Department of Planning and Environment

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Guidance on strategic planning outcome -Implement sound pricing and prudent financial management

Regulatory and assurance framework for local water utilities

December 2022

Acknowledgement of Country

The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

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Contents

1. Introduction

Local water utilities can best meet the needs of their customers, and manage key risks, when their decisions and activities are based on effective, evidence-based strategic planning.

The NSW Department of Planning and Environment is committed that all local water utilities should have in place effective, evidence-based strategic planning. This will ensure utilities deliver safe, secure, accessible, and affordable water supply and sewerage services to customers. It will also ensure they can manage keys risks now and into the future, and in the event of significant shocks. Local water utilities remain responsible for conducting strategic planning.

The department gives assurance of effective, evidence-based strategic planning. Local water utilities not making dividend payments[1] are encouraged, but not compelled, to use the department's assurance framework, experience and capacity to support effective strategic planning.

Through the department's assurance role under section 3 of the Regulatory and assurance framework for local water utilities (PDF, 1613.11 KB) - Regulatory and Assurance Framework - we establish what outcomes we expect effective, evidence-based strategic planning to achieve (see section 3.2 of the Regulatory and Assurance Framework) and assess if a utility's strategic planning achieves these outcomes to a reasonable standard (see sections 3.3 and 3.4 of the Regulatory and Assurance Framework).

We give separate, optional guidance in the department's guidance Using the Integrated Planning and Reporting framework for local water utility strategic planning (PDF, 573.33 KB) to explain how utilities can achieve the strategic planning outcomes to a reasonable standard using the *Integrated Planning and Reporting Framework* for councils under the *Local Government Act 1993*.

1.1. Purpose of this document

This document supplements the Regulatory and Assurance Framework and gives guidance on achieving the outcome of implement sound pricing and prudent financial management to a reasonable standard.

This guidance is consistent with the objectives and principles established under the Regulatory and Assurance Framework, including being outcomes focused and risk-based.

This document sets out good practice for **all local water utilities** to apply when doing strategic planning to achieve the outcome of implement sound pricing and prudent financial management.

[1] Sections 3 and 4 of the Regulatory and Assurance Framework, are also the Guidelines for council dividend payments for water supply or sewerage services, under section 409(6) of the *Local Government Act 1993.* Before taking a dividend payment from a surplus of the council's water supply and/or sewerage business, a council must have in place effective, evidence-based strategic planning in accordance with section 3 of the Regulatory and Assurance Framework.

For any local water utility that pays a dividend, implementation of this guidance is the evidence the utility needs to demonstrate compliance with the majority of the eligibility criteria for dividend payments that are set out in the provisions in section 4 of the department's Regulatory and Assurance Framework. Appendix A provides information about how this guidance can be used as evidence for the majority of the eligibility criteria for dividend payments.

1.2. Structure of this document

This guidance is structured providing:

- the expectations for achieving this outcome to a reasonable standard
- an appendix providing information about how to evidence the majority of the eligibility criteria for dividend payments that are set out in the provisions in section 4 of the department's Regulatory and Assurance Framework
- an appendix with optional 'how to' guidance that helps utilities achieve assurance expectations
- an appendix providing templates, case studies and tools useful for utilities to achieve assurance expectations.

1.3. Review of this guidance

As part of our commitment to continuous improvement, we will review the performance of the Regulatory and Assurance Framework within 2 years from finalisation. There will also be periodic reviews of the full suite of relevant regulatory and assurance documents, which will happen at least every 5 years.

We welcome feedback on this guidance and will update it when needed based on feedback or a 'lessons learned' review following our assessment of strategic planning by local water utilities.

2. Oversight of local water utility strategic planning

Under section 3 of the Regulatory and assurance framework for local water utilities (PDF, 1613.11 KB), the department establishes what outcomes it expects effective, evidence-based strategic planning to achieve (see section 3.2) and assesses whether a local water utility's strategic planning achieves these outcomes to a reasonable standard (see sections 3.3 and 3.4).

Councils making a dividend payment from a surplus of their water and/or sewerage business must meet the expectations set out in section 3 and section 4 of the Regulatory and Assurance Framework.[2] Local water utilities not making dividend payments are encouraged, but not compelled, to utilise the department's assurance framework, experience and capacity to support effective strategic planning.

For effective, evidence-based strategic planning to occur, the department expects strategic planning to achieve the following outcomes to a reasonable standard:

- Understanding service needs
- Understanding water security
- Understanding water quality
- Understanding environmental impacts
- Understanding system capacity, capability and efficiency
- Understanding other key risks and challenges
- Understanding solutions to deliver services
- Understanding resourcing needs
- Understanding revenue sources
- Make and implement sound strategic decisions
- Implement sound pricing and prudent financial management **(this guidance)**
- Promote integrated water cycle management

A **reasonable standard** is met if the utility considers and addresses an outcome in a way that is:

- **sufficient:** underpinned by evidence-based analysis that supports the conclusions reached
- **appropriate:** underpinned by relevant departmental guidance and industry standard approaches to conduct planning and reach conclusions

[2] Sections 3 and 4 of the Regulatory and Assurance Framework are also the Guidelines for council dividend payments for water supply or sewerage services, under section 409(6) of the *Local Government Act 1993.* Before taking a dividend payment from a surplus of the council's water supply and/or sewerage business, a council must have in place effective, evidence-based strategic planning in accordance with section 3 of the Regulatory and Assurance Framework.

- **robust:** underpinned by evidence that draws on appropriate sources and recognises and rebuts potential alternative interpretations.

The assessment considerations the department will apply and how these may be addressed are set out in more detail in the Regulatory and Assurance Framework.

3. Guidance on implementing sound pricing and prudent financial management

Under section 3.2 of the Regulation and Assurance Framework, the department expects utilities to achieve to a reasonable standard the strategic planning outcome **implement sound pricing and prudent financial management.** This includes considering:

- How does the utility set and structure its water supply and sewerage pricing to recover its revenue requirement, promote the efficient use of services and achieve equitable and affordable pricing and intergenerational equity?
- How does the utility implement a cost-reflective and consumption-based tariff structure and long-term stable price path?
- How does the utility set appropriate developer charges to recover the infrastructure cost of servicing growth?
- How does the utility consider payment of tax equivalents and dividends?
- How does the utility consider affordable access to essential water services for all customers?
- How does the utility ‘ring-fence’ the water supply and sewer business fund from council’s general-purpose fund?

3.1. Implementing sound pricing and prudent financial management

Sound pricing and prudent financial management are important in ensuring that local water utilities have enough revenue to deliver their services to appropriate standards over time, and for promoting efficient consumption of water and sewerage services.

To apply sound pricing and prudent financial management, utilities should understand:

- the demand for their water and sewerage services over the medium to long term
- their customers' needs, values and preferences
- the costs to provide these services, now and over the medium term
- the most efficient way of providing services to required standards.

It is therefore closely related to other key elements of strategic planning for utilities.

What sound pricing and prudent financial management requires

The department's expectations are that a local water utility's water supply and sewerage prices:

1. recover its efficient costs of providing water supply and sewerage services to customers
2. are cost reflective, fair and equitable, and structured to promote efficient investment and consumption decisions, including the efficient and sustainable provision and use of water supply and sewerage services, and that:
    - recycled water prices should be set consistent with NWI recycled water pricing principles
    - trade waste charges are set consistent with the departmental guidelines
    - developer charges are set consistent with the departmental guidelines
3. are reasonably stable over time and consider affordability and impacts on customers.

In the following sections we set out **what** the department's expectations are for **implementing sound pricing and prudent financial management** to a reasonable standard. In Appendix B and Appendix C, we provide optional guidance and case-studies and tools on **how** some of these expectations could be met.

3.2. Prices should recover the efficient costs of providing water supply and sewerage services to customers

The local water utility should recover all its efficient costs of providing water supply and sewerage services to customers through prices, with prices set at lower bound, or above

The utility is expected to recover all its efficient costs through prices.

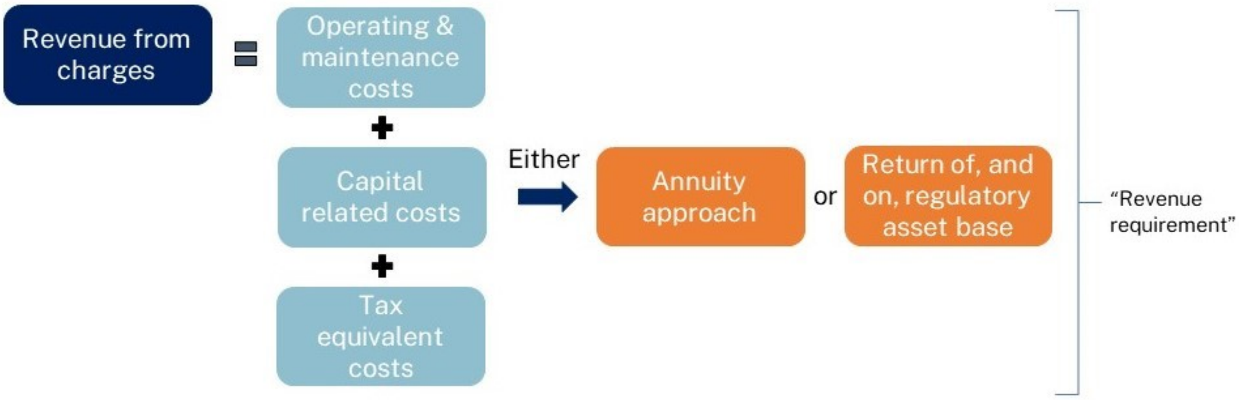
The most transparent and efficient approach to calculating the efficient cost of providing water supply and sewerage services is the building block approach.

The building block approach allows the utility to estimate the revenue requirement that prices need to raise. This approach means that a utility's prices are calculated to recover its:

- efficient operating and maintenance costs
- efficient capital-related costs, comprising either:
  - — the use of an annuity to fund future asset renewal/replacement and upgrade/growth costs, or
  - — a return of and on a regulatory asset base (RAB) to reflect the cost of asset consumption and the cost of capital, respectively
- tax equivalent costs (under the tax equivalent regime).[3]

The sum of these costs for each service is the water utility's revenue requirement for that service (Figure 1).

Figure 1: Revenue requirement



As shown in Figure 1, in relation to the capital costs **there are two methods for reflecting the costs of capital in prices, namely the annuity approach and the regulatory asset base (RAB) approach**. Local water utilities can use either method to calculate prices. Both methods are explained below.

There are important considerations as to which and whether all the efficient costs to council of its initial and full capital investments over time will be recovered through prices. There are two key methods:

- **lower bound pricing** includes provision for the cost of renewing, replacing, or upgrading assets in the future, but not a return of or on the initial investment in existing assets.
- **upper bound pricing** includes provision for the opportunity cost of capital invested (that is, a return on the capital that reflects the market return) and also full recovery of that capital over the life of the assets.

Consistent with the National Water Initiative (NWI), it is expected that a utility:

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[3] The Taxation equivalent regime (TER) is outlined in Chapter 5 of the Department of Local Government's *Pricing and Costing for Council Businesses, A Guide to Competitive Neutrality* (Guide), July 1997. Under this guide, for reasons of competitive neutrality, councils are required to apply TER payments to all Category 1 business pricing and to Category 2 business pricing where practicable. This 1997 guide identifies some of the major local, state and federal government taxes that council may need to consider.

- achieves at least lower bound pricing and moves towards upper bound pricing where practicable
- achieves upper bound pricing if it serves more than 50,000 connections
- not recover more than upper bound pricing.[4]

Further, the Local Government Code of Accounting notes that all Category 1 business activities (that is, those businesses with gross operating turnover over $2 million) are expected to generate a return on capital.[5] This is only achieved through upper bound pricing.

Methods to calculate both lower and upper bound prices are explained below.

A utility's prices should be set at lower bound, or above. If not, the utility will not receive sufficient revenue from prices to maintain its network and therefore its service delivery capacity.

If the local water utility is unable to recover its costs from prices as a result of customers' inability to pay, it should report the community service obligation payment it receives to cover the costs that cannot be recovered from prices

If a utility is unable to fully recover costs from its prices in the long term as a result of its customers' inability to pay, it should report the size and source of any community service obligation (CSO) payment or subsidy to its water supply or sewerage services that covers the costs that cannot be recovered from prices.

We give guidance on understanding and assessing customers' ability to pay in the guidance on the outcomes of understanding revenue sources and understanding service needs.

The utility should consider arrangements to make an ongoing CSO unnecessary over time.

Under the NWI, where the utility is unlikely to fully recover costs in the long term (for example, because prices that reflect costs are not affordable) and a CSO is deemed necessary, a utility should:

- publicly report the size and source of the subsidy
- where practicable, consider alternative management and/or operational arrangements to make an ongoing CSO unnecessary over time, without compromising service standards too much.

If prices are currently less than lower bound, the utility could consider either:

- increasing its revenue by increasing prices (subject to its assessment of its customers' ability to pay) so that revenues better match costs, or
- implementing cost reductions or efficiencies to reduce its costs without lowering service standards below acceptable levels to customers, so that the prices generate revenues that better match costs.

If a utility's prices are less than lower bound because of its customers' inability to pay its costs of service provision, it would not be in a position to receive a return on investment to pay a dividend.

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[4] 2004 COAG Intergovernmental Agreement on National Water Initiative.

[5] Special Purpose Financial Statements – Local Government Code of Accounting – Section 3.

The local water utility should establish separate revenue requirements for each of its services (water supply and sewerage)

A utility should establish separate revenue requirements for each of its services (water supply and sewerage) and set prices for each to recover its revenue requirement.

This means that prices should be set to recover the efficient costs (revenue requirement) of supplying water supply services, and sewerage prices should be set to recover the efficient costs of supplying sewerage services.

This is important for ensuring prices are cost-reflective and, in turn, that they are equitable and promote efficient investment and consumption decisions.

To calculate the revenue requirement for each service, the local water utility should identify and attribute its direct costs to its water supply and sewerage services and allocate common costs, consistent with the utility's cost allocation manual

The local water utility should identify and attribute direct operating and capital costs to each service, respectively.

The utility should allocate any common costs to each service, consistent with its cost allocation manual. This will allow the council to ring-fence the local water utility's costs and revenues from the council's other activities, and clearly separate the costs and revenues of its water supply, sewerage and other services within its water business.

The costs of providing a utility service are a mix of:

- **direct costs** that can be identified as necessary to providing a specific service
- **indirect or common costs** that cannot be directly traced to a specific cost object, as they are incurred in providing more than one service. Examples of common costs include corporate costs, such as some executive, HR, ICT, legal and insurance costs. Costs may be common between the council's other operations and the utility, and/or between services within the utility.

Section 3.6 below gives further detail on ringfencing, the allocation of common costs and cost allocation manuals.

The revenue requirement a local water utility uses to set its prices should reflect the efficient costs of supplying its services to appropriate levels

Prices should be set to recover a utility's efficient operating and capital-related costs. This means that only:

- efficient operating costs should be included in the operating cost allowance, and
- prudent and efficient capital expenditure should be included in the capital cost allowance.

Efficient operating and capital costs reflect the least-cost way to provide water supply and sewerage services to customers at an appropriate standard (that is, to meet customers' needs) while complying with all regulatory requirements (for example, environmental regulatory requirements), using a long-term planning horizon (for example, considering full life cycle costs of all options).

Calculating the efficient operating costs to supply services

The utility should be able to explain and justify any increases in operating costs in real terms (that is, excluding the effects of inflation). For example, this may involve the utility determining and explaining the relationship between operating expenditure and population growth, changes to regulatory requirements or changes to service levels. The level of detail of such analysis or explanation only needs to be proportionate to the level of increase of operating expenditure.

The utility's operating expenditure allowances should incorporate reasonable expectations for ongoing cost efficiencies, consistent with most businesses realising such efficiencies over time.

Operating and capital expenditure forecasts should be consistent with each other

The utility should ensure its operating and capital expenditure forecasts are consistent with each other, including ensuring that:

- forecast operating expenditure reflects any offsetting effects from the capital expenditure program (and the reverse)
- it uses consistent inputs in both the operating and capital expenditure forecasts, where applicable
- costs are not duplicated, or excluded entirely from, operating and capital expenditure forecasts.

Appendix B gives more guidance on how to estimate efficient operating and capital costs.

Calculating the efficient capital costs to supply services and reflecting these costs in prices

The utility should be able to explain and justify its ongoing capital expenditure program, including changes from trend over time. It should include reasonable provision for cost efficiencies (ongoing improvements) in this program.

For less regular capital expenditure, a utility should consider and be able to explain:

- the outcomes the capital expenditure is intended to achieve
- any other viable options of achieving these outcomes
- why the selected capital expenditure item is the best way of achieving the required outcome.

A utility's analysis to evaluate and support its proposed capital expenditure only needs to be proportionate to the level of expenditure. Larger capital projects should be supported by cost-benefit analysis, which considers the range of workable options to achieve the project's objective.

As well as recovering the efficient costs of the utility's forward capital investment programs, there are important considerations as to which and whether all the efficient costs to the utility of its initial and full capital investments over time will be recovered through prices. There are two key methods:

- Lower bound pricing, which includes provision for the cost of renewing, replacing, or upgrading assets in the future, but not a return of or on the initial investment in existing assets.
- Upper bound pricing, which includes provision for the opportunity cost of capital invested and also full recovery of that capital over the life of the assets.

Consistent with the NWI, it is expected that a utility achieves at least lower bound pricing and moves towards upper bound pricing where practicable. The NWI requires that a utility with over 50,000 connections implements upper bound pricing.

Further, the Local Government Code of Accounting notes that all Category 1 business activities (that is, those businesses with gross operating turnover over $2 million) are expected to generate a return on capital.[6]

In lower bound pricing, utilities should check and address any short-term cashflow issues, particularly in the case of 'lumpy' infrastructure investments, where there are large up-front costs associated with planning and construction.

Alternatively, if a utility sets its prices to recover more than its upper bound revenue requirement, then it is charging its customers too much. The utility should drop or adjust its prices until they are set to recover no more than its upper bound revenue requirement over the pricing period.

