18 July 2024

Report to Australian Energy Regulator

Basslink conversion

Modelling and analysis of benefits

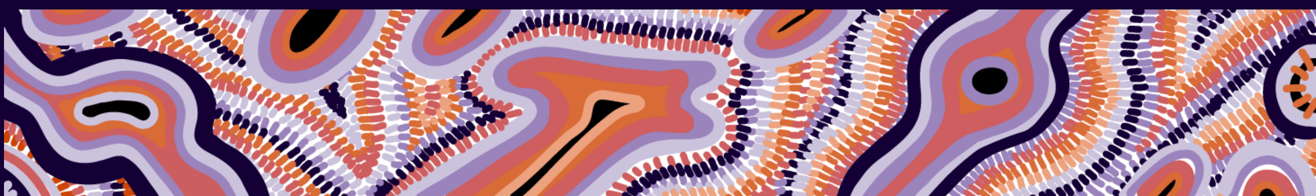
About ACIL Allen

ACIL Allen is a leading independent economics, policy and strategy advisory firm, dedicated to helping clients solve complex issues.

Our purpose is to help clients make informed decisions about complex economic and public policy issues.

Our vision is to be Australia's most trusted economics, policy and strategy advisory firm. We are committed and passionate about providing rigorous independent advice that contributes to a better world.

ACIL Allen acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land and its waters. We pay our respects to Elders, past and present, and to the youth, for the future. We extend this to all Aboriginal and Torres Strait Islander peoples reading this report.



Goomup, by Jarni McGuire

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Background

The AER engaged ACIL Allen to advise the AER's decision on whether conversion provides long-term benefits to consumers and, if so, use modelling to inform the possible magnitude of the potential benefits. The advice was provided under 2 consecutive workstreams.

Workstream 1 was a piece of theoretical analysis to assess whether there is a sound basis that the conversion of Basslink from a market network service to a prescribed transmission service is likely to yield NEM market benefits (as specified in the Regulatory Test for Transmission (RIT-T)) and Consumer benefits in the form of lower wholesale electricity prices and CO2-e emissions, and higher reliability and system security. ACIL Allen found that the conversion of Basslink would likely yield both NEM market benefits and consumer benefits. However, it was unclear that those benefits would be greater than the cost of regulation (return to and return of capital and operating costs of a regulated Basslink).

Following our Workstream 1 advice to the AER, we were commissioned to undertake Workstream 2, which is the subject of this report. For Workstream 2, we were required to undertake modelling to estimate the benefits of converting Basslink to a prescribed network service. The modelling was based on AEMO's ISP 2024 Step Change scenario. The methodology was undertaken in two stages.

The first stage was based on least-cost planning to match generation entry, exit, and transmission developments to the AEMO Step Change scenario. The configuration of Marinus Link will significantly influence Basslink and, therefore, the market and consumer benefits of conversion. Three configurations of Marinus Link were considered: no, one and two links. The least cost planning modelling was undertaken for the three Marinus Link configurations (resulting in some generation entry and exit changes.

The second stage was based on market modelling. The entry and exit schedules from the least-cost planning exercise were used in our NEM market model, *PowerMark*, to develop market projections. The resulting projections were used to estimate consumer benefits (as the change in the consumer surplus) and market benefits (as the change in the sum of the consumer and producer surplus).

Modelling uses and limitations

The results of any NEM market or least cost planning model can only approximate the future because it requires many assumptions about future inputs that are inherently uncertain and model simplifications so that the model can produce realistic results within reasonable time frames.

The most effective use of results from NEM market models is in estimating a reasonable range across a set of scenarios or estimating differences in results by comparing outcomes under different scenarios and sensitivities. Most of the analysis in this report is provided in terms of modelled ranges or comparisons across scenarios. The ranges and comparisons provide one set of inputs for the AER's consideration of the conversion application.

The two approaches for calculating benefits have different degrees of sensitivity to assumptions and scenario design. For each configuration of Marinus Link considered:

— NEM market benefits of converting Basslink range approximately $400 million across the scenarios considered.
— NEM consumer benefits are around a factor of 10 higher than NEM market benefits and have a range of $2 billion or more across the scenarios considered. These benefits are highly sensitive to projected wholesale electricity prices. Some of the differences in projected prices are likely to be associated with assumptions and model simplifications.

Neither the estimates of market benefits nor consumer benefits provide a definitive answer for the AER as to whether Basslink should be converted because:

— these estimates are only one input to be considered by the AER in its decision-making process
— the assessment of benefits ranges from negative values (disbenefits) to positive values (benefits) depending on the assumptions that are made
— the consumer benefits are highly sensitive to projected wholesale electricity prices, which are very sensitive to entry and exit decisions and are likely to include some modelling error
— the consumer benefits are sensitive to the degree that Hydro Tasmania is able to exercise market power in the Tasmanian region.

We consider greater weight should be placed on the assessment of NEM market benefits rather than consumer benefits because of the consistency of the results across each of the scenarios modelled. We consider less weight should be placed on the assessment of consumer benefits because the results are less consistent across the scenarios modelled, and the results are highly sensitive to the projected wholesale electricity prices and the ability of Hydro Tasmania to exercise market power.

Scenarios modelled

PowerMark was used to simulate the various Basslink regulatory and operational scenarios for the 3 different commissioning configurations of Marinus Link[1], as follows:

— a converted (regulated) Basslink
— Basslink, as a market network service, actively traded in the market
— Basslink as a market network service, but selling the trading rights to Hydro Tasmania (Hydro Tasmania actively trades Basslink).

These same 3 regulatory and operational scenarios were modelled with Hydro Tasmania more heavily contracted (in the long-term). We assumed Hydro Tasmania would be 5% more heavily contracted for the modelling in these cases. If Hydro Tasmania is more heavily contracted, it has less incentive to use its market power to raise spot prices in Tasmania.

Eighteen scenarios were modelled, as shown in the following table.

[1] No Marinus Link, one Marinus Link and two Marinus Links.

Table ES 1 Scenarios modelled for the Basslink conversion assessment

Marinus Link Stage 1 (July 2029)	Marinus Link Stages 1&2 (July 2029 and July 2036)	No Marinus Link
Regulated – prescribed network service	Regulated – prescribed network service	Regulated – prescribed network service
Merchant – market network service	Merchant – market network service	Merchant – market network service
Merchant – Trading rights sold to Hydro Tasmania	Merchant – Trading rights sold to Hydro Tasmania	Merchant – Trading rights sold to Hydro Tasmania
Regulated – prescribed network service (Hydro Tasmania more heavily contracted)	Regulated – prescribed network service (Hydro Tasmania more heavily contracted)	Regulated – prescribed network service (Hydro Tasmania more heavily contracted)
Merchant – market network service (Hydro Tasmania more heavily contracted)	Merchant – market network service (Hydro Tasmania more heavily contracted)	Merchant – market network service (Hydro Tasmania more heavily contracted)
Merchant – Trading rights sold to Hydro Tasmania (Hydro Tasmania more heavily contracted)	Merchant – Trading rights sold to Hydro Tasmania (Hydro Tasmania more heavily contracted)	Merchant – Trading rights sold to Hydro Tasmania (Hydro Tasmania more heavily contracted)

Source: ACIL Allen

Consumer benefits

Our analysis indicates that consumer benefits may be associated with converting Basslink to a prescribed network service. These benefits will likely be more significant, where Basslink faces less competition from Marinus Link. Total estimated consumer costs have a present value of around 330 billion between 2025 and 2050. Consumer benefits as a percentage of total consumer costs range from -0.01% to 1.49% from 2025 to 2050.

Where Marinus Link does not proceed, the consumer benefits of Basslink conversion between 2025 and 2050 are estimated to have a present value as high as $4.95 billion. However, the consumer benefits have an extensive range across the scenarios considered and may have a present value as low as $2.7 billion.

Where Marinus Link Stage 1 only proceeds, the consumer benefits between 2025 and 2050 are estimated to have a present value as high as $3.4 billion but may have a present value as low as zero.

Where both Marinus Link stages proceed, the consumer benefits between 2025 and 2050 are estimated to have a present value of as high as $1.6 billion. However, they may be as low as $168 million.

Market benefits

Our estimate of market benefits was much smaller than consumer benefits. Underlying system costs for 2025 to 2050 are around $85 billion. The variation in economic costs where Basslink is not converted is between -0.44% and 0.18 % of total system costs.

Where Marinus Link does not proceed, the market benefits between 2025 and 2050 are estimated to have a present value as high as $377 million but may have negative benefits with a present value of -$58 million.

Where Marinus Link Stage 1 only proceeds, the market benefits between 2025 and 2050 are estimated to have a present value as high as $284 million but may have negative benefits with a present value of -$145 million.

Where both Marinus Link stages proceed, the market benefits between 2025 and 2050 are estimated to have a present value as high as $238 million but may have negative benefits with a present value of -$156 million.

Conclusions

We have the following conclusions from the modelling and analysis in preparing this report.

— Conversion of Basslink is likely to have long-term consumer benefits (excluding the costs of regulation), but the potential range of benefits is extensive and highly uncertain. The estimates of consumer benefits are small in the context of total consumer costs, ranging from -0.1% to 1.68% of total consumer costs.

— The uncertain consumer benefits should be considered in the context of the highly certain prescribed services costs consumers will be required to pay should Basslink be converted. When risk adjusting the consumer benefits for uncertainty and factoring in the likely cost of regulation, there may be no net consumer benefits from the conversion of Basslink.

— Basslink's conversion may also have long-term market benefits, but these are unlikely to exceed the costs of the prescribed services, should Basslink be converted.

— Rejecting Basslink conversion is unlikely to lead to excessive price rises and price volatility, with the exception where Hydro Tasmania gains access to Basslink trading rights, especially where Marinus Link does not proceed, or if it does proceed, before the time that Marinus Link becomes available.

— Basslink, operating as a market network service, may not recover its operating and maintenance costs if both stages of Marinus Link are developed. The risk appears to be highest in the first few years following the commissioning of Marinus Link's second stage. In those circumstances, Basslink may face financial pressure to exit the market. This will depend on Basslink’s view of the future and its willingness to work through the years of potential loss to future years where it is projected to return to profitable performance.

Introduction 1

1.1 Background

Basslink is a high-voltage direct current (HVDC) cable linking Georgetown in the north of Tasmania to the Loy Yang switchyard in Gippsland in Victoria. It was initially developed with a short-term export limit of around 590 MW (Tasmania to Victoria) and a continuous rating (imports and exports) of 478 MW.

Following a significant fault and outage in 2016, the short-term export rating was limited to around 500 MW. This has been gradually relaxed (presumably as the Basslink owners have better understood the upper export limits). However, since September 2018, exports have not exceeded 500 MW until early 2024, with export flows exceeding 500 MW for less than 200 five-minute dispatch intervals as of early July 2024.

Basslink was placed into voluntary administration in November 2021 because of ongoing disputes with Hydro Tasmania (its customer) and a failed attempt to sell the business to the APA Group (APA). APA subsequently acquired 100% of the Basslink senior secured debt and participated in the receiver-led competitive process to sell, restructure, or recapitalise the business.

APA was selected as the preferred bidder for Basslink in September 2022, and the acquisition was completed in October 2022 for $733 million. $648 million of these funds were used to repay APA's senior secured debt[2] (full face value), which APA had purchased at a discount to face value in late 2021 and early 2022. APA reported a total capital expenditure related to Basslink debt of $587.4 million in its 2022 annual financial report.

Basslink is subject to a specific condition in Chapter 11 of the National Electricity Rules (NER).

> *If, after the commencement date, a network service provided by means of, or in connection with, the Basslink transmission system ceases to be classified as a market network service, it may at the discretion of the AER be determined to be a prescribed transmission service, in which case the relevant total revenue cap may be adjusted in accordance with Chapter 6A and this clause 11.6.20 to include to an appropriate extent the relevant network elements which provide those network services.*[3]

2 This amount represents the face value of APA's senior secured debt in Basslink plus interest accrued – APA Group ASX Announcement, 17 October 2022.

3 NER Version 207, Clause 11.6.20(c), 1 February 2024.

APA lodged an application with the Australian Energy Regulator (AER) on 19 May 2023 seeking a determination to convert Basslink's network services from market network services to prescribed transmission services. The request involves two matters to be considered by the AER:

— An application to convert Basslink from a Market Network Service Provider (MNSP) to a Transmission Network Service Provider (TNSP) making Basslink an intending TNSP.

— The making of a transmission determination for Basslink should it convert from being an MNSP to a TNSP.

The AER is assessing the application for conversion by considering whether it will contribute to the achievement of the National Electricity Objective (NEO). It engaged ACIL Allen to provide advice as an input to its decision. In particular, ACIL Allen was engaged to provide advice on whether conversion may provide long-term benefits to consumers and, if so, use modelling to inform the possible magnitude of the potential benefits.

1.2 Workstream requirements

ACIL Allen undertook two streams of work as an input to the AER's decision on whether to accept conversion of Basslink.

Workstream 1 was a piece of theoretical analysis to assess whether there is a sound basis that conversion of Basslink from a market network service to a prescribed transmission service may yield market benefits in the National Electricity Market (NEM) (as specified in the Regulatory Investment Test for Transmission (RIT-T)) and consumer benefits in the form of lower wholesale electricity prices and CO2-e emissions, and higher reliability and system security. A summary of the Workstream 1 findings are provided in Appendix A of this report.

Workstream 2 required ACIL Allen to undertake modelling to estimate conversion benefits consistent with the approaches identified in Workstream 1.

The modelling was based on AEMO’s ISP 2024 Step Change scenario. The scenarios included various plausible inputs and assumptions (including Hydro Tasmania's contracting and bidding behaviour) agreed upon with the AER. The methodology was undertaken in two stages.

The first stage was based on least cost planning to match generation entry and exit and transmission developments to the AEMO Step Change scenario. The configuration of Marinus Link will have a major influence on Basslink and therefore the market and consumer benefits of conversion. Three configurations of Marinus Link were considered; no, one and two links. The least cost planning modelling was underken for the three Marinus Link configurations (resulting in some changes to generation entry and exit.

The second stage was based on market modelling. The entry and exit schedules from the least cost planning exercise were used in our NEM market model, *PowerMark*, to develop market projections. The resulting projections were used to estimate consumer benefits (as the change in the consumer surplus) and market benefits (as the change in the sum of the consumer and producer surplus).

This report describes the modelling approach and results. It provides advice, based on the modelling findings, as an input to the AER’s decision on APA's conversion application.

1.3 Structure of this report

This report is structured as follows:

— Chapter 2 sets out the modelling approach used in the Workstream 2 analysis.

— Chapter 3 provides our analysis of the modelling results.

- Chapter 4 sets out our findings and conclusions on whether conversion provides long-term market and consumer benefits, as an input to the AER's decision.
- Appendix A provides a summary of the work that was undertaken during Workstream 1.

Modelling the benefits of conversion 2

2.1 Uses and limitations of the modelling

Modelling the NEM over long time frames requires many assumptions about future inputs and model simplifications so that the model can produce realistic results within reasonable time frames. It also requires a finite number of scenarios/sensitivities to be modelled. Therefore, results from any NEM market or least cost planning model will be an approximation of the future because of:

— uncertainty around future inputs (capital and operating costs, fuel costs, government policies, etc.)
— uncertainty around the timing of entry and exit of generation and storage facilities
— uncertainty around the timing and size of changes to the transmission system
— whether the range of scenarios modelled covers all possible futures and uncertainty around the weight to be applied to each scenario
— simplifications applied in developing and formulating the model.

The most effective use of results from NEM market models is in estimating a reasonable range of results or differences by comparing outcomes under different scenarios and sensitivities. Most of the analysis in this report is provided in terms of modelled ranges or comparisons across scenarios. The ranges and comparisons provide one set of inputs for the AER's consideration of APA's conversion application.

