QUEENSLAND FARMERS' FEDERATION

Review of RAB-based irrigation prices 2027-29

April 2026

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Prepared for:
Queensland Competition Authority

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This submission is provided to:

Queensland Competition Authority

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Submitted via website: https://www.qca.org.au/submissions/

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About the Queensland Farmers' Federation

The Queensland Farmers' Federation (QFF) is the united voice of agriculture in Queensland.

Our members are agricultural peak bodies who collectively represent more than 13,000 farmers who produce food, fibre and foliage across the state.

QFF's peak body members come together to develop policy and lead projects on the key issues that are important to their farmer members and the Queensland agriculture sector.

Together, we form a strong, unified voice leveraging our effectiveness by working together to drive policy and initiatives that support a strong future for Queensland agriculture.

Submission

The Queensland Farmers' Federation (QFF) provides this interim submission to the Queensland Competition Authority (QCA) as a part of its review into the potential adoption of a Regulatory Asset Base (RAB) pricing framework for irrigation services provided by Sunwater and Seqwater in Queensland.

QFF supports a robust, transparent and evidence-based assessment of pricing frameworks. This review represents the most significant potential reform to rural water pricing in Queensland in recent decades, with long-term implications for irrigators, regional economies, agricultural productivity, food security. These impacts are directly linked to the Queensland Government's Prosper 2050 vision and its ambition to grow the State's agricultural output to $30 billion, which is contingent on maintaining access to affordable, reliable and predictable water for irrigation.

QFF notes that the Minister will convene a Roundtable process over the coming 3-4 weeks to examine the consistency of key assumptions underpinning both the QFF commissioned analysis and work undertaken by service providers. QFF supports this process as critical to ensuring that any comparison between pricing frameworks is undertaken on a like-for-like basis and is seeking an approval from the QCA to provide a supplementary submission (if required) at the conclusion of the Minister's Roundtable.

QFF has commissioned an independent review by Highlander Consulting to assess the relative merits and performance of the Renewals Annuity and RAB frameworks. The findings indicate the Renewals Annuity framework delivers materially lower long-term prices, provides greater price stability and transparency, aligns more closely with Lower Bound Pricing under the National Water Initiative (NWI), and supports intergenerational equity. [1]

By contrast, while a RAB framework may deliver lower prices in the short term, it results in structurally higher costs over time due to the compounding effect of capital growth and the application of a regulated return on capital.[2]

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[1] Highlander Consulting 2026, *Independent Review of Rural Water Pricing Frameworks, p.6.*
[2] Highlander Consulting 2026, *Independent Review of Rural Water Pricing Frameworks, pp.8-9*

Context

QFF commissioned Highlander Consulting to undertake an independent comparison of the Renewals Annuity and RAB pricing frameworks, combining qualitative historical assessment with long-term quantitative modelling.

The analysis covers six irrigation schemes across Sunwater and Seqwater and models pricing outcomes over a 50-year period (2012-2062). The modelling is grounded in actual historical cost and pricing data provided by Sunwater and Seqwater, together with forward forecast expenditure and demand assumptions from both providers, applied consistently across both frameworks. [3]

This ensures the comparison reflects how each framework performs over time in practice, rather than relying on theoretical or short-term assumptions.

QFF considers this long-term lens essential. The impacts of pricing frameworks are structural, cumulative and intergenerational, and cannot be meaningfully assessed over a single regulatory period.

Key Findings

Long-term price outcomes

The Highlander analysis shows a consistent result across all schemes assessed. The Renewals Annuity framework delivers materially lower prices for irrigators over the long term.

While a RAB framework produces lower prices in the short to medium term, this position reverses over time. Prices under a RAB increase more rapidly and exceed Renewals Annuity outcomes in all schemes. This reflects a structural difference driven by the compounding effect of capital investment and the application of a regulated return on that capital. [4]

By FY2062, prices under a RAB are estimated to be between 13% and 40% higher than under the Renewals Annuity framework, depending on scheme characteristics. [5]

These outcomes are consistent across schemes, reinforcing that the divergence is inherent to the framework rather than scheme-specific.

Position within the National Water Initiative (NWI) pricing framework

The difference between the Renewals Annuity and RAB frameworks ultimately comes down to where irrigation pricing sits within the NWI cost recovery envelope.

The Renewals Annuity framework aligns with lower-bound pricing, recovering efficient operating, maintenance and renewal costs without embedding a return on capital. A RAB framework introduces a return on capital (WACC), shifting pricing outcomes toward the upper bound over time. [6]

While some interpretations of current policy settings may accommodate elements of a RAB approach within a lower-bound framework, the Renewals Annuity more closely reflects the long-standing application of lower-bound pricing as understood by irrigators.

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[3] Highlander Consulting 2026 *Independent Review of Rural Water Pricing Frameworks, p.6*
[4] Highlander Consulting 2026 *Independent Review of Rural Water Pricing Frameworks, p.6*
[5] Highlander Consulting 2026 *Independent Review of Rural Water Pricing Frameworks, p.8*
[6] Highlander Consulting 2026 *Independent Review of Rural Water Pricing Frameworks, pp.6-7*

Queensland has historically adopted a lower-bound pricing approach to support affordability, regional development, agricultural productivity and food security. Moving to a RAB would represent a shift in how that position is applied in practice, with implications for both irrigators and broader policy objectives. [7]

Price stability and predictability

The Renewals Annuity framework delivers stable and predictable pricing by smoothing capital expenditure over a long-term horizon.

This avoids the price shocks associated with large or lumpy capital investment and provides a more consistent pricing path over time. Under a RAB framework, prices are more directly linked to capital spend, resulting in step changes as new investment is added to the asset base. [8]

Stable and predictable water pricing is a critical enabler of agricultural productivity, as it provides the certainty required for long-term investment decisions, efficient water use and sustained production outcomes.

Producers already operate in an environment of significant variability across input costs, seasonal conditions and market returns. While this level of risk is inherent to agricultural production, there is limited capacity to absorb additional variability in core inputs such as water. Introducing a pricing framework that results in less predictable or more volatile pricing outcomes reduces the ability of irrigators to plan, invest and manage their businesses with confidence, even where short-term prices may appear lower.

Transparency and forward visibility

The Renewals Annuity framework is inherently forward-looking. It requires long-term capital expenditure forecasts, typically over a 30-year period which are subject to customer engagement and scrutiny.

This provides irrigators with visibility of future costs drivers and a genuine opportunity to influence decisions before costs are locked in. It also strengthens accountability around proposed expenditure.

A RAB framework places greater reliance on historical expenditure. While this may simplify aspects of regulation, it reduces forward visibility and may reduce opportunities for customers to engage meaningfully ahead of pricing outcomes being set. [9]

Intergenerational equity

The Renewals Annuity framework supports a more balanced sharing of costs across generations by smoothing expenditure over time.

Under a RAB framework, costs are progressively pushed into the future as the asset base grows, and returns on capital accumulate. This results in lower prices for current users, but higher costs for future irrigators. [10]

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[7] Highlander Consulting 2026 *Independent Review of Rural Water Pricing Frameworks, pp.12-13*

[8] Highlander Consulting 2026 *Independent Review of Rural Water Pricing Frameworks, p.8*

[9] Highlander Consulting 2026 *Independent Review of Rural Water Pricing Frameworks, p.8, 50*

[10] Highlander Consulting 2026 *Independent Review of Rural Water Pricing Frameworks, pp.8-9, 51*

This represents a redistribution of costs across generations, creating risks for the long-term sustainability of irrigated agriculture.

Incentives and capital expenditure.

The RAB framework may create structural incentives that favour capital expenditure, as returns are earned on the value of the regulated asset base.

This introduces a risk that investment decisions may favour capital solutions and that expenditure which would otherwise be treated as operating or maintenance costs may be capitalised. [11]

This comes back to how the model is designed, not how providers behave. The framework itself creates a financial incentive to increase capital expenditure, which flows through to higher prices over time.

The Renewals Annuity framework does not create this incentive. It is focused on recovering efficient costs associated with maintaining and renewing infrastructure, rather than generating a return on capital.

Overall cost implications

Taken together, these factors result in materially higher long-term costs under a RAB framework.

While a RAB may offer benefits such as regulatory consistency and reduced reliance on long-term forecasting, these are largely administrative and do not offset the higher costs borne by irrigators. [12]

The Highlander review concludes that the evidence does not support a transition to a RAB framework on affordability or efficiency grounds. [13]

A shift in pricing framework will not resolve many of the underlying inefficiencies and cost drivers that are currently contributing to rural water prices, and risks adding complexity without addressing the root causes of cost pressures faced by irrigators.

These underlying drivers include factors such as energy costs, asset utilisation, and the efficiency of asset management and delivery models, which sit outside the pricing framework but materially drive pricing outcomes.

Key Issues for Further Consideration by the QCA

QFF considers the following issues require further examination:

- The structural nature of long-term price escalation under a RAB framework
- The policy implications of shifting from lower-bound to upper-bound pricing
- The treatment of capital versus maintenance expenditure
- The intergenerational transfer of costs
- The implications for transparency and customer engagement
- Whether a change in pricing framework addresses, or simply overlays, the underlying cost drivers contributing to current rural water prices.

[11] Highlander Consulting 2026 *Independent Review of Rural Water Pricing Frameworks, pp.8, 51*
[12] Highlander Consulting 2026 *Independent Review of Rural Water Pricing Frameworks, pp.8-9*
[13] Highlander Consulting 2026 *Independent Review of Rural Water Pricing Framework, p.53*

Ministerial Roundtable Process

QFF supports the Minister's Roundtable process as an important step in testing the consistency of assumptions across different analyses.

A like-for-like comparison of modelling inputs and assumptions is essential to ensuring confidence in the outcomes of this review. The outcome must prioritise a framework that is fit for purpose for irrigators, recognising their role in delivering broader public value through agricultural productivity and food security, rather than one that advantages the service provider.

QFF will continue to engage constructively and reflect the outcomes of this process in its final supplementary submission if granted the approval by the QCA.

Conclusion (Interim Position)

QFF maintains an open position pending completion of the Roundtable process and finalisation of its independent review.

However, based on the current evidence, the Renewals Annuity framework delivers lower long-term costs, greater price stability and transparency, and aligns more closely with the Government's commitment to Lower Bound Pricing principles. [14]

This is not simply a technical or regulatory question. The choice of pricing framework will directly influence agricultural productivity, food security, and the viability of irrigation-dependent industries across Queensland.

Maintaining access to affordable, reliable and predictable water will be critical to achieving the State's Prosper 2050 vision and its ambition to grow agricultural output to $30 billion.

QFF welcomes in advance the QCA's approval to provide a final, evidence-based supplementary submission following completion of the Minister's Roundtable process.

Yours sincerely

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[14] Highlander Consulting 2026 *Independent Review of Rural Water Pricing Frameworks, pp.6, 53*

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QUEENSLAND FARMERS' FEDERATION

Independent review of rural water pricing frameworks

A comparison of regulated asset base and renewals annuity approaches for irrigation pricing

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Acknowledgments

Highlander Consulting acknowledges Aboriginal and Torres Strait Islander peoples as the First Australians. We recognise and respect their cultures, histories and diversity and their unique connection to the lands, waters and seas.

Limitations statement

The sole purpose of this report and the associated services performed by Highlander Consulting (Highlander) is to provide an independent review of rural water pricing frameworks in accordance with the scope of services set out in the contract between Highlander and the Queensland Farmers' Federation (the Client).

This report has been prepared on behalf of and for the exclusive use of the Client and is subject to and issued in connection with the provisions of the agreement between Highlander and the Client. Highlander accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party. The analysis and conclusions in this report are based on data available at the time of writing and are subject to the assumptions and limitations documented within.

Versions

Description	Date	Written by	Technical review	Final review and approval
Draft report	23 Mar 2026	Angus MacDonald and Joe Hayes	Sebastian Vanderzeil	Angus MacDonald
Draft report	30 Mar 2026	Angus MacDonald and Joe Hayes	Sebastian Vanderzeil	Angus MacDonald
Final report	9 Apr 2026	Angus MacDonald and Joe Hayes	Sebastian Vanderzeil	Angus MacDonald

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Definitions of lower bound

Definitions of lower bound pricing are set out in chronological order (Table 1) to clarify how changes in wording and different interpretations can lead to different conclusions about whether the proposed regulatory asset base (RAB) model represents a departure from lower bound pricing.

The definition (or interpretation) of lower bound pricing in Queensland appears to have evolved over time. Earlier interpretations focused on recovering efficient operating, maintenance and renewal costs, and explicitly excluded a return on existing capital. More recent interpretations, since 2020, limit the exclusion of a return to pre-2000 assets, implicitly allowing a return on post-2000 capital, including both existing asset values and future capital expenditure on their renewal and refurbishment.

The Council of Australian Governments (COAG) National Water Initiative (NWI) definitions are provided below for context:

> Lower bound pricing – the level at which to be viable, a water business should recover, at least, the operational, maintenance and administrative costs, externalities, taxes or TERs (not including income tax), the interest cost on debt, dividends (if any) and make provision for future asset refurbishment / replacement. Dividends should be set at a level that reflects commercial realities and stimulates a competitive market outcome.
>
> Upper bound pricing –the level at which, to avoid monopoly rents, a water business should not recover more than the operational, maintenance and administrative costs, externalities, taxes or tax equivalent regimes (TERs), provision for the cost of asset consumption and cost of capital, the latter being calculated using a weighted average cost of capital (WACC).

A key distinction between lower and upper bound is the treatment of financing costs: lower bound reflects the cost of debt, while upper bound applies a full cost of capital (WACC).

In practice, applying WACC within renewals frameworks can, in some circumstances, produce outcomes that move prices along a continuum towards upper bound. The price impact depends on how the model is applied.

Table 1 sets out the primary source definitions of lower bound pricing in chronological order to support interpretation of this evolution and its implications for RAB.

Table 1: Chronological evolution of lower bound definitions

Source (author and date)	Definition (extract)	Source	Key distinction	Interaction with RAB (analytical observation)
Council of Australian Governments – National Water Initiative (2004)	Lower bound pricing includes recovery of operating, maintenance and administrative costs, externalities, taxes or equivalent, and provision for future asset refurbishment / replacement, and may include financing elements such as interest on debt and, where applicable, dividends.	https://www.dcceew.gov.au/sites/default/files/sitecollectiondocuments/water/Intergovernmental-Agreement-on-a-national-water-initiative.pdf	Establishes conceptual distinction between renewals-based cost recovery applying cost of debt (lower bound) and full cost-of-capital recovery applying a WACC (upper bound).	A RAB framework aligns more closely with the upper-bound building block model described in the NWI.
Queensland Competition Authority (2012–13 irrigation review)	In the 2006–11 and 2013–17 reviews, the QCA recommended, and the Queensland Government approved, lower-bound prices set to recover operating, maintenance and administrative costs, and renewals expenditure recovered via a renewals annuity. The framework excluded a rate of return on existing assets as of 30 June 2013.	https://www.qca.org.au/wp-content/uploads/2019/07/w-qca-draftreport-seqwateripr-vol1-1212.pdf	Exclusion of a rate of return on the existing asset base as of 30 June 2013, is consistent with the application of lower bound pricing at the time, which did not allow a return-on-capital component.	Introduction of a RAB model (which includes a return on capital) would represent a departure from this definition of lower bound.
Queensland Treasury / DEWS submission to ACCC (2016)	Government's lower bound pricing foregoes any revenue from a rate of return associated with supplying bulk water for irrigation. This supports growth and development of agriculture. Outcomes are affordable water and regulated water service providers are financially sustainable.	https://www.accc.gov.au/system/files/Queensland%20Treasury%20and%20Department%20of%20Energy%20and%20Water%20Supply.pdf	Clear policy statement that no return on capital is recovered.	A RAB approach introduces a return on capital that is not contemplated under this Queensland Government (2016) lower bound definition.

Queensland Competition Authority (2019–20 irrigation review) ^	Lower bound prices recover costs of operating, maintaining, administering and renewing each scheme. They exclude a return on and of the scheme's initial asset base (at 1 July 2000).	https://www.qca.org.au/wp-content/uploads/2020/02/irrigation-price-review-final-report-part-a-overview-final.pdf	The words 'at 1 July 2000' limit the exclusion to legacy assets and can allow, in principle, a return to apply to post-2000 capex.	A RAB is broadly consistent with this definition, as it allows utilities to earn a rate of return on capex post-2000, while excluding pre-2000 assets.
Queensland Government – Department of Local Government, Water and Volunteers (current policy) ^	Lower bound pricing generally requires recovery of the irrigation share of operating, maintenance and refurbishment costs, but excludes the initial costs of assets constructed before 2000 and dam safety upgrade costs.	https://www.business.qld.gov.au/industries/mining-energy-water/water/industry-infrastructure/pricing/irrigation	Continues the QCA's pre-2000 exclusion framing and no general exclusion of return on capital is stated. Does not explicitly address whether returns on post-2000 capital are included within lower bound pricing.	Under this definition, a RAB model can be interpreted as consistent with lower bound, including returns on post-2000 capital. Whether this definition aligns with the spirit of lower bound is a matter for debate. It appears to represent a material departure from the QCA (2013) and Queensland Government (2016) definition of lower bound.

Note: ^ Both latter definitions of lower bound represent a material change from past Queensland Government lower bound policy.

Implications

The 2020 definition differs from Queensland Government definitions applied from 2000 to 2016. Highlander is not aware of a formal process that clearly communicated this change and its implications to irrigators at the time. As a result, lower bound pricing, as historically understood by irrigators, continues to exclude a return on existing capital regardless of timing.

Taken together, the definitions show that pre-2020 lower bound explicitly excluded a return on capital, while post-2020 lower bound excludes only pre-2000 assets, implicitly opening the door for a return on existing assets and/or any future capital expenditure on their renewal and refurbishment.

Under a RAB approach, this distinction is material. It allows a return on post-2000 capital and leads to pricing outcomes closer to the NWI upper-bound framework. While a renewals annuity may limit the extent to which a return on capital is reflected in the near term, it does not resolve the underlying policy issue. The current definition (or interpretation of that definition) permits a return on post-2000 existing capital and does not constrain the future adoption of a RAB model.

As the QCA is considering whether to adopt a RAB framework, this distinction is central:

- Under the pre-2020 definition / wording, there is a clear policy basis to reject RAB
- Under the post-2020 definition / wording, that constraint is removed.

To improve clarity and ensure consistent interpretation, this report adopts the following terminology:

- References to the previously described “lower bound” or “long-held Queensland Government view of lower bound” are expressed as the pre-2020 definition or interpretation of lower bound.
- References to Queensland’s current policy position are expressed as the post-2020 definition or interpretation of lower bound, which allows a rate of return on existing asset values and capital and renewals expenditure on existing assets post-2000.

Where the report finds that the RAB or other pricing model moves outcomes towards upper bound, this is stated explicitly as being relative to the pre-2020 definition of lower bound.

This report has clarified that differences in the application of lower bound pricing policy may reflect a change in the definition or interpretation of lower bound pricing that has occurred over time.

Under Queensland’s current post-2020 definition of lower bound, a return on post-2000 existing capital expenditure – as enabled by the proposed RAB model – may be viewed by some as consistent with the new Queensland interpretation of lower bound.

In contrast, this report finds that the proposed RAB model is inconsistent with the long-standing interpretation of lower bound pricing shared by successive Queensland Governments and irrigators from 2000 to at least 2016, and in practice continuing to the present (2026).

Executive summary

This report provides an independent qualitative and quantitative comparison of the renewals annuity and regulated asset base (RAB) approaches for irrigation pricing in Queensland. The Queensland Farmers' Federation (QFF) engaged Highlander Consulting to assess both approaches by reviewing relevant pricing theory and developing a long-term pricing model applied to four Sunwater and two Seqwater schemes. The model reconstructs prices over 50 years from FY2013 to FY2062.

QFF intends this report to be considered by the Queensland Competition Authority (QCA)—and QFF members—as part of the QCA's review of proposals from rural irrigation service providers (Sunwater and Seqwater) to introduce a RAB-based irrigation pricing model.

Queensland's irrigation pricing sits within the National Water Initiative (NWI) pricing envelope:

- The renewals annuity aligns with NWI lower-bound pricing, recovering operating, maintenance and renewal costs without a return on the existing asset base.
- The proposed RAB approach introduces a return on existing capital (WACC × asset base). While consistent with the Queensland post-2020 definition of lower bound, it represents a departure from the long-standing pre-2020 definition in Queensland, which excluded a return on capital.

When this report refers to capital or a return on capital, it relates to existing assets and the renewal or refurbishment of those assets. NWI and Queensland policy have always allowed a return on new or augmented assets (where they deliver a net benefit to customers). This report does not dispute that principle. However, it is not directly relevant to the matters considered here, as there has been no eligible augmentation of pre-2000 assets or new assets in regulated schemes to date.

