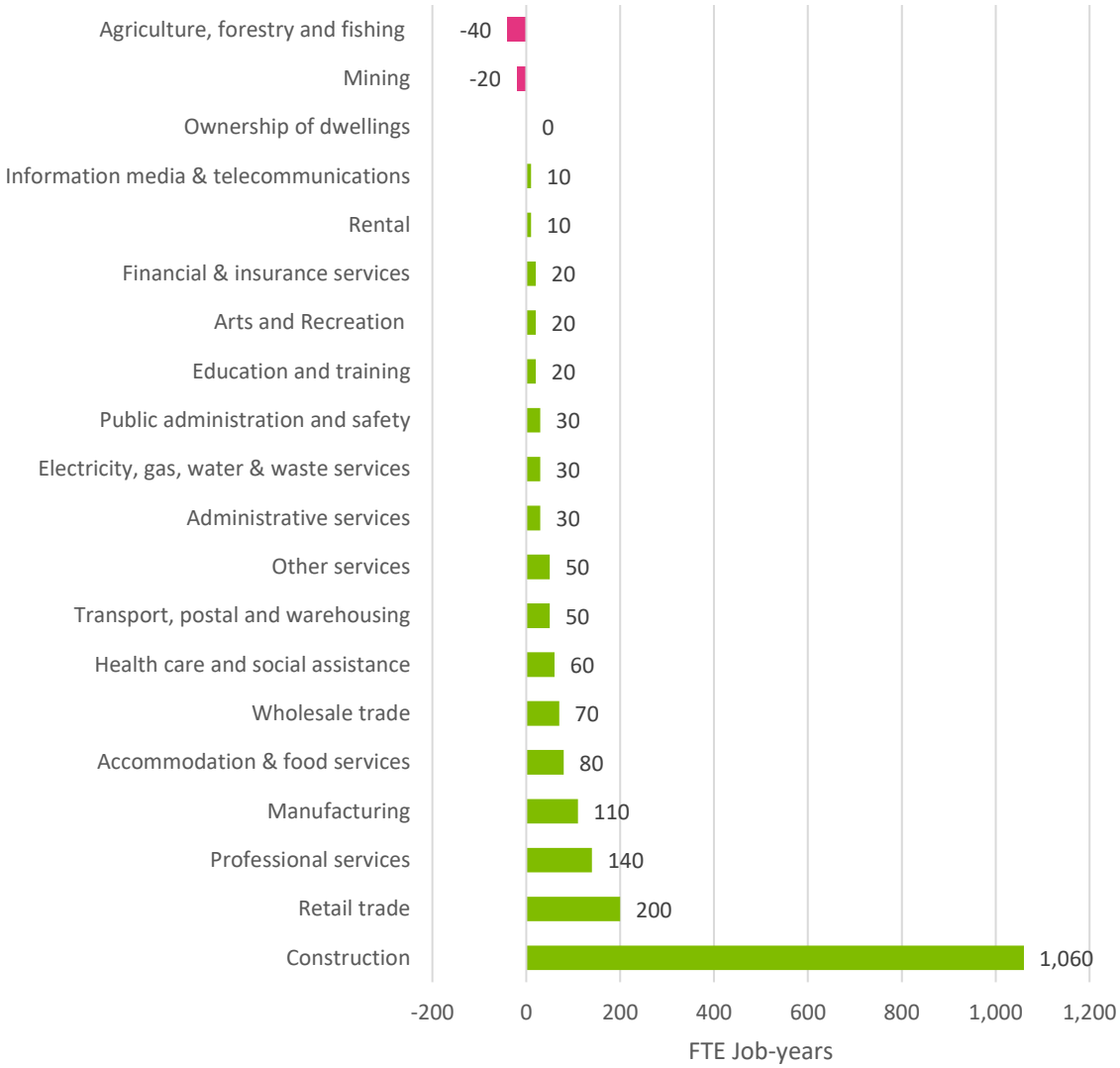
Source: SGS Economics and Planning and Centre of Policy Studies (2024)

Figure 9 illustrates labour demand during construction, including both direct labour (e.g., direct construction) and indirect labour (e.g., production-induced jobs in construction and manufacturing sectors, and consumption-induced jobs such as retail). During construction, employment will be concentrated in the construction industry, which is responsible for almost one third of the employment

generated (or 1,060 FTE job-years). Retail trade is responsible for an additional 10 per cent of FTE job-years (200 FTE job-years) in the Tasmanian workforce, followed by the professional services industry which added 7 per cent (140 FTE job-years).

On the other end of the spectrum, modelling illustrates a net negative impact to agriculture, forestry and fishing (-40 FTE job-years) and mining (-20 FTE job-years) during construction. This output is a direct reflection of a constrained labour market, i.e., that labour will likely be pulled away from these sectors during construction to fill labour demand for construction of the Project.