The two approaches for calculating benefits have different degrees of sensitivity to assumptions and scenario design. As will be discussed in further detail in this report, for each configuration of Marinus Link considered:

— NEM market benefits associated with conversion vary within a range of approximately $400 million across the scenarios considered. The upper bound shows positive market benefits and the lower bound shows negative market benefits for each configuration. The upper and lower bounds fall as the capacity of Marinus Link increases.
— NEM consumer benefits are around 10 times higher than NEM market benefits and vary within a range of $2 billion or more across the scenarios considered. In a small number of scenarios, they are zero or negative. These benefits are highly sensitive to projected wholesale electricity prices because small differences in projected prices are multiplied across large volumes of electricity consumption in some cases to generate considerable projected consumer benefits. Some of these small differences in projected prices are likely to be associated with the assumptions made and model simplifications.

Neither the estimates of market benefits nor consumer benefits provide a definitive answer for the AER as to whether Basslink should be converted because:

- these estimates are only one input to be considered by the AER in its decision-making process
- the assessment of benefits ranges from negative values (disbenefits) to positive values (benefits) depending on the assumptions that are made
- the consumer benefits are highly sensitive to projected wholesale electricity prices, which are very sensitive to entry and exit decisions and are likely to include some modelling error
- the consumer benefits are sensitive to the degree that Hydro Tasmania can exercise market power in the Tasmanian region.

However, despite the uncertainty in the assumptions and variability in the results, the results exhibit some important consistencies for the AER to consider in making its decision, including:

- for each configuration of Marinus Link considered, the range (lower to upper bound) of market benefits is relatively stable at around $400 million
- the upper and lower bounds of market benefits fall as the assumed capacity of Marinus Link increases
- the upper and lower bounds of consumer benefits generally fall as the assumed capacity of Marinus Link increases
- where the market power of Hydro Tasmania is mitigated, consumer benefits of converting Basslink fall.

We consider greater weight should be placed on the assessment of NEM market benefits rather than consumer benefits because of the consistency of the results across each of the scenarios modelled. We consider less weight should be placed on the assessment of consumer benefits because the results are less consistent across the scenarios modelled, and the results are highly sensitive to the projected wholesale electricity prices and the ability of Hydro Tasmania to exercise market power.

2.2 Modelling approach

We used a combination of least-cost planning (Plexos) and market modelling (ACIL Allen's *PowerMark* model) to develop estimates of:

- market benefits, as the combination of producer/consumer surplus, including any competition benefits and option value
- consumer benefits, as the assessment of the impact of price changes on consumers.

2.2.1 Least cost development plan

Before assessing Basslink's benefits under any framework, we developed an optimal NEM development plan for use in the modelling. We developed the plan using Plexos, with Basslink operating as a prescribed network service (with Basslink operating at maximum availability). We adopted the Australian Energy Market Operator’s (AEMO's) latest Step Change scenario and assumptions for its Integrated System Plan (ISP). The scheduling of Basslink's flows reflected the cost structures of market participants in Victoria and Tasmania (and possibly other NEM regions) and losses across Basslink.

The optimal development plan included all government-legislated targets and plans for developing and funding renewable generation and associated dispatchable capacity, consistent with AEMO's latest ISP.

2.2.2 Market modelling

We then replicated the optimal NEM development plan from Plexos in our NEM market simulation model, *PowerMark,* for AEMO's Step Change scenario. As *PowerMark* operates with greater modelling granularity than Plexos, we adjusted the optimal development plan once initial *PowerMark* modelling was undertaken. Typically, this included adjustments to plants committed to meeting peak demands because *PowerMark* identified greater benefits for low-utilisation peaking technologies (open cycle gas turbines, Battery Energy Storage Systems (BESS), etc.).

Scenarios modelled

Once the optimal development path was finalised, *PowerMark* was used to simulate the various Basslink regulatory and operational scenarios for the 3 different commissioning configurations of Marinus Link[4], as follows:

— a converted (regulated) Basslink

— Basslink as a market network service actively traded in the market

— Basslink as a market network service but selling trading rights to Hydro Tasmania (Hydro Tasmania actively trades Basslink).

These same 3 regulatory and operational scenarios were modelled with Hydro Tasmania more heavily contracted (in the long-term). We assumed Hydro Tasmania would be 5% more heavily contractedfor the modelling in these cases. If Hydro Tasmania is more heavily contracted, it has less incentive to use its market power to raise spot prices in Tasmania.

Another option considered was for Basslink to sell trading rights to a mainland participant. However, this option was not modelled because the trading rights incentives for a mainland-based entity were not considered materially different from Basslink actively trading on its own behalf. Several factors led to this conclusion:

— The market power of mainland participants is considered insufficient for any single participant to gain a significant benefit in mainland markets through trading Basslink.

— Splitting the trading rights between multiple parties is an unattractive option for Basslink as it reduces its influence on market outcomes and would be expected to provide much lower sale revenues compared with selling to a single entity.

— The combination of the Tasmanian Renewable Energy Target (TRET) and the output from Hydro Tasmania's generators results in interconnector flows largely from Tasmania to Victoria, and most revenues[5] are linked to exports from Tasmania.

— The Tasmanian wholesale market is dominated by government-owned Hydro Tasmania, reducing the ability of mainland entities to influence the Tasmanian price to benefit Basslink revenues.

— Government-owned Aurora Energy dominates the Tasmanian retail electricity market, which reduces incentives for mainland entities to seek exposure to the Tasmanian region's spot price. The Tasmanian retail electricity market is sub-scale for major mainland base entities[6] so there is limited attraction in competing for Tasmanian electricity customers.

[4] No Marinus Link, one Marinus Link and two Marinus Links.

[5] For scenarios with Marinus Link Stage 1 only, the present value of Basslink projected revenues attributable to exports from Tasmania to Victoria are between 86% and 97% of all Basslink projected revenues between 2025 and 2050.

[6] Q3 2023-24 retail market data sourced from the AER shows no major retailer currently competes for small residential customers in Tasmania and Sheel as the only national retailer in the small and large business markets. Aurora Energy had 94% of the residential, 95% of small business and 69% of large business customers at the end of March 2024.

— A little more than half of Tasmanian electricity is consumed by transmission-connected customers. ACIL Allen understands these customers contract directly with Hydro Tasmania under long-term arrangements.

Eighteen scenarios were modelled, as shown in the following table.

Table 2.1 Scenarios modelled for the Basslink conversion assessment

Marinus Link Stage 1 (July 2029)	Marinus Link Stages 1&2 (July 2029 and July 2036)	No Marinus Link
Regulated – prescribed network service	Regulated – prescribed network service	Regulated – prescribed network service
Merchant – market network service	Merchant – market network service	Merchant – market network service
Merchant – Trading rights sold to Hydro Tasmania	Merchant – Trading rights sold to Hydro Tasmania	Merchant – Trading rights sold to Hydro Tasmania
Regulated – prescribed network service (Hydro Tasmania more heavily contracted)	Regulated – prescribed network service (Hydro Tasmania more heavily contracted)	Regulated – prescribed network service (Hydro Tasmania more heavily contracted)
Merchant – market network service (Hydro Tasmania more heavily contracted)	Merchant – market network service (Hydro Tasmania more heavily contracted)	Merchant – market network service (Hydro Tasmania more heavily contracted)
Merchant – Trading rights sold to Hydro Tasmania (Hydro Tasmania more heavily contracted)	Merchant – Trading rights sold to Hydro Tasmania (Hydro Tasmania more heavily contracted)	Merchant – Trading rights sold to Hydro Tasmania (Hydro Tasmania more heavily contracted)

Note: Hydro Tasmania contract levels were increased by 5% in the more heavily contracted scenarios

Source: ACIL Allen

Benefits assessed

The differences in fuel, operating, maintenance, and emissions costs were input to RIT-T-style market benefits assessments. The consumer benefits were estimated by multiplying the market price differences by consumer demand. Benefits under the various market network service scenarios were compared with the prescribed network service scenario (regulated Basslink).

Competition benefits were not considered significant or included in the market benefits assessment. It was assumed that there was no significant difference in option value across the scenarios.

The modelling did not identify reliability benefits for calculating consumer benefits (no unserved energy or near misses). The reasons for this are discussed in Appendix A.3.3.

As Basslink is assumed to remain available under all modelled scenarios, it has been assumed that no power system security benefits are associated with converting Basslink.

Consideration of Tasmanian regulated retail electricity prices

Apart from the modelling of higher contract levels for Hydro Tasmania (refer Table 2.1 above), the Tasmanian wholesale/retail electricity price cap was not specifically applied in the modelling. The effect of the wholesale/retail electricity price cap on the modelled results for Tasmania depends on the degree to which the future cap is set with reference to market outcomes that are affected by the operating mode of Basslink.

The following factors are relevant to setting the Tasmanian retail electricity price cap:

— The price cap (set as a requirement for retailers to offer a standing offer contract) is determined periodically, which allows it to be updated for current market conditions
— Victorian contract prices are a large factor in determining the wholesale energy costs in the price determination. Victorian contract prices reflect expectations of future spot prices. The

operating mode of Basslink will likely affect Victorian contract prices, as reflected in the modelling.

— Where the modelling indicates lower Tasmanian prices but not lower Victorian prices, the lower prices may not flow through to Tasmanian consumers.

Where the Tasmanian retail electricity prices continue to be set using the current methodology, modelled consumer benefits for a Basslink mode of operation that includes benefits from lower Tasmanian prices but not lower Victorian prices, likely overstate the benefits or understates the disbenefits of that mode of operation.

Key assumptions

The key assumptions used in the modelling, referred to in chapter 3, are summarised in Table 2.2, by category of key assumption.

Table 2.2 Key assumptions in the modelling, by category of key assumption

Assumption	No Marinus Link	One Marinus Link	Two Marinus Links
Thermal plant closure	– TAS: Tamar Valley in 2028 – VIC: Yallourn in 2028, Somerton in 2033 and Loy Yang A in 2035 – SA: Osborne and Torrens Island B in 2026, Dry Creek and Mintaro in 2030, Hallet in 2032, Ladbroke Grove in 2035 – NSW: Eraring in 2025, Vales Point B in 2029 and Bayswater in 2033 – QLD: Stanwell and Tarong in 2027, Callide B in 2028, Tarong North in 2029, Gladstone in 2030 and Kogan Creek in 2035	– As per no Marinus Link	– As per no Marinus Link
Interconnectors	– VNI West: from April 2029 – EnergyConnect: July 2026 – QNI Connect upgrade: July 2029	– As per no Marinus Link, plus – Marinus Link: Stage 1 from July 2029	– As per one Marinus Link plus, – Marinus Link: Stage 2 from July 2036
Capacity – VIC	– Onshore wind: increase gradually from around 4,500 MW in 2025 to 14,700 MW in 2035 – Solar: increase gradually from around 1,500 MW in 2025 to 2,900 MW in 2035 – Offshore wind: increase from about 500 MW in 2030 to 4,500 MW in 2035 – Storage: increase gradually from around 2,000 MW in 2025 to 7,300 MW in 2035 – Brown coal: decrease from 4,800 MW in 2025 to 3,300 MW in 2029 and to 2,300 MW in 2035	– Onshore wind: increase gradually from around 4,500 MW in 2025 to 13,800 MW in 2035 – Solar: increase gradually from around 1,500 MW in 2025 to 2,800 MW in 2035 – Offshore wind: as per no Marinus Link – Storage: increase gradually from around 2,000 MW in 2025 to 7,800 MW in 2035 – Brown coal: as per no Marinus Link	– Onshore wind: as per one Marinus Link – Solar: increase gradually from around 1,500 MW in 2025 to 2,700 MW in 2035 – Offshore wind: as per no Marinus Link – Storage: as per one Marinus Link – Brown coal: as per no Marinus Link

Assumption	No Marinus Link	One Marinus Link	Two Marinus Links
Capacity – TAS	– Wind: increase from around 400 MW in 2025 to around 1,200 MW-1,300 MW in 2029-2030 to 1,700 MW in 2035 – Hydro: increase by 390 MW from 2028 to 2030 as the result of the Battery of the Nation (BOTN) project – Natural gas: decrease about 200 MW from 2028-2029 due to the closure of Tamar Valley	– Wind: increase from around 400 MW in 2025 to around 1,900 MW-2,500 MW in 2029-2030 to 2,700 MW in 2035 – Hydro: as per no Marinus Link – Natural gas: : as per no Marinus Link	– Wind: increase from around 400 MW in 2025 to around 1,900 MW-2,500 MW in 2029-2030 to 2,900 MW in 2035 – Hydro: as per no Marinus Link – Natural gas: as per no Marinus Link

82% renewable energy target in 2030	– To achieve 82% target in 2030, between 2025 and 2030:
	  – Coal closure: about 11,000 MW of black and brown coal exits the market
	  – Wind and solar capacity: around 35,700 MW of wind and solar capacity enter the market
		– As per no Marinus Link	– As per no Marinus Link

Snowy 2.0	– July 2028	– As per no Marinus Link	– As per no Marinus Link

Source: ACIL Allen

Table 2.3 summarises the key infrastructure changes that have been assumed in the modelling, by timeline. In addition to the infrastructure changes identified in Table 2.3, there is substantial new wind, solar, hydro and battery capacity that enters the market between 2025 and 2035 as identified in Table 2.2. With the decarbonisation of the electricity market, there is a lot of change that occurs in the market between 2025 and 2035, and particularly in the period between 2025 and 2030.

Table 2.3 Key infrastructure changes in the modelling, by timeline

Assumption	No Marinus Link	One Marinus Link	Two Marinus Links
2025	– NSW: Closure of Eraring	– As per no Marinus Link	– As per no Marinus Link
2026	– SA: Closure of Osborne and Torrens Island B – EnergyConnect from July	– As per no Marinus Link	– As per no Marinus Link
2027	– QLD: Closure of Stanwell and Tarong	– As per no Marinus Link	– As per no Marinus Link
2028	– TAS: Closure of Tamar Valley – VIC: Closure of Yallourn – QLD: Closure of Callide B – Snowy 2.0: from July	– As per no Marinus Link	– As per no Marinus Link
2029	– NSW: Closure of Vales Point B – QLD: Closure of Tarong North – VNI West from April – QNI Connect upgrade from July	– Marinus Link: Stage 1 from July	– As per one Marinus Link
2030	– SA: Closure of Dry Creek and Mintaro – QLD: Closure of Gladstone	– As per no Marinus Link	– As per no Marinus Link
2031	– Nil	– As per no Marinus Link	– As per no Marinus Link
2032	– SA: Closure of Hallet	– As per no Marinus Link	– As per no Marinus Link
2033	– VIC: Closure of Somerton – NSW: Closure of Bayswater	– As per no Marinus Link	– As per no Marinus Link
2034	– Nil	– As per no Marinus Link	– As per no Marinus Link

Assumption	No Marinus Link	One Marinus Link	Two Marinus Links
2035	– VIC: Closure of Loy Yang A – SA: Closure of Ladbroke Grove – QLD: Closure of Kogan Creek	– As per no Marinus Link	– As per no Marinus Link
2036	– Nil	– As per no Marinus Link	– Marinus Link: Stage 2 from July

Source: ACIL Allen

Modelling results and analysis 3

This chapter provides various results for each of the scenarios identified in Table 2.1, culminating in estimates of the consumer and market benefits associated with conversion of Basslink.

3.1 Capacity

NEM entry and exit vary across the three Marinus Link commissioning configurations considered because of the change in the capacity of Marinus Link:

— Tasmanian renewable capacity, primarily wind and pumped hydro energy storage (PHES) increases as the Marinus Link capacity increases, driven by the TRET

— mainland capacity adjusts to the increase in Tasmanian renewable capacity and the consequential change in the operating behaviour of the Hydro Tasmania hydroelectric portfolio.

The mode in which Basslink operates has no impact on NEM entry and exit. Therefore, for each of the 3 Marinus Link configurations considered, entry and exit are the same across all Basslink operating modes.

3.1.1 NEM

Figure 3.1 shows the projected capacity and change in capacity for the NEM for the No Marinus Link configuration and the change in capacity for the NEM for the one and two Marinus Link configurations.

