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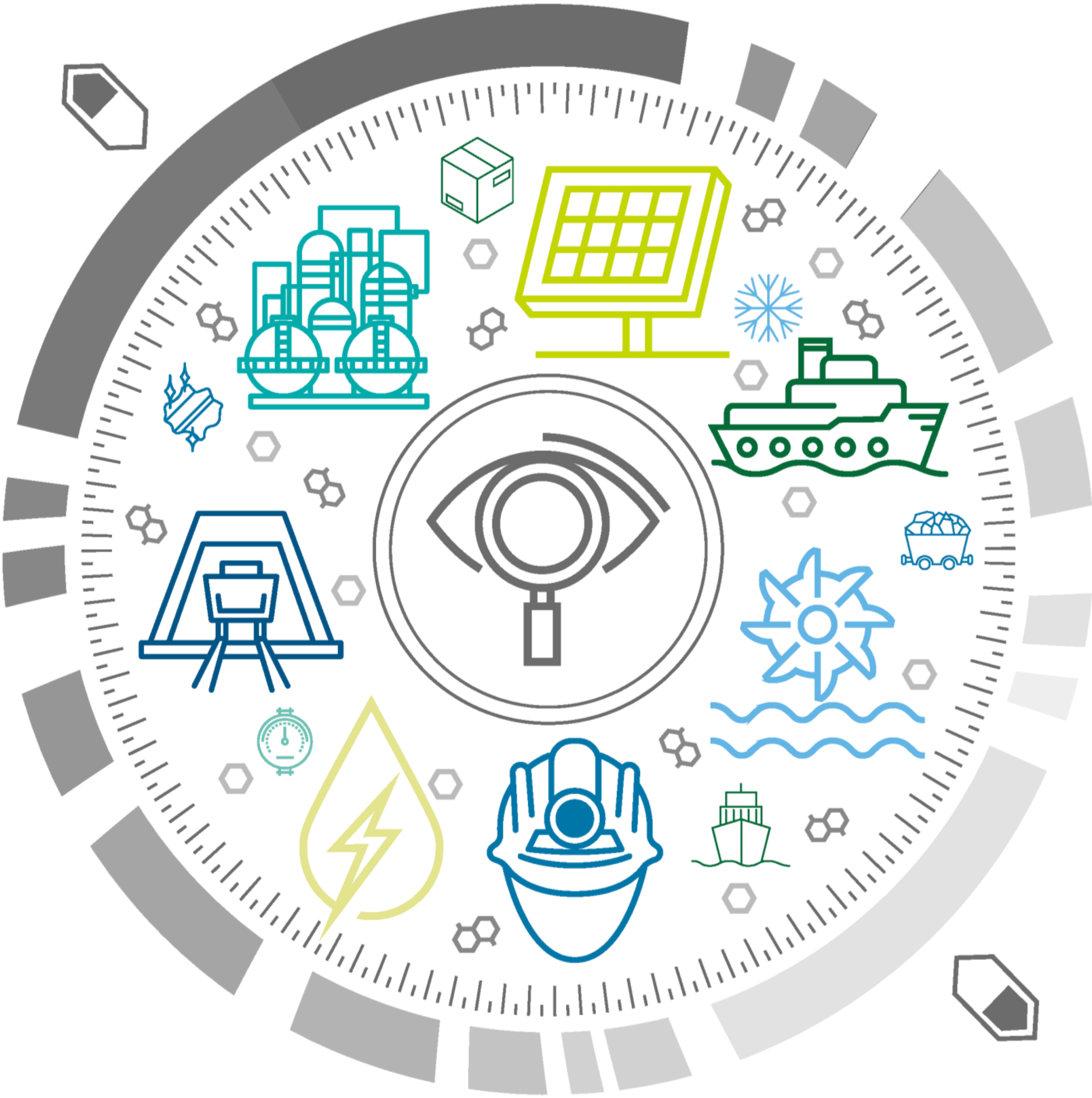