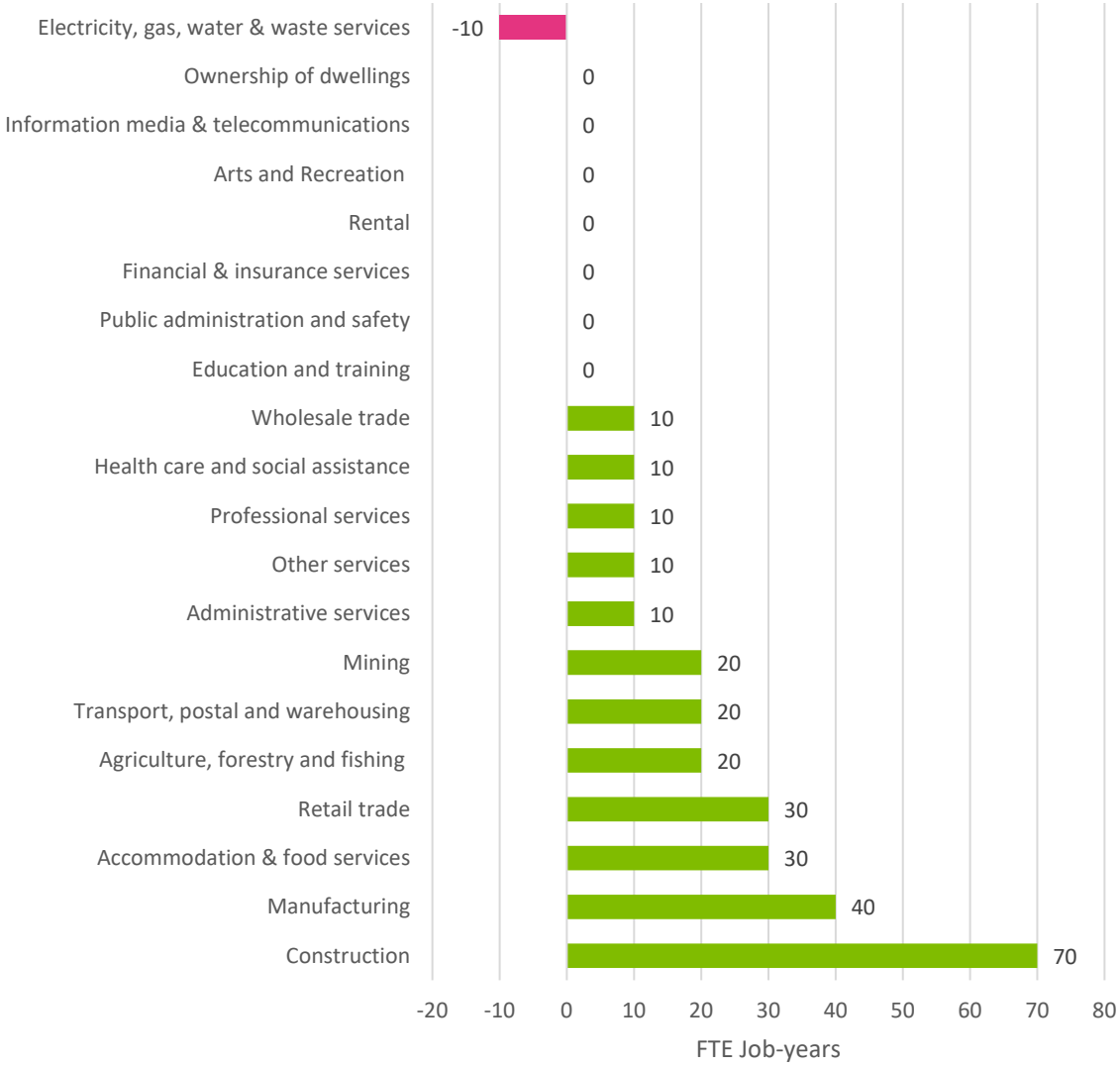
Figure 9: Labour force impacts by industry (FTE job-years), Tasmania, Construction Phase (Year 1-8)



Source: SGS Economics and Planning and Centre of Policy Studies (2024)

Figure 10 illustrates labour demand by industry during the 30-year modelling time horizon. Outputs indicate that labour demands will continue to draw from the construction sector (27 per cent of total employment, or 70 FTE job-years), followed by manufacturing (16 per cent of FTE job-years, or 40 FTE jobs years), then accommodation and food services and retail trade which are each responsible for an additional 11 per cent of FTE job-years added to the Tasmanian workforce (30 FTE job-years each).

Figure 10: Labour force impacts by industry (FTE job-years), Tasmania, Operational Phase (Year 9-38)



Source: SGS Economics and Planning and Centre of Policy Studies (2024)

Labour force impacts in South East Tasmania SA4and Hobart SA4

In the South East Tasmania SA4 and Hobart SA4, the Project is expected to generate approximately 515 FTE job-years over construction and operations (Table 14).

- During the 8-year construction phase, the Project is expected to generate over 451 FTE job-years, at an average of 56 FTE jobs per annum.

- During 30 years of operations, the Project is expected to generate 64 FTE job-years, at an average of around 2 FTE jobs per annum.
- The peak annual impact occurs in Year 4, with over 110 FTE jobs generated in the region in that year (Figure 11).

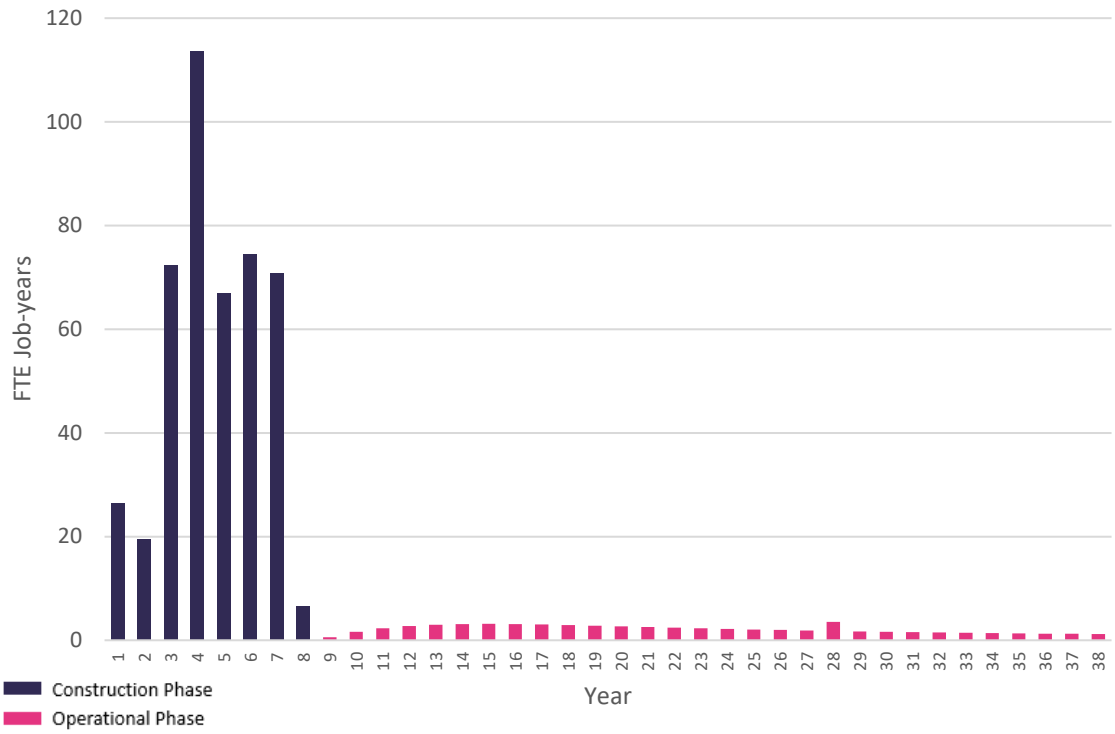
Labour force impacts by industry breakdown is not available at the South East Tasmania SA4 and Hobart SA4 level due to modelling limitations.