In the **No Marinus Link** configuration, coal-fired capacity exits, and renewable/storage capacity enters in line with the transition to a net-zero emissions future by 2050. There is some growth in natural gas capacity from 11 GW to 21 GW by 2039 to provide firming and support power system reliability. Around 2/3 of this natural gas-fired capacity is projected to convert to green hydrogen between 2040 and 2050. Total installed capacity in the NEM is projected to be around 170 GW by 2040 and 217 GW by 2050.

While the overall chart appears orderly, there are several key changes in the period to 2032 that have a significant effect on projected dispatch, and therefore projected prices and energy costs, which drive estimates of consumer benefits. These include:

— Eraring closure in 2025[7] (2,880 MW)

— Torrens Island B closure in 2026 (800 MW)

— Yallourn closure in 2028 (1,538 MW)

— Callide B closure in 2028 (700 MW)

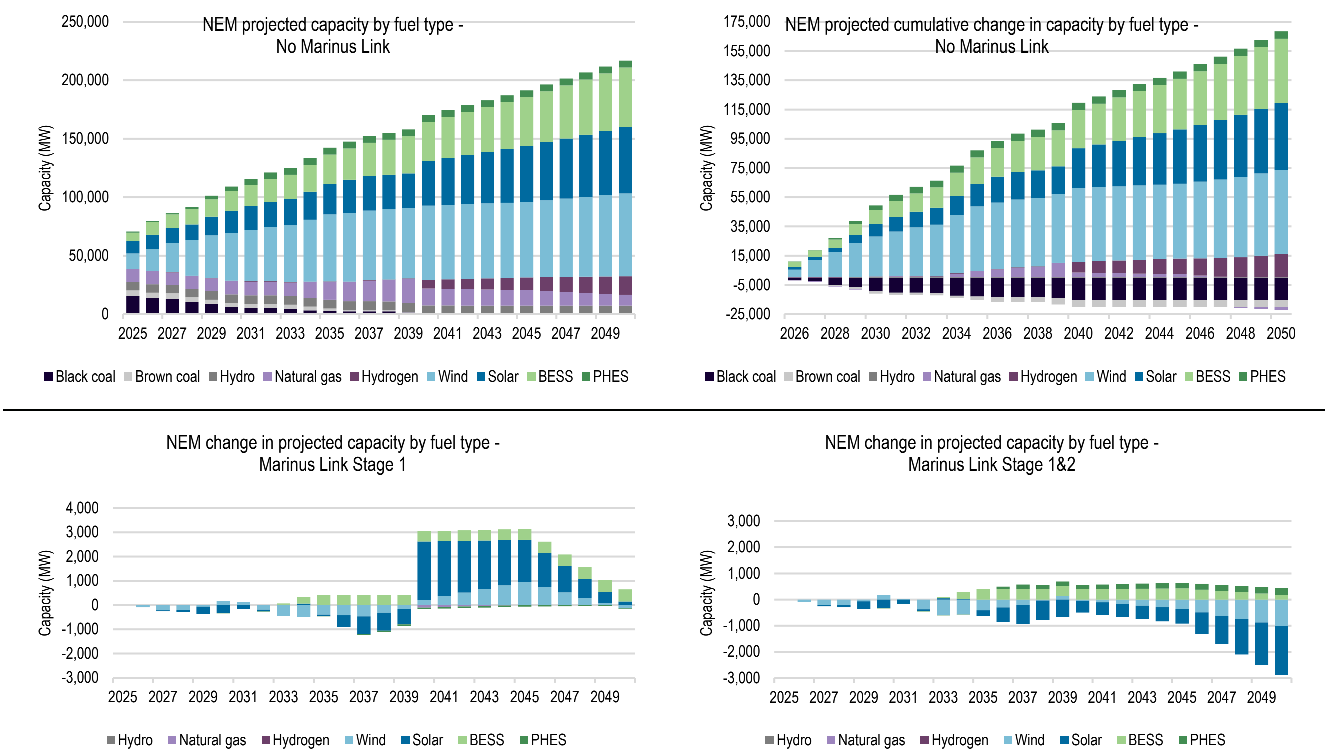
— additional coal-fired closures between 2028 and 2032 in New South Wales and Queensland (around 7,000 MW).

In addition, there are several transmission augmentations that have been included in the modelling that have an effect on the period to 2032. These are set out in section 3.2 below.

For the **Marinus Link Stage 1** configuration, wind and solar investment across the NEM is almost the same as in the No Marinus Link configuration by 2050, with wind in Tasmania displacing wind on the mainland. The configuration supports around 500 MW of additional storage by 2050.

For the **Marinus Link Stage 1&2** configuration, additional wind and PHES in Tasmania displaces solar and wind in mainland regions with a net reduction in wind and solar across the NEM, due to the stronger wind resource in Tasmania.

Figure 3.1 NEM projected capacity (no Marinus Link) and change in capacity (compared with No Marinus Link) by fuel type



Note: Results were modelled for 2025 to 2040 and then at spot years 2045 and 2050. Results for 2041 to 2044 and 2046 to 2049 are linearly interpolated.

Source: ACIL Allen

[7] The New South Wales Government and Origin Energy agreed to an extension of Eraring to August 2027 in late May 2024. This extension was agreed after most of the modelling had been completed. ACIL Allen considers the extension has little effect on comparative economic and customer benefits provided in this report.

3.1.2 Tasmanian region

Figure 3.2 shows the projected capacity and change in capacity for the Tasmanian region for the No Marinus Link configuration and the change in capacity for the NEM for the one and two Marinus Link configurations.

The differences in installed wind generation in Tasmania in each Marinus Link configuration is determined by the:

— TRET Target (increasing renewable energy by 9,500 GWh by 2040)

— amount of renewable energy that is feasible in Tasmania, as determined by the Plexos planning model.

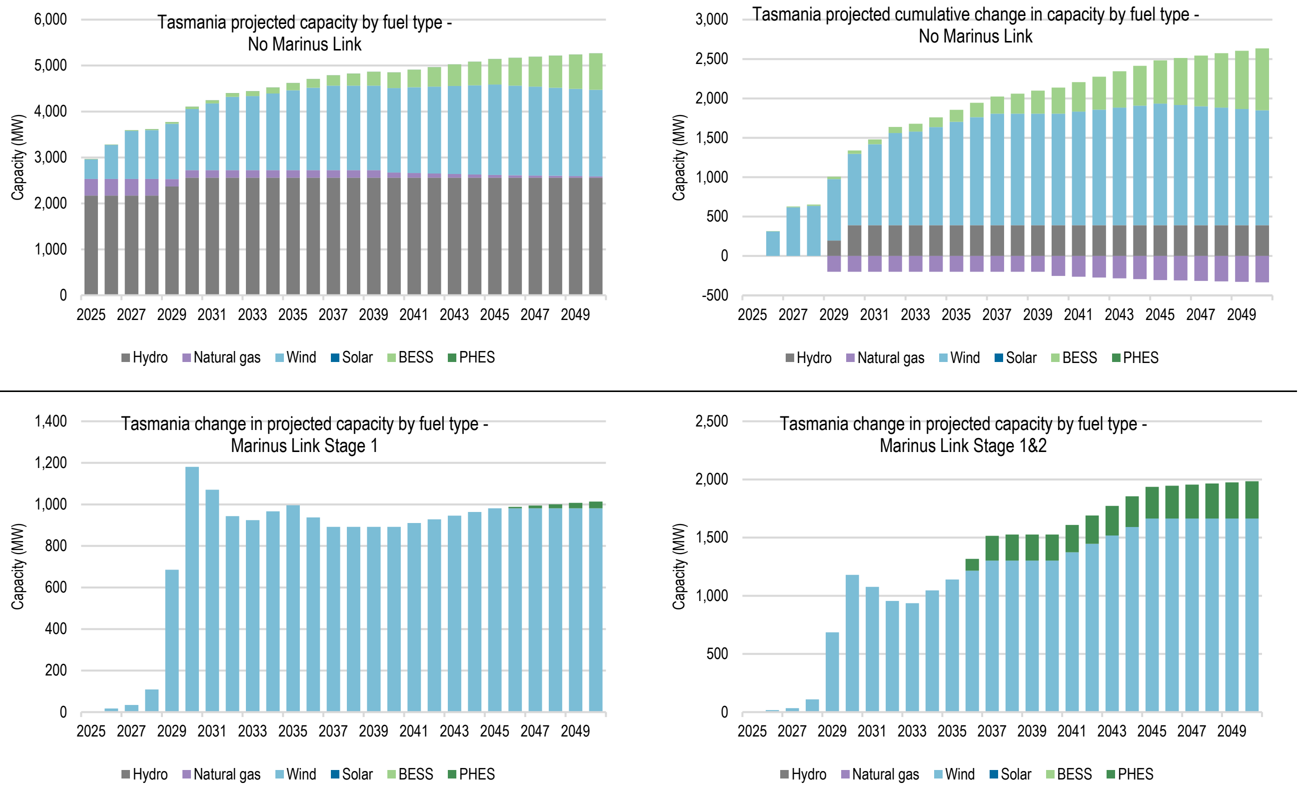
In the **No Marinus Link** configuration, wind generation in Tasmania increases to around 1,900 MW and BESS to around 800 MW by 2050. The wind generation is primarily driven by TRET supported investment, growing to around 50% of the proposed TRET. Investment is limited by the transfer capacity of Basslink in this configuration.

In the **Marinus link stage 1** configuration, Tasmanian wind generation rises by around a further 1 GW compared to the No Marinus Link case by 2050. The Tasmanian region achieves around 80% of the proposed TRET by 2040. The combined transfer capacity of Basslink and Marinus Link Stage 1 limit further investment. A small amount of additional capacity is installed prior to 2050 as the Tasmanian region experiences modest growth in energy consumption. The additional Tasmanian wind generation defers investment in mainland solar and wind capacity until 2039 but then supports bringing forward solar and wind investment from 2040. As noted above, overall wind and solar investment is almost the same as in the No Marinus Link configuration.

In the **Marinus Link Stage 1&2** configuration, Tasmanian capacity is projected to increase by around 1.3 GW of wind and around 320 MW of storage capacity by 2040, with the TRET scheme fully subscribed in this configuration. By 2050, Tasmanian wind capacity increases by around 3.5 GW compared with the No Marinus Link Configuration.

The additional Tasmanian capacity, coupled with less constraints on transfers from Tasmania, largely displaces equivalent mainland capacity to 2039. From 2040, NEM wide capacity is projected to be around 3 GW lower than the No Marinus configuration. Around 2/3 of the reduction capacity is projected to be solar with most of the remaining 1/3 projected to be wind. The combined capacity of two Marinus Links and Basslink provides more access to flexible Tasmanian hydro generation, augmented by 320 MW of pumped hydro. This results in less economic curtailment of renewable energy and the need for less renewable capacity to meet consumer demand for energy.

Figure 3.2 Tasmanian region projected capacity (no Marinus Link) and change in capacity (compared with No Marinus Link) by fuel type



Note: Results were modelled for 2025 to 2040 and then at spot years 2045 and 2050. Results for 2041 to 2044 and 2046 to 2049 are linearly interpolated.

Source: ACIL Allen

3.2 Inter regional transmission capacity augmentations

Changes in inter-regional transmission capacity affects dispatch within and between regions. There are some significant projected changes in inter-regional transmission capacity between 2026 and 2030 in the modelled scenarios (EnergyConnect is already committed and is under construction).

Table 3.1 Modelled interconnector capacity augmentations

Interconnector	Forward direction	Year	Capacity (MW)
Heywood	Vic to SA	2024	460 (500)
		Jul 2026	560 (600)
QNI	NSW to Qld	2024	600 (1,290)
		Jul 2030 (QNI Medium upgrade)	1,432 (2,050)
EnergyConnect	NSW to SA	Jul 2026	800 (800)
VNI West	Vic to NSW	Apr 2029	1,930 (1,800)
Marinus Link	Tas to Vic	Jul 2029	750 (750)
		Jul 2036	1,500 (1,500)

Note: Forward capability, with backward capability shown in brackets.

Source: ACIL Allen analysis of AEMO data

3.3 Trading incentives

The results of the modelling indicate that the Basslink mode of operation is likely to have a significant effect on dispatch and pricing outcomes, and, therefore, on consumer benefits. The variations in dispatch and pricing outcomes depend on the following factors:

— the dominance of Hydro Tasmania in the Tasmanian region and the extent to which that dominance is lessened by the other factors
— the extent to which Hydro Tasmania has exposure to spot prices (which depends on the volume and tenor of forward contracts)
— competition between Basslink and Hydro Tasmania when Basslink is operated in merchant mode
— the increase in competition for both Basslink and Hydro Tasmania with the development of either one or both stages of Marinus Link.

The presence or absence of these factors affect the incentives for Hydro Tasmania and the manner in which Basslink is traded when operating in merchant mode. These incentives are discussed in more detail in the following sections.

3.3.1 Regulated Basslink

In the regulated cases, Basslink is available at full continuous capacity in both directions with the higher rating for short periods for export from Tasmania to Victoria. Projected Tasmanian prices are generally lower than mainland region prices. This is because Tasmania is projected to be a major exporter of energy over Basslink, or the combination of Basslink and Marinus Link.

Hydro Tasmania has no exposure to Victorian prices[8] and seeks to sell when prices are high in Tasmania, to the extent that its generation is flexible and can be scheduled at different times. However, its revenues depend on Tasmanian region prices. There is an opportunity cost for Hydro Tasmania to generate (which is typically assigned as a value to the water that would be used in generating). Where the Tasmanian price is less than its assessed opportunity cost, Hydro Tasmania would be expected to reduce output and allow either imports or local wind generators to supply a large portion of Tasmania's electricity demand.

Basslink exports electricity from Tasmania to Victoria when Victorian prices are higher than those in Tasmania and imports electricity from Victoria when Victorian prices are lower.

When prices are high in Victoria, Hydro Tasmania has an incentive to generate to export, but not to the extent that the interconnector constrains and the two regions' prices separate. In this sense, Hydro Tasmania has an incentive to shadow Victorian prices.

However, because of the projected energy surplus in Tasmania (through the projected growth in wind generation in Tasmania supported by the TRET outstripping local demand growth), it is expected that exports will dominate imports. As wind generation is variable, when the combined capacity operates at high production levels, the Basslink and Marinus Link interconnectors are likely to constrain leading to lower prices in Tasmania compared with Victoria and other mainland regions. While the development of Marinus Link increases interconnector capacity, which ordinarily would reduce the likelihood of flow constraints, it also facilitates increased wind capacity in Tasmania which increases the energy surplus and likelihood of constraints occurring.

[8] It is assumed Hydro Tasmania does not access the Interregional Settlements Residues. If Hydro Tasmania gains some exposure to Victorian prices through acquiring some of the Interregional Settlements Residues, it gains some of the incentives discussed in section 4.3.3.

3.3.2 Merchant Basslink

Basslink operating in merchant mode receives revenue by bidding a price to transfer electricity either to or from Tasmania. A merchant Basslink creates a form of competition for Hydro Tasmania:

— when electricity is flowing from Tasmania to Victoria, by limiting flows to the Victorian region and therefore the effective demand available to Hydro Tasmania and other Tasmanian generators (which reduces competition in the Victorian region).

— when electricity is flowing from Victoria to Tasmania, by providing access to Tasmania for Victorian generators.[9]

When electricity demand and prices are high in Victoria, Basslink has the incentive to bid higher prices to transfer energy to Victoria, creating a larger price difference between the two regions. This results in a upward pressure on prices in Victoria (and potentially in other mainland NEM regions) and a downward pressure on prices in Tasmania, compared with the regulated case.

Similarly, when electricity demand and prices are high in Tasmania, Basslink has the incentive to bid high prices to transfer energy to Tasmania, creating a large price difference between the two regions in the opposite direction.

However, most of the competitive effects would be expected to be associated with exports from Tasmania to Victoria with limited potential to capture revenues for imports to Tasmania, except for the first one or two years.[10] Tasmania is an energy constrained rather than a capacity constrained region as Tasmania has significant surplus capacity through the hydroelectric power system. Therefore, high price events in Tasmania which are not linked to high prices in Victoria; are driven by shortages of energy rather than shortages of capacity.

