Economic regulatory barriers to cost-effective water recycling

A REPORT PREPARED FOR INFRASTRUCTURE NSW

July 2018
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Executive summary

With recycled water set to play a much more prominent role in meeting the future needs of a rapidly growing NSW population, the right policy and regulatory settings must be in place to promote investment in and use of cost-effective water recycling. Getting these settings right could deliver significant customer, community and environmental benefits.

Introduction

The NSW population is forecast to grow from about 7.7 million to over 12 million by 2056, with unprecedented growth likely to occur across Greater Sydney, particularly in Sydney’s Western Parkland City. As the State’s population increases, so too will the demand for water, wastewater and stormwater services. Meeting this increasing demand will be a significant challenge: we will need to provide more services to established areas and additional services to new urban residential developments, while also managing the growing stresses on our river systems and waterways.

Recycled water is likely to play a much greater role in delivering quality water, wastewater and stormwater services to a growing NSW population and helping to secure the future of our cities, towns, communities and regions as productive, liveable and resilient places.

The NSW Government’s 2017 Metropolitan Water Plan strongly endorses the use of a broader range of recycling options—provided they are cost-effective—and notes the important contribution water recycling can make to reducing future demand on drinking water supplies and deferring or avoiding the need for major new water infrastructure. However, the uptake of water recycling in NSW has slowed in recent years and aspects of the policy and regulatory framework covering recycled water create barriers that constrain investment in and use of recycled water. Without change, water recycling may not be able to play a full part in the future supply of water-related services across NSW, with potentially significant adverse consequences for the broader community.

Recognising this risk, and the need to seize timely opportunities to promote cost-effective water recycling, the 2017 Metropolitan Water Plan recommended an independent inquiry into barriers that could limit the uptake of water recycling initiatives. Infrastructure NSW is leading this inquiry. In August 2017, the Premier requested that Infrastructure NSW also prepare a sectoral State infrastructure strategy statement for the South Creek Corridor in Sydney’s outer west, which includes a review of current economic and regulatory barriers to recycled water schemes.

Box 1: Water recycling in NSW

Water for recycling and reuse can be sourced from rainwater, stormwater, greywater and effluent from wastewater treatment plants. Water recycling can range from large-scale wastewater recycling schemes to smaller scale decentralised sewer mining and stormwater harvesting.

Recycled water in metropolitan NSW is used for non-potable purposes only, such as watering gardens and washing cars, irrigating parks and golf courses, industrial uses and maintaining environmental flows in rivers.
Across the State, a variety of schemes are currently operating, including larger scale wastewater recycling schemes (such as the Rouse Hill Recycled Water Scheme), smaller scale sewer mining (such as Sydney Olympic Park for irrigation purposes), private onsite schemes (such as Barangaroo) and stormwater harvesting (such as the Canada Bay Water for our Community project). The Rouse Hill scheme is Australia’s largest residential recycling scheme, currently supplying 32,000 residential properties.

Source: Frontier Economics

Frontier Economics was engaged by Infrastructure NSW to provide independent advice on the optimum regulatory framework for the uptake of cost-effective recycled water initiatives. Our report makes 32 recommendations focused mainly on the economic regulatory framework governing water recycling in NSW. These recommendations are intended to inform the development of an improved policy and regulatory framework to apply in the Greater Sydney, Lower Hunter and Central Coast regions (also known as ‘metropolitan NSW’), as well as integrated land use and water planning for the South Creek catchment.

Setting the scene: challenges and opportunities

Unprecedented population growth

Over the next 40 years, NSW will face strong population growth, particularly in Western Sydney and around the South Creek corridor. In planning for the future, Sydney Water anticipates a doubling of the city’s population to 8.3 million by 2056 - an unprecedented rate of growth that will place increasing pressure on water-related infrastructure and services, particularly as the major assets of public water utilities near capacity and/or require substantial investment to expand or upgrade.

Creating productive, liveable and resilient communities

The need to meet the growing demand for water across NSW provides an opportunity to influence the future of infrastructure and service provision. Through the Greater Sydney Commission (GSC), the NSW Government is pursuing a vision for Greater Sydney, based on a metropolis of three cities: the Harbour City, the Central River City and the Western Parkland City (centred on the new western Sydney Airport.

To secure future water supplies for Greater Sydney, the Government is considering a new paradigm of integrated land use and water management. This new approach integrates water cycle planning as an interconnected service, planned and managed to take account of community and environmental needs with land use planning.

Given its potential to provide significant benefits to both end-customers and the broader community, water recycling is likely to be a key element of future integrated approaches to meet the demand for water and wastewater services from a growing population, while at the same time protecting sensitive environments and promoting more productive, liveable and resilient urban communities.

Consistent with this, the 2017 Metropolitan Water Plan and Lower Hunter Water Plan view water recycling as playing an increasingly important role. The 2017 Metropolitan
Water Plan also records community support for water recycling in helping to create a more liveable region with green spaces and trees, healthy rivers, good water quality and biodiversity. In this context, it is critical that the policy and regulatory framework in NSW facilitates the uptake of cost-effective water recycling.

Box 2: Integrated water and land use planning in the South Creek corridor

The South Creek catchment will need to support infrastructure and services for the Western Parkland City - the hottest, driest and flattest part of Greater Sydney. The Western Parkland City’s population will grow to over 1.5 million by 2056, generating higher community demand for water and wastewater services, as well as water needed to increase the urban tree canopy, maintain open and green spaces, and support waterways and water features in the landscape. Wastewater treatment and stormwater flows will need to be managed to avoid degrading water quality or increasing erosion in the catchment.

Adopting an integrated approach to land use and water cycle management for South Creek would entail greater use of cost-effective water recycling to help protect South Creek and riparian zones through reduced wastewater and/or stormwater discharges of nutrients, as well as generating additional water for broadscale irrigation of green spaces, the urban tree canopy and visible ‘celebrations’ of water - this would be in addition to the conventional indoor water demand for residential, commercial, and industrial uses.

Infrastructure NSW is currently developing a business case for integrated land use and water cycle management in South Creek.

Source: Frontier Economics

The need for change: opportunities and reform pathways

There have been significant changes in the NSW urban water market since the mid-2000s, including the NSW Government’s shift away from setting targets for recycled water to adopting a focus on cost-effective water recycling and the growing role played by private water entrants in complementing and competing with the services provided by the public water utilities.

Despite these changes, the uptake of water recycling in metropolitan NSW has plateaued in recent years, generating concerns that existing regulatory, policy and institutional arrangements are impeding the potential for investment in and use of recycled water. Aspects of the regulatory framework covering or influencing water recycling in NSW have not been reviewed or updated for over ten years.

This report focuses on the economic regulatory framework that governs pricing and licensing of public and private water utilities in NSW and the extent to which this framework provides appropriate incentives and signals for investment in water recycling - where and when it is cost-effective - to deliver value to water customers and address NSW’s urban development and population challenges.

Box 3: Why is it important for water recycling to be ‘cost-effective’

It is important to focus on ‘cost-effective water recycling’ because, while recycled water schemes can offer significant advantages, they can be costly. In some circumstances, the expense of setting up and running a scheme will outweigh its benefits.
In certain times and/or places, water recycling can lower the cost or improve the quality of water-related services relative to other solutions (in other words, it is ‘cost-effective’). In these circumstances, water recycling provides additional value to water customers and the broader community by promoting efficient prices for these services and maximising a broader set of policy and/or community objectives (such as social and environmental outcomes).

However, this is not necessarily the case: in some circumstances, water recycling may increase the costs and prices for these services and potentially increase the cost of achieving policy goals or the outcomes sought by the community (in other words, it is not cost-effective). These types of water recycling activities will not provide additional value to the community.

Recognising this, the 2017 Metropolitan Water Plan seeks to encourage water recycling where and when it is cost-effective, rather than supporting recycling projects for their own sake or setting mandatory recycling targets. This approach is more likely to promote recycled water schemes that provide value for money, deliver benefits to the community and ultimately encourage greater uptake of recycled water.

Source: Frontier Economics

Our review has found that while many elements of the economic regulatory framework are promoting cost-effective water recycling and remain ‘fit for purpose’, a number of aspects are likely to act as barriers to cost-effective water recycling. These aspects include:

- Lack of consistent, accessible and timely information published by public water utilities on water, wastewater and stormwater system constraints and the potential costs savings in these systems from water recycling, which means market participants cannot identify opportunities for cost-effective water recycling

- Lack of regulatory guidance to ‘encourage’ public water utilities to consider and propose water recycling investment opportunities

- Challenges in incorporating the broader costs and benefits of water recycling in investment and regulatory decision-making

- Additional risks and disincentives for public water utilities to consider investment in water recycling relative to other solutions, even where water recycling may be cost-effective

- Retail usage prices for water and wastewater that may not provide efficient signals regarding use of these services (including the emerging system constraints) or signals that promote investment in water recycling in the right place and at the right time

- Differential application of developer charges to recycled water and other services, which reduces the incentive for developers to consider water recycling

- Uncertainty in how IPART’s proposed ‘retail-minus approach’ approach to setting prices for wholesale services for wholesale customers with a recycled water plant will apply in practice, which creates risks for both public water utilities (who provide these services) and private water utilities (who receive and pay for these services) in NSW

Our review also found that elements of the broader policy and regulatory framework (which interacts with the economic regulatory framework) may act as barriers to cost-effective water recycling, including:
Perceptions of community attitudes towards recycled water, which creates uncertainty about whether highly treated recycled water can be considered as an option for augmentation of drinking water supplies in the future

Aspects of environmental regulation that are not keeping pace with technological advances and market developments in water recycling

Aspects of the planning framework governing urban development, including the BASIX mechanism, which may favour traditional centralised water solutions.

A number of these barriers have been identified in recent Federal and State Government reviews, including the Productivity Commission’s 2017 National Water Reform report.

These barriers indicate there is now a critical urgency to ensure a robust, contemporary and fit-for-purpose policy and regulatory framework that facilitates the uptake of cost-effective water recycling to help meet future demand for water-related services and facilitate integrated land use and water cycle planning.

With very high levels of population growth forecast for Western Sydney, there is particular urgency in facilitating the uptake of cost-effective water recycling to achieve the GSC’s vision for a Western Parkland City, including the South Creek corridor.

There is no reason why this updated framework should not be in place by the end of 2020, in line with the timelines for the next Metropolitan Water Plan, amendments to the Water Industry Competition (Review) Amendments Act 2014 and IPART’s 2020 retail pricing decisions for Sydney Water and Hunter Water.

Getting the framework right

Getting this framework ‘right’ is in the long-term interests of NSW water customers and the broader community. Cost-effective water recycling in the right place and at the right time should:

- **Promote efficient prices for water-related services** by getting the maximum economic benefit from existing and new investment in these assets, improving opportunities for competition and ongoing innovation in the sector and reducing pressure on policymakers to establish generic water recycling scheme targets or mandates

- **Maximise community value and benefits** by getting the best possible value from public funds aimed at achieving a broader set of environmental, social and economic objectives.

The following 32 recommendations are evidence-based and aimed at addressing current and potential barriers to cost-effective water recycling. They seek to encourage greater consideration of the broader costs and benefits of water recycling, provide consistent incentives and signals for investment in and use of water recycling, and promote the entry of efficient private sector providers of recycled water. They require action to be taken by the NSW Government, the public water utilities and the Independent Pricing and Regulatory Tribunal (IPART), with an emphasis on acting sooner rather than later.
Not all of the actions recommended in this report are straightforward. But decisions need to be made now to keep ahead of the intense pressure that population growth will place on essential water, wastewater and stormwater infrastructure over the next decade and to avoid the potentially significant adverse impacts of this pressure on the NSW economy, natural environment and communities across the State.
Recommendations: The NSW Government

By the end of 2020, the Department of Planning and Environment, in its role in leading the development of the NSW Government’s Metropolitan Water Plan, should:

- **Reconfirm** that a key objective of the policy and regulatory framework is to facilitate cost-effective water recycling (where and when the benefits of water recycling to the community exceed the costs), rather than supporting or mandating water recycling projects for their own sake. This objective should be confirmed in the next Metropolitan Water Plan. (Recommendation 1)

- **Assess and report on progress** in the next Metropolitan Water Plan towards refining the policy and regulatory framework in line with the recommendations in this report to ensure the framework is meeting four key preconditions necessary to facilitating cost-effective water recycling:
  - Encouraging consideration of the broader costs and benefits of water recycling
  - Providing consistent incentives and signals for public water utility investment in and use of water recycling relative to other services and assets
  - Promoting efficient private sector entry in water recycling
  - Being congruent with government policy settings. (Recommendation 2)

- **Commission**, in conjunction with the public and private water utilities, a review of measures to enhance industry ability to coordinate and engage with potential sources of co-funding in water recycling. (Recommendation 8)

- **Provide information** to IPART and the broader market regarding expectations of any Ministerial direction to IPART to allow some of the costs of investment in water recycling to be recovered from the broader customer base, and the alignment of any direction with the NSW Government’s priorities as set out in the next Metropolitan Water Plan. (Recommendation 10)

- **Amend** the operating licences for the NSW public water utilities (WaterNSW, Sydney Water and Hunter Water) to ensure they develop and publish an annual ‘system limitation report’ that makes key information publicly available on long-term growth servicing plans, system constraints and the costs (or savings) of alleviating (or deferring) constraints in each water and wastewater system in a consistent, timely and accessible way. These ‘system limitation reports’, signed by the Boards of the public water utilities, should reflect integrated long-term planning between agencies, be consistent with the Metropolitan Water Plans and underpin price submissions to IPART and any wholesale prices that may be negotiated with wholesale customers (such as private sector recycled water proponents). (Recommendation 11)

- **Develop** a framework for monitoring the ‘system limitation reports’ developed by the public water utilities to ensure they are consistent with the Metropolitan Water Plans (see related Recommendation 11). (Recommendation 12)

- **Amend** the operating licences for Sydney Water (Section 3.2) and Hunter Water (Section 2) to require these public water utilities to develop and publish an annual report on ‘when and how’ they have considered cost-effective water recycling in meeting community needs (that is, extending beyond water conservation purposes) as part of their existing licence obligations to prepare a Water Conservation Report (Recommendation 11Error! Reference source not found.).
- **Progress** the action proposed in the 2017 Metropolitan Water Plan to pursue and publicly report on engagement with the community on whether highly treated recycled water can be considered as an option for drinking water supply in the future. DPE should also review the appropriateness of other restrictions on the use of recycled water raised in this review. *(Recommendation 30)*
- **Review** the potential barriers relating to environmental regulation raised in this review, including the extent to which environmental regulation of the urban water sector is proportionate, flexible and efficient – in line with best practice principles. *(Recommendation 31)*
- **Review** the planning and related issues raised during this review, including the BASIX mechanism. *(Recommendation 32)*

### The Department of Planning and Environment, in its role in leading the development of future Metropolitan Water Plans every five years, should:

- **Assess and report on:**
  - The ‘state of play’ of cost-effective water recycling in supporting the government’s priorities
  - Whether the policy and regulatory framework is meeting the four key preconditions necessary to facilitating cost-effective water recycling set out in Recommendation 2. *(Recommendation 3)*
- **Review and report on** the costs and benefits of a continuation of the 2008 NSW Government Direction to set specified water, wastewater and stormwater developer charges for Sydney Water and Hunter Water to zero. *(Recommendation 19).*
- **Request** IPART to review and report by the end of 2021 (and then every five years thereafter) on potential changes to the framework for competition in the NSW urban water sector, including postage stamp pricing, to improve the efficiency of water, wastewater and stormwater services across the Greater Sydney, Lower Hunter and Central Coast regions. *(Recommendation 29)*
- **Review**, in conjunction with other NSW Government agencies, the IPART Act to ensure it is keeping pace with best practice economic regulation and changes in the sectors it regulates (including the increasing role of private sector water recycling). *(Recommendation 28)*

### Recommendations: IPART

### As part of its 2018 recycled water review, IPART should:

- **Amend** the framework for assessing avoidable costs associated with recycled water schemes to ensure any ex-post review considers only information that was available at the time of the decision to invest in water recycling. *(Recommendation 4)*
- **Extend** the framework for assessing avoidable costs associated with recycled water schemes to include stormwater assets owned and operated by the public water utilities. *(Recommendation 5)*
- **Consider** how public water utilities can be given incentives to engage with private sector recycled water proponents that generate avoidable costs, but where there is no wholesale service being provided to the private sector recycled water proponent. *(Recommendation 6)*
- **Extend** the framework for assessing avoidable costs associated with recycled water schemes to allow for the value of external benefits to be recovered from the broader customer base where public water utilities can demonstrate customer willingness and capacity to pay. (Recommendation 7)
- **Provide** greater regulatory guidance on the circumstances in which it would expect co-funding to be received for water recycling schemes when setting prices for recycled water. (Recommendation 9)
- **Amend** its *Guidelines for Water Agency Pricing Submissions* to strengthen the regulatory guidance on ‘when and how’ the public water utilities should undertake a ‘Regulatory Investment Test’ to identify the ‘preferred investment option’ (including the potential for water recycling) when making major investment decisions to meet an identified need – similar to the guidance published by the Australian Energy Regulator under the National Electricity Rules. The Guidelines should also indicate how any ‘Regulatory Investment Test’ should support business cases and regulatory proposals provided to IPART. (Recommendation 14)
- **Strengthen** the regulatory guidance it provides about the scope and form of retail price regulation of recycled water provided by public water utilities (including principles and decision-making processes for establishing this form of price regulation). (Recommendation 16)
- **Strengthen** the regulatory guidance it provides about the scope and form of retail price regulation of recycled water provided by private WICA licensees (including principles and decision-making process for establishing this form of price regulation). (Recommendation 26).
- **Provide** regulatory guidance on what may be classified as a recycled water asset in the context of cost-effective catchment-wide planning solutions (including assets used either as a pathway to or end-point for some form of potable reuse) and how expenditure associated with these assets will be treated with regards to cost recovery. (Recommendation 17)
- **Review** the pricing principles for the structure of recycled water prices to ensure they promote economically efficient outcomes, including promoting cost-effective integrated catchment scale land use and water cycle planning solutions. (Recommendation 18)
- **Review** the developer charges formula and methodology for recycled water to ensure it remains fit for purpose and reflects current common industry assumptions. (Recommendation 20)
- **Evaluate** the merits of publishing annual market guidance on the range of long-run marginal cost (LRMC) estimates for each water and wastewater supply area, drawing on information contained in the annual ‘system limitation reports’ published by the public water utilities (see related Recommendation 11). (Recommendation 22)
- **Provide** guidance to stakeholders on how it intends in practice to apply aspects of its proposed wholesale pricing methodology (‘retail-minus’ approach) when setting prices for wholesale services to customers with a recycled water plant. (Recommendation 27)

**As part of its 2020 Sydney Water and Hunter Water**

- **Continue** to set the regulated asset base (RAB) for regulated services based on the ‘line-in-the-sand’ to which new assets are added (subject to prudence and efficiency) and depreciation (and disposals removed). (Recommendation 21)
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<td><strong>Evaluate</strong> the merits of adopting a more light-handed form of price control, such as a tariff basket used in regulation of monopoly services in other jurisdictions, where prices can be updated annually where there are material changes in the operating environment (such as capacity constraints or government policy), subject to clear pricing principles and pricing constraints. <em>( Recommendation 23)</em></td>
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<td><strong>Set</strong> usage charges for water and wastewater (for those customers that pay wastewater usage charges) with regard to the long-run marginal cost (LRMC) of providing services to give better signals regarding emerging capacity constraints. This includes ensuring the estimated LRMC of supply reflects the ‘system limitation reports’ published by each of the public water utilities <em>(see related Recommendation 11)</em>. <em>( Recommendation 24)</em></td>
<td></td>
</tr>
<tr>
<td><strong>Evaluate</strong> the merits of removing the discharge factor applying to wastewater service charges. <em>( Recommendation 25)</em></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>As part of its annual role in monitoring operating licence compliance of the public water utilities, IPART should:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ensure</strong> that the ‘system limitation report’ published by each of the public water utilities is consistent with the framework developed by DPE, robust and fit for purpose <em>(see related Recommendation 11)</em>. <em>( Recommendation 13)</em></td>
<td></td>
</tr>
</tbody>
</table>
1 Introduction

1.1 Background

Infrastructure NSW plays a key role in the planning, development and delivery of vital infrastructure across NSW. Infrastructure NSW assists the NSW Government in identifying and prioritising critical public infrastructure for the State, including providing advice to the Premier on removing or reducing economic and regulatory impediments to the efficient delivery of infrastructure projects.

The NSW Government’s 2017 Metropolitan Water Plan (MWP) seeks to ensure there is sufficient water to meet Greater Sydney’s needs for the next 50 years. The Plan identified a range of pricing, regulatory and governance issues that could limit cost-effective recycled water initiatives and recommended an independent inquiry into barriers and enablers to the uptake of cost-effective water recycling. Infrastructure NSW is leading this inquiry.

In addition, in August 2017, the Premier requested that Infrastructure NSW prepare a sectoral State infrastructure strategy statement, in accordance with sections 23 and 24 of its Act,¹ for the South Creek Corridor in Sydney’s outer west, which should include:

“The independent review of current economic and regulatory barriers to recycled water schemes, including the financial implications for government agencies (including Sydney Water), a framework for market participation, and pricing principles to be considered by IPART.”²

The South Creek Corridor Sector Review (SCCSR) aims to develop regulatory certainty for integrated water and land use planning in the corridor, as well as major infrastructure investment options, including broadscale non-potable water recycling. The review is being conducted in accordance with the Greater Sydney Commission’s vision for the corridor as central to the creation of a ‘cool and green’ Western Parkland City in Sydney’s outer west, which is expected to be home to well over 15 million people by 2056.³

This report is intended to inform the development of an improved regulatory framework for the uptake of cost-effective recycled water, including stormwater management, that could be applied in the Greater Sydney, Lower Hunter and Central Coast regions (also known as ‘metropolitan NSW’). The report will also inform integrated water and land use planning for the South Creek catchment.

¹ Section 23 of the Infrastructure NSW Act 2011 requires Infrastructure NSW to prepare and submit to the Premier a sectoral State infrastructure strategy statement for any sector the Premier considers significant for the State, within such time as the Premier directs. Section 24 of the Act states that the content of the statement may include analysis of current and future needs in the sector and options available for dealing with those needs or to influence demand in the sector.

² IPART (Independent Pricing and Regulatory Tribunal) regulates prices and administers the licensing framework for urban water utilities in NSW.

³ Greater Sydney Commission 2017, A Metropolis of Three Cities – The Greater Sydney Region Plan
1.2 Purpose and scope of the review

Frontier Economics was engaged by Infrastructure NSW to assist with its independent inquiry by providing advice on:

- The optimum framework, including economic regulatory conditions and pricing principles, for cost-effective recycled water initiatives (including stormwater management) that could be applied in the Greater Sydney and Lower Hunter and Central Coast regions (metropolitan NSW)
- Ways to encourage investment in water recycling schemes, in the context of integrated water cycle management, which are economically efficient.
- In providing this advice, Infrastructure NSW has asked Frontier Economics to identify any pricing or regulatory barriers that may bias investment decisions away from recycled water; the key economic regulatory conditions and pricing principles required to facilitate water recycling options; and opportunities for private sector investment in water recycling.

To ensure the review is focused on those matters where it can make the most valuable contribution, and aligns with current NSW Government policies and approaches, its scope has been defined as follows:

- **The scope of recycled water initiatives**: Recycled water initiatives include wastewater recycling and stormwater harvesting and reuse: from small localised schemes through to larger centralised networks. As discussed in section 2, these recycled water schemes could be provided by public utilities, WICA licensees (including private utilities, developers and large end-customers), local councils and end-customers (such as golf courses).

- **The meaning of ‘cost-effective’ water recycling**: Water recycling involves the recovery or reclamation of water from wastewater or stormwater for potable or non-potable use, which can be supplied back to the water system directly or indirectly. Water recycling should not be an objective in itself, but rather a potential means of maximising the net benefit to the community from the provision of water-related services. As discussed in section 3.2, the focus of this report is on reducing or eliminating barriers to water recycling, with the aim of delivering the best solution for the community rather than simply promoting the maximum possible level of water recycling. This aligns with the 2017 Metropolitan Water Plan, which moves away setting water recycling targets and adopts a new approach focused on economic efficiency and demonstrated community benefit.

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4 *Water Industry Competition Act 2006* (NSW): see section 8.1 for an explanation of the purpose and role of WICA.

5 Potable water is suitable for drinking and other uses requiring high quality water. The standards that define potable water are set out in the Australian Drinking Water Guidelines. ‘Non-potable water’ is not of drinking quality, but may still be used for many other purposes, depending on its quality.
The potential barriers to be investigated: The uptake of cost-effective recycled water schemes will be affected by a range of factors reflecting the existing policy, regulatory, institutional, governance and planning frameworks and how these interact. The focus of this report is on economic regulatory barriers and how economic regulatory arrangements for water-related services (including the price setting framework) might be reformed to facilitate cost-effective recycling. However, the report does highlight a range of broader governance and planning arrangements and other aspects of the regulatory framework (such as environmental and health regulation) that may require more detailed review.

Box 4: Why is it important for water recycling to be ‘cost-effective’?

While recycling water schemes can offer significant advantages, they can be costly. In some circumstances, the expense of setting up and running a scheme will outweigh its benefits.

In certain times and/or places, water recycling can lower the cost or improve the quality of water-related services relative to other solutions (in other words, it is ‘cost-effective’). In these circumstances, water recycling provides additional value to water customers and the broader community by lowering prices for these services and potentially also lowering the cost of achieving a broader set of policy and/or community objectives (such as social and environmental outcomes).

However, this is not necessarily the case: in some circumstances, water recycling may increase the prices for these services and potentially increase the cost of achieving policy goals or the outcomes sought by the community (that is, it is not cost effective).

In its submission to Infrastructure NSW’s inquiry, Sydney Water indicates that in some past recycling investments, the costs have been greater than the value of the water. IPART’s 2016 pricing decision for Sydney Water noted that its Rosehill Recycled Water Scheme requires significant ongoing financial support and is unlikely to provide value to the community.

Recognising this risk, the 2017 Metropolitan Water Plan seeks to encourage water recycling where and when it is cost-effective, rather than supporting recycling projects for their own sake or mandating water recycling targets.


1.3 Approach to the review

In developing this report, we have:

- Utilised our knowledge of the urban water sector in Australia – including metropolitan NSW – and drawn on frameworks developed for the Water Services Association of Australia (WSAA)⁶ and Infrastructure Australia⁷ on best practice economic regulation

- Applied the learnings from other jurisdictions in Australia, the UK and the USA, including the challenges and opportunities associated with adopting integrated water cycle management approaches such as recycling wastewater and stormwater

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⁷ Frontier Economics and Arup, Urban Water Regulation Reform: A Report Prepared for Infrastructure Australia, December 2017
- Drawn on the comments and supporting material provided by stakeholders as part of the consultation process
- Examined each key element of the current economic regulatory framework as it applies to water recycling and other water-related services, as well as how these elements fit together with elements of the regulatory framework that apply beyond recycled water
- Detailed the key reform opportunities – where possible, supported by a decision-making framework that can be applied to South Creek – and the processes and pathways that may be required to implement these reforms.
- This approach will ensure that Infrastructure NSW is well placed to articulate specific water regulatory reform programs for both South Creek and broader metropolitan NSW that will promote the uptake of cost-effective recycled water.

1.4 Report structure

The remainder of this report is structured as follows:

- Section 2 provides context to the review by giving an overview of the history and key drivers of and barriers to water recycling in metropolitan NSW.
- Section 3 defines what is meant by economically efficient or ‘cost-effective’ water recycling and identifies key preconditions for promoting cost-effective water recycling.
- Sections 4 to 9 assess whether the current economic regulatory settings meet each of these preconditions and identify barriers to cost-effective recycling.
- Section 10 provides a roadmap to implementing regulatory reform that will address these barriers to cost-effective recycled water across metropolitan NSW.
- Section 11 outlines other potential regulatory and policy barriers to cost-effective water recycling across metropolitan NSW.

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8 This included a series of targeted workshops with stakeholders in December 2017 and April 2018 (including public water utilities, private water utilities, local councils, regulators and government agencies, as well as IPART) and the provision of supporting material by some stakeholders on the barriers to water recycling in metropolitan NSW.
2 Water recycling in metropolitan NSW

This section gives an overview of the uptake of water recycling in metropolitan NSW to date. It notes the slowing in water recycling in Sydney since 2010 and highlights the urgency of removing barriers that may inhibit cost-effective water recycling from delivering value to water customers and the broader community across metropolitan NSW.

Key finding

Since the end of the millennium drought around 2010, there has been a slowing in the uptake of water recycling across Sydney. Forecast population and housing growth, and associated development needs, across metropolitan NSW means there is now a critical urgency to ensure that the policy and regulatory framework for recycled water facilitates the uptake of cost-effective water recycling – particularly given the need for integrated catchment scale land use and water cycle planning to achieve the Greater Sydney Commission’s vision for a more productive, liveable and sustainable Greater Sydney. With particularly strong growth forecast for Western Sydney, there is considerable urgency in facilitating the uptake of water recycling to achieve the GSC’s vision for a Western Parkland City, including the South Creek corridor.

This framework should be in place by the end of 2020 in line with the NSW Government’s Metropolitan Water Plan, amendments to the Water Industry Competition Amendment (Review) Act 2014 and IPART’s 2020 retail pricing decisions for Sydney Water and Hunter Water.

2.1 Current uptake of water recycling in metropolitan NSW

Water for recycling and reuse can be sourced from rainwater, stormwater, greywater and effluent from wastewater treatment plants. As outlined in Table 1, water recycling can range from large-scale wastewater recycling schemes to smaller scale decentralised sewer mining and stormwater harvesting.

Recycled water in metropolitan NSW is used for non-potable purposes only, such as:

- Residential uses, including toilet flushing, garden watering and car washing
- Irrigating public areas, including parkland, sports fields and golf courses
- Industrial uses, including for cooling towers, boilers and some manufacturing processes
- Maintaining environmental flows in rivers.