The annuity versus the regulatory asset base approach to capital cost recovery

As shown in Figure 1 above, there are two methods for reflecting the costs of capital in prices, namely the annuity approach and the regulatory asset base. Councils can use either method to calculate prices. Both methods are explained below.

The **annuity approach** forecasts asset renewal or replacement and growth costs over a fixed period, converts these to a present value, and then converts this present value to a future annualised charge.

A **regulatory asset base (RAB)** reflects the value of a utility's asset base for pricing purposes; that is, for the purpose of determining a utility's capital-related costs or revenue requirements when setting prices. In other words, customers fund the economic value of assets used to provide water supply and sewerage services (see Box 1).

A RAB can be different from the actual asset base of a water utility. The RAB should only include the efficient costs of assets used to supply the relevant services to customers (on some occasions, economic regulators have excluded capital expenditure from a RAB on the basis that it was not considered efficient). Further, the value of assets contributed by third parties (for example, through government grants or developer charges) is generally deducted from the RAB so that utilities do not recover costs of assets twice.

We give guidance on determining the initial value of the RAB. We also give guidance on how to roll it forward over time to determine capital-related costs for pricing in Appendix B.

Box 1 - The regulatory asset base (RAB)

The Australian Competition and Consumer Commission (ACCC) has defined the RAB as the value that would compensate a business's investors adequately for the efficient, forward-looking costs of providing the required services.

Where a business is determining its RAB before making any investment, the opening RAB value is zero. All efficient capital expenditure required to deliver services should be added to the RAB

[6] Special Purpose Financial Statements – Local Government Code of Accounting – Section 3.

as it is incurred. However, when a business has already made investments to provide services before establishing the RAB, the business must decide what contribution current and future water supply and sewerage customers should make to these past investments when it determines the initial RAB value.

Source: ACCC, *Issues Paper – Water Charge Rules for Charges Payable to Irrigation Infrastructure Operators*, May 2008, p 24.

The RAB approach includes an allowance for a return of the asset base and a return on the asset base. The 'return of capital' reflects annual consumption of the asset base's economic benefit or service capacity and is referred to as depreciation. The 'return on capital' reflects the opportunity cost of the investment.

The annuity approach provides a smooth revenue allowance, where revenue fluctuations are levelled out over the term of the annuity. Given the lumpy nature of some expenditure, the figure factored into prices will not necessarily equate to the actual capital expenditure incurred in any given year. Utilities may need to manage this carefully to ensure they can draw on any surplus annuity revenue (from years when actual capital expenditure was less than the annuity revenue) to apply in years when actual capital expenditure may be larger than the annuity revenue. As outlined in Appendix B, annuities should be reviewed on regular basis.

Under the RAB approach, the profile of revenue recovered depends on the:

- depreciation method used (although straight-line depreciation is generally preferred[7])
- timing of when capital expenditure is actually incurred or forecast to be incurred.

Revenue is recovered from customers once the utility makes the investment (see **Error! Reference source not found.**2).

However, assuming:

- an initial RAB of zero
- the same level of capital expenditure
- the same timeframe
- the same discount rate
- the utility should receive the same amount of revenue from the RAB and annuity approaches in present-value terms.[8]

Whether a utility uses a RAB or an annuity, the utility should aim to receive sufficient revenue to recover at least its forecast efficient capital costs required to deliver services to appropriate levels. This is important for ensuring that its assets have the capacity to deliver services to customers at appropriate levels.

Appendix B gives more information on options to apply the annuity and RAB approaches for determining capital-related costs.

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[7] Which recovers capital costs evenly over the assumed life of the asset, from when it enters the RAB.

[8] Australian Competition and Consumer Commission (ACCC), *Issues Paper – Water Charge Rules for Charges Payable to Irrigation Infrastructure Operators*, May 2008, p 22.

Box 2 - Annuity versus RAB

The annuity approach converts forward-looking long-term capital expenditure (for example, over 20 to 30 years) into a smoothed revenue path, where revenue fluctuations are levelled out using an appropriate discount rate. The utility recovers this revenue figure through prices each year. The annuity figure factored into prices will not necessarily equate to the actual capital expenditure incurred in any given year, as it is smoothed.

The RAB approach also converts capital expenditure into a revenue stream, but that can include previous capital expenditure on existing assets and forecast capital expenditure (forecast over the pricing period) and the stream may not be smooth. The cost of capital investment is returned to the utility over the asset's useful life through a return of the capital expenditure (or a depreciation allowance) and a return on the capital expenditure (to reflect the opportunity cost of the investment in the utility, in the form of an allowance for the weighted average cost of debt and equity).

Under the RAB approach, the return on and of capital represent the revenue stream recovered through prices each year, and the profile of the revenue recovered (that is, how smooth it is) depends on when capital expenditure is incurred, the size of the initial RAB relative to new capital expenditure and the depreciation profile (for example, under a straight line depreciation approach, the value of assets will be recovered evenly over their respective economic lives). Notably, the revenue factored into prices represents a recovery of expenditure through prices from when the utility makes an investment.

To be able to incur the capital expenditure and deliver the capital project, the utility may have to arrange for debt and/or equity financing before recovering revenue through prices. The revenue factored into prices should broadly equate to the efficient financing cost of actual expenditure (although the utility may need to consider differences between expenditures and revenues in each year – for example, when revenues are smoothed out under the annuity approach, as noted above). The Weighted Average Cost of Capital (WACC) reflects the weighted average cost of debt and equity, and this can be used as the discount rate under the annuity approach or to calculate the return on capital under the RAB approach.

Source: ACCC, *Issues Paper – Water Charge Rules for Charges Payable to Irrigation Infrastructure Operators*, May 2008.

Including a rate of return/discount rate in the revenue requirement for upper bound pricing

Under the NWI's definition of upper bound pricing, a utility's prices should allow it to earn a return on capital consistent with the weighted average cost of capital (WACC).

Further, the Local Government Code of Accounting notes that:

- all Category 1 business activities (that is, those businesses with gross operating turnover over $2 million) are expected to generate a return on capital, and that:
  - — in monopoly businesses, such as water supply and sewer services, the rate of return should be sufficient to cover costs and replace assets needed to maintain service standards

— in a competitive market, the return on invested capital should be equal to, or better than, a return on an Australian Government 10-year bond.

- National Competition Policy (NCP) requires Category 1 businesses to generate a return on capital that is comparable to rates of return for private businesses operating in a similar field.[9]

Under the NCP's competitive neutrality principles, the Local Government Code of Accounting and the NWI's upper bound pricing, Category 1 businesses (and Category 2 businesses, where practicable) should also make provision for corporate income tax in their prices. An allowance for corporate income tax can be provided through the rate of return (through a pre-tax WACC) or a separate tax allowance (accompanied by a post-tax WACC). Some economic regulators, such as the Independent Pricing and Regulatory Tribunal of NSW (IPART), favour using a post-tax WACC and providing a separate tax allowance. This is on the basis that it is a more accurate and transparent means of determining a utility's tax allowance.

Consistent with the above requirements, utilities should apply a WACC when:

- discounting their annuity (under the annuity approach) or
- determining the return on capital (under a RAB approach).

This WACC should be pre-tax, if a separate allowance for corporate income tax is not calculated, or post-tax if such a separate tax allowance is calculated and recovered through prices.

There should also be no double-counting of inflation. For example, if costs are modelled in real terms to initially set real prices (for example, in year 0 or year 1 dollars of the pricing period), for these prices to then be annually indexed by inflation throughout the pricing period, then a real WACC should apply to the RAB. The RAB can then be indexed by inflation when rolling it forward to the start of the next pricing period, at the next pricing reset.

WACC estimates can be sourced from IPART's prevailing 'Water' WACC estimate (refer to its biannual WACC updates or its latest water price determination).[10] IPART also publishes a spreadsheet WACC model on its website.[11]

While not preferred[12], as an alternative and 'lower bound' approach, a utility could use an estimate of its cost of debt as the discount rate in the annuity calculation. For example, IPART's Local Government Discount Rate Fact Sheets give periodic updates of its market-based estimate of the cost of the local government sector's debt. This is calculated by taking the risk-free rate (10-year Australian Government bond yield), adding half of a debt margin spread (for 10-year, non-financial, corporate, A-rated debt) and debt-raising costs of 12.5 basis points.[13] IPART's WACC spreadsheet (mentioned above) also includes a worksheet on this 'Local Government Discount Rate'.

Including externalities when calculating its revenue requirement

The NWI's Pricing Principles refer to externalities, when listing costs to be recovered from lower and upper bound pricing. The utility should consider if they wish to include externalities.

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[9] Special Purpose Financial Statements – Local Government Code of Accounting – Section 3.

[10] For example, see: www.ipart.nsw.gov.au/Home/Industries/Special-Reviews/Regulatory-policy/Market-Update

[11] Available at: www.ipart.nsw.gov.au/Home/Industries/Special-Reviews/Regulatory-policy/Market-Update

[12] Because it would not reflect the weighted average cost of debt and equity.

[13] For example, see: www.ipart.nsw.gov.au/Home/Industries/Local-Government/Local-Infrastructure-Contributions-Plans/Local-Government-discount-rate

In practice, potential externalities of providing water supply and sewerage services are often 'internalised'. They are often included in operating and/or capital expenditure allowances as the costs of complying with environmental and other regulatory requirements. A utility should include its efficient costs of complying with regulatory requirements in its operating and capital expenditure allowances when setting water supply and sewerage prices.

The exception is if there is clear evidence that customers are willing to pay for an environmental outcome above and beyond that required by environmental regulation. In this case, a utility should include its efficient costs of achieving this outcome in its cost allowances when setting prices, consistent with its customers' willingness to pay. However, care should be taken in testing and verifying customers' willingness to pay.

The department's guidance on achieving the strategic outcomes of 'understanding service needs' and 'understanding revenue sources' gives more guidance on understanding customers' needs, values, preferences and their willingness to pay for services.

The local water utility's revenue requirement should include allowances for taxes and tax equivalent regime (TER) payments

Utilities pay various taxes. These taxes should be included in the building block calculation of the revenue requirement.

Where a local utility is exempt from an obligation to pay a tax because it is a council, it is good practice for the utility to pay the tax liability that it would face if it was privately owned and to recover the cost of the 'tax equivalent liability' from its prices. This is known as the tax equivalent regime (TER). The purpose of the TER is to ensure consistency with the competitive neutrality principle under the NCP, which is that government businesses should compete with other businesses on an equal footing and not have a competitive advantage because of their public ownership.

A utility's allowance for tax or TER payments should include

- land tax
- stamp duty, and
- payroll tax if applicable, depending on the size of the utility.

Under upper bound pricing and NCP principles, a utility should also include an allowance for corporate income tax in its prices:

- Where a utility uses a post-tax WACC to calculate the allowance for a return on assets in the revenue requirement (as applied to the RAB or used as the discount rate in the annuity), it can calculate a separate corporate tax allowance. To do this, the utility applies the relevant tax rate, adjusted for the value of imputation credits, to its taxable income, where taxable income is the revenue requirement (excluding tax allowance) less operating cost allowances, tax depreciation and interest expenses.
- Where a utility uses a pre-tax WACC to calculate the allowance for a return on assets in the revenue requirement (through the RAB or the discount rate in the annuity), it includes provision for income tax in the WACC. A separate allowance for corporate income tax is not required.

Demand forecasts the local water utility uses to set prices should come from an appropriate forecasting method

The local water utility should base prices (and expenditure requirements) on the best available information on forecast water sales volumes, sewage volumes or loads and water supply and sewerage connection numbers.

The guidance on the outcome of understanding service needs gives guidance on demand analysis and forecasting.

3.3. Prices are cost reflective, fair and equitable, and structured to promote efficient investment and consumption decisions, including the efficient and sustainable provision and use of water supply and sewerage services

The local water utility should implement a cost reflective, two-part tariff structure for both water supply and sewerage services that recovers its revenue requirements

Under the NWI's Pricing Principles, governments committed that a utility should use 2-part water tariffs, comprising a fixed service availability charge and a usage charge, to recover its water revenue requirement from residential and non-residential customers – unless this is demonstrated not to be cost-effective.[14]

Two-part tariffs have the advantage of allowing:

- the usage price to signal the marginal cost of supply, thus promoting the efficient use of water and sewerage services
- the fixed service availability charges to recover the remaining revenue requirement, to allow for financial sustainability.

Two-part tariffs are relatively simple to administer and understand, which can be important in promoting community acceptance and empowering customers to balance the benefits and costs of their use of water supply and sewerage services.

A utility may apply inclining (increasing) block water usage prices. This means charging large water users a higher price per unit beyond a specified usage threshold(s). However, a single water usage charge set with reference to the long-run marginal cost (LRMC) of supply – as outlined below – is preferable.

[14] For example, for a relatively small volume of non-potable supply, it may be most practical to simply levy a usage charge if there are no property meters or other means of also levying fixed availability charges.

The local water utility should have regard to its marginal cost of supply when setting its of water usage price

The NWI's Pricing Principles state that utilities should base water usage charges on the LRMC of water supply and that, on economic efficiency grounds, the water usage price should comprise only a single charge because they are more economically efficient, equitable and simple.

However, these principles also acknowledge that utilities may decide on more than one tier (an inclining block tariff) for the water usage charge for policy reasons – for example, to send a strong pricing signal that encourages efficient water use.

Under an inclining block tariff, prices for water consumption within at least one of the tiers will be lower or higher than the best estimate of LRMC, which suggests that at least one of the tiers is priced too high or too low. If a utility applies an inclining block tariff, ideally each tier should be priced within the range of reasonable LRMC estimates.

Setting water usage prices at the LRMC of supply promotes efficient consumption (see **Error! Reference source not found.**), particularly if there is a need to augment supply capacity within the foreseeable future (for example, within the next 10 to 20 years). This is because customers would face the long-run costs of supplying an additional unit of water to them, which suggests they would only consume an additional unit of water where the benefits exceed the long-run costs of supply.

The LRMC of supply uses information from strategic planning, as it primarily relates to forecasts costs to meet demand over the long term. In Appendix B, we give guidance on how to estimate the LRMC of supply.

However, some discretion is required. A utility may need to balance a range of potentially competing objectives in setting water usage prices, including:

- the efficiency of the price signal in the short- and the long-run, given the water supply and demand balance
- the stability of prices
- administrative simplicity.

This means that there may be a case against setting the water usage price exactly at the best estimate of the LRMC of supply. For example, to balance the above objectives, a utility may elect to:

- set the water usage price within a reasonable range of LRMC estimates, or
- transition the water usage price to the LRMC over time, or
- set the water usage price to reflect the likelihood of short-term supply constraints (for example, because of drought) rather than long-term capacity requirements (although, if supply constraints are too frequent there may be a need for supply augmentation, which would be reflected in estimates of the LRMC of supply), or
- set its water usage charge(s) so that its residential water usage charge recovers 50-75% of its residential revenue, because it does not have reliable LRMC estimates, or because there is a case for giving strong pricing signals for water conservation, or

- maintain their current approach to setting water usage prices.[15]

[15] To date, consistent with previous guidance from the department, many local water utilities have set their water usage charge(s) so that their residential water usage charge recovers at least 75% of their residential revenue (for utilities with 4,000 or more connected properties) or 60% of their residential revenue (for utilities with less than 4,000 connected properties).

Box 3 - The long run marginal cost of water supply

The marginal cost of water supply is the cost of supplying an additional unit (kL) of water. Pricing at marginal cost can promote the efficient use of resources.

If prices are set below marginal cost, it can encourage an individual to consume additional units of water even when the benefit to the individual of those additional units of water is outweighed by the costs to society of supplying them. Conversely, a price set above marginal cost can discourage individuals from consuming additional units of water despite the benefits to them outweighing the costs to society of supplying them.

Short-run marginal cost of supply (SRMC) versus long-run marginal cost of supply (LRMC)

Marginal cost can be estimated in either a short-run or long-run perspective. SRMC is the cost of supplying an additional unit, assuming that at least one factor of production (capital investment) is fixed. Both SRMC and LRMC are forwarding-looking concepts – that is, costs that are sunk (that is, costs the utility has incurred or is committed to incur) are irrelevant in their calculation.

LRMC is the cost of supplying an additional unit of water, assuming that all factors of production can be varied (for example, capital investment can be made to increase supply capacity). LRMC is estimated by forecasting the costs to meet future increases in demand for water services over a long period, consistent with required service standards and levels of reliability (for example, assumed frequency and duration of water restrictions).

The LRMC of supply will generally increase when demand is forecast to increase and/or there is a need to augment supply capacity. If there is no need to augment supply in the foreseeable future, LRMC will approach the SRMC of supply. In estimating the LRMC of water supply, and deriving usage prices, utilities should be mindful of how price changes themselves affect demand and therefore the need to augment supply over the long term. This can be done by applying estimates of the price elasticity of demand to forecasts.

LRMC and SRMC pricing have their respective pros and cons, depending on the circumstances:

- SRMC can be volatile. Given that water supply generally involves lumpy investments, a SRMC price will be low when there is excess capacity, increase as capacity is constrained, and then fall suddenly once additional capacity is installed.
- LRMC includes the costs of future supply augmentations and stabilises prices over time. However, in some circumstances and depending on how it is calculated, LRMC can send inefficient price signals in the short term. For example, during periods of water shortages (for example, drought) LRMC may be lower than SRMC (which could rise steeply during these periods), which may mean that pricing at LRMC encourages inefficiently high use at certain times. Further, as LRMC is based on future supply and demand, LRMC estimates can be sensitive to the period selected and demand (and supply) assumptions.

Source: Frontier Economics

The local water utility should have regard to its marginal cost of supply when setting its sewerage prices

Sewerage prices should reflect the utility's estimate of its costs to augment its supply capacity to meet customers' needs over the medium- to longer-term.