The significant growth in wind generation through the TRET will results in Tasmania having large volumes of surplus energy. Therefore, it is unlikely that Tasmania will experience any significant energy shortfall[11] making demand for high priced imports less likely.

The ability of Basslink to be an effective competitor with Hydro Tasmania is lessened with the development of Marinus Link. The ability to constrain flows and capture large price differences is eroded where large volumes can flow across a regulated Marinus Link.

3.3.3 Hydro Tasmania trades Basslink

In these cases, Hydro Tasmania is assumed to acquire the trading rights to Basslink. No bidding restrictions were assumed to apply to Hydro Tasmania under the cases.

When prices are high in Victoria, and there are large volumes of available renewable energy from other parties in Tasmania, Hydro Tasmania has incentives to bid a high transfer price on Basslink to maximise Basslink revenues.

When prices are high in Victoria, and there is limited renewable energy from other parties in Tasmania, Hydro Tasmania has incentives to offer Basslink in a way that maximises transfers on Basslink and lifts the Tasmanian price to shadow the Victorian price. This maximises Hydro Tasmania's spot price exposure through volumes exported to Victoria at high marginal prices in Tasmania.

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[9] A merchant Basslink would mean less competition for the Tasmanian region than a regulated Basslink when electricity is flowing to Tasmania, because Basslink bid prices would be added to the transfers (price delivered to Tasmania from Victoria would be higher. This may result in some Basslink capacity being economically withheld.

[10] The exception is in the first one to two years prior to the expansion of wind generation through the TRET.

[11] It is possible that a wind drought could lead to an energy shortfall, but the availability of flexible hydroelectric energy would be expected to mitigate most wind drought events.

When prices are high in Tasmania relative to Victoria (typically coinciding with limited renewable energy from other parties in Tasmania), Hydro Tasmania has an incentive to withhold capacity in Tasmania and capture significant revenues through a combination of energy transferred over Basslink and energy generated locally by Hydro Tasmania. These incentives would be reduced where Hydro Tasmania's forward contract obligation volumes exceeded the sum of Basslink flows and Hydro Tasmania's local generation.

3.3.4 Hydro Tasmania contract levels

The level of long-term forward contracts held by Hydro Tasmania will affect its incentives because it will affect how large Hydro Tasmania's exposure is to spot prices. Where Hydro Tasmania is contracted at high volumes relative to its capacity to physically generate, it will have limited spot price exposure and less incentive to operate in ways to increase prices and price volatility in Tasmania.

3.4 Prices

Figure 3.3 to Figure 3.5 provide annual average prices between 2025 and 2050 for cases of one, two and no Marinus links. The top panels in each figure show the annual average prices for the regulated scenario and the regulated scenario with higher contract levels for Hydro Tasmania. The remainder of the panels show the difference between each scenario and the relevant regulated scenario.

The modelled price outcomes are mostly consistent with expectations based on the incentives set out above. The modelling is undertaken at hourly granularity and includes simulation of profit maximising behaviour by participants, through participants adjusting offers/bids to improve profitability in each hour.

The model allows several rounds of rebidding to effect this. Ideally, the model will settle at an equilibrium in each hour modelled (and it does for over 99% of the hours simulated). However, to minimise solution time, the *PowerMark* model limits the number of rebidding rounds. Occasionally this results in inconsistent pricing outcomes in specific hours across cases (due to there being more than one equilibrium). Our review of the results indicates that the inconsistencies that exist are not material with respect to the expected results, or our conclusions drawn from the modelling.

3.4.1 Marinus Link stage 1

Figure 3.3 shows projected prices for the various cases with a single Marinus Link, commissioned in July 2029.

Regulated Basslink

For the regulated cases with a single Marinus Link, Tasmanian prices are mostly lower than NEM mainland region prices. This reflects the large projected surplus of energy in Tasmania developed under the TRET resulting in flows on Basslink and Marinus Link being predominantly exports from Tasmania to Victoria.

For the regulated case with a single Marinus Link and Hydro Tasmania contracting at higher volumes, prices in all NEM regions are mostly lower compared with the regulated case. The higher level of contracting mitigates some of Hydro Tasmania's market power in the spot market, resulting in lower prices in both Tasmania and the NEM mainland regions.

Merchant Basslink

Where Basslink is operated in merchant mode with a single Marinus Link, Tasmanian prices are lower than for the regulated cases. Tasmanian prices are significantly lower during the period 2027 to 2029, coinciding with a period of higher prices in Victoria. Victorian prices increase because of the staged closure of Yallourn, commencing in 2027 and to a lesser extent, the closure of the Torrens Island B power station in South Australia in 2026. This enhances the incentives on Basslink to bid to limit flows from Tasmania so as to capture higher price differences between Tasmania and Victoria, putting downward pressure on Tasmanian prices and contributing to higher prices in Victoria and South Australia.

The increased prices and price volatility dissipates after 2029 because of the commissioning of Snowy 2.0, increases in transmission capacity to Victoria (VNI West and Marinus Link stage 1) and increases in other renewable and storage capacity through Commonwealth and various state-based schemes, including investment in wind generation in Tasmania through TRET.

The commissioning of Marinus Link stage 1 in July 2029 also reduces the ability of the merchant Basslink to capture higher revenues by limiting flows from Tasmania, when prices are high in Victoria; up to 750 MW can flow freely on Marinus Link stage 1.

Where Basslink is operated in merchant mode with a single Marinus Link, prices under the Hydro Tasmania higher contract cases are mostly lower in all regions because of the mitigation of some of Hydro Tasmania's market power.

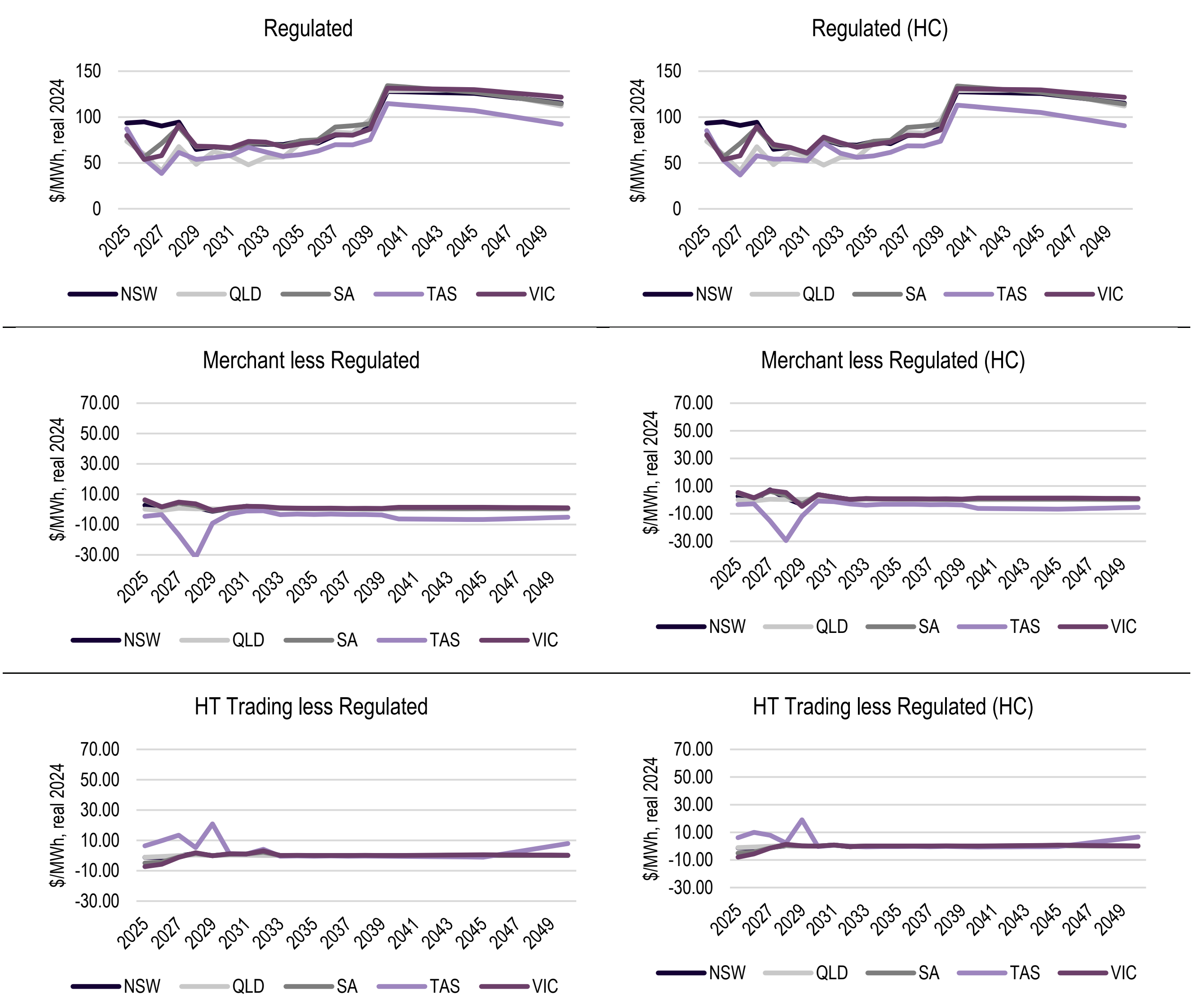
Hydro Tasmania trading Basslink

Where Basslink is traded by Hydro Tasmania with a single Marinus Link, Tasmanian prices are higher than for the regulated cases up until the commissioning of Marinus Link stage 1 in July 2029. This reflects Hydro Tasmania's incentives (refer to section 3.3.3 above) when trading Basslink:

— Hydro Tasmania bids to maximise transfers on Basslink and shadow the Victorian price when there is limited renewable energy from other parties in Tasmania, especially when Victorian prices are high.
— Hydro Tasmania withholds capacity in Tasmania to capture significant revenues through a combination of energy transferred over Basslink and energy generated locally by Hydro Tasmania, when prices are high in Tasmania relative to Victoria.

Where Basslink is traded by Hydro Tasmania with a single Marinus Link, prices under the Hydro Tasmania higher contract cases are mostly lower in all regions.

Figure 3.3 Marinus Link stage 1 – projected annual regulated time-weighted price by region for regulated scenarios (top panels) and difference in annual time-weighted price between other scenarios and regulated scenarios



Notes: Right-hand panels are for cases where Hydro Tasmania is contracted at higher levels over the long term (HC). The results were modelled for 2025 to 2040 and then at spot years 2045 and 2050. The results for 2041 to 2044 and 2046 to 2049 are linearly interpolated. HT = Hydro Tasmania.

Source: ACIL Allen

3.4.2 Marinus Link stages 1&2

Figure 3.4 shows projected prices for the various cases with two stages of Marinus Link, commissioned in July 2029 and July 2036 respectively.

The price outcomes for the various cases are similar to those for the Marinus Link stage 1 cases. Prior to 2036, the cases are almost identical with small variations in wind, solar, BESS and PHES driven by the Plexos planning model anticipating the second stage of Marinus Link and adjusting generation and storage accordingly. From 2036, greater interconnection to Victoria reduces the effect of merchant and Hydro Tasmania commercial incentives and trading strategies, and reduces some of the price differences in comparison with the regulated cases.

With Marinus Link stages 1 and 2, prices under the Hydro Tasmania higher contract cases are mostly lower in all regions.

Figure 3.4 Marinus Link stages 1&2 – projected annual regulated time-weighted price by region for regulated scenarios (top panels) and difference in annual time-weighted price between other scenarios and regulated scenarios

Notes: Right-hand panels are for cases where Hydro Tasmania is contracted at higher levels over the long term (HC). The results were modelled for 2025 to 2040 and then at spot years 2045 and 2050. The results for 2041 to 2044 and 2046 to 2049 are linearly interpolated. HT = Hydro Tasmania.

Source: ACIL Allen

3.4.3 No Marinus Link

Figure 3.5 shows projected prices for the various cases with no Marinus Link.

Regulated Basslink

For the regulated cases with no Marinus Link, Tasmanian prices are mostly lower than NEM mainland region prices, reflecting the projected large surplus of energy in Tasmania developed under the, albeit smaller, TRET resulting in flows on Basslink being predominantly exports from Tasmania to Victoria. Prices are also mostly lower than in the cases that include one or both stages of Marinus Link. This is because the modelled Tasmanian wind investment is around 50% of the TRET compared to around 80% for Marinus Link stage 1 and 100% for Marinus Link stage 1&2. The relative energy surplus in Tasmania is higher for the No Marinus Link cases.

For the regulated case with no Marinus Link and Hydro Tasmania with higher contracts, prices in all NEM regions are mostly lower compared with the regulated case.

Merchant Basslink

Where Basslink is operated in merchant operation, Tasmanian prices follow a similar trajectory to that for the Marinus Link cases. The higher prices projected in Victoria between 2027 and 2029 provide the incentives for Basslink to bid to limit flows from Tasmania so as to capture higher price differences between Tasmania and Victoria, putting downward pressure on Tasmanian prices and contributing to higher prices in Victoria and South Australia. From 2030, price volatility in Victoria reduces (because of increases in generation and storage capacity as discussed in section 3.4.1 above) reducing the opportunities for Basslink to capture revenues by limiting flows.

Where Basslink is operated in merchant operation with no Marinus Link, prices under the Hydro Tasmania higher contract cases are mostly lower in all regions.

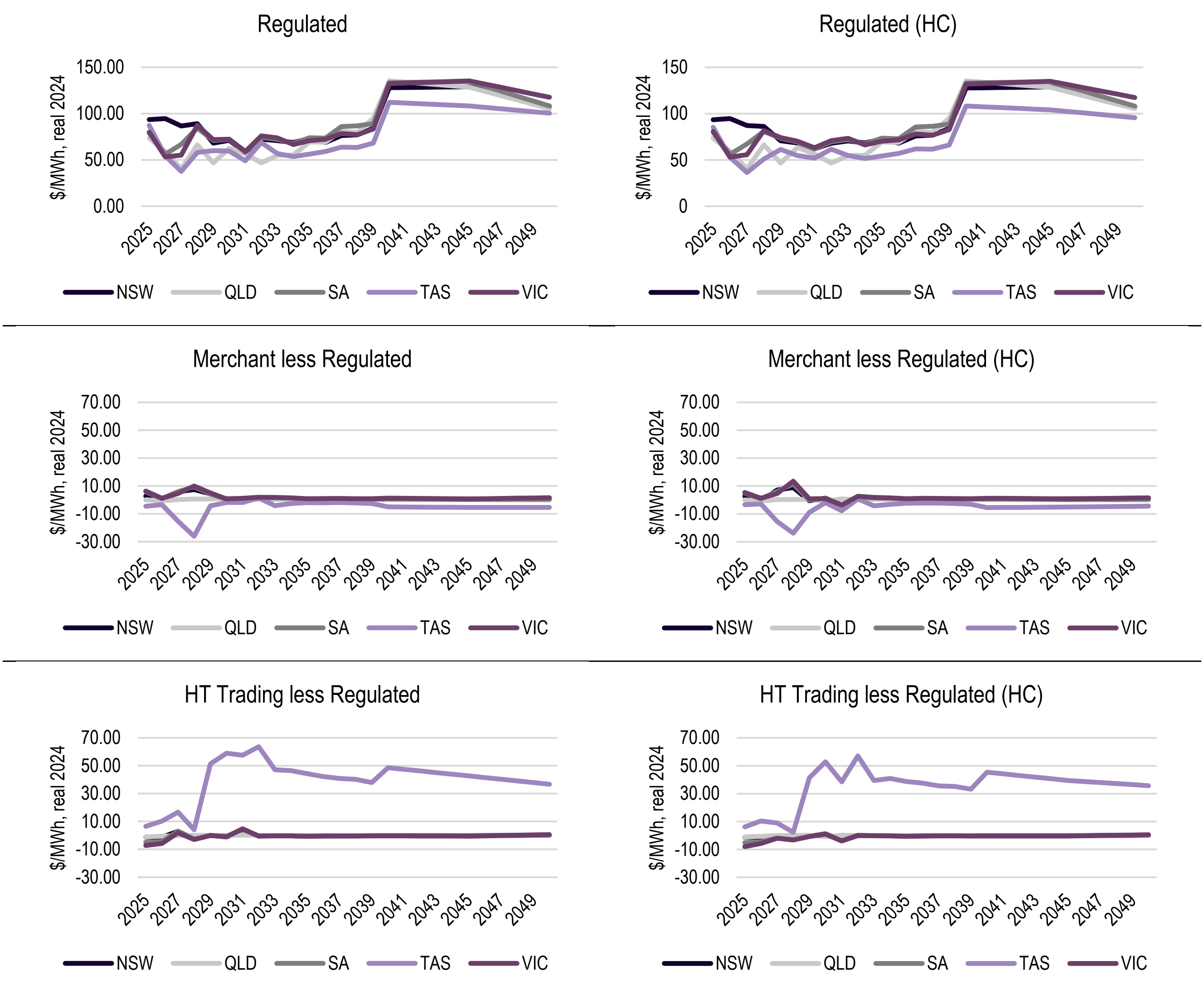
Hydro Tasmania trading Basslink

Where Basslink is traded by Hydro Tasmania, Tasmanian prices are significantly higher than for the regulated cases throughout the projection to 2050. This reflects Hydro Tasmanian incentives (refer to section 3.3.3 above) when trading Basslink:

— Hydro Tasmania bids to maximise transfers on Basslink and shadow the Victorian price when there is limited renewable energy from other parties in Tasmania, especially when Victorian prices are high.
— Hydro Tasmania withholds capacity in Tasmania to capture significant revenues through a combination of energy transferred over Basslink and energy generated locally by Hydro Tasmania, when prices are high in Tasmania relative to Victoria.