Syncline Community Cable Economic Impact Assessment – Draft report

Syncline Community Cable

November, 2024

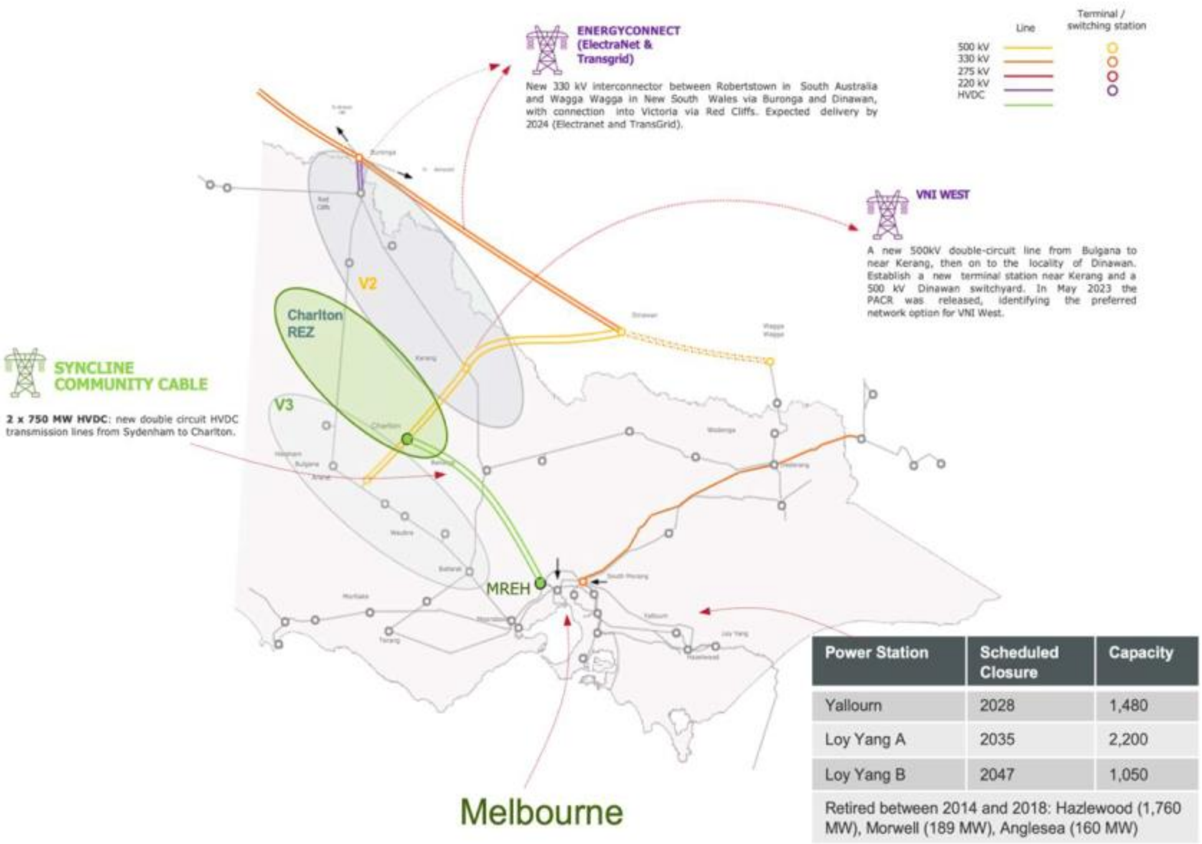
Deloitte Access Economics

1 Background

1.1 The project

Syncline Community Cable (SCC) is a proposed green field 255km underground high voltage DC transmission cable in Western Victoria. SCC consists of two 750MW HVDC transmission lines from Sydenham to Charlton.

Figure 1.1: SCC diagram



Source: Syncline Community Cable Pty Ltd (2024)

The project is at the advanced development stage, and would earn a regulated return on a five-year cycle for over 60 years. SCC will provide a consistent flow of electricity from renewable energy zones (REZs) in Western Victoria to consumers in Melbourne and New South Wales, without the reliability risks of overhead AC transmission. SCC can be commissioned by 2030 to mitigate major coal plant closures announced for between 2028 and 2035.

1.2 This report

Deloitte has been engaged by Syncline Community Cable Pty Ltd to model the impact of SCC on the Victorian economy. The policy case (a scenario where SCC is introduced to the economy as a discrete investment) is modelled against a baseline where the Victorian and Australian economies follow a business-as-usual path, consistent with Deloitte's macroeconomic forecasts, alongside current policy settings. This report outlines the methodology and results of this economic impact study.

2 Methodology

2.1 Estimating economic impacts using a Computable General Equilibrium framework

Economic impact analysis of a policy or program is best undertaken via a Computable General Equilibrium (CGE) framework. CGE is the preferred method of most major Commonwealth and State government agencies including Treasury departments and the Productivity Commission.