Rather, the RAB model considered in this report, proposes that capital expenditure on existing assets, that is, on renewal and refurbishment (not augmentation / new assets) will generate a return.

To assess the impact of this proposal, the pricing model applies a common cost base for each scheme and generate capital revenues and total annual charges under both the RAB and renewals annuity frameworks. Where available, actual costs were adopted in the model from FY2013, and then forecasts from Sunwater, Seqwater and the recent QCA process. Key parameters include a 30-year rolling annuity, a 50-year modelling horizon, and a WACC of 6.66%. Sensitivity analysis confirms that results are driven by pricing structures rather than key inputs.

Across all six schemes, the pricing model produces a consistent result: the renewals annuity delivers lower long-term prices than a RAB framework. The divergence is structural and increases over time. While RAB prices are lower in the short to medium term, they rise more rapidly and exceed annuity outcomes in later decades.

By FY2062, the RAB model's annual capital allowance is two to almost six times higher than renewals capital allowances. Prices under RAB are initially lower but exceed prices under a renewals approach in all schemes in later years. By FY2062, RAB prices are 13–40% higher than renewals annuity prices.

While present value comparisons of the two approaches – using a WACC discount rate – appear similar, this reflects differences in the timing of cashflows rather than equivalence of outcomes. The key differences forecast to be experienced by customers include:

- Long-term affordability: RAB results in higher total costs and prices in the modelled scenarios
- Intergenerational equity: RAB transfers significantly higher costs to future customers
- Investment incentives: RAB creates incentives for service providers to increase capital expenditure
- Price stability: A rolling renewals annuity smooth costs, whereas RAB introduces step changes
- Transparency: Renewals require 30-year forecasts, whereas RAB relies on near-term expenditure.

RAB offers regulatory consistency and simpler cost recovery, but at the cost of higher long-term capital allowances and therefore annual charges paid by customers. This report considers that the benefits of RAB are not justified by the suite of disbenefits conferred to customers by the RAB model.

In conclusion, the renewals annuity aligns with the long-standing Queensland pre-2020 lower-bound pricing policy, which excluded a rate of return on assets. It delivers lower long-term costs and prices, intergenerational fairness, better investment incentives, more transparency, and greater price stability.

Accordingly, the report recommends that:

1. The Queensland Government restore the pre-2020 definition (or Queensland interpretation) of lower bound (i.e., cost recovery with no return on capital from existing assets or future renewal and refurbishment capital expenditure on existing assets); and
2. The QCA's reference framework be updated accordingly and the QCA tasked with reassessing and recommending the appropriate pricing approach, noting that the evidence presented in this report strongly supports continued use of the rolling renewals annuity, from a long-term pricing and customer perspective.

Restoring the pre-2020 definition (or the longstanding Queensland interpretation of that definition) will align pricing policy with irrigator expectations, remove ambiguity, and support long-term, affordable pricing that is smooth, stable, transparent, and delivers strong intergenerational equity.

Postscript

This report does not oppose a return on new or augmented capital that delivers net benefits to customers and notes that this issue is not directly relevant to the matters considered in this report.

1. Regulatory and policy framework

1.1. Queensland's irrigation pricing regime

The Queensland Competition Authority (QCA) regulates irrigation prices for Sunwater and Seqwater based on the costs of service delivery, including operating, maintenance and capital costs. The QCA recommends prices through periodic reviews, typically covering four- to five-year price paths, with prices designed to recover the prudent and efficient costs of providing water services to irrigators. Based on the QCA's recommendations, the Queensland Government is the final approver of prices.

Queensland has historically used a renewals annuity approach to recover the renewal / capital costs of irrigation infrastructure. Under this approach, the expected future lumpy costs of replacing aging assets are converted into regular annual payments (an annuity) based on a long-term forecast, typically covering 30 years. The annuity is included in irrigation prices alongside operating, maintenance, administration, and renewal and refurbishment costs. In addition, under NWI lower bound irrigation pricing policy, customers may pay for Sunwater's tax payable under a tax equivalent regime (TER) and dividend costs (where applicable). Under Queensland's pre-2020 definition of lower bound, the renewals annuity does not generate a standalone return *on* capital, rather it should be equivalent to a return *of* capital (like a depreciation allowance with timing and calculation differences). A renewals annuity funds the replacement of assets as they age. It does not generate profit or a return on the asset value of the irrigation schemes.

The QCA, Sunwater and Seqwater are now considering whether a Regulated Asset Base (RAB) approach would better serve regulatory objectives. Under the proposal, upon transitioning to a RAB framework, any negative final renewals annuity balance would be carried forward as the opening RAB, while positive balances are returned to irrigators as rebates (say over 4 or 8 years). Capital costs are then recovered through depreciation (return *of* capital) plus a return on capital (RAB × Weighted Average Capital Cost or WACC). The RAB operates as a rolling asset base, which will generally increase in value over time. So, as new capex is added the RAB increases in value by that amount, but then depreciation reduces the balance, and the net or remaining asset value (the RAB) is multiplied by the service providers WACC to generate the annual return on capital. The depreciation allowance and return on capital are recovered through prices, alongside operations and maintenance costs.

The distinction is fundamental. A renewals annuity funds future replacement, whereas a RAB performs a similar function via depreciation but also provides a return on invested capital. The renewals annuity broadly reflects NWI and Queensland pre-2020 lower-bound pricing principles.

Under a RAB framework, prices are initially comparable to those under a renewals annuity, but over time incorporate an increasing return on capital. When assessed against the pre-2020 definition of lower bound, this results in pricing outcomes that move towards upper bound over the long term.

The choice between these approaches therefore affects both price levels and how costs are shared over time. In terms of total revenues, the modelling indicates higher revenues over the long term under a RAB framework compared to a renewals annuity assessed against the pre-2020 definition. In terms of intergenerational equity, a RAB approach results in lower prices in the short to medium term, followed by higher prices in later periods.

1.2. The National Water Initiative pricing envelope

The Council of Australian Governments (COAG) water reform framework 1994 and the National Water Initiative (NWI) 2004 provide the policy framework for irrigation pricing. The framework recognise that water infrastructure operates as a natural monopoly and that irrigators generally cannot choose between competing providers. This creates a tension between the infrastructure provider's need to recover costs and the need to protect irrigators from higher than necessary monopoly pricing.

The NWI Pricing Principles, published by the Natural Resource Management Ministerial Council in 2010, address this tension by defining a pricing envelope with a lower bound and an upper bound within which all irrigation, industrial and urban water prices in Australia should fall.

1.2.1. Lower-bound pricing

Lower-bound pricing sets the floor for cost recovery. It includes prudent and efficient operating, maintenance and administrative costs, provision for future asset refurbishment or replacement, tax equivalent regime (TER) payments, dividends (if any) and interest on debt. The definition of lower bound excludes a return on, and depreciation of, pre-1 July 2000 assets, and does not include any return on equity or opportunity cost of capital.

While often described as cost reflective, under this approach, governments may historically have invested in irrigation schemes to support regional economic development, create employment, enhance food security and achieve other policy objectives. The lower bound approach may not fully recover the investment cost of the initial asset base, rather it seeks to break even in terms of each schemes operations, maintenance and future asset refurbishment and renewal costs.

1.2.2. Upper-bound pricing

Upper-bound pricing builds on the (NWI and Queensland pre-2020) lower bound cost definition, by adding a regulated return on capital. This includes both depreciation and a regulated return on the agreed asset value established for pricing purposes, which is typically referred to as the RAB (typically the return is calculated as the WACC × RAB).

The upper bound approach allows recovery of and return on invested capital, including legacy assets. As a result, upper-bound prices can in the long term reflect the full economic cost of service provision, without exceeding a regulated upper limit or excessive monopoly pricing.

1.3. Approaches to capital cost recovery

The NWI Pricing Principles recognise two primary approaches to recovering asset renewal and capital costs.

1.3.1. Renewals annuity

A renewals annuity converts a forward program of capital and renewals expenditure (e.g. 30 years) into an annual charge included in irrigation prices. It is designed to fund asset renewal and refurbishment, rather than provide a return of or on the existing asset base.

The approach requires a scheme-specific renewals account (or "bank balance"), which records inflows (customer payments) and outflows (capital and renewals expenditure). Service providers may apply either a cost of debt or a WACC within the renewals calculation.

The renewals annuity operates as a rolling mechanism, updated periodically to reflect revised cost forecasts. This structure smooths costs and prices over time.

The choice of financing assumption (cost of debt or WACC) does not change the fundamental nature of the approach as a cost recovery model, but it can influence price outcomes depending on the profile of renewals balances:

- Where balances are negative, applying WACC implies a higher financing cost than the cost of debt.
- Where balances are positive, applying WACC provides a higher return on those balances.

In practice, these effects may offset over time, and in some cases the use of WACC can result in lower prices than using the cost of debt. The net impact is scheme-specific and depends on the timing of expenditure and resulting balance trajectory.

Overall, the renewals annuity remains a cost recovery framework without a persistent return on capital, and which closely aligns with lower-bound pricing outcomes as historically applied in Queensland.

1.3.2. Regulatory asset base

The RAB (building-block) approach establishes irrigation asset values as a regulatory asset base. Costs are recovered through annual depreciation (return of capital) and a return on capital (RAB × WACC). Depreciation reduces the asset base over time, while new (non-grant funded) capital expenditure is added, increasing the base and future return charges.

Unlike a renewals annuity, the RAB approach applies WACC directly to the asset base, resulting in an ongoing and compounding return on capital. This is a structural feature of the model and is not offset through a balancing mechanism.

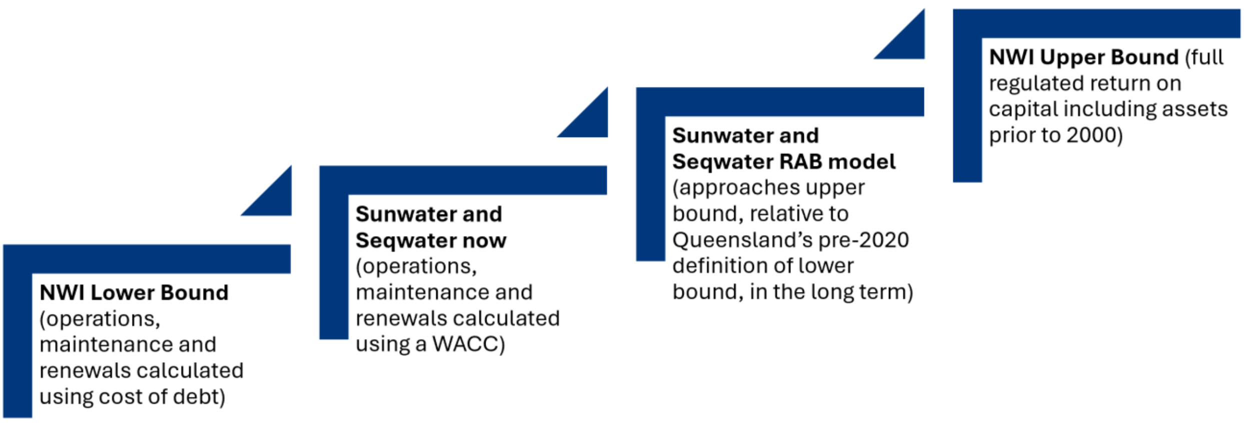
RAB frameworks are standard across many monopoly infrastructure sectors, including electricity, gas and urban water. In contrast, irrigation pricing in Queensland has historically relied on the renewals annuity approach, consistent with the cost recovery framework reflected in NWI lower-bound pricing and Queensland's pre-2020 policy settings.

A lower bound pricing policy for irrigation services—applied from 2000 to 2020—has been the consistent policy position of successive Queensland Governments. This approach supported regional economic development and affordable water for irrigators in Sunwater and Seqwater schemes, with the QCA engaged over successive pricing periods to regulate outcomes consistent with these objectives.

1.4. Position of pricing approaches within NWI framework

Pricing approaches can be viewed along a spectrum from lower- to upper-bound recovery.

Figure 1: NWI pricing continuum



A renewals annuity aligns with lower-bound pricing by recovering operating, maintenance and renewal costs without applying a persistent return on the asset base.

A RAB framework moves pricing along this spectrum by applying a return on capital (WACC) to an asset base in addition to depreciation. This introduces an ongoing and compounding return on capital, which is a defining feature of upper-bound pricing structures.

At the upper bound, the WACC is applied to the full asset base, including historical assets (potentially even prior to 2000), representing the maximum level of cost recovery under the NWI framework.

1.5. Implications for irrigators

The choice between a renewals annuity and a RAB has several implications for irrigators. A renewals annuity relies on long-term forecasts of asset replacement to determine current charges, meaning outcomes are sensitive to the accuracy of those forecasts. By contrast, a RAB framework recovers actual capital expenditure as it occurs, with all (QCA allowed) capex added to the asset base and earning a regulated return. This creates an incentive to increase and capitalise expenditure, and any QCA approved cost overruns or higher-than-expected capital costs can be incorporated into the RAB and reflected in all future prices.

The two approaches also differ in transparency and intertemporal cost allocation. Renewals annuities are typically supported by long-term renewal forecasts, providing irrigators with forward visibility of planned investment and indicative pricing impacts.

Under a RAB framework, regulatory proposals may focus on shorter periods, with pricing outcomes driven by realised expenditure and the evolving asset base. In terms of intergenerational impacts, renewals annuities tend to smooth costs across users over time, whereas a RAB may result in lower initial charges but higher prices as the asset base expands. These conceptual differences provide the basis for the analysis that follows.

The subsequent sections apply these frameworks to assess current and proposed approaches across six schemes, with a focus on price outcomes, cost recovery and the distribution of costs over time.

2. Historical cost review and scheme profiles

2.1. Purpose and scope of the historical review

This section reviews historical cost and pricing data for each of the six irrigation schemes covered by this review. The historical baseline serves two purposes: it establishes the cost structures and pricing trajectories that irrigators have experienced under the renewals annuity framework, and it provides the empirical foundation for the RAB counterfactual analysis presented in Section 4.

The review period begins in 2012, when the QCA's current approach to irrigation pricing was established through its first comprehensive price reviews for Sunwater (April 2012) and Seqwater (May 2013). Data sources include QCA pricing submissions, Network Service Plans, service contracts, and publicly available cost data from QCA final reports.

2.2. Scheme-by-scheme profiles

2.2.1. Bundaberg Distribution (Sunwater)

Scheme characteristics

The Bundaberg Distribution Scheme serves approximately 900 customers in the Bundaberg region, supplying water primarily for irrigation. The scheme draws from Fred Haigh Dam and services a range of irrigation areas across multiple sub-systems. Total Water Access Entitlements (WAEs) are 166,330ML, with an average usage of 48.5% giving a 20-year average use of 80,739ML.

Customers face a four-part tariff structure comprising Part A (fixed) and Part B (volumetric) charges for the bulk water supply scheme, and Part C (fixed) and Part D (volumetric) charges for the distribution system. This analysis focuses on the Part C and Part D distribution tariffs.

Table 2: QCA recommended distribution prices – Bundaberg Channel

Year	Part C (Fixed) ($/ML, nominal)	Part D (Volumetric) ($/ML, nominal)
2012–13	$37.93	$49.58
2016–17	$41.86	$54.73
2019-20	$45.08	$58.94
2023–24	$54.54	$58.08
2024–25	$54.54	$58.08
2028–29	$72.78	$57.50

Cost recovery for the Bundaberg channel tariff group is projected to reach 83% by FY2029, up from 76% in FY2026, mainly through an increase in the Part C charge. The scheme held a positive renewals balance of $3.06 million at the end of FY2012, which had decreased significantly to negative $9.25 million by the end of FY2027 because of high capital expenditure in recent years.

2.2.2. Burdekin Distribution (Sunwater)

Scheme characteristics

Burdekin Distribution is Sunwater's largest irrigation distribution system, supplying water from the Burdekin River and Burdekin Falls Dam through an extensive network of channels. The scheme services 258 customers, predominantly sugar cane growers and horticulture. Total medium priority WAEs for irrigation are 335,431ML, with long-term average annual usage of 205,634 ML.

Customers have a four-part tariff structure comprising Part A (fixed) and Part B (volumetric) charges for the bulk water supply scheme, and Part C (fixed) and Part D (volumetric) charges for the distribution system. This analysis focuses on the Part C and Part D distribution tariffs.

Table 3: QCA recommended distribution prices – Burdekin Channel

Year	Part C (Fixed) ($/ML, nominal)	Part D (Volumetric) ($/ML, nominal)
2012–13	$32.90	$24.91
2016–17	$36.31	$27.49
2019-20	$39.10	$29.60
2023–24	$45.87	$24.88
2024–25	$45.87	$24.88
2028–29	$54.32	$23.59

The Burdekin Distribution Scheme held a negative renewals annuity balance of $2.48 million at the end of FY2012. In Sunwater's RAB review proposal, the scheme has a positive annuity closing balance of $2.15 million in FY2027. This indicates that annuity contributions have exceeded actual renewals expenditure, building a reserve for future asset replacement. The fixed charge (Part C) has increased steadily across the review periods, while the volumetric charge (Part D) has remained stable. The rise in Part C charges to FY2029 is forecast to bring the prices to 100% cost reflective, from 98% currently.

2.2.3. Eton WSS (Sunwater)

Scheme characteristics

The Eton Bulk WSS, near Mackay, supplies water primarily for sugar cane irrigation. The scheme services predominantly irrigation customers with WAEs of 62,759ML. Long term average utilisation is 34.9% of total allocation with a 20-year average usage of 21,900ML. Customers are classified into High A and High B priority groups. High B is the primary irrigation tariff class considered in this analysis.

Table 4: QCA recommended bulk prices – Eton WSS

Year	Part A (Fixed) ($/ML, nominal)	Part B (Volumetric) ($/ML, nominal)
2012–13	$26.38	$3.40
2016–17	$29.12	$3.76
2019-20	$31.36	$4.05
2023–24	$35.87	$4.39
2024–25	$35.87	$4.39
2028–29	$35.91	$6.09

The Eton Water Supply Scheme held a negative renewals balance of $1.81 million at the end of 2011-12. The closing annuity balance for 2026-27 from Sunwater's RAB review proposal was negative, at $2.78 million. This reflects significant capital expenditure within the Eton scheme in recent years. Both the fixed (Part A) and volumetric charge (Part B) have increased steadily across the review periods, with recommended prices covering 100% of recoverable costs.

2.2.4. Upper Condamine WSS (Sunwater)

Scheme characteristics

The Upper Condamine Water Supply Scheme is located on the Darling Downs near Warwick and Toowoomba, supplying water primarily for irrigation with some urban demand. The scheme services approximately 100 irrigators growing a mix of broadacre crops. Total WAEs are approximately 33,960 ML, of which 42.5% is used, with a 20-year average of 14,422ML/year. Customers are divided into several sub-tariff groups, with the Sandy Creek/Condamine River group representing the primary irrigation tariff class considered in this analysis.

Table 5: QCA recommended prices – Upper Condamine WSS

Year	Part A (Fixed) ($/ML, nominal)	Part B (Volumetric) ($/ML, nominal)
2012–13	$13.33	$4.68
2016–17	$14.72	$5.17
2019-20	$34.03	$5.57
2023–24	$34.03	$6.09
2024–25	$16.89	$6.33
2028–29	$25.47	$11.66

The annual tariffs for Condamine WSS fluctuate, with a significant spike between FY2020 and FY2024 reflecting an increase in capex on dam safety upgrades. The scheme held a negative renewals balance of $1.05 million at the end of FY2012, while in Sunwater's RAB review proposal the closing balance for FY2027 was negative $0.59 million. Scheme prices are currently not cost reflective, with the rise in tariffs to FY2029 set to increase the recovery of allowable costs to 100%.

2.2.5. Central Lockyer Valley WSS (Seqwater)

Scheme characteristics

The Central Lockyer Valley WSS is located near Gatton in Southeast Queensland and is managed by Seqwater. The scheme supplies water primarily for irrigation, supporting dairy, vegetable and forage crop production. Total WAE are approximately 18,402 ML across surface water and groundwater allocations. Long-term average usage is relatively low and variable, with approximately 33% utilisation (6,072ML), reflecting highly variable water availability in the Lockyer Valley.

Table 6: QCA recommended prices – Central Lockyer Valley WSS

Year	Part A (Fixed) ($/ML, nominal)	Part B (Volumetric) ($/ML, nominal)
2012–13	$0.00	$9.89
2016–17	$26.43	$10.65
2019-20	$35.42	$11.46
2023–24	$48.88	$11.77
2024–25	$48.88	$11.77
2028–29	$66.12	$13.18

The $0.00 fixed charge in FY2013 reflects transitional pricing at the commencement of the QCA's first Seqwater pricing review. Fixed charges have since increased significantly, reaching $66/ML by FY2029, with FY2025 prices held at FY2024 levels as a standstill year between regulatory periods.