Where Basslink is traded by Hydro Tasmania with no Marinus Link, prices under the Hydro Tasmania higher contract cases are mostly lower in all regions.

Figure 3.5 No Marinus Link – projected annual regulated time-weighted price by region for regulated scenarios (top panels) and difference in annual time-weighted price between other scenarios and regulated scenarios



Notes: Right-hand panels are for cases where Hydro Tasmania is contracted at higher levels over the long term (HC). The results were modelled for 2025 to 2040 and then at spot years 2045 and 2050. The results for 2041 to 2044 and 2046 to 2049 are linearly interpolated. HT = Hydro Tasmania.

Source: ACIL Allen

3.5 Basslink revenues

Figure 3.6 shows projected Basslink revenues for the various Marinus Link configurations and cases where Hydro Tasmania is contracted less heavily. The dark part of the bars are revenues generated by exports from Tasmania to Victoria and the light bars are revenues generated by imports from Victoria to Tasmania. Revenues from exports are higher than from imports, consistent with Tasmania predominantly as an exporter of power because of the investment in surplus renewable energy through the TRET.

For the cases including one or both stages of Marinus Link, revenues from imports are very small following the commissioning of Marinus Link stage 1 in July 2029. Tasmanian average demand ranges from around 1,200 to 1,600 MW and peak demand rises gradually from 1,700 to 2,500 MW over the period 2025 to 2050.The increase in import capacity with the commissioning of Marinus Link stage 1 reduces the likelihood of constraints on imports and price separation from Victoria, and swamps the ability of a merchant Basslink to capture revenues from imports.

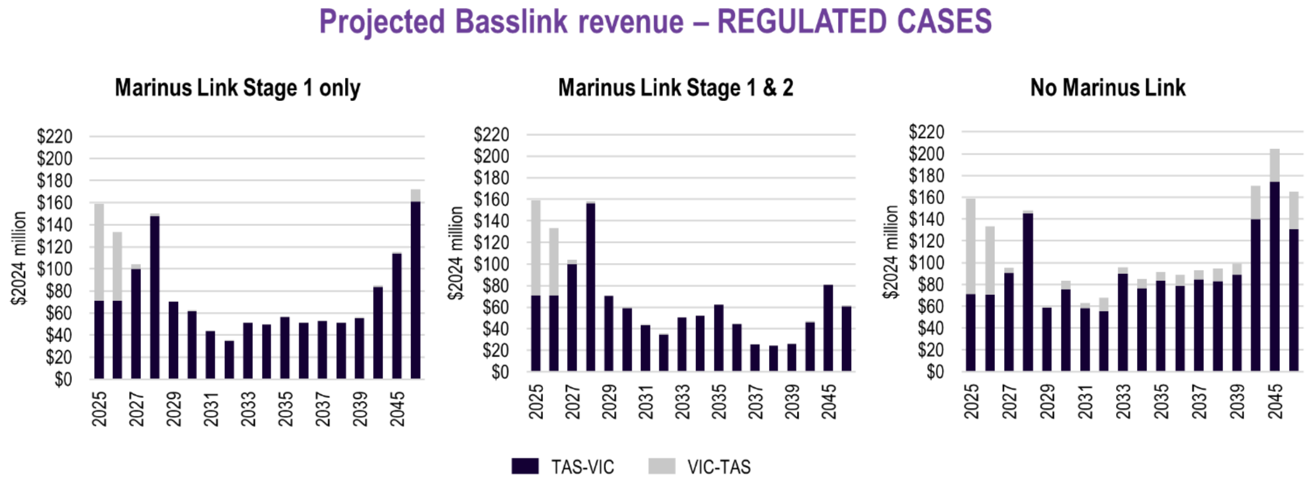
For the no Marinus Link configuration, revenues are substantially higher for the regulated, merchant and Hydro Tasmania trading cases. The merchant case has higher revenues than the regulated case through capturing higher revenues from both exports and imports using the strategies outlined in section 3.3.2 above. The Hydro Tasmania trading case has higher revenues than the merchant case after 2029, because it captures much higher revenues on imports to Tasmania. Hydro Tasmania benefits in this case from restricting imports and capturing higher prices on the combination of imported power and generation from its local Tasmanian power stations.

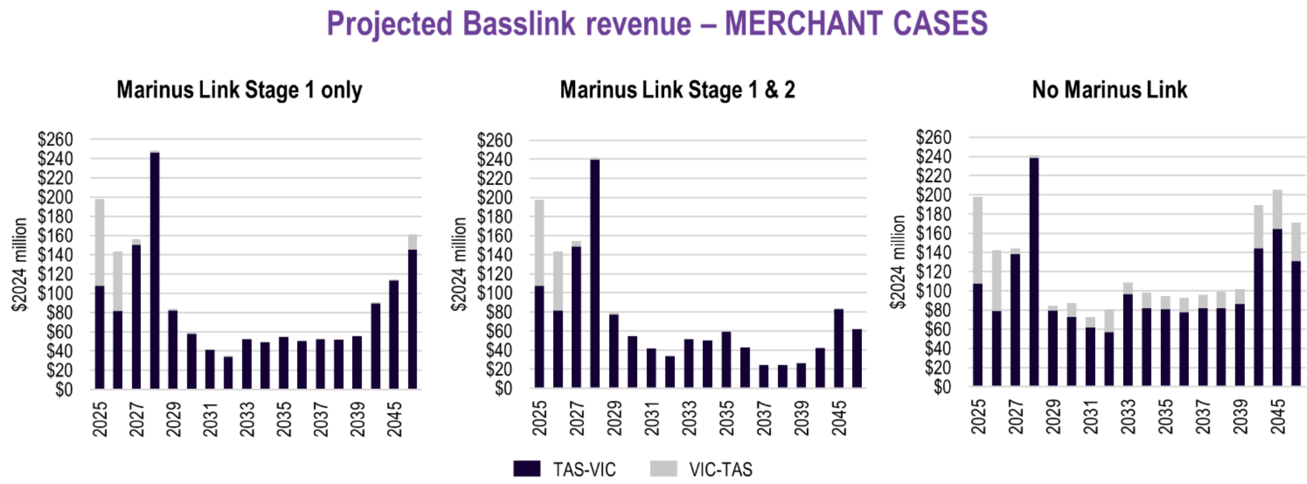
Figure 3.7 shows projected Basslink revenues for the various Marinus Link configurations and cases where Hydro Tasmania is more heavily contracted. The colour coding is the same as for the less heavily contracted scenarios.

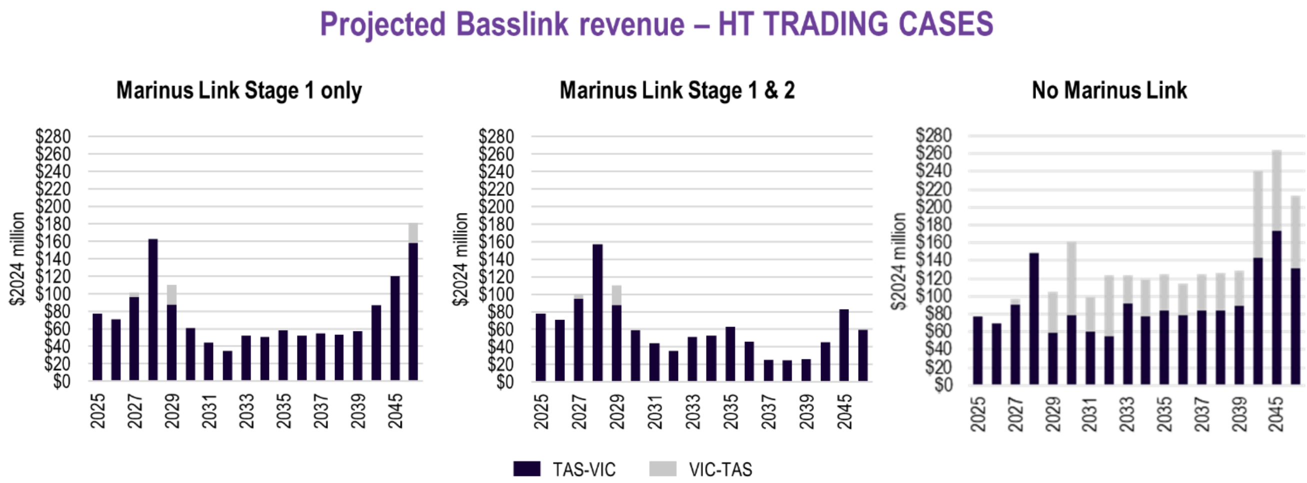
Basslink revenues are slightly higher for the merchant cases than for the regulated and Hydro Tasmania trading cases. The higher contract levels on Hydro Tasmania reduces its ability to influence spot prices by withdrawing capacity and make it a less effective competitor with Basslink. Basslink is able to take advantage of these circumstances and capture more revenue on exports.

For the Hydro Tasmania trading cases, revenues are higher where Marinus Link is commissioned, driven by higher revenues on exports (the higher contracting levels cause more periods to constrain on export). For the Hydro Tasmania trading case with no Marinus Link, revenues are lower caused by less opportunity for Hydro Tasmania to withhold capacity on imports.

Figure 3.6 Projected Basslink revenues for each Marinus Link configuration and each case

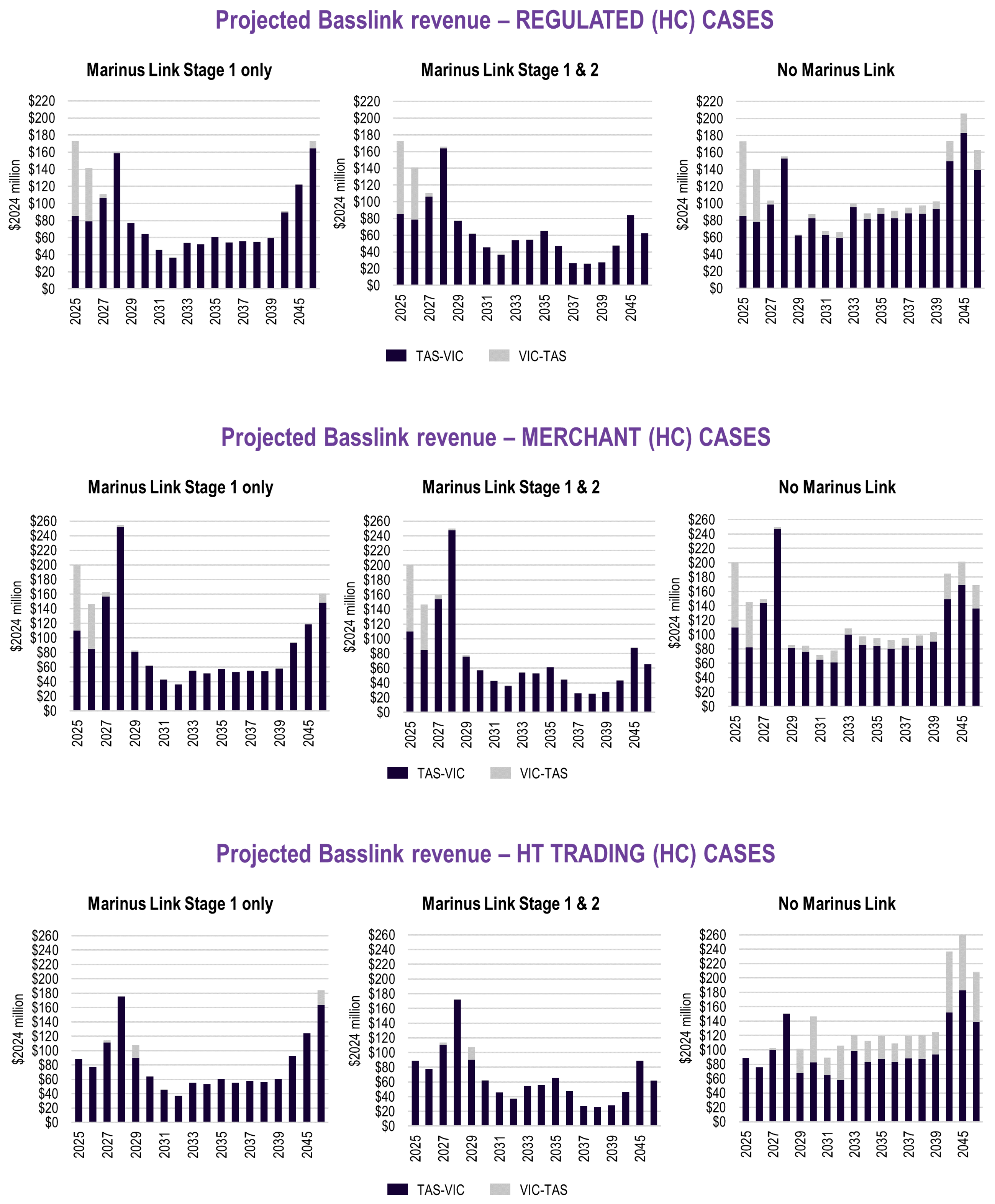






Source: ACIL Allen

Figure 3.7 Projected Basslink revenues for each Marinus Link Configuration and each case (HT higher contracts)



Source: ACIL Allen

3.6 Emissions

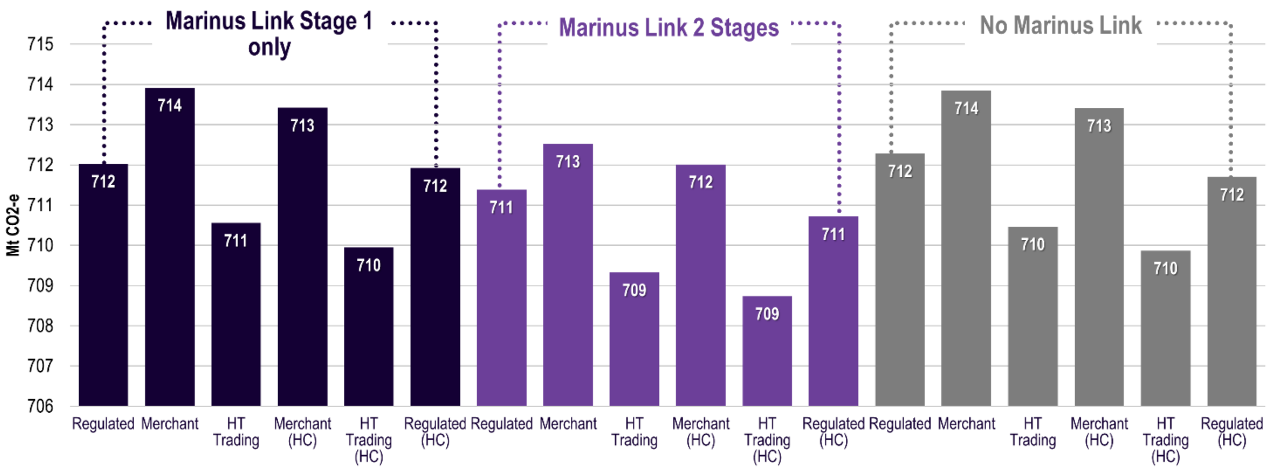
Figure 3.8 shows the total projected emissions from 2025 to 2050 for all Marinus Link configurations and scenarios. The variation in emissions across all scenarios is around 5 Mt CO_2-e over the modelled period. The variation in emissions falls to around 4 Mt CO_2-e across the scenarios with the same Marinus Link configuration.