CGE frameworks are preferred because they can explicitly account for a range of impacts that are otherwise omitted in alternative approaches. Importantly, CGE analysis incorporates:

- **The impact of resource constraints throughout the economy**, as the use of labour or capital by one sector is often at the expense of uses elsewhere
- **The possibility of changes in the mix of inputs** used in production due to changes in relative prices or technology
- **The responsiveness of prices and other variables** to policy changes that affect such things such as tariffs on imported goods, budgetary support to industry, industry productivity, and workforce participation.

These assumptions allow for the modelling of 'second-round' impacts – where agents respond to changes in price signals. This feature enables CGE models to account for impacts of a policy change or program across the *entire* economy.[1] This is because second-round impacts enable the development of 'real-world' insights such as crowding out effects (where some industries and regions lose out from an injection of economic activity elsewhere) and/or positive spill overs to other regions and industries resulting from the policy, program, or disruption modelled (due to demand for upstream industries).

Modelling second-round impacts is especially important when considering large capital investments into regional areas, where the impacts will occur at a whole-of-economy level but affect each industry differently. Other economic modelling techniques, such as input-output modelling are useful for historical or point-in-time analysis but are not sufficiently dynamic to address the above issues and are therefore not considered fit for purpose for this type of long-term modelling task.

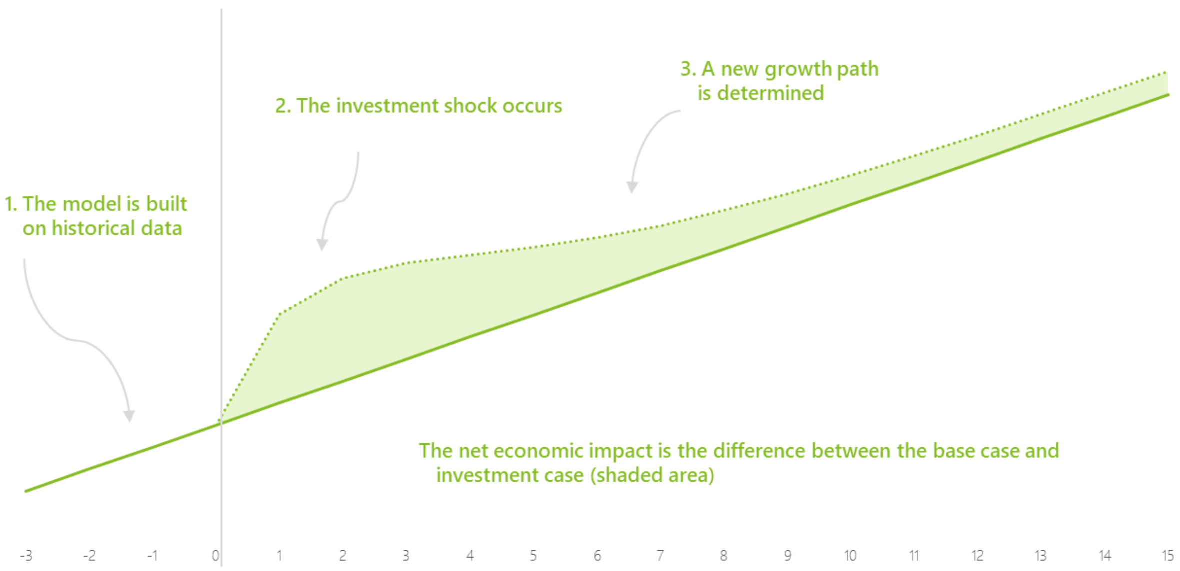
CGE models estimate economic impacts by comparing a 'policy scenario' against a 'baseline scenario'. Here, the baseline refers to a future scenario in which the economy continues along a 'business as usual' trajectory (Figure 2.1). The policy scenario is developed by applying changes (known as 'shocks') to the baseline scenario which reflect the nature of an intervention or disruption. For this project, the modelling utilises Deloitte Access Economics' in-house CGE model, DAE-RGEM. For more information on DAE-RGEM, see Appendix A.

In the context of this modelling exercise, the policy scenario modelled is an investment in the electricity transmission sector, reflecting the construction and operations of SCC in the West Victoria region. SCC is also expected to support the introduction of additional renewable electricity generation from West Victoria into the grid – the additional generation that SCC supports, relative to the baseline, is also considered as an input to the model.

The CGE model then solves for the market-clearing (equilibrium) levels of demand and supply across all specified goods and factor markets in the economy. This effectively creates a new path for the economy over time. This new path describes the policy scenario where the impact of this capital investment is realised according to the stylised 'shocks' to the supply chain. Comparing this new path crafted by the policy scenario to that of the baseline scenario (where the project does not occur), illustrates the incremental economic impact of a particular shock (in this case, a significant capital investment in Western Victoria).