Cost recovery for Central Lockyer Valley is projected at 68% in FY2026, rising to 77% by FY2029, with ongoing reliance on government reflecting the scheme's challenges. The scheme recorded a negative closing annuity balance of $0.35 million in FY2012, increasing to negative $3.76 million by FY2027.

2.2.6. Lower Lockyer Valley WSS (Seqwater)

Scheme characteristics

The Lower Lockyer Valley WSS is managed by Seqwater and supplies water for irrigation from Atkinson Dam and supporting weirs. The scheme serves 164 irrigators with total medium priority WAE of 11,268ML. Demand is highly variable, with average usage of around 1,538 ML (13.8% of WAE), though this has ranged from as low as 150 ML in drought periods to around 2,700 ML in wetter years.

Table 7: QCA recommended prices – Lower Lockyer Valley WSS

Year	Part A (Fixed) ($/ML, nominal)	Part B (Volumetric) ($/ML, nominal)
2012–13	$24.49	$29.99
2016–17	$37.67	$23.96
2019-20	$47.53	$25.80
2023–24	$62.11	$28.19
2024–25	$62.11	$28.19
2028–29	$80.93	$31.57

Cost recovery for the Lower Lockyer is projected at 76% in FY2026, rising to 84% by FY2029, with total allowable costs of $4.4 million over the period. Relatively high per ML prices reflect the small customer base and low utilisation, which spread fixed costs over a limited revenue base. Prices FY2025 are unchanged from FY2024 as a standstill year between Seqwater regulatory periods.

The scheme recorded a negative closing annuity balance of $0.52 million in FY2012, with a positive balance by FY2027, resulting in an initial RAB value of $0 for Seqwater's review submission.

2.3. Cost drivers across schemes

Several common themes emerge across the schemes. Fixed charges (Part A and Part C) have increased faster than volumetric charges, reflecting recent capex for the asset-intensive nature of irrigation systems and the QCA's cost allocation approach. Electricity costs are a key driver in pumped schemes such as Eton, Bundaberg and the Burdekin, exposing prices to energy volatility. Cost recovery remains below 100% in several schemes, particularly Seqwater schemes, indicating ongoing reliance on government subsidies.

Distribution schemes such as Bundaberg and Burdekin have higher prices per ML due to channel and pump infrastructure. Smaller, lower-utilisation schemes such as Central and Lower Lockyer face high unit costs, as fixed costs are spread over less water. Renewals annuity balances vary across schemes, with some remaining negative, which has implications for a potential transition to a RAB.

These patterns underpin the modelling in Section 4, where each scheme's cost structure is used to project long-term price paths under both frameworks.

3. Modelling methodology

3.1. Model purpose and design

Highlander Consulting has developed an Excel-based pricing model to enable QFF and its members to compare the long-term impacts of the renewals annuity and RAB frameworks across six Sunwater and Seqwater schemes. The model reconstructs RA and RAB prices over the period 2012-13 to 2061-62, capturing capital replacement cycles and allowing the RAB base to develop over time.

The model is not intended to replicate the Sunwater or Seqwater pricing calculators. Instead, it has been designed to provide a transparent and internally consistent comparison of the underlying pricing frameworks using a common cost base for each examined scheme.

Consistent assumptions and a common cost base are applied across both frameworks, ensuring that differences in results reflect pricing mechanisms rather than input variation. The model replicates, where possible, Sunwater and Seqwater cost allocation approaches between fixed and volumetric charges to align with QCA regulatory submissions. Key parameters, including WACC, asset life, annuity period and capex sensitivity, can be adjusted via a dashboard on the Executive Summary sheet, with outputs summarised through charts and key metrics.

The model is modular, with each scheme structured through dedicated sheets for inputs, calculations and outputs, allowing additional schemes to be incorporated as needed. It is also designed to be transparent and auditable, enabling QFF and stakeholders to interrogate assumptions, test sensitivities and update inputs as new data becomes available from future QCA pricing reviews.

3.2. Model structure

The model comprises four layers for each scheme: input data, calculation engines for both pricing frameworks, output and comparison tables of key values and charts for each scheme. These are arranged across dedicated Excel worksheets per scheme.

3.2.1. Input data

The input data for each scheme is stored within its cost sheet, with the cost path comprising three components: operating expenditure (opex), review events and revenue offsets, and renewals expenditure (capex). These inputs are sourced from Sunwater and Seqwater data, QCA submissions and Network Service Plans.

Where data gaps exist, values have been interpolated to reflect pricing transitions between years. For Sunwater schemes, capex forecasts are extended beyond Year 40 (FY2065) using representative earlier forecast capital profiles to reflect the cyclical nature of renewals expenditure, rather than relying on simple escalation. This approach avoids over-weighting periods of unusually high forecast expenditure and maintains a more representative long-term capital profile.

The model uses actual costs to 2025, QCA-approved forecasts where available, and service provider forecasts for the remaining projection period. Assumptions are applied only in the outer years where detailed forecasts are not available, and these are designed to maintain representative capital expenditure patterns rather than to extrapolate historical values.

3.2.2. Renewals annuity engine

The renewals annuity is modelled in line with QCA pricing methodology. The opening balance is set using the scheme's closing annuity balance in 2011-12. Each year, interest is applied to the opening balance at the nominated annuity rate, which can be varied between the WACC and cost of debt for sensitivity analysis. The selected interest rate (WACC or cost of debt) is applied symmetrically to both positive and negative annuity balances, reflecting either a return earned on positive balances or a financing cost / interest payable on negative balances.

The model then adds the annuity payment, calculated as a rolling annuity over the specified period (default 30 years) based on the net present value of forecast capex, before deducting actual capex to determine the closing balance. Total annual revenue requirements comprise the annuity payment, opex, and review events and revenue offsets.

The model tracks annuity balances over time, with positive balances indicating over-recovery relative to renewals expenditure and negative balances indicating a deficit. In practice, balances tend to build ahead of major capex programs and are drawn down as expenditure occurs.

3.2.3. RAB engine

The RAB engine models prices as if each scheme had operated under a regulated asset base framework since 2012. The opening RAB is set using the scheme's closing annuity balance in 2011-12.

Each year, capex is added to the opening RAB and depreciation is deducted, with depreciation comprising base RAB depreciation over the asset life (default 50 years), depreciation on historical capex, and half-year depreciation for new assets. The return on capital is calculated by applying the selected interest rate, either WACC or cost of debt, to the opening RAB. The closing RAB is then derived as the opening balance plus capex less depreciation.

Inflation is incorporated within the capex forecasts, which are modelled in nominal terms. The RAB increases through the addition of capital expenditure and decreases through depreciation. The RAB is not separately indexed to account for inflation, because its inputs have already been escalated (using CPI) to achieve nominal cash flows.

Under the RAB framework, capital expenditure is recovered over time through depreciation, which represents the return of capital. Over the asset life, the initial capital investment (the principal) is fully recovered through this process. In addition, there is a return on capital earned (WACC x RAB).

Consistent with Sunwater's proposed RAB approach, positive closing annuity balances are assumed to be returned to customers over a defined period (either 4 or 8 years) as a rebate, reducing overall bills rather than the underlying water price.

Closing annuity balances from 2011-12 were used in the model, which starts in 2012-13. Only Bundaberg had a positive closing balance (and an opening RAB of $0).

Annual revenue requirements under the RAB framework comprise return on capital, total depreciation, opex, and review events and revenue offsets.

3.2.4. Output and comparison layer

For each scheme, the model produces side-by-side comparisons of annual recoverable costs under the renewals annuity and RAB frameworks, along with RA and RAB balances and fixed and variable tariffs. Cost shares are set by scheme based on QCA determinations, with fixed and variable splits applied accordingly. Fixed tariffs are calculated as fixed revenue divided by total WAE, while variable tariffs are based on variable revenue divided by expected usage.

The Executive Summary sheet provides a dashboard allowing users to select a scheme and view key outputs, including annual cost and balance trajectories, tariff comparisons, and total costs under each framework in both nominal and present value terms. A discount rate, set at 6.66% by default, is applied to enable net present value comparisons for customers.

3.3. Common cost base and data sources

Both pricing frameworks use a common cost base for each scheme so that differences in results reflect the pricing mechanism rather than input variation. The cost base comprises opex, review events and revenue offsets, and renewals capex. Opex is derived from QCA submissions, Network Service Plans and scheme-level data provided by Sunwater and Seqwater, using actuals where available and escalated at 2.5% CPI with zero real growth through to 2061-62. Review events and revenue offsets capture regulatory adjustments, including pass-throughs and prior period corrections, and are applied consistently across both frameworks.

Renewals capex is based on historical actuals and forward estimates from Sunwater and Seqwater data, QCA materials and Network Service Plans. For capex, when its long-term forecasts expire, Seqwater has escalated capex by CPI (2.5%) rather than project lumpy capex like Sunwater.

For Sunwater, to support the 30-year rolling annuity, capex is extended to 2090–91 so that the final model year (2061–62) incorporates forward estimates. Given the concentration of expenditure in the 2050s, capex beyond the forecast period is extended by repeating earlier representative capital expenditure profiles to reflect cyclical renewals patterns, with CPI applied only where consistent with the service provider's own forecasting approach.

A sensitivity parameter allows testing of alternative capex paths. Demand assumptions, including WAE and expected usage, are based on QCA determinations and held constant in the base case.

The dataset has been assembled by combining review of regulatory submissions, extraction of scheme-level data, direct provision of data for this project from Sunwater and Seqwater and using costs from the QCA's reports. A full list of source documents is provided in Appendix A.

3.4. Assumptions

The model's key assumptions are set on the Assumptions sheet and the Executive Summary dashboard. Users can adjust these to test sensitivity. The base case assumptions are as follows.

3.4.1. Financial parameters

The weighted average cost of capital (WACC) is set at 6.66%, consistent with the QCA's most recent determination for Sunwater irrigation schemes and close to the most recent QCA determination for Seqwater rural irrigation schemes of 6.67%. This rate is used for both the return on capital under the RAB and, in the base case, as the discount rate for the renewals annuity calculation for both Sunwater and Seqwater. The model allows the annuity interest rate to be switched from the WACC to the cost of debt for sensitivity analysis. The cost of debt is set at 4.95% (to be confirmed with Seqwater and Sunwater).

The present value discount factor is set at 6.66%, aligned with the WACC to ensure consistency with the pricing framework and comparability across scenarios. The RAB rebate period (for returning positive annuity balances to irrigators under the RAB transition) is set at 8 years, consistent with Sunwater's proposed transition design.

The model applies a nominal post-tax WACC to nominal cashflows. Tax is not modelled separately; instead, it is reflected within the WACC. This simplified approach is appropriate for comparing the renewals annuity and RAB frameworks, as it is applied consistently to both.

3.4.2. Asset life and depreciation

The default asset life for RAB depreciation is 50 years, reflecting the long-lived nature of bulk water infrastructure (dams, channels, pipelines, pump stations). Straight-line depreciation is applied, with a half-year convention for new capital additions to reflect mid-year construction timing. The model tracks depreciation separately for the initial RAB base and for each year's new capex additions, ensuring that the cumulative depreciation schedule is transparent and auditable.

3.4.3. Inflation and escalation

CPI is assumed at 2.5% per annum. Real growth in operations, maintenance and renewals expenditure is assumed at zero, meaning costs escalate at CPI only. These assumptions are consistent with QCA regulatory practice and can be adjusted for sensitivity analysis.

3.4.4. Fixed and variable cost shares

The split between fixed (Part C) and variable (Part D) revenue is set per scheme based on QCA determinations. Sunwater distribution schemes (Burdekin and Bundaberg) operate at 68% fixed and 32% variable, to reflect higher variable electricity costs associated with pumping into channels.

Sunwater bulk schemes (Eton and Upper Condamine) and Seqwater schemes (Central Lockyer and Lower Lockyer) operate at 78-80% fixed and 20-22% variable, reflecting the cost structures determined by the QCA for each scheme type. These shares are consistent with the QCA's 2025 price review, which set the variable tariff at approximately 20% of operations and maintenance plus a scheme-specific quantity of electricity costs.

3.4.5. Annuity period

The renewals annuity is calculated annually over a rolling 30-year horizon, consistent with the current QCA methodology recommended for Sunwater and Seqwater irrigation prices. This period is long enough to smooth the impact of lumpy capital expenditure items, while providing meaningful forward visibility for irrigators. Longer annuity periods (e.g. 50–80 years) would further smooth price paths by spreading costs over a longer horizon, however, that would require longer term forecasts. Our model base case adopts 30 years – not more.

3.5. Sensitivity analysis framework

The model allows sensitivity analysis to test the impact of key variables on pricing outcomes. Core parameters include the WACC, choice of annuity discount rate (WACC or cost of debt), asset life for RAB depreciation, capex levels via a global sensitivity factor, the annuity period, the present value discount rate, and the RAB rebate period for transitions from positive annuity balances.

Sensitivities are tested one parameter at a time through the Executive Summary dashboard, with outputs including present value and nominal cost comparisons, tariff trajectories and balance profiles for the selected scheme.

This approach isolates the impact of individual assumptions and allows users to assess the robustness of results under alternative scenarios. The capex sensitivity is particularly important, applying a uniform percentage adjustment across all renewals expenditure to test the impact of systematic over or under investment, which is a key risk under RAB pricing due to incentives to expand the asset base. Section 4.4 details Highlander's sensitivity analysis of key parameters.

3.6. Model limitations

The model is a comparative pricing tool rather than a full regulatory model. It is designed to show the direction and magnitude of differences between the two frameworks under consistent assumptions, not to replicate QCA price determinations exactly. Key limitations should be noted.

- The model relies primarily on data provided for this report by Sunwater and Seqwater, supplemented by QCA reports and publicly available Network Service Plans. Where data gaps exist, assumptions are applied in outer years only and are documented for transparency. Long-term cost and demand forecasts are inherently uncertain, and results in later decades are indicative of structural trends rather than precise outcomes, with limited influence on present value results due to discounting.
- The model does not separately account for tax equivalent regime payments or dividends, as these policy-driven transfers affect both frameworks similarly and are outside the scope of the comparison.
- The model simplifies depreciation, using a straight-line approach over a single asset life rather than asset-level schedules (producing different asset lives for different classes of assets), reflecting the data limitations and time constraints associated with this project.
- The model also does not capture behavioural responses to pricing frameworks, such as changes in water use or investment decisions by service providers, beyond that tested through our capex sensitivity.

Despite these limitations, the model provides a robust basis for comparison. The use of a common cost base, consistent assumptions and a transparent structure ensures that differences in outcomes are attributable to the pricing frameworks themselves, with key drivers including the return on capital, the size of the capital base and the intergenerational allocation of costs clearly identified.

4. Model outputs and price path comparison

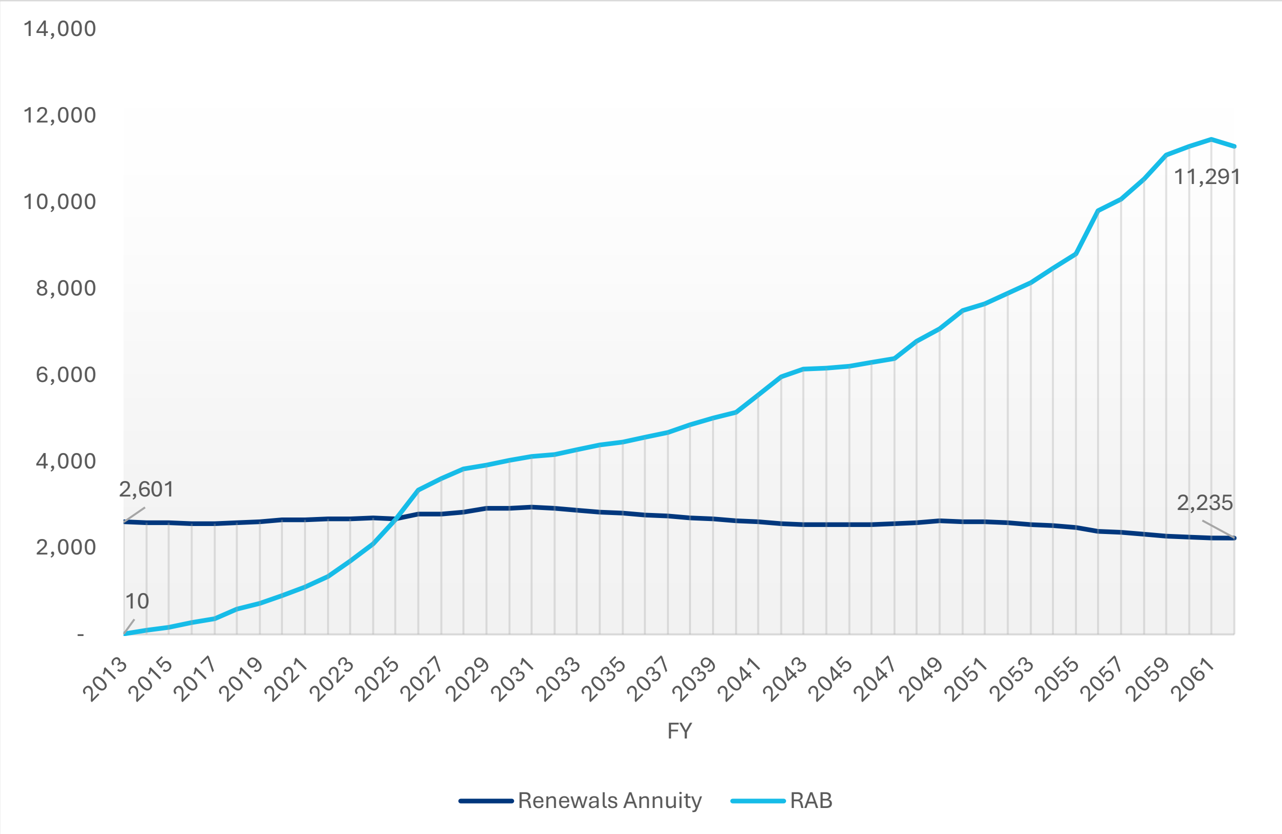
4.1. Overview

The modelling results are consistent across all six schemes when the pricing approaches are started in 2012-13. That is, the renewals annuity produces lower long-term prices than the RAB in every case. The two frameworks track closely for the first 10–15 years, then diverge progressively as the RAB's asset growth compounds returns on capital. The magnitude of divergence varies with scheme scale, customer volume (WAE) base and capital intensity. The implications of these results are evaluated in Section 5.

4.2. Results by scheme

4.2.1. Bundaberg Distribution (Sunwater)

Figure 2: RAB capital revenue vs renewals allowance – Bundaberg Distribution ($'000 pa)



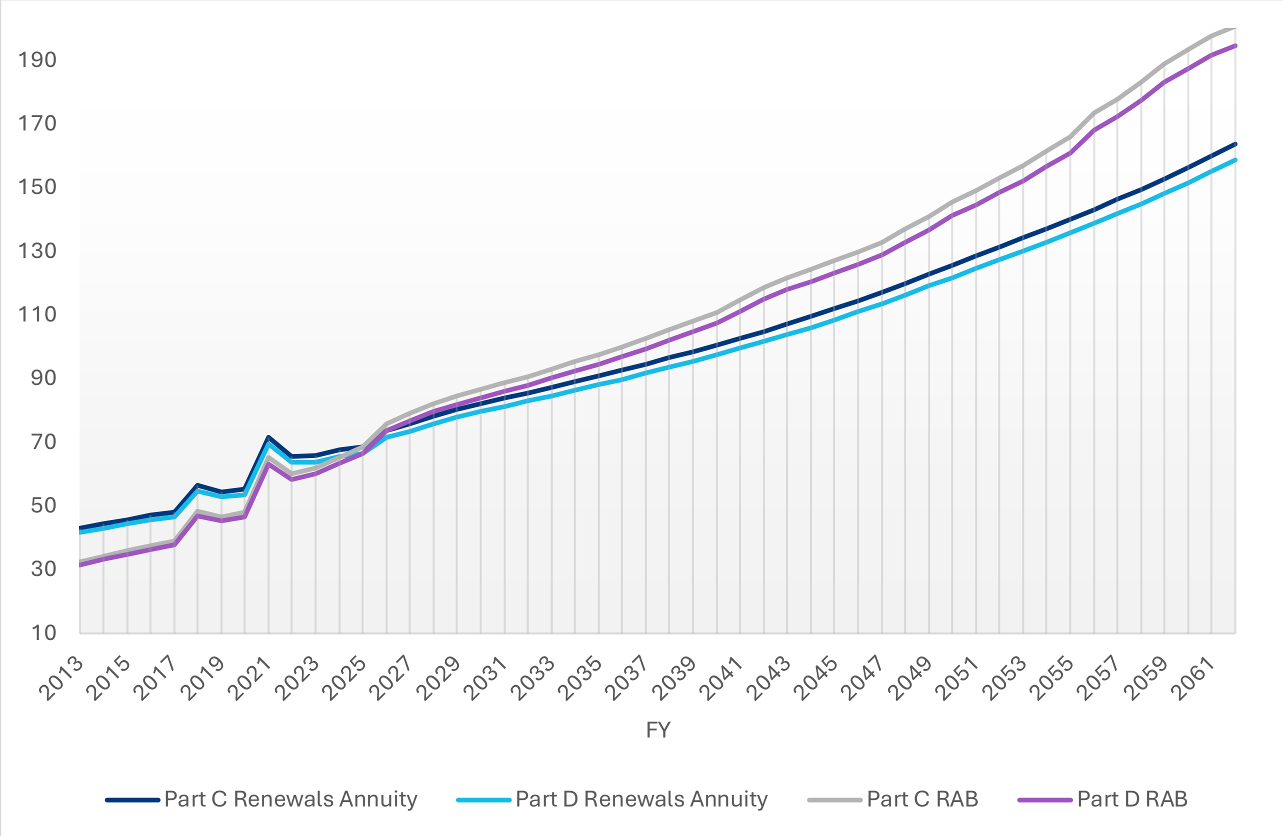
Note: Values represent annual capital revenue allowances only (renewals annuity vs RAB) and exclude operating expenditure. Modelled using a common cost base from Sunwater, Seqwater and QCA data.