Table 14: Labour force impacts (FTE job-years), South East Tasmania SA4 & Hobart SA4, Year 1-38

South East Tasmania SA4 & Hobart SA4	Total FTE job-years	Average Annual FTE job-years
Construction Phase (Year 1 – 8)	451	56
Operational Phase (Year 9 – 38)	64	2
Total impact	**515**	-

Source: SGS Economics and Planning and Centre of Policy Studies (2024)

Figure 11: Labour force impacts (FTE job-years), South East Tasmania SA4 & Hobart SA4, Year 1-38



Source: SGS Economics and Planning and Centre of Policy Studies (2024)

6.2 Qualitative economic impacts, opportunities and externalities

This section details the economic impacts, opportunities and externalities related to the Project. These include:

1. First Nations Employment and Procurement Opportunities
2. Skills and Training Opportunities
3. Impacts on Tourism Industry
4. Local Benefits Sharing
5. Opportunity to Export Energy to Mainland Australia
6. State Energy Price and Market Implications
7. Impacts on Local Social Amenity and Community Infrastructure
8. Impacts on Land Values and Demand for Land and Housing
9. Implications on Coal-fired Power Plants
10. Opportunity to Reduce Carbon Footprint
11. Opportunity to Support the Feasibility of Other Renewable Energy Projects
12. Local, State and Federal Government Revenues

They are discussed sequentially below.

6.2.1 First Nations Employment and Procurement Opportunities

As discussed in Chapter 6.1, the construction and operations phases of the Project will generate direct and indirect jobs across a range of industries including construction, accommodation and food, manufacturing and retail. The extent to which economic opportunities will be made available to First Nations peoples through employment and procurement policies, processes and procedures is a key focus for Hydro Tasmania.

Aboriginal People are the original custodians of the land on which the Project's economic benefits will materialise. According to the 2021 ABS census, there are around 14,400 Aboriginal and/or Torres Strait Islander people in the South East Tasmania SA4 and Hobart SA4 regions of Tasmania and 30,200 in the State. Through the construction and operations of the Project, there is an opportunity to provide First Nations people with access to employment opportunities as well as First Nations-owned businesses with procurement opportunities.

Consultation conducted by Hydro Tasmania as part of the Social Impact Assessment for the Project identified a range of barriers to participation and engagement of Aboriginal and Torres Strait Island people.

Hydro Tasmania has developed a local content framework including social procurement component and is also developing a First Nations Participation Strategy. These initiatives will inform the development of clear outcomes for First Nations participation prior to and during construction, as well as a suite of actions to support these outcomes. Outcome specifically related to the Project include:

- Employment and training
- Land management
- Cultural recognition
- Business development
- Knowledge sharing
- Community health and wellbeing
- Heritage management
- Access to country.

Hydro Tasmania will develop detailed employer's requirements for project construction. The lead contractor will be required to comply with these requirements, and the requirements will include specifications such as:

- First Nations employment and training; and
- First Nations local industry participation.

The social procurement component of the Local Content Framework, in addition to other objectives, seeks to identify efforts and actions to increase the economic opportunities for First Nations communities. This includes taking advantage of estimated employment resulting from construction and operations of the Project.

6.2.2 Skills and Training Opportunities

The job creation impacts associated with the Project span numerous industries (as illustrated in **Figure 9**). These jobs are anticipated to span a diverse range of occupational categories, from administrative to managerial and executive functions as well as trades and labour in the construction industry. The extent to which the broader local and regional labour forces will benefit from such economic opportunities is a key focus for Hydro Tasmania.

At issue are:

- Whether and to what extent the local labour force possesses or lacks the capacity and skills to fill jobs required for the construction or operations of the Project, and
- Where there are capacity and skills gaps, what opportunities exist to address them through training and upskilling the local workforce.

These issues and opportunities are important to consider, as the demand for imported labour, or FIFO workers, has economic implications, and the positive impacts of increasing the share of local or Tasmanian based workers can be significant. Workers and their households typically spend most of their wages or income in the region where they live. This implies that a significant portion of the total wage surplus (a component of GVA discussed in Section 6.1) generated by the Project is likely to be spent outside of the state and in mainland Australia. High-level modelling indicates that replacing around half of the 931 job years associated with FIFO workers with Tasmanian-based residents may increase GSP by around $105 million across the construction period, primarily due to household consumption effects.[18]

[18] This analysis is based on redistributing a portion of the household consumption component relative to relocating 465.5 job-years (i.e. half of the 931 job-years associated with FIFO workers). There are several limitations to this approach; 1. The increase in household consumption is due to the increase in FTE job years and existing workers earning higher incomes. Redistributing consumption by FTE job years does not account for existing workers earning higher incomes and, therefore, the analysis may overstate

Overcoming (or partly addressing) the following challenges, identified by Hydro Tasmania, are relevant to improving the capability and capacity of the Tasmanian workforce relevant to the Project:

- There is a lack of alignment between the skills needed for the local and regional labour force to benefit from such opportunity and the small number of people locally studying these skills, such as science, technology, engineering and mathematics, which are recognised as highly critical in the renewable energy space.
- There is a year-on-year decrease in the number of students enrolling in school, reducing the available workforce.
- There are many barriers to workforce participation particularly in rural and remote regions where transport and access to education is challenging.
- The undersupply of qualified trainers for mechanical and electrical trades in Tasmania's VET system is hampering the number of training positions and providing challenges for existing students to complete their apprenticeships.
- Teachers lack the knowledge and awareness to connect students with local career opportunities and are instead focused on behavioural management.
- Some VET certificates can be cost-prohibitive for small to medium enterprises and individuals; for example, Traffic Controller Training.
- Providing continuity of employment in the construction industry as major projects commence and complete, to maintain capacity in the Tasmanian labour force.

In terms of initiatives, Hydro Tasmania is committed to guiding its procurement in line with Australian industry standards (such as the Australian Skills Guarantee and the Tasmanian Building and Construction Training Policy) and will encourage local employment and training through obligations imposed on the contractor through its employer's requirements for the construction phase. Some possible measures for Hydro Tasmania to explore include:

- Developing a local industry participation plan (LIPP) for the construction phase of the project.
- Alignment with the initiatives indicated in the 2024 Tasmanian Government Youth Jobs Strategy.
- Structuring skill development pathways through partnerships with peak bodies, government agencies, RTO's NGO's, TAFEs or the University of Tasmania.
- Collaborate with and utilise the Civil Construction Federation's Earthworks Training Academy to grow civil skills and experience.
- Support local existing and successful training programs.
- Collaborate with Department of Children & Young People (DECYP) VET Y9-12 to develop in school training that aligns to employment outcomes.
- Partnering with the DECYP Derwent Collective to offer work exposure experiences for Y 7-12.
- Develop strategies to attract and train a diversity of people (women, workforce re-entry, career change).

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the impacts. 2. The types of jobs undertaken by Tasmanian and mainland Australian residents may not necessarily be associated with the same income.

- Seek to understand and collaborate to overcome the barriers to training and employment.
- Collaborate with DEWR Employment Facilitator South and the South-Central Workforce Hub to leverage off Commonwealth and State employment funding and training programs.
- Encourage the supply chain to create apprenticeships for youth, workers transitioning out of other sectors, or the First Nations population.
- Pursuit of procurement practices in line with Australian Industry Standards.
- Setting local procurement targets (including for First Nations businesses) for the engineering, procurement and construction (EPC) contractor
- Establishing a Social Impact Management Plan (SIMP) for the project. The SIMP will detail the key actions and partnerships to deliver desired outcomes across a range of thematic areas including employment and training, and economic development. The SIMP will also guide monitoring and evaluation of performance relating to skills and training development during the construction phase.

For large infrastructure works like the Project, such skills and training initiatives can grow the size and capabilities of the Tasmanian workforce, thus reducing reliance on FIFO workers from mainland Australia and increase downstream household consumption impacts related to the Project.

6.2.3 Impacts on Tourism Industry

A key issue is whether and to what extent existing tourism-oriented business operations may be impacted or benefit by the construction and operations of the Project.

Hydro Tasmania owns the Tarraleah Village, which is intended for use by the Owner's Team during construction. While this is likely to displace some tourists from the region during construction, the net impact on tourism-related industries (as measured by the economic modelling) is positive. In particular:

- GVA for the Retail Trade industry is estimated to be approximately $4.2 million higher per annum (than the BaU) during construction and approximately $0.36 million higher per annum than the BaU during operations.
- GVA for the Accommodation and Food Services industry is modelled to be approximately $1.5 million higher per annum than the BaU during construction and approximately $0.25 million higher per annum than the BaU during operations.

Consideration for these quantitative findings suggest that although the impacts and disruption to some tourism-oriented business during construction may be material and require mitigation measures, the overall impact to tourism (as measured by spending in Retail Trade and Accommodation and Food Service) is net positive by contrast to the BaU.

Mitigation measures which would aim to identify and mitigate adverse impacts could include but may not be limited to:

- Development of a SIMP, which would include a focus on impacts on the tourism industry
- Local Benefits Sharing Action Plan.

6.2.4 Local Benefits Sharing

A Local Benefit Sharing Strategy has been developed by Hydro Tasmania for the Major Projects. The strategy establishes a requirement for the development of a Local Benefit Sharing Action Plan for the Project that involves local community members in co-designing benefit-sharing initiatives. Local Benefit Sharing (LBS) is defined as deliberate measures undertaken by Project proponents to share the benefits of the development with host communities. Such measures go beyond statutory requirements related to compensation and mitigation measures, and are additional to socio-economic or environmental risk mitigation and other compliance obligations. The LBS Strategy has three mechanisms for delivering local benefits:

1. Developing the project reference designs, including encouraging EPC Contractors throughout the early contractor involvement (ECI) phase, that consider solutions that leave ancillary infrastructure in place that can add social and economic value to communities in the future.
    - This would be achieved by setting a goal that 0.5 per cent of the capital cost of the Project is directed towards legacy ancillary infrastructure. For the Project, this equates to around $9.35 million spent on legacy ancillary infrastructure.[19]
2. Defining Employer's requirements and targets, and developing and supporting enabling initiatives to help contractors realise opportunities for local industry participation and capacity building.
    - This would be achieved by investing in social procurement and employment programs to support local workforce development; setting targets for local content; and other specific 'employer's requirements', targets and policies.
3. Establishing and investing in a 'community benefits sharing fund' to support locally identified and co-designed initiatives that respond to local community needs.
    - This will be achieved through an annual fund equivalent to $1200/MW of installed capacity per year (totalling around $120,000 per year for the Project during the construction period[20], or around $960,000 across the full construction period)

6.2.5 Opportunity to Export Energy to Mainland Australia

Currently, Tasmania and the mainland are connected by Basslink, which has capacity of 500 MW connecting Loy Yang substation and the George Town substation. With the prospective development and operation of Marinus Link – a project currently being progressed by Marinus Link. Pty Ltd - interconnection capacity between Tasmania and the mainland is anticipated to increase.