[1] Productivity Commission, Input Output tables: https://www.pc.gov.au/research/supporting/input-output-tables

Figure 2.1: Stylised representation of economic impact modelling using a CGE framework



Source: Deloitte Access Economics

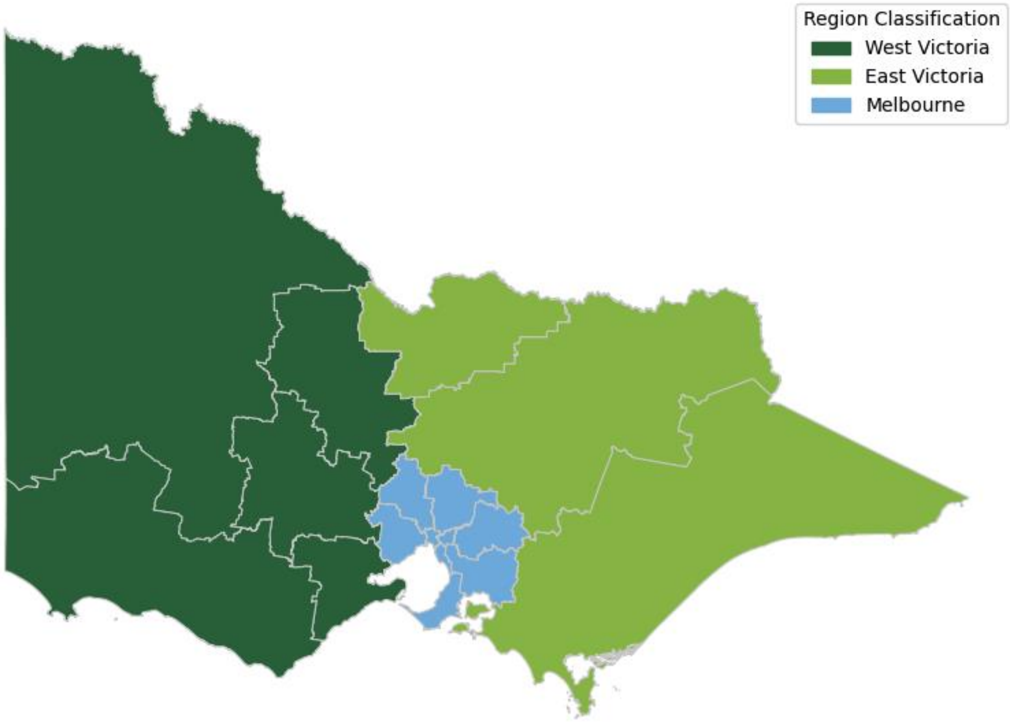
Importantly, CGE outputs are only provided relative to the baseline, and do *not* reflect year-on-year change. This means that for an industry that experiences decreased output to the order of $100 million for a given year, the industry output is $100 million lower than it would have been in the baseline estimate for that year. This is different to a $100 million decrease in output relative to the previous year. Similarly, for a sector that sees full-time employment increase by 100 jobs, this means that the sector is expected to sustain 100 more jobs than the baseline projection for the same given year – not an increase in jobs from one modelled year to the next.

2.2 Defining the policy scenario

The policy 'shock' modelled for this exercise is represented by the project's capital investment and operating expenditure profile. These estimates are provided to Deloitte Access Economics by Syncline Community Cable. The estimated expenditures are then coded into Deloitte Access Economics' in-house CGE model, DAE-RGEM. The additional volume of clean electricity generation that can be hosted due to the project (relative to a baseline where the Western Renewable Link is instead developed) is also considered as an input to the model. This is calculated by converting the incremental revenue (relative to WRL) generated by SCC into megawatt hours.

The modelled period extends from 2025-2070. This reflects the full life of the project, including planning and development phase and the length of operations. The regions considered in this analysis are West Victoria, East Victoria, Melbourne and the rest of Australia, where Victoria is divided as shown in Figure 2.1.