Renewals annuity costs remain relatively stable at around $2.2-3.0 million over the period before gradually declining, reflecting consistent smoothing of capex across the thirty-year renewals period.

The cumulative cost of the RAB exceeds the cumulative cost of the renewals annuity by FY2042.

In contrast, RAB costs start near zero but increase from the mid-2020s, overtaking the annuity and continuing to rise sharply over time. The scale of divergence is significant, with costs exceeding $11.4 million by the late 2050s. This increase is punctuated by step-changes in the early 2040s and mid-2050s, reflecting major capital programs entering the regulatory asset base.

Figure 3: Fixed and variable annual charges – Bundaberg Distribution ($/ML)



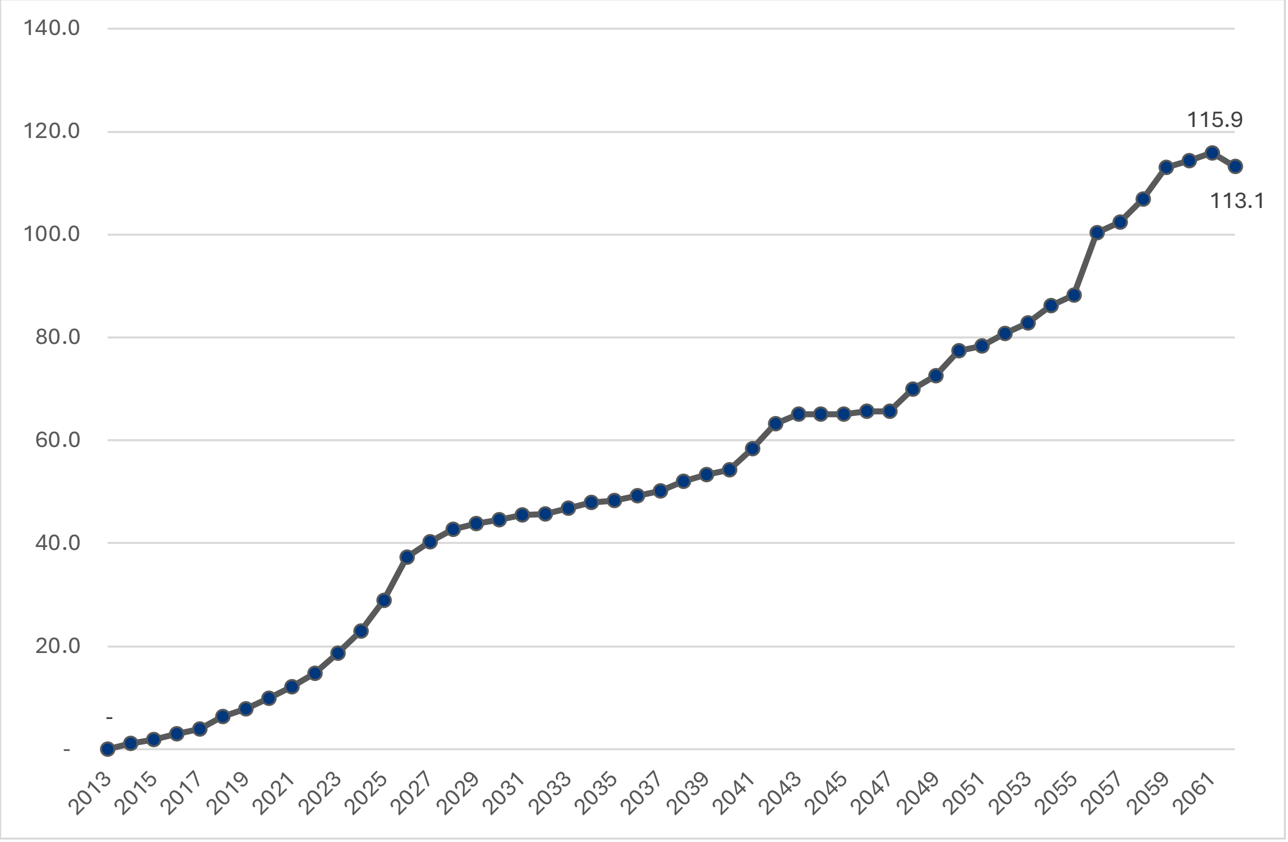
Note: Prices are derived from total costs (operating and capital) under each framework and are presented to show relative differences between pricing approaches.

Under the renewals annuity, Part C and Part D charges increase steadily over time and remain closely aligned, with a modest and consistent spread between fixed and variable components. This reflects a stable allocation of costs and effective smoothing of renewals expenditure.

Under the RAB framework, both Part C and Part D follow a similar trajectory but at a higher level, with divergence from the annuity emerging from the mid-2020s, widening progressively. By the late 2050s, both RAB tariffs reach close to $200/ML, compared to around $160/ML under the annuity.

For reference, the figure below sets out our estimated RAB values for the scheme, assuming a FY2013 start (as per the QFF scope). The opening RAB is set at zero, reflecting a positive closing annuity balance in 2011–12. This approach accords with the QFF scope. With additional budget, the opening RAB could be updated (with further modelling) to start in FY2026 or later. QFF did not request this.

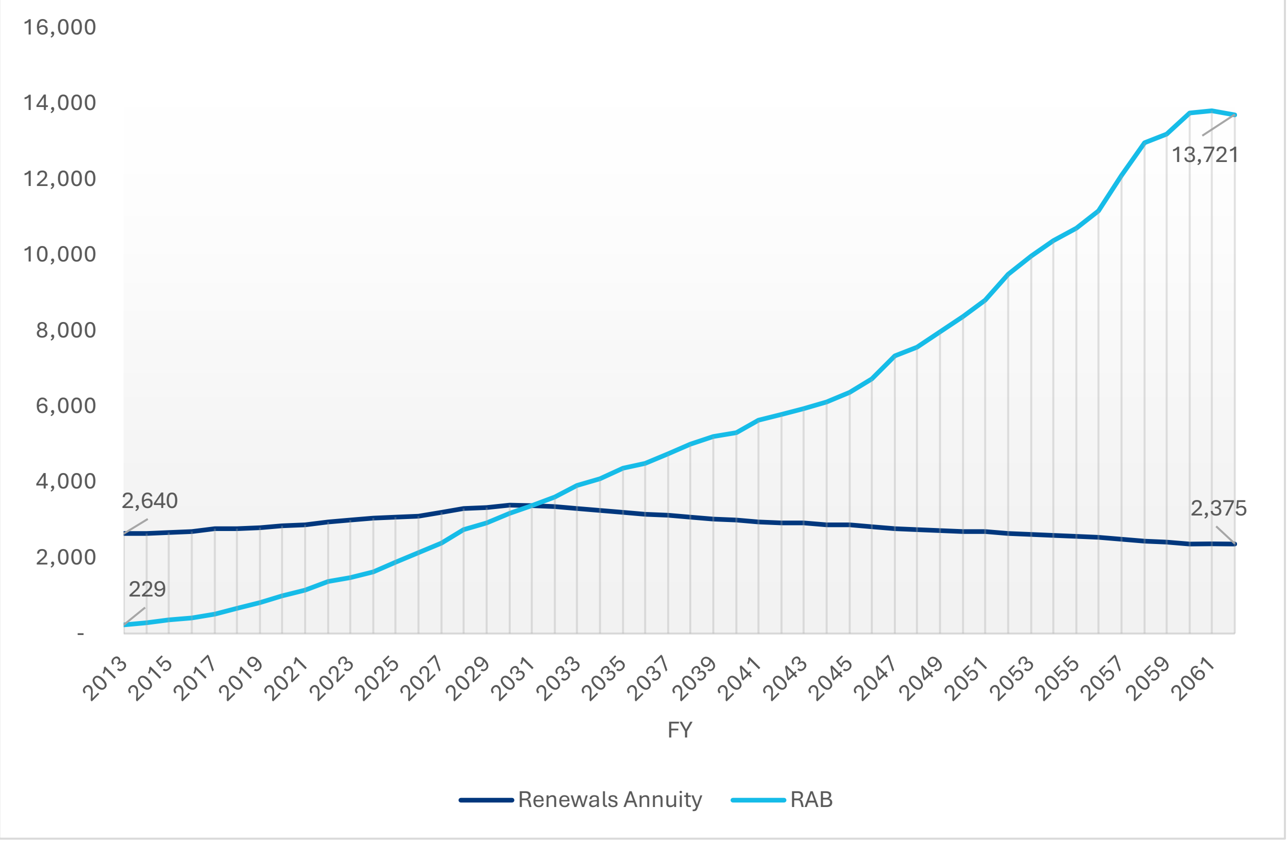
Figure 4: Opening RAB value for Bundaberg Distribution ($ million)



Capital revenue generated from the RAB includes the annual depreciation allowance (return of capital) and the annual return on capital (WACC x the above RAB).

4.2.2. Burdekin Distribution (Sunwater)

Figure 5: RAB capital revenue vs renewals allowance – Burdekin Distribution ($’000 pa)



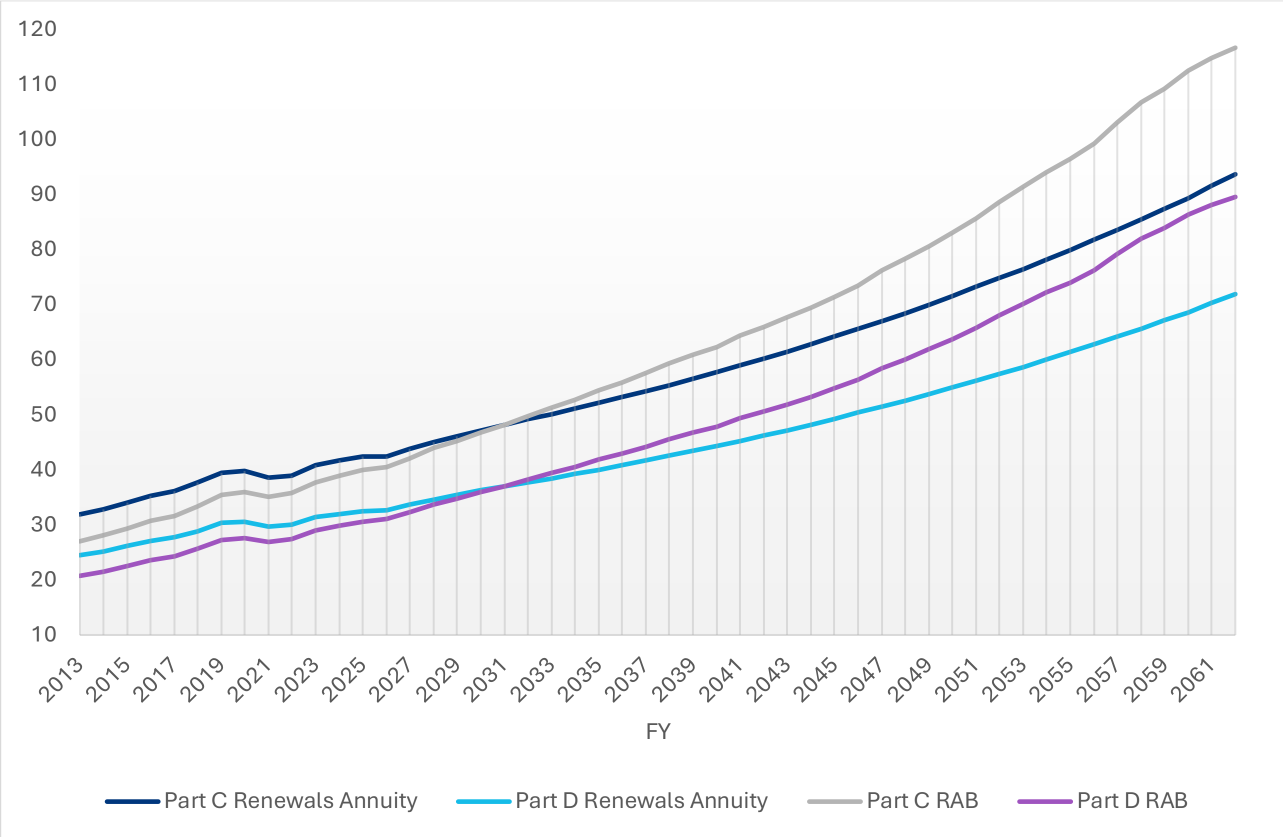
Note: Values represent annual capital revenue allowances only (renewals annuity vs RAB) and exclude operating expenditure. Modelled using a common cost base from Sunwater, Seqwater and QCA data.

The initial annual capital revenues are lower under a RAB framework, reflecting the time required for the asset base to accumulate and the low starting RAB value. However, after the 2032-33 the annual costs recoverable under the RAB framework increase significantly, peaking at over $13.7 million in 2056-57.

The cumulative costs of the RAB exceed that of the renewals annuity by FY2046.

In contrast, the annual costs recoverable under a renewals annuity approach are more constant, with an early build up to $3.4 million around the year 2029 allowing interest to accumulate and smooth significant capex spending in the 2050s.

Figure 6: Fixed and variable annual charges – Burdekin Distribution ($/ML)



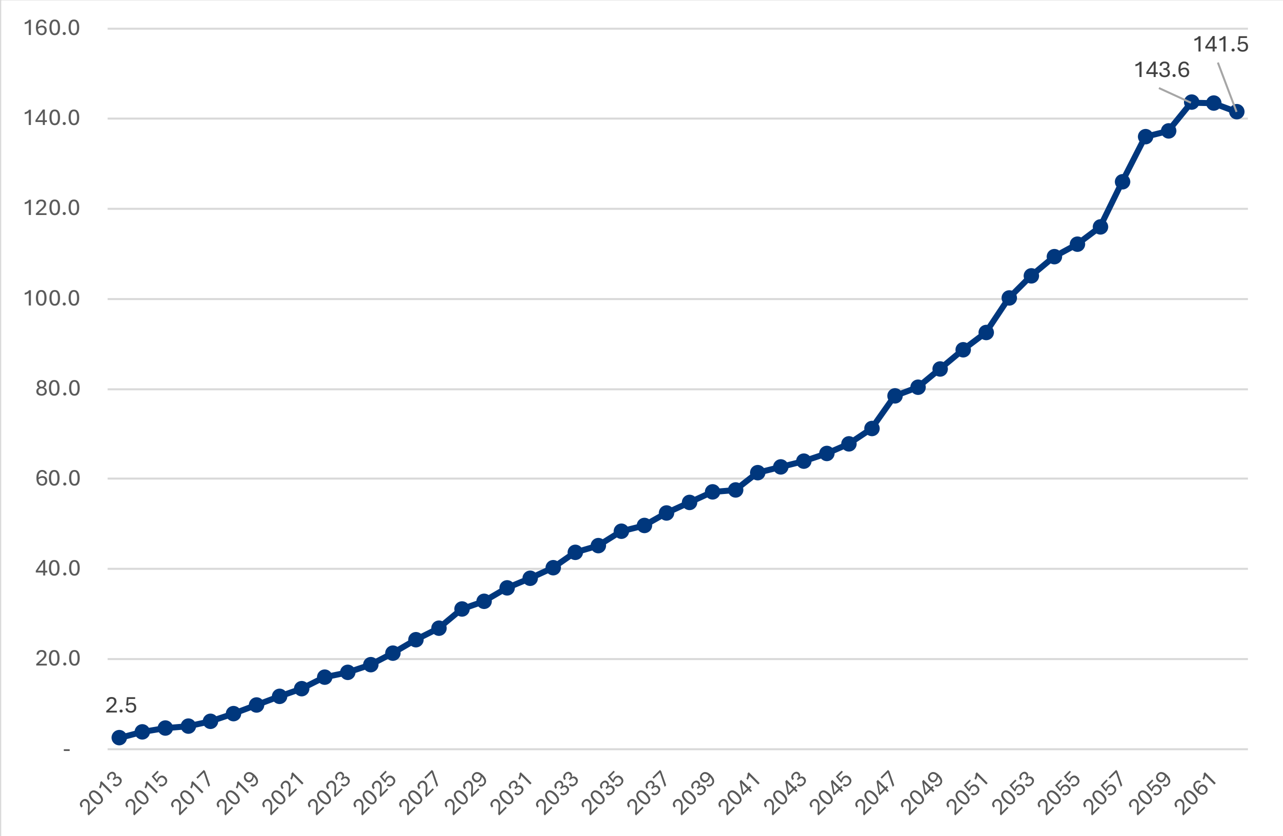
Note: Prices are derived from total costs (operating and capital) under each framework and are presented to show relative differences between pricing approaches.

Initial prices are lower under the RAB framework, reflecting the time required for the asset base to build. From around 2032-33, prices under RAB increase more rapidly, with Part C charges diverging materially and reaching around $115/ML by the late 2050s. It is also notable that when significant capital expenditure occurs, RAB prices step-up while renewals expenditure increases consistently.

In contrast, the renewals annuity produces a smoother price path, with Part C rising more gradually to around $90/ML as capex is smoothed over time. Part D charges follow a similar but less pronounced pattern, reflecting their smaller share of cost recovery.

For reference, the figure below sets out our estimated RAB values for the scheme, assuming a FY2013 start (as per the QFF scope). This could be updated (with further modelling) to start in FY2026 or later.

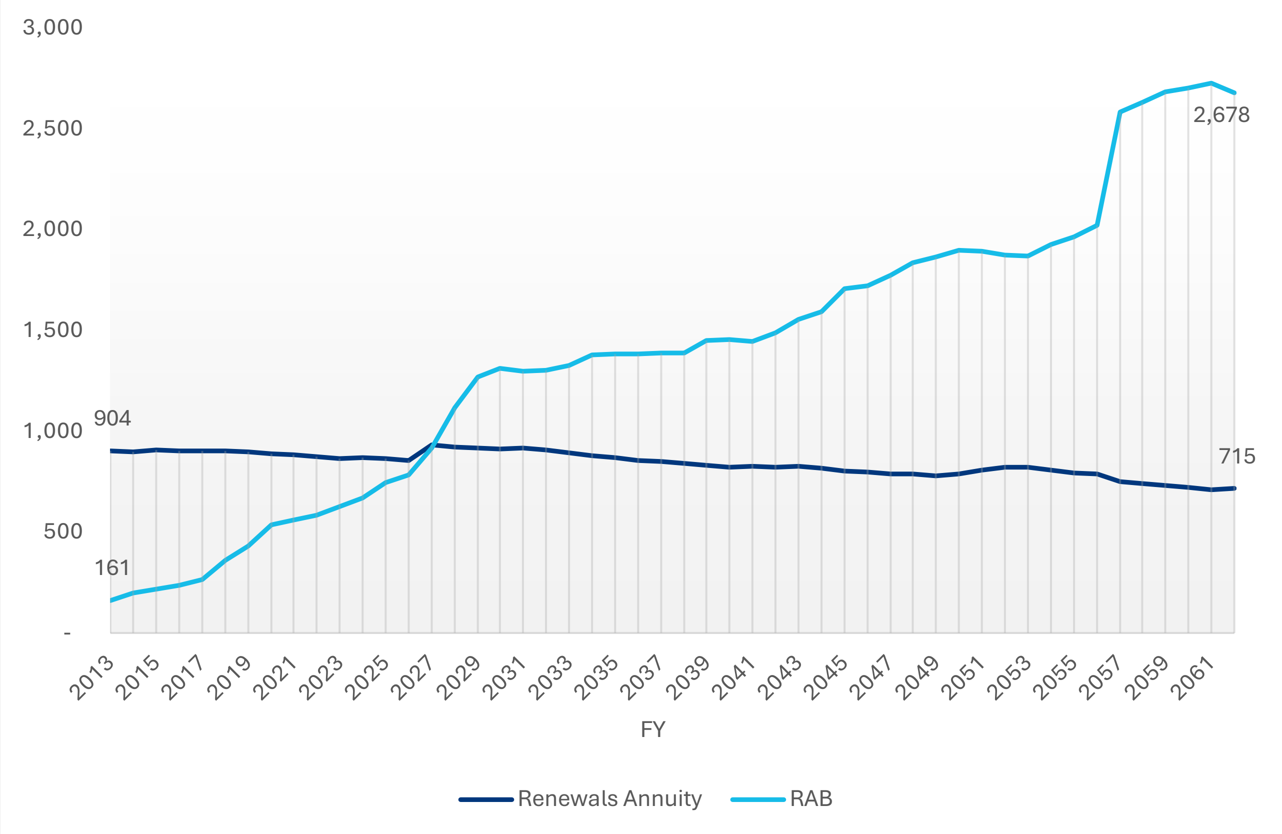
Figure 7: Opening RAB value for Burdekin Distribution ($ million)



Capital revenue generated from the RAB includes the annual depreciation allowance (return of capital) and the annual return on capital (WACC x the above RAB).