A utility should set its sewerage usage price with reference to its SRMC of supplying its sewerage service, or with reference to its LRMC of supplying its sewerage service if it needs to augment the capacity of its system within the foreseeable future. By 'with reference to' the SRMC or LRMC of the supply of services, we mean balancing the objective of setting prices at the marginal cost of supply with other objectives of best-practice pricing. In practice, therefore, some utilities may elect to:

- set their sewerage usage price within a reasonable range of SRMC or LRMC estimates, or
- gradually transition their sewerage usage price towards their best estimate of SRMC or LRMC, or
- use estimates of their operation, maintenance and administration (OMA) cost per kL as a proxy for SRMC (although the increase in OMA costs from collecting, transporting, treating and disposing of an additional unit of sewage is a more accurate estimate of the SRMC of supplying sewerage services).

The local water utility should consider levying a single fixed sewerage service availability charge for residential customers (combining access and usage components) and apply sewerage usage prices to non-residential customers as part of a 2-part tariff

To minimise administrative cost and complexity, residential sewerage customers can pay a single, fixed service availability charge. However, if needed to ensure equity between residential and non-residential customers, this fixed residential charge can comprise a base level service access component and a deemed usage component. The deemed usage component can be derived by applying the sewerage usage charge to an estimate of average residential discharge volume.

Utilities should apply sewerage usage prices to non-residential customers as part of the above-mentioned 2-part tariff. They can also be used to incorporate a deemed 'usage' component into residential customers' fixed service availability charge. This ensures that all residential customers face a common sewerage bill, which can be administratively efficient.[16] This deemed or average level of residential discharge can be reviewed at each pricing reset (that is, at the end of each pricing period).

The sewerage usage price is applied to an estimate of each non-residential customer's volume of discharge to the sewerage network. As a property's discharge to the sewer network is generally not individually metered, this estimate can be calculated as the customer's metered water consumption multiplied by their sewerage discharge factor. A sewerage discharge factor is an estimate of the proportion of a customer's metered water consumption that is discharged to the sewerage network.

[16] IPART has, for example, set Essential Water's water service availability charges to its 2 largest customers (2 mines) based on their historical share of total water consumption, and set water service availability charges for all other customers based on their meter (or deemed meter) sizes.

The local water utility should consider whether to set different prices for different areas where there are distinct supply systems that have different costs

Typically usage and availability prices[17] are set on a 'postage stamp' basis, where all customers of the same type, receiving the same service, pay the same prices – regardless of any variations in the costs of serving specific locations within the utility's area of operations.

However, some utilities may face very different cost to supply customers in different nodes or locations.

Utilities should consider whether to differentiate prices by the cost of servicing different customers (for example, based on location and/or service standards) where the benefits of doing so outweigh the costs of identifying differences and the equity advantages of alternatives.

Noting that where the utility has in place a robust system of developer charges by area, these charges may already signal the development-contingent costs of servicing specific locations within the utility's area of operations.

Where all customers are supplied by the one integrated water supply system (for example, from one dam or one integrated network of dams), there is strong case for postage stamp pricing. However, if customers are served by separate supply systems, there may be a case for node or catchment-specific prices (for example, if there are discrete sewage collection, treatment and disposal catchments, with materially different costs of sewerage service supply; or separate water supply systems, serviced by separate water sources). A nodal pricing approach involves setting prices to recover the cost (revenue requirement) of supplying individual customers, or groups of customers, within a given geographical area or supply node.

Water supply and sewerage availability charges should recover the residual revenue required

A utility should set water supply and sewerage service availability charges to recover the difference between the total cost of delivering water supply and sewerage services (each service's revenue requirement) and the forecast revenue to be recovered from water supply and sewerage usage charges, respectively.

A utility should determine service availability charges by allocating its residual revenue requirement (being total revenue requirement less forecast revenue from usage charges) across customer types in a way that reflects service demands and is equitable, transparent and promotes price stability.

For water supply, this can be done by setting service availability charges with reference to the size of each customer's connection or meter, as a customer's meter size is a reasonable and readily available indicator of their share of network capacity. For sewerage services, a water meter – multiplied by sewage discharge factors – is a reasonable proxy.

Alternatively, a utility could set service availability charges with reference to each customer category's average share of consumption of water services over a given period. Such an approach

[17] That is, ongoing prices to residential and non-residential customers.

may be suitable, for example, when setting water service availability charges for very large customers, if charges based on meter size may not be appropriate.[18]

The primary role of the service availability charge is to recover the residual revenue requirement of the utility as equitably and transparently as possible, while minimising any adverse price shocks.

Therefore, a utility may elect to adopt a different approach to setting its service availability charges if it considers there are other ways to achieve the above-mentioned objectives.

Appendices A and B give more guidance and information on how utilities could set service availability charges.

The local water utility should publish its discharge factors and, where warranted, be open to tailoring a customer's discharge factor to reflect individual circumstances

Utilities often develop discharge factors by type of customer (for example, for residential customers, and for different categories of non-residential customers). Occasionally, however, there can be circumstances that warrant a more tailored approach to determining a non-residential customer's discharge factor (by reviewing that particular customer's circumstances). For example, some customers may have a large water meter for fire-fighting purposes, which may mean they require a lower-than-standard discharge factor to accurately reflect their levels of discharge to the sewer network.

To promote transparency in pricing, utilities should publish their discharge factors, by type of customer, on their websites.

Trade waste charges should be consistent with the department's trade waste guidelines

Trade waste is any liquid waste other than domestic sewage. Trade waste discharge places greater demands on the sewerage system and costs more to treat than domestic sewage. Trade waste is largely discharged by commercial and industrial customers. Customers liable for trade waste charges also pay non-residential sewerage charges.

When setting sewerage prices, utilities should deduct forecast trade waste revenue from the sewerage revenue requirement. This is because to promote economic efficiency and equity, trade waste charges should be set to reflect the costs that trade waste discharges place on the sewerage network.

The NSW Department of Planning and Environment's *Liquid Trade Waste Management Guidelines for councils in regional NSW* include guidance on developing and applying trade waste fees and charges that reflect costs.[19] For pricing and management purposes, this categorises trade waste discharges by risk and the costs they can impose on the sewerage network – including Category 1, Category 2, Category 2S and Category 3 discharges (see **Error! Reference source not found.**).

[18] For example, this is how IPART has set Essential Water's water service availability charges to the 2 mines that it serves in Broken Hill.

[19] NSW Department of Planning, Industry and Environment, *Liquid Trade Waste Management Guidelines for councils in regional NSW*, 2021, Chapter 8.

In keeping with this guidance, trade waste charges can include:

- **Fixed charges**, including:
  - Application fees – to recover the costs of administration and technical services provided in processing a trade waste application. This fee can vary for different charging categories to reflect the complexity of processing the application.
  - Renewal fees – utilities may apply a renewal fee if an existing approval is renewed or modified.
  - Annual fees – to recover the costs for ongoing administration and scheduled inspections (including monitoring). These vary by the different trade waste categories to reflect the varying complexity of the inspection and administration requirements of different types of discharge.
  - Inspection and/or re-inspection fees – to recover the costs of unplanned or re-inspections of premises (for example, where there may be suspected non-compliance with approval conditions), above and beyond the costs of inspection activities covered by application or annual fees.
- **Variable charges** to recover the costs of:
  - 'Category 2' discharges ($/kL) – which includes commercial food discharges (greasy/oily waste) and other commercial discharges with prescribed pre-treatment.
  - 'Category 3' mass-based discharges ($/kg) – which includes high-risk industrial discharges that are in excess of the 'deemed concentrations' in domestic sewage.
  - Non-compliant charges for Category 1, Category 2 and Category 3 discharges – which are higher usage fees that apply when the discharger has not installed or maintained appropriate pre-treatment equipment. For examples, refer to the department's 2021 guidelines:
    - Category 1 dischargers who install recommended and appropriate pre-treatment equipment and maintain it regularly will be required to pay only the annual fee nominated for Category 1 – that is, they would not pay a usage charge. However, if this pre-treatment equipment is not installed or maintained, then the Category 1 discharger would pay the trade waste usage charge (otherwise just applicable to Category 2 discharges) in the utility's trade waste management plan.
    - For a Category 2 discharger, a non-compliance charge may be 5 to 10 times higher than the standard trade waste usage charge ($/kL).
  - Category 2S discharges ($/kL) – which include transporters who tanker human waste to council's sewage treatment works; ship-to-shore pump-out of toilet waste and/or greywater; and owners/operators of 'dump points' that are directly connected to the sewerage system for disposal of toilet waste and/or greywater.
- **Other charges** related to the nature of the waste, including
  - charges for the discharge of large quantities of stormwater, groundwater or high-quality water to the sewerage system
  - food waste disposal charges.

Box 4 - Trade waste categories for charging purposes

Category 1: activities requiring no or minimal pre-treatment equipment where effluent is well defined (for example, cafes and bakeries). Low risk. **Pays fixed charge only, unless non-compliant.**

Category 2: activities requiring prescribed pre-treatment equipment where effluent is well characterised (for example, large retail outlets, restaurants, large pubs, shopping centres, mechanical workshops). Medium risk. **Pays fixed and volume-based charges.**

Category 3: industrial activities, where large volumes of liquid trade waste (over 20 kg per day) are discharged to the sewerage system (for example, food manufacturing, metal processing, oil refinery, chemical production). High risk. **Pays fixed and mass-based charges.**

Category 2S: liquid trade waste discharge directly to the treatment plant by a tanker (for example, septic systems, commercial wastewater, portable toilet waste). High risk. **Pays fixed and volume-based charges**.

Source: NSW Department of Planning, Industry and Environment, *Liquid Trade Waste Management Guidelines for councils in regional NSW*, 2021, Chapter 8

Recycled water prices should be set consistent with NWI recycled water pricing principles

Some utilities supply recycled water to customers. This includes treated stormwater and treated sewage.

A utility should set its recycled water prices consistent with the NWI's Pricing Principles for recycled water (see **Error! Reference source not found.**).

The first step in setting recycled water prices is for a utility to determine the efficient costs of supplying recycled water, and who should pay for these costs. The costs of the scheme include its share of any common costs that a scheme imposes, as well as separable capital, operating and administrative costs.

The NWI's principles recognise that the costs to be recovered from recycled water customers should be adjusted for the value of any avoided costs and externalities. Appendix B gives more guidance on estimating potential avoided costs of recycled water schemes.

Once the utility has determined the residual costs of the recycled water scheme, it should then set recycled water prices to recover these costs.

In keeping with the NWI, recycled prices should also be transparent. Users should understand recycled prices and the utility should publish them to help customers make efficient choices.

Box 5 - Recycled water pricing principles

NWI recycled water pricing principles

- Recycled water prices should include a usage (volumetric) charge, and utilities should set prices with regard to price substitutes (for example, drinking water and raw water).
- Price structures should reflect differentiation in the quality or reliability of water supply.
- Where appropriate, pricing should reflect the role of recycled water as part of an integrated water resource planning system.
- Prices should recover efficient, full, direct costs. Utilities should set system-wide, incremental costs (adjusted for avoided costs and externalities) as the lower limit, and the lesser of standalone costs and willingness to pay as the upper limit. Utilities should recover any gap in full cost recovery from all beneficiaries of the avoided costs and externalities. Utilities should review subsidies and CSO payments periodically and, where appropriate, reduce these over time.
- Prices should be transparent, and users should understand them. Utilities should publish prices to help customers make efficient choices.

Source: NWI Pricing Principles.

Prices for raw water supplies to customers should recover the efficient costs of supply

Some utilities also supply raw or unfiltered water to customers. This may include water that is untreated, or water that is chlorinated but not filtered.

Prices for raw water services should:

- recover between the incremental and standalone costs of supply
  - **incremental (or avoidable) costs** represent those the utility would save if it stopped providing the service
  - **standalone costs** represent those directly attributable to providing the service, plus a share of the utility's common costs (for example, corporate overheads), allocated in keeping with the utility's cost allocation manual
- include a usage charge to signal the opportunity cost of supply and promote efficient water consumption (considering the relationship between the non-drinking water and drinking water supply systems)
- consider the price of substitutes and give customers appropriate incentives to use water that is fit for purpose
- be clear and understandable to users.

Forecast raw or unfiltered water revenue should be deducted from the water revenue requirement when setting water prices.

Bulk water prices should recover the efficient costs of supply

Some utilities supply bulk water to other utilities.

It is expected that bulk water prices recover the efficient costs of supply (or revenue requirement) taking account of expectations of upper bound pricing.

It is expected that bulk water's efficient costs of supply will be recovered through a two-part tariff.

The bulk water usage prices should be set with reference to the utility's marginal cost of supply.

This could be the utility's SRMC or LRMC of bulk water supply, depending on factors such as:

- the efficiency of the price signal in the short- and the long-run, given the water supply and demand balance
- administrative simplicity
- the potential effect of sales forecast uncertainty and the need to manage revenue volatility.

A utility should then set bulk water fixed charges to recover its residual revenue requirement (that is, its revenue requirement for the period, less its forecast revenue from usage charges over this period).

The cost of servicing growth should be recovered as developer charges consistent with department's developer charges guidelines

The NWI's Pricing Principles allow utilities to include up-front developer charges.

Developer charges should recover the incremental costs to a utility of servicing new development – that is, the costs a utility will incur in servicing new development above the ongoing revenue that it will receive from customers in that development over time. Where periodic prices are set on a 'postage stamp' basis, this means that developer charges should reflect the incremental costs of servicing a new development area above the system-wide average costs.

Cost-reflective developer charges are important for economic efficiency and equity reasons. They:

- signal the incremental costs to developers of providing water supply and/or sewerage services to specific new development areas, which helps to ensure that development occurs where its benefits exceed its costs
- ensure there are sufficient funds to provide necessary infrastructure and services
- minimise the effect on the utility's existing water supply and sewerage customers, by ensuring that they do not have to pay the costs of servicing higher-cost development areas.

In NSW, the power for local utilities to levy developer charges for water supply, sewerage and stormwater services comes from section 64 of the *Local Government Act 1993* by means of a cross-reference to section 306 of the *Water Management Act 2000*.

Utilities should set their developer charges consistent with the method and procedural requirements outlined in the department's developer charges guidance, currently titled *2016 Developer Charges Guidelines for Water Supply, Sewerage and Stormwater*. Under these guidelines:

- The developer charge for each equivalent tenement[20] is calculated as the present value of the capital expenditure required over time to service the development area, less the present value of the expected net income over time from providing services to the development area.
  - Net income is revenue received from servicing the area (from levying periodic prices on residential and non-residential properties in the new development area) less the operating and maintenance costs of providing services to the area (that is, the 'reduction amount').
- Utilities must outline developer charges and related information in development servicing plans (DSPs). Utilities must register all DSPs with the department and publish them on the utility's website.
- A utility may elect to levy less than the calculated developer charge and to cap developer charges. This is to maintain affordability and to avoid 'stranded assets'. If it does so, the utility must calculate the resulting cross-subsidy from existing customers and disclose it in the relevant DSP, its annual report, annual operational plan and in communication materials for consultation with stakeholders. The utility also needs to prominently disclose and explain the effect of cross-subsidies for new development on the typical residential bill on its website and report it to the department.
- An increase in developer charges (that is, a move from lower to higher developer charges) may be phased in over a 3-year period.
- A utility should review developer charges relating to its DSP documents after a period of 4 to 8 years.
- The department may exempt utilities with growth of under 5 lots for each year from the need to prepare DSPs.

3.4. Prices are reasonably stable over time and consider affordability and impact on customers

The local water utility should consider how to manage revenue volatility over time while maintaining a relatively stable price path

If actual water sales volumes match the forecasts used to set prices, then the utility will recover its full revenue requirement (that is, it will not under- or over-recover). However, there are often significant differences between forecast demand for water and actuals due to climate and economic variability, which mean that a utility faces the risk of under or over recovery. This can become a significant risk over a multi-year price path.

Given uncertainty in forecasting water sales volumes, a utility should consider how to manage revenue volatility to ensure it recovers its revenue requirement over time while maintaining a stable price path.[21]

[20] Equivalent tenement is defined as a detached residential home.

[21] This is consistent with IPART's approach when applying its 'demand volatility adjustment mechanism'. IPART's application of this mechanism is explained in detail in Appendix D of the Final Report accompanying its 2020 determination of Hunter Water's prices.

Options to manage risks include:

- a rolling 'true-up' at the end of the pricing period. This determines an under- or over-recovery amount to be added to the revenue requirement when setting prices for the next pricing period in a way that recovers this amount in NPV terms, while seeking to maintain price stability.
- measures used by economic regulators such as IPART and the Essential Services Commission to manage material variations between forecast efficient costs and sales volumes and actual efficient costs and volumes over the pricing period.

Appendix B gives more guidance on how utilities could apply measures to manage revenue volatility.

The local water utility should establish multi-year pricing paths (periods) for its water supply and sewerage services

Relatively stable price paths and longer pricing periods assist customers and the utility to better plan and manage water services.

There is a trade-off between shorter and longer pricing periods:

- Shorter periods (for example, setting prices annually) reduce the risk of forecasting error but impose higher administrative costs on the utility (in having to comprehensively set prices more regularly) and may create more price uncertainty and volatility for its customers.
- Longer periods (for example, setting prices for 4 years or more) help to lower administrative costs to the utility, improve certainty for customers (at least over the pricing period) and align investments with the utility's strategic planning, but will increase the risk of forecasting error (and hence that prices deviate from efficient costs over the period).

Longer pricing periods create stronger incentives to develop accurate forecasts of costs and sales volumes; and allow utilities to build customer acceptance of changes to prices more gradually. For example, an increase in prices in a new pricing period could be phased in gradually over a 4-year period so that prices may not recover costs in year 1, but they do recover costs in NPV terms over the 4-year period.

Unless there is a case otherwise, a council-owned utility should establish 4-year price paths (periods) consistent with its long-term price path and in alignment with its Delivery Program and Community Strategic Plan. A utility would need to review its prices in the final year of its current pricing period (year 4 of pricing period 1) to have new prices in place from the first year of its new pricing period (year 1 of pricing period 2).