Figure 2.1: Regional breakdown for modelling



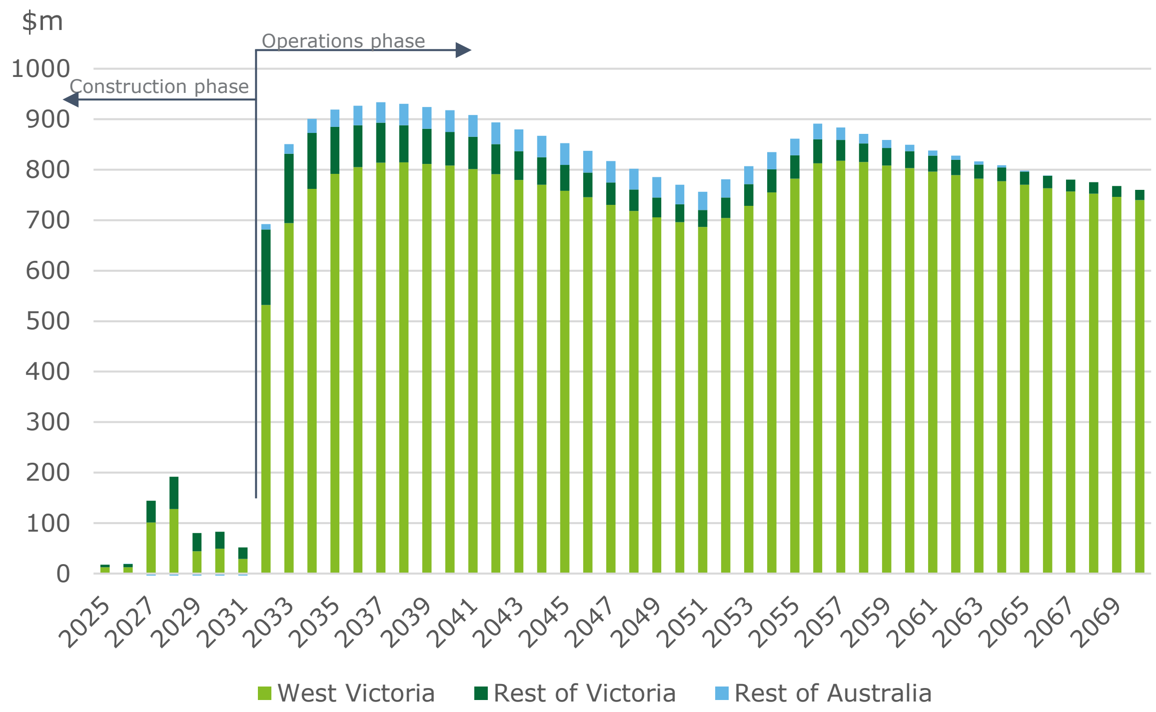
3 Economic Impact Analysis

Syncline Community Cable (SCC) is estimated to deliver $4.2 billion in additional Gross State Product for Victoria (present value terms) and provide 221 additional Full-Time Equivalent (FTE) jobs on average over the life of the project.

3.1 Economic impact

The SCC is expected to generate positive economic impacts for Victoria and Australia. This chapter outlines the economic impact of the Project, including impacts to Gross State Product (GSP), employment and industry output.

Chart 3.1: SCC, impact to regional product ($ million) in cumulative, discounted terms



Source: DAE-RGEM

At the height of economic activity during the operations Phase in 2037, Victorian GSP is expected to be around $900 million higher than it would have been without the development of SCC.[2] Economic impacts continue to be realised through the operations phase, beginning in 2033, albeit to a lower magnitude than in the construction phase. Most of this impact is concentrated in West Victoria, which experiences a total uplift in gross regional product (GRP) of $6.5 billion over the project life (in present value terms). This equates to an average uplift of 0.38 per cent per year over the life of the project relative to a baseline where the project does not occur. This uplift in economic activity is driven by the capital investment associated with construction of SCC, as well as the additional renewable electricity generation that is hosted by the project. The development and operations of SCC stimulate a further $751 million of economic activity in the rest of Victoria,

[2] Annual impacts are presented in real, undiscounted terms. Total impacts are presented as the present value (discounted at 7%) of the deviation relative to the baseline.

and $242 million in the rest of Australia, meaning that the project leads to a total Australian GDP uplift of $7.5 billion.