9 It should be noted that recycled water introduced into an existing potable water source, such as the Hawkesbury-Nepean river system, mixes with this water source before later being drawn upon and further treated as potable water. The existing potable water source acts as an environmental buffer during the time water is stored, allowing mixing and treatment processes to continue.
Table 1: Types of water recycling schemes

<table>
<thead>
<tr>
<th>Type of water recycling</th>
<th>Process / purpose</th>
<th>Operators/Providers</th>
<th>Example</th>
</tr>
</thead>
</table>
| Larger scale wastewater recycling | • Large-scale treatment of wastewater, where wastewater is transported to a purpose-built plant for further treatment and then provided as recycled water to multiple customers for various non-potable uses | • Often owned and/or operated by public utilities or private providers | • Rouse Hill Recycled Water Scheme (for residential purposes)  
• Fairfield-Rosehill Recycled Water Scheme (for industrial purposes)  
• St Marys – Recycled Water Scheme (for environmental flows) |
| Smaller scale sewer mining | • Small-scale treatment of wastewater, typically through extracting wastewater from a local network, which is then treated on-site and used onsite or nearby as recycled water | • Often owned and/or operated by developers and/or building managers local councils, golf clubs | • Sydney Olympic Park (for irrigation)  
• Pennant Hills Golf Club’s Water Reclamation Plant (for irrigation)  
• Pitt Town (for residential purposes) |
| Private onsite reuse schemes | • Recycled water is produced by capturing and treating wastewater from a site’s buildings or facilities and re-using as recycled water onsite | • Often owned and/or operated by developers and/or building managers and/or private providers | • Barangaroo  
• Central Park  
• Sydney Water’s Parramatta office |
| Stormwater harvesting | • Collecting, treating and storing stormwater from canals, etc. (rather than rainwater from roofs), which can be used as recycled water for irrigation | • Often owned and/or operated by public utilities, local councils or local authorities | • Sydney Olympic Park  
• Canada Bay (Water for our Community Project for irrigation) |

Source: Frontier Economics

- The current framework for participation in the market for recycled water services in metropolitan NSW has evolved over time, in part through autonomous factors and in part through government policy decisions (most notably the implementation of WICA).

On the supply side, proponents of water recycling schemes can be:

- Public water utilities as part of their program of investments

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10 As at the Fairfield-Rosehill Recycled Water Scheme, private providers may own and operate the water recycling plant and pipelines and sell the recycled water to a public utility, which then sells it to end-customers.

11 The scheme may also include a connection to return approved residuals back to the wastewater system.

12 The scheme may also include a connection to return approved residuals back to the wastewater system.
- Alternative providers of water and wastewater services, such as WICA licensees, who may rely on access to the public utilities’ water or wastewater monopoly network facilities to provide services to end-users
- Local councils and others who wish to manage their own water needs.

The incentives for uptake of recycled water initiatives by these different parties will be influenced by different elements of the overall policy and regulatory framework (and the interactions between them), as well as by each party’s commercial drivers.

In addition, some recycled water schemes do not entail supply to end-customers but rather involve self-supply, using stormwater, wastewater or sewer mining (such as local councils who self-supply for irrigation needs).

On the demand side, recycled water users comprise those who voluntarily seek to be supplied with recycled water as an alternative to traditional potable water (such as industrial customers of the Fairfield-Rosehill (Camellia) Recycled Water Scheme), as well as some users within mandated recycled water schemes (such as residents supplied by Sydney Water’s Rouse Hill scheme). Developers interested in water recycling as part of their land development plans are a key part of the market.

### 2.2 Drivers of and barriers to water recycling

Figure 1 summarises the key events in the history of water recycling in metropolitan NSW. From the 1960s to the 1990s, water recycling in metropolitan NSW was limited to small isolated schemes. During this period, recycled water was primarily seen as a cost-effective source of water for irrigation (such as for golf courses) and as a wastewater disposal opportunity, rather than a means to balance economic, social and environmental objectives.
Water recycling in metropolitan NSW

Figure 1: Historical drivers of water recycling in metropolitan NSW

Source: Frontier Economics
The advent of the millennium drought and a shift towards integrated approaches\(^\text{13}\) led to a series of Federal, State and local government policy and regulatory reforms or ‘enablers’ that facilitated investment in, and use of, water recycling across metropolitan NSW (see Figure 2).

Figure 2: Regulatory and policy enablers promoting uptake of water recycling

<table>
<thead>
<tr>
<th>Enabler / Policy</th>
<th>Aim</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Planning Process</td>
<td>To identify, advocate for and potentially lead opportunities for water recycling</td>
<td>• 2004 and 2006 Metropolitan Water Plan which included water recycling commitments</td>
</tr>
<tr>
<td>Planning Requirements</td>
<td></td>
<td>• Australian Government’s 2017 national target of recycling 30 per cent of wastewater by 2015</td>
</tr>
<tr>
<td>Access regimes, regulatory licensing and sewer mining policies</td>
<td></td>
<td>• NSW BASIX targets and other local council requirements</td>
</tr>
<tr>
<td>Monopoly pricing regulation</td>
<td></td>
<td>• Water Industry Competition Act (2006) which was introduced to encourage new sources of water supply and a licensing regime for private sector provision of services</td>
</tr>
<tr>
<td>Environmental and Health Regulation</td>
<td></td>
<td>• IPART decision to set wastewater usage charges for larger customers</td>
</tr>
<tr>
<td>Funding provision</td>
<td></td>
<td>• Waste Water Discharge Regulations (2016)</td>
</tr>
<tr>
<td>Information provision</td>
<td></td>
<td>• NSW Water Savings Fund (2006); Central Coast Water Savings Fund (2006)</td>
</tr>
<tr>
<td>• To promote the uptake of environmentally conscious technologies and water related services</td>
<td></td>
<td>• Section 16A Directions to IPART</td>
</tr>
<tr>
<td>• To manage public health risks</td>
<td></td>
<td>• Environmental Upgrade Agreements</td>
</tr>
<tr>
<td>• To provide clear guidelines and expectations for stakeholders involved in recycled water schemes</td>
<td></td>
<td>• Australian Recycling Water Guidelines Phase 1 (2009)</td>
</tr>
</tbody>
</table>

This investment in water recycling by both public and private utilities across metropolitan NSW\(^\text{14}\) included centralised and decentralised supply and integrated treatment solutions. This included the Rouse Hill scheme, Australia’s largest residential recycling scheme, which commenced in 2001 and currently supplies 32,000 residential properties.\(^\text{15}\)

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\(^\text{13}\) These integrated approaches are characterised collectively as ‘integrated water cycle management’ (IWCM) and ‘water sensitive urban design’ (WSUD). They attempt to balance supply and demand options, make use of all potential sources of water (including treated wastewater and stormwater) and optimise economic, social and environmental outcomes (including options that ‘mimic’ the natural water cycle).

\(^\text{14}\) It is worth noting that in metropolitan NSW over the millennium drought period, these regulatory and policy enablers are likely to have facilitated recycling schemes that were cost-effective, as well as some that were not (see Section 3 for a description of what is meant by ‘cost-effective’ water recycling).

\(^\text{15}\) The Rouse Hill scheme was driven by concerns regarding population growth and the potential impacts of new development on the Hawkesbury-Nepean River, community pressure and a regulatory direction.
A combination of the end of the millennium drought around 2010 (and an end to water restrictions), major supply augmentation (such as the Sydney Desalination Plant) and reduced levels of financial support subsequently slowed the uptake in water recycling capacity in Sydney (see Figure 3).

**Figure 3: Water recycling schemes and capacity in greater Sydney**

Note: The capacity and output of some recycled water schemes across Sydney may not be included in this chart.

Source: Adapted from Watson et al, Local recycled water in Sydney: A policy and regulatory tug-of-war, Journal of Cleaner Production 148 (2017), p585

This plateauing in the uptake of recycled water has given rise to concerns that aspects of the existing regulatory, policy and institutional arrangements may be impeding the potential for further uptake of recycled water.

A range of barriers to water recycling – including elements of the economic regulatory framework, as well as broader policy and governance issues – have been identified in recent Federal and State Government reviews (see Box 5 and Box 6).

**Box 5: Barriers to integrated water cycle management investments identified by the Productivity Commission**

The Productivity Commission’s report on National Water Reform identified several potential impediments to integrated water cycle management (IWCM), including water recycling:

- The lack of effective interaction between land use planning and integrated water cycle management, including the large number of entities involved

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● Disparate roles and responsibilities for stormwater management
● Difficulty in identifying a clear beneficiary or responsible agency to lead the IWCM project
● Difficulty in quantifying some of the benefits associated with IWCM projects (such as improved urban amenity or ecological outcomes)
● Classification of recycled water discharged into the environment as a licensed pollutant
● Environmental and/or public health regulation that restricts beneficial use of treated wastewater (such as direct and indirect potable reuse).
● Inflexible economic regulation.

Source: Productivity Commission, National Water Reform, Inquiry Report, December 2017

Box 6: Barriers to water recycling identified in the 2017 Metropolitan Water Plan

The 2017 Metropolitan Water Plan found that there are significant institutional, policy and regulatory barriers to the uptake of economically efficient water recycling, including:
● Different treatment of recycled water scheme costs compared to traditional wastewater servicing costs for Sydney Water
● Developer charges being levied for recycled water schemes but not levied for traditional water and wastewater servicing
● Limited access to planning and land release processes for private sector service providers (who often include recycled water in their developments).


2.3 Future role of water recycling in integrated land use and water management planning

As noted in Chapter 1, the 2017 Metropolitan Water Plan dispenses with water recycling targets and moves to an approach where water recycling is a means to achieve a set of outcomes rather than an objective in itself. Alongside this new approach, the plan strongly endorses use of a broader range of recycling options – provided they are cost-effective – noting the important contribution water recycling can make in urban communities to reducing future demand on drinking water supplies and deferring or avoiding the need for major new water infrastructure.

Water recycling is an integral element in the NSW Government’s planning to secure water supplies to accommodate major population growth in metropolitan NSW. Water recycling is increasingly essential to dealing with increasing wastewater treatment needs in densely populated areas with sensitive environments, and to supporting the development of liveable and resilient communities in these areas.

As observed in the State Infrastructure Strategy, the NSW population is forecast is set to increase from 7.7 million in 2016 to over 12 million by 2056, with around 80% of this growth forecast to be in the Greater Sydney region. This means that Sydney Water’s strategic planning must anticipate an eventual doubling of the city’s population to about

8.3 million people by 2056, with concentrations of growth anticipated to occur in certain locations such as the Western Parkland City in the South Creek catchment.

This growth will place increasing pressure on key water-related infrastructure, particularly as the major assets of the public water utilities near capacity and/or require significant and costly investment to extend their effective working life:

- While past efforts at demand management and investment in water security assets (such as the Sydney Desalination Plant) provided some headroom, there are emerging constraints on new sources of bulk water supply for Sydney and the water supply transfer network (around 80% of treated water supply capacity is concentrated at Prospect). The State Infrastructure Strategy indicates that if a 10% rebound in per capita water demand occurs, the raw water sustainable yield would be exceeded in about seven years.

- On the wastewater side, the emerging constraints are arguably even more serious. Some 75% to 80% of Sydney’s wastewater is treated at three major coastal treatment plants where capacity expansions are difficult and costly to implement. Augmentations of the major sewer networks in the north and south of Sydney to transfer higher volumes of wastewater to these plants could involve investment of billions of dollars, adding significant pressure to customer prices and bills over time. Moreover, wastewater discharges will mean increased pollution loads for high-value water resources, such as inland waterways, beaches and harbours.

Through the Greater Sydney Commission’s role in leading metropolitan planning, the NSW Government is seeking to make the Sydney region more productive, sustainable and liveable. To address these challenges, a shift to a new paradigm of integrated land use and water cycle management is being considered that integrates water cycle planning – as an interconnected service, planned and managed to take account of both community and environmental needs – with land use planning.

Uptake of recycled water is likely to be a key element of future approaches to integrate water cycle management with land use planning to meet demand for water and wastewater services from a growing population, while simultaneously protecting sensitive environments and promoting more liveable and resilient urban communities. As part of its WaterSmart Cities program, the NSW Government is focusing on integrated water cycle solutions and cost-effective water recycling to reduce demand for water and new infrastructure, and to build greener cities.

Consistent with this, the 2017 Metropolitan Water Plan and Lower Hunter Water Plan see water recycling as playing an increasingly important future role. For example, the 2017 MWP states that Sydney needs a new approach to planning and managing water

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18 The Global Water Partnership’s definition of Integrated Water Resource Management (IWRM) is widely accepted and states: ‘IWRM is a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.’
services to enable urban communities to be more drought and heat resilient, improve community health and amenity, and protect waterways:

“By building integrated water solutions and cost-effective water recycling into new development areas, we can reduce future demand on drinking water supplies, help mitigate flooding risks, reduce pollutants entering our waterways, and defer or avoid the need for major new water infrastructure.”

The 2017 Metropolitan Water Plan also records community support for water recycling, noting that:

“The community consistently highlighted the importance of water conservation and recycling in helping create a more liveable and resilient region ... [including] a desire for secure, reliable and diverse water services that contribute to maintaining green spaces and tree canopy, and improving river health, water quality and biodiversity.”

In this context, it is critical that the policy and regulatory framework for recycled water facilitates the uptake of water recycling where and when it is cost effective – particularly given the need for integrated catchment scale land use and water cycle planning to achieve the GSC vision for a more productive, liveable and sustainable Greater Sydney, including South Creek. The crucial role for water recycling has been observed in other settings, such as California, where urban planners face urban growth, water scarcity and environmental challenges (see Box 7).

The South Creek catchment represents a microcosm of these future challenges. Development of this area will place pressure on the ability to meet demand for existing water and wastewater services by the community given future constraints on surface water supplies and emerging constraints on existing water and wastewater infrastructure. Additional water sources will also be needed to meet new demands such as those associated with maintaining urban tree canopy, the amenity of community open spaces and visible water in the landscape.

In addition, wastewater will need to be managed in a way that avoids water quality degradation in South Creek due to nutrient loading from wastewater treatment plant discharges, while the creek and riparian zones are also sensitive to increases in wastewater and stormwater flows that can increase erosion and destabilise banks.

Infrastructure NSW is currently developing a Strategic Options Business Case for integrated land use and water management in South Creek as part of the South Creek Corridor Strategy. This will assess the merits of a business as usual approach versus a more integrated approach to land use and water cycle management in achieving the stated vision and objectives for South Creek. A more integrated approach would not only entail

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greater use of cost-effective recycled water to meet conventional indoor water demand for residential, commercial and industrial uses; it would also help to protect South Creek and riparian zones through reduced wastewater and/or stormwater discharges of nutrients and generate additional water for broad scale irrigation of greenspace, the urban tree canopy and visible ‘celebrations’ of water.

2.4 Reversing the slowing of uptake in water recycling

Forecast population and housing growth, and associated development needs, across metropolitan NSW underscore concerns about the slowing in uptake of water recycling that has occurred in Sydney since the end of the millennium drought. We consider these concerns to be well founded.

There is now a critical urgency to ensure that the policy and regulatory framework for recycled water facilitates the uptake of cost-effective water recycling – particularly given the importance of integrated catchment scale land use and water cycle planning – to achieve the Greater Sydney Commission vision for a more productive, liveable and sustainable Greater Sydney. With particularly strong population growth forecast for Western Sydney, there is considerable urgency in facilitating the uptake of water recycling to achieve the GSC’s vision for a Western Parkland City, including the South Creek corridor.

This framework should be in place by the end of 2020 in line with the NSW Government’s Metropolitan Water Plan, amendments to the Water Industry Competition (Review) Amendments Act 2014 and IPART’s 2020 retail pricing decisions for Sydney Water and Hunter Water.

Box 7: Use of recycled water in California

Water reuse in California has more than tripled since the 1970s, growing from less than 200,000 acre-feet (246,696 ML) per year to 713,653 acre-feet of recycled water (880,276 ML) in 2015. Some of the key drivers include:

- California suffered its worst drought in recorded history between 2012 and 2017, which has motivated governments and organisations to focus on water sustainability.
- Policies have been implemented on a city level with San Francisco having mandated collection and treatment of rainwater, grey water or foundation drainage for uses such as toilet flushing and irrigation for all new constructions greater than 250 000 square feet.
- The use of potable domestic water for non-potable uses, including, but not limited to, cemeteries, golf courses, parks, highway landscaped areas, and industrial and irrigation uses, was declared to be a waste or an unreasonable use of the water within the meaning of Section 2 of Article X of the California Constitution.
- Regulatory changes that allowed for direct potable reuse legislation in specific schemes passed in 2016, with permits being issued in 2017 (although there is a long history of indirect potable reuse across California – such as Orange County’s Groundwater Replenishment System (GRWS), which has been operational since January 2008).21 Assembly Bill (AB)

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21 The GWRS is the world’s largest water purification system for indirect potable reuse. It can produce up to 100 million gallons (379,000 cubic meters) of high-quality water every day, which is pumped into injection wells, where it
574 to expand California’s ability to use recycled water for potable purposes was legislated in late 2017.

A prime example of the role of recycled water in future planning in California is the Los Angeles Department of Water and Power (LADWP) Recycled Water Master Planning, which set a target to use 59,000 acre feet of recycled water by 2035 (from around 19,000 acre feet in 2012). It determined that the most cost-effective option involved a combination of non-potable reuse and groundwater replenishment (a form of indirect potable reuse involving treating wastewater at an advanced water purification facility and then conveying the water to spreading grounds which allow it to percolate into underground aquifers). This was found to be a more cost-effective option than both the status quo (entailing purchasing costly imported water from Northern California, and an alternative involving non-potable reuse only which would require significant investment in distribution infrastructure) and for which demand for recycled water was uncertain.

serves as a seawater intrusion barrier, and groundwater basins, where it replenishes the deep aquifers of north and central Orange County’s groundwater basin: https://www.ocwd.com/gwrs/about-gwrs/
3  How can the economic regulatory framework promote cost-effective water recycling?

This section outlines the potential benefits and costs of water recycling and defines what ‘cost-effective water recycling’ means. It identifies four key preconditions for an economic regulatory framework that are necessary to facilitating cost-effective water recycling.

### Recommendations

1. By the end of 2020, the Department of Planning and Environment (DPE), in its role in leading the development of the NSW Government’s Metropolitan Water Plans, should reconfirm that a key objective of the policy and regulatory framework is to facilitate cost-effective water recycling (where and when the benefits of water recycling to the community exceed the costs), rather than supporting or mandating water recycling projects for their own sake. This objective should be confirmed in the next Metropolitan Water Plan.

2. By the end of 2020, DPE, in its role in leading the development of the Metropolitan Water Plans, should assess and report on progress towards refining the policy and regulatory framework in line with the recommendations in this report to ensure the framework is meeting four key preconditions necessary to facilitating cost-effective water recycling:
   - Encouraging consideration of the broader costs and benefits of water recycling
   - Providing consistent incentives and signals for public water utility investment in and use of water recycling relative to other services and assets
   - Promoting efficient private sector entry in water recycling
   - Being congruent with government policy settings.

3. As part of its role in leading the development of future Metropolitan Water Plans every five years, DPE should assess and report on:
   - The ‘state of play’ of cost-effective water recycling in supporting the NSW Government’s priorities
   - Whether the policy and regulatory framework (including the economic regulatory framework) continues to meet the four key preconditions necessary to facilitating cost-effective water recycling set out in Recommendation 2.

3.1  What is ‘cost-effective’ water recycling?

Water recycling can provide a range of costs and benefits, relative to more traditional water servicing solutions.

The direct costs of water recycling include the upfront cost of providing recycled water infrastructure (such as treatment plants and reticulation systems) and ongoing operation and maintenance of this infrastructure. These costs will vary depending on the nature of the water recycling initiative.

The direct benefits of water recycling relate to the services it provides to end-users, both in terms of the uses to which recycled water is put (such as irrigation) and – in the case of treated wastewater schemes– the wastewater services it also provides. Recycled water may have particular benefits to those who use it: for example, it can be more reliable than potable water or it may have quality characteristics that make it particularly suitable for
irrigation (such as valuable nutrients) or certain industrial production processes (such as ‘polished’ water, from which particulate material has been removed).

However, it is also widely recognised that recycled water can have a range of indirect positive impacts, many of which accrue to other parts of the community. As noted in the 2006 MWP and 2017 MWP:

“Recycled water can deliver multiple benefits and has an important role to play in the 2006 Metropolitan Water Plan... Recycling can reduce the demand for drinking water, deliver benefits to river health by decreasing the level of nutrients discharged by sewage treatment plants and diversify the system with a supply source not relying on rainfall.”

One of the key benefits of water recycling is the potential to reduce the operating costs and avoid or defer the need for augmentations of the potable water supply and wastewater transport and treatment networks – known as ‘avoidable costs’. Water recycling can also generate other benefits, such as environmental improvements, by reducing the need for water abstraction from and/or wastewater discharge into local water bodies and provide health, recreation and amenity benefits by retaining water in the landscape or irrigating greenspace. Many of these benefits extend beyond the water business and its direct customers to generate broader liveability outcomes for the community.

The quantum, timing and the distribution of these costs and benefits will vary depending on the nature, size, timing and location of any recycled water investment.

In some cases, a recycled water scheme will lead to net benefits to the community, particularly where it enables costly augmentations to centralised water and/or wastewater networks to be avoided or deferred, and/or is associated with significant social or environmental benefits (see Figure 4). For example, recycled water schemes that permit a broader range of end uses (such as discharge to rivers as environmental flows or indirect potable reuse through surface water or groundwater augmentation) are likely to significantly increase the value of the benefits associated with these avoidable costs and may also significantly reduce the direct costs associated with third pipe reticulation systems.

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22 NSW Government, 2006 Metropolitan Water Plan, Water for Life, v
23 These costs and benefits may accrue to various parties – recycled water providers, public water utilities, water or wastewater customers, local and global community and environment etc.
24 These systems provide non-potable recycled water to multiple users (usually in urban areas) via a reticulation system that is separate from the drinking water supply.
In other cases, however, a recycled water scheme may not lead to net benefits to the community. For example, in some circumstances the ‘avoidable cost’ benefits of water recycling may be limited if there is sufficient capacity in existing drinking water or wastewater networks without the need for significant augmentations for some time (see Figure 5). In this circumstance, the incremental capital and operating expenditures associated with water recycling (relative to a business as usual or traditional option) may exceed the incremental benefits, meaning that water recycling is not efficient or cost-effective (that is, it has a net cost to the community).

**Figure 4: Incremental costs and benefits of water recycling: net benefits to the community**

**Figure 5: Incremental costs and benefits of water community: net cost to the community**
For the purposes of this review, we have defined ‘cost-effective’ water recycling as that which maximises the net benefits to society. This approach is consistent with the terms of reference to develop an optimum framework for cost-effective recycling water initiatives and to encourage investment in water recycling schemes that are economically efficient.

This notion of efficient or cost-effective water-related services necessarily includes considering the full range of costs, benefits and risks associated with specific water recycling schemes – including those environmental, health and other community benefits or costs that might not be priced in markets, but have a value to the community.

Regulatory and policy settings that promote cost-effective water recycling are in the long-term interests of customers and the broader community as they can:

○ Lead to lower prices for these services by reducing inefficient investment in and use of traditional water, wastewater and stormwater services and/or improving opportunities for competition and innovation in the sector

○ Potentially lower the cost of achieving a broader set of policy and/or community objectives.

In contrast, policy and regulatory settings that create barriers to cost-effective water recycling and/or facilitate investment in and use of water recycling where it is not cost-effective are unlikely to be in the long-term interests of customers and the broader community as they can increase the overall cost of providing water, wastewater and stormwater services to the community.

The challenge for policymakers, regulators, water providers and customers involves promoting “water, wastewater and stormwater services so as to maximise net benefits to the community”. This requires a regulatory and policy framework that recognises the broader costs and benefits associated with water recycling and readily facilitates the adoption of recycled water solutions where and when they maximise the benefits to society as a whole (not just the financial benefits to the water supplier). This can be thought of as ensuring that water recycling projects that are economically viable are able to proceed.

Projects that are economically viable may also be financially viable (if benefits to users or other parties are high and can be readily recovered). However, some economically viable schemes may not be financially viable (for example, if it is difficult to recover the costs

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26 This will depend on whether water-related investments are the most efficient means of achieving a given community outcome; for example, whether wastewater recycling can improve environmental outcomes (by avoiding discharge) at lower cost than other options (such as reducing nutrient run-off from agricultural land).
27 Productivity Commission, Australia’s Urban Water Sector, 2011, p. xlvii
of the project from those who benefit or there are delays or uncertainty in receiving regulatory approval) (see Figure 6).

Figure 6: Economic vs financial viability of water recycling

![Economic vs financial viability of water recycling diagram]

Equally, the policy and regulatory framework should not facilitate water recycling projects that are not economically viable. Some water recycling schemes may not be economically viable even when considering the full set of costs and benefits to the community associated with the schemes. For example, Sydney Water notes:

“Review of [its] past recycling projects have generally shown that costs are greater than the value of water. We will continue to explore new technologies and methods of making recycled water more efficient.”

Some of these schemes may also not be financially viable (for example, due to uncertain demand, scale and/or operational costs) and thus require ongoing financial support from other sources, such as the general customer base (such as the Sydney Water’s Fairfield-Rosehill Recycled Water Scheme). The risk of policy and regulatory settings facilitating water recycling that is not cost-effective is increased where generic water recycling schemes or targets are mandated. Rather, the objective should be to develop a framework that supports water recycling where and when it is cost-effective, rather than one that supports or mandates recycling projects for their own sake.

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30 Sydney Water, Water Conservation Report: 2016-17, p10
This approach is reflected in the 2017 Metropolitan Water Plan and Sydney Water’s Water Conservation Strategy, which move away from targets for recycled water and water conservation respectively. We consider it important that future Metropolitan Water Plans continue to confirm that a key objective of the policy and regulatory framework is to facilitate cost-effective water recycling (where and when the benefits to the community exceed the costs), rather than supporting or mandating water recycling projects for their own sake.

**Recommendation 1:** By the end of 2020, DPE, in its role in leading the development of the NSW Government’s Metropolitan Water Plans, should reconfirm that a key objective of the policy and regulatory framework is to facilitate cost-effective water recycling (where and when the benefits of water recycling to the community exceed the costs), rather than supporting or mandating water recycling projects for their own sake. This objective should be reflected in the next Metropolitan Water Plan. This objective is critical in creating value for water customers and the broader metropolitan NSW community.

### 3.2 Economic regulatory framework

The uptake of cost-effective recycled water schemes will be affected by a range of factors that reflect existing policy, regulatory, institutional, governance and planning frameworks and how these interact.

- The focus of this report is on the economic regulatory framework. In the context of utility industries such as water, economic regulatory functions typically entail:
  - Determination or oversight of the prices and service levels provided by monopoly suppliers
  - Licensing of suppliers as a means of monitoring and enforcing compliance with these service levels/prices
  - Overseeing competition in contestable elements of these industries (such as via regulation of third party access to essential facilities).

The objective of these economic regulatory instruments is to promote effective competition where this is possible or otherwise to reproduce the disciplines of competition by encouraging efficiency and innovation in service and cost performance over time.

In the Australian urban water sector, economic regulation is a State Government responsibility – although, as shown in Figure 7, the States have agreed to apply economic regulation and pricing in a manner consistent with certain requirements and principles set out in the National Water Initiative (NWI).

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32 While reviewing broader institutional and regulatory settings in detail is outside the formal scope of this report, we have sought to identify where elements of these frameworks interact with the economic regulatory framework and in particular where they may constitute barriers to cost-effective water recycling.
Federal Government

NSW Government

Independent Pricing and Regulatory Tribunal of NSW

Sets non-binding guidelines and recommendations for reform of the urban water sector and economic regulation (e.g. NWI, ‘Harper’ review)

Specifies the framework for independent economic regulation and private sector participation (IPART Act, WICA)

Regulates prices and administers the licensing framework for urban water utilities consistent with the legislative framework

Federal Guidelines

• Increase water use efficiency and encourage the re-use and recycling of wastewater where cost effective
• Encourage innovation in water supply sourcing, treatment, storage and discharge

NSW Government legislation

Independent Pricing and Regulatory Tribunal Act 1992
Water Industry Competition Act (2006)

The IPART Act sets a legislated mandate for IPART to regulate prices of declared public water utilities for water services in NSW metropolitan areas and protect and promote the ongoing interests of the consumers, taxpayers and citizens of NSW.

The WICA seeks to encourage competition in relation to the supply of water and the provision of sewerage services and to facilitate the development of infrastructure for the production and reticulation of recycled water; and for other purposes. WICA establishes:
• a licensing regime for private sector entrants
• an access regime for existing water industry infrastructure
• IPART as the arbitrator of disputes over access to infrastructure services and sewer mining disputes.

Independent Pricing and Regulatory Tribunal of NSW

IPART regulates the urban water sector through:
• Setting of maximum retail prices charged by Sydney Water and Hunter for water, wastewater, stormwater and some recycled water services (and potentially of retail prices charged by WICA licensees)
• Overseeing competition in contestable elements of these industries incl. undertaking scheme specific price reviews for prices levied by Sydney Water and Hunter Water for providing wholesale water, wastewater and other services to private operators licenced under WICA, who in turn, either on-sell or provide recycled water and other services to customers
• The charges levied on developers for the provision of water, wastewater, recycled water and stormwater serviced provided by the public utilities
• The licensing frameworks that apply to the public and private utilities across metropolitan NSW.

Source: Frontier Economics
In the context of the current review, the incentives for uptake of water recycling – by public water utilities, alternative providers/WICA licensees and developers and other parties – will be influenced by different elements of the overall framework for economic regulation (and the interactions between these), namely:

- The regulatory framework for **retail prices** of water-related services, which will affect the investment incentives of public water utilities and alternative providers
- The regulatory framework for services provided by public water utilities to alternative service providers (encompassing both the WICA for **third party access** regime and wholesale pricing regulation)
- The **licensing** of both WICA licensees and public water utilities
- The framework for **developer charges**.