Marinus Link is a submarine transmission interconnector proposed to run between Heybridge near Burnie (Tasmania) and Hazelwood in Victoria and be delivered across two stages:

- **Stage 1** is the delivery of a 750 MW cable to be operational by 2030, including infrastructure for both stages.
- **Stage 2** is the delivery of a second 750 MW cable to be operational by 2032.

[19] Based on the capital expenditure estimate of $1.87 billion presented in Table 7

[20] Based on the peak capacity of the Tarraleah Hydropower Scheme increasing from 90 MW to approximately 190 MW via the Project

The delivery and operation of Marinus Link will facilitate and expand the opportunities for Tasmania to generate and export additional energy to mainland Australia. Additionally, the bi-directional nature of the capacity introduced means Tasmania will also have access to variable renewable energy generation from the mainland that may assist in balancing supply and demand for Tasmanian users, placing downward pressure on wholesale energy prices, as described further in the consideration below.

In terms of export-oriented benefits materialising, as project planning for the Project progresses, the status of Marinus Link will be monitored, and if Marinus Link is delayed or does not proceed, the power generation role of the Project in on-island versus energy exports to the mainland should be considered.

6.2.6 State Energy Price and Market Implications

In terms of the social and commercial implications to energy prices for individual, commercial and industrial consumers, at issue is whether and to what extent the Project generates impacts that may materially maintain and/or improve the capacity, delivery and stability of power generation capacity.

In terms of capacity, the Project is likely to assist in exerting downward pressure on wholesale electricity prices by facilitating the replacement of marginal and coal-powered generators with additional dispatchable capacity. Under the current circumstances of high and escalating energy costs, downward pressure is a relevant and material benefit to residents and the community.

In terms of delivery and stability, the Project will diversify the systems of overall power generation; that is, it can be relied upon when other forms of power generation are unable to respond (for example, wind or solar).

6.2.7 Impacts on Local Social Amenity and Community Infrastructure

The key issue related to the provision of local social amenity and community infrastructure is whether and to what extent existing systems and funding mechanisms are sufficient for building schools, childcare, health services and sports facilities.

Economic impact modelling suggest that the completion and delivery of the Project will generate significant economic activity across the region and state, which have the potential to contribute to a higher standard of living, wages and employment opportunities as discussed previously. And as discussed in Table 15, the direct and indirect economic activity related to construction and operations of the Project are also estimated to generate local, state and federal tax revenues, including potentially infrastructure contributions. Such public funds are used in part for the provision of community infrastructure (such as libraries, parks, childcare centres, etc.).

Furthermore, Hydro Tasmania is a GBE and as such, pays dividends to its shareholder, the State of Tasmania. These profits are invested back into funding and developing essential community infrastructure projects, such as social and affordable housing, healthcare and education.

6.2.8 Impacts on Land Values and Demand for Land and Housing

The issues relating to land values and demand for housing are multi-faceted. In particular, the economic impact modelling estimates that during construction, significant employment demands are placed on the regional labour force (as discussed in Section 6.1).

The following characterises the likely effects related to housing demand and land value (as a result) during construction as a result of different worker groups:

- **FIFO workers (directly employed).** An average of around 116 FTE construction jobs each year are anticipated to be FIFO workers (based on around 931 FTE job-years for mainland Australian workers during the 8-year construction period – refer to **Table 8**). These workers are anticipated to be housed in at existing accommodation at Wayatinah Village and Tarraleah Village (owned by Hydro Tasmania) and a purpose-built workforce accommodation facility. This should not appreciably affect land values or demand for housing in the region.
- **Local workforce (directly employed).** An average of around 50 FTE jobs each year (based on 399 FTE job-years for the local region during construction – refer to **Table 8**) will be sourced from the local region; i.e. workers already residing locally. This region (encompassing the South East Tasmania and Hobart SA4s) is large and hosts nearly 300,000 residents, or more than half of Tasmania's population.[21] While classified in this report as 'local', many of the workers in this category are likely to reside in Hobart, an approximate 1 hour and 45 minute-drive from Tarraleah. This is likely to exceed the daily commute time that most workers are willing to undertake and, consequently, many of the 'local' workers from Hobart are likely to opt to reside in the provided worker accommodation at Tarraleah Village. Other local workers closer to the project site may choose to stay in their homes (whether they rent or own), and commute daily. Given the negligible increase in demand for housing within context of the population base, these workers are unlikely to have a significant impact on land values or demand for housing.
- **Other workers (indirect effects).** In addition to the 1,330 job-years directly resulting from construction of the project, a further 609 job years, or around 76 FTE jobs each year, are anticipated to be indirectly supported.[22] The location of these jobs will be throughout Tasmania and are associated with upstream impacts (i.e. purchase of goods and services necessary to deliver the project, such as input materials, manufacturing, warehousing and logistics providers, etc.) and downstream impacts (i.e. additional household spending on goods and services across the economy, such as on retail and consumer goods, education and health services, etc.). The specific location of where these induced jobs will be located and thus the regional impact on land values and demand for housing is unknown, however, some jobs will likely manifest within the local region and contribute to local housing pressures.

Although the impacts on land values and demand for land and housing are anticipated to be minimal (given the worker accommodation which will be provided at Tarraleah Village), impacts in this space should be closely monitored, as adverse impacts related to housing can have significant social and economic implications for community members. In particular, if the proposed workforce accommodation at Tarraleah Village is insufficient to meet the demand for workforce housing, land values are likely to escalate, contributing to higher costs of development, which necessitate higher sales prices and rents.