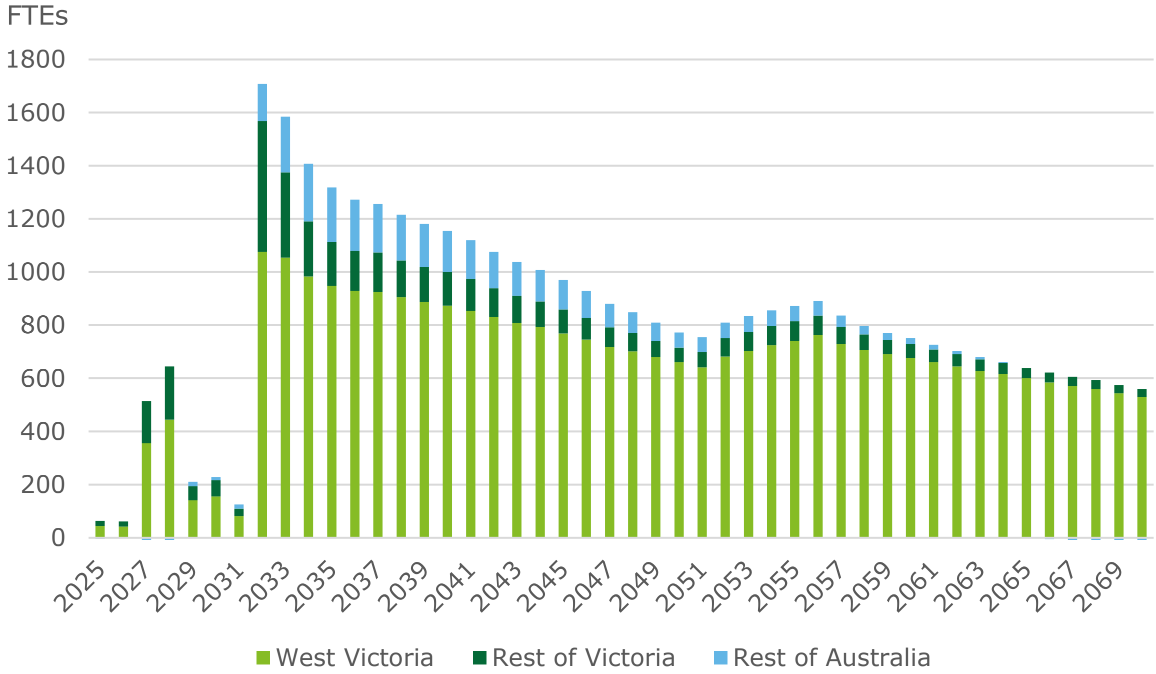
3.2 Employment impact

SCC is also expected to support higher employment in Victoria. Between 2025 and 2070, employment in Victoria is estimated to increase by 755 Full Time Equivalent (FTE) jobs on average for any given year relative to the projected baseline.

The construction activity associated with the project generates up to an additional 624 FTEs in Victoria. After construction is complete, the additional renewable electricity associated with SCC supports up to an additional 1,076 FTEs in West Victoria, and a further 631 across other parts of Victoria and Australia. This is a result of the additional workers required to develop and maintain these generators, and the additional economic output that can be produced with extra capacity in the market, which drives prices down.

SCC helps to unlock the benefits of a swath of renewable energy projects in West Victoria. This includes the Melbourne Renewable Energy Hub – a 1.6 GWh battery energy storage system, and the Charlton Renewable Energy Zone.

Chart 3.2: SCC, impact to regional employment, FTE jobs



Source: DAE-RGEM

As shown in Chart 3.2, there are also positive spill overs in employment to Melbourne and other parts of Australia. This is likely due to interstate imports of goods and services necessary for the operation and construction of SCC. The breakdown of these employment impacts by sector are detailed in Chapter 3.3.