As summarised in Figure 8, these elements of the framework for economic regulation are the focus of this review.\(^3^4\)

**Figure 8: Key elements of the economic regulatory framework affecting water recycling**

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<table>
<thead>
<tr>
<th>Influencing Instrument</th>
<th>Economic regulatory instruments</th>
<th>Levels of cost-effective water recycling (incl. where/when/how much water recycling occurs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic regulatory legislation (i.e. IPART Act, WICA)</td>
<td>1. <strong>Price regulation of retail water related services</strong></td>
<td></td>
</tr>
<tr>
<td>Other government policy</td>
<td>• Retail price regulation of water, wastewater, and stormwater applies to public water utilities&lt;br&gt;• Retail price regulation of recycled water applies to public water utilities&lt;br&gt;• Retail price regulation of WICA licensees</td>
<td></td>
</tr>
<tr>
<td>Planning processes</td>
<td>2. <strong>Pricing of wholesale services and third party access</strong></td>
<td></td>
</tr>
<tr>
<td>Environmental and health regulation</td>
<td>• Pricing for access (or transportation) &amp; wholesale services provided by public water utilities.</td>
<td></td>
</tr>
<tr>
<td>Licensing</td>
<td>3. <strong>Licensing</strong></td>
<td></td>
</tr>
<tr>
<td>Developer charges</td>
<td>• Licensing of public water utilities&lt;br&gt;• Licensing of WICA licensees</td>
<td></td>
</tr>
<tr>
<td>Developer charges</td>
<td>4. <strong>Developer charges</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Developer charges that apply (or don't apply) for some water and wastewater services&lt;br&gt;• Developer charges that apply for recycled water</td>
<td></td>
</tr>
</tbody>
</table>

Source: Frontier Economics

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\(^3^3\) Third party access can be broadly defined as encompassing those situations where a third party wishes to obtain access to a bottleneck facility (a point on a network through which all service products must pass to reach the end-consumers) to be able to provide goods and services to customers in upstream or downstream markets. This is typically seen as being most relevant to facilities that are natural monopolies – such as transportation networks – that would be uneconomic to duplicate.

\(^3^4\) The relationship between these elements of the economic regulatory framework and the cost and risk associated with water recycling in metropolitan NSW is summarised in Table 5 in Appendix A.
Each of these elements influences the incentives for investment in, and use of, water recycling. Identifying any economic regulatory barriers that may limit investment in, and use of, cost-effective water recycling therefore involves reviewing the key elements of the current economic regulatory framework for water-related services.  

### 3.3 Preconditions to promote cost-effective water recycling

To achieve the underlying policy objectives set for it, any regulatory framework will need to comply with a number of high-level principles. We have distilled a set of principles for best practice economic regulation of the urban water sector (see Figure 9). In broad terms, best practice regulation:

- Achieves outcomes at least cost (such as by adopting risk-based and outcomes-focused approaches rather than prescriptive approaches, recognising the costs associated with regulation)
- Provides incentives to improve outcomes over time (with outcomes aligning to customer preferences and expectations)
- Is flexible to efficiently and effectively manage emerging challenges and developments (such as integrated water cycle management) in the sector, rather than being tied to previous paradigms around industry structure and traditional service delivery models
- Is transparent – both in expectations (what is required) and regulatory decision-making (how decisions have been made) – and consultative.

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35 Including the pricing of water, wastewater and recycled water services, as well as non-price elements of the framework that may create delays or uncertainty in adopting recycled water solutions.
Figure 9: High-level principles and characteristics of effective economic regulation

**Principles of ‘best practice’ economic regulation**

- **Focus, independence & accountability**
  - Independent regulation subject to clearly articulated & prioritised objectives, concentrated on protecting the long-term interests of end users of infrastructure services, enshrined in legislation
  - The role of economic regulators should be focussed on outcomes by ensuring the operation of well-functioning and contestable markets where appropriate or by designing a system of incentives and penalties that replicate as far as possible the outcomes of competitive markets
  - Regulatory decisions should be subject to appropriate scrutiny and challenge including effective appeal mechanisms

- **Transparency**
  - Regulator’s expectations and decision-making is transparent (e.g., reasons for decisions clearly articulated and publicly available) and with procedural fairness
  - Key information to be made available to customers and stakeholders, including information for the operation of well-functioning and contestable markets

- **Flexibility & coherence**
  - Pricing and licensing frameworks are updated periodically as market conditions change and continue to be relevant and effective over time, and regulator's empower businesses to efficiently and effectively manage emerging challenges and developments aligning outcomes with customer preferences & expectations
  - Regulatory frameworks should form a logical part of the Government’s broader policy context, consistent with established priorities, including frameworks that enable cross-sector delivery of policy goals where appropriate

- **Efficiency**
  - Regulatory interventions should be proportionate and cost-effective to ensure that the benefits from regulation outweigh the costs
  - Compliance costs should be minimised through avoiding delays and excessive information requirements and undertaking regulatory reviews in a timely manner
  - Unnecessary duplication between regulators should be eliminated
  - Regulation (including licensing) is risk-based and outcomes-focused approaches to achieve outcomes at least cost
  - Regulator's expectations and decision-making is transparent (e.g., reasons for decisions clearly articulated and publicly available) and with procedural fairness

- **Capability**
  - Regulators have appropriate expertise and resources to effectively undertake their functions
  - Regulators seek to build expertise of customers, stakeholders and market participants

- **Timeliness & predictability**
  - Timeliness of decision-making is responsive to market and stakeholder needs
  - Decision-making is stable and objective (e.g., well-defined decision making criteria and clear timetables) enabling all those affected to anticipate the context for future decisions and to make long term investment decisions with confidence

*Source: Frontier Economics; adapted from Frontier Economics, Improving Economic Regulation of Urban Water, A Report Prepared for the Water Services Association of Australia (WSAA), August 2014*
Ultimately, best practice regulation should mean more efficient and effective regulation that results in more flexible, customer-orientated and lower cost outcomes for the community. There are several elements of regulation that will influence its efficiency and effectiveness. These include:

- **Governance arrangements**—including regulatory objectives and principles; institutional form, structure and organisational capacity; powers and functions (including extent of jurisdiction); and review and appeals mechanisms. These matters are typically defined in legislation and subsidiary instruments.

- **Approaches, methodologies and instruments for regulation**—including use of traditional and alternative approaches and forms of regulation and associated instruments, such as incentive and risk sharing mechanisms and compliance monitoring and enforcement.

- **Regulatory decision-making processes**—including processes for setting prices/standards, stakeholder engagement and interaction between regulators.

Some of these elements will be within regulators’ control (such as regulatory decision-making processes), while others may be outside their control (such as governance arrangements).

While the general principles above are relevant for the current review, we have also identified some specific preconditions to ensure the economic regulatory framework in the NSW urban water sector promotes cost-effective water recycling (see Table 2).
Table 2: Providing incentives and signals to promote cost-effective water recycling: Preconditions of an economic regulation framework

<table>
<thead>
<tr>
<th>Precondition</th>
<th>Why</th>
<th>How</th>
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<tbody>
<tr>
<td><strong>1. Encourages consideration of broader costs and benefits of water recycling</strong></td>
<td>The benefits of cost-effective recycling schemes may extend beyond direct impacts incurred by water businesses and their customers to include a broader set of economic, environmental, social and liveability related outcomes.</td>
<td>Recognise and encourage consideration of the full range of costs, benefits and risks associated with water recycling schemes (including those that might not be priced in markets) as part of investment decision-making (e.g. detailed cost-benefit or Regulatory Investment Test for major augmentation decisions)</td>
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<tr>
<td></td>
<td>A holistic approach to investment decision-making requires consideration of these additional costs and benefits, otherwise there is a risk that the economic, environmental and socially optimal set of recycled water investments may be under- or over-provided.</td>
<td>Provide guidance on how businesses should consider these costs and benefits as part of business case development and investment evaluation, and how the regulator will consider this information as part of regulatory decision-making</td>
</tr>
<tr>
<td></td>
<td>Recognise and encourage consideration of the full range of costs, benefits and risks associated with water recycling schemes (incl. those that might not be priced in markets) as part of investment decision-making (e.g. detailed cost-benefit or Regulatory Investment Test for major augmentation decisions)</td>
<td>Provide incentives (and remove disincentives) to water businesses to invest in servicing solutions (including water recycling) that maximise the net benefits to the community, including a funding framework that allows beneficiaries of water recycling to contribute to the costs in line with the benefits they receive</td>
</tr>
<tr>
<td><strong>2. Provide consistent incentives and signals for efficient investment in and use of water recycling relative to other services and assets</strong></td>
<td>Provides for least-cost mix of public utility investment in water, wastewater, recycled water and stormwater services</td>
<td>Ensure regulation of recycled water prices is proportionate, cost-effective and reflects the specific market characteristics</td>
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<td></td>
<td>Recognises that water, wastewater, recycled and stormwater form part of an integrated urban water system</td>
<td>Provide similar levels of risk allocation between utilities and customers across investment in water, wastewater, recycled water and stormwater services</td>
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<td></td>
<td>Ensure usage prices (where practical) provide signals regarding the forward-looking cost of balancing supply and demand (i.e. reflect long-run marginal costs (LRMC)) to encourage efficient use of these services and investment in cost-effective water recycling (including private sector entry and self-supply)</td>
<td>Avoid retrospective regulatory decision-making</td>
</tr>
<tr>
<td><strong>3. Promote efficient or cost effective private sector entry in water recycling</strong></td>
<td>Provides for least-cost mix of incumbent and new entrant water, wastewater, recycled water and stormwater services</td>
<td>Ensure consistent and timely information is accessible on system constraints (including associated costs) to allow market participants to identify opportunities for cost-effective water recycling (including private entry)</td>
</tr>
<tr>
<td>Precondition</td>
<td>Why</td>
<td>How</td>
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<td>--------------</td>
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</tr>
<tr>
<td>● Ensures efficient entry occurs where forward-looking costs of new entrant water recycling is lower than the forward-looking costs of traditional or other alternative servicing solutions, rather than new entrants entering through profitable arbitrage opportunities as a result of inefficient retail and wholesale pricing arrangements</td>
<td>● Provide wholesale price signals for entry where it lowers overall system costs over time (including erring on the side of promoting new entry)</td>
<td>● Ensure timeframe for regulatory decision-making is consistent with market needs</td>
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<tr>
<td></td>
<td>● Provide incentives for businesses to invest in servicing solutions that maximise the net benefits to society (e.g. providing a framework to allow beneficiaries to contribute in line with their benefits)</td>
<td>● Ensure accountability and confidence in decision-making process (e.g. through appeal mechanisms)</td>
</tr>
<tr>
<td>4. Congruence with government policy settings</td>
<td>● Regulatory framework needs to recognise broader policy settings</td>
<td>● Ensure 'postage stamp pricing'(^{36}) not undermined</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Promote alternative sources and water security as per WICA &amp; the Metropolitan Water Plan</td>
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<td></td>
<td></td>
<td>● Enable achievement of the Greater Sydney Commission's vision for a Western Parkland City</td>
</tr>
</tbody>
</table>

Source: Frontier Economics

\(^{36}\) ‘Postage stamp pricing’ (also known as uniform pricing) means that the same types of customers within an area are charged the same price for the same service, regardless of which individual water supply and/or wastewater treatment system is used to provide the service (and thus the cost of providing the service).
3.4 The need for an ongoing focus on the policy and regulatory settings

Given the importance of ensuring the economic regulatory framework provides incentives and signals for cost-effective water recycling, we consider it important that DPE, in its role in leading the development of the Metropolitan Water Plan by end of 2020, assesses and reports on progress in refining the policy and regulatory framework (including the economic regulatory framework) in line with the recommendations in this report to ensure the framework is meeting the four key preconditions we have identified as being necessary to facilitate cost-effective water recycling:

- Encouraging consideration of the broader costs and benefits of water recycling
- Providing consistent incentives and signals for public water utility investment in and use of water recycling relative to other services and assets
- Promoting efficient private sector entry in water recycling
- Being congruent with government policy settings.

Given that many aspects of the economic regulatory framework, including the specific arrangements for recycled water, have not been reviewed or updated for over ten years, we consider it important that there is continued focus on ensuring the economic regulatory framework is promoting cost-effective water recycling in line with the government’s priorities, and facilitating sound long-term water investment decision-making for Greater Sydney and the Lower Hunter and Central Coast regions. For this reason, we also consider it important that in leading the development of future Metropolitan Water Plans every five years, DPE assess and report on:

- The ‘state of play’ of cost-effective water recycling in supporting the government’s priorities
- Whether the policy and regulatory framework (including the economic regulatory framework) is meeting the four key preconditions we have identified as being necessary to facilitate cost-effective water recycling.

This should minimise the risk that future changes in market structure and government priorities occur without a corresponding review and update of the economic regulatory framework. In undertaking this assessment, DPE should examine the four key elements of the economic regulatory framework including:

- Price regulation of retail water-related services
- Price regulation of wholesale services and third party access
- Licensing of public water utilities and WICA licensees
- Developer charges for water-related services.
**Recommendation 2:** By the end of 2020, DPE, in its role in leading the development of the Metropolitan Water Plans, should assess and report on progress towards refining the policy and regulatory framework in line with the recommendations in this report to ensure the framework is meeting four key preconditions necessary to facilitating cost-effective water recycling:

- Encouraging consideration of the broader costs and benefits of water recycling
- Providing consistent incentives and signals for public water utility investment in and use of water recycling relative to other services and assets
- Promoting efficient private sector entry in water recycling
- Being congruent with government policy settings.

**Recommendation 3:** As part of its role in leading the development of future Metropolitan Water Plans every five years, DPE should assess and report on:

- The ‘state of play’ of cost-effective water recycling in supporting the NSW Government’s priorities
- Whether the policy and regulatory framework (including the economic regulatory framework) is meeting the four key preconditions necessary to facilitating cost-effective water recycling set out in Recommendation 2.

Sections 4 to 9 of this report assess the current economic regulatory framework applying to recycled water in metropolitan NSW against the preconditions outlined in Table 2, namely whether it:

- Encourages consideration of the broader costs and benefits of water recycling
- Provides consistent incentives and signals for investment in and use of water recycling relative to other services and assets
- Promotes efficient private sector entry in water recycling
- Is congruent with NSW Government policy settings.
4 Does the economic regulatory framework account for broader costs and benefits?

A holistic approach to long-term investment decisions requires consideration of the broader impacts associated with potential investments. This section examines whether the current economic regulatory framework adequately accounts for the broader costs and benefits associated with water recycling – including economic, environmental, social and liveability outcomes, many of which accrue to the broader community.

Recommendations

4. As part of its 2018 recycled water review, IPART should amend the framework for assessing avoidable costs associated with recycled water schemes to ensure any ex-post review considers only information that was available at the time of the decision to invest in water recycling.

5. As part of its 2018 recycled water review, IPART should extend the framework for assessing avoidable costs associated with recycled water schemes to include stormwater assets owned and operated by the public water utilities.

6. As part of its 2018 recycled water review, IPART should consider how public water utilities can be given incentives to engage with private sector recycled water proponents that generate avoidable costs, but where there is no wholesale service being provided to the private sector recycled water proponent.

7. As part of its 2018 recycled water review, IPART should extend the framework for assessing avoidable costs associated with recycled water schemes to allow for the value of external benefits to be recovered from the broader customer base where public water utilities can demonstrate customer willingness and capacity to pay.

8. By the end of 2019, DPE should commission, in conjunction with the public and private water utilities, a review of measures to enhance industry ability to coordinate and engage with potential sources of co-funding in water recycling.

9. As part of its 2018 recycled water review, IPART should provide greater regulatory guidance on the circumstances in which it would expect co-funding to be received for water recycling schemes when setting prices for recycled water.

10. As part of its role in leading the development of future Metropolitan Water Plans every five years, DPE should provide information to IPART and the broader market regarding expectations of any Ministerial direction to IPART to allow some of the costs of investment in water recycling to be recovered from the broader customer base, and the alignment of any direction with the NSW Government’s priorities as set out in the next Metropolitan Water Plan.

4.1 Recognition of broader costs and benefits

IPART clearly recognises that there is a range of drivers for individual recycled water schemes (see Box 8) that mean there may be a divergence between the users and the beneficiaries of a particular scheme.
Box 8: IPART’s characterisation of drivers of individual recycled water schemes

Drivers may include one or a combination of the following:

- Users’ demand for recycled water on the basis of cost and/or product characteristics (such as greater reliability of supply or suitability for certain industrial processes)
- The need for recycled water in new developments to meet requirements in planning instruments such as the Building Sustainability Index (BASIX)
- Agencies’ need to meet environment protection licence requirements relating to effluent discharges to waterways – for example, recycled water may be the least cost means of meeting specified obligations
- Agencies’ need to meet operating licence requirements to reduce potable water demand
- Government mandates to implement recycling schemes to meet broader public policy objectives.


IPART has also noted that:

“If costs are not allocated appropriately between the users of a recycled water scheme and the beneficiaries of any cost savings in other parts of the system or of any external benefits, schemes may not proceed because recycled water prices will need to be set at a level that exceeds customers’ willingness to pay. Where these projects represent part of the least-cost water supply solution, this will result in an economically inefficient outcome.”37

While IPART’s pricing arrangements for recycled water clearly recognise the need to incorporate these broader costs and benefits into its regulatory decision-making (see Figure 10), the issue is whether the current arrangements are effective in doing so – and whether they are likely to remain so in the context of changes to the industry paradigm (including the need for the integrated catchment scale land use and water cycle planning that is required to achieve the GSC vision for South Creek).

The following discussion examines how well the current framework deals with the two key potential benefits attributable to recycled water:

- Avoidable capital and operating costs in upstream water or downstream wastewater networks
- Broader non-market benefits relating to environmental and social impacts.

Figure 10: IPART’s recycled water pricing arrangements recognise broader costs and benefits of water recycling

<table>
<thead>
<tr>
<th>IPART Recycled Water Pricing Principle</th>
<th>Rationale and implication</th>
</tr>
</thead>
<tbody>
<tr>
<td>RW maximum prices should promote full cost recovery in line with ‘user pays’ principle (minus any developer charges)…except where there are ‘cost offsets’ to be recovered from other beneficiaries.</td>
<td>• RW pricing arrangements should recover the “total direct costs” (incl. some share of joint water costs) to promote efficient investment in &amp; use of RW, except where there are other clear beneficiaries.</td>
</tr>
<tr>
<td>• Avoided costs that benefit the agency &amp;/or other users (e.g. temporary/permanent deferral of DW or WW augmentation) should be shared with these other beneficiaries – to the extent that it leaves them no worse off than they would have otherwise have been.</td>
<td>• Recognises that RW schemes should be considered as part of an integrated urban water system with system-wide costs &amp; benefits. Without recognising these broader costs &amp; benefits there might be over/under investment in RW.</td>
</tr>
<tr>
<td>• The scheme generates broader community benefits, &amp; “for which external funding is received” (e.g. WTP for avoided wastewater or stormwater discharge)</td>
<td>• Policy obligations on utilities should be recovered from broader set of water or wastewater customers</td>
</tr>
<tr>
<td>• Where NSW Government directs IPART to allow a portion of RW costs to be passed to the broader water customer base (s16A direction) e.g. Fairfield-Rosehill.</td>
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4.2 Avoided potable water and wastewater costs

Background

A material driver of the economic feasibility of water recycling can be the avoidable costs that may result from the temporary or permanent deferral of upstream drinking water and downstream wastewater capital and operating expenditure – particularly where there are emerging capacity constraints in the upstream water and/or downstream wastewater network (Figure 11).

These ‘avoidable costs’ are costs that would have been incurred in the provision of water and/or wastewater services without investment in and use of a specific water recycling scheme (that is, if traditional or business as usual services were provided). These avoidable costs are a benefit that accrues largely to the broader ‘postage stamp’ customer base (those customers who are being charged the same tariff for services irrespective of the costs to deliver these services to different locations).
The nature and extent of any such avoidable costs will vary depending on the specific characteristics of the water recycling scheme and how it affects the existing network. For example, a wastewater recycling scheme may reduce upstream potable water by the quantity of recycled water consumed in the scheme and will also reduce downstream wastewater flow. In contrast, a stormwater/groundwater/rainwater harvesting scheme will reduce upstream potable water, but will not reduce downstream wastewater flow.\(^{38}\)

These avoidable costs may also be affected by the location of recycled water schemes, depending on the connectedness of the network and whether constraints are system-wide or localised.\(^{39}\)

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\(^{38}\) Stormwater harvesting may provide a range of other benefits such as reduced stormwater flow with potential benefits for the costs of stormwater assets, reduced nutrient run-off into local water bodies and/or flooding risk.

\(^{39}\) For example, Oakley Greenwood observed that the avoidable wastewater network costs may be highly dependent on location, noting: “The potential cost impacts for wastewater network augmentation and WWTP [Wastewater Treatment Plant] augmentation are primarily driven by changes in flow and load requirements and the individual circumstances of the assets and catchments. These individual circumstances relate to factors such as location of the RWP (Recycled Water Plant) – and the current spare capacity within the catchment – and whether different operating statuses of the RWP can be accommodated by the downstream WWTP. These factors can vary significantly from one catchment to the next and therefore have a considerable impact on any potential cost savings from the introduction of a RWP”. Oakley Greenwood, Cost drivers for wholesale wastewater services and cost impacts of recycled water plants, prepared for Independent Pricing and Regulatory Tribunal, Revised Final Report, 29 June 2017, p. 9
To facilitate cost-effective water recycling, these avoided costs should be reflected in the pricing arrangements and investment incentives for potential proponents of water recycling schemes (both public utilities and others).

**Current approach**

For public utilities, IPART’s avoided cost framework allows for the recovery of avoidable costs created by recycled water schemes from the broader utility customer base. This occurs via IPART’s methodology for recycled water periodic and developer charges whereby the value of the avoided costs attributable to a recycled water scheme can be added to the public utility’s water or wastewater regulatory asset base (RAB) and thus be recovered from the broader customer base rather than from customers of the recycled water scheme.

IPART’s 2006 Avoided Cost Guidelines prescribe how any avoidable costs are to be calculated, including the present value of the deferred capital augmentation expenditure and avoided operating expenditure arising from reduced water and wastewater volumes in each of the relevant assets using a ‘with and without’ water recycling approach.

IPART has also issued guidelines about the process for determining the quantum of avoidable costs. While the value of avoided costs to be shared with general water and/or wastewater customers are assessed and determined as part of a retail water and wastewater price determination (rather than as part of agency investment decision), the allowance for avoided costs can be reviewed as part of an ex-post review. There is the potential for an ex-post adjustment where IPART considers “agencies overstate or understate the length and cost of deferral or misrepresent an avoided cost’s value”. IPART notes that an ex-post-adjustment would only be considered where actual costs avoided are materially different from forecast and the agency’s calculations and assumption are found to be materially in error.”

**Assessment of current approach**

Consistent with the promotion of cost-effective water recycling, IPART’s ‘avoided cost’ framework is designed to recognise:

- That recycled water schemes, in an integrated system, can create broader costs and benefits for the system (such as temporary or permanent deferral of drinking water or wastewater operation / augmentation)

- Some of the costs of a recycled water scheme should be shared with general water and/or wastewater customers in line with the benefits they receive – to the extent that it leaves those customers no worse off (i.e. the share of costs of the recycled

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40 IPART, Assessment Process for Recycled Water Scheme Avoided Costs – Guidelines, January 2011
41 However, a utility can seek an informal or preliminary review at the time an investment decision in being made.
42 IPART, Assessment Process for Recycled Water Scheme Avoided Costs – Guidelines, January 2011, p9
water schemes which are borne by the general customer base is no more than the value of the avoidable costs they would otherwise incur).

There are two potential issues with the current treatment of avoidable costs that may not promote cost-effective water recycling:

- The risks associated with a potential ex-post review of avoidable cost allowance
- The limited scope of application of the avoided cost framework.

On the first issue, while some form of ex-post assessment may be appropriate, the current framework is likely to create additional risk and uncertainty for public utilities investing in water recycling relative to traditional solutions. As highlighted by Hunter Water’s experience (summarised in Box 9), perceptions of additional risk associated with an ex-post review may create additional uncertainty for investment in recycled water, which in turn may bias traditional solutions over recycled water schemes (noting that WICA licensees supplying recycled water also face cost recovery risk).

IPART’s 2011 avoided costs guidelines may create uncertainty regarding what information will be considered as part of an ex-post review of avoided costs and the allocation of risk where estimated and actual avoided costs differ. The guidelines note that an ex-post-adjustment may occur where agencies are “materially in error based on circumstances and information that existed at the time the avoided cost was assessed”. This can create uncertainty as to whether this refers to information:

- At the time the decision was made to invest in water recycling (which would include an assessment or estimate of the expected avoidable costs), or
- When IPART assessed the actual avoided cost (and any material difference) as part of a subsequent determination (that is, with benefit of hindsight).

Box 9: Case study: Kooragang Industrial Wastewater Scheme

The Kooragang Industrial Wastewater Scheme (KIWS) was approved for planning and development by the Hunter Water Board in 2011. As part of its planning process, Hunter Water consulted with IPART to validate a method of calculating avoidable cost. The total amount of avoided cost was found to be $15.6 million ($2011-12) from Grahamstown WTP and other smaller network deferrals. The ‘avoidable cost funding stream’ from the broader customer base was a material aspect of the Hunter Water Board’s decision to proceed with investment in the KIWS.

In IPART’s 2012-13 Hunter Water price review, a KIWS business case was submitted to IPART. Atkins Cardno reviewed the KIWS scheme and IPART determined that the avoidable costs were $9.5 million, which could be recovered through Hunter Water’s regulatory asset base.

In IPART’s 2015-16 Hunter Water price review, IPART found the avoided costs associated with the KIWS were closer to $2.5 million, citing lower than expected volumes of recycled water being produced. Ultimately, IPART decided not to include avoided costs in their pricing determination, noting the lower than expected uptake of recycled water and that Hunter Water had decided to sell the scheme. IPART noted that the avoided cost framework was designed in 2006 for recycled water schemes owned and operated by public water utilities.

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43 IPART, Assessment Process for Recycled Water Scheme Avoided Costs – Guidelines, January 2011
To the extent that the ‘avoidable cost funding stream’ from the broader customer base is material and a significant part of a recycled water project’s financial viability, this uncertainty has the potential to impact willingness to invest in recycled water and ultimately may bias traditional solutions over recycled water schemes.

Although capital expenditure associated with traditional water and wastewater servicing solutions is also subject to ex-post prudence reviews by IPART at the next price review, there does not appear to be a consistent allocation of risk between utilities and customers across water, wastewater and recycled water investments. For example, ex-post reviews of investment in water and/or wastewater services consider information available at the time of the investment decision (such as forecast demand), rather than information that has become available given the benefit of hindsight (such as actual demand).

**Recommendation 4:** As part of its 2018 recycled water review, IPART should amend the framework for assessing avoidable costs associated with recycled water schemes to ensure any ex-post review considers only information that was available at the time of the decision to invest in water recycling. This should avoid creating additional risk and uncertainty for public utilities investing in water recycling.

A second set of issues relates to the coverage of the avoided cost framework. In particular, IPART’s avoided cost guidelines do not extend to stormwater services or recycled water schemes owned and operated by private entities (including where there may not be a wholesale service provided to these private entities).

First, it is conceivable that some recycled water schemes could lead to avoidable costs in stormwater assets owned and operated by the public water utilities. It would seem appropriate that any such avoidable costs be treated in the same way as avoidable costs relating to the utilities’ water or wastewater assets.

Given that stormwater management is mainly a local government function, it is likely that any avoidable costs in stormwater systems associated with a recycled water scheme (such as a stormwater harvesting scheme) will accrue to councils rather than to the water utilities. As this falls outside IPART’s ambit, recognition of these avoidable costs is dependent on negotiation between the public utilities and the relevant council to receive a funding contribution, which could then be appropriately offset to the charges recovered for recycled water users.

We recognise that IPART’s approach to regulation of recycled water was developed in 2006 when the recycled water industry, particularly private sector entry in water recycling, was in its infancy in NSW. We note that IPART intends to review the avoidable cost framework and issues around ownership of recycled water schemes as part of its approach to recycled water pricing.

To ensure a level playing field, other parties investing in recycled water schemes (such as WICA licensees) should also be able to receive the benefits generated by their schemes for the broader water and/or wastewater network. Currently, if these recycled water
schemes are not receiving a wholesale service (and therefore are not paying wholesale charges to public utilities where there is a mechanism to account for avoidable costs\(^{44}\), there is no mechanism for avoided costs to be funded by the broader customer base, and there may be limited incentives for public water utilities to engage with private sector recycled water proponents even where they may generate avoidable costs (and therefore potentially deliver value to water customers). This is likely to act as a barrier to investment in cost-effective water recycling, particularly given coordination issues around co-funding.

As discussed in section 5.2, some regulatory frameworks impose obligations on businesses to consider and consult on the potential for non-network or traditional options, often supplied by third parties.

**Recommendation 5:** As part of its 2018 recycled water review, IPART should extend the framework for assessing avoidable costs associated with recycled water schemes to include stormwater assets owned and operated by the public water utilities. This should ensure the public water utilities have equal and consistent incentives to invest in recycled water where and when it results in avoidable stormwater costs.

**Recommendation 6:** As part of its 2018 recycled water review, IPART should consider how public water utilities can be given incentives to engage with private sector recycled water proponents that generate avoidable costs, but where there is no wholesale service being provided to the private sector recycled water proponent. This should facilitate efficient entry in private sector recycling, creating value for water customers and the broader metropolitan NSW community, and assist to ‘level the playing field’ between public utilities and private sector investors in water recycling.

### 4.3 Broader non-market benefits

**Background**

Several stakeholders have contended that IPART’s approach to regulating prices does not adequately reflect broader benefits provided by recycled water.\(^ {45}\) These benefits include resilience, cleaner waterways, healthier communities, reduced ocean outfall discharges and liveability (for example, reduced urban heat island effect).

**Current approach**

IPART has previously noted that relevant liveability considerations, such as environmental sustainability, affordability and water security, are factored into Sydney Water’s (and Hunter Water’s) prices through the following process:

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\(^{44}\) However, as discussed in section 5, in practice the lack of information on the extent of such avoidable costs and uncertainty on when they might be passed on to WICA licensees may constitute a barrier to cost-effective recycling.

\(^{45}\) For example, the City of Sydney submission to IPART’s 2016 review of Sydney Water’s prices
1. Parliament passes legislation and government (including through agencies such as the Environment Protection Authority, DPI Water and the Department of Planning and Environment) sets policy and regulatory requirements to reflect and enforce the relevant legislative requirements. This includes requirements imposed on Sydney Water, amongst other entities.

2. Sydney Water develops a plan and estimates the level of expenditure required to deliver its services and meet its obligations. Sydney Water then makes a pricing proposal to IPART.

3. IPART reviews Sydney Water’s pricing proposal to ensure that Sydney Water’s prices reflect the prudent and efficient costs of delivering its services and meeting its mandated obligations as set out in point 1 above.46

Thus, the general test applied by IPART in considering whether to allow for broader non-market benefits to be reflected in regulated prices of the public water utilities is whether there is clear legally binding obligation imposed on the water utilities that is directly linked to achieving these broader benefits. IPART has explicitly rejected general statements of government policy (such as the Lower Hunter Water Plan) as meeting this test on the basis these are not statutory instruments.