The case for a shorter pricing period (for example, annually) would be, for example, if the utility's operating environment is affected by significant change, which makes forecasting accurate costs and/or sales volumes over a 4-year period extremely difficult. For instance, this may happen if a significant change to a key regulatory requirement is pending, but not yet known.

To calculate prices over a multi-year period:

- revenue requirements and prices can be initially set over this period in real dollars (that is, excluding the effects of inflation), with prices then formally confirmed and indexed each year to account for the effects of inflation.

- a utility does not need to set its prices to recover its revenue requirement in each year of the pricing period. Rather, to allow for a smooth price profile, prices can be set to recover these costs in aggregate over the pricing period in net present value (NPV) terms.

The local water utility should conduct analysis of potential effects on customers before finalising prices

Before finalising prices for a pricing period, the utility should consider how prices may affect its customers. This includes potential changes to price levels and/or price structures (for example, an increase to usage charges or fixed service availability charges).

The level of analysis should be proportionate to the size of potential bill increases and should focus on high level questions:

- Is the level of average or typical bill increases for a range of residential and non-residential customer types justified? Including, for example, larger households, smaller households, pensioners and any other vulnerable groups, and commercial and industrial customers of various sizes.
- Is the size and frequency of bill or price increases over time justified? For instance, a given increase in prices may have less of an effect on customers if it follows a sustained period of relatively flat prices compared to if it follows a sustained period of material price rises.
- What are average or typical bills relative to comparable utilities?
- What is the nature of its customer base? Including for example, its measure of relative socio-economic advantage or disadvantage, as measured by the Australian Bureau of Statistics' (ABS's) Socio-Economic Indexes for Areas.
- What is the potential for customers to mitigate the potential effect of price increases? For example, through accessing pensioner rebates or other concessions, or through reducing their discretionary use of services (if applicable).

The utility should take care to ensure that its customers are aware of its hardship policies, and make these readily accessible (including on the utility's website and bills).

The utility should consult with its customers to understand their needs, values and preferences, including their preferences about potential trade-offs of service levels and price. The guidance on the outcome of understanding service needs gives more guidance on understanding customers' needs, values and preferences.

The guidance on the outcome of understanding revenue sources gives more guidance on understanding customers' ability to pay for services.

The local water utility should consider ways to minimise the potential effect of price increases on customers

The utility should consider ways to minimise the potential effect of price increases on customers, including:

- gradually phasing large price increases in over several years and smoothing prices over time as much as possible (this could still potentially allow the utility to recover its revenue requirement over a given period, in NPV terms)
- ensuring customers are aware of available concessions and eligibility requirements for these concessions, and that customers are also aware of the utility's financial or payment hardship policies
- considering the scope to re-size or re-profile planned expenditure, particularly if this can be achieved without compromising service quality.

3.5. Dividend payments

The local water utility may pay dividends to the owner council, if it meets certain pre-conditions

A dividend is a return on investment paid to the shareholder. In the case of a utility, this is the local council responsible for managing and investing in the utility's water supply and sewerage functions.

Utilities are permitted to pay dividends from their water supply and sewerage service surpluses. However, payment of dividends must be consistent with the provisions in Section 4 of the Regulatory and Assurance Framework (see appendix A).

Utilities can only pay dividends from funds that are genuinely surplus to their efficient costs, so that they do not come at the expense of efficient expenditure or investment in the water business and hence service levels.

3.6. 'Ring-fencing' of the water supply and sewer business funds from the council's general-purpose fund

The local water utility should 'ring-fence' the water supply and sewer business funds from the council's general-purpose fund

Ring-fencing involves separating the costs and revenues of the local water utility from the council. That is, 'fencing off' the utility's assets and accounts from the council's other operations.[22]

Ring fencing is a requirement of section 409(3) of the *Local Government Act 1993,* which requires:

- utilities to use revenue from water supply and sewerage charges for providing water supply and sewerage services
- approval of the Minister for Local Government under section 410 of the *Local Government Act 1993* for loans between the water business and the council, and within the water business (that is, between services for which separate prices are charged).

Ring-fencing:

[22] Consistent with the requirements of section 409(3) of the *Local Government Act 1993*.

- leads to more accurate information that can be used for making decisions about resource allocation, management and operational changes and improvements
- promotes cost-reflective pricing – and hence prices that allow the utility to be financially sustainable, provide services to an appropriate standard to customers over time, and to send efficient signals to consumers about the costs of their water supply and sewerage supply
- is consistent with the principle of competitive neutrality, as it should ensure the water supply and sewerage prices of a utility reflect the costs of supplying these services (and not any cross-subsidisation between the council and the water utility, or the reverse).

The local water utility should establish and maintain accounting separation for its water services from the rest of the council's operations

The utility should attribute, allocate and record costs of its water business separately from the rest of its operations. It should also separately record and account for the revenue from its water business. That is, the council's water business should establish and maintain accounting separation from the rest of the council's operations.

It is expected that the utility will separately account for its costs and revenues between services within the water business (that is, recording and accounting for separate costs and revenues between its water supply and sewerage services).

To demonstrate ring-fencing is in place, the utility should:

- have a clearly established system and process for consistently and comprehensively attributing and recording direct costs to and within the water business (including between water supply and sewerage services), which maximises the recording of direct costs
- document its cost allocation manual, that establishes methods for consistently and comprehensively identifying and allocating common costs to and within the water business.

Preparing a cost allocation manual

A cost allocation manual will clearly explain the principles, policies and approaches it uses to:

- attribute all direct costs to its water business to its water and sewerage services. **Direct costs** are those that can be directly traced to a specific cost object (for example, a specific service).
- allocate common or indirect costs of water supply or sewerage services:
  - between the water supply and sewerage services– where the cost item is shared between range of utility services, and
  - between the utility and the rest of the council's operations – where the cost item is shared between both the council's utility business and its general operations.

Examples of **common costs** include corporate costs, such as some executive, HR, ICT, legal and insurance costs. Costs may also be common between the council's other operations and the utility, and/or between services within the utility.

The utility's cost allocation manual should clearly explain the reasons for its cost allocation methods:

- Generally, costs should be allocated on the basis of causality. That is, related to the service that 'causes' or necessitates the costs to be incurred.
- Use cost allocator principles that are transparent, simple and measurable.
- Be as simple as possible and use information that is available without undue cost and effort. The cost and effort of getting the required information should be in proportion to the resulting improvement in the accuracy of the cost allocation.[23]

There are some important principles to be applied in cost allocation:

- Where possible, common costs should be allocated using a causal allocator selected by the utility. A good causal allocator has a strong correlation with the costs of the service, is transparent, simple and measurable.
- A non-causal allocator should only be used to allocate common costs where these are immaterial or where establishing a causal relationship would take unreasonable cost and effort.
- The same cost should not be allocated more than once.
- A common cost should be allocated so that its full amount – no more and no less – is allocated between the services to which it relates.
- The aggregate costs allocated to each service or users of a service should be between the standalone and avoidable cost of providing the service.

Cost allocation is the process of identifying, aggregating, and assigning costs to specific cost objects. A cost object is any activity or item for which costs are separately measured. Cost objects are usually services, but can also include specific regions, segments of the production process or customers.

[23] IPART, Cost Allocation Guide, Water Industry Competition Act 2016, 2018 p 13.

Appendix A: Using this guidance as evidence for a dividend payment

The local water utility may pay dividends to the owner council, only if it meets certain pre-conditions

A dividend is a return on investment paid to the shareholder. In the case of a local water utility, this is a payment to the council responsible for managing and investing in the utility's water supply and sewerage functions.

Payment of dividends must be consistent with the eligibility criteria and other requirements set out in section 4 of the Regulatory and Assurance Framework.

Implementation of this guidance is evidence of four of the eligibility criteria (namely criterion 2, 3, 5 and 6), and contributes towards the evidence of criterion 4.

In summary, the eligibility criteria of section 4 of the Regulatory and Assurance Framework require that before paying a dividend a council must:

1. Calculate any dividend payment in accordance with the methodology set out in section 4.2 of the Regulatory and Assurance Framework.
2. Be able to demonstrate there is a surplus in the council's water supply and/or sewerage business.
3. The council must demonstrate full cost-recovery pricing and cost-reflective pricing including developer charges in place for the water supply and/or sewerage business.
4. Have in place effective, evidence-based strategic planning in accordance with section 3 of the Regulatory and Assurance Framework.
5. Demonstrate financial reports are a true and accurate reflection of the business.
6. Demonstrate, with an independent audit report of cost allocation of the water supply and/or sewerage business, that the overhead reallocation charge to the water supply and/or sewerage businesses is a fair and reasonable cost.

Appendix B: Optional how to guidance for implementing sound pricing and prudent financial management

To support utilities in achieving the strategic planning outcome of **implement sound pricing and prudent financial management** to a reasonable standard, we offer the following optional how-to guidance.

The optional how-to guidance in this section covers a variety of areas that may help address one or more of the expectations set out in section 3 of this guidance document.

How to determine capital-related costs using an annuity

The annuity approach forecasts asset renewal or replacement and growth costs over a fixed period. It converts these to a present value, and then converts this present value to a future annualised charge. The utility includes this annualised charge in its revenue requirement in setting water supply or sewerage prices.

The annuity should:

- provide the utility with sufficient revenue to invest to renew, and if necessary, upgrade its network to meet demand and appropriate service levels
- reflect efficient forecasts of capital expenditure
- consider a long-term planning horizon (beyond the pricing period)
- be reviewed on a regular basis.

There are several steps involved in determining capital-related costs using the annuity approach:

1. Forecast asset renewal or replacement and growth costs over the relevant time horizon. The utility can do this, for example, by drawing on:
   - relevant strategic and asset management plans
   - past experiences with similar assets
   - assessments of the operating performance and condition of existing assets
   - demand forecasts.
2. Apply an appropriate discount rate to calculate the present value of these future capital expenditure requirements. As outlined in the ‘Rate of return/discount rate’ part of section 3.3 of this guidance:
   - this should be the WACC or, at a minimum, an estimate of the council’s cost of debt
   - IPART estimates can be used, as it publishes:

- regular information on the midpoint WACC for utilities that it regulates in its Biannual WACC update and in its water price determinations
- a market-based estimate of the cost of debt for the local government sector in its 'Local Government Discount Rate Fact Sheet', which is calculated by taking the risk-free rate (10-year Australian Government bond yield), adding half of a debt margin spread (for 10-year, non-financial, corporate, A-rated debt) and debt-raising costs of 12.5 basis points.

3. Convert the present value to annualised charges (allowances) using the formula outlined in **Error! Reference source not found.** below. The utility includes these allowances in the calculation of its revenue requirements to set water supply and sewerage prices.

Box 6 - Annuity formula

The formula for calculating a constant annuity is:

$$PMT = PV\left[\frac{r}{1-\left(\frac{1}{1+r}\right)^{n}}\right]$$

where:

PMT = annuity payment per period

PV = present value future capital expenditure for asset replacements

r = discount rate

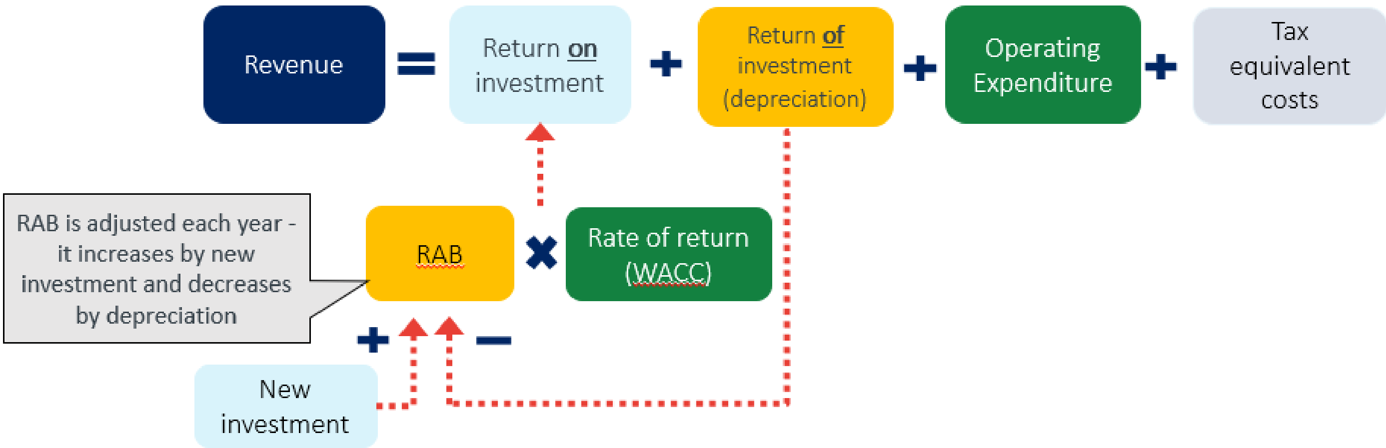
n = term of annuity (asset life)

How to determine capital-related costs under the RAB approach (upper bound pricing)

The RAB approach includes an allowance for a return of capital and a return on capital. The 'return of capital' reflects annual consumption of economic benefit or service capacity and is referred to as depreciation. The 'return on capital' reflects the opportunity cost of the investment.

Under the RAB approach, the 'building blocks' of the revenue requirement include the elements summarised in Figure 2 below.

Figure 2: RAB/building block approach



Where a utility is using a RAB approach to recover capital expenditure, it should take several steps to determine the capital-related costs of the revenue requirement:

- establishing the initial RAB value
- establishing the number of asset categories within the RAB to calculate depreciation, and the method for determining the depreciation allowance (the return of assets)
- determining the return on the RAB (the return on assets), including the rate of return or the weighted average cost of capital (WACC)
- rolling forward the RAB over time.

Establishing the initial RAB

The RAB should only include efficient capital expenditure funded by the utility. Therefore, it should exclude any capital expenditure deemed to be inefficient or excessive for the needs of current users or contributed by third parties (for example, government or developers).

Valuing existing assets is difficult. Their value could range anywhere from their scrap value to their optimal replacement cost. One approach is to value the initial RAB at the cost of replacing existing assets with assets in the same condition (that is, after allowing for depreciation) and with the same operational capability, but optimised to account for technological change and past sub-optimal investment decisions (such as poor location or over-capacity). This could be based on a modern engineering equivalent replacement asset (MEERA) or a depreciated optimised replacement cost (DORC) valuation of assets.

Where there is uncertainty about the efficiency of past capital expenditure and/or the utility's contribution to this expenditure, economic regulators such as IPART have drawn a 'line in the sand' in establishing the initial RAB. For example, IPART drew a line in the sand in establishing Sydney Water's initial RAB in 2000. This involved using the WACC to calculate the present value of Sydney Water's future revenue stream – minus cash operating costs – that the assets would generate based on (then) current prices. This reflected the economic value of its existing assets, was reasonably easy to implement and avoided any price shock to customers in transitioning to the RAB/building block approach (see **Error! Reference source not found.**).

Box 7 - Establishing Sydney Water's initial RAB

In its 2000 determination of Sydney Water's prices, IPART established Sydney Water's initial RAB using an **optimised deprival valuation** (ODV) approach.

This involved considering 3 potential bases:

- Replacement cost — the cost of replacing the existing assets with identical assets in the same condition (that is, after allowing for depreciation). For regulatory purposes, these costs can be optimised by adjusting for technological change and past poor investment decisions (such as bad location). The value so obtained is called the **DORC**.
- Recoverable amount — the future revenue stream, minus cash operating costs, that the assets will generate. This figure is then adjusted to today's dollars (that is, present value) to allow for the time value of money (or interest cost). This is the 'line in the sand' (LIS) method.
- Net realisable value — if the assets are surplus to requirement, the value is the price the assets could be sold for on the open market.

IPART observed that whichever is the:

- higher of the recoverable amount and the net realisable value is the economic value of the assets
- lower of the economic value and the DORC is the ODV of the assets.

Since, in Sydney Water's case, the DORC was much higher than the economic value, IPART estimated the value of Sydney Water's assets for pricing (that is, their RAB) by using the LIS method.

Source: IPART, Sydney Water Corporation – *Prices for Water Supply, Sewerage and Drainage Services, Medium term price path from 1 October 2000*, pp 20-21.

Transitioning from an annuity to a RAB

The ACCC has noted that, to achieve consistency in revenue (in present value terms) between the annuity and RAB approaches, the opening RAB value for a business that has previously financed all of its capital under a renewal annuity should equal zero. This is because the renewal annuity represents a current contribution by customers to the future renewal of assets, not a contribution by the utility yet to be recovered through prices.

It also states, however, that where an operator has financed capital investments outside the renewal annuity and has used debt financing or an equity contribution, there may be a case for establishing an opening value for assets of greater than zero. For example, it reports that in transitioning from an annuity approach to a RAB approach, the Victorian Essential Services Commission allowed rural water businesses with customer debt to roll this debt into their initial asset base, which was otherwise zero.[24]

[24] Australian Competition & Consumer Commission (ACCC), *Issues Paper – Water Charge Rules for Charges Payable to Irrigation Infrastructure Operators*, May 2008, p 24.

Once a utility establishes the initial RAB it should roll this forward as outlined below.

The return of investment (depreciation allowance)

The return of investments is usually calculated using a 'straight-line depreciation method', which means the value of the asset is returned to the utility evenly over the asset's economic life. That is, the utility divides the value of the asset by its assumed life in years to determine the annual allowance for depreciation for that asset.

In practice, a utility does not need to divide every asset's value by its specific life. Some form of aggregation is required – for example, dividing the RAB for each service by the weighted average life of assets in the RAB, or dividing the RAB into asset categories and dividing each of those categories by the weighted life of assets in each category. A utility could base the weighted average life of assets, for example, on its asset register (existing assets) and the items in its capital expenditure program over the relevant upcoming pricing period (new assets).

Regardless of the extent to which the RAB may be disaggregated to calculate the depreciation allowance, asset lives must be accurate. That is, weighted average asset lives should reflect the mix of depreciating assets used to provide water supply and sewerage services, which include short-lived assets such as computers and long-lived assets such as dams. When calculating the depreciation allowance, a utility should exclude non-depreciating assets from the RAB and calculation of weighted average asset lives. Non-depreciating assets may include land and holes (that is, typically sewer cavities).