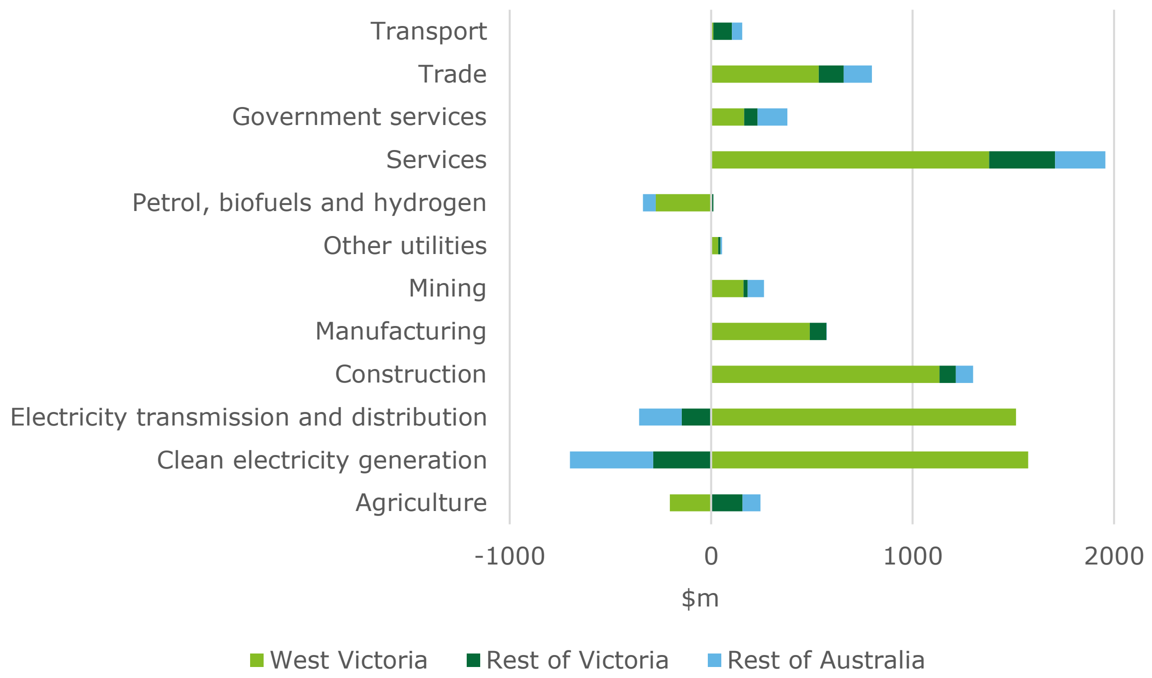
3.3 Industry impacts

The economic uplift generated by the project is concentrated in clean electricity and associated industries. The NPV of additional gross value added generated by the clean electricity is $1.6 billion in West Victoria. Although this is offset somewhat by a crowding out of clean electricity generation in the rest of the country (-$700 million). This is due to restraints in the availability of the labour and capital required for this industry causing crowding out in other regions. Other sectors to experience large increases in GVA include:

- services (from the accountants, lawyers, engineers and other professionals required to support the project)
- construction (mostly concentrated during the construction phase of SCC)
- manufacturing (an industry with high energy intensity)
- transmission and distribution (concentrated in West Victoria, with some crowding out in the rest of the country).

There is a small amount of crowding out (reduction in GVA) for some industries – mainly fossil fuels and agriculture in West Victoria. However, this is more than offset by the gains experienced by the industries supported by SCC.

Chart 3.3: Present value of impacts of SCC to sectoral value added, 2025 to 2070



Source: DAE-RGEM

Appendix A CGE modelling

A.1. CGE modelling with DAE-RGEM

CGE modelling provides the most reliable and respected basis of determining the net impact of changes affecting the economy. These changes may be external shocks, like a slowdown in global demand for a given commodity or service; they may be policy changes, like the introduction of a carbon tax; or they may be a new project or investment, like a road or sporting stadium.

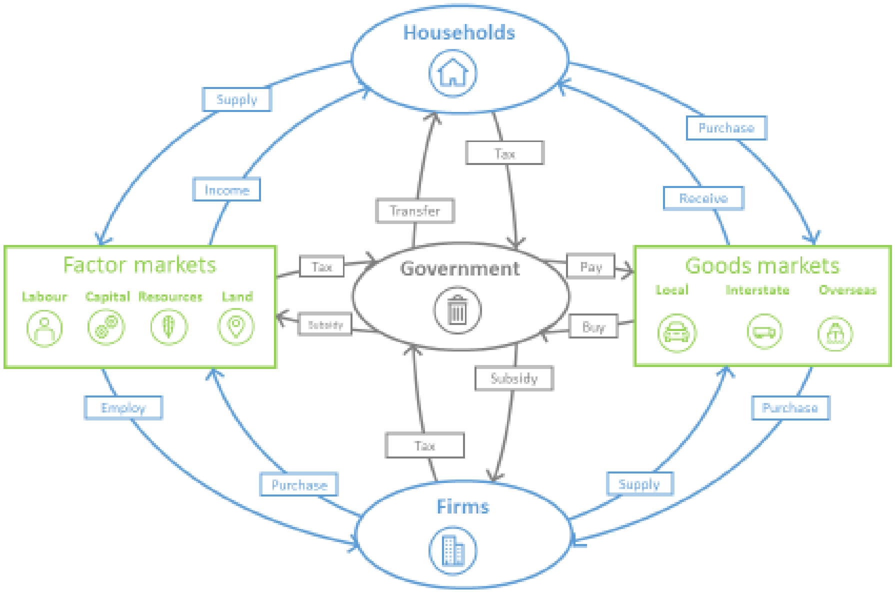
It is a framework that supports bespoke scenario analysis in a single, robust, integrated economic environment, enabling an assessment of the net impact on key macroeconomic indicators such as GDP and employment, and key sectoral measures like industry output. CGE modelling is the preferred framework for gauging the impacts of large, multi-year projects throughout the economy, and is widely recognised by all levels of government in Australia. But like all modelling, there is a right and a wrong way to do CGE analysis. Deloitte Access Economics uses approaches to CGE modelling that have been honed through years of experience, and in collaboration with government economic agencies. We bring a trusted and proven approach to this complex area of modelling.