Where there is no explicit legally binding obligation for the water utility to undertake activities that result in broader non-market benefits, IPART may nevertheless allow for the costs of these to be recovered in regulated prices if the water utility can demonstrate that its customers are willing and capable of paying for these outcomes.47

In addition to this general position, in developing its specific approach to regulating recycled water, IPART recognises that some mandated recycled schemes may be motivated by broader public policy objectives, such as community or environmental benefits that extend beyond the water agency and its customers. However, IPART’s approach does not provide for any additional costs in achieving such benefits to be automatically passed on to the broader customer base.48

46 IPART notes: “Liveability is included in our concept of prudence and efficiency to the extent that the objectives of liveability are reflected in the broader social and environmental regulatory framework created by Parliament, the government, and its expert environmental and social regulators (e.g., EPA, Department of Planning and Environment, DPI Water), on behalf of the community. IPART would consider, and could allow, expenditure proposals to achieve standards higher than those mandated by Parliament and/or government. In such a case, IPART would require clear evidence that it would be prudent and efficient for customers to pay to exceed the mandated standards… [Including] whether Sydney Water’s customers have both the capacity and willingness to pay more to realise the higher standard. — Proponents would need to provide evidence for IPART to consider in forming a judgement on whether Sydney Water’s customers have the capacity and willingness to pay the higher prices required to meet the higher standard.” IPART, Review of prices for Sydney Water Corporation: From 1 July 2016 to 30 June 2020 Water — Final Report, June 2016, p35


48 IPART notes: “In other cases, recycled water schemes may not be commercially viable from the water agency’s point of view, but may result in other community or environmental benefits beyond the water agency and its customers. In principle, the value of these external benefits should be met directly by the Government, for example through a CSO payment. If the Government does provide funding in this way, the value of the payment received should be deducted from the costs of the scheme to be recovered from customers of the water agency. If the Government does not
IPART’s 2006 recycled water guidelines also allow the cost and prices of recycled water schemes to be offset where ‘external funding is received’ – that is, from parties other than the broader customer base.

The current regulatory framework does not explicitly address how to treat broader non-market benefits where these arise from a recycling scheme owned and operated by a private proponent. This issue is discussed further in section 8.1.

**Assessment of current approach**

The current economic regulatory framework does include some mechanisms for broader external benefits, including those that may result from water recycling, to be considered in investment decision-making, either by allowing for the regulated water utilities to recover the costs of meeting defined standards and/or through demonstrating its customers are willing to pay for outcomes over and above those mandated by these standards.

There are two broad issues that impact the incentives for investment in water recycling where there may be broader external benefits:

- Does the current economic regulatory framework ‘allow’ some of the costs associated with recycled water schemes that generate non-market benefits to be recovered from the broader customer base?
- Does the current economic regulatory framework ‘allow’ some of the costs associated with recycled water schemes that generate non-market benefits to be recovered from external parties?

*Does the current economic regulatory framework ‘allow’ costs associated with recycled water schemes that generate non-market benefits to be recovered from the broader customer base?*

IPART’s general position is that it will only allow the recovery of costs associated with meeting legally binding obligations or “where there is evidence of customer capacity and willingness to pay”. However, IPART does not apply this general position when considering the funding of recycled water schemes. While water and wastewater solutions that generate external benefits can be funded by the broader customer base through postage stamp drinking water and/or wastewater prices “where there is evidence of customer capacity and willingness to pay”, IPART’s 2006 recycled water guidelines only allow the cost and prices of recycled water schemes to be offset where “external funding is received” – that is, from parties other than the broader customer base.

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provide funding via a CSO but explicitly mandates a scheme that is uneconomic, the Tribunal will only allow the agency to recover the revenue shortfall from the broader water and wastewater customer base if there is an explicit directive from the Government to do so.” IPART, Pricing arrangements for recycled water and sewer mining – Sydney Water Corporation, Hunter Water Corporation, Gosford City Council and Wyong Shire Council - Final Report, September 2006, p34
IPART’s current avoided cost framework does not provide for the value of any external benefits to be deducted from the costs to be recovered from recycled water users (and added to the RAB of the broader customer base) even if there is customer capacity and willingness to pay for these benefits. This would not appear to be consistent with IPART’s general position that it may allow recovery of expenditure by a water utility to realise standards higher than those it is legally obliged to meet if it can be clearly shown that customers are willing and able to pay higher prices to achieve this. The strict approach adopted in its avoided cost framework may become more problematic over time as recycled water becomes an increasingly integral part of the overall water and wastewater system.

Some stakeholders, such as Sydney Water, have suggested that the current framework does not sufficiently reflect these broader benefits and that the value of these benefits should be directly reflected in prices of services regulated by IPART. Sydney Water’s suggestion implies that IPART should determine an appropriate value for these broader benefits and reflect these in prices to be recovered from the broader customer base rather than recycled water customers. For example, the value of the estimated benefits could be added to the water/wastewater RAB of the utilities as suggested by Sydney Water or, in the case of WICA licensees that receive a wholesale service from Sydney Water, as an additional ‘minus’ component of the ‘retail-minus’ framework for setting wholesale prices.

In our view, it is not appropriate for IPART to exercise discretion itself on the value of the external benefits potentially attributable to individual recycled water schemes (and/or water and wastewater schemes) and incorporate these into its ‘cost offset amounts’ under its avoided cost framework. Automatically adding the value of non-market benefits onto the entire customer base RAB implicitly assumes that the broader customer base (across the utility’s entire region) represents a good proxy for the beneficiaries of the liveability and environmental benefits and that they are willing and capable of contributing towards these benefits.

However, it is appropriate where customer willingness and capacity to pay can be demonstrated by the public water utilities for the recovery of the costs associated with these non-market benefits from the broader customer base.

IPART’s general position that it will only allow the recovery of costs associated with meeting legally binding obligations or “where there is evidence of customer capacity and willingness to pay” is consistent and appropriate for an independent economic regulator.

We therefore propose that, in its forthcoming review of its approach to regulating recycled water, IPART should modify its avoided cost framework to allow for the value

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49 Sydney Water noted: “There are often benefits derived by the broad customer base from recycled water schemes that the current avoided costs framework does not adequately recognise. For example, where recycling schemes can be demonstrated to provide non-market benefits to all water customers (i.e. the community), it seems appropriate to consider broadening the existing avoided costs mechanism to allow these values to be allocated to the water/wastewater RAB, and hence for this value to be allocated to the broader community. The regulator should retain some discretion on the value each scheme contributes to these benefits.” SWC submission to INSW review, 2018
of non-market external benefits associated with recycled water to be included where customer willingness and capacity to pay can be demonstrated by the public water utilities. This should ensure the public water utilities have equal and consistent incentives to invest in recycled water where and when it results in broader external benefits that are valued by the broader customer base.

**Recommendation 7:** As part of its 2018 recycled water review, IPART should extend the framework for assessing avoidable costs associated with recycled water schemes to allow for the value of external benefits to be recovered from the broader customer base where public water utilities can demonstrate customer willingness and capacity to pay. This should ensure the public water utilities have equal and consistent incentives to invest in recycled water where and when it results in broader external benefits.

**Does the current economic regulatory framework ‘allow’ costs associated with recycled water schemes that generate non-market benefits to be recovered from external parties?**

We note there is nothing in the current framework that prevents water businesses from seeking external co-funding from beneficiaries (such as developers, local councils or NSW Government agencies). IPART’s avoided cost framework explicitly allows for any payments towards recycling schemes paid by parties other than the utility and its customers to be part of the ‘offset’ amount deducted from the cost to be recovered from direct users of the scheme.

In many circumstances, where there are clear beneficiaries, recovering some of these costs from these beneficiaries may be preferable to recovering them from the broader customer base (Sydney Water’s proposal) or by government through a Community Service Obligation (CSO) payment (IPART’s 2006 guidelines).

However, there are broader coordination challenges that may represent barriers to cost-effective water recycling. It is well recognised that in some cases, it may be difficult to coordinate and secure funding from external beneficiaries of recycled water initiatives because:

- The costs and benefits associated with recycled water may accrue to a broad range of beneficiaries and it may be difficult/costly to identify the beneficiaries and/or engage with them (including the broader community).

- Many beneficiaries (developers, local councils, government agencies and others) may not have the incentives and/or the ability to contribute to the costs of providing recycled water or may not be willing/able to share in the risks.

- It may be particularly difficult for new entrants to negotiate with a broad range of potential beneficiaries to secure funding for external benefits associated with water recycling schemes. It may also be problematic for these suppliers to undertake a willingness to pay (WTP) survey of the broad customer base (which asks customers how much they would be willing to pay in higher bills to enable the broader social or environment benefits be achieved), most of whom are not their direct customers.
The public water utilities may have little incentive to undertake such studies on their behalf.

We consider there is merit in IPART providing greater regulatory guidance as part of its 2018 recycled water review on the circumstances in which it would expect co-funding to be received for water recycling schemes (and for traditional schemes that may generate external benefits). However, we recognise that many of the difficulties in coordinating funding from a range of beneficiaries go beyond the economic regulatory framework and are not necessarily best addressed through changes to the framework. These processes are new to the water industry and require new skillsets and collaborative approaches. For this reason, we recommend DPE commission, in conjunction with the public and private water utilities, a review of measures to enhance industry ability to coordinate and engage with potential sources of co-funding in water recycling by the end of 2019. This should reduce barriers to co-funding in cost-effective water recycling and create value for water customers and the broader metropolitan NSW community.

While the challenges around coordinating funding from a range of beneficiaries can be seen as a rationale for direct government intervention through regulation and/or planning mechanisms, this carries risks. Mandating schemes or requiring costs to be passed through to the customers of the public water utilities carries the risk of implementing recycled water schemes that are not cost-effective – suggesting the need for rigorous and transparent cost-benefit analysis of any such schemes before they are mandated. It is can also create uncertainty around where and when government direction may occur (and in what timeframe), which can impact incentives for investment (including incentives to seek co-funding from beneficiaries) by public and potential private sector proponents.

Importantly, IPART’s framework for setting prices for recycled water schemes recognises the NSW Government (through a Section 16A directive) can direct IPART to allow a portion of recycled water costs to be recovered from the broader customer base. However, given the risks outlined above, it is our view that a Ministerial direction to IPART to allow some of the costs of investment in water recycling to be recovered from the broader customer base should only occur where and when the investment is demonstrated to be cost-effective and where it may be challenging to ascertain customer willingness to pay for external benefits and/or coordinate and engage with potential sources of co-funding.

Providing greater clarity regarding the circumstances where the Minister may provide this direction to IPART is likely to provide greater investment certainty to public water utilities and potential private sector proponents. For this reason, we recommend that DPE, in its role in leading the development of future Metropolitan Water Plans every

50 Hunter Water noted in its submission to this review that “issuance of a directive (under section 16A of the IPART Act 1992) has high transaction costs and long administrative timelines, which may sometimes be disproportionate to the size of the recycled water schemes. The potential delays associated with securing a CSO or directive may tip the balance in favour of traditional investments and servicing solutions, resulting in missed recycling opportunities”.

five years, should provide information to IPART and the broader market regarding expectations of any Ministerial direction to IPART to allow some of the costs of investment in water recycling to be recovered from the broader customer base, and the alignment of any direction with government priorities.

In the context of catchment-scale planning such as South Creek, recycled water is likely to facilitate achievement of the environmental and liveability outcomes sought by the Government for new development in the Western Parkland City. It is likely that appropriately specified regulatory and planning instruments will be required to ensure that these benefits are realised in practice – in other words, coordinated government action may be required to ensure that an integrated land use and water management strategy which secures diverse external benefits is adopted. The precise nature and form of these regulatory and planning mechanisms will need to be developed carefully as part of Infrastructure NSW’s South Creek Corridor Strategic Business Case to ensure cost-effective outcomes.

**Recommendation 8:** By the end of 2019, DPE should commission, in conjunction with the public and private water utilities, a review of measures to enhance industry ability to coordinate and engage with potential sources of co-funding in water recycling. This should reduce barriers to co-funding in cost-effective water recycling and create value for water customers and the broader metropolitan NSW community.

**Recommendation 9:** As part of its 2018 recycled water review, IPART should provide greater regulatory guidance on the circumstances in which it would expect co-funding to be received for water recycling schemes when setting prices for recycled water. This should provide greater certainty to public water utilities and current and/or potential private sector proponents about the recycled water costs that can be recovered from recycled water customers.

**Recommendation 10:** As part of its role in leading the development of future Metropolitan Water Plans every five years, DPE should provide information to IPART and the broader market regarding expectations of any Ministerial direction to IPART to allow some of the costs of investment in water recycling to be recovered from the broader customer base, and the alignment of any direction with the NSW Government’s priorities as set out in the next Metropolitan Water Plan. Providing greater clarity about the circumstances where the Minister may provide this direction to IPART is likely to provide greater investment certainty to public water utilities and potential private sector proponents.
5 Promoting cost-effective water recycling: consistent incentives and signals

Sections 5 to 7 examine whether the current economic regulatory framework provides consistent incentives and signals for use of and investment in cost-effective water recycling by the public water utilities, WICA licensees or other parties.

This section discusses the lack of information available to market participants on the public water utilities’ long-term growth servicing plans, system constraints and the costs (or savings) of alleviating (or deferring) constraints in water and wastewater systems. It then examines the regulatory guidance provided to public water utilities to ‘encourage’ consideration of cost-effective water recycling as part of investment decision-making.

- Section 6 examines retail price regulation of recycled water provided by public water utilities, WICA licensees or other parties. Section 7 examines retail price regulation of water, wastewater and stormwater services provided by public utilities.

Recommendations

11. The NSW Minister for Energy and Utilities should amend the operating licences for the NSW public water utilities (WaterNSW, Sydney Water and Hunter Water) by the end of 2019 to ensure they develop and publish an annual ‘system limitation report’ that makes key information publicly available on long-term growth servicing plans, system constraints and the costs (or savings) of alleviating (or deferring) constraints in each water and wastewater system in a consistent, timely and accessible way. These ‘system limitation reports’, signed by the Boards of the public water utilities, should reflect integrated long-term planning between agencies, be consistent with the Metropolitan Water Plans and underpin price submissions to IPART and any wholesale prices that may be negotiated with wholesale customers (such as private sector recycled water proponents).

12. By the end of 2020, DPE, in its role in leading the development of the NSW Government’s Metropolitan Water Plans, should develop a framework for monitoring the consistency of the ‘system limitation report’ with these plans (see related Recommendation 11).

13. IPART, in its role in monitoring operating licence compliance, should ensure that the ‘system limitation report’ published by each of the public water utilities is consistent with the framework developed by DPE, robust and fit for purpose (see related Recommendation 11).

14. As part of its 2018 recycled water review, IPART should amend its Guidelines for Water Agency Pricing Submissions to strengthen the regulatory guidance on ‘when and how’ the public water utilities should undertake a ‘Regulatory Investment Test’ to identify the ‘preferred investment option’ (including the potential for water recycling) when making major investment decisions to meet an identified need – similar to the guidance published by the Australian Energy Regulator under the National Electricity Rules. The Guidelines should also indicate how any ‘Regulatory Investment Test’ should support business cases and regulatory proposals provided to IPART.

15. The NSW Minister for Energy and Utilities should amend the operating licences for Sydney Water (Section 3.2) and Hunter Water (Section 2) by the end of 2019 to require these public water utilities to develop and publish an annual report on ‘when and how’ they have considered cost-effective water recycling in meeting community needs (that is, extending beyond water conservation purposes) as part of their existing licence obligations to prepare a Water Conservation Report.
5.1 Lack of information on long-term growth servicing plans and system costs and constraints

Background

As discussed in section 3, one of the key benefits of water recycling is the potential to reduce the operating costs and avoid or defer the need for augmentations of the potable water supply and wastewater transport and treatment networks – known as ‘avoidable costs’. As highlighted in section 3, the costs and benefits of water recycling are highly specific to the nature of the scheme and will not provide the same net benefits in all situations.

For public water utilities and WICA licensees to identify opportunities for cost-effective water recycling, there needs to be consistent, timely and accessible public information on:

- WaterNSW’s long-term servicing plans to meet forecast demand in the Sydney, Illawarra and Blue Mountains bulk water supply regions
- Sydney Water and Hunter Water’s long-term growth water and wastewater servicing plans across the major greenfield, infill and brownfield areas
- The system limitations and avoidable costs associated with use of the WaterNSW, Sydney Water and Hunter Water existing water network(s)
- The system limitations and avoidable costs associated with use of the Sydney Water and Hunter Water wastewater network(s) (see Box 10).

Ideally, this information published by these agencies would:

- Be aligned with the NSW Government’s policy objectives as set out in the Metropolitan Water Plans and reflect common views on key parameters, such as forecast population growth
- Reflect a collaborative approach to providing integrated solutions to meet the needs of the community, given the vertical separation between WaterNSW and Sydney Water.

Box 10: Key information required on system limitations and avoidable costs

- For public water utilities and WICA licensees to identify opportunities for cost-effective water recycling, proponents need to be able to evaluate whether the scheme is economic. This evaluation requires consistent, timely and accessible public information on where water recycling may generate avoidable costs in the upstream water and downstream wastewater network(s), and the size of these avoidable costs.
- As the system constraints (and therefore the size of avoidable costs) are highly dependent on asset and location, a recycled water proponent needs to have access to specific information for the relevant system, including:
  - **System-wide bulk water augmentation and potential deferral costs**, which could be represented by the LRMC of bulk water supply (the current estimate from IPART’s 2016 Sydney Water pricing decision is around $1.30/kL)
**Current approach**

Currently, such key information is not available to all market participants in a consistent, timely and accessible manner. For example:

- WaterNSW’s *long-term* servicing plans (including system augmentation) to meet forecast bulk water demand in the Sydney, Illawarra and Blue Mountains bulk water supply regions is not publicly available.

- Sydney Water’s growth services plan covers a five-year period only\(^{51}\) (rather than the 20-year strategic capital plan recommended in the NSW State Infrastructure Strategy) and does not set out the implications for services growth on existing upstream water and downstream wastewater network(s).

- IPART’s water pricing decisions (such as the 2016 Sydney Water Final Report) do not publish LRMC estimates of water supply that:
  - Are consistent with WaterNSW’s long-term servicing plans to meet forecast bulk water demand
  - Are consistent with the NSW Government’s priorities (such as the 2017 Metropolitan Water Plan)
  - Incorporate the long-term costs of delivering downstream water treatment and transport services (that is, non-bulk water forward looking costs) to meet forecast water demand.

- IPART’s wastewater pricing decisions (such as the 2016 Sydney Water Final Report) do not publish LRMC estimates of wastewater services that reflect the long-term costs of wastewater transport, treatment and disposal services by service area.

- No entity appears to have responsibility to periodically publish robust and reliable estimates of the LRMC of bulk and non-bulk water supply or wastewater services (as proxy for the value of deferral costs) in a way that is consistent with the NSW Government’s Metropolitan Water Plans

- Further, it is not clear whether:

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The information that is published by these agencies is aligned with the NSW Government’s priorities and Metropolitan Water Plans.

The NSW Government (including DPE) currently has a role in ensuring these agencies publish information in a consistent, timely and accessible manner.

Assessment of current approach

This lack of consistent, timely and accessible public information makes it challenging for public water utilities and WICA licensees to identify, within a reasonable timeframe:

- Where and when water recycling may defer or avoid expenditure that would otherwise have been incurred in supply services to customers (that is, the size of any avoidable costs)
- The charges that WICA licensees may pay for wholesale services, which include estimates of forward-looking avoidable costs as part of the ‘minus’ component (see section 8).
- The economic and financial viability of water recycling as part of developing business cases (and engaging with developers within reasonable timeframes) to demonstrate the efficiency of recycled water schemes.

This lack of information is likely to:

- Act as a barrier to identification of opportunities for cost-effective water recycling (including private sector entry) and create uncertainty about pricing for wholesale services, (which ultimately could inhibit investment in, and use of, cost-effective water recycling and increase the costs and prices to meet the needs of customers) by:
  - Not encouraging recycled water in constrained areas where there is a potential to reduce total system costs
  - Not discouraging recycled water in areas where there is spare capacity and little opportunity to reduce total system costs.
- Make it challenging for IPART to undertake any scheme specific review (SSR) of wholesale charges in a timely way that meets the needs of the market.
- Make it challenging to set retail prices for water, recycled water, wastewater and stormwater with regard to the long-term costs of supply.
- Reduce accountability on the key public water utilities to ensure strategic asset planning is aligned with government priorities and incorporates adequate consideration of water recycling as a means of creating resilience and flexibility, and lowering the total system costs of integrated solutions to meet the needs of the community (see section 5.2).
- Other regulatory frameworks, such as the national framework for regulation of Australia’s energy markets, have faced similar challenges in facilitating cost-effective investment in non-traditional solutions (or new entrant provision of services) and...
how any barriers may be overcome through information provision (see Box 11). Similarly, the arrangements in the Victorian water sector encourage integrated capital planning (Box 12).

Box 11: National Electricity Rules: obligation to provide a system limitation report

The Australian Energy Market Commission considered a change to the National Electricity Rules (NER), proposed by City of Sydney and others, that would obligate electricity network providers to pay all embedded generators a ‘local generation network credit’ (LGNC) that reflects the estimated long-term benefits that embedded generators provide in terms of deferring network investment.

The AEMC did not agree that obligating the payment of a universal credit would encourage embedded generation in the right location at the right time, but rather made a decision to amend the NER to obligate electricity network providers to publish a ‘system limitation report’ (in addition to obligations to publish an Annual Planning Report) in accordance with a template specified by the Australian Energy Regulator. The system limitation report is to be published annually in conjunction with each electricity network provider’s Annual Planning Report.

The AEMC noted that providing key information about system limitations and costs in a consistent and accessible manner ‘will allow providers of non-network solutions to focus on locations where their solutions could be used to defer or avoid investment in the network…Ultimately, this can reduce the costs of delivering electricity to consumers’.

Source: AEMC, National Electricity Amendment (Local Generation Network Credits) Rule 2016

Box 12: Arrangements for development of water supply plans for Melbourne

While the structure of the water market in Melbourne differs to that in Greater Sydney, a parallel can be found in the arrangements governing the development of water supply plans.

In Melbourne, the bulk water supplier (Melbourne Water) is required under its Statement of Obligations to work with the three metropolitan retail water businesses (and other water businesses connected to the Melbourne supply system that have corresponding obligations imposed in their Statements of Obligations) to develop a Melbourne Water System Strategy. This strategy establishes an integrated system view of available consumptive water in the Melbourne water supply system and integration of supply and demand options across a 50-year planning period.

To ensure consistent, timely and accessible information on long-term growth servicing plans, system costs and constraints, we recommend imposing obligations on WaterNSW, Sydney Water, Water NSW and Hunter Water, through a change to their respective operating licences, to publish this information. This would allow IPART to consolidate this information and publish annual guidance to the market (see Recommendation #22).

Requiring these public water utilities to work collaboratively and publish this information should:

- Allow stakeholders to understand the costs of addressing system constraints (and potentially alleviating system constraints through water recycling) across key parts of the water and wastewater network
- Improve the basis for measuring the financial viability of water recycling (or other solutions) at the earliest opportunity, which will improve the ability for recycled water proponents to identify and propose solutions and engage with developers and other market participants
- Encourage integrated planning and solutions between the public water utilities and with potential private sector players to meet the needs of the community

- Remedy some of the information asymmetry and provide some balance to the relative negotiating power between recycled water proponents and the public water utilities when they negotiate wholesale pricing arrangements or other commercial service agreements

- Reduce the time required (and potentially need for) IPART to undertake a four-month scheme specific wholesale price review.

In our view, such information is critical to well-run public utilities making optimal investment decisions about their networks (including consistency with government policy and priorities and the need for integrated planning across agencies). As such, providing this information does not impose an additional regulatory burden.

Both DPE (in its role in developing the Metropolitan Water Plans) and IPART (in its role of monitoring licence compliance) should ensure that the information published by these agencies is aligned with the NSW Government’s priorities (including the Metropolitan Water Plans) and is robust and fit for purpose.

Given the likely time taken to consult on and develop this obligation, and for the public water utilities to comply by developing and publishing this information, the NSW Government and IPART could consider a set of transitional arrangements (and avoidable cost estimates) that allow the ‘retail-minus’ framework to operate (without the need for scheme specific reviews) and provide incentives for Sydney Water and Hunter Water to take actions that will facilitate competition (for example, by erring on the ‘high side’ of the reasonable range of avoidable cost estimates).

**Recommendation 11:** The NSW Minister for Energy and Utilities should amend the operating licences for the NSW public water utilities (WaterNSW, Sydney Water and Hunter Water) by the end of 2019 to ensure they develop and publish an annual ‘system limitation report’ that makes key information publicly available on long-term growth servicing plans, system constraints and the costs (or savings) of alleviating (or deferring) constraints in each water and wastewater system in a consistent, timely and accessible way. These ‘system limitation reports’, signed by the Boards of these public water utilities, should reflect integrated long-term planning between agencies, be consistent with the Metropolitan Water Plans and underpin price submissions to IPART and any wholesale prices that may be negotiated with wholesale customers (such as private sector recycled water proponents).

**Recommendation 12:** By the end of 2020, DPE, in its role in leading the development of the NSW Government’s Metropolitan Water Plans, should develop a framework for monitoring the consistency of the ‘system limitation reports’ developed by the public water utilities to ensure they are consistent with the Metropolitan Water Plans.

**Recommendation 13:** IPART, in its role in monitoring operating licence compliance, should ensure that the ‘system limitation report’ published by each of the public water utilities is consistent with the framework developed by DPE, robust and fit for purpose. This should ensure that information contained in these reports can be used by IPART in setting (or
arbitrating between parties) the prices for wholesale services and by market participants to identify opportunities for cost-effective water recycling (including private entry).

5.2 Lack of guidance to ‘encourage’ utilities to consider water recycling investment options

Background

There may be a number of regulatory, informational and cultural barriers that result in public water utilities tending to favour traditional or business as usual options over water recycling to meet community needs – for example, by choosing to commit capital expenditure to augment the size of a wastewater pipeline or treatment plan, rather than considering the potential for water recycling.

For public water utilities to identify and evaluate opportunities for investment in water recycling as part of robust investment decision-making to meet community needs, they require (amongst other things) regulatory guidance on:

- Where and when detailed cost-benefit or options analysis should be conducted
- How such analysis should be undertaken, including options that should be considered (such as water recycling), and costs and benefits to be incorporated
- How this analysis should be reported and used to support business cases and forecast expenditure proposals.

Current approach

Currently IPART’s Guidelines for Water Agency Pricing Submissions require that pricing submissions should provide details of major projects, explaining the options analysis undertaken and the overall basis for the cost estimate. The guidelines also note that agencies should report any avoided or deferred water and/or wastewater costs, including business cases, associated with recycled water schemes.

Assessment of current approach

In our view, the current economic regulatory framework ‘allows’ rather than ‘encourages’ utilities to consider water recycling (and the associated costs and benefits) as part of robust investment decision-making.

In practice, the lack of clear regulatory guidance on ‘when and how’ to evaluate water recycling as part of investment decision-making is likely to act as a disincentive to consider water recycling – and the associated costs and benefits it may provide to the community.

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52 IPART, Guidelines for Water Agency Pricing Submissions, December 2017, p11
53 IPART, Guidelines for Water Agency Pricing Submissions, December 2017, p22
This creates uncertainty for water utilities as to how IPART may view their investment evaluation processes, particularly where the preferred option could involve investment in non-least financial cost solutions (for example, where there are external benefits), and may result in public water utilities favouring traditional investments.

In our view, there are opportunities to draw from the guidance provided to utilities in other regulatory frameworks where there have been concerns that utilities may not be investing in solutions that provide the greatest net benefit to the community.

For example, before the creation of the National Electricity Market (NEM), state-owned electricity networks were responsible for network planning across each of the electricity supply chain segments in their respective States. With the introduction of the NEM and movements towards contestability, there were concerns that the networks were not making investment decisions that were “maximising net public benefits or market benefits”. Through several iterations, the Regulatory Investment Test (RIT) was introduced to ensure businesses compared:

“…network investments with alternative options, such as co-generation and energy efficient technologies and practices; take into account the environmental requirements of the governments making up the National Electricity Market; and ensure that investments maximise net public benefits”…[and to] assess and rank different investment options…on the principles of economic efficiency and competitive neutrality, with a view for network businesses to consider network and non-network investments equally.”

Box 13 summarises the role of the RIT in promoting investment decisions that maximise the economic welfare or net public benefits to the community.

**Box 13: The Regulatory Investment Test in the National Electricity Rules**

- The National Electricity Rules (NER) administered by the Australian Energy Regulator (AER) provide significant guidance on several aspects of the ‘Regulatory Investment Test’. The RIT is required to identify the ‘preferred option’ where investment exceeds $5 million.
- The RITs are cost–benefit analysis frameworks that electricity network businesses (transmission and distribution) must perform and consult on before making major investments in their networks to address an identified need. When undertaking RITs, network businesses must give due consideration to what options are available, before identifying the best way to address needs on their networks – which the NER terms the ‘preferred option’. The preferred option is the credible investment option that maximises the present value of the net economic benefit to all those who produce, consume and transport electricity in the relevant market.
- The RIT process is one of the key mechanisms to ensure that investment considers the long-term interests of consumers. In this context, the AER’s role includes:
  - Developing, publishing and amending the RITs and the RIT application guidelines
  - Determining whether other classes of market benefits or costs proposed by RIT proponents are relevant under the RITs
  - Reviewing proposed expenditure by network businesses and compliance with the RIT framework.

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In undertaking this role, the AER consults on and then publishes RIT guidelines that set out:

- Where the RIT should be applied and how to undertake the RIT, including:
  - Defining a credible base case and alternatives
  - The relevant classes of market benefits or costs, role of customer engagement and treatment of external co-funding
  - Incorporation of uncertainty and option value.
- The type of information to be presented to the AER as part of pricing submissions.
- How the RIT will be used by the AER, including in assessing the efficiency of investment expenditure.

Source: Australian Energy Regulator, Issues Paper: Review of the application guidelines for the regulatory investment tests, February 2018

In addition, some regulatory frameworks impose obligations on businesses to consider and consult on the potential for non-traditional solutions. For example, the NER impose obligations on network businesses to:

- Consider ‘non-network options’ prior to investing in material network augmentation
- Publish and consult on a non-network options report that outlines when and how a network constraint may be addressed by non-network options and to call for submissions from potential non-network providers to assist in addressing the system constraint.55

These obligations were imposed to overcome a perceived bias by energy network businesses to favour traditional or business as usual infrastructure options (such as network augmentation) over alternative or non-network solutions in meeting community needs.