4.2.3. Eton Bulk (Sunwater)

Figure 8: RAB capital revenue vs renewals allowance – Eton Bulk WSS ($'000 pa)



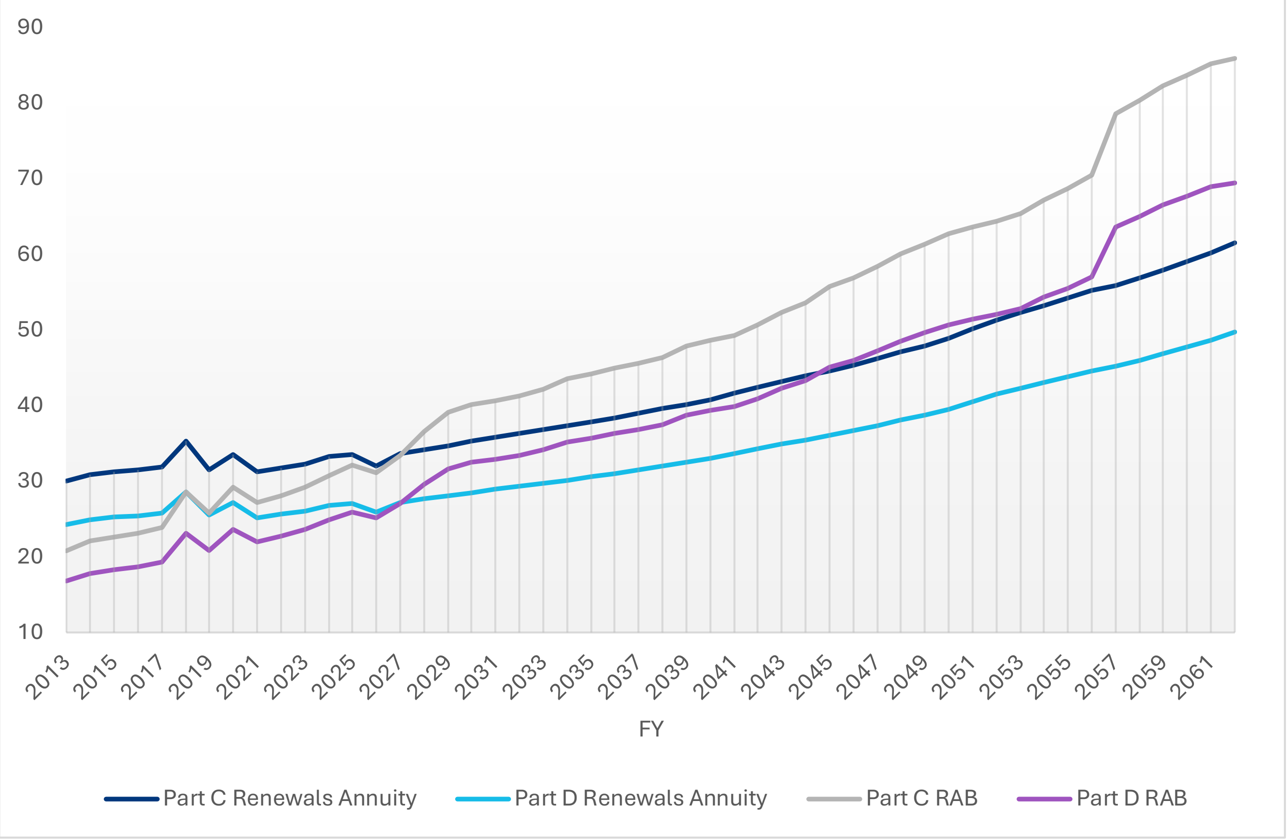
Note: Values represent annual capital revenue allowances only (renewals annuity vs RAB) and exclude operating expenditure. Modelled using a common cost base from Sunwater, Seqwater and QCA data.

Initial costs under the RAB framework are significantly lower, reflecting the small starting asset base. However, costs increase rapidly from the mid-2020s and continue to rise throughout the 50-year period, reaching over $2.6 million by the late 2050s.

The RAB's cumulative cost exceeds that of the renewals annuity by FY2041.

This sustained escalation contrasts with the renewals annuity, which remains relatively stable before gradually declining, highlighting the limited smoothing under RAB and the compounding effect of capital accumulation in a scheme with ongoing expenditure pressures.

Figure 9: Fixed and variable annual charges – Eton WSS ($/ML)



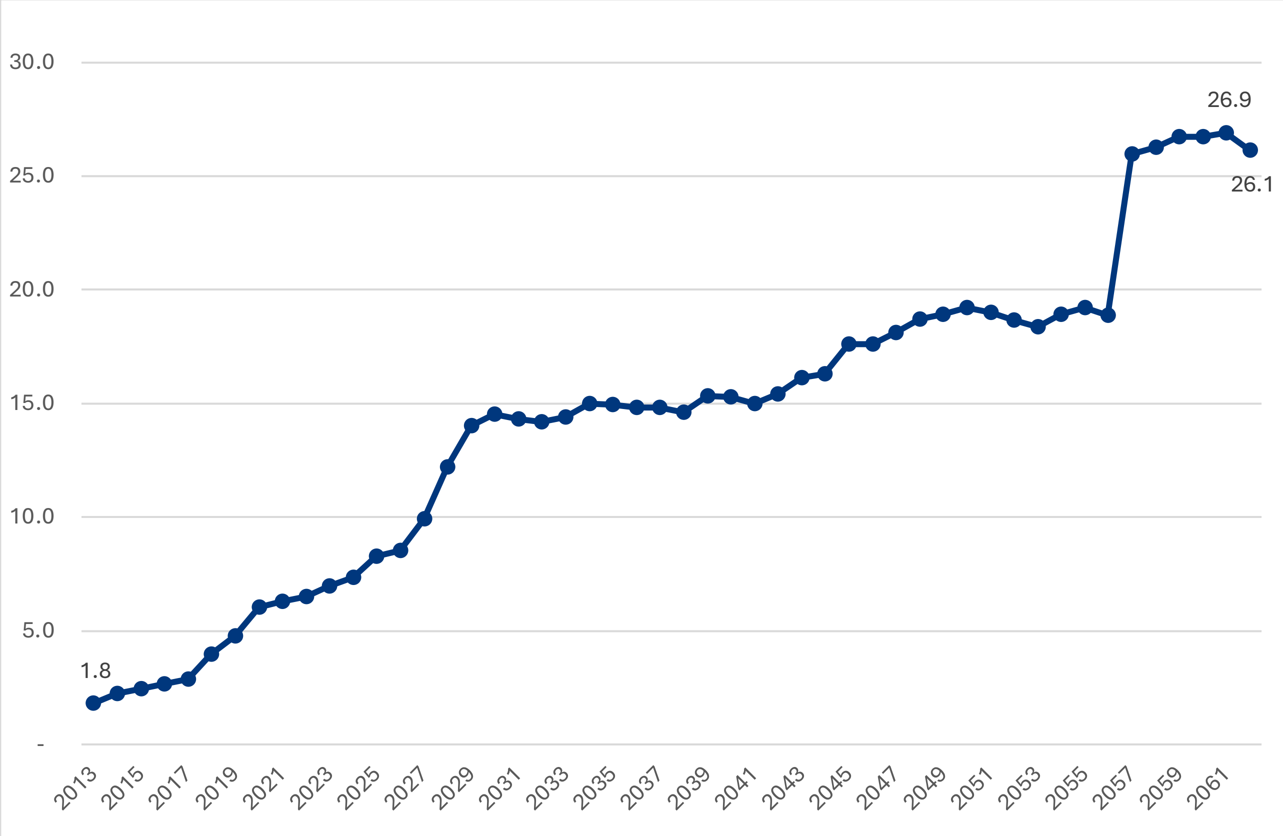
Note: Prices are derived from total costs (operating and capital) under each framework and are presented to show relative differences between pricing approaches.

Prices under the RAB framework start lower but increase steadily before accelerating from the late 2030s, with a pronounced step-up in the mid-2050s where both Part C and Part D charges increase sharply. Part C rises to around $85/ML by the end of the period, compared to approximately $60/ML under the renewals annuity, highlighting the growing impact of the capital base. This reflects sustained asset accumulation and the effect of major capex entering the RAB.

In contrast, the renewals annuity produces a more gradual and consistent increase, smoothing these expenditure peaks and resulting in a more stable price path with less volatility across both fixed and variable charges.

For reference, the figure below sets out our estimated RAB values for the scheme, assuming a FY2013 start (as per the QFF scope). This could be updated (with further modelling) to start in FY2026 or later.

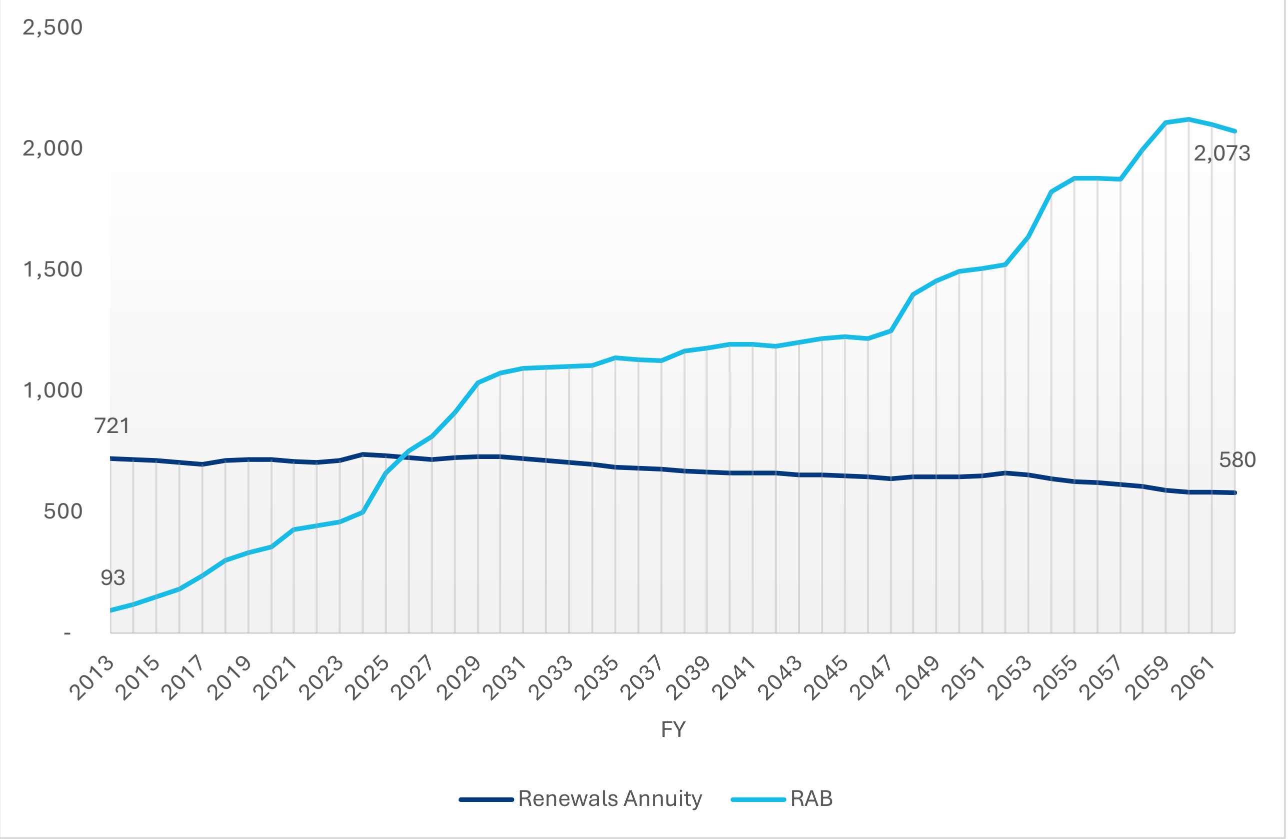
Figure 10: Opening RAB value for Eton Bulk WSS ($ million)



Capital revenue generated from the RAB includes the annual depreciation allowance (return of capital) and the annual return on capital (WACC x the above RAB).

4.2.4. Upper Condamine (Sunwater)

Figure 11: RAB capital revenue vs renewals allowance – Upper Condamine WSS ($’000 pa)



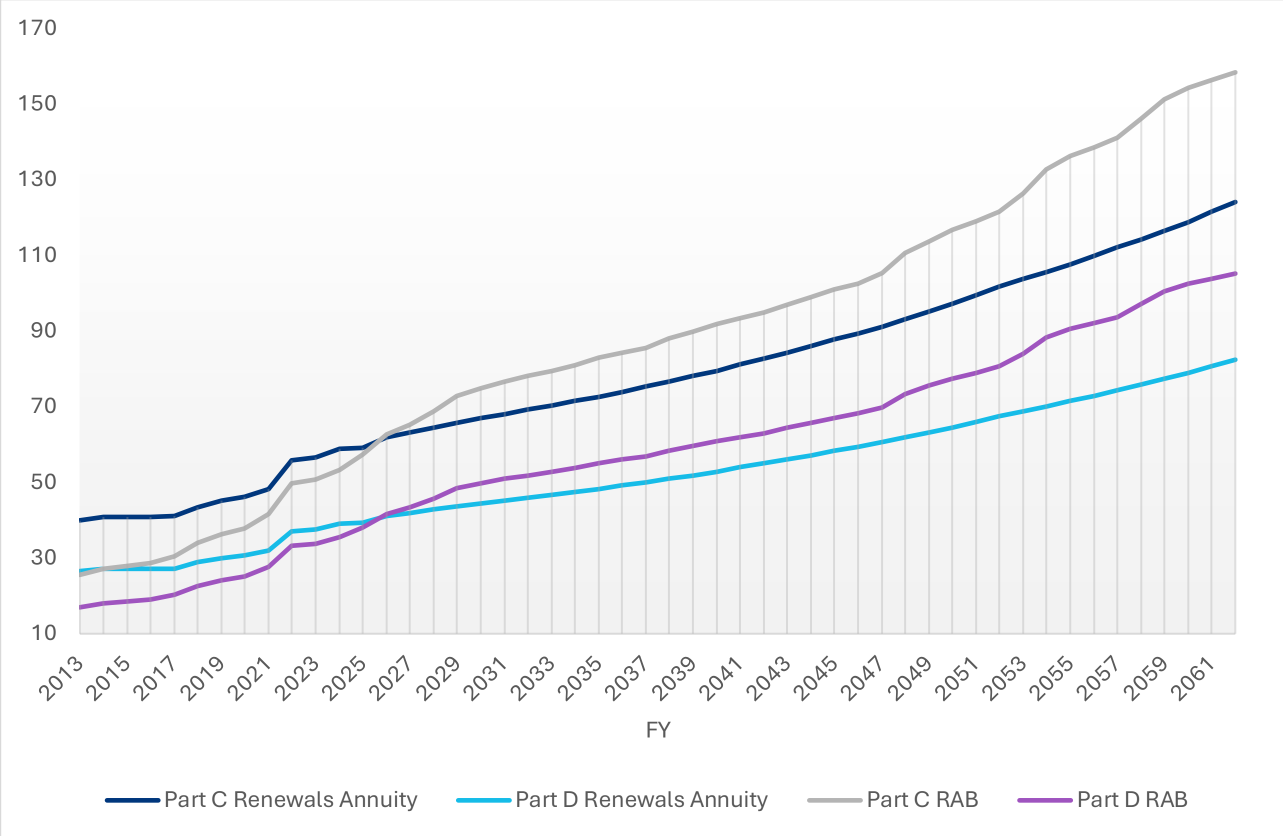
Note: Values represent annual capital revenue allowances only (renewals annuity vs RAB) and exclude operating expenditure. Modelled using a common cost base from Sunwater, Seqwater and QCA data.

Renewals annuity costs remain relatively stable at around $0.7 million through the early period before gradually declining, reflecting consistent smoothing of capex and limited volatility in expenditure.

The cumulative cost of the RAB exceeds the cumulative cost of the renewals annuity by FY2040.

In contrast, costs under the RAB framework start significantly lower but increase steadily from the mid-2020s, overtaking the annuity and continuing to rise over time. The increase is gradual but includes clear step changes in the late 2040s and early 2050s as larger capex programs enter the asset base. By the end of the period, RAB costs reach around $2.1 million, substantially higher than approximately $0.6 million under the annuity approach.

Figure 12: Fixed and variable annual charges – Upper Condamine WSS ($/ML)



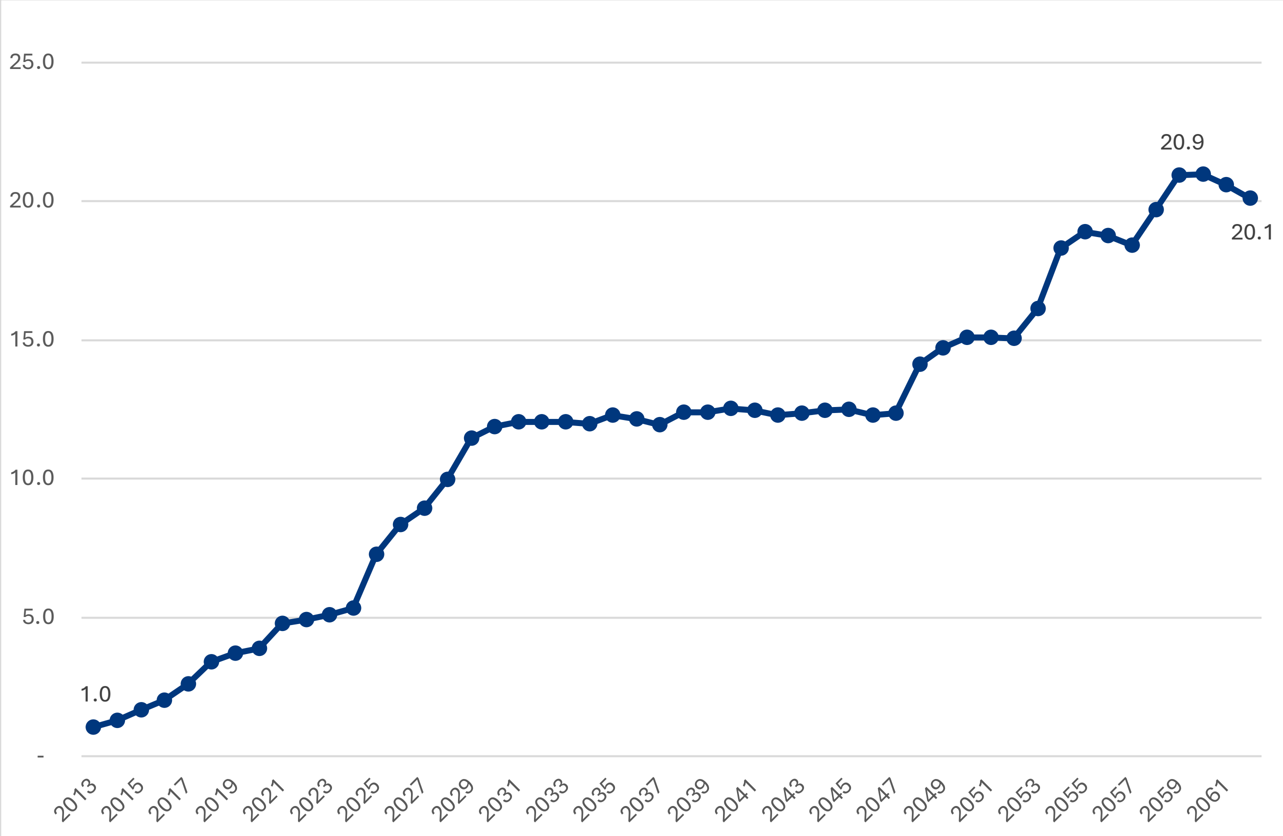
Note: Prices are derived from total costs (operating and capital) under each framework and are presented to show relative differences between pricing approaches.