Under such hypothetical circumstances described above, further effects could materialise in the form of housing stress (i.e., households spending more than 30 per cent of their gross income on housing), which also represents a decrease in consumer surplus spending, which indirectly affects local businesses in discretionary household spending categories, such as clothing, retail, food and beverage, etc. The quantification of such impacts, however, fell outside the scope of SGS and CoP's technical modelling. Housing stress is, however, considered in the Social Impact Assessment.

[21] ABS 2021 Census data

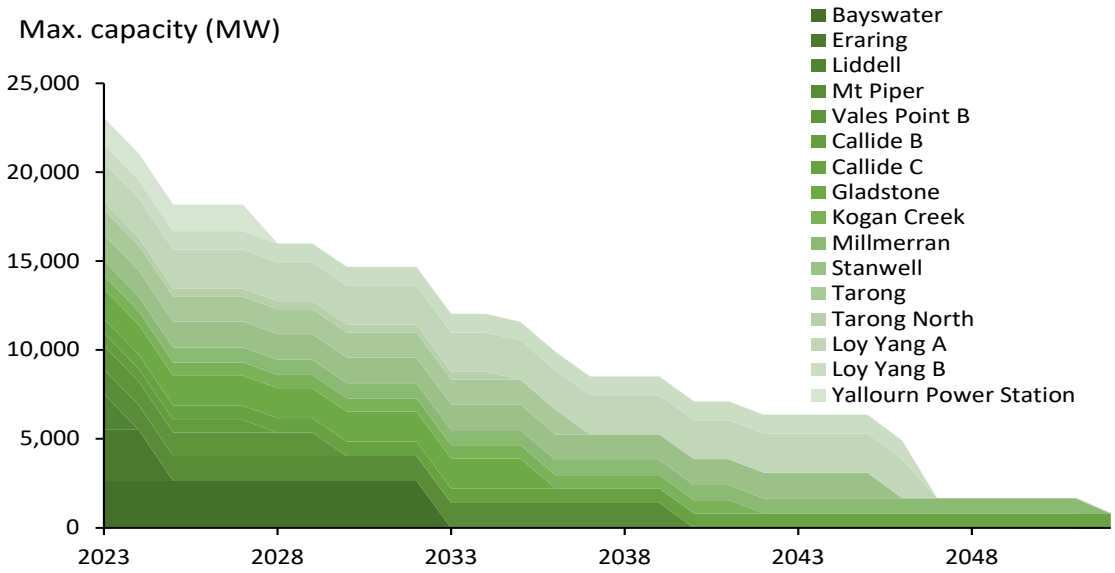
[22] This is the 1,949 total FTE job-years reported in Table 13 for the construction period, minus the 1,330 direct job-years

In terms of mitigating potential adverse impacts, workforce accommodation should be of adequate size, and the Local Benefit Sharing Strategy may contain funds to support local residents who are adversely impacted because of the Project.

6.2.9 Implications on Coal-fired Power Plants and Regional Economies

Most of Australia's coal-fired power plants are scheduled to close in the coming decades. Some of these closures are the result of assets reaching or exceeding their useful operating life, while other closures are due to projected redundancy because of increasing renewable energy capacity. Information from AEMO has been summarised below in Figure 12 to illustrate the estimated timing of coal-fired power plant closures.

Figure 12: Timing of coal-fired plant closures



Source: AEMO, AEMC

The Project (along with Marinus Link) would de-risk the forecast closure of coal-fired power plants and transition to an energy system reliant on a greater share of VRE. Such an outcome is a key driver and benefit of the project.

There are, however, some localised regional impacts of coal-fired power plant closures which need to be considered by governments at all levels, and the energy industry more broadly. In many regional areas, the extraction and refinement of coal and its conversion to energy has been central to livelihood development, wealth creation and economic advancement, sustaining entire communities across generations. As a result, there are strong perceived linkages between the strength of the coal-fired power plant sector and the economic, social, political and cultural health of the area against which the merits of such renewable projects are perceived.

As Australia transitions to an energy grid supported by renewable energy as per government policy and targets, there will be a need to implement initiatives to ensure that the transition is just and does not threaten regional economies and the livelihood of residents. Delivery of initiatives are primarily the role of governments with authority in mainland Australia and plant operators. However, in terms of mitigation and performance measures, Hydro Tasmania may consider skills alignment and attraction for some interstate workers made redundant from retired operations.

6.2.10 Opportunity to Reduce Carbon Footprint

According to the Greenhouse Gas (GHG) Footprint Study conducted by EDF Renewables, the emission intensity of the Project is estimated to be 1.8 g gCO2eq/kWh excluding the biogenic emissions from the reservoir. Excluding emissions from the reservoir is reasonable given it is already existing and will not be dismantled. The value of 1.8 gCO2eq/kWh is below the world-wide median emission intensity for hydropower, below solar emission intensity, and far below gas and coal emission intensity.

6.2.11 Opportunity to Support the Feasibility of Other Renewable Energy Projects

As described in Chapter 3, the Project is intended to support the achievement of national emissions reduction targets as well as Tasmania's Hydrogen Action Plan. Through the provision of additional dispatchable capacity from such hydro power, the attainment of broader decarbonisation efforts across numerous sectors, such as transport, agriculture and industry, becomes more possible.

The timing of when this opportunity may be capitalised upon, however, will depend on broader industry development of the Green Hydrogen sector.[23]

6.2.12 Local, State and Federal Government Revenues

Based on the outputs of the technical CGE modelling, the Project is projected also to generate public taxation receipts for various levels of government (Table 15). Compared to BaU, over construction and operations:

- Local governments in Tasmania are expected to collect an additional $13 million from sources such as local Council rates associated with additional commercial premises for the stimulated economic activity, and other user chargers and fees.
- The Tasmanian State Government is expected to collect an estimated $473 million (excluding Hydro Tasmania dividends). This tax revenue includes property and payroll taxes and stamp duties.
- The Australian Federal Government is expected to collect an estimated $477 million. This tax revenue largely stems from taxation on the provision of goods and services and income taxes on individuals.