The emissions tend to be lowest for the cases where Hydro Tasmania trades Basslink and highest where it is traded as a merchant link, independent of Hydro Tasmania. This is as expected:

— Hydro Tasmania optimises zero emissions hydro electricity when prices are high on the mainland (displacing fossil fuels) when it can trade Basslink.

— When Basslink is operated as an independent merchant link, interconnector flows from Tasmania are constrained during high prices on the mainland, leading to a little more use of fossil fuels during these periods.

Figure 3.8 Projected total emissions by scenario – 2025-2050 (Mt CO_2-e)



Note: Costs discounted to 2024 using a 7% real discount rate.
Source: ACIL Allen

The overall variation in emissions is not significant. This is shown in the estimate of the difference in emissions costs in Figure 3.9 below. The costs have been developed by applying the latest published AER emissions values to the annual projected emissions for each scenario. The annual costs are presented as a present value using a 7% real discount rate. The present values are presented relative to the regulated and regulated higher contract cases for each Marinus Link configuration. The costs are presented from 2025 to 2039[12] and from 2025 to 2050.

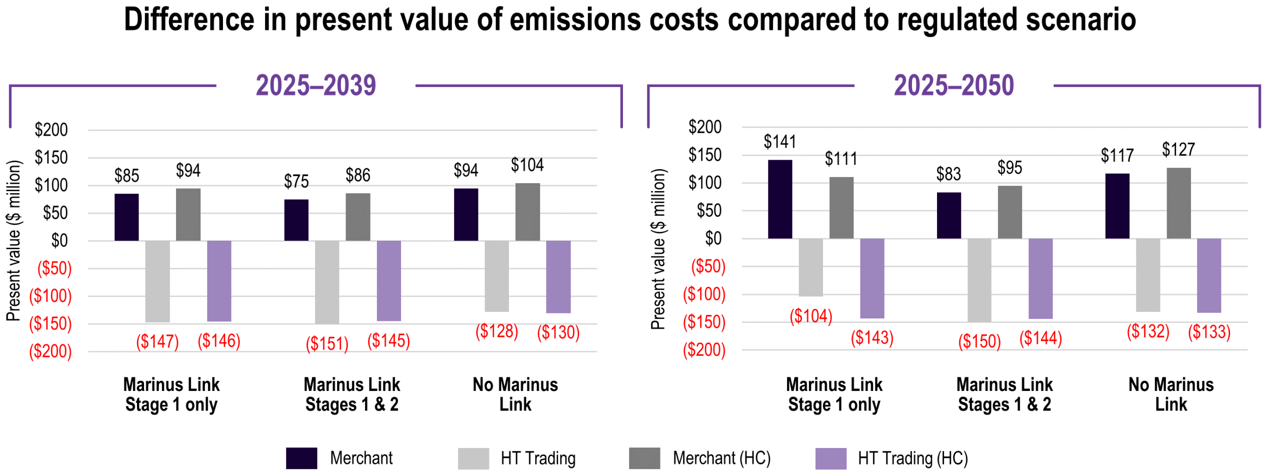
The range in cost of emissions across the scenarios for each Marinus Link configuration is between $240 and $300 million in present value terms.

The cost of emissions is explicitly included in the modelling from 2040. Therefore, the short-run marginal costs of fossil fuel producers from 2040 include the cost of emissions. As short-run marginal costs before 2040 do not include the cost of emissions, the 2025-2039 emissions costs

[12] ACIL Allen has included explicit emissions costs in the modelling from 2040 as a carbon penalty on fossil fuel producers. This has been included to enable the policy of net zero emissions by 2050 (i.e., emitters are required to purchase offsets from 2040).

were included in the consumer benefit and market benefit assessments in section 3.7 and 3.8 below.

Figure 3.9 Projected difference in cost (present value) of emissions (2025-2039 and 2025-2050)



Note: A positive number means higher costs; a negative number means lower costs. Costs discounted to 2024 using a 7% real discount rate. HT = Hydro Tasmania, HC = higher levels of contacting.

Source: ACIL Allen

3.7 Consumer benefits

Consumer benefits are defined as an estimate of the change in the consumer surplus plus the change in the cost of emissions under each Marinus Link configuration and case.

The consumer demand curve is not explicitly derived and modelled (demand is an input and held constant). Therefore, the change in consumer surplus is calculated by estimating the change in energy costs paid by consumers (product of the change in projected prices and consumer demand in each NEM region).

The change in the cost of emissions is calculated from the modelled NEM emissions (based on standard emissions factors for each fossil fuel generator) and the most recent value of emissions published by the AER.

3.7.1 Change in energy costs

The changes in energy costs are estimated by subtracting the calculated energy costs in each case from the relevant regulated case (regulated and regulated with higer contracting by Hydro Tasmania (HC)). An increase in energy costs compared to the relevant regulated case is calculated as a negative change (disbenefit).

Marinus Link stage 1

Figure 3.10 shows the change in energy costs for the one Marinus Link configuration. Energy costs mostly increase compared to those of the regulated[13] case. The exception is for the cases where Hydro Tasmania trades Basslink and is assumed to have higher levels of long-term contracts and, therefore, has less incentive to raise spot prices in Tasmania.

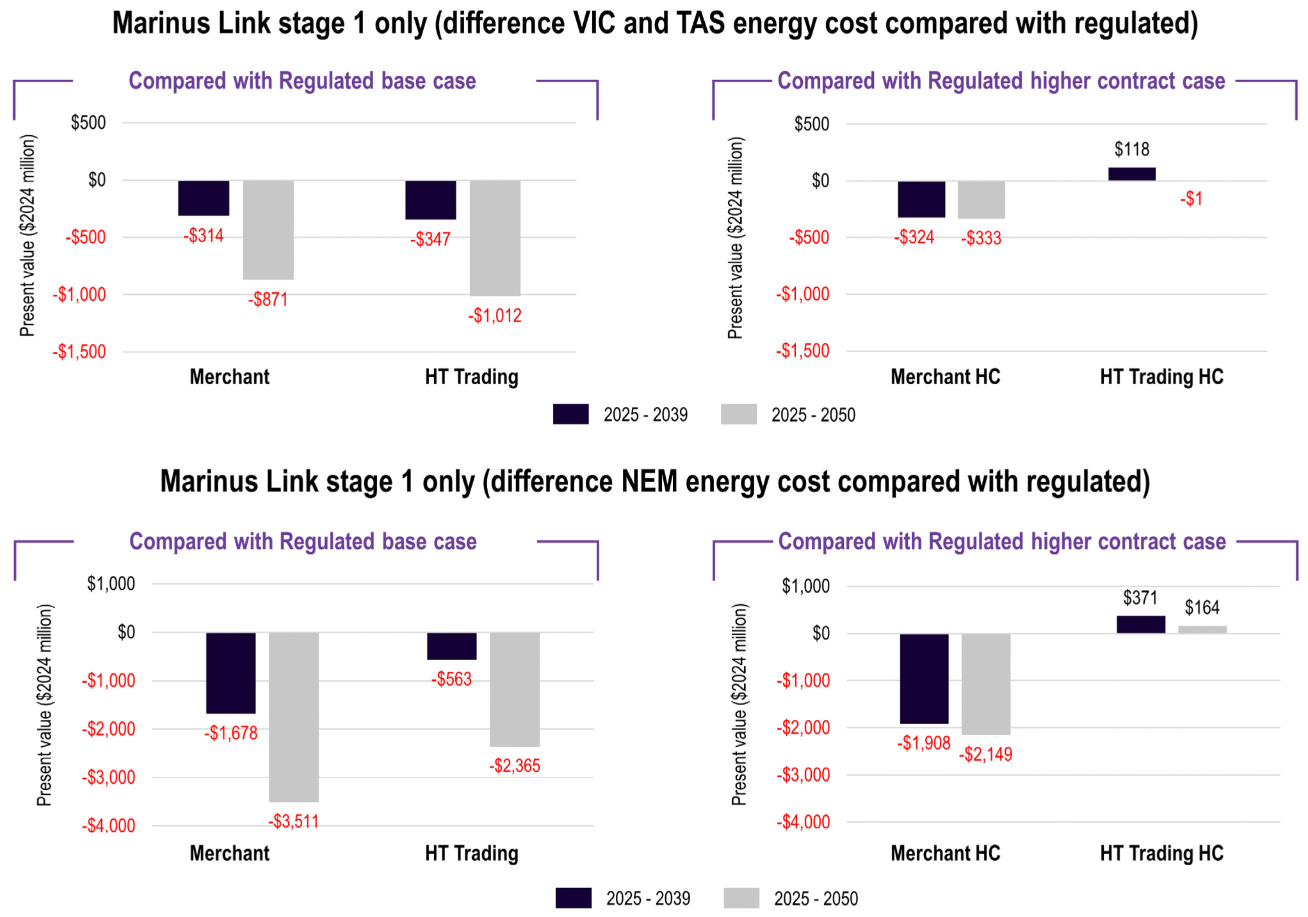
[13] The prescribed services costs that consumers would pay for a regulated Basslink, are not included in the assessment of consumer benefit – considering the prescribed services costs are outside ACIL Allen's scope.

For the merchant scenario, Basslink operates to constrain flows to Victoria to maximise income. This causes higher prices in the mainland regions and lower prices in Tasmania. However, the price increases in the mainland regions across much larger energy consumption has a larger impact on consumer benefits than the lower prices in Tasmania.

Where Hydro Tasmania is assumed to have higher levels of long-term contracts, the merchant cases have lower NEM wide energy costs, although the costs for Tasmania and Victoria are a little higher.

For the Hydro Tasmania trading Basslink scenario, higher prices across Tasmania and the mainland NEM regions results in higher energy costs.

Figure 3.10 Marinus Link stage 1 - Change in energy costs compared with regulated cases



Note: A positive number means a benefit; a negative number means higher costs. Costs discounted to 2024 using a 7% real discount rate. HT = Hydro Tasmania, HC = higher levels of contacting.

Source: ACIL Allen

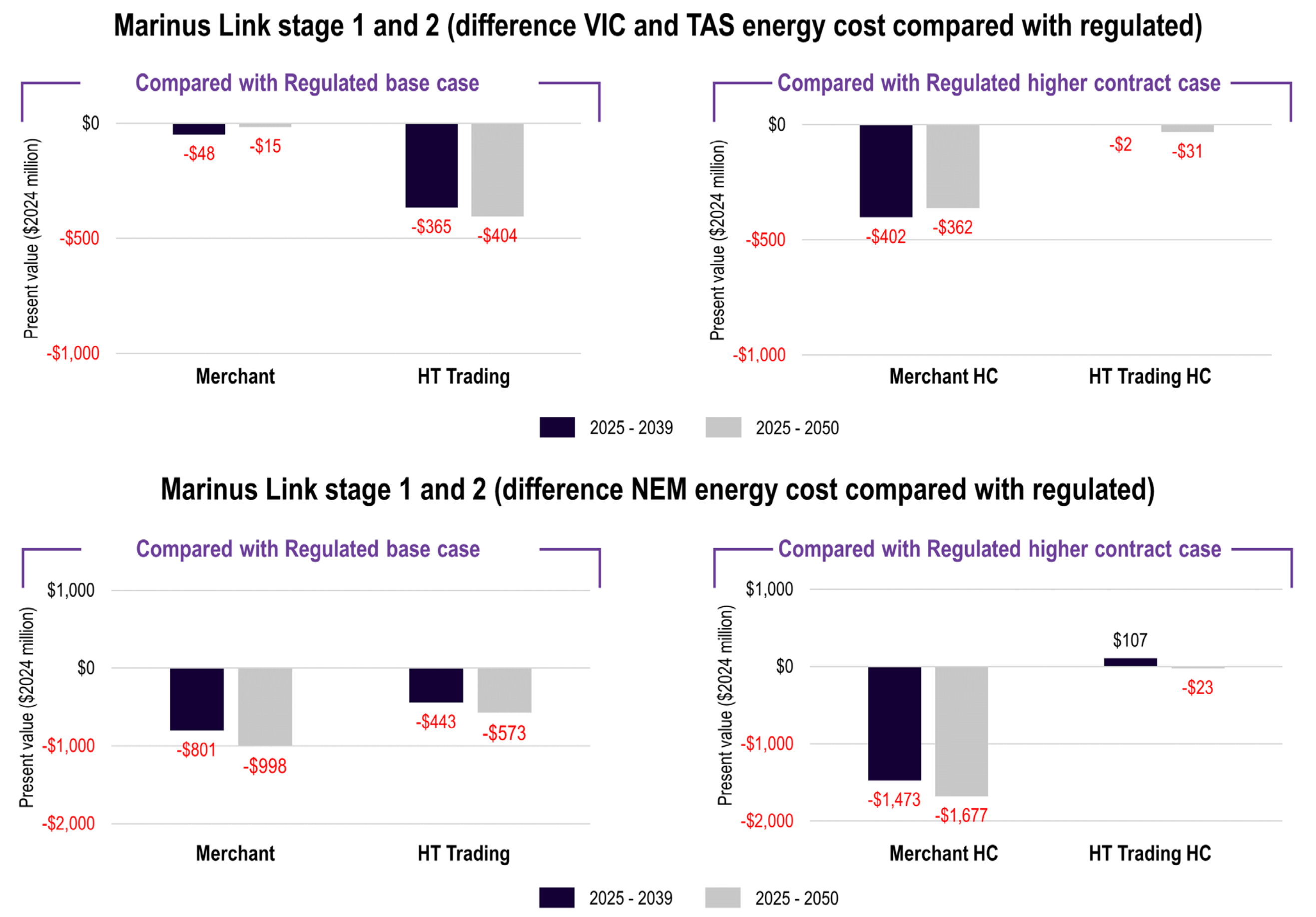
Marinus Link stage 1&2

Figure 3.11 shows the change in energy costs for the Marinus Link stage 1&2 configuration. Energy costs mostly increase compared to the regulated cases apart for the Hydro Tasmania trading case with higher assumed long-term contracts, when calculated over the 2025 to 2039 period. The higher level of contracting reduces Hydro Tasmania incentives to raise spot prices in Tasmania.

Energy costs increase substantially for the merchant and Hydro Tasmania trading cases compared with the relevant regulated case. Similarly, energy costs are substantially higher for the merchant case with higher assumed long-term contracts for Hydro Tasmania, compared with the regulated case with higher assumed long-term contracts for Hydro Tasmania.

The negative consumer benefits are generally smaller with two Marinus Links than with one, with positive benefits higher than the regulated scenario with higher levels of contracting by Hydro Tasmania. Regulation provides less consumer benefit compared with different forms of merchant operation where there are two links. This is because two links dissipate the ability of either Basslink or Hydro Tasmania to exercise market power compared with one Marinus Link, as the availability of the large amount of Marinus Link regulated transmission capacity limits efforts to constrain or control flows on Basslink.

Figure 3.11 Marinus Link stage 1&2 - Change in energy costs compared with regulated cases



Note: A positive number means a benefit; a negative number means higher costs. Costs discounted to 2024 using a 7% real discount rate. HT = Hydro Tasmania, HC = higher levels of contacting.