If assets lives (or weighted average asset lives) are too short (that is, less than the true economic lives of the assets), today's customers will pay too much (that is, they will pay for future customers' consumption of the assets). If they are too long (that is, longer than the true economic lives of the assets), today's customers will pay less but future customers may pay for assets they don't use, and the utility may also face financeability concerns for a period. Accurate assets lives in the calculation of the depreciation allowance are therefore important for intergenerational equity.

IPART has recently noted that a weighted average asset life based on the relative depreciation of each of the individual assets produces the most accurate reflection of aggregate depreciation in the short term. But, to remain accurate, the weighted life of the remaining assets needs to be regularly reset (that is, at each price reset). According to IPART, if the weighted life of the remaining bundle of assets is not regularly reset with reference to the actual lives of the underlying assets that would normally maintain their value for a longer time may depreciate faster than they should.[25]

The return on investment

The NWI's Pricing Principles require the return on the RAB to be consistent with the WACC and 'with the cost of equity derived from the Capital Asset Pricing Model (CAPM).'

The WACC should reflect the weighted average cost of debt and equity required for an efficient business (the benchmark entity) to invest in necessary infrastructure.

[25] IPART, Draft Water Regulatory Framework: Technical Paper, May 2022, p 62-64.

If the WACC is set too high, customers would pay too much for the services and the water utility could be encouraged to overinvest. If it is set too low, the water utility's financial viability could suffer, leading it to underinvest.

Estimating a WACC can be complex, as it can require consideration of assumed gearing ratios, risk profiles compared to the market and how to estimate the cost of debt. However, IPART produces a WACC spreadsheet model and a biannual publication of WACC estimates for utilities (as well as other regulated entities), which a utility can use to set its prices. For example, IPART's biannual updates show that the midpoint of its real post tax water WACC estimates has ranged from 2.7% to 3.8% over the January 2020 to January 2022 period.[26]

A utility could apply a real or nominal WACC, and a pre or post tax WACC. As discussed in the 'Rate of return/discount rate' part of section 3.3 of this guidance, a utility should, however, ensure there is no double-counting of inflation or tax. IPART sets prices for the Central Coast Council, for example, by applying a real post tax WACC to its RAB. This is because it:

- calculates a separate tax allowance for the council, meaning the WACC should be post tax
- determines the council's revenue requirement and prices in real terms (year 1 dollars of the determination period), to then be annually indexed by inflation throughout the pricing period, meaning the WACC should be real (as real costs/prices will be separately adjusted to account for inflation).

The process of rolling forward the RAB over time

The RAB is rolled forward as follows:

$RAB_t = RAB_{t-1} \times (1+i)$ + capex − depreciation − capex contributed by third parties and developer charges revenue − asset disposals

Where:

- t is the year for which revenue is to be calculated, and t-1 is the previous year
- i is the annual indexation of the asset base (when the WACC is a real cost of capital)
- capex is prudent and efficient capital expenditure, added to the RAB as it is incurred or forecast to be incurred.

For the duration of a pricing period (for example, 4 years), a RAB may be held constant in real terms (to set prices in real dollars, to then be indexed by Consumer Price Index – CPI – in each year during the pricing period) and incorporate forecast capital expenditure over the period, less:

- forecast depreciation
- developer charges revenue
- contributions by third parties
- asset disposals.

[26] IPART, WACC Biannual Update, 24 February 2022, p 6, https://www.ipart.nsw.gov.au/Home/Industries/Special-Reviews/Regulatory-policy/WACC

In place of forecasts for the previous period, it can then be rolled forward to the start of the new pricing period to incorporate (adjust for):

- indexation and actual capital expenditure
- developer charges revenue
- third party contributions
- asset disposals.

Figure 3: Approach to rolling forward the RAB

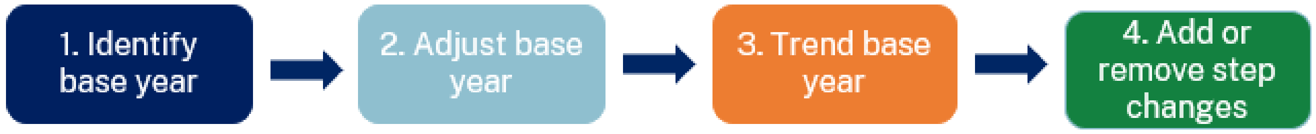
$$= RAB_{t-1} \times (1+i) - \text{Capex} - \text{Depreciation} - \text{Developer charges revenue} - \text{Capex contributed by third parties} - \text{Asset disposals}$$

How to estimate efficient operating expenditure

As previously noted, the utility's forecast operating expenditure should incorporate reasonable expectations for expenditure growth and cost efficiencies. It should clearly explain and justify any forecast increases in operating expenditure.

Consistent with this, a utility can use a 'base-step-trend' approach to forecast efficient operating expenditure, for inclusion in the revenue requirement when setting prices (**Figure 4**).

Figure 4: Base-trend-step method for forecasting operating expenditure



The 'base-step-trend' method involves:

1. Identifying a starting or base year of actual operating and maintenance expenditure. This is usually the most recent year of actual expenditure for the utility.
2. Adjusting the base year for any one-off or non-recurrent expenditure to derive a forecast that best reflects the operating expenditure requirements for the forthcoming period. For example, this could involve reducing base-year operating expenditure by the amount of any one-off expenditure that is unlikely to be incurred in the upcoming period.
3. Trending forward the base year over the forthcoming period, taking account expected:
   - output growth (that is, the relationship between operating expenditure and any change in the size of the network and/or the number of customers and volumes of water supplied and sewage removed)
   - real price growth, including the price for labour and materials (this should only include any price growth above CPI, assuming all costs/prices will eventually be indexed by CPI)
   - continuing efficiency gains, reflecting that over time, water businesses should become more efficient at providing services.
4. Adding or removing any step changes in costs resulting from:
   - new regulatory obligations that represent a major upward step in compliance costs
   - major external factors outside the control of the utility, where there will be an effect on the costs of the utility, and that are not accounted for through output, price or productivity growth
   - efficient operating/capital expenditure trade-offs, where avoided capital expenditure more than offsets an increase in operating expenditure in NPV terms.

In applying a continuing efficiency factor in its forecasts (part of step 3), a utility could use its own estimate of potential efficiency gains or apply an estimate in a prevailing determination of an economic regulator. For example, over recent years:

- IPART has applied an ongoing efficiency factor to utilities' forecast operating expenditure and capital expenditure. IPART bases this on the average multi-sector productivity of the Australian market sector over the last 40 years, drawing on data produced by the Productivity Commission's Productivity Bulletin. For IPART's 2020 determinations of prices for Sydney Water, Hunter Water and Water NSW Greater Sydney, this continuing efficiency factor was 0.8% for each year.[27]
- The AER has applied a continuing efficiency factor of 0.5% for each year to its determination of energy distribution networks' operating expenditure allowances. This is based on estimated productivity in the gas sector and labour productivity forecasts for the utility sector.[28]

How to estimate efficient capital expenditure

As previously mentioned, only prudent and efficient future renewal expenditure should be included in the annuity calculation under lower bound pricing, and only prudent and efficient expenditure should be included in the RAB for calculating the return on and off assets under upper bound pricing.

'Efficient capital costs' reflect the least-cost way to provide water supply and sewerage services to customers to an appropriate standard (that is, to meet customers' needs),[29] while complying with all regulatory requirements (for example, environmental regulatory requirements), taking into account a long-term planning horizon (for example, considering full life cycle costs of all options).

Capital-related costs generally constitute a large proportion of efficient costs recovered through water charges. Capital expenditure includes expenditure to:

- maintain service levels/standards – that is, renewal and replacement
- expand services – that is, growth
- make improvements or upgrades to existing services or to comply with existing or changed government or regulatory obligations – that is, improvements/compliance.

In determining its capital expenditure for a pricing period, a utility should consider:

- its strategic assessment management and financial plans (ideally, a utility's capital expenditure should be consistent with its long-term strategic plans)
- customers' needs and preferences for service levels, including their willingness to pay (subject to the utility's regulatory requirements)
- trade-offs between operating and capital expenditure to minimise costs to customers over the long term, while providing the service levels they need

[27] IPART, *Review of prices for Sydney Water*, Final Report, June 2020, Appendix F.

[28] As outlined in the AER's *Final decision paper – Forecasting productivity growth for electricity distributors*, March 2019.

[29] A local water utility's service levels should be established as part of 'make and implement sound strategic decisions' (see separate strategic outcome), and be informed by customer views and preferences.

- the utility's capacity to deliver expenditure, noting that some capital programs may need to be staged over several pricing periods.

Utilities should consider distinguishing between:

- recurring capital expenditure – where a utility can potentially use trend analysis to generate forecasts for the volume and timing of the replacement of certain assets, drawing on data about asset condition and risk analysis, noting that a utility should be able to identify and justify changes from trend over time
- less regular expenditure – where more tailored analysis is required to confirm efficient capital expenditure, including consideration of all viable options to achieve the required outcome (including capital and non-capital solutions) and assessment of the optimal timing, scale and scope of the project.

Larger capital projects should be supported by cost-benefit analysis, which considers all viable options to achieve the project's objective.

As noted by the Victorian Essential Services Commission, efficient capital expenditure has the following characteristics:

- Required expenditure is based on a P50 estimate, in which there is an equal likelihood of project costs being higher or lower than forecast (noting a P50 estimate may not be appropriate where a business's proposed capital program is dominated by one or 2 major projects).
- Contingency allowances are optimised.
- Forecast capital expenditure for renewal incorporates expectations for a reasonable rate of improvement in cost efficiency.
- Risks of project delays and cost overruns are managed through contractual agreements with service providers.[30]

Further, a key step to ensuring efficient operating and capital expenditure is following best-practice, competitive procurement practices.

How to estimate the long-run marginal cost (LRMC) of water and sewerage supply

In theory, the LRMC of supply is the cost of supplying an additional unit of supply over the long term (that is, assuming all factors of production can be varied). It comprises the sum of marginal operating and capital costs of increases in water or sewerage supply capacity to meet demand over the long term. LRMC is a forward-looking concept – that is, the LRMC calculation excludes costs that are sunk (that is, that have already been incurred or committed).

LRMC estimates are important for setting usage prices to promote efficient consumption decisions by consumers. They are also important reference points for utilities and other stakeholder to assess the efficiency of potential supply increases and/or conservation measures, and thus can help in

[30] Victorian Essential Services Commission (ESC), *2023 water price review: Guidance paper*, p 33.

promoting efficient investment decisions by utilities and other potential suppliers of water supply and sewerage services.

Developing water supply and sewerage LRMC estimates requires information on forecast demand and the efficient investment and expenditure requirements to meet this demand over the medium- to longer- term. This is information that utilities should have as part of sound strategic planning. It is particularly important that utilities facing significant upgrades in their water and/or sewerage supply systems within the next 10 years estimate and understand their LRMCs of supply.

There are 2 broad approaches to calculating LRMC for water supply and sewerage services: the **average incremental cost (AIC) approach** and the **Turvey (or perturbation) approach**. At a high level, they both involve 'shocking' estimates of demand by a defined increment (or decrement) from the assumed base level demand. A utility uses this to establish the incremental cost of meeting this additional demand (in the least-cost manner), in per unit NPV terms.

As shown in Figure 5:

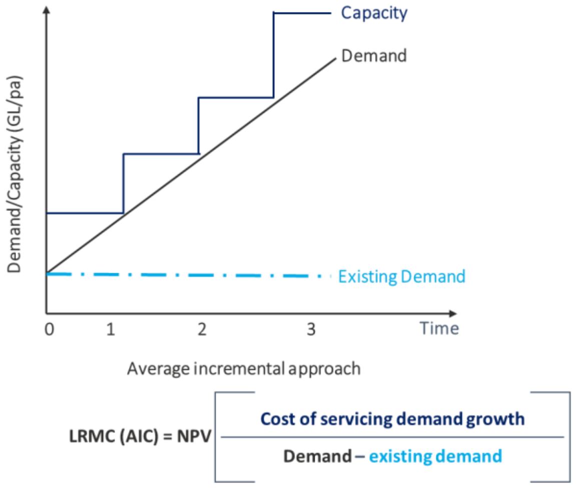
- **The AIC approach averages the costs of meeting growth in demand over each additional unit of demand.** Under the AIC method, the optimised long-run costs generate a capacity curve that ensures supply can meet demand over the period. The costs associated with the increase in capacity are divided by the difference in the current demand (light blue line) and forecast demand (dark blue line). The NPV of these costs per unit of additional demand over the period is the LRMC.
    - However, as the AIC approach averages all growth-related expenditure over all growth-related demand (rather than considering the marginal change in costs from a marginal change in demand) it is only an approximation of LRMC.
- **The Turvey (or perturbation) approach calculates the marginal change in costs from a marginal change in demand.** As with the AIC approach, under the Turvey approach costs are optimised to ensure that the supply and demand balance is maintained over the period. Demand is shocked (or perturbed) such that it jumps from the dark blue base demand curve upwards to the shocked demand curve. Costs are then re-optimised to maintain the supply demand balance. The NPV of the difference between the costs associated with the revised capacity (red dotted line based on the shocked demand) and the baseline capacity (dark blue line) divided by the difference between the shocked demand curve (light blue dotted line) and the base demand curve (black line) is the LRMC.

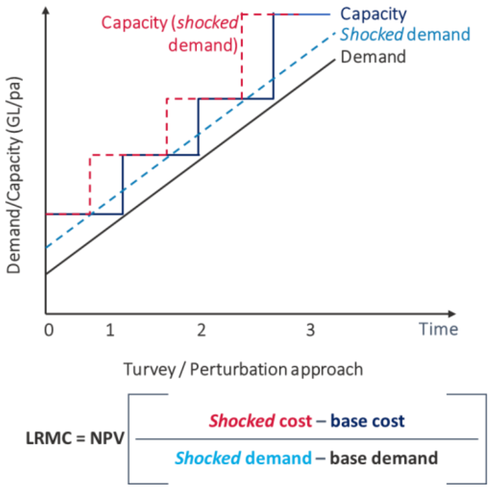
Importantly, given the inherent uncertainties and assumptions required in estimating LRMCs, there is no single LRMC estimate. There is value in estimating LRMC using both methods and under alternative assumptions.[31]

One of the main benefits of the Turvey approach is that by focusing on the effect of an increment (or decrement) in demand, it is more consistent with the concept of marginal cost.

Figure 5: Calculating LRMC

[31] IPART (2019), *Prices for Sydney Water from 1 July 2020- Issues Paper*, p.90.





While both methods differ slightly, they both require using the best available information by supply catchment/network on:

- existing demand/volumes and yield/capacity
- forecast demand/volumes over a given period (typically 30 years)
- program of optimised capital and operating expenditure[32] that a utility can implement to meet capacity/yield requirements to manage demand. This should consider all elements of the service supply chain (for example, bulk water supply, treatment and distribution; and sewage collection, distribution, treatment and disposal).
  - As water supply and sewerage assets can be very long-lived, and thus give benefits beyond the modelling period (typically 30 years), a utility should convert the profile of capital expenditure to an annuity
- the driver of expenditure, and whether it is related to meeting demand or incurred for other reasons (but has an effect on capacity or yield), for example:
  - Improving security of supply of a given area by connecting 2 parts of the bulk water system can increase overall system yield (and thus affect the volume of water the system can provide).
  - Reduced yield of a bulk water system as a result of reduced extraction from a river. In this example, the cost of managing reduced extraction should not be included (as it is related to complying with a policy requirement, rather than meeting growth).
- additional capacity or yield provided by each investment.
- build time for each investment.

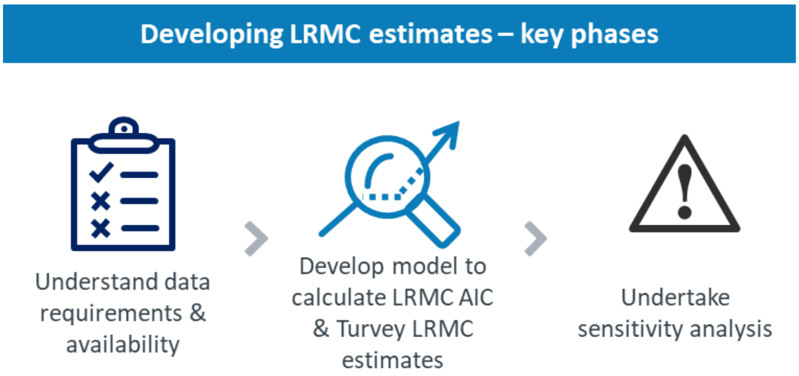
At a high level, as shown in Figure 6, developing LRMC estimates of water supply or sewerage services involves 3 key steps:

- **Step 1: Understand data requirements and availability**.
- **Step 2: Undertake LRMC modelling.** This includes developing LRMC estimates for water supply and sewerage services consistent with the methodologies outlined above (that is, calculating AIC and Turvey-based estimates).

[32] that is, the least-cost program of capital and operating expenditure.

- **Step 3: Undertake sensitivity analysis –** As discussed above, there is no one single LRMC estimate. It is important to understand how the estimate varies under alternative states of the world. This could involve simple sensitivity analysis to vary the discount rate, demand or cost estimates.