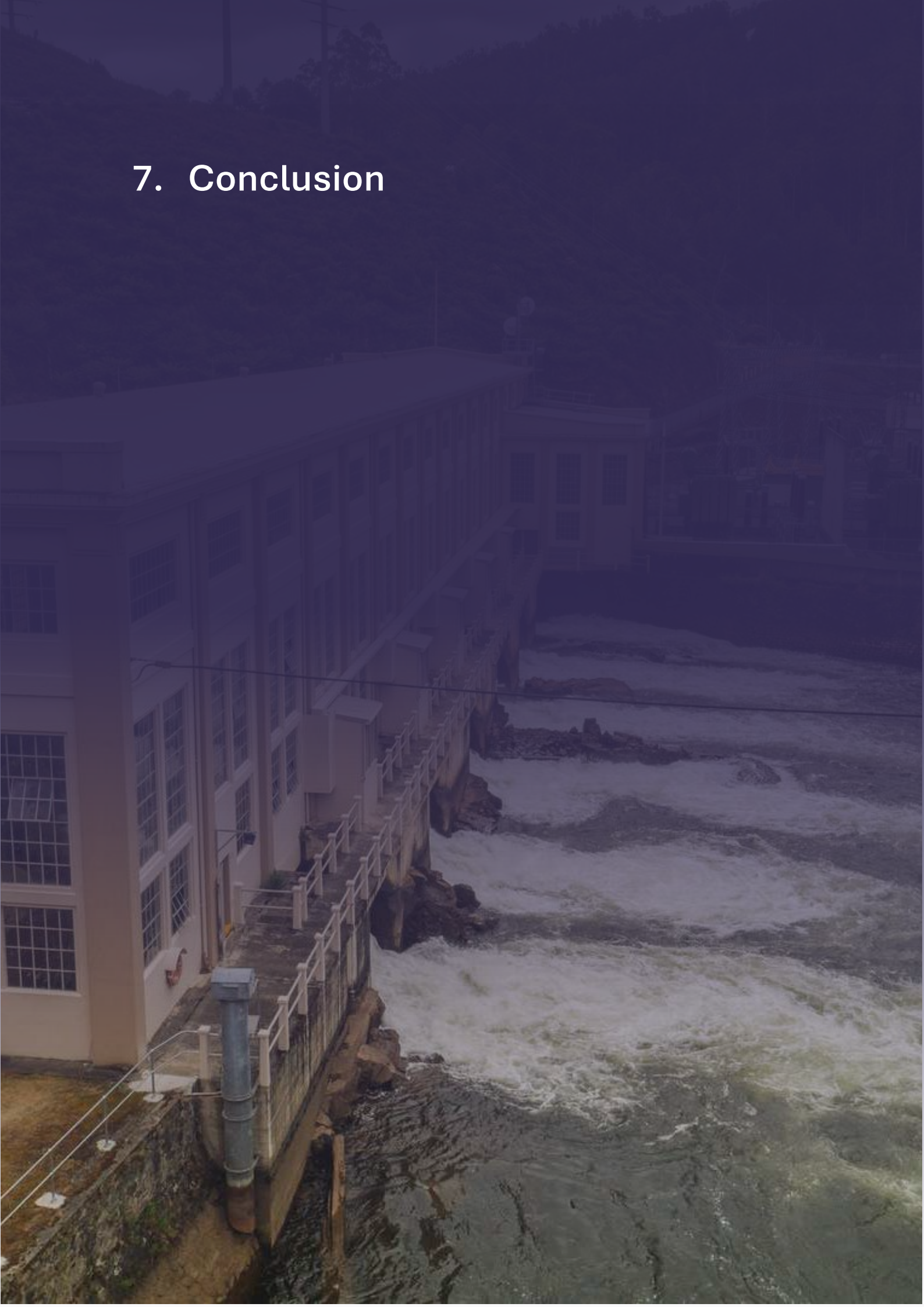
Table 15: Local, State and Federal Government Revenue

Government	Total
Local Government Revenue	$13 million
State Government Revenue (excluding Hydro Tasmania dividends)	$473 million
Federal Government Revenue	$477 million

Source: SGS Economics and Planning and Centre of Policy Studies (2024)

[23] The Tarraleah PBC states that the overall efficiency of the hydrogen cycles needs to be substantially improved to become commercially viable.

7. Conclusion



7. Conclusion

Given the perspectives of the economic impact assessment, the Project is anticipated to deliver significant economic outcomes and opportunities (above the BaU) to Tasmania. Careful mitigation of potential negative externalities, as being considered by Hydro Tasmania, will enable the affected local communities to benefit from the Project and the opportunities it presents.

Key findings of this EIA are presented in Table 16, within the context of the Commonwealth Government's request for further information[24] and EPA Tasmania's impact assessment guidelines for the Project.

Table 16: Key findings related to economic impacts of the Project

Scoping requirement	Section addressed
Commonwealth Government request for information related to this EIA	
An analysis of the economic and social impacts of the action, both positive and negative	The project will generate a range of positive impacts and may generate some negative impacts. Positive impacts and opportunities include: – An expansion of state output and employment, including in upstream and downstream industries (summarised further in below rows of this table), which will contribute to growth in local, state and Federal Government tax revenues – Potential downward pressure on energy prices, reduced likelihood and severity of blackouts, and increased revenue for Hydro Tasmania due to exports of energy to mainland Australia – First Nations employment and procurement opportunities – Skills and training opportunities to support a stronger and more resilient economy – Regional benefits via the Local Benefits Sharing initiative – Reduced carbon emissions – Opportunities to support the feasibility of other renewable energy initiatives Some potential negative impacts need to be considered. These include: – Potential negative impacts on the tourism sector (noting these may be positive due to increased regional spending associated with the construction workforce)