Our in-house CGE model, DAE-RGEM, is unrivalled in both its capability and in the breadth of its applicability to policies, projects and wider scenario analysis. DAE-RGEM is one of the only models in the world that can model the impact of a scenario on individual Australian regions (such as individual cities or local government areas), linked to each other, and to other individual countries (e.g. China) in the global trading system.

DAE-RGEM encompasses all economic activity – including production, consumption, employment, taxes and trade – and can run scenarios through time involving multiple regions, industries and commodities. It is a model that can be customised for specific purposes, whether that be an unorthodox industry definition, a unique regional perspective or multi-faceted policy or project evaluation.

Figure A.1 gives a stylised representation of DAE-RGEM, specifically a system of interconnected markets with appropriate specifications of demand, supply and the market clearing conditions determine the equilibrium prices and quantity produced, consumed and traded.

Figure A.1: Stylised representation of DAE-RGEM



Source: Deloitte Access Economics

The model rests on the following key assumptions:

- All markets are competitive and all agents are price takers
- All markets clear, regardless of the size of the shock, within the year.
- It takes one year to build the capital stock from investment and investors take future prices to be the same as present ones as they cannot see the future perfectly
- Supply of land and skills are exogenous. In the business as usual case, supply of natural resource adjusts to keep its price unchanged; productivity of land adjusts to keep the land rental constant at the base year level.
- All factors sluggishly move across sectors. Land moves within agricultural sectors; natural resource is specific to the resource using sector. Labour and capital move imperfectly across sectors in response to the differences in factor returns. Inter-sectoral factor movement is controlled by overall return maximizing behaviour subject to a Constant-Elasticity-of-Transformation (CET) function. By raising the size of the elasticity of transformation to a large number we can mimic the perfect mobility of a factor across sectors and by setting the number close to zero we can make the factor sector specific. This formulation allows the model to acknowledge the sector specificity of part of the capital stock used by each sector and also the sector specific skills acquired by labour while remaining in the industry for a long time. Any movement of such labour to another sector will mean a reduction in the efficiency of labour as a part of the skills embodied will not be used in the new industry of employment.

DAE-RGEM is based on a substantial body of accepted microeconomic theory. Key features of the model are:

- The model contains a 'regional household' that receives all income from factor ownerships (labour, capital, land and natural resources), tax revenues and net income from foreign asset holdings. In other words, the regional household receives the gross national income (GNI) as its income.
- The regional household allocates its income across private consumption, government consumption and savings so as to maximise a Cobb-Douglas utility function. This optimisation process determines national savings, private and government consumption expenditure levels.
- Given the budget levels, household demand for a source-generic composite goods are determined by minimising a CDE (Constant Differences of Elasticities) expenditure function. For most regions, households can source consumption goods only from domestic and foreign

sources. In the Australian regions, however, households can also source goods from interstate. In all cases, the choice of sources of each commodity is determined by minimising the cost using a CRESH (Constant Ratios of Elasticities Substitution, Homothetic) utility function defined over the sources of the commodity (using the Armington assumption).
- Government demand for source-generic composite goods, and goods from different sources (domestic, imported and interstate), is determined by maximising utility via Cobb-Douglas utility functions in two stages.
- All savings generated in each region are used to purchase bonds from the global market whose price movements reflect movements in the price of creating capital across all regions.
- Financial investments across the world follow higher rates of return with some allowance for country specific risk differences, captured by the differences in rates of return in the base year data. A conceptual global financial market (or a global bank) facilitates the sale of the bond and finance investments in all countries/regions. The global saving-investment market is cleared by a flexible interest rate.
- Once aggregate investment level is determined in each region, the demand for the capital good is met by a dedicated regional capital goods sector that constructs capital goods by combining intermediate inputs in fixed proportions, and minimises costs by choosing between domestic, imported and interstate sources for these intermediate inputs subject to a CRESH aggregation function.

Producers supply goods by combining aggregate intermediate inputs and primary factors in fixed proportions (the Leontief assumption). Source-generic composite intermediate inputs are also combined in fixed proportions (or with a very small elasticity of substitution under a CES function), whereas individual primary factors are chosen to minimise the total primary factor input costs subject to a CES (production) aggregating function.

Limitation of our work

General use restriction

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