In our view, many of the informational and cultural barriers (alongside other barriers) to investment in alternative or non-traditional solutions identified in other markets are likely to exist within public water utilities in metropolitan NSW. For this reason, there is likely to be merit in IPART amending its Guidelines for Water Agency Pricing Submissions to provide clearer guidance and incentives for public utilities to consider water recycling (and the broader set of costs and benefits associated with water recycling relative to traditional solutions) as part of investment decision-making. Clearly, water recycling will not be the most economic option to address all system needs. However providing clear guidance on ‘when and how’ public water utilities are to evaluate water recycling as part of investment decision-making is likely to act as an incentive to consider water recycling – and the associated costs and benefits it may provide to the community – when evaluating solutions to meet an identified need. This includes IPART providing regulatory guidance to public water utilities on:

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55 See for example, SA Power Network's Non-Network Options Report that invites comments and proposals for non-network solutions to address identified system limitations. https://www.sapowernetworks.com.au/centric/industry/our_network/annual_network_plans/non_network_options_reports.jsp
How to undertake a Regulatory Investment Test to identify the ‘preferred investment option’ (the option that maximises the net benefits to the community in meeting the identified need), including how to:

- Define a credible base case and alternatives (including what factors should be considered in defining the options and when would IPART expect to see a water recycling or non-traditional investment option evaluated)
- Consider and value the relevant types of benefits or costs, role of customer engagement and treatment of external co-funding
- Model the stream of costs and benefits (including the time period for modelling and discount rates to be used in evaluating options with different levels of risk)
- Incorporate uncertainty and option value, and any other factors.

Provide guidance to utilities on how any Regulatory Investment Test should support business cases and regulatory proposals, and how IPART and its expenditure consultants will use this information.

What information provided by public water utilities will be made available to the public.

In addition, requiring the public utilities to report annually on how they have considered water recycling in meeting community needs (through a change to their respective operating licences) is likely to strengthen their incentive to consider cost effective water recycling. We note that currently Sydney Water is required to report on how it conserves water in line with its approved Economic Level of Water Conservation (ELWC) methodology. In our view, this reporting could be extended to include explicit reference to how water recycling has been considered in meeting community needs (including water conservation), at minimal cost.

**Recommendation 14:** As part of its 2018 recycled water review, IPART should amend its Guidelines for Water Agency Pricing Submissions to strengthen the guidance on ‘when and how’ the public water utilities should undertake a ‘Regulatory Investment Test’ to identify the ‘preferred investment option’ (including the potential for water recycling) when making major investment decisions to meet an identified need – similar to the guidance published by the Australian Energy Regulator under the National Electricity Rules. The Guidelines should also indicate how any ‘Regulatory Investment Test’ should support business cases and regulatory proposals provided to IPART. This should ensure public water utilities consider, in a consistent and robust way, the potential for water recycling when evaluating solutions to meet an identified need.

**Recommendation 15:** The NSW Minister for Energy and Utilities should amend the operating licences for Sydney Water (Section 3.2) and Hunter Water (Section 2) by the end of 2019 to require these public water utilities to develop and publish an annual report on ‘when and how’ they have considered cost-effective water recycling in meeting community
needs (that is, extending beyond water conservation purposes) as part of their existing licence obligations to prepare a Water Conservation Report.
6 Promoting cost-effective water recycling: retail price regulation of recycled water

The regulation of retail recycled water prices can directly influence the economic and financial viability of recycled water, as well as the risk and uncertainty of investment in and use of recycled water. This section analyses the current arrangements for retail price regulation of recycled water services and the opportunities to refine key elements of these arrangements to promote cost-effective water recycling.

Recommendations

16. As part of its 2018 recycled water review, IPART should strengthen the regulatory guidance it provides about the scope and form of retail price regulation of recycled water provided by public water utilities (including principles and decision-making processes for establishing this form of price regulation).

17. As part of its 2018 recycled water review, IPART should provide regulatory guidance on what may be classified as a recycled water asset in the context of cost-effective catchment-wide planning solutions (including assets used either as a pathway to or end-point for some form of potable reuse) and how expenditure associated with these assets will be treated with regards to cost recovery.

18. As part of its 2018 recycled water review, IPART should review the pricing principles for the structure of recycled water prices to ensure they promote economically efficient outcomes, including promoting cost-effective integrated catchment scale land use and water cycle planning solutions.

19. DPE, in its role in leading the development of the Metropolitan Water Plans, should review and report on the costs and benefits of a continuation of the 2008 NSW Government Direction to set specified water, wastewater and stormwater developer charges for Sydney Water and Hunter Water to zero.

20. As part of its 2018 recycled water review, IPART should review the developer charges formula and methodology for recycled water to ensure it remains fit for purpose and reflects current common industry assumptions.

6.1 Overview of IPART’s approach to retail price regulation of recycled water

IPART’s broad approach to retail price regulation of recycled water, as set out in its 2006 review, is guided by a number of high-level principles (see Table 3).

Table 3: IPART’s high-level pricing principles for regulating recycled water

<table>
<thead>
<tr>
<th>Pricing principle</th>
<th>Rationale and implication</th>
</tr>
</thead>
</table>

Regulation of recycled water pricing should only occur where there is an opportunity for market power

- Recognises that price regulation in other circumstances may not improve economic efficiency
- Only some recycled water schemes will be subject to pricing regulation

Pricing arrangements should reflect the specific market and other characteristics of recycled water and sewer mining schemes

- Recognises that there are a range of drivers for recycled water schemes
- Direct costs of recycled water schemes should be recovered on a scheme-by-scheme basis

Pricing arrangements for recycled water and sewer mining must be consistent with maintaining the current framework for water and sewerage pricing

- Recognises need to avoid inefficient investment in and use of recycled water as a result of inconsistencies in application of regulation and policy between drinking water, wastewater, and recycled water services (e.g. postage stamp pricing)

Pricing arrangements for recycled water should reflect the fact that the services form part of an integrated urban water system

- Recognises the complex inter-relationships between water recycling and other services (incl. cost impacts / savings)
- Implies not all costs associated with water recycling should be recovered from recycled water customers (see section 4)


These principles underpin IPART’s broad approach to regulation of retail recycled water services, which comprises three elements:

- The scope and form of regulation applied to different categories of recycled water schemes
- The level of cost to be recovered from individual recycling schemes (via ‘ring-fencing’ of recycled water schemes)
- The structure of recycled water prices.

Currently, IPART sets prices for one ‘mandated scheme’ – Sydney Water’s Rouse Hill Development Area. IPART has decided to defer regulation of recycled water prices for all schemes, apart from Rouse Hill, until it completes a broader review of its approach to regulating recycled water prices.57

IPART does not currently regulate the prices that WICA licensees (who may also be wholesale customers) can charge for the recycled water services they provide to their end-customers (see further discussion in section 8.1).

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57 IPART considered that it would not be efficient for it to determine recycled water prices on a scheme-by-scheme basis as this would require a lengthy investigation, which is likely to hinder and delay progress on negotiations with land developers.
6.2 Coverage and form of regulation

Current approach

IPART’s current regulatory framework divides recycled water projects into two groups: mandated schemes and voluntary schemes.

Box 14: IPART’s classification of public utility water recycling schemes

<table>
<thead>
<tr>
<th>IPART categorises recycled water schemes as ‘mandated’ or ‘voluntary’ depending on the degree of choice customers have in connecting to them.</th>
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</thead>
<tbody>
<tr>
<td><strong>Mandated schemes</strong></td>
</tr>
<tr>
<td>Mandated recycling schemes are (mainly residential) recycling schemes to which customers must connect due to a government policy, such as the Building Sustainability Index (BASIX). Given the mandated nature of these schemes, IPART considers that it needs to exercise regulatory oversight over these schemes rather than leaving prices to be negotiated between the parties. However, rather than determining recycled water prices for mandated schemes, IPART has developed pricing guidelines to assist water businesses in calculating prices (which it will monitor to prevent inconsistent and unintended pricing outcomes). IPART has decided that it will make a price determination for mandated schemes only where there is sufficient information to set efficient prices. IPART requires the costs and revenues of mandated recycled water schemes to be ‘ring-fenced’ from the regulated activities (except to the extent there are any avoidable costs or other ‘offsets’).</td>
</tr>
<tr>
<td><strong>Voluntary recycling schemes</strong></td>
</tr>
<tr>
<td>Voluntary schemes are those where customers can connect at their own discretion and have an alternative water service available, such as potable water or river water (usually at a regulated price). In these circumstances, IPART considers that water utilities will not be able to exercise a high degree of market power over these recycled water customers (most of whom would be expected to be non-residential customers, such as industrial users or irrigators who may be able to benefit from a lower cost or more reliable supply). IPART does not determine prices for these schemes but leaves these prices to be negotiated directly between the customer and the public water utility. However, IPART’s pricing principles guide these negotiations. For example, IPART also requires the costs and revenues of voluntary recycled water schemes to be ‘ring-fenced’ from the regulated activities (except to the extent there are any avoidable costs or other ‘offsets’).</td>
</tr>
</tbody>
</table>


Assessment of current approach

IPART’s primary rationale for its approach is that where users are able to choose to receive recycled water over an alternative water supply option, there is not a strong case for price regulation as the water business may have limited ability to exercise market power to the detriment of users. We support this approach, as direct regulation of such voluntary schemes may lead to prices that exceed end-users’ willingness to pay, which could inhibit cost-effective water recycling.

For mandated schemes, where recycled water customers have no alternative water supply options (including where recycled water may be directly connected to toilets and/or outdoor taps), the water business may have a greater ability to exercise market power to
the detriment of users, and there is a stronger case for IPART to oversee prices (either through direct regulation or some other mechanism).

However, in our view there are a number of challenges in applying the ‘binary’ option of direct regulation for mandated schemes and light regulation for voluntary schemes:

- **IPART’s definition of mandated schemes may not hold in practice in some circumstances.** According to IPART, the key criterion for determining whether a scheme is ‘mandated’ is whether there is an obligation on someone other than the water agency (such as the customer or the developer) to connect to the scheme, or to use recycled water from the scheme. Hunter Water noted that BASIX does not mandate connection to a recycled water schemes but rather sets water use reductions that can also be achieved by other means (for example, rainwater tanks).  

- **Changes in industry and market structure** (including increasing competition ‘for the market’ from WICA licensees) means that an increasing number of developments will be serviced by WICA licensees, where customers are unlikely to have alternative water supply options (such that these could be considered ‘mandated schemes’), yet IPART does not collect information necessary to directly set retail recycled water prices. The current form of regulatory oversight generally preferred by IPART (the development of guidelines) is a relatively light-handed form of regulation in these circumstances (see section 6.3).

- **Many recycled water scheme proponents have chosen to benchmark to Sydney Water’s usage prices, where prices are set with regard to LRMC and the incremental cost of measures to bring the overall demand and supply of water into balance, rather than in line with IPART’s recycled water pricing principles.**

Given the changes in policy, industry and market structure since IPART developed the recycled water pricing arrangements in 2006, we consider it sensible to review the framework for determining the scope and form of retail price regulation of recycled water provided by public water utilities as well as WICA licensees (see section 6.3).

**Recommendation 16:** As part of its 2018 recycled water review, IPART should strengthen the regulatory guidance it provides about the scope and form of retail price regulation of recycled water provided by public water utilities (including principles and decision-making processes for establishing this form of price regulation). Improving the guidance about

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58 Similarly, Hunter Water observed that the Lower Hunter Water Plan references a number of recycled water initiatives within the region but does not require connection to them. Rather, Hunter Water is dependent on councils to include the requirement for a recycling scheme in their development consent conditions through mechanisms such as Development Control Plans (DCPs) to support the recovery of the costs of such schemes. It noted that the lack of a clear mandate supporting recycled water schemes can be an issue in relation to dual reticulation schemes, which can lead to a risk of stranded assets and/or under-recovery of costs associated with recycled water schemes that do not have the ongoing commitment of key stakeholders, which in turn could undermine incentives to invest in recycled water.
‘when and how’ price regulation of recycled water will be applied will provide greater certainty to public water utilities and customers.

6.3 Ring-fencing of water recycling schemes and costs

Current approach

One of the key elements of IPART’s approach to regulating retail recycled water prices is that prices and/or developer charges for recycled water should be set to recover the ‘total direct costs’ (including some share of joint costs) of each individual water recycling scheme (subject to sharing of avoided costs and other ‘offsets’ with beneficiaries) – see Figure 10.

IPART requires that recycled water costs (and revenues) are ‘ring-fenced’ from the water agencies’ regulated business to ensure that recycled water costs are not recovered from other water and wastewater customers (through postage stamp water, wastewater and stormwater prices), except to the extent there are any avoidable costs or other ‘offsets’.59

This reflects IPART’s belief that the direct costs of recycled water schemes should be recovered on a scheme-by-scheme basis, and should be recovered from users of the scheme:

- In line with the impactor or user pays principle (or from other users and/or external parties where they are beneficiaries or IPART is directed by government60), based on the drivers and benefits of the scheme

- To avoid ‘cost shifting’ between customers of voluntary recycled water schemes to the regulated parts of their businesses (that is, cross-subsidisation) and provide efficient signals from investment in and use of recycled water.61

Assessment of current approach

A number of stakeholders suggested that ring-fencing of individual recycled water schemes for public water utilities may create a risk of asset stranding given that, without a broader recycled water RAB that allows recovery of recycled water costs from all recycled water customers, public utilities may not have a method of recovering some costs if recycled water demand in an individual scheme does not meet forecasts.


60 Schemes covered by a Section 16A direction issued by the NSW Government (such as Sydney Water’s Fairfield scheme) allow any revenue shortfall to be recovered from the broader customer base

61 IPART notes that efficient pricing “implies that prices should recover at least the costs of providing the service and recover no more than the stand-alone (total direct) cost of the scheme. For most services, the incremental costs of supplying users of those services are appropriately attributable to them under a ‘user pays’ principle... On this basis, the starting point for pricing recycled water would be that the direct incremental costs of each recycled water scheme should be recovered from users of that scheme.” IPART, Pricing arrangements for recycled water and sewer mining – Sydney Water Corporation, Hunter Water Corporation, Gosford City Council and Wyong Shire Council - Final Report, September 2006, p24
Stakeholders noted that this contrasts with risk and recovery of costs associated with traditional servicing solutions,\(^{62}\) whereby the overall revenue requirements (or ‘building block costs’) may be recovered from a broad range of customers (subject to cost allocation and other pricing principles).\(^{63}\)

In addition, the sequencing or timing of cost recovery may differ between recycled water and traditional capital expenditure.\(^{64}\)

As this creates some additional risks and uncertainties relating to public utilities investing in recycled water, some stakeholders have argued that either:

- There should be a recycled water RAB for public utilities that allows the overall cost of providing recycled water services (across all recycled water schemes) to be recovered from all recycled water customers (subject to cost allocation and pricing principles), in the same way the costs associated with traditional servicing solutions.
- Recycled water assets should be considered water and/or wastewater assets where they are an efficient means of providing a catchment-wide water, wastewater and stormwater solution (such as a scheme providing for indirect potable reuse), with capital expenditure on these assets being added to the water and/or wastewater RAB, to be recovered from a broad range of these customers.

**Recovery of public utilities’ recycled water costs through a recycled water RAB**

We recognise that the ‘ring-fencing’ of recycled water schemes that requires recovery of the total direct costs (subject to sharing of avoided costs and other offsets with beneficiaries) of each individual water recycling scheme from users of the scheme creates some additional risks and uncertainties relating to public utilities investing in recycled water. However, the proposed creation of a recycled water RAB for public utilities risks creating further inequities either between recycled water customers and other water and/or wastewater customers or between public utilities and new entrant providers of recycled water (who don’t have access to a recycled water RAB).

Firstly, IPART’s approach recognises there are a diverse range of drivers for investment in water recycling and that many recycling schemes are unique and discrete, unlike the interconnected water or wastewater network. An overall recycled water RAB used to set recycled water prices would mean the diverse drivers of these schemes would not be reflected in the prices of these individual schemes, and could lead to a form of postage

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62 The exception is for schemes covered by a Section 16A direction issued by the NSW Government (such as Sydney Water’s Fairfield scheme) that allows any revenue shortfall to be recovered from the broader customer base.

63 Note there are several cost recovery and/or funding frameworks for public water utilities, some of which allow recovery of costs/demand risk from the broader drinking water customer base.

64 For example, Sydney Water contended: “Recycled water projects have a different risk profile for Sydney Water than traditional wastewater solutions. The traditional solution involves capex, which is subject to an ex-post IPART efficiency review, and which Sydney Water starts to recover immediately once work commences and the project enters the RAB. In contrast, the capex component of a recycled water project (excluding that part which is eligible for the water and wastewater RAB) can only be recovered from developers (not customers) as individual blocks of land are released by the developer.” SWC, submission to INSW review, 2018
stamp pricing for recycled water. It is not clear why it would be equitable for customers of diverse unconnected recycled water schemes to pay a common price reflecting the shared costs of all recycled water schemes for recycled water simply because they are all receiving recycled water, when the nature of the services being provided (such as the quality of the recycled water and the costs of supplying it) may vary widely. Moreover, it would mean that the risks of individual recycled water schemes would be shared between other recycled water scheme customers. Thus, any shortfalls in cost recovery from one recycled water scheme (for example, due to demand being less than forecast) would be recovered from customers of other recycled water schemes, which may in turn put at risk those schemes, particularly if there was a major financial shortfall from failure of a large recycled water scheme.

Secondly, the public water utilities should be in a position to evaluate the risk associated with specific investments and adjust prices that are offered to customers accordingly. We would expect suppliers in a competitive market to consider the risks when offering terms and conditions of supply.

We note that IPART’s position is that “the risks to water agencies of building recycled water infrastructure where schemes are subject to developer charges (mostly mandated schemes) are similar to those for water and sewerage infrastructure…For recycled water developer charges, the Tribunal has decided to align the discount rate with the weighted average cost of capital (WACC) used by the Tribunal when making water and sewerage price determinations”. 65 For clarity, we recommend that IPART, as part of its 2018 recycled water review, consider the appropriate discount rate to be used when setting or overseeing public utilities recycled water prices – particularly for voluntary schemes.

Thirdly, spreading the costs of recycled water schemes across all recycled water schemes operated by public water utilities would make it difficult for new entrants to compete with public utilities in servicing a development with a recycled water scheme. This would raise barriers to private sector entry in water recycling.

For these reasons, we do not support recovery of public utilities’ recycled water costs through a recycled water RAB.

Recovery of public utilities’ recycled water costs through the water and/or wastewater RAB

Similarly, recovering recycled water schemes through the water and/or wastewater RAB and water and wastewater postage stamp prices could result in recycled water customers contributing little towards the costs of a scheme that is providing direct benefits to them in the form of a recycled water service. Again, it could also discourage efficient private sector entry given that private proponents do not have access to a broader water and/or

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wastewater RAB to lower the costs to be recovered from customers of individual recycled water schemes.

However, where recycled water assets are an efficient means of providing a catchment-wide water, wastewater and stormwater solution (for example, a scheme providing for indirect potable reuse), a key question is whether the extent of integration of recycled water services with other services means that in some cases it is no longer appropriate to regard them as separate services with costs that should be ‘ring-fenced’.

IPART’s framework does recognise that recycled water services can form part of an integrated urban water system and that there are complex inter-relationships between recycled water, water, stormwater and wastewater services that should be accounted for in setting prices and/or developer charges for recycled water.66 However, the ‘ring-fencing’ of recycled water schemes that are part of an integrated catchment wide solution to managing water, wastewater and stormwater services creates additional risks and uncertainties relating to public utilities investing in recycled water.

In particular, a mandated recycled water scheme which is seen as a critical part of a least-cost catchment-wide planning solution (as a means of deferring augmentation of water, wastewater and stormwater services and/or providing for urban liveability or amenity) might be seen as so integrated that its key benefits accrue across the entire catchment (for example, to all water, wastewater and stormwater customers in that catchment) rather than to the direct users of recycled water (if any). It is also possible that, at some time in the future, recycled water will be used to supplement the potable water supply system through indirect potable reuse, effectively removing any distinction between recycled water and potable water services.

In these circumstances, it may be appropriate to consider incorporating the cost associated with cost-effective recycled water schemes directly into the broader RAB for water and/or wastewater and therefore spread the cost across the entire customer base. While we note the NSW Government (through a Section 16A directive) can direct IPART to allow a portion of recycled water costs to be recovered from the broader customer base; this requires ministerial intervention and may not provide the level of certainty required to equalise incentives for public utilities to invest in recycled water, relative to more traditional solutions. For this reason, we recommend that IPART, as part of its 2018 recycled water review, provide regulatory guidance on how recycled water assets that form part of a least-cost catchment-wide planning solution (including either as a pathway to or end-point for some form of potable reuse) will be treated with regards to cost recovery.

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66 A key component of this is the avoidable cost framework that recognises recycled water schemes can create broader costs and benefits for the system (such as temporary or permanent deferral of drinking water or wastewater operation/augmentation) and that some of the costs of a recycled water scheme should be shared with these other beneficiaries in line with the benefits they receive – to the extent that it leaves those other beneficiaries no worse off. However, as outlined in section 4.2, the current application of the avoided cost framework creates some risks, which are likely to act as a disincentive for investment in cost-effective water recycling.
**Recommendation 17:** As part of its 2018 recycled water review, IPART should provide regulatory guidance on what may be classified as a recycled water asset in the context of least-cost catchment-wide planning solutions (including assets used either as a pathway to or end-point for some form of potable reuse) and how expenditure associated with these assets will be treated with regards to cost recovery. This will provide greater regulatory certainty to public utilities regarding the costs and risks associated with investment in cost-effective water recycling, particularly given the need for integrated catchment scale land use and water cycle planning to achieve the GSC vision for a more productive, liveable and sustainable Greater Sydney, including the Western Parkland City.

## 6.4 Structure of recycled water prices

### Current approach

Although IPART has only directly set prices for one recycled water scheme (Rouse Hill), it has espoused pricing principles for the structure of recycled water prices, including that the structure of recycled water prices should send appropriate price and risk signals:

- Recycled water prices are to include a usage component to be set to equate the demand with supply (that is, tie the recycled water usage price to the percentage of potable water used by the scheme), but no greater than the potable water usage price.
- Annual fixed charge can be used to recover cost not recovered through usage charges or developer charges.
- Developer charges for recycled water should be set to recover the differences between the costs of the scheme net of subsidies and avoided costs, and the periodic revenues to be generated over time from periodic usage and fixed charges.

### Assessment of current approach

IPART’s approach is designed to set recycled water usage prices in a way that balances supply and demand at the lowest long-term net social cost, but in practice it is not clear whether this has occurred, given where direct price regulation:

- Has been in place (such as Rouse Hill) prices were originally set to equate supply and demand in *individual* recycled water schemes
- Not been in place, including for other ‘voluntary schemes’ and for most WICA licensee recycled water schemes, proponents have chosen to benchmark to Sydney Water usage prices, where prices are set with regard to LRMC and the incremental cost of measures to bring the *overall* demand and supply of water into balance (rather than *individual* recycled water schemes)

This means that prices for many of these schemes may not be reflecting the unique characteristics of these schemes or equating supply and demand in individual recycled water schemes and/or across the catchment.
For this reason, we consider it sensible for IPART to review the pricing principles for the structure of recycled water prices to recognise the different role played by water recycling in different circumstances, and that the pricing principles may differ where water recycling is part of an integrated catchment scale land use and water cycle plan relative to where it is an isolated scheme.

**Recommendation 18:** As part of its 2018 recycled water review, IPART should review the pricing principles for the structure of recycled water prices to ensure they promote economically efficient outcomes, including promoting cost-effective integrated catchment scale land use and water cycle planning solutions.

### 6.5 Developer charges

Developer charges are upfront charges water utilities levy on developers to recover the costs of providing potable water, wastewater, stormwater and/or recycled water infrastructure to new developments. Developer charges are intended to recover the efficient costs of infrastructure needed to service a new development area and signal the costs of development in different areas. They relate to expenditure to service new growth – not to expenditure to augment, replace or renew existing assets. As noted by IPART:

“A developer charge is a location-specific up-front charge that reflects the additional costs of servicing that development area. The developer charge was designed to recover the total difference between the average operating cost (reflected in the postage stamp price of the agency) and the costs of servicing the specific development area.”

According to IPART, developer charges can ensure existing customers do not face higher costs as a result of new development, signal the different costs of providing services to different locations, and enhance the potential for competition in the provision of water and sewerage services to new developments.

**Current approach**

IPART’s 2000 and 2013 Determinations set a methodology for fixing maximum developer charges that can be levied on developers by the metropolitan water utilities and Central Coast Councils.

In 2008, the NSW Government decided to set Sydney Water and Hunter Water’s water, wastewater and stormwater developer charges to zero to promote housing affordability.

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69 The current developer charges determinations prescribe a Net Present Value (NPV) methodology that water agencies must use to calculate their charges. This effectively calculates, on an ‘Equivalent Tenement’ (ET) basis, the cost of providing services to a new development above and beyond the retail (postage stamp) price revenue the utility will receive from customers in that area.
and address perceptions that they were unfair, arbitrary and opaque. This applies to
development that falls within the water utilities’ brownfield areas under existing
Development Servicing Plans (DSPs), and greenfield areas under the Growth Servicing
Plan ('in-sequence' development).  

Since 2008, prudent and efficient growth expenditure to service ‘in-sequence’
development has been added to Sydney Water and Hunter Water’s notional revenue
requirements and been recovered through their respective periodic (retail) prices to all
customers. For ‘out-of-sequence’ development, Sydney Water and Hunter Water require
developers to fund and construct works.

The NSW Government’s 2008 decision on developer charges does not apply to Sydney
Water and Hunter Water’s recycled water developer charges. Under this approach,
recycled water developer charges are based on a methodology similar to IPART’s
published methodology for water, wastewater and stormwater services. They involve full
cost recovery (of relevant assets) but also allows for the recognition of avoided water and
wastewater costs associated with recycled water schemes (consistent with IPART’s
recycled water pricing principles).

**Assessment of current approach**

The impact of this differential approach to developer charges for recycled water vis-a-vis
water and wastewater is to provide a bias towards traditional solutions rather than
recycled water solutions. This is because developers are likely, all other things being equal,
to prefer traditional solutions that do not incur developer charges.

The differential approach to developer charges for recycled water could also disadvantage
new entrants who cannot cross-subsidise servicing of new development, something that
may have not been envisaged at the time given that water recycling, and private sector
entry under WICA, was in its infancy. As noted by Sydney Water:

> "WICA licensees, who are looking to provide services to developers, are currently obliged by WICA
to provide recycled water as part of their service to customers. This creates a natural business
constituency that is interested in promoting recycled water, because for them this is a prerequisite to
market entry. However, the extent to which this artificially promotes recycled water is limited by the
position regarding developer charges. Traditional wastewater solutions do not incur developer charges
and Sydney Water can only charge the postage stamp/average price to customers of these projects.
This puts WICA licensees at a competitive disadvantage, as the traditional solution is effectively
cross-subsidised by existing Sydney Water customers, while the WICA licensee needs to bring
forward a recycled water project."

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70 This policy was given effect via a direction from the Treasurer to Sydney Water and Hunter Water under section 18
(2) of the IPART Act. This Direction does not apply to the Central Coast Council, which levies these charges consistent
with IPART’s 2013 determination.

71 SWC, submission to INSW review, 2018
Lendlease, in commenting on the NSW Government’s decision to set developer charges for water and wastewater at zero, stated:

“This passes the incremental cost of any new development on to Sydney Water’s or Hunter Water’s broader customer base and distorts the true cost of reticulating water and wastewater infrastructure. Recycled water, on the other hand (and quite perversely), does not benefit from this leg up.”

This could have the consequence of slowing the supply of housing where land release may depend on private sector entry.

In our view, whether developer charges apply or not should not be dependent on the nature of the servicing solution, as long as it provides the best value for customers.

In our view, there is a strong argument when considering how to promote cost-effective water recycling, for the NSW Government to consider rescinding the 2008 Direction to set specified water, wastewater and stormwater developer charges for Sydney Water and Hunter Water to zero. This would remove a clear bias against recycled water schemes (whether provided by public water utilities or new entrants) in being able to compete with traditional water and wastewater solutions for servicing new developments, and more broadly would provide locational price signals.

However, the 2008 Direction represents a balancing of a broader set of objectives than simply promoting-cost effective water recycling. In our view, a logical first step would be for DPE, in its role in leading the development of the Metropolitan Water Plans by end of 2020, to review and report on the costs and benefits of a continuation of the 2008 Direction to set specified water, wastewater and stormwater developer charges for Sydney Water and Hunter Water to zero. This should highlight whether the benefits, in terms of promoting housing affordability, outweigh the costs, in terms of impeding investment and private sector entry in water recycling and the achievement of integrated land and water planning.

One possible alternative to rescinding the 2008 Direction would be to also set recycled water developer charges to zero if water/wastewater developer charges remain at zero. This would remove the distortion between developer charges for recycled water and traditional water services to new developments serviced by public water by public water utilities. However this alternative option carries risks. By allowing public water utilities to transfer the cost of servicing new developments with recycled water to their broader customer base, this would make it difficult, if not impossible, for new entrants (who do not have the ability to shift costs in this way) to compete with public water utilities in offering to service new developments with recycled water schemes. This could significantly limit the uptake of cost-effective water recycling through innovative private providers and create a barrier to competition.

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72 Lendlease, submission to INSW review, 2018
For this reason, we recommend that, if the NSW Government chooses not to rescind the 2008 Direction following the DPE review, recycled developer charges not be removed, even if developer charges for water and wastewater remain at zero.

We also recommend that IPART review a number of aspects of the methodology for setting recycled water developer charges during its 2018 review of recycled water to ensure that the current methodology balances the provision of efficient locational price signals and appropriate risk allocation while being transparent, as well as reflecting current common industry assumptions.

One specific issue raised in this review was that in the developer charges formula, the recycled water consumption/ equivalent tenement (ET) is hardcoded at 110kL/ET/year, whereas many stakeholders agree that the actual consumption is around 50kL/ET/year. This could distort operating costs and revenue in the calculation of developer charges and should be considered by IPART in its upcoming recycled water review.