[24] Excluding request for information about consultation activities which are considered more relevant to the social impact assessment

Scoping requirement	Section addressed
	– Potential impacts on land values and demand for housing, with a chance that the construction workforce may result in increased demand for limited housing, driving up prices and adversely affecting those in the rental market
Projected economic costs and benefits of the project, including the basis of their estimate through cost/benefit analysis or similar studies	Construction of the Project is expected to cost $1.87 billion. This is anticipated to be split across the South East Tasmania SA4 and Hobart SA4 regions ($0.19 billion), the rest of Tasmania ($0.94 billion), mainland Australia ($0.50 billion), and internationally ($0.26 billion). Cost-benefit analysis was not scoped to be undertaken as part of this EIA, however, the project is anticipated to generate numerous economic benefits, including downward pressure on energy prices, reduced likelihood and severity of blackouts, and increased revenue for Hydro Tasmania due to exports to mainland Australia.
Employment opportunities expected to be generated by the project (including construction and operational phases).	Inputs from Hydro Tasmania indicate that 1,330 direct FTE job-years will be created during the Project's construction, and CGE modelling suggests there will be a further 873 indirectly supported FTE job-years in upstream and downstream industries. On average, around 8 direct and indirect FTE jobs will be supported each year during operation.
Tasmanian EPA scoping requirements	
Include an estimate of total capital investment for the proposal and where that capital will be expended (particularly in relation to the source of large capital items of processing equipment).	The total capital investment and where it will be expended is summarised in the Commonwealth Government request for information part of this table.
Describe impacts on local and state labour markets 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.	Impacts on the local and state labour markets are summarised in the Commonwealth Government request for information part of this table. Hydro Tasmania may pursue numerous skills and training opportunities, including via establishment of a SIMP, Local Content Framework and employer's requirements which the lead contractor will need to comply with.
Describe impacts on upstream/downstream industries, both locally and for the State.	Various upstream and downstream industries will benefit from the Project. CGE modelling indicates that outside of construction, the main impacts will be in the retail trade, professional services and manufacturing sectors. The regional:State split of impacts is unknown.

Scoping requirement	Section addressed
Detail the extent to which raw materials, equipment, goods and services will be sourced locally.	As outlined above, $0.19 billion of capital expenditure will be spent in the South East Tasmania SA4 and Hobart SA4 regions, and $0.94 billion will be spent in the rest of Tasmania. These values are illustrative of the extent to which raw materials, equipment, goods and services will be sourced locally.
Detail any impacts on the local, regional, state and national economies.	GSP is anticipated to increase by $1.60 billion because of the project, of which $298 million will materialise within the South East Tasmania SA4 and Hobart SA4 region (GRP).

Appendix A: CGE Model

CGE Model Framework

The Victoria University Regional Model (VURM) is a detailed mathematical representation of Australia's regions, specifically designed to capture the disaggregated nature of economic inter-relationships. This representation covers the behaviour of regional agents that supply goods and services (industries – public and private), and regional agents that demand goods and services (industries, the government, households and investors). The model also covers interstate and international trade, with explicit modelling of demand for each regional economy's production (i.e., for its interstate and international exports) and of supply into the economy (i.e., of its interstate and international imports). Flows of capital and labour are accounted for, both as regional incomes (wages and profit) and items of industry costs (labour and capital-used).

- Production induced impacts: Construction of the Project will require engagement of professional advisory services, bulk earth works, purchase of concrete aggregate and other materials. These are the direct impacts – activities which have supply chain linkages and industry dependencies. Economic activity associated with their upstream linkages are the indirect 'production' effects.
- Consumption induced impacts: Those who earn a wage to deliver the Project spend their income in the local economy on goods and services. These downstream impacts constitute the indirect 'consumption' effects.

Limitations and Assumptions of CGE Model

CoPS describes the core CGE equations as *neo-classical*, which implies they often assume cost-minimising behaviour by producers, average-cost pricing, and household demands based on optimising behaviour. However, VURM conforms only loosely to the theoretical general equilibrium paradigm. For example, it can make allowance for:

- Non-market clearing, especially for labour (unemployment) or for commodities (inventories);
- Imperfect competition (e.g., monopoly pricing); and
- Demands not influenced by price (e.g., government demands).

The ability of VURM to represent real-world behaviour depends not only on the realism of its theoretical basis, but also the quality of the underlying database. 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 a number of sectors, commodities, primary factors and 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 response. 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 revenue and expenditure) of each jurisdiction; and with the Australian economy's external balance of payments (exports, imports, foreign capital transfers, etc.).

Further information on the VURM model is available in a published technical working paper.[25]

[25] Centre of Policy Studies. The Victoria University Regional Model (VURM): Technical Documentation, Version 1.0.

Other Economic Models

A wide range of economic models can be used to estimate how the 'direct' economic impacts of the Project translate to 'indirect' economic impacts and, therefore, 'total' economic impacts (total impacts = direct impacts + indirect impacts). These models are generally known as:

- Static (input-output) models, and
- Computable General Equilibrium (CGE) models.

While static models are simple and cost-effective, their use is increasingly questioned because of their modelling limitations. Static models assume that the past equals the future and that a significant direct impact does not cause substitution, pricing and/or crowding out effects in the regional economy. Moreover, any future productivity improvements in the economy are not captured.

Collectively these shortcomings would cause static models to overestimate the indirect and, therefore, total economic impacts of project options.

General equilibrium models overcome these shortcomings and produce highly credible estimates. CoPS' Computable General Equilibrium Model is a large-scale, dynamic, multi-region, multi-commodity model of the world economy. It meets the standards of government, industry and academia, providing the Project with a single, robust, integrated economic framework to analyse economic impacts over time.[26]

[26] The CoPS modelling outputs are quantifications of absolute FTE jobs above or below the business-as-usual case (i.e., without Marinus Link) or gross value-added (GVA) above or below the BaU. Baseline employment or GVA values are not included as outputs of the CoPS modelling.