Figure 6: Three phases to calculating LRMC



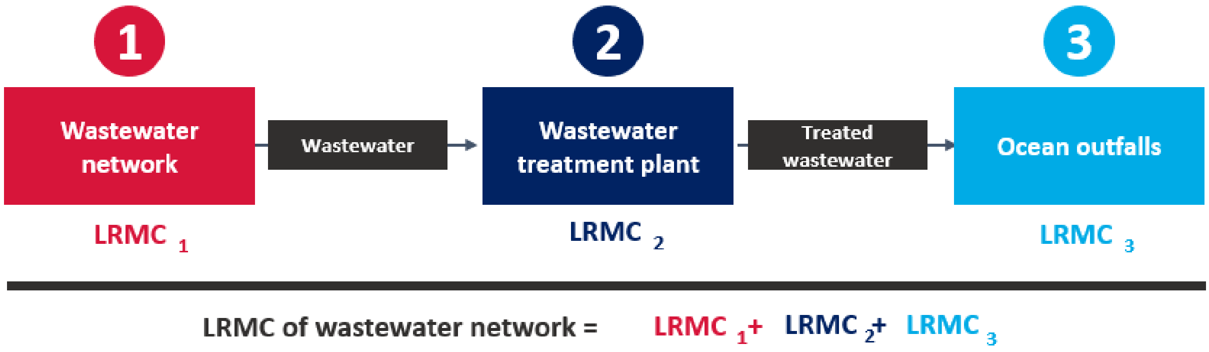
The same framework and method can be applied to both water supply and sewerage services. At a high level (recognising slight differences in the method discussed above):

- **For water supply, LRMC comprises the sum of marginal capital and operating costs associated with bringing forward planned increases in capacity or yield** (for example, a desalination plant or a recycled water plant or a pipeline). Water that a utility supplies to a particular location is often from a common bulk water supply system but the utility may supply it through discrete transfer and distribution systems. This means there is often a single catchment-wide bulk water LRMC but there can be multiple LRMCs for water supplied to end customers (reflecting different capacity constraints in different transfer and distribution systems).
- **For sewage management, LRMC comprises of the sum of the marginal operating and capital costs associated with bringing forward planning increases in capacity** (for example, expansion of a treatment plant or pipeline related to managing growth in volumes). If there are discrete sewerage systems within a utility's network, each with unique constraints, volumes and expenditure, each system will have a different LRMC (that is, separate LRMCs for each sewerage system).

The LRMC for a given supply system or catchment may comprise several individual LRMC estimates for each asset in the system. For example, calculating the LRMC of the indicative sewerage system/catchment in Figure 7 below would involve:

- calculating a separate LRMC for the sewage collection and transfer network
- calculating the LRMC of the sewage treatment plant
- calculating the LRMC of the sewerage system's ocean outfalls
- adding the 3 LRMC estimates together to calculate the total LRMC of the sewerage system.

Figure 7: Calculating LRMC – an indicative sewerage example



IPART's principles for estimating LRMC are listed in 0.

Box 8 - Principles for estimating LRMC

Estimates of long-run marginal costs should:

- capture all relevant supply chain components (for example, drinking water bulk water supply, treatment and transport; and sewage transportation, treatment and disposal)
- be specific to location and granular enough to give meaningful price signals for consumption and investment in a given location (for example, sewage catchment)
- reflect relevant cost drivers and include all relevant system-wide costs
- be based on an efficient portfolio of credible investment options, reflecting (published) information on system limitations and relevant strategic plans (for example, water plans and integrated water cycle management plans)
- use transparent and well-justified assumptions, including established population growth and climate forecasts or models, accepted water, sewerage and stormwater system planning assumptions, and relevant probabilistic or deterministic standards
- reflect a time horizon that would be expected to capture the life cycle of the next major augmentation of the relevant system
- use the best available information/data for the relevant inputs
- use a discount rate equal to the prevailing WACC determined by IPART
- use established and generally accepted estimation approaches, such as the Turvey Perturbation or AIC methods
- be exposed to sensitivity analysis to test how changes in inputs and assumptions affect results.

Source: IPART, *Guidelines for Water Agency Pricing Submissions*, November 2020, p 29.

Regardless of the approach utilities take to calculating LRMC, they should take care to ensure the capital and operating costs included in the analysis only relate to meeting demand.

How to estimate the short-run marginal cost (SRMC) of water and sewerage supply

SRMC is the cost of supplying an additional unit, assuming that at least one factor of production (capital investment) is fixed. It can also be considered as the costs a utility would avoid if it did not provide an additional unit of supply.

SRMC can be much more variable than LRMC. For example:

- When there is sufficient capacity, SRMC can be quite low – comprising, for example, the pumping (electricity) and treatment (chemicals) costs incurred in supplying an additional kL of water or in transport, treating and disposing of an additional kL of sewage. A utility can estimate its SRMC of water (or sewerage service) supply by, for instance, calculating the costs of supplying an additional X kL of water (or sewerage services), and then dividing that total additional cost by X to derive a $ per kL estimate.
- However, when there is insufficient capacity, SRMC can be much higher because water may need to be supplied from more expensive sources or sewage may need higher levels of alternative forms of treatment.

In cases where little investment is required to meet demand (for example, if there is sufficient capacity in the sewerage system or sufficient water supply for the foreseeable future because of little to no population growth), the LRMC is likely to be lower and closer to SRMC.

How to set water supply and sewerage service availability charges

Once a utility has determined forecast revenue from water supply and sewerage usage charges (usage charges multiplied by forecast sales volumes), it can then set water supply and sewerage service availability charges to recover the residual revenue requirement in each year. Service availability charges are annual charges to customers and are independent of the customer's level of consumption.

Under a 2-part tariff, the water usage price is generally used to signal the costs of an additional unit of water supply, with the fixed service charge then used to recover any residential revenue requirement. The question is often then how to best allocate this residual revenue requirement across customers, through fixed water service availability charges, taking account of factors such as equity, administrative efficiency and avoiding any perverse or sub-optimal outcomes.

To reflect the load they can place on the water and sewerage supply systems and be equitable, one option is to set customers' service availability charges based on the size of the customer's water supply service connection or meter. To achieve this, they can be calculated as follows:

Water supply service availability charges

- A utility determines how many water meters/connections it serves, by size, and converts these to a number of base level (for example 20 mm) meter equivalents:
  - for residential customers (including standalone houses and each apartment or unit), it could deem each customer to be a 20 mm meter/connection[33]
  - for non-residential customers, it would convert a meter to a 20 mm equivalent as follows:

$$(\text{meter size in mm})^2 \div 20^2 = \text{number of 20 mm equivalents}$$

- A utility would then divide its residual revenue requirement for water by the number of 20 mm equivalent connections, to determine a 20 mm connection charge.
- For residential customers, a utility can then apply this charge to each customer – that is, each dwelling unit (for example, standalone houses, strata title units, non-strata title units and attached dual occupancies).
- For non-residential customers, a utility can adjust this 20 mm connection charge to reflect the actual size of the meter servicing them as follows:

$$\text{Service availability charge} = \frac{(\text{meter size in mm})^2 \times \text{charge for a 20 mm meter}}{20^2\ (=400)}$$

Sewerage service availability charges

A utility can apply the same approach for determining its sewerage service availability charges, with the exception that it would apply sewerage discharge factors to the water meters in converting them to 20 mm equivalents and in applying the charge.

When the sewerage service availability charge is combined with the allowance for a deemed residential sewerage usage charge, it means that the annual residential sewerage bill can be calculated as follows:

$B_r = SDF \times (AC_{20} + C_r \times UC)$

- Where B_r = annual residential sewerage bill
- SDF = residential sewerage discharge factor (the proportion of total residential water consumption that is discharged to the sewerage system)
- AC_{20} = annual residential sewerage service availability charge (before application of the discharge factor)
- Cr = average annual residential water consumption
- UC = sewerage usage charge.

[33] Rather than deeming each residential customer to have a 20 mm connection, the utility could base charges on residential customers' actual meter size. However, this may result in strata units paying different charges, depending on whether they have a common meter or are individual metered (and provide an incentive for units not to be individually metered).

The annual non-residential sewerage bill can be calculated as follows:

$B_N = SDF \times (AC + C \times UC)$

- Where B_N = annual non-residential sewerage bill
- SDF = the customer's sewerage discharge factor (the proportion of total residential water consumption that is discharged to the sewerage system)
- $AC = AC_{20} \times (D^2/20^2)$
- C= customer's annual water consumption (kL)
- D = water supply connection (meter) size
- UC = sewerage usage charge (kL).

Given the potential effect of discharge factors, utilities may wish to put a floor on the non-residential sewerage bill that is equal to the residential service availability charge plus the deemed residential sewerage usage charge (or allowance) – that is, set a minimum non-residential bill equal to the residential bill.

How to recover costs of recycled water schemes

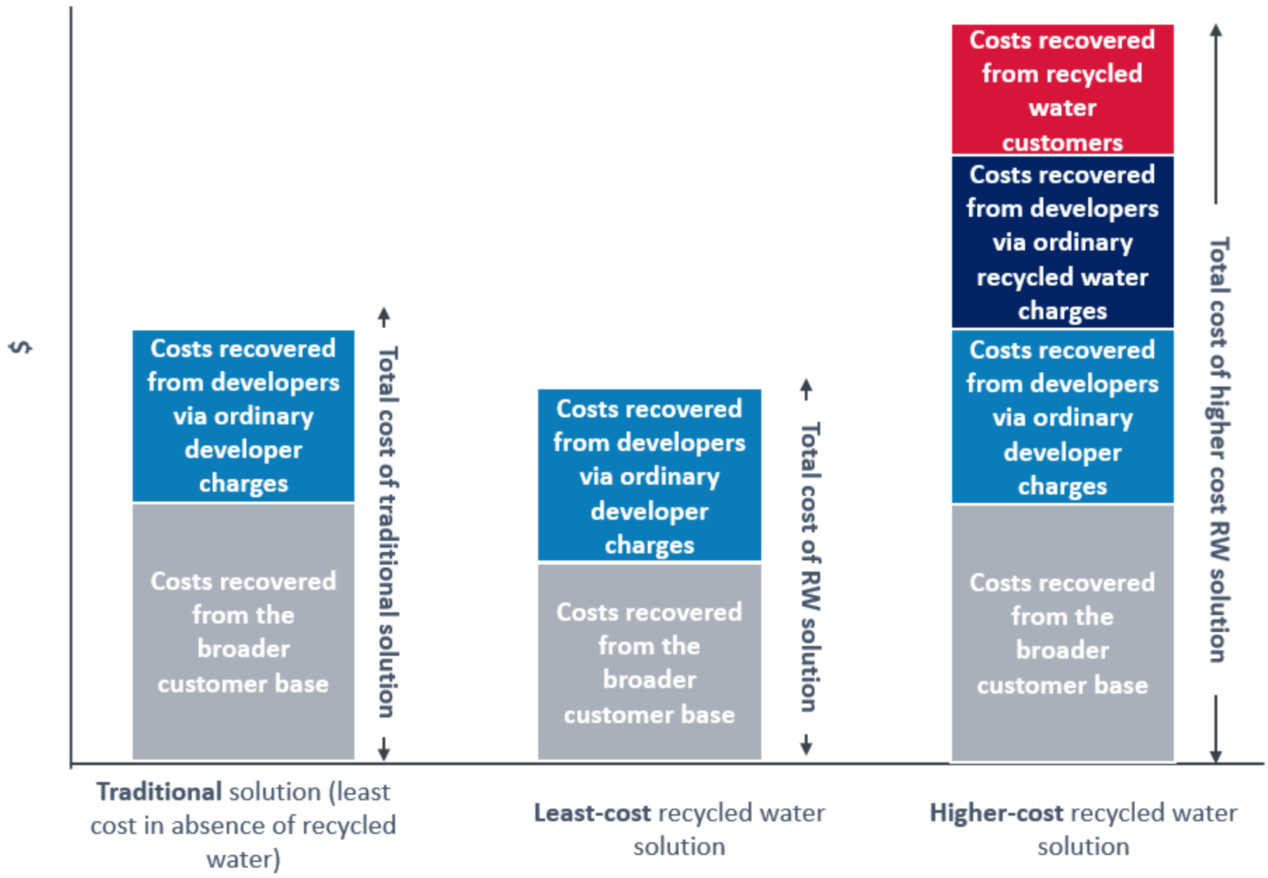
IPART has established a framework for how Hunter Water and Sydney Water can recover the costs of their recycled water services.[34] This is broadly consistent with the NWI's Pricing Principles for recycled water and utilities can therefore use it as a guide in determining how to recover the costs of their recycled water schemes.

As shown in Figure 8, under this framework:

- If the recycled water scheme represents the least-cost means of delivering water and/or sewerage services, the utility could recover its costs through water and/or sewerage prices and developer charges from the broader customer base, like any other efficient water or sewerage costs.
- If a recycled water scheme is not the least-cost means of delivering water or sewerage services, then the utility can still recover its costs from the broader water and/or sewerage customer base, but only up to the higher of the:
    - value of any net avoided water and/or sewerage costs of the recycled water scheme – that is, the costs the broader customer base would have faced under the least-cost supply solution, regardless of the investment in the recycled water scheme
    - broader customer base's willingness to pay for any external benefit of the scheme.

[34] This is outlined in IPART's Final Report on its *Review of Pricing Arrangements for Recycled Water and Related Services*, July 2019.

Figure 8: Funding recycled water schemes



To identify the appropriate funding arrangement, the utility should identify if the recycled water scheme represents the least-cost means of delivering water and/or sewerage services.

How to identify if recycled water represents the least-cost means of delivering water and/or sewerage services

Least cost represents the least cost to the service provider of delivering its water, sewerage and/or stormwater services, while complying with its regulatory requirements. This means any assessment of least cost should:

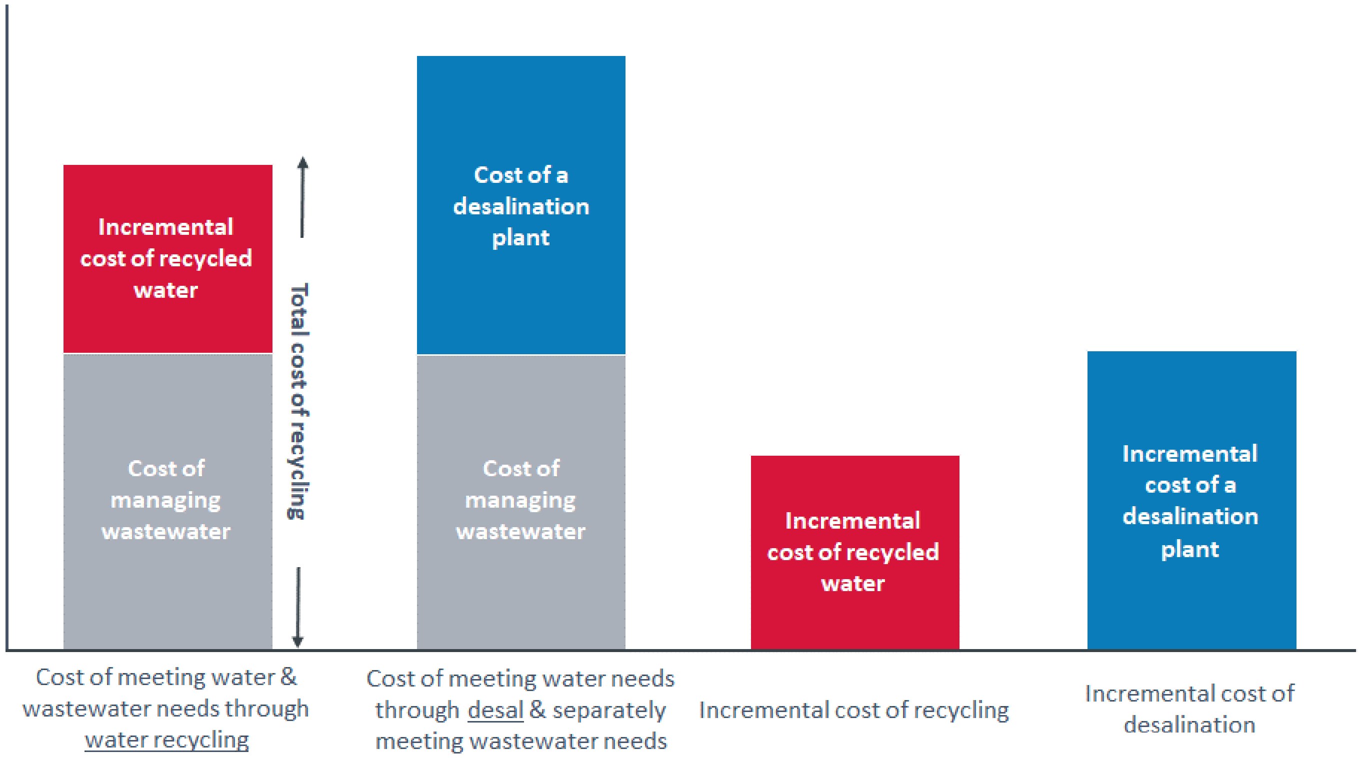
- consider all capital and operating costs of complying with relevant regulatory requirements
- consider all system-wide costs, including effects and avoidable costs in the upstream water and downstream sewerage networks (see discussion below)
- consider costs over the lifespan of the relevant investment (typically 30 years with a residual value)
- be consistent with long-term, system-wide strategic plans
- only include costs to the service provider (that is, exclude private costs).

It is important to capture the system-wide costs (rather than just focus on the direct costs of the investment), because some investments, such as recycling, can have a significant effect on downstream sewerage services costs. In those cases, a simple comparison of costs of different investments (whereby projects are ranked in ascending order from lowest per unit cost to highest per unit cost) may not help identify the optimal investment.

For example, to compare the cost of recycling with desalination, the utility must recognise that recycling can represent both a water supply source and a method of managing sewage. As shown in the stylised example in Figure 9:

- Recycling appears to be a more expensive solution when the total cost of recycled water is compared to the total cost of a desalination plant.
- However, when the incremental cost of recycling (that is, the cost on top of the sewage management solution) is compared to the incremental cost of desalination, it represents the least-cost approach to delivering water services.