Under the renewals annuity, Part C charges increase steadily from around $40/ML to $125/ML, while Part D follows a smoother but lower path, reflecting gradual cost recovery and capex smoothing.

In contrast, RAB prices begin slightly lower but quickly converge and then diverge from the mid-2020s, with Part C rising more sharply over time. This divergence becomes more pronounced through the late 2040s and 2050s, with fixed charges under RAB reaching around $170/ML by the end of the period. Large jumps in RAB charges are again present following years with significant capex spending. Part D follows a similar pattern, though with a smaller spread, increasing to just over $110/ML, reflecting the growing impact of the capital base on prices.

For reference, the figure below sets out our estimated RAB values for the scheme, assuming a FY2013 start (as per the QFF scope). This could be updated (with further modelling) to start in FY2026 or later.

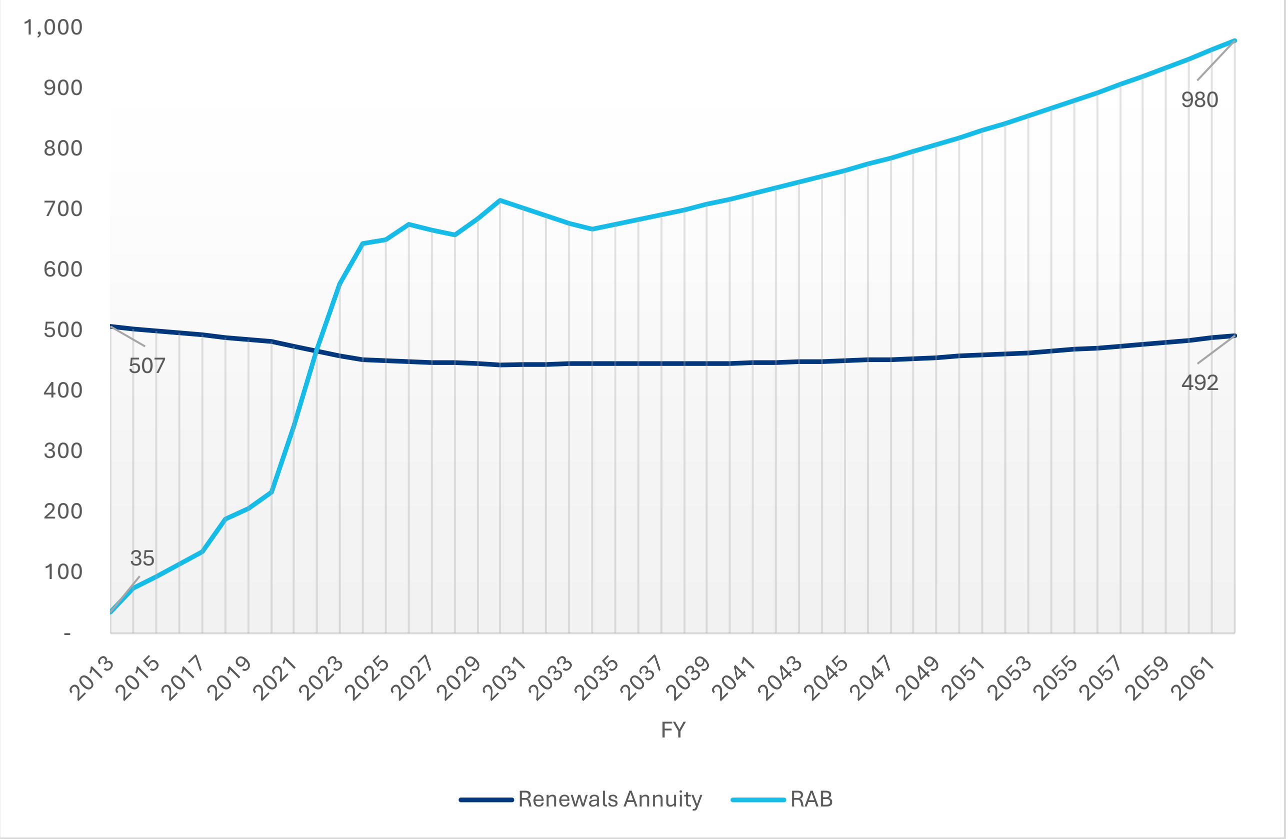
Figure 13: Opening RAB value for Upper Condamine ($ million)



Capital revenue generated from the RAB includes the annual depreciation allowance (return of capital) and the annual return on capital (WACC x the above RAB).

4.2.5. Central Lockyer (Seqwater)

Figure 14: RAB capital revenue vs renewals allowance – Central Lockyer WSS ($'000 pa)



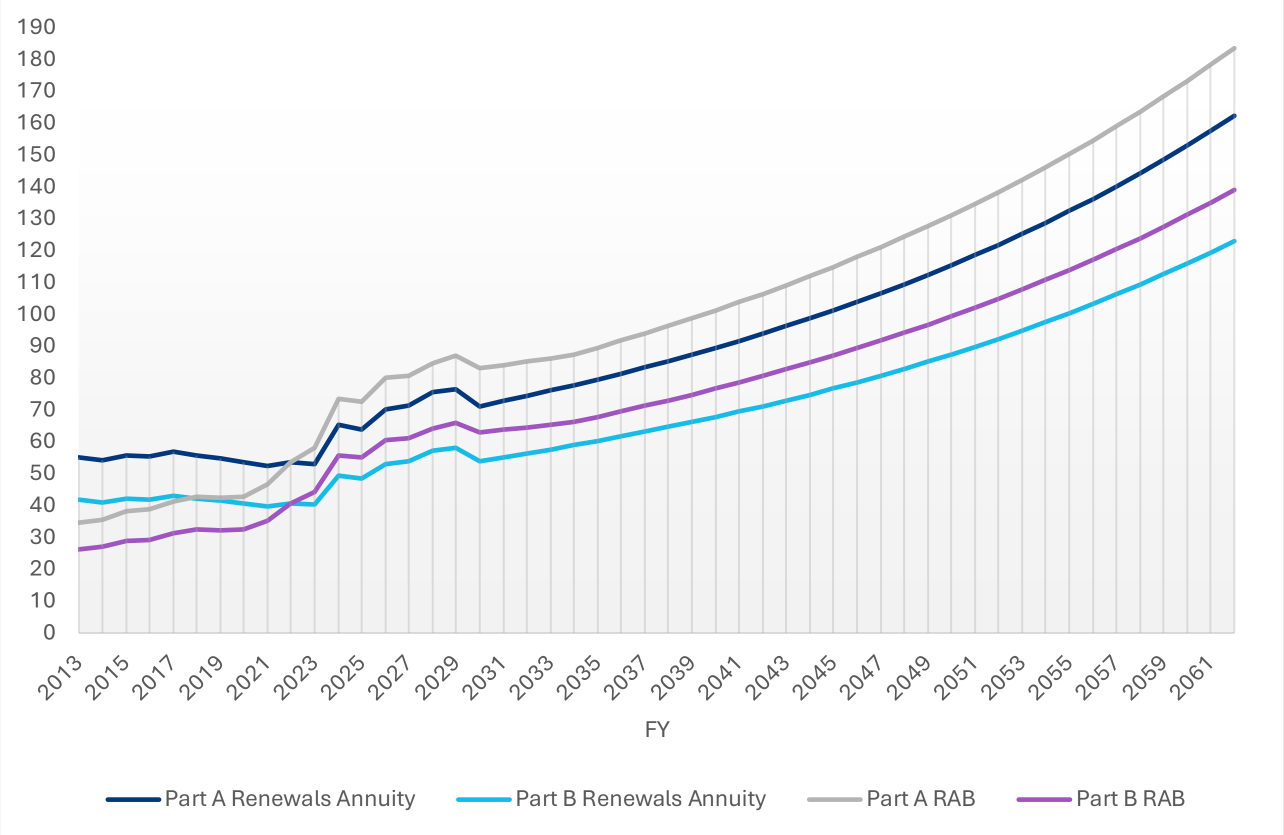
Note: Values represent annual capital revenue allowances only (renewals annuity vs RAB) and exclude operating expenditure. Modelled using a common cost base from Sunwater, Seqwater and QCA data.

Renewals annuity costs remain relatively stable over the period, declining from around $500,000 to approximately $450,000 around 2030, before gradually returning to just under $500,000. This reflects the smoothing of expenditure inherent in the renewals annuity.

The cumulative cost of the RAB exceeds the cumulative costs of renewals annuity by FY2036.

In contrast, RAB costs begin significantly lower but increase rapidly in the early 2020s, overtaking the annuity around 2022-23 and rising sharply to approximately $650,000 to $700,000 by the late 2020s as major capital expenditure enters the asset base. This is followed by a modest decline from 2030 to 2034, where depreciation temporarily exceeds capex, before costs resume a steady upward trend to around $980,000 by the end of the period.

Figure 15: Fixed and variable annual charges – Central Lockyer Valley WSS ($/ML)



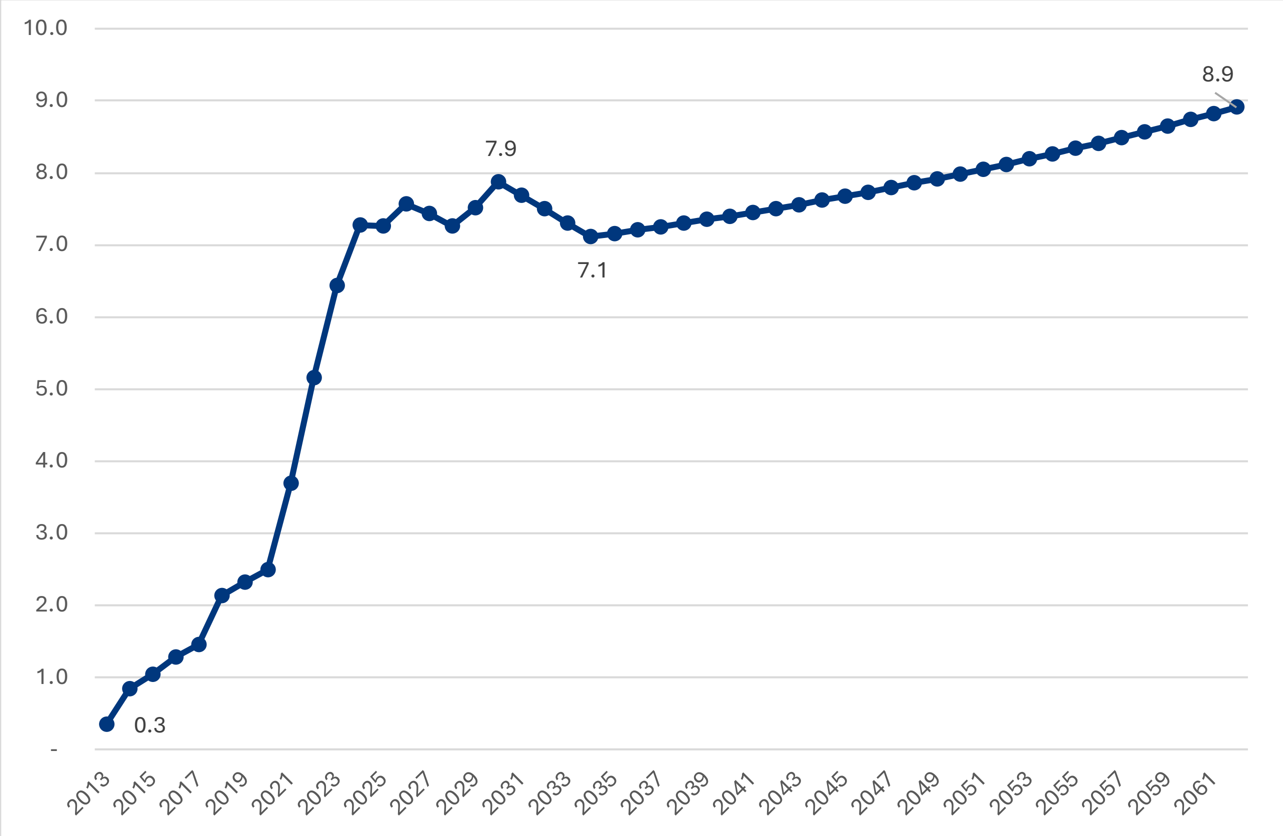
Note: Prices are derived from total costs (operating and capital) under each framework and are presented to show relative differences between pricing approaches.

Under the renewals annuity, Part A and Part B charges increase gradually over time, with a noticeable step-up in the mid-2020s before returning to a smooth upward trajectory. The spread between fixed and variable charges remains consistent, with Part A tracking above Part B throughout.

Under the RAB framework, prices follow a similar early pattern but increase more sharply from the mid-2020s, with a pronounced step up in 2024 reflecting significant capital expenditure entering the asset base. Beyond this point, both Part A and Part B rise steadily at a slightly higher rate than under the annuity, leading to a marginally widening gap over time. By the end of the period, RAB Part A reaches around $180/ML compared to approximately $160/ML under the annuity, with the Part B tariffs showing a similar but slightly smaller divergence.

For reference, the figure below sets out our estimated RAB values for the scheme, assuming a FY2013 start (as per the QFF scope). This could be updated (with further modelling) to start in FY2026 or later.

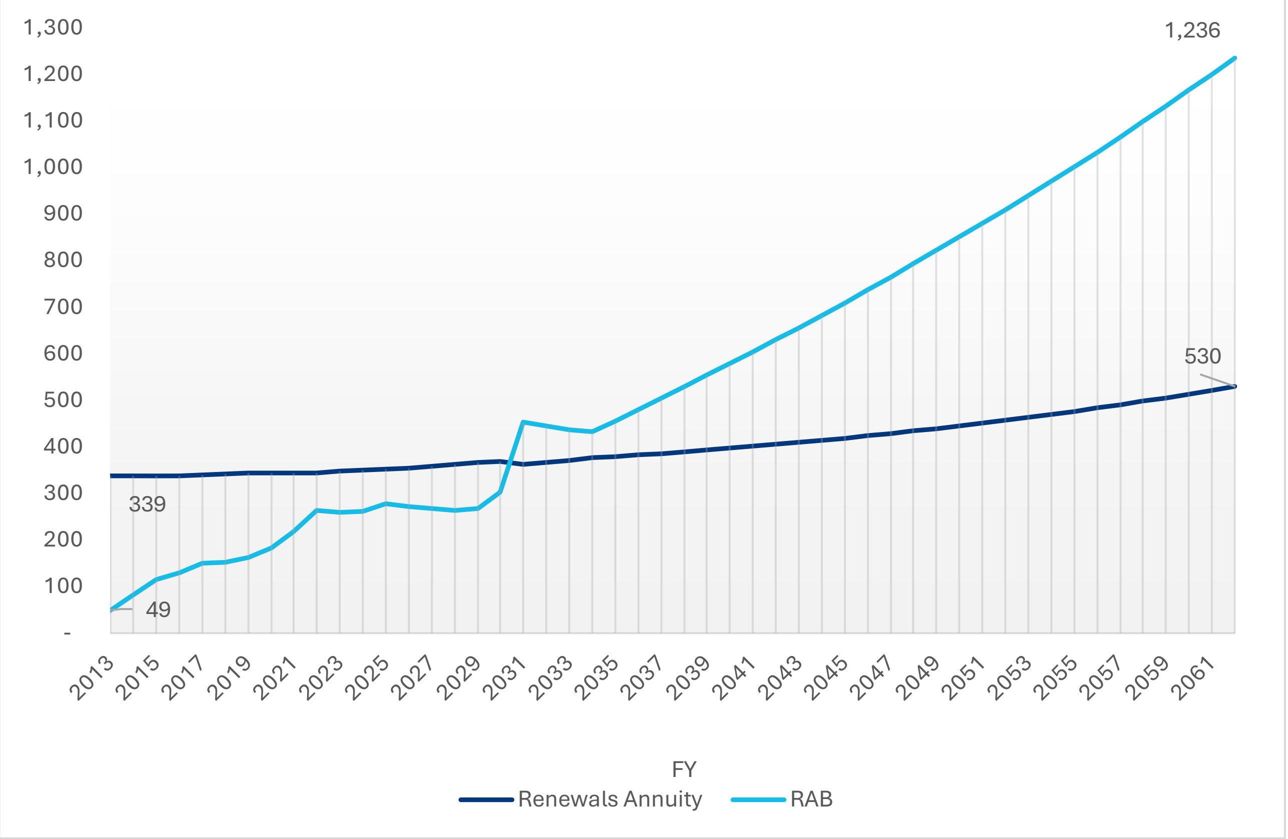
Figure 16: Opening RAB value for Central Lockyer WSS ($ million)



Capital revenue generated from the RAB includes the annual depreciation allowance (return of capital) and the annual return on capital (WACC x the above RAB).

4.2.6. Lower Lockyer (Seqwater)

Figure 17: RAB capital revenue vs renewals allowance – Lower Lockyer WSS ($'000 pa)



Note: Values represent annual capital revenue allowances only (renewals annuity vs RAB) and exclude operating expenditure. Modelled using a common cost base from Sunwater, Seqwater and QCA data.

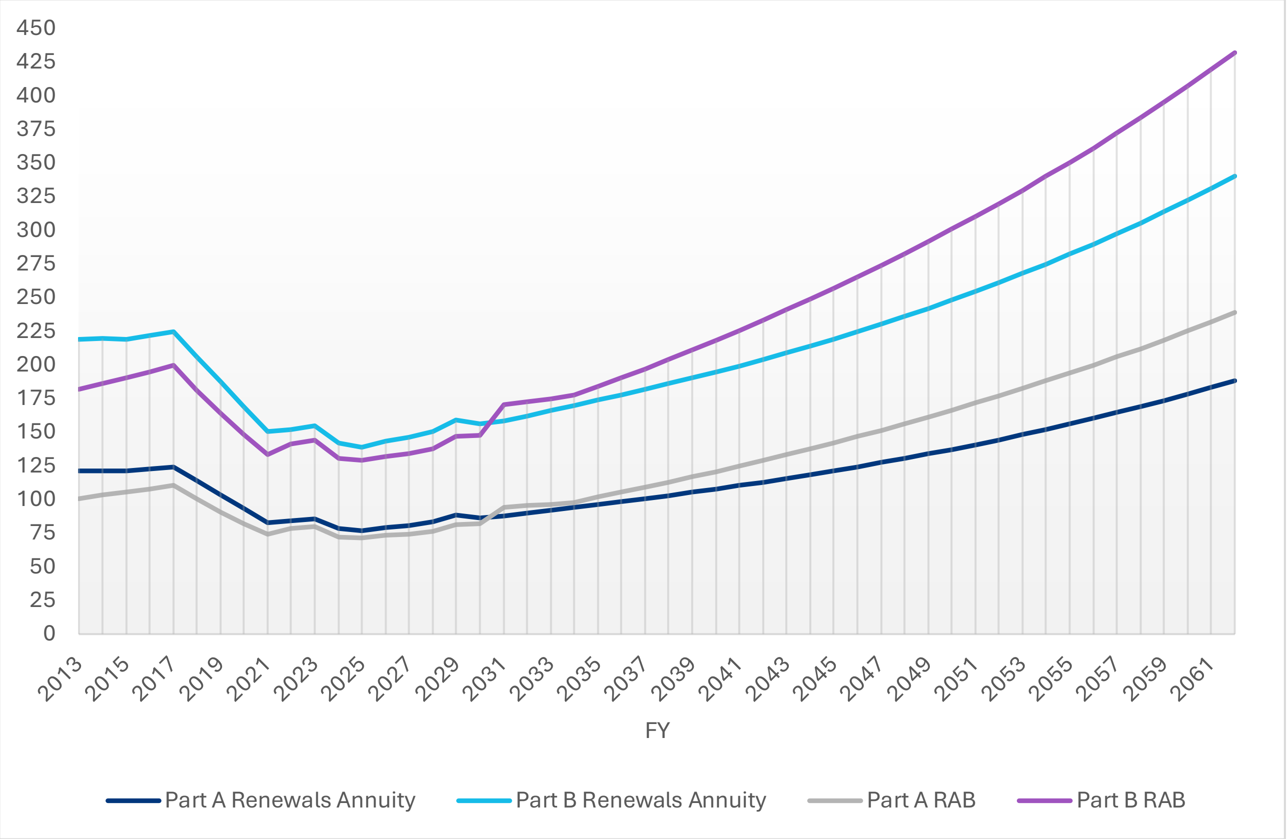
Renewals annuity costs increase gradually from around $330,000 to approximately $530,000 over the period, following a smooth and relatively predictable trajectory.