**Recommendation 19:** DPE, in its role in leading the development of the Metropolitan Water Plans, should review and report on the costs and benefits of a continuation of the 2008 NSW Government Direction to set specified water, wastewater and stormwater developer charges for Sydney Water and Hunter Water to zero. This should highlight whether the benefits, in terms of promoting housing affordability, outweigh the costs, in terms of impeding investment and private sector entry in water recycling and the achievement of integrated land use and water planning.

**Recommendation 20:** As part of its 2018 recycled water review, IPART should review the developer charges formula and methodology for recycled water to ensure it remains fit for purpose and reflects current common industry assumptions.
Promoting cost-effective water recycling: retail price regulation of water, wastewater and stormwater services provided by public utilities

IPART determines the maximum ‘retail’ prices to be charged for declared government monopoly services provided by water utilities, such as Sydney Water and Hunter Water. The retail price regulation of water, wastewater and stormwater services provided by public utilities influences the economic and financial viability of water recycling by ‘setting the benchmark’ for assessing the cost-effectiveness of water recycling and/or representing the ‘starting point’ in setting wholesale charges under IPART’s proposed retail-minus methodology (see section 8).

This section analyses current arrangements for retail price regulation of water, wastewater and stormwater services provided by public utilities, and the opportunities to refine several key elements of these arrangements to promote cost-effective water recycling.

Recommendations

21. As part of its 2020 Sydney Water and Hunter Water price reviews, IPART should continue to set the regulated asset base (RAB) based on the ‘line-in-the-sand’ to which new assets are added (subject to prudency and efficiency) and depreciation (and disposals) removed.

22. As part of its 2018 recycled water review, IPART should evaluate the merits of publishing annual market guidance on the range of long-run marginal cost (LRMC) estimates for each water and wastewater supply area, drawing on information contained in the annual ‘system limitation reports’ published by the public water utilities.

23. As part of its 2020 Sydney Water and Hunter Water price reviews, IPART should evaluate the merits of adopting a more light-handed form of price control, such as a tariff basket used in regulation of monopoly services in other jurisdictions, where prices can be updated annually where there are material changes in the operating environment (such as capacity constraints or government policy), subject to pricing principles and constraints.

24. As part of its 2020 Sydney Water and Hunter Water price reviews, IPART should set usage charges for water and wastewater (for those customers that pay wastewater usage charges) with regard to the long-run marginal cost (LRMC) of providing services to give better signals regarding emerging capacity constraints. This includes ensuring the estimated LRMC of supply reflects the ‘system limitation reports’ published by each of the public water utilities.

25. As part of its 2020 Sydney Water and Hunter Water price reviews, IPART should evaluate the merits of removing the discharge factor applying to wastewater service charges.
7.1 Setting total revenue requirement to be recovered

IPART’s determinations establish both the level and structure of prices for water, wastewater and stormwater services. This involves setting the total revenue requirement (or ‘building block’ revenue) for each service to be recovered through prices, and then allocating the revenue requirement across customer classes (residential and non-residential based on volume shares) and establishing tariff structures designed to recover these amounts given assumed demand forecasts (see Appendix B for details on IPART’s approach and pricing principles).

Current approach

In determining the total level of efficient costs to be recovered from retail customers (known as the ‘revenue requirement’), IPART applies a ‘building block’ methodology. This methodology includes a ‘return on’ and ‘return of’ (or depreciation) assets based on their regulatory asset value, as well as operating and maintenance expenditure based on IPART’s assessment of the efficient level of costs required for the public utility to provide services to its customers while complying with its legal and regulatory obligations.

A key component of this ‘building block’ revenue is the valuation applied to assets known as the regulatory asset base (RAB). As capital expenditure occurs, new assets are added into the RAB at cost, which is subsequently recovered over the life of the asset via the return of assets (regulatory depreciation) and return on assets.

At the time when Sydney Water and Hunter Water first became subject to economic regulation by IPART, an initial ‘line-in-the-sand’ RAB was established. This ‘line-in-the-sand’ value reflected the level of then prevailing prices rather than the original or replacement cost of these assets. This means that the RAB upon which Sydney Water’s and Hunter Water’s revenue requirements and thus retail prices are based is lower than the current market value or replacement costs of these assets.

Assessment of current approach

Some stakeholders to this review have suggested this ‘low’ RAB represents a barrier to cost-effective recycling, as the price of potable water is too low – meaning that alternatives such as recycled water are not competing on a level playing field.

In our view, these claims are misplaced.

Firstly, the extent of the ‘discount’ of the RAB to current values will be a lot lower now than it was at the time of the ‘line-in-the-sand’ valuations, as many of these original assets will now be fully or largely depreciated. This means that their contribution to the total RABs of the regulated businesses would now be lower compared to that represented by new assets that have been incorporated subsequently into the RAB at full cost.

In our view, IPART, as part of its 2018 recycled water review, could provide guidance to stakeholders as to the proportion of the current public utilities’ water and wastewater
RABs that is made up of capital expenditure added since the initial ‘line-in-the-sand’ RAB was established.

Secondly, when a user is assessing the relative merits of taking up a supply of recycled water to replace potable water, the key determinant will be how the volumetric price of potable water compares to the forward-looking cost of a recycled water supply, given that most customers will continue to need to remain connected to the potable supply system. This will depend more on the structure of tariffs for potable water (and in particular ensuring that the volumetric price reflects LRMC) than on the total level of potable water prices and customer bills.73

**Recommendation 21:** As part of its 2020 Sydney Water and Hunter Water price reviews, IPART should continue to set the regulated asset base (RAB) based on the ‘line-in-the-sand’ to which new assets are added (subject to prudence and efficiency) and depreciation (and disposals) removed.

### 7.2 Retail potable water tariffs

Potable water tariff structures involve a fixed (or service) and usage component that together provide an opportunity to recover the efficient cost of supplying these services while meeting that standards and obligations imposed on public water utilities.

#### Current approach

Fixed water service charges for residential and non-residential customers are set on a 20mm meter equivalent basis, where residential dwellings are deemed to each be one 20mm meter equivalent customer. The water service charges reflect IPART’s principle that the residential water service charge is to be a standard annual charge for all residential dwellings unless there is evidence that there are material differences in the costs of servicing different residential property types. In its 2012 review of pricing structures, IPART “found that there is no evidence that the cost to make water available differs according to the type of residential property.”74 For non-residential customers the water service charge increases exponentially with meter size.

In setting the usage charge component of water prices, IPART has placed emphasis on the objective of economic efficiency, setting a single (postage stamp wide) usage price having regard to estimates of the LRMC of supply to provide signals as to the future costs of usage, noting:

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73 A corollary of this is that to ensure new entrants can compete on even terms with incumbent suppliers, it is important that such competition takes place on the relative forward-looking costs of each, rather than the incumbent having an artificial advantage by virtue of lower average costs based on historic RAB values that do not reflect the cost of new assets (see discussion in section 6.3.1).

74 Rather, IPART stated that “location may be a greater driver of service cost, it is cheaper to provide water services to houses in the Macarthur area, which is closer to water treatment plants, than it is to provide water to units on the Northern beaches, which require greater length of mains IPART, Review of price structures for metropolitan water authorities, 2012, p. 13
“...the water usage charge is to be a standard variable charge for all customers – and be set with reference to the utility’s long-run marginal cost of supply. We consider the current structure is efficient, as it signals the capacity constraints in each utility’s network.”

In its most recent Sydney Water decision, IPART moved the water usage price towards its best estimate of the LRMC and the water usage price decreased from $2.28/kL to $1.97/kL (in 2015-16 dollars). This reflected IPART’s estimate of an LRMC of water supply of around $1.30/kL. However, IPART’s estimate of the LRMC of water supply related to bulk water supply and did not include the LRMC associated with Sydney Water’s treatment and transfer network. Sydney Water noted that both its and IPART’s estimates may systematically under-estimate the LRMC and noted they did not include any network costs.

For its 2016 Hunter Water decision, IPART left the water usage charge at its previous level of $2.22/kL because no estimate of LRMC was available:

“The Lower Hunter Water Plan (LHWP) does not specify Hunter Water’s next supply augmentation. In its submission to the Issues Paper, DPI Water noted that, in the case of the lower Hunter, the identification of potential new supply options is at a very preliminary stage. DPI Water outlined that the next supply augmentation will be considered in the next review of the LHWP, which is due for completion in 2019-20. This will enable a LRMC estimate to be available for the next price review. We will work with Hunter Water to develop an agreed methodology for estimating LRMC in order to inform the next price review.”

Assessment of current approach

As the service charges are fixed and unavoidable by customers (as they cannot disconnect from the water supply system), they will not influence customers’ water consumption decisions. However, this not the case with usage prices.

The current estimates of the LRMC of water supply for both Sydney Water and Hunter Water are unlikely to reflect the future costs associated with an increment in demand (including across bulk water, treatment and transportation), in line with the NSW Government’s policy objectives as set out in the Metropolitan Water Plans, because of:

- WaterNSW’s long-term servicing plans (including system augmentation) to meet forecast bulk water demand in the Sydney, Illawarra and Blue Mountains bulk water supply regions are not publicly available (see section 5.1).
- There does not currently appear to be a collaborative long-term planning approach to providing integrated solutions to meet the needs of the community, given the vertical separation between WaterNSW and Sydney Water.

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75 IPART, Review of price structures for metropolitan water authorities, 2012, p8  
77 Sydney Water Response to IPART’s Issues Paper October 2015, p.49  
78 IPART, Hunter Water final decision, 2016, p.101
The LRMC estimates do not incorporate the long-term forward-looking costs of delivering downstream water treatment and transport services (that is, non-bulk water forward-looking costs) to meet forecast water demand.

This is likely to result in usage prices for drinking water that do not reflect robust estimates of the forward-looking costs of supply, which may impact incentives to invest in demand management and/or recycled water solutions. For example, some local councils observed that reductions in Sydney Water potable retail water prices had made it more difficult to justify investments in water efficiency measures, including recycled water schemes.

IPART has also previously noted that water prices may not reflect current supply and demand conditions. It is well recognised that estimates of the LRMC may be low at times of significant excess capacity where supply augmentation is not expected to be required for many years, but may be high at a time when a major augmentation is imminent.

We note that IPART’s approach is to estimate the LRMC at a point in time (typically calculated at the start of the regulatory period) and set usage prices for water and wastewater for the entire period, rather than provide scope for rebalancing prices each year within a broader tariff basket and subject to pricing principles and constraints (as permitted by other utility regulators of monopoly services). This has the potential to:

- Result in usage prices sending inefficient signals regarding the supply and demand balance and the cost of providing services when there have been material movements in the supply-demand balance and/or government priorities during the regulatory period (particularly given a single postage stamp price)
- Prevent public water utilities from encouraging efficient use of their networks (and responding to competition)
- Act as a barrier to cost-effective water recycling.

Some stakeholders suggested that the lack of a scarcity charge – particularly at the bulk supply level – resulted in under-pricing of potable water relative to recycled water.

We recognise that there are other objectives – such as price stability – when setting usage prices; however, given the importance of robust, relevant and accessible estimates of the cost of future potable water augmentation and the LRMC of supply, we consider there to be an opportunity for IPART to consider:

- Providing guidance to the market by publishing annual updates to the LRMC estimates for each water and wastewater supply area, drawing on information

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79 Note: the water usage price for Sydney Water is currently well above estimates of the LRMC of bulk water supply. See IPART’s 2016 Final Report on Sydney Water’s prices.
80 IPART, Submission to Competition Policy Review, 2014, p18
81 Such as the Australian Energy Regulator in its regulation of network electricity and gas prices, and the Essential Service Commission of Victoria in its regulation of monopoly Victorian water businesses.
contained in the ‘annual system limitation’ reports published by the public water utilities (see recommendation #12), consistent with the government priorities as set out in the Metropolitan Water Plans. We note that IPART has a similar role in publishing a ‘benchmark range’ for solar feed-in tariffs each year to provide guidance to the retailers and customers on the value of electricity exported to the grid by solar customers in NSW in the coming financial year.\(^2\)

- Providing greater flexibility for rebalancing of water usage prices throughout the determination period within a more light-handed form of price control, such as a tariff basket, where prices are updated annually subject to pricing principles and constraints. IPART has provided this level of flexibility to businesses, such as energy network businesses, when it had a role in regulating energy network prices prior to 2009.

**Recommendation 22:** As part of its 2018 recycled water review, IPART should evaluate the merits of publishing annual market guidance on the range of long-run marginal cost (LRMC) estimates for each water and wastewater supply area, drawing on information contained in the annual ‘system limitation reports’ published by the public water utilities. This should ensure that market participants, including private sector proponents, have access to information on forward-looking system limitations and costs, and can identify opportunities for cost-effective water recycling.

**Recommendation 23:** As part of its 2020 Sydney Water and Hunter Water price reviews, IPART should evaluate the merits of adopting a more light-handed form of price control, such as a tariff basket used in regulation of monopoly services in other jurisdictions., where prices can be updated annually where there are material changes in the operating environment (such as capacity constraints or government policy), subject to pricing principles and constraints. This would allow usage prices to be updated when there have been material movements in the supply-demand balance and/or government priorities during the regulatory period, in line with other regulatory precedents for price control of monopoly service businesses.

### 7.3 Retail wastewater prices

Wastewater price structures involve a mixture of fixed and volumetric charges, with the volumetric charges applying only to non-residential customers.

**Current approach**

IPART sets fixed wastewater service charges for both resident and non-residential customers on a 20mm meter equivalent basis, where residential dwellings are deemed to each be one 20mm meter equivalent customer.

In its 2016 decision, IPART decided to separate the implicit connection and usage components of the wastewater service charge (where one component of the fixed service

charge is a deemed usage charge of 150 kL. multiplied by the wastewater usage charge, with a discharge factor of 75% applied to residential wastewater service charges) on the basis that this ensures consistency in the treatment of residential and non-residential customers, where the latter typically have a discharge factor applied to their wastewater service charges.\(^83\) For non-residential customers, the water service charge increases exponentially with meter size.\(^84\)

Providing a signal to customers about the cost of their usage or discharge into the wastewater system is challenging as properties are generally not metered for wastewater discharges.

For this reason, residential customers currently do not face a wastewater usage charge – but, as discussed below, a deemed wastewater usage charge is incorporated into their fixed service charges. However, non-residential customers do pay a wastewater usage charge on volumes above a defined allowance. The wastewater usage charge applies to non-residential customers who are deemed to have discharged more than the discharge allowance (currently transitioning down to 150 kl p.a.) to the wastewater network.\(^85\)

**Assessment of current approach**

IPART’s approach to setting wastewater fixed service charges implies that each customer’s contribution to fixed service charges (or the residual revenue requirement) should relate to the typical volumes each customer discharges to the system. This seems to ignore the fact that most of the costs are ‘sunk’ (and cannot be recovered) and that reductions in volumes do not lead to any ability to reduce the current capacity of the network. The benefits of such reductions are in savings in future augmentations, but this benefit is already reflected in lower usage charges.

IPART’s considerations have been limited to a retail context, where it is assumed customers have no ability to bypass the system and so the focus was on how to equitably share the fixed costs across the captive customer base, with limited impacts on economic efficiency. However, this is not necessarily the case when it comes to considering the allocation of fixed cost to wholesale customers (see section 8). For this reason, we

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\(^{83}\) On average, residential customers use 200 kL of water per year and discharge 150 kL of wastewater per year.

\(^{84}\) Standalone small businesses (20mm meter standalone customers) with discharge factors of 75% face the same wastewater charges and reductions as residential customers. However, standalone small businesses with discharge factors greater than 75% have higher wastewater service charges than residential customers. Each non-residential customer’s discharge up to the discharge allowance is included in the service charge.

\(^{85}\) Sydney Water applies discharge factors to estimate each customer’s discharge volume; with reference to the customer’s metered water consumption. For example, if a customer consumes 400 kL of water per annum and Sydney Water applies a discharge factor of 78%, they are deemed to have discharged 312 kL of wastewater to the wastewater network (0.78 x 400 kL = 312 kL). Different discharge factors are applied to charges for non-residential customers depending on the nature of the business and the amount of wastewater it is likely to discharge. These vary from 98% (shopping arcades) to between 2% and 5% (nurseries). A default discharge factor of 78% applies to any non-trade waste business customer when there is a lack of information on the type of business they are operating. Non-residential customers can ask their utility to conduct an individual assessment of the discharge factors used to determine their bills and obtain an individual discharge factor.
recommend that IPART consider removing the discharge factor applying to wastewater service charges.

IPART’s approach to setting wastewater usage charges reflects its view that while LRMC is applicable for water pricing to signal the cost of large-scale augmentation of the water supply, SRMC (short-run marginal cost) is more applicable for non-residential wastewater pricing since the current wastewater systems are based around individual wastewater plants that are not interconnected.86

On this basis, IPART indicated in the 2012 Determination for Sydney Water that it intended to progressively reduce wastewater usage charges to reflect the SRMC of collecting, transporting, treating and disposing of effluent, which it estimated at around 25c/kl. IPART noted that its decision to set the price at SRMC also reflected the postage stamp pricing constraint.

As part of the 2016 price review, Sydney Water submitted that LRMC is the preferred principle to adopt (see Box 12) and noted that the concept of basing wastewater charges on LRMC has been recognised in other jurisdictions. For example, a 2014 report by Sapere Research Group for the Essential Services Commission of South Australia found that “the concept of LRMC is relevant to wastewater services”.87 Similarly, a 2012 report by COVEC for Watercare reviewed the wastewater prices applying in Australia, the US and the UK and found “[p]ricing at SRMC appears to be explicitly adopted in NSW only.”88

In its Inquiry on Country Water and Wastewater Pricing, ERA (WA) recommended that commercial wastewater pricing should be based on LRMC, as the current total cost of wastewater provision in some regional areas is very high.89 LRMC was chosen as the appropriate measure because it would provide the most appropriate cost-reflective price signals for these areas.

Box 15: The case for long-run marginal cost signals for wastewater

In its submission to IPART, Sydney Water argued that “according to IPART, its 2012 decision to base wastewater usage pricing on SRMC was made in the context of postage stamp pricing. It considered that LRMC pricing for wastewater within a postage stamp regime has limited signalling capacity, because (as wastewater catchments are diverse and numerous) changes in usage in one catchment may not affect capacity in another.

We do not agree with this, as we believe wastewater services should be priced to send efficient investment signals to customers and suppliers. We are concerned about the potential for the wastewater usage charge to further transition towards SRMC. In particular we note that:

- Locational specific costs and postage stamp pricing are not unique to Sydney Water. They apply to other water businesses and energy networks (where the cost of meeting demand

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86 IPART, Review of price structures for metropolitan water authorities, 2012
across the network could be different but the same price is charged). However, there are few precedents for using SRMC. LRMC or fully distributed pricing models are the dominant practices.

- IPART’s SRMC pricing rule results in a systemic underestimation of efficient prices over time, as it does not contain a long-term pricing signal. In principle under an SRMC pricing rule, prices would vary over time and locations, as capacity constraints are approached. However, IPART’s rule effectively assumes there are no constraints anywhere at any time, no requirements for increased quality and no growth.

We further note that, to service greenfield growth over the next 50 years and assuming current standards in our environment protection licences (EPLs) are maintained, we will need to undertake additional investment to provide wastewater services that will cost about $2.5 billion. The Environment Protection Authority (EPA) is currently considering tightening EPL load requirements for wastewater systems in the Hawkesbury Nepean catchment to the 2014-15 levels, which are 200% below the current load caps for nitrogen and phosphorous. If this were the prevailing approach to licensing our loads over the longer term, to meet this would require engineering solutions involving reverse osmosis at all plants. The capex costs over 50 years to provide these additional services could more than double (that is, to about $6 billion), along with a doubling of annual opex (from $115m to $230m).

We also believe that, if the usage price for wastewater is charged with reference to discharge factors applied to water use, it does not make sense for IPART to set this price on a different basis to the water usage price. We acknowledge that with postage stamp pricing an LRMC rule will not accurately measure marginal costs in each region and in each period. However, it provides a system-wide average, which will better approximate the average marginal cost of service over time than a SRMC estimate, which is based purely on marginal operating costs in the absence of constraints. We consider that an LRMC for the overall network can be estimated.

Finally, we note that, given consumers’ responses to prices require investment in equipment and process (to change use and discharge patterns), stable long-term signals are more relevant to consumer decision-making than short-term potentially volatile signals”.

At its 2016 Sydney Water review, IPART set a maximum non-residential wastewater usage charge for Sydney Water of $1.10 per kL in real terms over the 2016 determination period. IPART considered this to be a reasonable ‘holding position’ in the context of an ongoing debate with Sydney Water about SRMC vs LRMC.

In our view, the losses in economic efficiency of charging too much for customers in wastewater catchments where the LRMC is low are likely to be outweighed by the efficiency costs of charging too little for those catchments that are becoming increasingly constrained. In this regard, we also note that for Sydney Water the vast majority of sewage (75%) is transported to the three ocean discharge wastewater treatment plants via increasingly constrained transport and treatment systems, many of which are nearing capacity and require material and costly augmentations to meet forecast growth.

This low signal is likely to represent a barrier to cost-effective water recycling, as recycling schemes can reduce the increasingly large forward-looking costs required to alleviate capacity constraints and reflect this in lower bills to customers.

Given the importance of robust, relevant and accessible estimates of the cost of future wastewater augmentation and the LRMC of supply, we consider there to be an opportunity for IPART to consider changes to its approach in the next price reviews for Sydney Water and Hunter Water. On an ongoing basis, this could be assisted by IPART publishing annual market guidance on the range of LRMC estimates for each water (and wastewater) supply area, drawing on information contained in the annual ‘system limitation reports’ published by the public water utilities (see recommendation #12).
Recommendation 24: As part of its 2020 Sydney Water and Hunter Water price reviews, IPART should set usage charges for water and wastewater (for those customers that pay wastewater usage charges) with regard to the long-run marginal cost (LRMC) of providing services to give better signals regarding emerging capacity constraints. This includes ensuring the estimated LRMC of supply reflects the ‘system limitation reports’ published by each of the public water utilities. This would require moving away from IPART’s current approach of setting wastewater usage prices with regard to the short-run marginal cost (SRMC) of providing services.

Recommendation 25: As part of its 2020 Sydney Water and Hunter Water price reviews, IPART should evaluate the merits of removing the discharge factor applying to wastewater service charges. This would remove incentives for inefficient (or non-cost effective) private sector entry in water recycling under IPART’s proposed ‘retail-minus’ wholesale pricing methodology.

7.4 Postage stamp pricing

A fundamental feature of the current retail pricing arrangements for water and wastewater services for the public utilities is the NSW Government policy of postage stamp pricing, whereby the same kinds of customers within the same area of operations are charged the same price for the same service. This means that any difference in the cost of supplying water and/or wastewater services to customers in different locations on the network is not reflected in the regulated prices they pay.

Postage stamp pricing may mask areas where recycled water solutions could be a cost-effective solution (for example, in areas with relatively high costs to service) and may therefore encourage a bias towards traditional solutions. It also creates challenges in establishing wholesale charging arrangements that promote efficient new entry without undermining the uniform pricing regime at retail level (see section 8.1).

While there are a range of costs and benefits associated with moving away from postage stamp pricing for water-related services, we recommend the NSW Government request IPART to review potential changes to the framework for competition in NSW urban water services, including postage stamp pricing, to improve the efficiency of water, wastewater and stormwater services across Greater Sydney and market and facilitate alternative water and wastewater servicing solutions as part of integrated water cycle management. IPART should report the results of this review by the end of 2020, including the identification of options to create value for water customers and the broader metropolitan NSW community.

7.5 Trade waste

Trade waste is defined as wastewater from commercial and industrial customers in which the concentrations of pollutants exceed a domestic equivalent (that is, a concentration or level that is the same as would be expected in household wastewater).
Current approach

The public utilities levy a number of different types of trade waste charges, according to pricing principles for trade water services (see Appendix B). These include charges designed to reflect the higher costs and risks associated with treating different types of trade waste discharges compared to domestic strength sewage, charges to recover the cost of administering trade waste agreements and conducting inspections and monitoring, and tanker service charges (effluent delivered by truck to treatment plants).

Assessment of current approach

To the extent that these charges are cost-reflective, they provide appropriate incentives for cost-effective recycling where recycling plants can potentially treat these pollutants at lower cost and reflect this in their offerings to end-use customers.

7.6 Stormwater

Local government, rather than Sydney Water or Hunter Water, is the main provider of stormwater services in the Sydney and Newcastle areas. This means that only some of Sydney Water’s and Hunter Water’s residential and non-residential water and wastewater customers are also their stormwater customers.

Current approach

Currently, stormwater customers of the public utilities are levied a stormwater charge based on their property area size. This reflects IPART’s view that area-based charging is the most equitable charging approach across customer categories and best reflects the impactor pays principle, on the basis that a property’s area is a reasonable and readily available indicator of its contribution to the public utility’s stormwater costs.

Assessment of current approach

As discussed in section 4.2, IPART’s avoided cost guidelines do not extend to stormwater services or recycled water schemes, and that it is conceivable that some recycled water schemes could lead to avoidable costs in stormwater assets owned and operated by the public water utilities. It would seem appropriate that any such avoidable costs be treated in the same way as avoidable cost relating to the utilities’ water or wastewater assets.

We have recommended that, as part of its 2018 recycled water review, IPART extend the framework for assessing avoidable costs associated with recycled water schemes to include stormwater assets owned and operated by the public water utilities. This should ensure the public water utilities have equal and consistent incentives to invest in recycled water where and when it results in avoidable stormwater costs (see recommendation #5).
8 Promoting cost-effective water recycling: incentives for efficient private sector entry

In addition to the issues addressed in sections 4 to 7, several other factors impact on the incentives for private sector entry in cost-effective water recycling:

- Potential for retail price regulation of WICA licensees’ services to end-customers
- Price regulation of wholesale services
- Third party access
- Licensing timeframes.

This section examines whether these aspects of the economic regulatory framework are likely to promote private sector entry in cost-effective water recycling.

**Recommendations**

26. As part of its 2018 recycled water review, IPART should strengthen the regulatory guidance it provides about the scope and form of retail price regulation of recycled water provided by WICA licensees, including principles and the decision-making process for establishing this form of price regulation.

27. As part of its 2018 recycled water review, IPART should provide guidance to stakeholders on how it intends in practice to apply aspects of its proposed wholesale pricing methodology (‘retail-minus’ approach) when setting prices for wholesale services to customers with a recycled water plant.

8.1 Framework for market participation

As summarised in Box 13, the current framework for private entry and market participation in the NSW urban water market is governed by the *Water Industry Competition Act 2006* (WICA).

WICA opened the way for alternative suppliers to enter the market through the introduction of a licensing regime and a third party access regime governing access to services provided by what were seen as the monopoly network components of the supply chain. The purpose of introducing these regimes was to enable competition in contestable parts of the supply chain (such as the supply of retail services to end-customers).

In practice, the emerging market framework for urban water services has not relied on third party access. Rather, WICA licensees typically purchase bundled ‘wholesale’ services from the public water utilities (for example, a bulk water supply to the boundary of a new development area and/or a wastewater collection, treatment and disposal service). This enables WICA licensees to provide services to end-customers, including
potable water and wastewater services, with licensees providing the ‘last mile’ of the reticulation network (and potentially recycled water infrastructure).  

This has resulted in competition to service new greenfield or infill developments (‘competition for the market’) rather than full retail contestability across a public utility’s entire region (‘competition in the market’, as is in place in the NSW gas and electricity market).

Box 16: The role of the Water Industry Competition Act (WICA) in governing market participation

Traditionally, water and wastewater supply has been viewed as a natural monopoly network requiring a single supplier and hence economic regulation of that monopoly supplier. However, the introduction of WICA in 2006 recognised that it is feasible for competition to occur in at least some parts of the supply chain. WICA seeks to “encourage competition in relation to the supply of water and the provision of wastewater services and to facilitate the development of infrastructure for the production and reticulation of recycled water; and for other purposes”.

WICA provides for:

- A licensing regime for private sector providers of reticulated drinking water, recycled water and wastewater services
- A third-party access regime for water and wastewater infrastructure
- Authorisation of IPART to arbitrate certain sewer mining disputes.

Source: Frontier Economics

However, as recycled water can be a substitute for potable and/or stormwater (noting that at present it is used for non-potable purposes only), WICA licensees who supply recycled water are both users of – and competitors with – other parts of the centralised potable water and wastewater networks owned and operated by the public water utilities. In this sense, IPART’s characterisation of contestable services as being retail and reticulation services downstream and upstream of the centralised water and wastewater networks does not fully reflect the fact that water recycling is also a (partial) alternative to potable water supply and to wastewater treatment and disposal – that is, water recycling can reduce the need for investment in other parts of the supply chain and in some cases can involve a potential bypass of these assets. In other words, the contestable activities extend to other parts of the supply chain.

Initially prices of ‘wholesale’ services provided by the public utilities to WICA licensees were established through commercially negotiated agreements (against the backdrop of potential regulation). While the current scale of the wholesale services market is small, the question of how wholesale providers and customers are regulated and wholesale services are priced, are emerging as a key determinant of the potential future development of both the wholesale and related downstream or upstream markets and the scope of competition in this market.

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90 Lend Lease’s Bingara Gorge development is a notable exception to this in that Sydney Water does not provide a wholesale water or wastewater service.

91 In particular, the NSW Government amended WICA to explicitly limit the right of WICA licensees to provide only retail services, so that they could not simply purchase water from a public utility and on-sell it without providing any investment in physical infrastructure.
8.2 Potential for retail price regulation of WICA licensees’ services to end-customers

Current approach

While IPART does not currently regulate the prices that wholesale customers can charge for their services to their customers, including for recycled water, WICA provides the ability for IPART to regulate the prices of WICA licensees under some circumstances.

If declared a monopoly supplier,92 the licensee may be subject to a pricing determination or periodic review of its pricing policies by IPART. To date, no WICA licensee has been regulated in this way.

Assessment of current approach

While the framework recognises that regulatory intervention should be proportionate and reflect the specific market characteristics, IPART’s determinations have put forward various views on whether the intention is to regulate recycled water prices.

We note that currently some WICA licensees benchmark their prices to Sydney Water’s prices, but the potential for a WICA licensee to be declared a monopoly supplier and be subject to retail price regulation could create market uncertainty for proponents of recycled water schemes. It also creates uncertainty for customers of these schemes and the extent of protection from any use of market power.