Figure 9: Cost comparisons should account for all system-wide costs



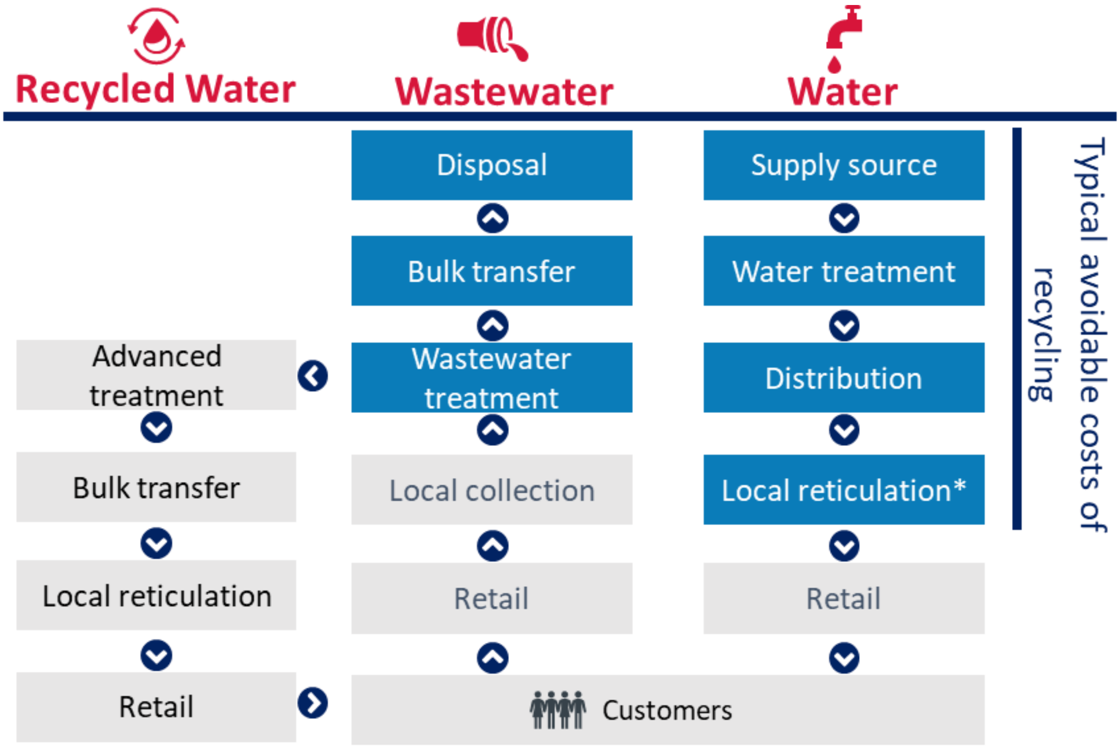
How to estimate avoided costs

A material benefit of some services (such as some recycling schemes) is avoided upstream water and downstream sewerage capital and operating costs. For example, as shown in Figure 10, recycling to meet some water demands can avoid or defer:

- **short-term operating costs in the supply and delivery of drinking water,** from the bulk supply source through the transfer and distribution system to the customer
- **costs associated with longer-term augmentation** to the capacity of each of these components of the water supply system
- **short-term operating costs in the transport of sewage** from customers' premises through the distribution and transfer system, and its treatment and disposal
- **costs associated with longer-term augmentations** to the capacity of each of these components of the sewerage system.

The deferral of this expenditure represents an economic cost saving for the community (an 'avoided cost' benefit) relative to a base case of no further sewage recycling. Conceptually, the avoided cost is equal to the difference in the present value of the streams of capital and operating expenditure with and without the recycling scheme.

Figure 10: Avoided costs – recycled water may avoid shorter term and longer-term costs



To determine the relevant avoided costs associated with undertaking water investments, it is important to consider all parts of the upstream (that is, drinking water supply) and downstream (that is, sewage capture, treatment and disposal) supply chain – whether this be owned and/or operated by the utility or other parties.

As documented in its *Review of pricing arrangements for recycled water and related services*, IPART notes that LRMC estimates can be used to estimate avoided costs:

> ‘We prefer that avoided and deferred costs funded by broader customers be calculated on the basis of long-run marginal cost (LRMC) estimates of potable water, wastewater and stormwater services’.[35]

In simple terms, as shown in Figure 11, avoided costs can be estimated by multiplying:

- the LRMC of the supply of water or sewerage services (‘price’ of supply); by
- the reduction in water or sewage volumes (‘quantity’ of supply) over the modelling period, as a result of the recycled water produced.

Figure 11: Estimating the value of avoided costs

[35] IPART, *Review of pricing arrangements for recycled water and related services*, Final Report, 2019.

Appendix C: Templates, case studies and tools

To support utilities in achieving the strategic planning outcome of **implement sound pricing and prudent financial management** to a reasonable standard, we give the following optional templates, case studies and tools.

Illustrations of determining building block revenue requirements using the RAB approach

The IPART website[36] gives an illustrative spreadsheet model setting out how it determines a utility's revenue requirement and then how it converts this into prices. This may be a useful reference point for some utilities for more information and detail.

It includes worksheets on IPART's policies for determining revenue requirements, instructions on how to use the illustrative model and key cost components, including the RAB, operating expenditure, tax allowance and WACC.

The department's financial planning model (FinMod)

For local water utilities that chose to set lower bound pricing, the department's financial planning model for local water utilities (FinMod) enables utilities to use their data on long-term expenditure and investment projections to calculate typical residential bills. This can be used to analyse potential effects on customers by comparing bills for scenarios with different levels of service and associated revenue requirements as well as for any other sensitivity analysis.

The FinMod model is currently not fully aligned with the expectations set out in section 3. It would need to be adapted by calculating separately renewals annuity and entering this directly into the model as annualised projected renewals. The operating expenditure stream need to include tax equivalents (excluding income tax).

A utility that decides to pay a dividend to Council's general fund will need to seek an appropriate level return on investment as an output of the model.

The department will update FinMod to fully align with this guidance in 2023.

The FinMod model is available from the department upon request.

[36] https://www.ipart.nsw.gov.au/Home/Industries/Special-Reviews/Regulatory-policy/IPART-cost-building-block-and-pricing-model

Estimating the LRMC of water and sewerage supply

As discussed above, there are 2 broad approaches to calculating LRMC:

- The AIC approach averages the costs of meeting growth in demand over each additional unit of demand.
- The Turvey (or perturbation) approach calculates the marginal change in costs from a marginal change in demand.

Table 1 gives examples of some of the assumptions or characteristics that utilities should consider when developing LRMC estimates.

Table 1: Calculating LRMC -example of information requirements

Assumption	Sewerage services	Bulk water	Treatment & reticulation of water (non-bulk)
Geographic scope	By system (can be multiple systems)	Across the entire water system (typically one system)	By water supply zone (can be multiple zones)
Key drivers of LRMC	• Volume of discharged sewage collected, treated and disposed • Load/composition of sewage • Capacity of assets • Cost and timing of proposed investments	• Water demand • Water quality • Yield of assets • Cost and timing of proposed investments	• Water demand • Water quality • Capacity of assets • Cost and timing of proposed investments
Expenditure trigger by growth in demand	• To expand transport and/or treatment capacity to accomodate dry weather volumes • To expand transport and/or treatment capacity to accomodate wet weather overflows (to the extent that increased demand affects the capacity of the system to manage wet weather overflows)	• To increase system yield	• To expand treatment and transport capacity
Possible sensitivities	• Discount rate • Sewage volumes • Existing capacity (trigger for investment) • Capital and operating costs of proposed investment • Build time and capacity of proposed investment	• Discount rate • Water demand • Existing yield (trigger for investment) • Capital and operating costs of proposed investment • Build time and yield of proposed investment	• Discount rate • Water demand • Existing capacity (trigger for investment) • Capital and operating costs of proposed investment • Build time and capacity of proposed investment
LRMC technique	• AIC • Turvey	• AIC • Turvey	• AIC • Turvey

Estimating LRMC in practice – a worked example

Figure 12 summarises a worked example involving the calculation of LRMC using the Turvey and the AIC approaches, for an indicative water network.

This example is for illustrative purposes only and only covers 10 years (rather than the recommended typical 30-year period). In practice, any LRMC estimate should be a long-term assessment, typically 30 years.

Under the Turvey approach:

- **Step 1**: Identify forecast demand and supply constraints. In this indicative example, in the absence of any investment, demand will exceed supply in 2031 (15 ML of demand compared 10 ML of supply). This means that action is required by 2031 to ensure supply exceeds demand over the period.
- **Step 2**: Identify the capital and operating cost of meeting forecast demand over the period. To meet demand, assuming a 3-year lead time, capital expenditure of $690,000 is required in 2028 and ongoing operating expenditure of $10,000 per year from 2031 is required.
- **Step 3:** Convert the forecast capital expenditure to an annuity, in recognition of the fact that the benefits of the water supply option go beyond the modelling period. In this example, we have assumed the life of the asset is 50 years, resulting in an annuity of $50,000 per year.
- **Step 4**: Calculate the present value of expected capital and operating expenditure to meet forecast demand ($385,409) and the present value of forecast demand (85 ML)
- **Step 5:** Shock (that is, increase or decrease) the demand by a given increment (in this example, demand has been shocked by 1.3 ML per year).
- **Step 6**: Repeat steps 1 to 3 for the shocked demand curve. In this example, increased demand brings forward investment requirements from 2031 to 2029, resulting in a present value of expenditure of $471,250 and a present value of demand of 99 ML.
- **Step 7**: Calculate the LRMC by dividing the difference in the present value of expenditure ($471,250 − $385,409 = $85,842) by the difference in the present value of demand in KL (99,489 kL − 84,694 kL = 14,794 kL).

Under the AIC approach:

- **Step 1**: Calculate the difference between forecast demand and existing demand for each year of the modelling period.
- **Step 2**: Identify the capital and operating cost of meeting forecast demand over the period. To meet demand, assuming a 3-year lead time, capital expenditure of $690,000 is required in 2028 and ongoing operating expenditure of $10,000 per year from 2031 is required.
- **Step 3:** Convert the forecast capital expenditure to an annuity (see Box 2), in recognition of the fact that the benefits of the water supply option go beyond the modelling period. In this example, we have assumed the life of the asset is 50 years, resulting in an annuity of $50,000 per year.
- **Step 3:** Calculate the present value of expected capital and operating expenditure to meet forecast demand ($385,409) and the present value of forecast demand (85 ML).
- **Step 4**: Calculate the LRMC by dividing the present value of expenditure to meet growth ($385,409) by the present value of forecast demand (85 ML) in kL.

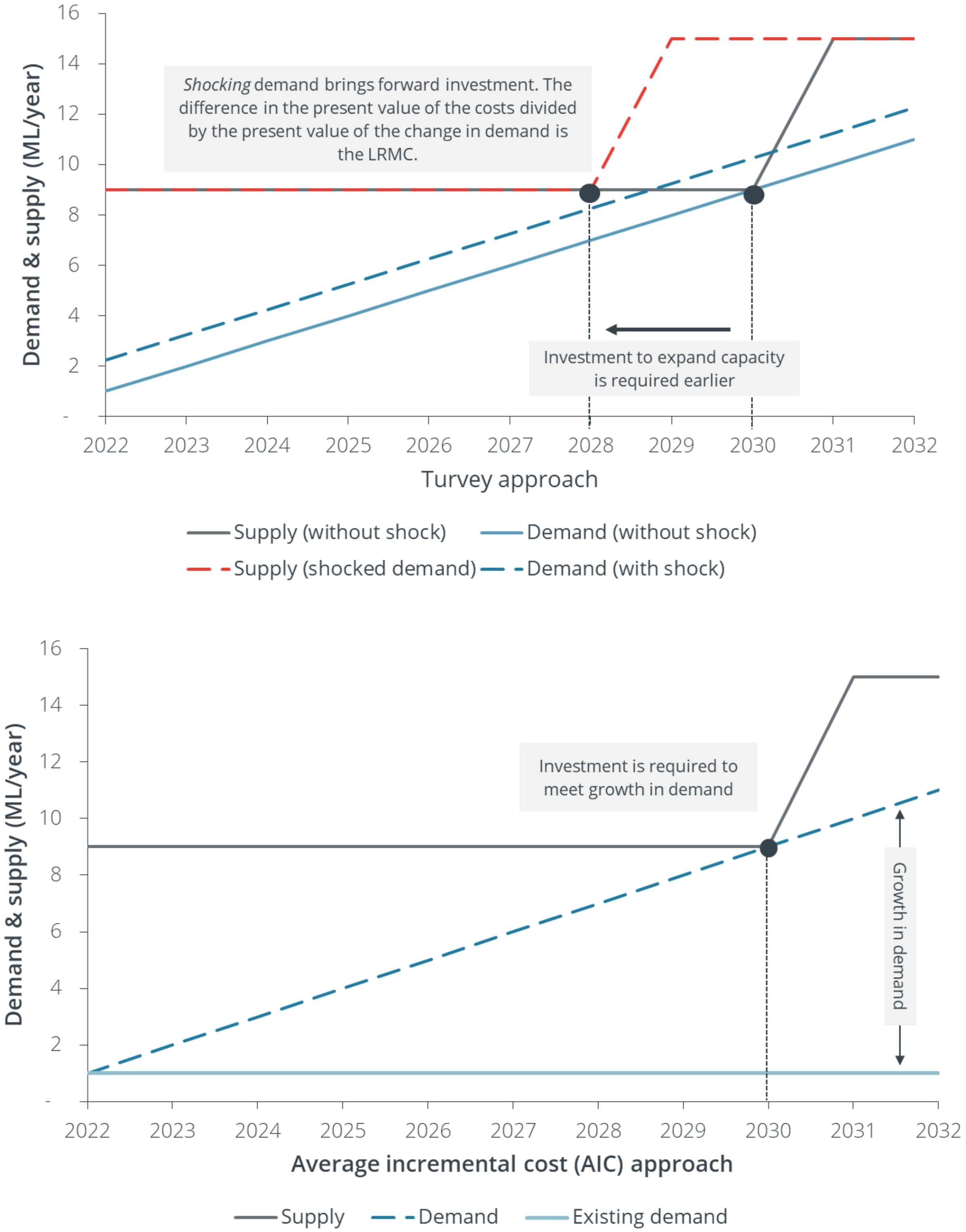
Figure 12: Calculating LRMC – an indicative water supply calculation

Indicative water supply system		Present value	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2032	2032	2032	2032	2032	2032	2032	2032	2032	2032	2032
Discount rate	7%																							
Turvey approach																								
Difference in present value of expenditure (A-B)		85,842																						
Difference in present value of demand (with & without shock)		14.7944																						
LRMC (PV expenditure / PV volumes)		5.8																						
Without shock																								
Supply (without shock)	ML/year		9	9	9	9	9	9	9	9	9	15	15	15	15	15	15	15	15	15	15	15	15	15
Demand (without shock)	ML/year	84.694	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Capital expenditure (annuity)	$2020-21		-	-	-	-	-	-	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Operating expenditure	$2020-21		-	-	-	-	-	-	-	-	-	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
A: Total expenditure	**$2020-21**	**385,409**	**-**	**-**	**-**	**-**	**-**	**-**	**50,000**	**50,000**	**50,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**
With shock																								
Supply (shocked demand)	ML/year		9	9	9	9	9	9	9	15	15	15	15	16	17	18	19	20	21	22	23	24	25	26
Demand (with shock)	ML/year	99.489	2.3	3.3	4.3	5.3	6.3	7.3	8.3	9.3	10.3	11.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3
Capital expenditure	$2020-21		-	-	-	-	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Operating expenditure	$2020-21		-	-	-	-	-	-	-	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
B: Total expenditure	**$2020-21**	**471,250**	**-**	**-**	**-**	**-**	**50,000**	**50,000**	**50,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**
Average Incremental Cost (AIC) approach																								
Present value of expenditure required to meet growth		385,409																						
Growth in demand		73																						
LRMC (PV expenditure / PV volumes)		5.3																						
Without shock																								
Supply	ML/year		9	9	9	9	9	9	9	9	9	15	15	16	17	18	19	20	21	22	23	24	25	26
Demand	ML/year		1	2	3	4	5	6	7	8	9	10	11	11	11	11	11	11	11	11	11	11	11	11
Existing demand	ML/year		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Growth in demand (compared to today)	ML/year	73	-	1	2	3	4	5	6	7	8	9	10	10	10	10	10	10	10	10	10	10	10	10
Capital expenditure	$2020-21		-	-	-	-	-	-	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Operating expenditure	$2020-21		-	-	-	-	-	-	-	-	-	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Expenditure required to meet growth in demand	**$2020-21**	**385,409**	**-**	**-**	**-**	**-**	**-**	**-**	**50,000**	**50,000**	**50,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**	**60,000**

Note: this is an indicative example only (rather than a working modelling tool) and as such, does not cover the typical modelling period (30 years).

In this example, the Turvey and AIC approach lead to slightly different answers. This highlights the benefit of calculating LRMC estimates using both approaches to ensure the range of LRMC estimates is identified.

Figure 13: Calculating LRMC – an indicative water supply calculation



Setting service availability charges

As outlined above, to reflect the load they can place on the water and sewerage supply systems and be equitable, customers' service availability charges can be set in proportion to the size of the customer's water supply service connection (or meter). This can be done by:

- deeming each residential customer (standalone houses and individual units or apartments) to have a standard 20 mm meter and using non-residential customers' actual meters ('deemed residential' approach – see Figure 14 and Figure 16), or
- using each residential and non-residential customer's actual meter ('pure meter' based approach – see Figure 15 and Figure 17).

Such potential methodologies for setting water and sewerage service availability charges are outlined below. Each approach has its own pros and cons.