Source: ACIL Allen

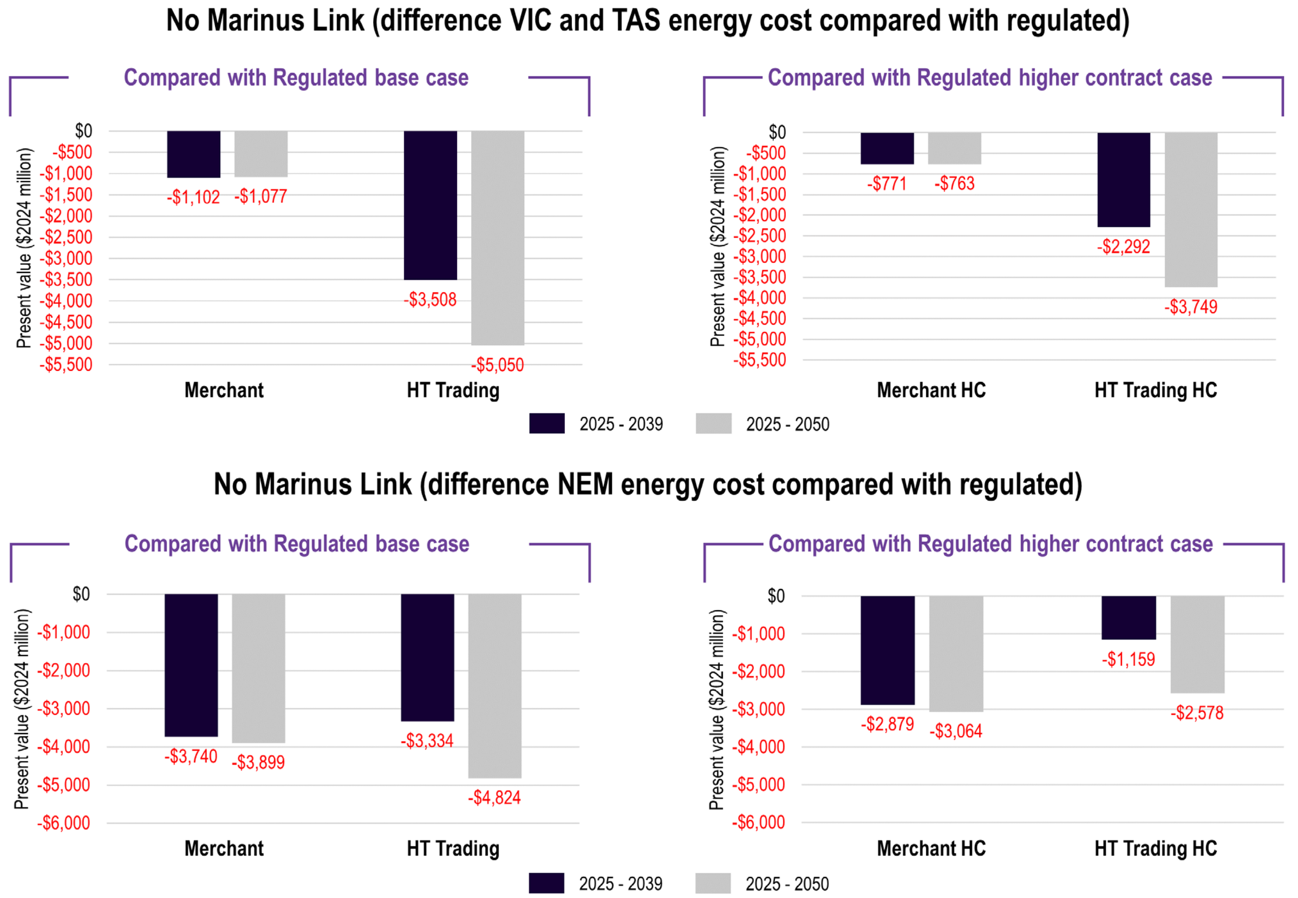
No Marinus Link

Figure 3.12 shows the change in energy costs for the no Marinus Link configuration. All cases show an increase in energy costs compared to the relevant regulated cases.

Not surprisingly, the consumer benefits of regulation with no Marinus Link are higher than with one or two Marinus Links, where the presence of a regulated competitor mitigates the influence of a merchant Basslink or Hydro Tasmania trading Basslink.

Where Marinus Link is not developed, consumer benefits increase by billions of dollars (present value) if Basslink is regulated.

Figure 3.12 No Marinus Link - Change in energy costs compared with regulated cases



Note: A positive number means a benefit; a negative number means higher costs. Costs discounted to 2024 using a 7% real discount rate. HT = Hydro Tasmania, HC = higher levels of contacting.

Source: ACIL Allen:

3.7.2 NEM total consumer benefits

The modelling incorporated emissions costs explicitly from 2040. To calculate the NEM[14] consumer benefits, the change in the cost of emissions for 2025-2039 must be added to the change in energy costs in the previous section. The NEM consumer benefits for the period 2025 to 2039 and 2025 to 2050 are provided in the following tables.

For the 2025 to 2039 period, the NEM consumer benefits compared to the relevant regulated case range from (in present value terms):

— negative $3.65 billion for the merchant case with no Marinus Link (that is, there is a consumer benefit of $3.65 billion by regulating Basslink), to

$225 million for the Hydro Tasmania trading case with one Marinus Link and higher assumed long-term contracts for Hydro Tasmania (that is, there is a consumer benefit of $225 million by not regulating Basslink).

Consumer benefits as a percentage of total consumer costs range from -0.10% to 1.68% over the period (refer Table 3.2).

[14] Consumer benefits including emissions were not calculated for Tasmania and Victoria because the change in cost of emissions cannot be assigned specifically to those regions.

Table 3.2 NEM present value of consumer benefits and as a percentage of present value of total consumer costs – 2025 to 2039 ($2024 million)

2025-2039	Merchant	HT Trading	Merchant (HC)	HT Trading (HC)
Marinus Link stage 1	-$1,594 (-0.72%)	-$710 (-0.32%)	-$1,814 (-0.82%)	$225 (0.10%)
Marinus Link stage 1&2	-$727 (-0.72%)	-$594 (-0.28%)	-$1,387 (-0.64%)	-$38 (-0.02%)
No Marinus Link	-$3,646 (-0.1.68%)	-$3,462 (-1.6%)	-$2,775 (-1.28%)	-$1,289 (-0.59%)

Note: Benefits discounted to 2024 using a 7% real discount rate. HT = Hydro Tasmania, HC = higher contracting.
Source: ACIL Allen

For the 2025 to 2050 period, the NEM consumer benefits compared to the relevant regulated case range from (in present value terms):

— negative $4.95 billion for the Hydro Tasmania trading case with no Marinus Link (that is, there is a consumer benefit of $4.95 billion by regulating Basslink), to

— a small positive benefit of $19 million for the Hydro Tasmania trading case with one Marinus Link and higher assumed long-term contracts for Hydro Tasmania (that is, there is a consumer benefit of $19 million by not regulating Basslink).

— Consumer benefits as a percentage of total consumer costs range from -0.01% to 1.49% over the period (refer Table 3.3).

Table 3.3 NEM present value of consumer benefits and as a percentage of present value of total consumer costs – 2025 to 2050 ($2024 million)

2025-2050	Merchant	HT Trading	Merchant (HC)	HT Trading (HC)
Marinus Link stage 1	-$3,427 (-1.02%)	-$2,512 (-0.75%)	-$2,055 (-0.61%)	$19 (0.01%)
Marinus Link stage 1&2	-$924 (-0.28%)	-$724 (-0.22%)	-$1,591 (-0.48%)	-$168 (-0.05%)
No Marinus Link	-$3,805 (-1.15%)	-$4,952 (-1.49%)	-$2,960 (-0.89%)	-$2,709 (-0.82%)

Note: Benefits discounted to 2024 using a 7% real discount rate. HT = Hydro Tasmania, HC = higher contracting
Source: ACIL Allen

Market modelling of the NEM over long periods requires simplification of many assumptions including selecting specific predetermined inputs for parameters which are either inherently uncertain or exhibit stochastic characteristics. Time and other factors also limit the number of scenarios that can be modelled. ACIL Allen has used AEMO's ISP Step Change assumptions, where available. Where the PowerMark model required additional input assumptions, we have taken reasonable steps to estimate a central or median value for the inputs. Therefore, we consider the results provided can be considered approximately a median-case set of results, rather than a best- or worst-case

3.8 Market (economic) benefits

Market (economic) benefits typically include:

— differences in capital invested in plant and equipment
— differences in fixed and variable operating costs
— differences in the cost of fuel consumed
— differences in emission costs
— competition benefits (changes in the producer/consumer surplus caused by changes in equilibrium prices)
— option benefits where capital invested creates valuable options that would not exist in the absence of the capital invested.

Conversion of Basslink to a prescribed network service from a market network service does not change Basslink's underlying nature. Basslink remains an interconnecting transmission facility between Tasmania and Victoria with the same transfer capacity in both directions. Therefore, the operation of Basslink, regardless of mode, does not change how generators enter and exit the market or how transmission is developed within the market.

Therefore, in assessing the market benefits of converting Basslink, there are no:

— differences in capital invested in plant and equipment
— differences in fixed operating costs
— option benefits where capital invested creates valuable options that would not exist in the absence of the capital invested.

In addition, there is no significant change in the consumer-producer surplus, so there are no significant competition benefits to be considered.

Therefore, the assessment of market benefits was limited to:

— differences in variable operating costs
— differences in the cost of fuel consumed
— differences in emission costs.

These costs were estimated using the *PowerMark* modelling for each case and each Marinus Link configuration.

Figure 3.13 shows the estimated change in economic costs[15] (compared with the relevant regulated case) for each case within each potential configuration of Marinus Link, where Hydro Tasmania is less heavily contracted.

The merchant scenarios lead to higher economic costs or lower market benefits. This is largely because a merchant Basslink has incentives to constrain flows when price differences between the Victorian and Tasmanian regions are large, which is also usually when supply in the importing region is tight. This leads to increased usage of expensive generation, which is mostly natural gas-fired generation, and later (after 2039), hydrogen gas-fired generation. However, the present value of the market benefits (using a 7% real discount rate) is relatively small compared to the total assessed economic costs.

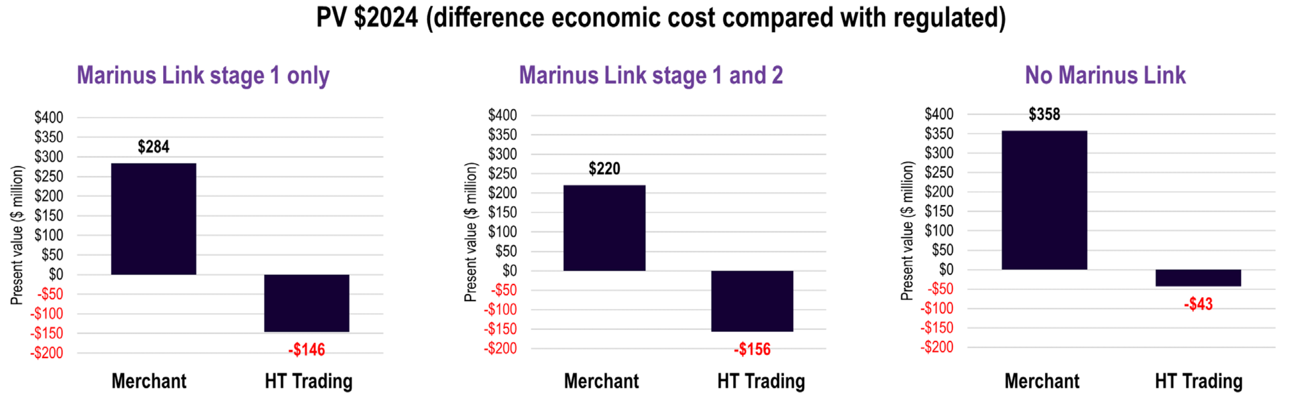
The Hydro Tasmania trading case shows positive economic benefits across all scenarios. When trading Basslink, Hydro Tasmania would be expected to act in a manner to raise prices in Tasmania (refer to section 3.3.3 above), it would also have incentives to operate the link at full

[15] Market benefits are calculated as the change in economic costs; i.e., a fall in costs is a benefit

capacity when price differences between Tasmania and Victoria are high, leading to lower use of expensive peaking capacity when supply in the importing region is tight.

Underlying system costs for 2025 to 2050 are around $85 billion. Where Basslink is not converted and Hydro Tasmania is less heavily contracted, the economic costs vary between a benefit of 0.19 % and a cost of -0.42% of total system costs.

Figure 3.13 Difference in economic costs compared with Regulated cases



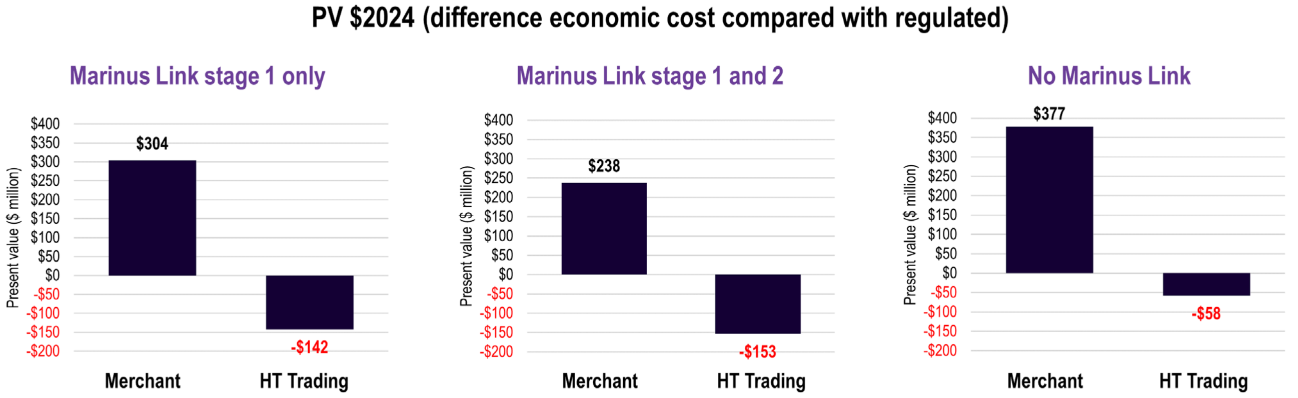
Note: Costs discounted to 2024 using a 7% real discount rate. HT = Hydro Tasmania

Source: ACIL Allen

Figure 3.14 shows the estimated change in economic costs (compared with the relevant regulated case) for each case within each potential configuration of Marinus Link, where Hydro Tasmania is more heavily contracted. The changes in economic costs are similar to the cases where Hydro Tasmania is less heavily contracted. The results suggest that the contracting levels of Hydro Tasmania have little effect on the differences in economic costs between the cases.

Underlying system costs for 2025 to 2050 are around $85 billion. Where Basslink is not converted and Hydro Tasmania is more heavily contracted, the economic costs vary between a benefit of 0.18% and a cost of -0.44% of total system costs.

Figure 3.14 Difference in economic costs compared with Regulated (HT higher contracts) cases



Note: Costs discounted to 2024 using a 7% real discount rate. HT = Hydro Tasmania

Source: ACIL Allen

4 Conclusions

For Workstream 2, ACIL Allen was asked to estimate the benefits of converting Basslink as an input to the AER's decision-making process by applying the modelling approaches set out in our Workstream 1 report. We considered both consumer and market benefits.

We consider our analysis approximates a median case based on a combination of assumptions drawn from AEMO's ISP assumptions set and additional input parameters estimated by us.

Our analysis is limited by the number of cases that were able to be undertaken because of time and other factors.

4.1 Consumer benefits

Our analysis indicates that there may be significant consumer benefits associated with converting Basslink to a prescribed network service. However, as discussed in section 2.1, these benefits are highly sensitive to projected wholesale electricity prices because small differences in projected prices are multiplied across large volumes of electricity consumption in some cases to generate large projected consumer benefits. Some of these small differences in projected prices are likely to be associated with the assumptions made and model simplifications.