RAB costs begin significantly lower but rise more rapidly than renewals for the first 17 years. In 2031, RAB costs step up and exceed the renewals when a year of significant capex enters the asset base. This is followed by a brief plateau / slight decline due to low capex and depreciation, and then a sustained upward trend reflects costs rising to around $1.2 million by 2061.

The cumulative costs of the RAB exceed the cumulative costs of the renewals annuity by FY2046.

The divergence between the two frameworks widens materially over time, particularly after the early 2030s, reflecting the compounding effect of capital accumulation under the RAB approach.

Figure 18: Fixed and variable annual charges – Lower Lockyer Valley WSS ($/ML)



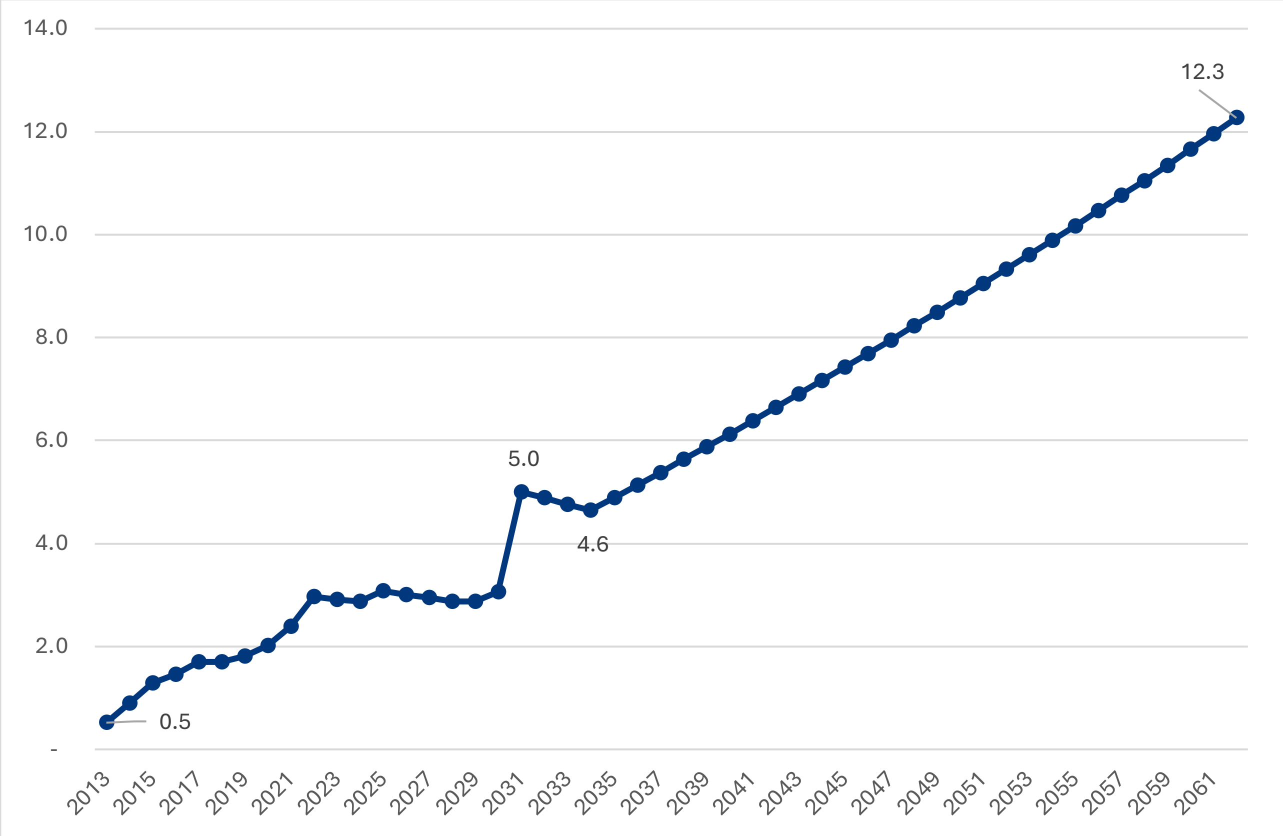
Note: Prices are derived from total costs (operating and capital) under each framework and are presented to show relative differences between pricing approaches.

Under the renewals annuity, at least theoretically, both Part A and Part B charges decline through the late 2010s and early 2020s before gradually increasing from around 2025. Notably, Part B remains consistently above Part A, reflecting the very low water use / poor yield performance of this scheme. Relatively high costs and low volumes of water use, at least in theory would result in relatively high volumetric cost-reflective charges (Part B tariffs under either pricing approach).

Under the RAB framework, a similar early decline is observed, followed by price rises from 2025. Then from about 2025, RAB prices begin to diverge from other prices, increasing more rapidly to the end of the 50-year modelling period. This divergence is most pronounced in Part B, which rises sharply to over $432/ML by 2062 (compared to $340/ML under the annuity). Fixed tariffs follow a similar trajectory at a lower level, RAB Part A reaches $239/ML by 2062, and under the annuity the Part A reaches $188/ML.

For reference, the figure below sets out our estimated RAB values for the scheme, assuming a FY2013 start (as per the QFF scope). This could be updated (with further modelling) to start in FY2026 or later.

Figure 19: Opening RAB value for Lower Lockyer WSS ($ million)



Capital revenue generated from the RAB includes the annual depreciation allowance (return of capital) and the annual return on capital (WACC x the above RAB).

4.3. Cross-scheme analysis

This section synthesises the modelling results across the six schemes, focusing on three dimensions: total capital cost recovery, tariff outcomes and balance behaviour. Together, these provide a clear and consistent picture of the differences between the renewals annuity and RAB frameworks.

4.3.1. Long-term capital cost outcomes

The most material difference between the frameworks emerges in long-term capital cost recovery. While the two approaches produce similar outcomes in early years, they diverge significantly over time as the RAB grows and generates an increasing return on capital. Table 8 sets out the annual capital revenue requirement in the final year of the modelling period (FY2062).

Table 8: Annual capital cost recovery in final year (FY2062)

Scheme	Renewals annuity ($M)	RAB ($M)	Multiple
Bundaberg Distribution	2.2	11.3	5.1x
Burdekin Distribution	2.4	13.7	5.8x
Eton Bulk	0.7	2.7	3.7x
Upper Condamine WSS	0.6	2.1	3.6x
Central Lockyer WSS	0.5	1.0	2.0x
Lower Lockyer WSS	0.5	1.2	2.3x

Across all schemes, the RAB produces materially higher long-term capital costs. The scale of the increase ranges from approximately two times in smaller schemes to over five times in larger, more capital-intensive systems. This reflects the compounding effect of applying a return on capital to an asset value (RAB) that generally increases with new capital expenditure (net of depreciation).

4.3.2. Price outcomes

These differences in capital cost recovery translate directly into irrigation prices over time. While RAB prices are initially lower, they increase more rapidly and exceed renewals annuity outcomes in all schemes in later years. Table 9 summarises indicative fixed and variable prices in FY2062.

Table 9: Indicative tariff outcomes in FY2062

Scheme	Framework	Fixed ($/ML)	Variable ($/ML)	Total ($/ML) ^	Difference ($/ML)	Difference (%)
Bundaberg Distribution	Renewals	164	159	322		
	RAB	201	195	395	73	23%
Burdekin Distribution	Renewals	94	72	166		
	RAB	117	90	206	41	25%

Scheme	Framework	Fixed ($/ML)	Variable ($/ML)	Total ($/ML) ^	Difference ($/ML)	Difference (%)
Eton Bulk	Renewals	62	50	111		
	RAB	86	69	155	44	40%
Upper Condamine WSS	Renewals	124	82	207		
	RAB	158	105	264	57	35%
Central Lockyer WSS	Renewals	162	123	285		
	RAB	184	139	323	37	13%
Lower Lockyer WSS	Renewals	188	340	529		
	RAB	239	432	671	143	27%

Note: ^ Part A and Part B are not strictly additive due to usage assumptions. Totals are only shown for illustration.

In all schemes, prices under the RAB eventually exceed annuity prices. The differences range from 13% to 40% in FY2062, with absolute differences of $37/ML to $143/ML. The scale of these increases is driven by capital intensity and the volumes over which costs are allocated.

The timing and scale of these differences vary by scheme. Larger and more capital-intensive systems such as Burdekin and Bundaberg exhibit the most pronounced long-term increases, with prices rising sharply as major renewal programs enter the asset base. In smaller schemes such as Central and Lower Lockyer, divergence occurs earlier but grows more gradually, reflecting smaller asset bases and lower absolute capital expenditure.

Volume and utilisation also influence outcomes. Schemes with lower water use (due to poor scheme performance in some cases) exhibit higher per ML prices, as fixed costs are recovered over a smaller volume. This effect is most evident in the Lockyer schemes, where low usage amplifies price impacts.

4.3.3. Cumulative payments and present value of payments

Table 10 shows total cumulative payments under each approach in nominal terms over 50 years. Plus, it shows the discounted present value of total payments over 50 years, using a discount rate of 2.5% and a WACC of 6.66%.

Table 10: Nominal and present values of total capital revenues

Scheme	Approach	Nominal cumulative payments ($,000)	PV of total payments using 2.5% discount rate (QFF request) ($,000)	PV of total payments using 6.66% discount rate (base case) ($,000)
Bundaberg Distribution	Renewals	130,759	76,891	40,916
	RAB	256,903	116,689	39,509

Scheme	Approach	Nominal cumulative payments ($,000)	PV of total payments using 2.5% discount rate (QFF request) ($,000)	PV of total payments using 6.66% discount rate (base case) ($,000)
Burdekin Distribution	Renewals	143,393	74,104	42,827
	RAB	277,294	74,187	30,687
Eton Bulk	Renewals	42,037	24,962	13,521
	RAB	69,193	33,106	12,508
Upper Condamine WSS	Renewals	33,698	19,981	10,800
	RAB	55,546	26,569	9,995
Central Lockyer WSS	Renewals	23,150	13,517	7,244
	RAB	32,618	16,521	6,762
Lower Lockyer WSS	Renewals	20,164	11,189	5,588
	RAB	28,445	13,184	4,779

Note: Nominal values are presented alongside discounted results to illustrate the intergenerational distribution of costs, particularly where price paths differ materially over time.

Across all schemes, nominal (undiscounted) renewals payments are lower under a renewals annuity than under a RAB over 50 years.

When discounted at 2.5%, present values remain lower under the annuity across all schemes.

Using the base case WACC of 6.66%, the present values of the renewals and RAB approaches are similar for most schemes, suggesting that the two approaches are comparable from a present value perspective at this discount rate. The approaches nevertheless differ materially in terms of price paths, risk allocation, and incentives.

Present value comparisons can also obscure the price path experienced by customers. Higher discount rates place less weight on costs in later decades, which can compress differences between approaches even where price outcomes diverge materially.

Under a RAB framework, prices are typically lower in the short to medium term and higher in later years, whereas the renewals annuity produces a more stable and smoothed trajectory. Nominal price paths and intergenerational cost distribution therefore provide a more practical representation of customer outcomes than discounted aggregates, which can mask important differences.

4.3.4. Revenue neutrality versus customer experience and impacts

Both approaches are mechanisms for recovering capital over time, with the RAB framework additionally providing an explicit return on capital. A renewals annuity recovers capital through a smoothed funding allowance based on forecast expenditure, while a RAB framework recovers capital through depreciation (return of capital) and a return on capital applied to the asset base.

When assessed in present value terms using a WACC as the discount rate, these approaches can produce broadly similar outcomes. This reflects the timing of cashflows rather than equivalence, as the return on capital under a RAB is calculated using the same rate used to discount future cashflows. As a result, discounting offsets much of the effect of the return on capital.

However, similarity in present value terms does not mean the approaches are equivalent in practice. The key differences lie in how costs are recovered over time and experienced by customers.

Under a RAB framework, prices are typically lower in the short to medium term and higher in later years, as the return on capital compounds on an expanding asset base. By contrast, a renewals annuity produces a more stable and smoothed price path.

This leads to key differences:

- Price path: RAB results in lower initial prices but higher prices in later decades, while renewals annuity produces more stable pricing.
- Intergenerational equity: RAB shifts a greater share of costs to future customers, whereas renewals annuity spreads costs more evenly.
- Transparency: Renewals annuities rely on long-term forecasts, providing forward visibility of costs, while RAB reduces reliance on forecasts but results in less predictable long-term outcomes as the asset base evolves.

Accordingly, while the approaches may appear similar in present value terms under standard regulatory assumptions, they are not equivalent in terms of customer outcomes and should be assessed with reference to nominal costs, price paths and intergenerational impacts.

4.3.5. Renewals annuity and RAB payment crossover points

The timing of the crossover between the renewals annuity and RAB differs from that shown in the Sunwater calculator. This primarily reflects differences in modelling start points and time horizons.

The model for this report reconstructs pricing from FY2013, allowing the asset base and annuity balances to evolve over a longer period, whereas the Sunwater calculator reflects pricing from a later starting point aligned to proposed regulatory periods. As a result, crossover points are not directly comparable, although the long-term behaviour of the two approaches is consistent.

Differences in crossover timing across schemes are also influenced by the timing of capital expenditure cycles. RAB costs appear to increase more rapidly in schemes with zero opening RAB values (i.e. where renewals annuity balances are positive). In these cases, positive annuity balances typically indicate that higher-than-average capital expenditures are expected in the near term.

Under both frameworks, this expenditure occurs, however, under a RAB it is added directly to the value of the asset base for pricing purposes, increasing both annual depreciation and the return on capital allowances. This results in a relatively rapid expansion of the RAB and associated customer prices.

By contrast, schemes with negative annuity balances may have recently undertaken significant capital expenditure. In these cases, near-term capex requirements may be lower. If so, this results in a slower increase in the RAB and a more gradual rise in RAB-based customer prices.

4.3.6. Renewals annuity balances versus RAB values

The observed differences in costs and prices are driven by the different behaviour of renewals balances and RAB valuations over time (Table 11).

Table 11: Renewals annuity versus RAB balance behaviour

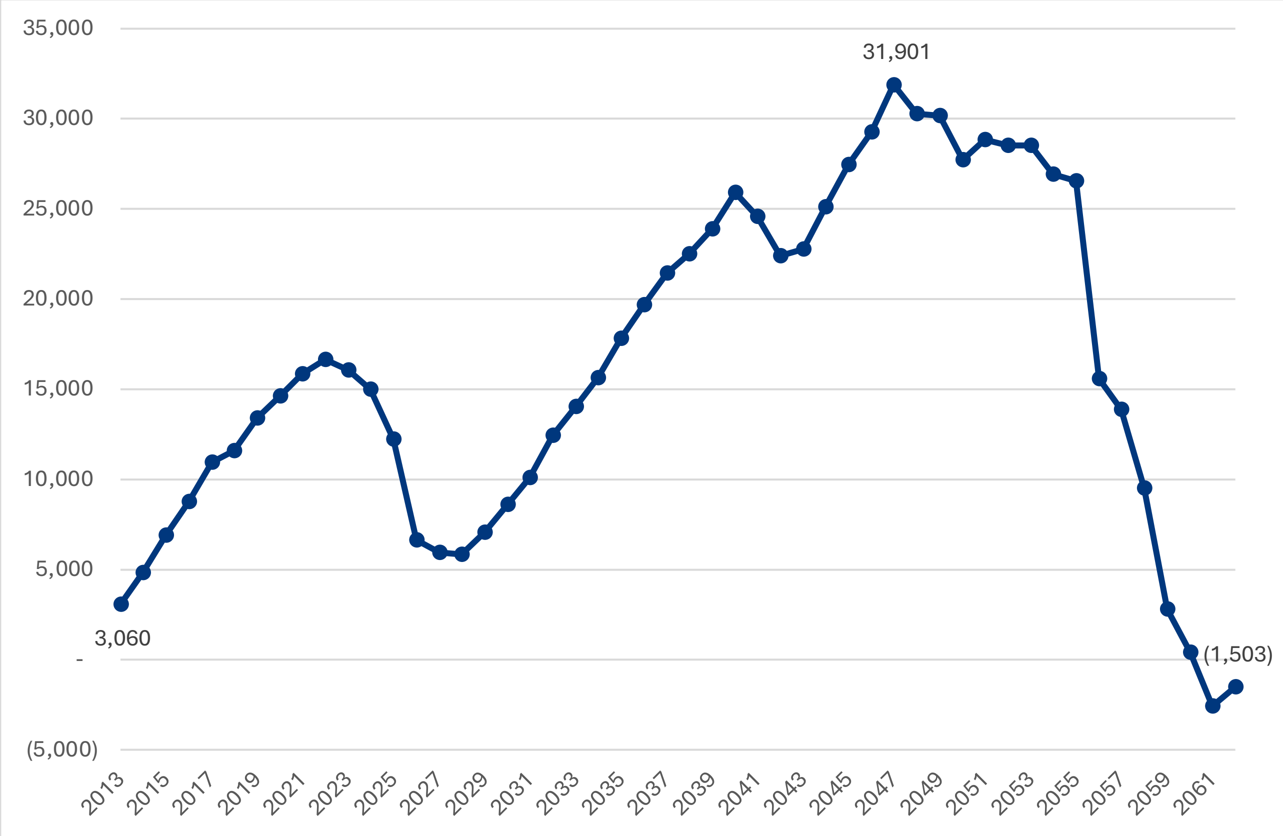
Characteristic	Renewals annuity balance	RAB asset value
Balance profile	Cyclical (build and drawdown)	Progressive growth over time
Early period	Accumulation of reserves	Low initial asset base
Later period	Drawdown to fund renewals	Large / growing asset base with ongoing returns
Prices	Smoothed over time	Linked to timing of capex / can be volatile
Price impact	Gradual and predictable	Step change increases in the long terms especially following major capex
Transparency	Forward-looking (30-year forecasts)	Backward-looking (realised expenditure)
Intergenerational equity	More evenly spreads costs across generations	Favours early and penalises later generations

4.3.7. Quantitative demonstration of price smoothing

The difference between the two methods, in terms of price smoothing, is driven by the way the renewals balance functions (rising and falling) in contrast with the RAB valuation, which typically rises over time (but rarely falls significantly).

As a result, the annuity incorporates an explicit smoothing mechanism, while the RAB reflects capital expenditure more directly as it occurs. This is true in the Bundaberg Distribution scheme, where a positive annuity balance rises over time, reaching over $40 million ahead of major capital expenditure.

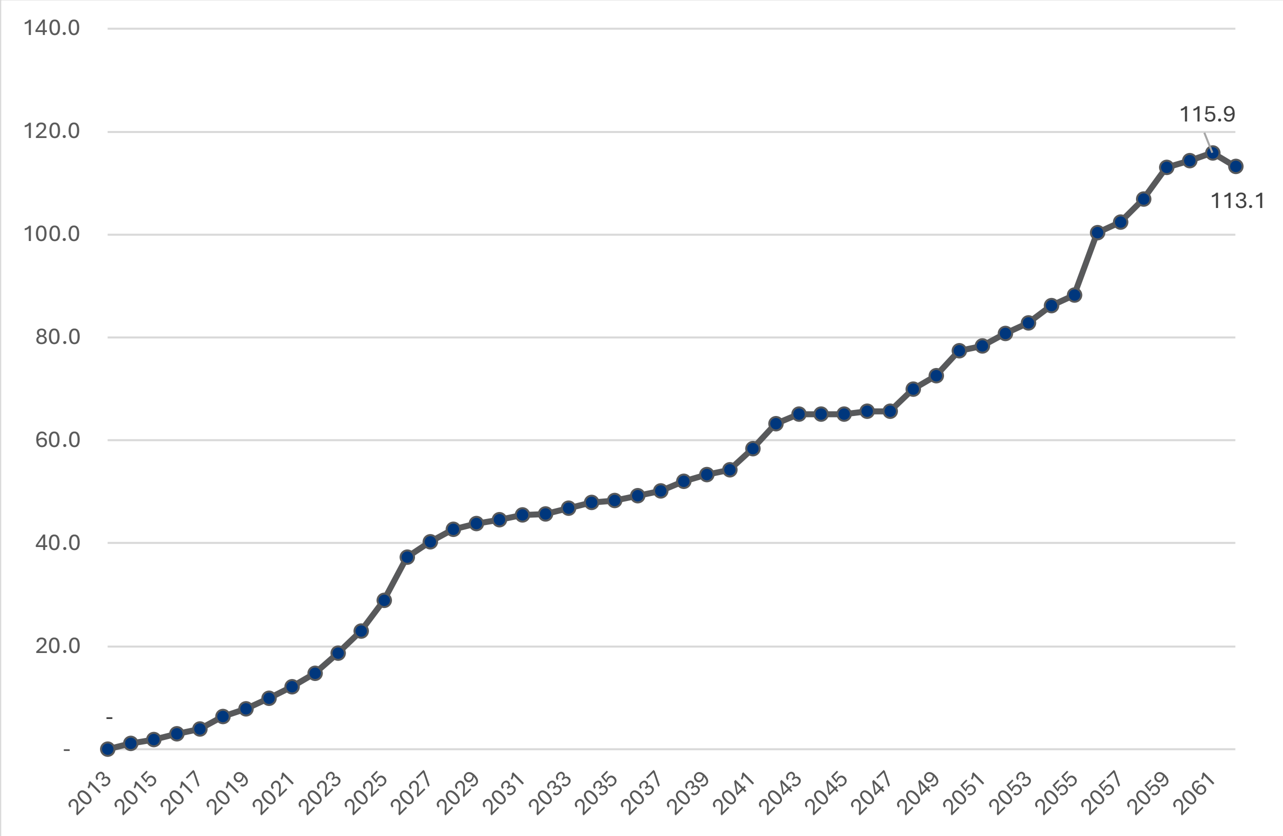
Figure 20: Renewals annuity opening balance – Bundaberg Distribution ($'000)



As major renewal expenditure occurs, this balance is drawn down, allowing costs to be funded from previously accumulated reserves rather than being passed directly into prices in the year of expenditure. This build-and-drawdown cycle is a defining feature of the renewals annuity and enables cross-generational smoothing of capital costs. As a result, prices remain relatively stable over time, even where capital expenditure is lumpy and concentrated in later decades.