Figure 14: Water service availability charge – deemed residential approach

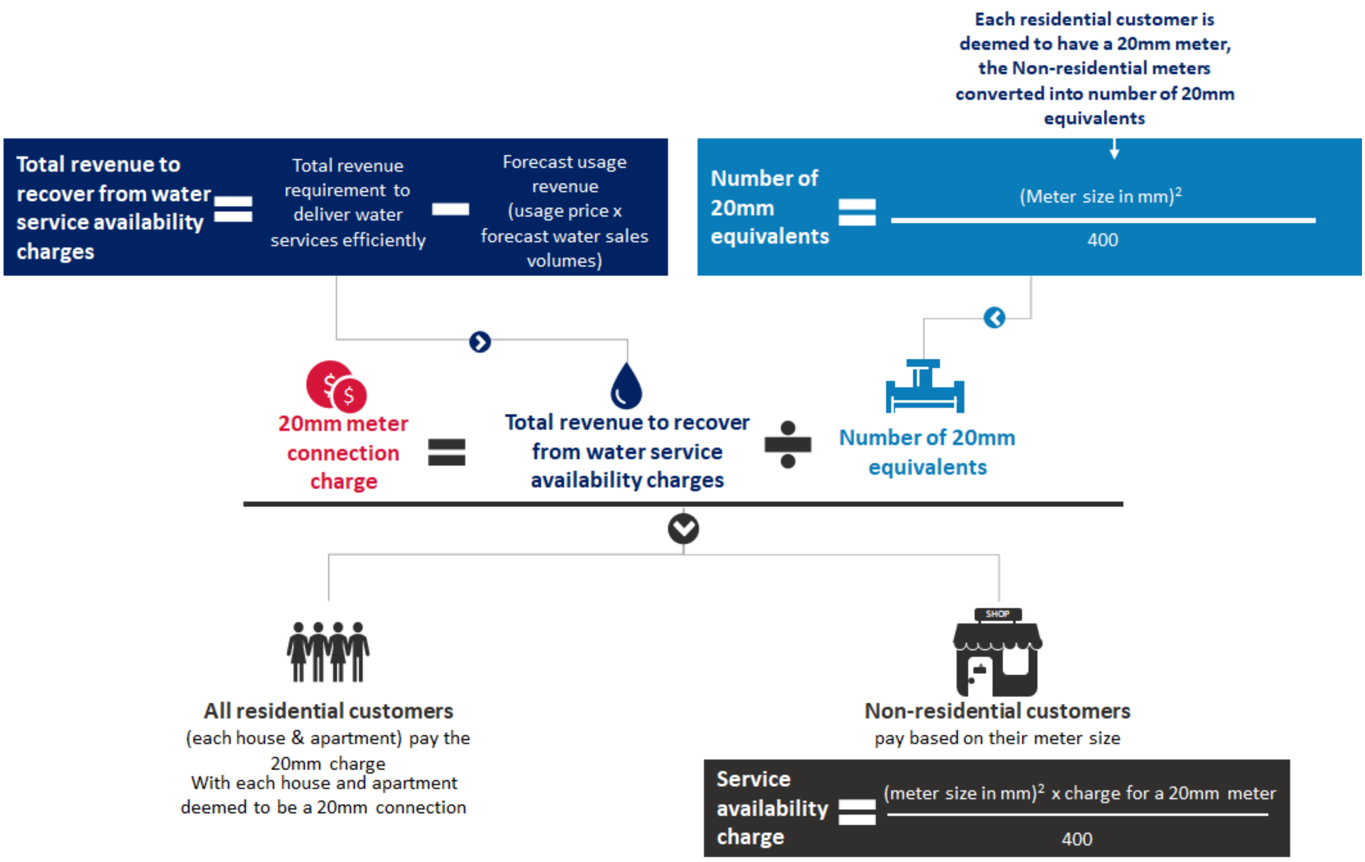


Figure 15: Water service availability charge – pure meter approach

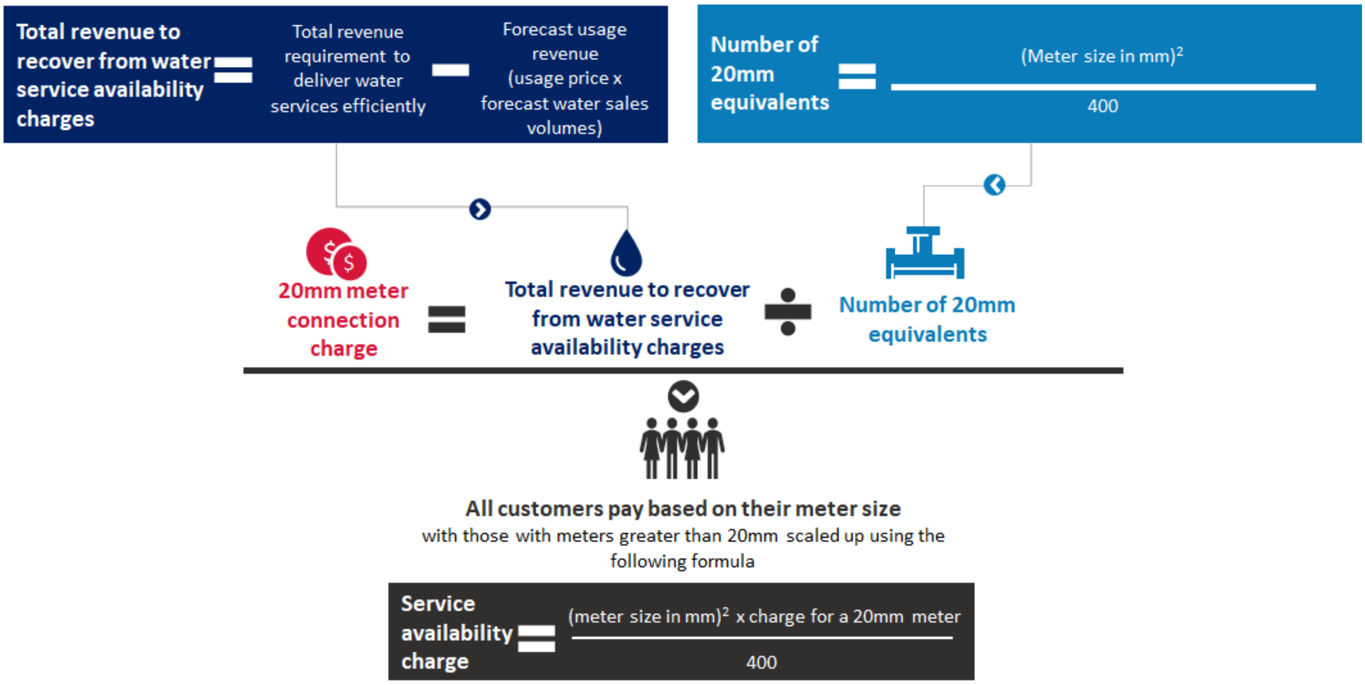


Figure 16: Sewerage service availability charge – deemed residential approach

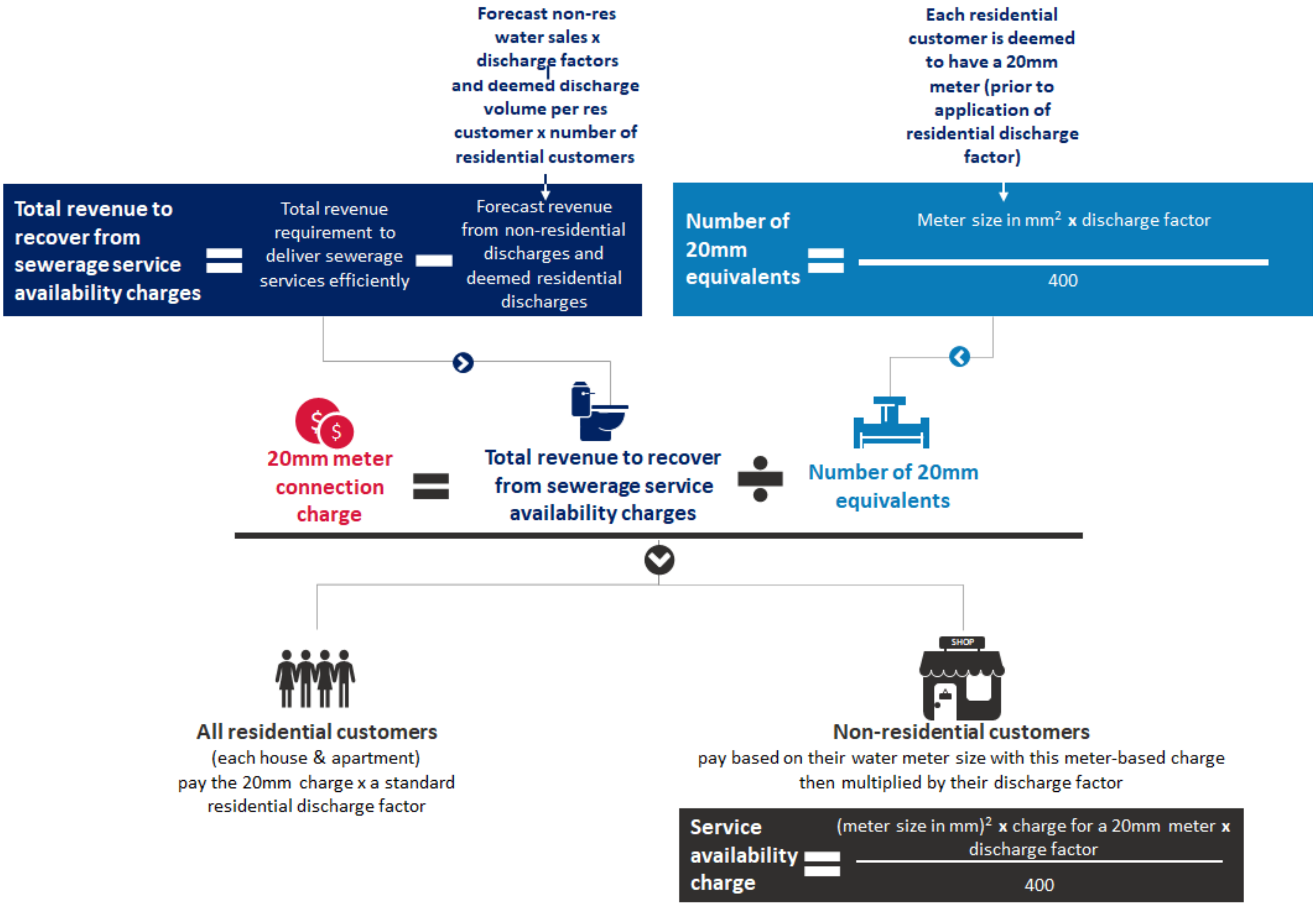
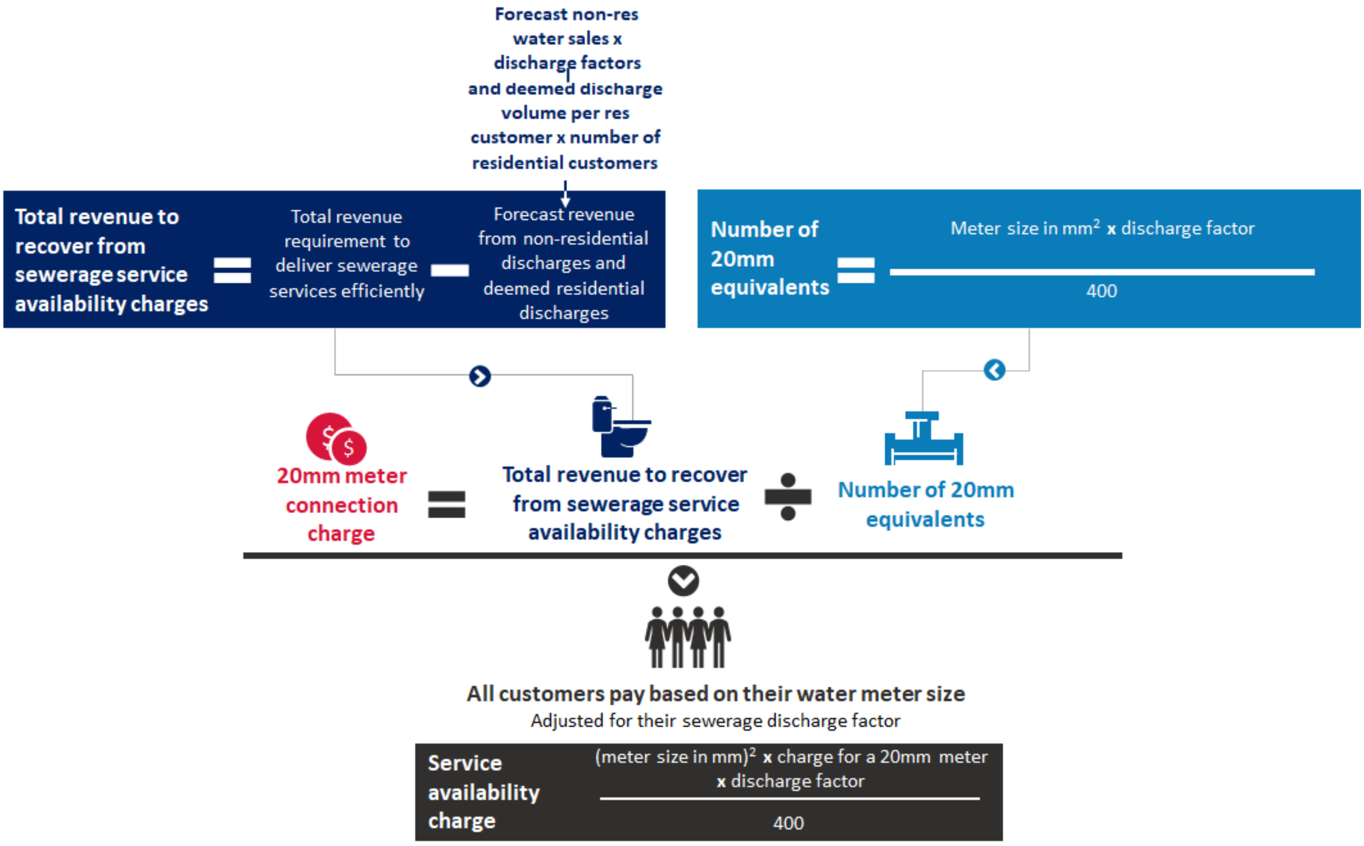


Figure 17: Sewerage service availability charge – pure meter approach



Estimating avoided costs – a worked example

The example in Figure 18 calculates the avoided costs associated with a recycled water scheme. It assumes a single water asset. It involves the following steps:

- **Step 1:** Calculate the change in water demand or sewage volumes. In this example, the recycled water scheme produces 10 ML to 14 ML of recycled water per year between year 1 and year 5, which offsets 10 ML to 14 ML of water demand.
- **Step 2:** Identify the LRMC of water or sewerage services. In this example, the LRMC of water is estimated to be $1.50/kL (see above for discussion of how to calculate LRMC estimates).
- **Step 3:** For each year, multiply the LRMC by the change in water demand or sewage volumes.
- **Step 4:** Calculate the present value of the stream of avoidable costs over the modelling period. In this example, it is equal to $78,081.

Figure 18: Estimating avoidable costs – an example of the provision of water services

	PV	Year 1	Year 2	Year 3	Year 4	Year 5
Volume of recycled water (ML/year)		10	11	12	13	14
Long run marginal cost of water ($1.50/kL)		$1.50/kL	$1.50/kL	$1.50/kL	$1.50/kL	$1.50/kL
Avoidable water costs ($FY22)		15,000	$16,500	$18,000	$19,500	$21,000
Avoidable water costs ($FY22, PV terms)	$78,081	← Discount cash flows				

Note: this is an indicative example only. As such, it only covers a 5-year modelling period, rather than the typical 30 years. In practice, analysis should be undertaken over a 30-year period.

Glossary

Term	Term in full or explanation
ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
AER	Australian Energy Regulator
AIC	average incremental cost
Annuity approach	The annuity approach forecasts asset replacement and growth costs over a fixed period, converts these to a present value, and then converts this present value to a future annualised charge.
CAPM	capital asset pricing model
Cost allocation	The process of identifying, aggregating, and assigning costs to specific cost objects. A cost object is any activity or item for which costs are separately measured. Cost objects are usually services, but can also include specific regions, segments of the production process or customers.
CPI	Consumer Price Index
CSO	community service obligation
Direct costs	Direct costs are those that can be directly traced to a specific cost object (for example, a specific service).
DORC	depreciated optimised replacement cost
DSP	development servicing plans
Equivalent tenement	A detached residential home.
Financeability	The ability for a business to gain enough cash flow to be financially sustainable and to raise funds to manage its activities and provide its water and sewerage services over the pricing period.
Incremental (avoidable) costs	Incremental costs represent those costs the utility would save if it stopped providing the service.

Indirect or common costs	Indirect or common costs cannot be directly traced to a specific cost object, as they relate to more than one – for example, they are incurred in providing more than one service. Examples of common costs include corporate costs, such as some executive, HR, ICT, legal and insurance costs.
IPART	Independent Pricing and Regulatory Tribunal
LIS	line in the sand
Lower bound pricing	Lower bound pricing includes provision for the cost of renewing, replacing, or upgrading assets in future, but not for the initial investment in existing assets or a return on them.
LRMC	long-run marginal cost
Marginal cost of water supply	The cost of supplying an additional unit (kL) of water.
NCP	National Competition Policy
Nodal pricing approach	A nodal pricing approach involves setting prices to recover the cost (revenue requirement) of supplying individual customers, or groups of customers, within a given geographical area or supply node.
NPV	net present value
NWI	National Water Initiative
ODV	optimised deprival valuation
Periodic prices	These are the ongoing prices to residential and non-residential customers.
Postage stamp prices	Basis for pricing where all customers of the same type, receiving the same service, pay the same prices – regardless of any variations in the costs of serving specific locations within the utility's area of operations.
RAB	regulatory asset base
Ring-fencing	Ring-fencing involves separating the costs and revenues of the utility from the council. That is, 'fencing off' the utility's assets and accounts from the council's other operations.
SRMC	short-run marginal cost
Standalone costs	Standalone costs represent those directly attributable to providing the service, plus a share of the utility's common costs (for example, corporate overheads), allocated in keeping with the utility's cost allocation manual.

Straight-line depreciation method	This means the value of the asset is returned to the utility evenly over the asset’s economic life.
TER	tax equivalent regime
Trade waste	Trade waste is any liquid waste of a domestic nature other than sewage.
Upper bound pricing	Upper bound pricing allows service providers to recover the opportunity cost of capital invested (that is, a return on the capital that reflects the market) and full recovery of that capital over the life of the assets.
WACC	weighted average cost of capital