The estimated consumer benefits are more significant where Basslink faces less competition from Marinus Link; they are estimated to be the highest if Marinus Link does not proceed and the lowest if there are two Marinus Links.

Where Marinus Link does not proceed, the consumer benefits of Basslink conversion between 2025 and 2050 are estimated to have a present value as high as $4.95 billion. However, the consumer benefits have an extensive range across the scenarios considered and may have a present value as low as $2.7 billion.

Where Marinus Link Stage 1 only proceeds, the consumer benefits between 2025 and 2050 are estimated to have a present value as high as $3.4 billion but may have a present value as low as zero.

Where both Marinus Link stages proceed, the consumer benefits between 2025 and 2050 are estimated to have a present value of as high as $1.6 billion. However, they may be as low as $168 million.

We consider that less weight should be placed on the assessment of consumer benefits than market benefits because the results are less consistent across the scenarios modelled, and the results are highly sensitive to the projected wholesale electricity prices and the ability of Hydro Tasmania to exercise market power.

4.2 Market benefits

Our estimate of market benefits was much smaller than consumer benefits.

Where Marinus Link does not proceed, the market benefits between 2025 and 2050 are estimated to have a present value as high as $377 million but may have negative benefits with a present value of -$58 million.

Where Marinus Link Stage 1 only proceeds, the market benefits between 2025 and 2050 are estimated to have a present value as high as $284 million but may have negative benefits with a present value of -$145 million.

Where both Marinus Link stages proceed, the market benefits between 2025 and 2050 are estimated to have a present value as high as $238 million but may have negative benefits with a present value of -$156 million.

We consider that greater weight should be placed on the assessment of NEM market benefits rather than consumer benefits because of the consistency of the results across each of the scenarios modelled.

4.3 Conclusions

We have the following conclusions from the modelling and analysis in preparing this report.

— Conversion of Basslink may have long-term consumer benefits (excluding the costs of regulation) but the potential range of benefits is large and highly uncertain. The estimates of consumer benefits are small in the context of total consumer costs, ranging from -0.1% to 1.68% of total consumer costs.

— The uncertain consumer benefits should be considered in the context of the highly certain prescribed services costs consumers will be required to pay should Basslink be converted. When risk adjusting the consumer benefits for uncertainty and factoring in the likely cost of regulation, there may be no net consumer benefits from the conversion of Basslink.

— Basslink's conversion may also have long-term market benefits, but these are unlikely to exceed the costs of the prescribed services, should Basslink be converted.

— Rejecting Basslink conversion is unlikely to lead to excessive price rises and price volatility, with the exception where Hydro Tasmania gains access to Basslink trading rights, especially where Marinus Link does not proceed, or if it does proceed, before the time that Marinus Link becomes available.

— Basslink, operating as a market network service, may struggle to meet its operating and maintenance costs if both stages of Marinus Link are developed. The risk appears to be highest in the first few years following the commissioning of Marinus Link's second stage. In those circumstances, Basslink may face financial pressure to exit the market. This will depend on Basslink's view of the future and its willingness to work through the years of potential loss, to future years where it is projected to return to profitable performance.

Appendices

Workstream 1 findings

A

This chapter sets out ACIL Allen's considerations and findings from Workstream 1 that fed into the Workstream 2 modelling and analysis which is discussed in the body of the report.

A.1 Workstream 1 requirements

Workstream 1 required ACIL Allen to provide advice on the following:

1. Whether there is a sound basis that the conversion of Basslink from a market network service to a prescribed transmission service is likely to yield:
   a) National Electricity Market (NEM) market benefits as specified in the Regulatory Investment Test for Transmission (RIT-T); and
   b) consumer benefits in the form of lower wholesale electricity prices and CO2-e emissions, and higher reliability and system security.
2. What circumstances or market analysis assumptions would make conversion more or less likely to yield:
   a) positive RIT-T market benefits; and
   b) consumer benefits.
3. The modelling approach(es) that could be undertaken to quantify the potential benefits or range of benefits.

In considering benefits, ACIL Allen was required to include NEM market benefits as specified in the RIT-T and consumer benefits in the form of lower wholesale electricity prices and CO2-e emissions, and higher reliability and system security.[16]

A.2 Benefits did not include costs of regulation

The analysis considered Basslink operating as a prescribed network service against the counterfactual of Basslink remaining a market network service.

As a prescribed network service, Basslink would operate at maximum availability. The cost of transferring electricity over Basslink would be limited to:

— electrical losses when Basslink flows are not constrained (less than the import/export capacity of Basslink).

— the difference between Victorian and Tasmanian regional prices after losses (for both imports and exports) when flows are constrained by Basslink’s transfer capacity.

As a market network service, Basslink revenues are determined by the flow of imports or exports (after losses) and the price Basslink offers to transfer electricity between the Victorian and

[16] ACIL Allen notes that CO2-e emissions, and higher reliability and system security, are also considered market benefits in the RIT-T.

Tasmanian regions. To maximise its profitability, Basslink may economically withhold capacity to benefit from high Victoria/Tasmania regional price differentials. Operating as a market network service would be expected to have some effect on competition and market efficiency.

In accordance with our brief, ACIL Allen only considered the benefits of converting Basslink (not the net benefits after the costs of regulating Basslink). Under current arrangements, the costs of regulating transmission (return of and to capital, and operating costs) are passed through to consumers.

The costs of regulating Basslink have a high degree of certainty (once the initial regulated asset base is set) and are likely to be large, as a present value, over the remaining life of the asset. On the other hand, the benefits are likely to be highly uncertain, vary over a large range and be sensitive to changes in key assumptions.

These uncertain potential benefits from the conversion of Basslink should be considered along with the certain costs of regulation.

A.3 Drivers of benefits

Investment in Basslink is a sunk decision and cannot be unmade. Theoretically, Basslink could be withdrawn from the market, but it would be expected to remain in service regardless of whether it remains a market network service or converted to a prescribed network service because:

— Basslink is expected under most scenarios in most years to remain operating cash flow positive (revenues less non-avoidable operating and maintenance costs, including stay-in-business capital costs), noting that APA estimates operating costs of around $35 million per annum between 2025 and 2030.[17]

— AEMO can direct Basslink under clause 4.9.2A of the NER, for which failure to comply is a tier 1 penalty provision under the National Electricity Law (NEL) through published regulations.

The conversion of Basslink will affect how Basslink's capacity is offered and priced to the market, affecting plant dispatch and pricing. However, it would not affect entry and exit from the market. Therefore, ACIL Allen considers there would be no differences in the timing of capital costs associated with entry to and exit from the NEM regardless of whether Basslink is converted. Also, any option value gained from the presence of Basslink exists whether Basslink is, or is not, converted. Therefore, ACIL Allen considers there are no differences associated with the timing of entry or exit or with option value, regardless of whether Basslink is converted.

The expected drivers of benefits associated with the regulatory status of Basslink are discussed below.

A.3.1 Dispatch

Although the annual generation volume from Hydro Tasmania's energy-constrained hydro generation assets is expected to remain largely unchanged between Basslink operating as a market network service and a prescribed network service, dispatch outcomes are expected to differ by time of day and season. In turn, this would be expected to change the dispatch outcomes of other plants in Tasmania and the mainland (particularly Victoria).

[17] While we expect Basslink can cover its non-avoidable costs as a market network service provider, this was tested through the modelling in Workstream 2.

These differences derive from:

- the way Basslink capacity is offered to the market (price and availability)
- Hydro Tasmania's dominant position in the Tasmanian region
- the degree of market power held by generators in Victoria and, to a lesser extent, adjoining NEM regions
- operating as a market network service, whether Basslink sells settlements residues or trading rights[18], and who purchases those residues or rights (as these purchases have the potential to change the degree of market power held by participants).

Basslink availability

Conversion to a prescribed network service

A converted Basslink would operate like other prescribed interconnectors – revenue would be earned through the recovery of operating and stay-in-business expenditure and sunk capital costs (return to and return of capital), which would be passed through to consumers.

Basslink capacity would effectively[19] be offered at full availability with price differences between regions caused by losses and, on occasion, congestion (where prices between regions separate). Settlements residues would be auctioned, and where no restrictions are in place, they may be purchased by any participant through AEMO quarterly auctions. The auction revenue would be returned to consumers (offsetting operating costs, stay-in-in business, and sunk capital costs).

As Basslink would be available at maximum availability to transfer power between the Victorian and Tasmanian regions, NEM competition would be expected to be maximised subject to the underlying industry structure within each region. Plant dispatch would reflect this level of competition.

Market network service

Basslink operating as a market network service may result in different projected dispatch outcomes compared with conversion to a prescribed network service, depending on several factors as follows:

- Basslink may remain fully or partially exposed to spot prices
- Basslink may sell trading rights on Basslink to another participant[20] (the buyer would have the right to dynamically price and offer Basslink capacity in each dispatch period)
- the bidding strategies employed by Basslink, including economically withholding capacity at very high offer prices
- the extent to which Hydro Tasmania deals with Basslink over dispatch rights and settlements residues.

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[18] It is assumed trading rights would involve the right to set the prices and volumes that Basslink would offer to transfer power and receive any resulting settlement residues.

[19] If converted, Basslink is not required to offer its capacity to the market. Basslink is assumed to have maximum availability (subject to planned or unplanned maintenance and any broader power system security constraints). Flows on Basslink will be determined by the AEMO NEM Dispatch Engine (NEMDE), based on demand and generation offers to supply energy and ancillary services in each region.

[20]

Some important considerations include:

— whether Basslink, as a market service, increases or decreases competition and more efficient NEM dispatch (especially in Tasmania)
— restrictions might be imposed on Hydro Tasmania and other participants when entering contracts for dispatch rights and settlement residues with Basslink.

A.3.2 Pricing

Differences in projected dispatch outcomes for Basslink operating as a market network service compared with operating as a prescribed network service would result in differences in projected prices. Projected changes in wholesale electricity prices should flow through to contract/hedge prices and then into retail electricity prices over time (noting that some stickiness is evident in retail prices, especially for small electricity customers).

A.3.3 Reliability

Reliability refers to the ability of the power system to deliver electrical energy to all willing electricity consumers at any point in time (the so-called supply-demand balance). It does not include interruptions to power supplies caused by technical failure or outages of the electricity network (referred to as power system security).

A converted Basslink would be expected to maximise the availability and reliability of the interconnector. Basslink, operating as a market network service, may economically withhold capacity when Victoria/Tasmania regional price differentials are high or drive price differentials higher. However, full capacity would be expected to be provided to avoid shortfalls in supply because:

— there would be no financial incentive in withholding capacity when one region was operating at or close to the market price cap
— reputational issues would prevent Basslink from withholding capacity where electricity consumers could not access sufficient electricity supply.

A.3.4 Greenhouse gas emissions

Differences in projected dispatch would drive differences in projected greenhouse gas emissions. Standard emissions factors can be assigned to each fossil fuel-fired power station. These emissions factors, combined with projected differences in dispatch and the interim value of emissions reduction (VER), estimate the value of changes in greenhouse gas emissions.

A.3.5 Retail price regulation

Retail electricity prices for small customers in the mainland Australia NEM regions, other than in the ACT[21] and regional Queensland[22], are subject to a cap under either the Default Market Offer (DMO) or the Victorian Default Offer (VDO). However, the DMO and VDO prices are a cap and are updated annually, reflecting changes in hedge contract prices and projected spot prices. Any

[21] Small electricity customers in the ACT are subject to retail tariffs that are set annually based on a 3 yearly price direction determined by the Independent Competition and Regulatory Commission.

[22] Small electricity customers in regional Queensland are subject to a regulated retail tariff set annually by the Queensland Competition Authority.

differences in pricing between conversion and retaining Basslink as a market network service are expected to flow through to retail electricity prices over time.[23]

Many retailers provide competitive tariffs based on a discount from their standing offer, with the standing offer closely linked to the DMO or VDO retail price cap. This approach adjusts prices quickly once the new DMO/VDO is published.

Tasmanian small customer retail prices are subject to a cap imposed on Aurora Energy, the Tasmanian Government-owned retailer. The Tasmanian Economic Regulator determines the prices. The method used by the Tasmanian Economic Regulator for setting the wholesale energy cost component in regulated retail prices is set in Tasmanian legislation. The methodology uses an average of:

— the long-run marginal cost (LRMC) of electricity generation by a notional electricity generator to supply electricity to non-contestable customers on mainland Tasmania
— the price Aurora Energy would pay to purchase electricity in Victoria and transport the electricity to mainland Tasmania to supply non-contestable customers on mainland Tasmania.[24]

Any price differences from operating Basslink as a prescribed network service rather than as a market network service may not flow directly or fully through to Tasmanian electricity consumers.

A.3.6 Who pays

APA has proposed a regulated regime that would impose significant costs of more than $100 million per annum on electricity consumers. This material increase in consumer charges is not part of ACIL Allen's analysis and would need to be included into the AER's final assessment.

A.4 Conversion may yield benefits

If Basslink is converted to a prescribed network service, it would operate as a fully available interconnector (subject to losses and other system constraints). If converted, the utilisation of Basslink should be maximised, thereby facilitating a more competitive market.[25]

There are several operating scenarios where Basslink remains as a market network service. However, the underlying value of Basslink would be driven by Basslink exercising its trading rights or selling those trading rights to one or more other participants. To derive maximum value from Basslink, the owner of the trading rights must constrain flows over Basslink at times, including:

— bidding substantial costs on the transfer of power
— economically withdrawing capacity, or pricing capacity just below or close to the market price cap.

There are also some circumstances in which market power may be increased if certain parties were to acquire the trading rights.

We expect that a converted Basslink would result in different dispatch and pricing outcomes compared with Basslink operating as a market network service. The differences may result in

[23] Small retail customers tend to be somewhat sticky and the rate at which these customers respond to price changes is slower than commercial and industrial customers where electricity costs may be a significant portion of productions costs.

[24] Office of the Tasmanian Economic Regulator, *Investigation to determine maximum standing offer prices for small customers on mainland Tasmania Final Report*, May 2016, page 28.

[25] Competition in Tasmania could be affected by the extent that Hydro Tasmania is allowed to participate in purchasing settlements residues.

operating and fuel cost changes, and differences in greenhouse gas emissions and wholesale electricity prices.

We don't expect a converted Basslink to impact the capital costs associated with entry or exit or provide any additional option value because it is assumed to continue to be available and operate regardless of whether it is converted.

A converted Basslink operating with fewer constraints than as a market network service may yield:

1. NEM market benefits, as specified in the RIT-T
2. consumer benefits, including lower wholesale electricity prices and CO2-e emissions (although no changes in reliability and system security would be expected).

However, the high degree of market concentration in Tasmania is a complicating factor and may result in a converted Basslink yielding less or no such benefits.

A.5 Circumstances and assumptions that might affect benefits

Various circumstances and assumptions might make the conversion of Basslink more or less likely to yield market or consumer benefits. The most likely circumstances and assumptions that may impact the market or consumer benefits include the following:

— the level of market concentration in Tasmania and any assumptions about how that might change over time
— any restrictions placed on Hydro Tasmania in participating in settlements residue auctions where Basslink is converted
— any restrictions placed on Hydro Tasmania in acquiring Basslink trading rights where it remains as a market network service
— Basslink trading and operating regime assumptions where it is assumed to remain as a market network service
— whether Marinus Link is developed and its assumed entry date (including whether there are one or two links)
— Tasmanian Renewable Energy Target (TRET) assumptions, including the extent and timing of the program
— Battery of the Nation assumptions, including the extent and timing of the investment
— Commonwealth and various mainland state government policy assumptions, including the extent and timing of the multiple programs[26]
— fuel and operating cost assumptions.

While not explicitly included in this advice, as it relates to any determination that may be made by the AER, the level of costs to be recovered from consumers where Basslink is converted may be significantly higher than the benefits yielded through conversion.

[26] Commonwealth CIS, Victorian offshore wind, storage and emissions targets, NSW Electricity Infrastructure Roadmap, etc.

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