By contrast, under the RAB framework, there is no equivalent reserve mechanism. Capital expenditure is incorporated into the asset base as it occurs, increasing both depreciation and the return on capital.

Figure 21: RAB value – Bundaberg Distribution ($ million)



The RAB therefore increases in step changes following periods of significant capital investment, with these increases flowing directly into higher cost recovery and prices. This results in a closer alignment between expenditure timing and pricing, but with greater price variability and higher long-term costs.

Taken together, these profiles highlight a fundamental trade-off between the two frameworks. The renewals annuity prioritises price stability through smoothing, while the RAB aligns cost recovery with investment timing, resulting in more volatile and higher long-term price outcomes.

4.3.8. Synthesis

The results are consistent across all six schemes. The renewals annuity produces lower long-term costs and smoother price paths, while the RAB defers costs initially but increases them materially over time. This reflects a fundamental difference in cost recovery. The renewals annuity smooths expenditure through balance accumulation and drawdown, whereas the RAB passes costs through as capital enters the asset base. These differences are structural rather than scheme specific.

4.3.9. Renewals annuity – WACC versus cost of debt

This section compares the use of the WACC, currently applied by Sunwater and Seqwater, with the cost of debt as an alternative basis for calculating the renewals annuity.

For the six schemes assessed, the modelling shows that using the WACC generally results in lower total annuity payments than using the cost of debt (apart from Central Lockyer WSS, where the difference is negligible). This outcome reflects the fact that annuity balances for these schemes remain positive for most of the modelled period and grow more positive over time in preparation for forecast capital expenditure in later decades.

Under these conditions, the WACC acts as an interest rate earned on positive balances. Under the alternative approach (applying instead the cost of debt), reducing this rate from 6.66% (WACC) to 4.95% (cost of debt) would lower the interest earned and requires higher customer contributions.

Table 12: Impact of WACC versus cost of debt on annual renewals annuity revenues

Scheme	Nominal Value under Cost of Debt ($,000)	Nominal Value under WACC ($,000)	Difference between WACC and Cost of Debt
Burdekin	158,423	143,393	-9%
Eton	42,909	42,037	-2%
Upper Condamine	34,469	33,698	-2%
Bundaberg	144,431	130,759	-9%
Central Lockyer	23,055	23,150	0%
Lower Lockyer	21,924	20,164	-8%

However, this result is not universal. In schemes where annuity balances remain negative for most of the model period, applying the cost of debt could reduce long-term costs to irrigators. In these cases, a lower interest rate reduces the financing burden associated with negative balances.

More broadly, the impact of changing the annuity interest rate is not straightforward. While a lower rate reduces interest applied to negative balances, it also increases the present value of future renewals expenditure, which can lead to higher annuity payments. The net effect depends on the profile of each scheme's annuity balance over time.

This creates a clear trade-off. Adopting the cost of debt would better align with lower-bound pricing principles but may increase or decrease long-term prices depending on scheme characteristics. A lower rate should not be assumed to reduce costs in all cases.

It is also important to note that this analysis covers six schemes only. Outcomes may differ across the broader portfolio of schemes not assessed in this review. In summary, on this topic, further scheme-level analysis is required before making a recommendation on the appropriate annuity interest rate.

4.4. Sensitivity analysis results

Sensitivity analysis tests the robustness of results to changes in key assumptions, focusing on parameters that materially affect the relative performance of the renewals annuity and RAB frameworks. The parameters tested were:

- WACC and annuity interest rate
- capex sensitivity
- asset life.

The results for each being tested on the Bundaberg Distribution Scheme are included in the tables below and the results were replicated across all other schemes (but not included).

4.4.1. WACC and annuity interest rate

Table 13: Impact of changing WACC and annuity interest rate on costs

Scenario	Change in early RA costs (%)	Change in early RAB costs (%)	Change in later RA costs (%)	Change in later RAB costs (%)
Cost of debt 4.95%	4%	0%	21%	-17%
WACC of 5.5%	3%	0%	15%	-12%
WACC of 7.5%	-2%	0%	-12%	8%

For the six schemes considered, lower rates (4.95% cost of debt or 5.5%) increase annuity costs by raising the present value of capex to be recovered, due to weaker discounting by the lower rates. The reverse occurs at higher rates (e.g. WACC of 7.5%), where stronger discounting reduces the present value of future costs and lowers annuity payments. However, sensitivity analysis shows that the renewals annuity continues to deliver lower long-term costs than the RAB.

Table 13 presents results either side of the assumed 6.66% WACC. Under the RAB, higher WACC increases costs by raising the return on capital applied to the asset base. As the WACC increases from 5.5% to 7.5%, closing-period RAB costs increase by around 20% across the tested range.

This highlights a key asymmetry. Lower rates can (depending on the scheme) increase annuity costs, while a higher WACC always increases RAB costs and RAB-driven prices.

4.4.2. Capex sensitivity

Changes in capex have a near one-for-one impact on both frameworks, increasing or decreasing costs proportionally. Under a RAB, lower capex reduces both depreciation and the return on capital. Under the renewals annuity, it reduces payments by lowering the present value of future expenditure.

Table 14: Impact of capex sensitivity on costs

Scenario	Change in early RA costs (%)	Change in early RAB costs (%)	Change in later RA costs (%)	Change in later RAB costs (%)
20% less capex spend	-21%	-20%	-21%	-20%
20% more capex spend	21%	20%	21%	20%

While the magnitude is similar, the timing differs. The annuity smooths impacts over time, whereas the RAB reflects them as capex enters the asset base.

4.4.3. Asset life

Reducing asset life from the 50-year base increases early RAB costs by accelerating depreciation, with a 25-year life producing significantly higher upfront costs. Over time, this reverses, as faster depreciation reduces the remaining asset base and lowers costs in later years.

Table 15: Impact of asset life on RAB costs

Scenario	Change in early RAB costs (%)	Change in later RAB costs (%)
25 years	100%	-17%
40 years	25%	-5%

Extending asset life (e.g. to 40 years) moderates early costs relative to a 25-year life and results in slightly lower costs later than the base case, as depreciation is more gradual. Overall, asset life primarily shifts the timing of cost recovery under a RAB rather than total costs.

5. Implications of model outputs

This chapter evaluates the modelling results from Section 4 against five criteria relevant to irrigator interests: price stability, long-term affordability, transparency, capital investment incentives, and intergenerational equity.

5.1. Price stability and predictability

The renewals annuity produces a relatively flat and predictable price path, with costs smoothed over time through the annuity mechanism. Across most schemes, prices increase gradually, with fixed charges typically rising at around 2-4% per annum and limited volatility even during periods of high capex in the 2040s and 2050s. This reflects the accumulation and drawdown of annuity balances, allowing irrigators to anticipate future price movements with a reasonable degree of confidence.

Under the RAB framework, prices are lower in the early years but increase more steeply over the long term, with step-changes observed in each scheme as major capital expenditure enters the asset base. This results in a steeper and less predictable trajectory, particularly in the later decades, where prices diverge materially from the annuity. As these increases are driven by the timing and scale of actual capex, which is inherently uncertain, irrigators face greater difficulty planning for long-term water costs.

5.2. Long-term affordability

The modelling demonstrates that cumulative costs to irrigators in the long-term are higher under the RAB framework across all schemes. The divergence is substantial, ranging from approximately 2:1 in smaller schemes such as Central and Lower Lockyer to over 5:1 in larger systems such as Burdekin by 2061-62, reflecting the compounding effect of the asset base over time.

A key affordability risk under RAB is that capital expenditure enters the asset base and earns a return until fully depreciated, resulting in sustained higher levels of cost recovery over long periods. Expenditure that is inefficient, misclassified or poorly timed is therefore locked into prices for the duration of the asset life. The QCA's reviews should mitigate this but cannot extinguish the incentive.

In contrast, the renewals annuity limits this exposure, with forecast errors adjusted through periodic recalibration of the annuity, preventing the same degree of cost persistence.

5.3. Transparency and accountability

The annuity framework provides irrigators with a 30-year forward view of planned renewals costs, albeit imperfect, updated at each QCA review. The imperfection is expected with long range forecasts, but even inaccurate forecasts can provide customers with an opportunity for a discussion about major capital spends and/or major variances.

The 30-year forecast allows irrigators to see what major works are planned, when they are expected, and how they may impact prices. This forward view is required, as the annuity contribution is calculated based on forecast renewals over the period. In contrast, under a RAB framework, while forward capital forecasts may still be developed, they are not required to determine prices in the same way and therefore may not be provided with the same level of detail or transparency.

Under a RAB, irrigators can see past spending added to the asset base but have limited visibility of future capital plans. The asset base is less transparent, especially where assets are revalued, grants or insurance offset costs, or the opening RAB is set through complex regulatory calculations rather than observable renewals and annuity balances.

5.4. Capital investment incentives

The RAB framework may create a structural incentive to increase capital expenditure, as each dollar added to the asset base earns a regulated return over its asset life. This also creates an incentive to classify some maintenance activities as capital rather than operating expenditure, as capitalised costs are recovered over time with a return, while opex is recovered once. This is known as the Averch-Johnson effect, where a regulated entity engages in increased capital accumulation to increase profits, which are regulated as a percentage of capital accumulated (the RAB return on capital).

This incentive is inherent to the design of the RAB. Because returns are directly linked to the size of the asset base, higher capital expenditure leads to higher future revenue. This creates a persistent incentive to favour capital solutions and to increase the asset base over time. While regulatory oversight seeks to manage this through prudency reviews and cost controls, it cannot fully remove the underlying incentive, particularly where service providers have better information about asset condition and investment needs.

The renewals annuity does not remove the investment incentive risks but is less prone to systematic over-capitalisation. The annuity is based on forecast renewal requirements rather than actual expenditure, so capital spending does not directly increase future charges in the same way. In instances where customers are overcharged (capex spending is lower than forecast), the subsequent renewals annuity payments are reduced. The primary risk under this approach is deferred maintenance, which can be mitigated through service standards and independent asset condition monitoring.

5.5. Intergenerational equity and risk allocation

The renewals annuity is designed to smooth costs across generations. The modelling confirms this, with renewals annuity-based prices rising gradually and annuity balances cycling between accumulation and drawdown to fund future renewals. Currently, irrigators contribute to a renewals reserve that supports future capital works, while future irrigators inherit functioning infrastructure and a partially funded renewal program, reducing exposure to sharp price increases when major capital expenditure occurs.

Under the RAB framework, prices are lower in early years where the opening asset base is small but increase materially over time as the RAB grows and earns an increasing return amount. This shifts a greater share of costs to future irrigators, who face higher prices as both depreciation and return on capital increase.

The modelling shows this effect clearly, particularly in later decades where RAB values and RAB-based prices diverge significantly from the annuity and are higher. This intergenerational transfer is evident across all schemes, however, it is accentuated in lower volume (WAE) schemes such as Eton Bulk, Upper Condamine WSSs and Lower Lockyer WSS, where costs are recovered over a narrower base.

6. Findings and recommendations

6.1. Summary of findings

The modelling produces a consistent result across all six schemes: the renewals annuity framework delivers lower long-term prices for irrigators than the RAB. The divergence is driven by the RAB's structural feature of applying a regulated return to an expanding asset base, compared with the annuity's cyclical accumulation and drawdown of renewal reserves.

The RAB introduces three risks that are not to the same extent present under the renewals annuity. First, it creates an incentive to increase and reclassify capital expenditure, consistent with the Averch-Johnson effect. Second, it reduces forward visibility of planned works, as pricing does not rely on a long-term forecast in the same way as the annuity. Third, it shifts costs to future irrigators, with much higher prices emerging as the asset base compounds over time. These risks are amplified in smaller, low volume (WAE) schemes where costs are recovered over a narrower base.

For Sunwater schemes, the RAB produces recoverable costs between three and five times higher than the renewals annuity by the end of the 50-year modelling period. Burdekin Distribution costs reach about $14 million per annum under the RAB compared to $2.4 million under the annuity by 2060-61. Seqwater schemes show the same structural divergence, though from lower starting cost bases.

Across all schemes, the RAB asset base grows steadily over time as new capital additions offset depreciation. In contrast, the renewals annuity balance follows a cyclical pattern, building through contributions and declining during periods of major renewal, aligning more closely with underlying infrastructure replacement cycles.

6.2. Justification for RAB transition

Arguments for adopting a RAB framework are regulatory consistency with other infrastructure sectors, simplified capital cost recovery, and reduced reliance on long-term renewal forecasts. A RAB aligns with the building-block approach used in electricity, gas and urban water, and allows capital costs to be incorporated into prices as they occur, rather than relying on long-term projections.

However, the modelling indicates these benefits come at a cost to irrigators across all six schemes. The RAB approach increases recoverable costs over the long term through the introduction of a return on capital applied to the asset base. Regulatory consistency alone is not sufficient justification where it results in higher prices for rural customers.

In the context of Queensland's long-standing pre-2020 definition of lower-bound pricing under the COAG NWI framework, lower-bound prices recover efficient operating, maintenance and renewal costs, including financing, without a persistent return on capital. A transition to a RAB would move pricing towards upper bound when assessed against this pre-2020 definition.

A RAB introduces a return on capital by applying WACC to a RAB. This creates a cost that is not present under a renewals annuity approach. On balance, the pricing theory and modelling do not support a transition to a RAB to achieve the reported benefits, as the most significant concern from a customer perspective is higher long-term prices driven by the introduction of a return on capital.

This report finds that under RAB there will be higher long-term prices, a greater cost burden on future generations, increased incentives for utilities to engage in capital expenditure, and reduced transparency in long-term planning (unless 30 year forecasts are maintained).

6.3. Improving renewals annuities

This report finds that, from a customer perspective, the renewals annuity is the preferred approach, but it can be improved. Reforms should focus on increased transparency and cost discipline. The 30-year renewals forecast should remain, supported by clear reporting of forecast and actual expenditure. Material deviations between forecasts and updated forecasts / actuals should prompt consultation with irrigators, including about modern equivalent solutions.

Capital classification should also be tightened to ensure routine maintenance is treated as operating expenditure, not capital expenditure, supported by clear and revised definitions and regulatory oversight by the QCA.

The above reforms would strengthen the rolling renewals annuity. The approach remains well suited to irrigation schemes, where capital expenditure is lumpy and long-term affordability is a key outcome.

The annuity rate also could be reconsidered. Using the cost of debt instead of the WACC would in theory better align prices with the NWI lower-bound. Cost of debt reflects actual borrowing costs, whereas the WACC includes a return on equity where negative balances endure in a scheme.

However, the impact of cost of debt versus WACC in calculating annual renewals allowances is not straightforward. Modelling shows that a lower rate (the cost of debt) can increase long-term annuity costs and customer prices by raising the present value of future capex. While it reduces interest on negative balances, this can be offset by higher payments needed to fund the higher present value.

Any change to the annuity rate should therefore focus on affordability, rather than assume dispensing with WACC will reduce prices (it may not). Further scheme-level analysis would be needed. Again, the QCA is well placed to design any of the above protections in a customer-centric manner. We recommend that the QCA engage with the service providers, QFF and customer representatives to enhance the future functioning of the renewals annuity.

6.4. Recommendations

This report recommends retention of the rolling renewals annuity as the basis for irrigation pricing in Queensland. The modelling across all six schemes is consistent: the current renewals annuity approach delivers lower long-term prices, smoother price paths, stronger intergenerational equity and greater transparency than a RAB framework, noting the importance of maintaining 30-year forecasts.

A transition to a RAB would increase long-term costs through the application of a return on (existing) capital to an expanding asset base, with impacts most pronounced in later decades and in both large and low-volume schemes. On this basis, the evidence does not support the introduction of a RAB model, particularly as it is less affordable and less transparent for customers in the long term.

To strengthen the annuity approach, the report recommends improved transparency of long-term forecasts and tighter cost definitions, including maintaining 30-year forecasts, strengthening consultation on material deviations, and ensuring maintenance is not inappropriately capitalised.

Further scheme-level analysis would be required before considering any change to the annuity rate (e.g. a move to cost-of-debt).

The current rolling renewals annuity remains the most appropriate framework to balance affordability, transparency and long-term sustainability, and aligns with Queensland's pre-2020 lower-bound pricing approach. While present value outcomes may appear similar under a WACC discount rate, this reflects timing of cashflows rather than equivalence of customer outcomes.

A RAB model that incorporates existing asset values or future renewal and refurbishment expenditure on existing assets would move pricing closer to upper bound when assessed against the pre-2020 definition.

Under the current post-2020 definition, it is asserted by others that this does not constitute a move toward upper bound, as that definition permits a return on post-2000 existing assets. However, in practice, this narrows the distinction between lower and upper bound pricing.

Accordingly, the report recommends that:

1. The Queensland Government restore the pre-2020 definition (or Queensland interpretation) of lower bound (i.e., cost recovery with no return on capital from existing assets or future renewal and refurbishment capital expenditure on existing assets); and
2. The QCA's reference framework be updated accordingly and the QCA tasked with reassessing and recommending the appropriate pricing approach, noting that the evidence presented in this report strongly supports continued use of the rolling renewals annuity, from a long-term customer perspective.

Restoring the pre-2020 definition (or the longstanding Queensland interpretation of that definition) will align pricing policy with irrigator expectations, remove ambiguity, and support long-term, affordable pricing that is smooth, stable, transparent, and delivers strong intergenerational equity.

Postscript

This report does not oppose a return on new or augmented capital that delivers net benefits to customers and notes that this issue is not directly relevant to the matters considered in this report.

7. Appendix A: Document register

The following table summarises the key source documents and data used in developing the pricing comparison model. The complete Excel model, including all input data and calculations, is provided separately to QFF.

Table 16: Document Register

Category	Document Type	Description
Sunwater	QCA pricing submissions	Burdekin, Eton, Upper Condamine and Bundaberg submissions across pricing periods (2006–25)
Sunwater	Network Service Plans	Annual Network Service Plans and renewals expenditure forecasts for Sunwater schemes
Sunwater	Synergies Economic Consulting report	Commissioned report on RAB pricing methodology for irrigation infrastructure
Sunwater	Response to data requests	Scheme-specific renewals, capital expenditure and demand data provided by Seqwater
Seqwater	QCA pricing submissions	Central Lockyer Valley and Lower Lockyer Valley submissions across pricing periods
Seqwater	Network Service Plans	Annual Network Service Plans and renewals expenditure forecasts for Seqwater schemes
Seqwater	Response to data requests	Scheme-specific renewals, capital expenditure and demand data provided by Seqwater
Eton Bulk	Austin Evans data files and model	Eton bulk water scheme data and model provided via Austin Evans for review
QCA	QCA submission documents	Final reports and recommended prices for all schemes across pricing periods
Regulatory	QCA guidance and principles	NWI pricing principles, QCA regulatory frameworks and cost allocation methodology
Literature	SAHA International and other references	2010 issues paper, jurisdictional comparisons and academic literature on RAB vs renewals pricing
ARR Data	Renewals annuity balance data	Historical and projected ARR opening balances for each scheme

All source data, assumptions, and calculations are contained, to the extent that they were drawn upon, within the accompanying Excel pricing model, which will be provided to QFF separately.

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