Given the increasing number of private sector recycled water schemes in metropolitan NSW, IPART should provide greater regulatory guidance on the scope and form of retail price regulation (including principles and decision-making process for establishing this form of regulation) of recycled water provided by WICA licensees. Improving the guidance about ‘when and how’ price regulation of recycled water will be applied will provide greater certainty to WICA licensees and customers (see related Recommendation 16).

Recommendation 26: As part of its 2018 recycled water review, IPART should strengthen the regulatory guidance it provides about the scope and form of retail price regulation of recycled water provided by WICA licensees (including principles and decision-making process for establishing this form of price regulation). Improving the guidance about ‘when

92 A licensed network operator or a licensed retail supplier may be declared by the Minister to be a monopoly supplier if they “provide a service for which there are no other suppliers to provide competition in that market, and for which there is no contestable market by potential suppliers in the short term and, in the case of a water supply service for recycled water, that connection of land to that service is required by or under some other Act”.
8.3 Price regulation of wholesale services

**Background**

Wholesale customers (typically WICA licensees seeking to undertake water recycling) often require wholesale water and/or wastewater services as inputs to their provision of services to end-customers. Wholesale customers often supply drinking water, as well as wastewater and recycled water services, to each end-customer and usually return some wastewater to Sydney Water’s or Hunter Water’s wastewater system.

As the price and non-price aspects of these wholesale services directly impact the financial viability of water recycling, the framework for setting the pricing of wholesale services is a core focus of this review (see Box 14 for a summary of the context and history of price regulation of wholesale services). This section analyses the arrangements for price regulation of wholesale services in metropolitan NSW — including the key objectives and principles for wholesale charging and the available methodologies — to assess whether the current arrangements are a barrier to cost-effective water recycling.

**Box 17: Pricing of wholesale services: Context and history**

Until now, prices for wholesale services have been negotiated by the parties through ‘private network operator’ (PNO) agreements between Sydney Water or Hunter Water and the private entity. Sydney Water and Hunter Water levied non-residential charges under these PNO agreements.

IPART initially considered possible approaches to regulation of these ‘wholesale’ services in its 2016 review of Sydney Water’s and Hunter Water’s prices but decided to undertake a separate detailed review. In 2017, IPART released its wholesale water and wastewater service determination but decided a switch from non-residential pricing to a ‘retail-minus’ pricing framework was appropriate.

Some stakeholders in IPART’s 2017 review contended that IPART’s proposed ‘retail-minus wholesale’ pricing methodology will render current and future water recycling schemes uneconomic and submitted that the decision was inconsistent with the intent of WICA and the promotion of competition in the delivery of water and wastewater services.

Some stakeholders to this review identified IPART’s proposed ‘retail-minus’ wholesale pricing methodology as the biggest single barrier to cost-effective water recycling.

**Current approach**

IPART’s wholesale price decision outlines the regulatory framework for wholesale services. 93 IPART defines ‘wholesale customers’ to be those that purchase water supply

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93 IPART, Prices for wholesale water and wastewater services, Sydney Water Corporation and Hunter Water Corporation, Final Report, June 2017
and/or wastewater services from Hunter Water and Sydney Water for the purposes of on-supplying water and wastewater services to customers.

The key elements of IPART’s approach are:

- Existing schemes would continue to be subject to existing pricing agreements or retail price determinations.
- New schemes without a recycled water plant that are on-selling water and wastewater services (although such schemes may be uncommon) would be subject to regulated system-wide prices, unless the parties agree to opt out of the determination and enter into an unregulated pricing agreement or seek a scheme-specific price determination.
- New schemes with a recycled water plant would be subject to unregulated pricing agreements (or where applicable, retail price determinations), unless a wholesale customer or service provider seeks a scheme-specific price determination.
- Non-residential retail pricing would apply for the supply of drinking water to top up a recycled water plant and disposal of waste (such as trade waste) from a recycled water plant that is not used for on-selling wastewater services.

IPART proposes to apply a so-called ‘retail-minus’ approach to most (but not all) of the wholesale services provided by public water utilities to new entrants. This approach should be applied for ‘on-selling’ water and wastewater services, including where a wholesale customer operates a recycled water plant.

IPART’s rationale for adopting a retail-minus approach (in preference to alternatives) are:

- Retail-minus pricing ensures that wholesale service providers and wholesale customers are on a level playing field in competing for the provision of ‘upstream’ and ‘downstream’ services to end-use customers. Other pricing approaches, such as location-based cost-of-service or non-residential retail prices, would result in inefficient pricing signals.
- Sydney Water and Hunter Water are bound to set postage stamp retail prices and, as such, inefficient price signals would be created under location-based cost-of-service wholesale prices.
- A non-residential price creates an arbitrage opportunity for on-selling.

IPART has decided upon a particular version of a retail-minus framework, as shown below.
This version of retail-minus is justified by IPART on the basis that:

- ‘Retail-minus’ provides appropriate incentives for efficient entry in the presence of postage stamp retail prices by creating a margin that reflects the cost of the contestable services.

- A ‘reasonably efficient new competitor cost’ benchmark in providing services from the point of wholesale purchase to end-use customers (i.e. retail & reticulation services) provides greater scope for competition and therefore dynamic efficiency gains over time than other approaches (such as the ‘as efficient competitor’ or ‘avoidable’ cost approach), even though it may risk some productive inefficiency in the shorter term.

- Facilitation costs should be reflected in wholesale prices and should, where relevant, account for avoidable water and/or wastewater costs from recycled water.

IPART also outlined a process for setting scheme-specific prices for future recycled water schemes given IPART was unable to estimate the typical or system-wide average impacts of a recycled water plant in a wholesale service provider’s costs with a reasonable degree of accuracy (because the size, location and operation of a recycled water plant will influence avoidable costs). In such cases, parties would need to engage with IPART to set a scheme-specific price.

**Assessment of current approach**

**Is IPART’s retail-minus approach a barrier to cost-effective recycling?**

Several stakeholders have suggested that a retail-minus methodology will be a major barrier to the uptake of water recycling in metropolitan NSW, as it could result in water recycling being uneconomic. In particular, it has been claimed that:
- IPART’s methodology will prevent efficient entry and enshrine the monopoly position of public water utilities.
- IPART’s methodology will lead to major increases in wholesale charges relative to those based on a single non-residential customer.
- Retail-minus methodologies have never been applied by regulators in Australia and are internationally discredited.

In our view, these claims are inaccurate: they do reflect the specific version of ‘retail-minus’ that IPART has proposed to apply to wholesale customers with recycled water plants; nor do they take into consideration the unique nature of competition in the NSW urban water sector (see Appendix D for further details). Further, there may be cases where wholesale charges may be lower, particularly where there are emerging capacity constraints in the water and/or wastewater network, than under the current non-residential pricing framework (see illustrative examples in Appendix E).

Retail-minus methodologies have been and are being used by regulators in other markets and jurisdictions. Ofwat (the UK water economic regulator) is now looking to make wider use of similar ‘wholesale-minus’ pricing scheme within the UK water sector (see Appendix G).

**Overview of objectives and principles in setting wholesale charges**

In assessing whether a retail-minus methodology represents a major barrier to water recycling, it is important first to consider the objective of third party access and related reforms to promote competition in markets upstream or downstream of monopoly networks.

The primary objective is economic efficiency, in its various dimensions, rather than competition for its own sake: that is, competition is merely a means to an end, with the end-point being promoting economic efficiency.

Ideally, wholesale and access prices should encourage new entry where it promotes economic efficiency – that is, where this would result in lower prices and/or better value services to end-customers over the long term. This includes avoiding entry that is only feasible because it undermines the postage stamp pricing regime and the arbitrage opportunities stemming from regulated retail prices. This clear objective provides a

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94 In broad terms, ‘economic efficiency’ means that the value created is maximised: services are produced at lowest possible cost and all parties willing to pay more than that cost are served. A further element of efficiency is ‘dynamic efficiency’, meaning how effectively the market provides incentives for ongoing improvements in ways of doing things to create more value.

95 As Kahn and Taylor note: “When a would-be entrant proposes to offer its services in competition with an existing supplier it is the task of efficient competition to ensure that the aspiring competitor prevails to the extent – and only the extent – that the total incremental costs to society involved in its supplying the service are equal to or lower than those of the incumbent.” Alfred E Kahn, and William E Taylor, The Pricing of Inputs Sold to Competitors: A Comment, *Yale Journal on Regulation*, Vol 11: 1994, p237
simple test for assessing the range of methodologies that are available for setting wholesale charges.\textsuperscript{96}

Given that there are existing water and wastewater networks in place, and that wholesale prices should allow for the integrated monopolist to continue to recover existing contributions to fixed and common costs in its access prices and to recover its total costs, the issue is how recycled water can best supplement and complement these networks (or potentially even substitute for them) so that the future costs of meeting the water and wastewater needs of all customers – new or existing – are met at lowest cost to society. To achieve this objective, a wholesale pricing methodology needs to signal where entry is valuable – for example, in locations where there are constraints in the water and/or wastewater network(s) (see Error! Reference source not found.).\textsuperscript{97}

Box 18: Entry is more valuable where there are constraints in key assets and/or systems

\begin{quote}
In situations where there is a high level of capacity in water and/or wastewater systems and there is no need for growth-related augmentations for an extended period of time, the benefits provided by recycled water plants and distribution systems, in the form of ‘avoidable costs’, are likely to be low (recognising there may be other benefits). In fact, if new recycled water assets are built under these circumstances, when existing systems can already supply water and wastewater needs at very low cost, this will simply increase the total costs of supplying these services and lead to higher overall customer bills.

However, where there are emerging constraints on water supply, so that there is an urgent need to augment the water supply system to maintain security of supply, the forward-looking cost of supplying water is likely to be high. In these circumstances, where investment in recycling (wastewater recycling or stormwater harvesting and reuse) may defer or avoid the need for a costlier augmentation or other supply-demand measure, it can provide considerable economic value. Similarly, recycling schemes involving treated wastewater can provide considerable economic value where wastewater networks are facing significant constraints, as can recycling schemes involving stormwater harvesting and reuse if stormwater systems are becoming constrained.
\end{quote}

Source: Frontier Economics

As many of the issues involved in wholesale pricing are analogous to access pricing, it is relevant to consider the access pricing principles under WICA – with which IPART is required to comply in its role as arbitrator (see Appendix C).\textsuperscript{98}

Overview of approaches to setting wholesale charges

In broad terms, there are two main approaches to setting prices for wholesale or access services:

- A ‘bottom up’ or ‘cost of service’ approach which seeks to explicitly identify the service being provided and establish the costs of providing this service

\textsuperscript{96} In addition to other broad pricing principles such as administrative simplicity and transparency, equity, consistency, etc.

\textsuperscript{97} As noted by Flow Systems, wholesale frameworks should include “transparent pricing that values the broader benefits of IWCM and reduced impact on centralised infrastructure and reflects these benefits in tariff structures”. Flow Systems, Submission to INSW review, 2017

\textsuperscript{98} The close links between wholesale pricing and access pricing and the need for congruence between them implies IPART should also have regard to these principles in relation to regulation of wholesale charges.
A ‘top down’ approach which starts with the final price for the end-to-end retail service and deducts the costs of those elements of this bundled service that are not used by the wholesale customer, leaving a charge for the wholesale service being provided (IPART’s proposed retail-minus methodology fits into this category – see Figure 12).

The retail-minus and cost of service methodologies will roughly lead to the same access prices where retail prices are fully cost-reflective: the cost of service adds up the costs of all the components of the value chain used by the wholesale customer or access seeker, whereas retail-minus subtracts those components not used by the access seeker from the final retail price. However, the distortions introduced by retail pricing constraints, such as postage stamp pricing, provide an obvious circumstance where this may not be true: as postage stamp prices are not cost-reflective for individual customer groups or for different geographic regions.

Within each of these broad categories, a vast array of potential sub-options have been suggested and/or applied in different utility sectors at different times. Experience suggests there is no universal ‘best’ solution for efficient prices for these services – rather, there is a need to carefully consider the circumstances of each setting.

As part of our analysis, we have examined several alternative wholesale pricing methodologies which are commonly applied and/or have been suggested by participants in this review, including:

- Non-residential pricing
- Cost of service approaches (‘bottom up’)
- Retail-minus approaches (‘top down’).

Our evaluation of these approaches is summarised in Table 4 and detailed in Appendix D.

While it can be instructive to draw on wholesale/access pricing models applied elsewhere, this needs to be done with due care to avoid drawing inappropriate conclusions, including advocating models used in other sectors with quite different market settings and/or policy objectives.
Table 4: Summary of evaluation of wholesale pricing methodologies

<table>
<thead>
<tr>
<th>Wholesale pricing methodology</th>
<th>Strengths and weaknesses</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Non-residential pricing</td>
<td>• Administratively simple</td>
<td>Sydney Water and Hunter Water have to date agreed to levy non-residential charges under negotiated ‘private network operator’ (PNO) agreements with private entities.</td>
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<tr>
<td></td>
<td>• Does not send price signals as to where water recycling is likely to be most cost-effective (e.g. in locations where there are major capacity constraints in existing water or wastewater networks) and could encourage new entrants to develop recycling schemes even where their forward-looking costs of servicing customers are higher than the incumbent’s (e.g. increasing system costs and prices)</td>
<td></td>
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<tr>
<td></td>
<td>• Minimises potential for ‘cherry-picking’ based on geographical cost differences, but does not prevent another form of ‘cherry-picking’ that relates to arbitrage across different price classes and tariff structures</td>
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<td></td>
<td>• Operating margin available to new entrants will largely reflect arbitrary differences in the allocation of fixed costs inherent in the retail charges of end-customers and may lead to a ‘downward spiral’ as there is a redistribution of the share of fixed costs away from customers of the new entrant to the customers remaining with the incumbent (even though network capacity cannot be reduced in response and there is no corresponding decrease in costs (See Appendix D))</td>
<td></td>
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<tr>
<td>Cost of service approaches</td>
<td>• In theory, is the simplest way of setting efficient wholesale charges to promote cost-effective water recycling</td>
<td>Cost of service approaches seek to explicitly identify the service being provided and establish the costs of providing this service. A cost-based approach aims to estimate the efficient costs of all service elements purchased by a third</td>
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<tr>
<td></td>
<td>• However, in the particular circumstances of the urban NSW water industry, there are considerable challenges in practice:</td>
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99 Conversely, a wholesale charge based on a single non-residential tariff could be too high and provide insufficient incentives for cost-effective investment in recycled water in some circumstances. This could occur where the forward-looking costs of supplying services are high due to approaching capacity constraints in the water and/or wastewater system that would require costly augmentations to address. This has the potential to lock out private suppliers from helping to solve the problem through decentralised recycling schemes and leave Sydney Water to implement potentially more costly solutions.

100 As discussed in section 7.4, a non-residential water charge comprises a fixed service charge (based on meter size) plus a water usage charge based on metered consumption; and a non-residential wastewater charge comprises a fixed service charge (again based on meter size) and a (low) wastewater usage charge based on deemed wastewater discharge. They are largely charges that recover a contribution of each customer to the sunk costs of the network.
- Complex and information-intensive to develop, and IPART does not currently have component costings to identify the costs of providing wholesale services to different types of customers in different parts of the system
- Not congruent with government policy in the NSW urban water sector where postage stamp pricing means water and wastewater charges at the retail level are deliberately not cost reflective
- Could be a viable option in the future

<table>
<thead>
<tr>
<th>Retail-minus</th>
<th><strong>Can provide appropriate incentives for efficient entry in the presence of postage stamp retail prices by creating a margin that reflects the forward-looking cost savings in water and wastewater networks</strong></th>
<th>The retail-minus approach calculates the wholesale price as the vertically-integrated firm’s retail price of the service less the costs avoided (or avoidable) in providing the wholesale service rather than the retail service.</th>
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<tbody>
<tr>
<td></td>
<td><strong>Can potentially blunt longer-term dynamic efficiency benefits of competition</strong></td>
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<td></td>
<td><strong>IPART’s proposed version may require some refinements</strong></td>
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</tbody>
</table>

*Source: Frontier Economics*
As postage stamp pricing applies in the urban water market in NSW, a retail-minus methodology is most likely to encourage efficient entry and promote cost-effective water recycling: it provides efficient signals, including where and when there may be emerging capacity constraints in existing water and/or wastewater systems, relative to alternative methodologies for setting wholesale prices. As highlighted in Appendix E, it may in some circumstances, including where there are emerging capacity constraints and the avoidable costs are high, result in lower wholesale charges than the current wholesale prices that are based on non-residential prices.\(^{101}\)

For this reason, IPART's proposed retail-minus approach to setting wholesale prices is an appropriate methodology in the presence of postage stamp pricing.

However, currently there are barriers to the retail-minus’ framework working effectively, given that in practice:

- There is insufficient publicly available information about upstream and downstream system constraints and avoidable costs to enable the identification of opportunities for cost-effective water recycling (that is, for potential recycled water proponents to identify indicative or likely wholesale prices in various locations).
- There is uncertainty about how retail-minus is to be applied to recycled water schemes (including a number of stakeholders to this review being unclear about whether upstream and downstream savings or ‘avoidable costs’ from recycled water plants are relevant to the calculation of wholesale prices\(^{102}\)) and there may be the potential for ‘double counting’.
- The timeframe for decision-making is not consistent with market needs (for example, a scheme-specific review to determine wholesale prices could take up to four months).

IPART should, as part of its 2018 recycled water review, clarify how it intends to apply aspects of this methodology in practice, within a timeframe consistent with market needs. This could involve setting out calculations for a set of indicative wholesale prices based on illustrative recycled water plants in various locations with differing levels of upstream water and downstream wastewater capacity constraints.

**Recommendation 27:** As part of its 2018 recycled water review, IPART should provide guidance to stakeholders on how it intends in practice to apply aspects of its proposed

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\(^{101}\) The strong support for continuation of this approach by new entrants appears to assume that charges based on a single non-residential price will be significantly lower than those based on IPART’s proposed retail-minus methodology. This perception may in part reflect a misunderstanding of whether upstream and downstream avoidable costs are to be included within the ‘net facilitation costs’ component in the retail-minus framework and/or absence of clear guidance or worked examples in IPART’s 2017 report on what these values might be and how they would be incorporated in the calculation of retail minus wholesale charges.

\(^{102}\) This confusion among stakeholders could result from these upstream and downstream savings being labelled as ‘negative facilitation costs’.
Detailed application of IPART methodology

While we have found that the retail-minus methodology provides appropriate incentives for efficient entry, we have concerns as to whether aspects of IPART’s particular version of retail-minus are consistent with promoting efficient entry. It is not yet fully clear how IPART will apply its methodology in practice, as IPART’s framework entails undertaking scheme-specific reviews to determine wholesale charges, including the value of any avoided upstream or downstream costs to be reflected in ‘net facilitation costs’.

However, IPART’s report provided some indication of its likely approach:

- In calculating the ‘retail’ component for potable water wholesale charges, the retail water usage price would be applied to the wholesale volumes measured at the point of wholesale connection (Appendix D of IPART Final Report).
- Section 6 of IPART’s Final Report suggests that in calculating avoidable bulk water supply costs, the LRMC of water supply could be applied to the volume of potable water displaced (we therefore assume a similar approach for wastewater).

In response to IPART’s Supplementary Draft Report, Sydney Water expressed concern that the avoided costs associated with reduced potable water usage would already be accounted for in reduced volumetric charges (due to reduced demand because the wholesale customer produces their own recycled water) as part of the calculation of the retail-minus wholesale price, so that inclusion of the suggested minuses/avoided costs would be double counting.

Any such double counting could result in wholesale charges that are too low, which would not be consistent with facilitating cost-effective water recycling.

Our analysis suggests that IPART’s proposed way of applying a retail-minus methodology may ‘double count’ avoided augmentation costs. This is shown in Appendix F.

Scheme-specific reviews

A key part of IPART’s approach for determining wholesale charges is to conduct scheme-specific reviews to establish the avoided costs and net facilitation costs on a scheme by-scheme basis as a scheme arises.

The stated rationale for this approach is that IPART does not have sufficient information on avoidable costs:

“This is because, at this stage, we cannot estimate the typical or system-wide average impacts of a recycled water plant on the wholesale service provider’s costs with a reasonable degree of accuracy.”
Given this, we can only set prices for on-selling services where there is a recycled water plant on a scheme-specific basis.\(^{103}\)

However, the need to engage in scheme-specific reviews (given some facilitation and avoidable costs may be scheme-specific) may create uncertainty around the financial feasibility of proposed recycled water schemes and challenges for potential WICA licensees engaging with developers (for example, it may be difficult to estimate the relevant avoidable costs and/or the time necessary to undertake a scheme-specific review may be too long).

IPART’s 2017 Final Report on Wholesale Pricing commits to undertaking scheme-specific reviews in four months. IPART also suggests a scheme-specific review could take place in parallel with a licence application process.

Despite this, private suppliers are concerned that this process will take too long.\(^{104}\) We concur that the process seems long and that this could significantly inhibit new entrants from competing in the market.

The recommendations in this report, including a licence obligation on public utilities to develop and publish an annual ‘system limitation report’ and for IPART to publish annual market guidance on the range of LRMC estimates for each water and wastewater supply area, should enhance the opportunity for public water utilities and wholesale customers to negotiate – and, if necessary, IPART to arbitrate – prices for wholesale services within a shorter timeframe.

Other services supplied to wholesale customers

In its determination on wholesale charges, IPART decided that for trade waste services wholesale customers should be treated as a retail trade waste customer and be charged based on the pollution loads they discharge to the public water utility’s systems – but that trade waste charges would also be included in the retail-minus wholesale wastewater charges.

In our view, to the extent that trade waste charges are cost-reflective, they provide incentives to treat and remove waste before return to the public water utility’s wastewater systems. This is a potentially valuable service provided by new wholesale customers to their end-use trade water customers for which they should be rewarded. It is not clear that these charges should be incorporated in the retail-minus arrangements if they are not subject to postage stamp pricing.

IPART decided that non-residential prices are appropriate for potable top-up (water used to top-up the supply of water to a recycled water scheme at times of shortage of feedstock) and disposal of waste from a recycled water plant that is not used for ‘on-selling’ wastewater services. IPART’s stated rationale for this approach is that in these

\(^{103}\) IPART Final Report on wholesale charges, p33

\(^{104}\) For example, Flow Systems noted that “scheme-specific determinations are not viable, as they are too lengthy and uncertain to allow for investment in innovation”. Flow Systems, Submission to IPART, May 2017
circumstances, the wholesale customer is not using the wholesale service to compete with the public utility in ‘upstream’ or ‘downstream’ retail drinking water and the wastewater service market where the public utilities are constrained by regulated retail prices; rather, the customer is using the service as an input in the production of another product (recycled water). We are not convinced by this distinction, as in both cases the wholesale service is being used, directly or indirectly, to compete with the public water utility: in the case of potable top-up, the water is a direct substitute for non-potable water supplied by the public water utility for non-potable uses. In addition, IPART’s approach requires separately metering and/or accounting for these volumes.

8.4 Regulation of third party access

Current approach

The Water Industry Competition Act provides the legislative framework governing the entry of new private water utilities and contains access provisions for entrants who require access to Sydney Water or Hunter Water assets to deliver a service (existing public utilities and local government schemes are not covered by the Act).

WICA provides for an access regime under which an applicant may seek access to an existing water industry infrastructure service, defined as the storage, conveyance or reticulation of water or sewage by means of water infrastructure or wastewater infrastructure – not the water or wastewater itself.

The access regime applies to the storage and transportation of water and sewage using existing significant water and wastewater networks in the areas covered by Sydney Water and Hunter Water.

WICA provides for the following mechanisms to seek access to water infrastructure services:

- Coverage declaration – an applicant may be granted a coverage declaration which establishes the right to negotiate terms and conditions of access with a service provider

- Voluntary access undertaking – an applicant may seek access to water infrastructure services under terms and conditions set out in a voluntary access undertaking approved by IPART.

The regime is a ‘negotiate/arbitrate’ regime. IPART has prepared negotiation protocols to assist access seekers and service providers with the application process. Where commercial terms cannot be reached for access, the applicant can request that prices be determined in binding arbitration conducted by IPART.

Assessment of current approach

Notably, there have been no instances of access since WICA came into operation. Instead, new licensees have sought to negotiate supply of a wholesale service because
that is the product they want for their business models (such as potable water delivered to the boundary of a development, rather than having to secure their own water and negotiate access).

In this regard, while the WICA access regime provides another potential avenue for new entrants (and in particular proponents of recycled water schemes) – and can therefore be seen as facilitating cost-effective water recycling – in practice the access regime has had little impact as it doesn’t necessarily fit the business model favoured by current market participants.

Should the business model of private sector entrants in the NSW urban water market change (for example, where an entrant gains access to a reliable water source to sell to end-customers), third party access under WICA may become more relevant, with the potential for renewed focus on the timeframe for decision-making in this negotiate/ arbitrate regime.

As set out in section 11.1, we have recommended the NSW Minister for Energy and Utility request IPART to review and report on potential changes to the framework for competition in the NSW urban water market, including postage stamp pricing, to improve the efficiency of water, wastewater and stormwater services across Greater Sydney and facilitate alternative water and wastewater servicing solutions as part of integrated water cycle management. In our view, it would be appropriate to consider the role of third party access in this context.

### 8.5 Timeframes for WICA licensing

#### Background

This component of the economic framework relates to licensing of market participants. There are two distinct licensing regimes:

- Public water utilities are subject to licences overseen by IPART but a public water utility does not require a licence in relation to water industry infrastructure situated within its area of operations.

- New water utilities must secure licences from IPART before they can operate in the marketplace. The WICA licensing regime provides for two types of licence:
  - Network operator’s licence – authorising the licence holder to construct, maintain and operate specified water industry infrastructure for the purposes identified in the licence
  - Retail supplier’s licence – authorising the licence holder to supply water or provide wastewater services by means of water industry infrastructure
Current approach

Under the WICA licensing regime, the Minister is formally responsible for determining whether to grant a licence and licence conditions, and setting licence fees. IPART considers licence applications, recommends terms or conditions of a licence to the Minister, and audits and enforces licences.

A range of obligations may be imposed by licence conditions or other means for water quality and public health, safety, reliability and continuity, and standards of service and consumer protection.

When considering whether a licence is to be granted and what conditions are to be imposed on such a licence, regard is to be had to the following principles:

- Protection of public health, the environment, public safety and consumers
- Encouragement of competition in the supply of water and the provision of wastewater services
- Ensuring of sustainability of water resources
- Promotion of production and use of recycled water.

A licence may not be granted unless the Minister is satisfied that the applicant has the capacity (including technical, financial and organisational) to carry out the licence activities in a manner that does not pose a risk to public health and has appropriate insurance arrangements.

IPART considers the application, along with any submissions, and provides a report to the Minister recommending whether the licence should be granted and, if so, on what terms or conditions. In doing so, IPART consults with other relevant government agencies and conducts a public process.

Assessment of current approach

Private providers are concerned this process takes too long. For example, Flow Systems contended that:

“Current IPART licensing timeframes are not keeping pace with the speed of land release and best practice licensing timeframes for essential services. Twelve to 18 months for WIC Act license approval is anti-competitive and remains a significant risk to recycled water schemes.

Licensing hurdles have also included a risk-averse approach to fail safe technologies and supplier of last resort. These items should no longer be hurdles as Licensees have proven their viability. Delays in licensing are impacting on the ability of families and people to move into their newly constructed and connected homes in a timely way. WIC Act licensing approval delays can be catastrophic as
developers financially penalize WIC Act utilities if licences are not signed by the Minister within set timeframes.  

IPART now has a target timeline, or ‘clock’, of 34 weeks for assessing licence applications and variations. Flow Systems suggest that WICA licensing should be fast-tracked to enable issuing of licences within three months.

Following a NSW Government review of WICA in 2014, extensive changes were recommended to the current scheme-based licensing regime, including:

- Separating licensing from scheme approval (both design approval and operational approval) and making operational and retail licensing entity-based
- Introducing a 'risk-based' approach to regulation of water infrastructure so that only 'high risk' water infrastructure would be regulated by IPART.

Changes to WICA were passed in October 2014 to provide for new licensing and approvals framework but the relevant Regulation not scheduled to commence until late 2019.

We note that the Minister for Energy and Utilities will submit amendments to the Water Industry Competition (Review) Amendments Act 2014 to streamline licensing arrangements, including a suite of new processes and associated documents related to the following instruments: licences, design approvals and operational approvals applying to licensees, persons constructing infrastructure and infrastructure owners respectively.

While we note the intent, it is not clear at this stage if these changes will adequately address stakeholder concerns about timelines. For this reason, we recommend that DPE, in its role in leading the development of the Metropolitan Water Plans and reviewing the plan every five years, assess and report on whether the amendments to WICA are meeting market needs. This review should occur alongside DPE’s periodic five-yearly review of whether the economic regulatory framework is meeting the four key preconditions necessary to facilitate the uptake of cost-effective water recycling (see recommendation #2).

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105 Flow Systems, Submission to IPART, May 2017
9 Promoting cost-effective water recycling: reflecting and achieving government policy

9.1 Achievement of broader policy objectives

Investment in and use of recycled water is integral to several NSW Government policy objectives relating to balancing supply and demand and promoting liveability.

Aspects of the current economic regulatory framework that impose barriers to cost-effective recycling will frustrate achievement of these policy objectives and should be addressed. Suggestions for reform within the short and longer term are outlined below.

It should also be recognised that some of the major barriers stem not from the economic regulatory framework itself but from government policy constraints imposed on that framework (especially postage stamp pricing and setting developer chargers to zero) and from community/political perceptions on potable reuse. These create biases against the public utilities undertaking recycling rather than opting for BAU solutions, but in many cases it is difficult to address these barriers without then increasing barriers to private sector entry.

In addition, a range of other potential barriers to cost-effective water recycling relate to factors outside of the economic regulatory framework, including the difficulty in coordinating co-funding by potential beneficiaries of recycled water schemes and broader regulatory and policy settings (see discussion below).

In this regard, it is important that the economic regulatory framework (and the economic regulator, IPART) play an appropriate role in addressing these broader issues. While we have identified several areas where IPART may be able to facilitate improvements (for example, by providing more guidance on its expectations regarding cost-benefit analyses to support investment in recycling schemes to deliver broader benefits where customers are willing to pay for these), this should not compromise IPART’s role as economic regulator.

9.2 Regulatory governance

Regulatory governance refers to the various elements that define the roles and responsibilities of the economic regulator, including its specified objectives and functions, powers and extent of jurisdiction, institutional form and appeal and review mechanisms.

While a review of the broader governance arrangements for IPART is beyond the scope of this review, several specific elements of the current governance arrangements that might represent barriers to cost-effective recycling were identified:

- The multiple legislated objectives which IPART is required to pursue
- The arrangements for review of IPART regulatory decisions.
The multiple factors which IPART is required to address

The first issue relates to the multiple legislated objectives IPART is required to pursue (see Box 16) and the lack of clarity in how IPART should make any trade-offs.

Box 19: Factors IPART is required to consider

In making determinations, IPART is required under section 15 of the IPART Act to have regard to the following matters (in addition to any other matters IPART considers relevant):

- Cost of providing the services concerned
- Protection of consumers from abuses of monopoly power in terms of prices, pricing policies and standard of services
- Appropriate rate of return on public sector assets, including appropriate payment of dividends to the government for the benefit of the people of New South Wales
- Effect on general price inflation over the medium term
- Need for greater efficiency in the supply of services so as to reduce costs for the benefit of consumers and taxpayers
- Need to maintain ecologically sustainable development (within the meaning of section 6 of the Protection of the Environment Administration Act 1991) by appropriate pricing policies that take account of all the feasible options available to protect the environment
- Impact on pricing policies of borrowing, capital and dividend requirements of the government agency concerned and, in particular, the impact of any need to renew or increase relevant assets
- Impact on pricing policies of any arrangements that the government agency concerned has entered into for the exercise of its functions by some other person or body
- Need to promote competition in the supply of the services concerned
- Considerations of demand management (including levels of demand) and least cost planning
- Social impact of the determinations and recommendations
- Standards of quality, reliability and safety of the services concerned (whether those standards are specified by legislation, agreement or otherwise).

Being required to have regard to such a long list of potentially conflicting objectives may be particularly problematic when IPART considers issues associated with regulating recycled water services, where issues include promoting effective competition between public utilities and WICA licensees, addressing broader social and environmental impacts that may be attributed to water recycling, and protecting the interests of customers. There are likely to be inherent trade-offs between these various objectives and any regulatory decision will entail placing subjective weightings on these.

In turn, this is likely to give rise to regulatory uncertainty and claims by those affected by IPART’s decisions that it has not appropriately considered each of the specified factors – which may lead to judicial reviews. Indeed, some of the parties affected by IPART’s wholesale pricing determination have made such arguments and openly canvassed the prospect of such reviews.

This also potentially places IPART in the position of having to make policy trade-offs that might be seen as more appropriately a role for government rather than an independent regulator. Most other economic regulators have legislated objectives that provide much greater clarity on their regulatory objectives and tend to give priority to protecting the long-term interests of customers of the regulated entities.
The arrangements for review of IPART regulatory decisions

Economic regulation is a complex and technical undertaking and requires a strong understanding of economic and legal principles and the operation of utility businesses and their operating environments – material errors of fact and discretion can happen.

In this environment, there is a risk that if businesses (public water utilities and new entrants) do not have recourse to an appropriate review (‘checks and balances’) to ensure that errors are corrected, then this could result in:

- Dampered appetite for investment, and/or, new entry
- Increased risk and the required cost of capital on investment
- Reduced rights for consumers (including new entrants seeking wholesale services from incumbents) to challenge decisions, which could lead to other more costly interventions.

At present, IPART’s determinations are subject to judicial review, where a court looks at the lawfulness of the decision-making process. If the court finds that a decision is unlawful, that decision will be quashed and the regulator can be forced to re-make the decision according to the law. Common types of faults in decision-making that could lead to the court invalidating a decision include an error of law, taking into account irrelevant considerations and that the decision was not free of bias or the appearance of bias.

However, merits review of decision-making is not available. An independent merits review considers all the evidence about the merits of a decision and decides whether or not a correct and preferable decision should be made. Some form of merits review is a recognised part of best-practice economic regulation and is in place in Victoria, as well as New Zealand and the United Kingdom. It can:

- Ensure material errors are corrected in a relatively low-cost way and/or reduce the need for most costly interventions
- Provide confidence to new entrants and investors (either as users of wholesale services or providers of retail services) who may see the right to merits review as a fundamental protection against any misuse of the administrative powers vested in regulatory authorities, particularly if WICA licensees have prices subject to IPART regulation (noting that currently IPART has chosen not to regulate)
- Help clarify how complex regulatory rules, and economic and legal principles, should be interpreted and applied,\(^{106}\) and “to drive continuous improvement in regulatory performance”.\(^{107}\)

\(^{106}\) Economic Regulation Authority (ERA) of WA, Submission to the COAG Energy Council’s 2016 review of the Limited Merits Review Regime, 7 October 2016, p2

\(^{107}\) Energy Consumers Australia, Review of Limited Merits Review, ECA submission to Review of LMR Consultation Paper, October 2017, p10
10 Potential reforms to the economic regulatory framework

We have identified reforms to the economic regulatory framework that in our view could help to address some of the barriers to cost-effective water recycling identified in this report and assist in achieving the NSW Government’s priorities to promote cost-effective water recycling and achieve the GSC vision for a more productive, liveable and sustainable Greater Sydney, including the Western Parkland City.

We have classified these reforms into those that could be implemented within the short to medium term (by the end of 2020) and long-term pathways (post 2020). In our view, many of these reforms should be in place by the end of 2020 in line with the NSW Government’s Metropolitan Water Plans, amendments to the Water Industry Competition (Review) Amendments Act 2014 and IPART’s 2020 retail pricing decisions for Sydney Water and Hunter Water.

10.1 Possible short to medium term reforms (by the end of 2020)

We have identified several reforms to the economic regulatory framework that should be capable of implementation in the short to medium term by the end of 2020. Some of these are capable of being advanced before this date.

We have also identified reviews and refinements that could be made to the broader regulatory and policy settings in the short to medium term (see section 11).
Recommendations: NSW Government

By the end of 2020, the Department of Planning and Environment, in its role in leading the development of the NSW Government’s Metropolitan Water Plans, should:

- **Reconfirm** that a key objective of the policy and regulatory framework is to facilitate cost-effective water recycling (where and when the benefits of water recycling to the community exceed the costs), rather than supporting or mandating water recycling projects for their own sake. This objective should be confirmed in the next Metropolitan Water Plan. *(Recommendation 1)*

- **Assess and report on progress** in the next Metropolitan Water Plan towards refining the policy and regulatory framework in line with the recommendations in this report to ensure the framework is meeting four key preconditions necessary to facilitating cost-effective water recycling:
  - Encouraging consideration of the broader costs and benefits of water recycling
  - Providing consistent incentives and signals for public water utility investment in and use of water recycling relative to other services and assets
  - Promoting efficient private sector entry in water recycling
  - Being congruent with government policy settings. *(Recommendation 2)*

- **Commission**, in conjunction with the public and private water utilities, a review of measures to enhance industry ability to coordinate and engage with potential sources of co-funding in water recycling. *(Recommendation 8)*

- **Provide information** to IPART and the broader market regarding expectations of any Ministerial direction to IPART to allow some of the costs of investment in water recycling to be recovered from the broader customer base, and the alignment of any direction with the NSW Government’s priorities as set out in the next Metropolitan Water Plan. *(Recommendation 10)*

- **Amend** the operating licences for the NSW public water utilities (WaterNSW, Sydney Water and Hunter Water) to ensure they develop and publish an annual ‘system limitation report’ that makes key information publicly available on long-term growth servicing plans, system constraints and the costs (or savings) of alleviating (or deferring) constraints in each water and wastewater system in a consistent, timely and accessible way. These ‘system limitation reports’, signed by the Boards of the public water utilities, should reflect integrated long-term planning between agencies, be consistent with the Metropolitan Water Plans and underpin price submissions to IPART and any wholesale prices that may be negotiated with wholesale customers (such as private sector recycled water proponents). *(Recommendation 11)*

- **Develop** a framework for monitoring the ‘system limitation reports’ developed by the public water utilities to ensure they are consistent with the Metropolitan Water Plans (see related Recommendation 11). *(Recommendation 12)*

- **Amend** the operating licences for Sydney Water (Section 3.2) and Hunter Water (Section 2) to require these public water utilities to develop and publish an annual report on ‘when and how’ they have considered cost-effective water recycling in meeting community needs (that is, extending beyond water conservation purposes) as part of their existing licence obligations to prepare a Water Conservation Report. *(Recommendation 15).*
As part of its 2018 recycled water review, IPART should:

- **Amend** the framework for assessing avoidable costs associated with recycled water schemes to ensure any ex-post review considers only information that was available at the time of the decision to invest in water recycling. *(Recommendation 4)*
- **Extend** the framework for assessing avoidable costs associated with recycled water schemes to include stormwater assets owned and operated by the public water utilities. *(Recommendation 5)*
- **Consider** how public water utilities can be given incentives to engage with private sector recycled water proponents that generate avoidable costs, but where there is no wholesale service being provided to the private sector recycled water proponent. *(Recommendation 6)*
- **Extend** the framework for assessing avoidable costs associated with recycled water schemes to allow for the value of external benefits to be recovered from the broader customer base where public water utilities can demonstrate customer willingness and capacity to pay. *(Recommendation 7)*
- **Provide** greater regulatory guidance on the circumstances in which it would expect co-funding to be received for water recycling schemes when setting prices for recycled water. *(Recommendation 9)*
- **Amend** its *Guidelines for Water Agency Pricing Submissions* to strengthen the regulatory guidance on ‘when and how’ the public water utilities should undertake a ‘Regulatory Investment Test’ to identify the ‘preferred investment option’ (including the potential for water recycling) when making major investment decisions to meet an identified need – similar to the guidance published by the Australian Energy Regulator under the National Electricity Rules. The Guidelines should also indicate how any ‘Regulatory Investment Test’ should support business cases and regulatory proposals provided to IPART. *(Recommendation 14)*
- **Strengthen** the regulatory guidance it provides about the scope and form of retail price regulation of recycled water provided by public water utilities (including principles and decision-making processes for establishing this form of price regulation). *(Recommendation 16)*
- **Strengthen** the regulatory guidance it provides about the scope and form of retail price regulation of recycled water provided by private WICA licensees might occur (including principles and decision-making process for establishing this form of price regulation). *(Recommendation 26)*
- **Provide** regulatory guidance on what may be classified as a recycled water asset in the context of cost-effective catchment-wide planning solutions (including assets used either as a pathway to or end-point for some form of potable reuse) and how expenditure associated with these assets will be treated with regards to cost recovery. *(Recommendation 17)*
- **Review** the pricing principles for the structure of recycled water prices to ensure they promote economically efficient outcomes, including promoting cost-effective integrated catchment scale land use and water cycle planning solutions. *(Recommendation 18)*
- **Review** the developer charges formula and methodology for recycled water to ensure it remains fit for purpose and reflects current common industry assumptions. *(Recommendation 20)*
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<th>As part of its 2020 Sydney Water and Hunter Water retail price reviews, IPART should:</th>
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<td>● Evaluate the merits of publishing annual market guidance on the range of long-run marginal cost (LRMC) estimates for each water (and wastewater) supply area, drawing on information contained in the annual ‘system limitation reports’ published by the public water utilities (see related Recommendation 11). <em>(Recommendation 22)</em></td>
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<td>● Provide guidance to stakeholders on how it intends in practice to apply aspects of its proposed wholesale pricing methodology (‘retail-minus’ approach) when setting prices for wholesale services to customers with a recycled water plant. <em>(Recommendation 27)</em></td>
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<th>As part of its annual role in monitoring operating licence compliance of the public water utilities, IPART should:</th>
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<td>● Continue to set the regulated asset base RAB for regulated services based on the ‘line-in-the-sand’ to which new assets are added (subject to prudency and efficiency) and depreciation (and disposals) removed. IPART’s approach to setting the RAB should establish that the revenue requirement is fit for purpose and is not a barrier to cost-effective water recycling. <em>(Recommendation 21)</em></td>
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<td>● Evaluate the merits of adopting a more light-handed form of price control, such as a tariff basket used in regulation of monopoly services in other jurisdictions, where prices can be updated annually where there are material changes in the operating environment (such as capacity constraints or government policy), subject to clear pricing principles and pricing constraints. <em>(Recommendation 23)</em></td>
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<td>● Set usage charges for water and wastewater (for those customers that pay wastewater usage charges) with regard to the long-run marginal cost (LRMC) of providing services to give better signals regarding emerging capacity constraints. This includes ensuring the estimated LRMC of supply reflects the ‘system limitation reports’ published by each of the public water utilities (see related Recommendation 11). <em>(Recommendation 24)</em></td>
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<td>● Evaluate the merits of removing the discharge factor applying to wastewater service charges <em>(Recommendation 25).</em></td>
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<td>● Ensure that the ‘system limitation report’ published by each of the public water utilities is consistent with the framework developed by DPE, robust and fit for purpose (see related Recommendation 11). <em>(Recommendation 13)</em></td>
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10.2 Possible longer-term reforms (post 2020)

We have also identified potential reform options to the economic regulatory framework that may not be feasible in the short to medium term but that could be considered over the longer term (post 2020), subject to broader consultation and evaluation of the costs and benefits of these reform options.

**Recommendation**

28. DPE, in conjunction with other NSW Government agencies, should review the IPART Act to ensure it is keeping pace with best practice economic regulation and changes in the sectors it regulates (including the increasing role of private sector water recycling).

10.3 Framework for market participation and retail price reform

Perhaps the most fundamental aspect of retail pricing that represents a barrier to cost-effective water recycling is the policy of postage stamp pricing, whereby the same kinds of customers within the same area of operation are charged the same price for the same service. As discussed in section 7, postage stamp pricing may mask areas where recycled water solutions could be a competitive solution and may therefore provide a bias towards traditional solutions. It also creates challenges in establishing wholesale charging arrangements that promote efficient new entry without undermining the uniform pricing regime at retail level.

Phased introduction of cost-reflective pricing, potentially including the introduction of location based charges (that is, the removal of postage stamp pricing) would significantly improve the incentives for the uptake of cost-effective water recycling.

However, the removal of postage stamp pricing would represent a major change to the current arrangements and could have significant distributional and other impacts, which would need to be fully considered and assessed.

As set out in section 11.1, we recommend the NSW Government request IPART to review and report on potential changes to the framework for competition in the NSW urban water market by the end of 2020, including postage stamp pricing, to improve the efficiency of water, wastewater and stormwater services across the Greater Sydney, Lower Hunter and Central Coast regions. This should identify options to create value for water customers and the broader metropolitan NSW community.
10.4 Rescind NSW Government Direction to set water and wastewater developer charges to zero

As discussed in section 6.5, there is a strong argument for the NSW Government to consider rescinding the 2008 Direction to set specified water, wastewater and stormwater developer charges for Sydney Water and Hunter Water to zero. This would remove a clear bias against recycled water and new entrants and, more broadly, would provide locational price signals.

A possible alternative would be to set recycled water developer charges also to zero if water/wastewater developer charges remain at zero. This would remove the distortion between recycled water and other services but not the disadvantage for new entrants. Moreover, it would further blunt locational price signals and may reduce pressure for price reform.

As set out in section 6.5.2, we recommend that DPE review and report on the costs and benefits of a continuation of the 2008 Direction (Recommendation 19).

IPART is currently reviewing the developer charges determinations for both the ‘active’ and ‘inactive’ water, wastewater and stormwater developer charges in the event the Government decides to change the 2008 Direction. IPART’s preliminary view in its Issues Paper is for no significant change to the developer charges methodology, although we note some stakeholders have flagged the scope for greater simplicity and transparency.

Views of developers and other stakeholders on whether the proposed methodology addresses key perceived problems with the previous approach are likely to be critical.

10.5 Regulatory governance reforms

While a review of the broader governance arrangements for IPART is beyond the scope of this review, specific elements of the current governance arrangements that might represent barriers to cost-effective recycling were identified:

- The multiple legislated objectives that IPART is required to pursue, which can cause confusion among stakeholders as to the appropriate weighting of these objectives
- The arrangements for review of IPART regulatory decisions, including the merits of alternative review mechanisms.

Given that the IPART Act dates back to 1992, there may be a case for a broader review of this Act to ensure it is keeping pace with best practice economic regulation and changes in the sectors it regulates (including the advent of and increasing private sector entry in recycled water). Reviewing the Act to ensure it continues to be fit for purpose is in line with best practice regulation and is likely to encourage efficient investment in, and use, of water-related services over time.
**Recommendation 28:** DPE, in conjunction with other NSW Government agencies, should review the IPART Act to ensure it is keeping pace with best practice economic regulation and changes in the sectors it regulates (including the increasing role of private sector water recycling).
11 Other potential regulatory and policy barriers

While the focus of this review is on the economic regulatory framework, participants raised a range of other potential barriers relating to broader regulatory and policy settings including:

- Market structure dominated by large integrated public utilities
- Regulatory, planning or community perceptions that may restrict the use of recycled water
- Aspects of environmental regulation and water recycling approvals processes
- Planning processes that favour traditional centralised solutions.

This section identifies a number of other potential barriers relating to broader regulatory and policy settings. Some of these should be capable of being addressed in the short to medium term, while others have a longer-term horizon (post 2020).

**Recommendations**

29. By the end of 2021 (and then every five years thereafter), DPE should request IPART to review and report on potential changes to the framework for competition in the NSW urban water market, including postage stamp pricing, to improve the efficiency of water, wastewater and stormwater services across the Greater Sydney, Lower Hunter and Central Coast regions.

30. By the end of 2020, DPE, in its role in leading the development of the Metropolitan Water Plans, should seek to progress the action proposed in the 2017 Metropolitan Water Plan to pursue and publicly report on engagement with the community on whether highly treated recycled water can be considered as an option for drinking water supply in the future. DPE should also review the appropriateness of other restrictions on the use of recycled water raised in this review.

31. By the end of 2020, DPE, in its role in leading the development of the Metropolitan Water Plans, should review the potential barriers relating to environmental regulation raised in this review, including the extent to which environmental regulation of the urban water sector is proportionate, flexible and efficient – in line with best practice principles.

32. By the end of 2020, DPE, in its role in leading the development of the Metropolitan Water Plans, should review the planning and related issues raised during this review, including the BASIX mechanism.

11.1 Market structure

The current framework for market participation is one which has been ‘grafted on’ to pre-existing vertically integrated supply models. Traditionally, water and wastewater supply has been viewed as a natural monopoly network requiring a single supplier – and hence economic regulation of that monopoly supplier.
In recognition of the incumbency advantages of the public utilities, we have made several recommendations, particularly in relation to imposing obligations on the public utilities to provide consistent and timely publicly available information on drinking water and wastewater growth servicing plans and system constraints and associated costs.

Some stakeholders identified specific aspects of the current market arrangements that they considered represented barriers to cost-effective recycling, including:

- Public utilities have legislated obligations to service growth areas.
- Procurement models for local government and others do not require government and developers to demonstrate they have investigated alternative water infrastructure solutions to achieve best overall community outcomes.
- Existing frameworks do not provide a clear framework for competition or fully support competition as envisaged under WICA.

The question of whether changes should be made to the market and industry structure itself is beyond the scope of this review. However, we note that several stakeholders have suggested that more fundamental changes should be considered. For example, Flow Systems suggested that the NSW Government should consider the establishment of an independent Water Market Operator to establish a framework to transition from existing centralised approaches to a new competitive IWCM framework, including:

- Defining IWCM and how it applies to management of new precincts
- Aligning precinct water management with GSC District Plans
- Rules of engagement, logistic framework, information and guidance for councils, stakeholders and industry.

However, Flow Systems provided few details about the precise functions of such an independent market operator and how such a market would work, although it did refer to the gas market reforms in NSW in the early 2000s.

Other proposed initiatives included:

- Removing the public utilities’ obligations to service new growth to allow for alternative providers to bid for water management and servicing solutions and services in new growth areas
- Establishing new procurement processes for IWCM and recycled water provision for councils, developers and others and require them to demonstrate that they have investigated alternative water solutions, along with public utility solutions, and then choosing the most suitable servicing strategy.

The current framework for market participation reflects the Government’s intent to promote competition to service new greenfield or infill developments (‘competition for the market’) rather than full retail contestability across a public utility’s entire region (‘competition in the market’).
Nevertheless, there may be merit in further review of the market structure for urban water in metropolitan NSW in light of recent market and technological developments. In doing so, careful thought would need to be given to ensure appropriate market-based design rather than simply adopting models from other sectors.

More immediately, consideration will need to be given to the market structure and procurement arrangements for delivering the water-related and other infrastructure requirements for the preferred integrated land use and water management strategy for South Creek. This could potentially involve innovative approaches using South Creek as a pilot study.

Recommendation 29: By the end of 2021 (and then every five years thereafter), DPE should request IPART to review and report on potential changes to the framework for competition in the NSW urban water market, including postage stamp pricing, to improve the efficiency of water, wastewater and stormwater services across the Greater Sydney, Lower Hunter and Central Coast regions.

11.2 Restrictions on the use of recycled water

Some stakeholders suggested that restrictions on the use of recycled water due to regulation, planning or community perceptions might act as a barrier to the uptake of cost-effective recycled water. Perhaps the most significant of these is that to date, use of recycled water has been limited to non-potable uses. This is not necessarily a regulatory barrier: public health and environmental regulation does not prohibit the use of recycled water for potable purposes if it complies with ADWQ guidelines (Australian Guidelines for Water Recycling: Augmentation of Drinking Water Supplies 2008) and related approvals. The barrier is more one of community/political acceptance.

The underlying economics of recycled water are heavily affected by permitted end uses. For example, adoption of indirect potable reuse would have a major impact on displaced volumes of potable water and wastewater disposal and treatment. This would lead to much larger avoided costs in upstream potable water and downstream wastewater networks, and avoid the need for costly investment in third pipe reticulation. It would also lead to much larger social and environmental benefits (such as reduced treated wastewater discharges to the environment).

Regional water planning that excludes transparent exploration of potable reuse compromises the cost-effectiveness of recycled water now and in the future and may lead to BAU solutions being adopted where a recycled water scheme would have higher overall community benefits.

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108 NSW Health does not have a published policy statement on indirect potable reuse, but advises that a comprehensive (quantitative) human health risk assessment would be necessary to determine if a scheme could be safely implemented (as per the Australian Guidelines). NSW Health has general powers under the Public Health Act to issue orders to suppliers of water to ensure public health risks are effectively managed.
This suggests that there may be significant payoffs – in terms of facilitating cost-effective water recycling – from actively pursuing “engagement with the community on whether highly treated recycled water can be considered as an option for drinking water supply in the future”.

Other restrictions on the use of recycled water identified as potential barriers included categorisation of high quality recycled water as a pollutant for discharge to waterways, failure to mandate recycled water connection in new developments and use of recycled water for firefighting.

**Recommendation 30:** By the end of 2020, DPE, in its role in leading the development of the Metropolitan Water Plans, should seek to progress the action proposed in the 2017 Metropolitan Water Plan to pursue and publicly report on engagement with the community on whether highly treated recycled water can be considered as an option for drinking water supply in the future. DPE should also review the appropriateness of other restrictions on the use of recycled water raised in this review.

### 11.3 Environmental regulation

Several stakeholders suggested that outdated and/or inflexible environmental regulation and related approvals were a significant barrier to cost-effective water recycling. Examples of these barriers included:

- High quality treated recycled wastewater discharged to rivers or waterways is required to be licensed as pollutant, despite its categorisation as suitable for ‘unrestricted irrigation’ under the Australian Guidelines for Waste Recycling
- Absence of a ‘zero’ ocean outfall target
- Potential gaps and overlaps in environmental planning approvals.

While a review of environmental regulation is beyond the scope of this review, we note that meeting the NSW Government’s objectives to facilitate cost-effective recycling will require that environmental and related approvals keep pace with technological and market developments.

Delivering value to the NSW community, including development in the Western Sydney Parkland City, will also require environmental regulation that is proportionate, flexible and efficient – that is, where it promotes outcomes in which the benefits outweigh the costs – in line with best practice environmental regulation.

For example, while a zero target on ocean outfalls and or wet weather overflows would clearly improve the financial viability of recycled water schemes, such a policy would need to be evaluated on its merits in cost-benefit terms. In other words, adopting a zero target for ocean outfalls could be justified only if the benefits to society from such a

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109 This is one of the proposed actions of the 2017 Metropolitan Water Plan (p31).
11.4 Planning and related regulation

Several issues relating to strategic planning and related regulation and planning approvals were raised during this review as potential barriers to cost-effective water recycling. These concerns raise key questions as to how to create a policy environment that ensures the best outcomes, as envisioned in strategic planning processes, emerge in practice.

One set of issues related to strategic planning for greenfield development or brownfield redevelopment, which has a major impact on how participants operate in the market. The 2017 Metropolitan Water Plan review found that:

“Currently there is a lack of alignment between land use planning and water servicing strategies. In addition, responsibility for the delivery of water, wastewater and stormwater services is split between water utilities, state agencies and local governments. This makes it difficult to achieve integrated water solutions.”

Some concerns were also raised about whether alternative IWCM solutions were adequately considered in strategic planning processes. It was also noted that the Metropolitan Water Plan, Lower Hunter Plan and GSC Regional Plans have no statutory authority.

New entrants are also concerned that water recycling opportunities are foreclosed by their not having a ‘seat at the planning table’ and claimed that incumbency is entrenched into strategic and statutory planning processes. There were suggestions that there was no provision for private utilities to compete for the delivery of the Green Grid and Blue Grid.

One issue raised by both public and private water suppliers related to a failure to mandate recycled water. The public utilities observed that it was up to individual councils to mandate requirement for water recycling (such as third pipe systems) in their development consent conditions through Development Control Plans. They observed that lack of clear obligations may lead to stranded assets – or adoption of a BAU approach to avoid this risk. For their part, private utilities proposed that the NSW

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Government should mandate recycled water and IWCM as minimum standards for new growth and compel houses to connect through BASIX.

At the same time, there was some recognition that automatic mandating can also lead to recycled water schemes which are not cost-effective. For example, in its submission to this review Sydney Water suggested that:

“...The integrated nature of water cycle management and planning makes it difficult to take a view of the value of water recycling “on average”, and suggests policy-makers should avoid untargeted recycled water promotion schemes. For example, any use of subsidies or targets to increase the rollout of recycled water may get more projects built, but without regard to whether each individual project is economic. We therefore strongly advise against generic targets and subsidies to drive recycled water investment. This is likely to lead uneconomic projects and a range of unintended consequences.

A much better approach is to tackle directly “undue” barriers where feasible. This will encourage and allow projects to get built (or expanded) that are currently unduly hampered by policy considerations, but which are likely to provide net benefits for the community…. The point is, any one-size-fits-all approach that attempts to increase recycled water uptake is unlikely to be economically efficient.”

This suggests that mandating recycled water should be targeted – that is, where detailed cost-benefit analysis has demonstrated it to be the optimal solution – rather than across-the-board.

Some participants commented on aspects of BASIX (which requires residential developments to use 40% less potable water than pre-BASIX benchmarks through rainwater tanks or recycled water schemes). In particular, it was suggested that BASIX:

- May not meet IPART’s definition of ‘mandated’ schemes because there are other options (such as rainwater tanks) to meet the target
- May not provide a robust assessment of broader cost and benefits of rainwater tanks compared to recycled water
- May set the target too low (with suggestions that there should be a higher target of 60% reduction in potable water use relative to the pre-BASIX benchmark).

Private utilities were also concerned that:

- IWCM is defined as high impact for development consents and thus is prohibited in residential and mixed-use land zones.
- WICA licensees are not on a level playing field, as they do not have the same development without consent powers of enforcement.

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111 Sydney Water, 2017 Sydney Water submission to INSW Recycled Water Review
While an assessment of these planning and related regulatory arrangements is beyond the scope of this review, we observe that these arrangements may result in inefficient (too much or too little) investment in water recycling if they:

- Do not provide an equal opportunity for consideration of decentralised solutions relative to ‘traditional’ centralised public water utility solutions

- Do not provide certainty by mandating connection – with the qualification that this should only be applied where there has been detailed cost-benefit analysis to demonstrate IWCM (in this instance, recycled water) is the optimal solution (that is, not in untargeted manner).

- Do not provide for a level playing field between public water utilities and new entrants.

**Recommendation 32:** By the end of 2020, DPE, in its role in leading the development of the Metropolitan Water Plan, should review the planning and related issues raised during this review, including the BASIX mechanism.
## Glossary

<table>
<thead>
<tr>
<th>Pricing principle</th>
<th>Rationale and Implication</th>
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<tr>
<td>Access regime</td>
<td>A regulatory framework which provides an avenue for firms to use certain infrastructure services owned and operated by others when commercial negotiations regarding access are unsuccessful (typically the ability to access the use of infrastructure services, or the price at which such access is provided).</td>
</tr>
<tr>
<td>Arbitrage</td>
<td>Buying an asset (or supplying a service) in one market and simultaneously selling an identical asset (or service) in another market at a higher price.</td>
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<tr>
<td>Australian Guidelines for Water Recycling: Augmentation of Drinking Water Supplies 2008 (ADWQ Guidelines)</td>
<td>Guidelines that deal with the use of recycled water to augment drinking water supplies (potable reuse)</td>
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<tr>
<td>Avoidable costs</td>
<td>The cost a business would avoid over the long run if it no longer produced a defined service</td>
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<tr>
<td>BASIX mechanism (Building Sustainability Index)</td>
<td>NSW government policy introduced in 2004 to regulate the energy and water efficiency of residential buildings (meeting thermal performance standards, reducing greenhouse gas emissions from operational energy use, reducing potable water consumption</td>
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<tr>
<td>Business as usual (BAU) services</td>
<td>The normal execution of standard functional operations within an organisation.</td>
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<tr>
<td>Building block costs</td>
<td>The costs associated with the building-block model, wherein the allowed revenue of the regulated firm is equal to the sum of underlying components or building blocks (return on capital, depreciation, operating expenditure)</td>
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<tr>
<td>‘Celebrations’ of water</td>
<td>Features and qualities of an area that promote water in the landscape (e.g. fountains) to improve the visual and recreational amenity of developments.</td>
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<tr>
<td>Cherry-picking</td>
<td>Where firms seek to take advantage of cross-subsidies by supplying low-cost customers and not supplying high cost customers. New market entrants may out-compete incumbent retail providers in low cost areas because of the difference between the cost of service wholesale price and regulated postage stamp retail prices.</td>
</tr>
<tr>
<td>Competition for the market</td>
<td>Allowing firms to compete for the right to provide water and wastewater services to customers in a defined geographic area (e.g. competition to service new greenfield or infill development), as distinct from competition in the market (full retail contestability)</td>
</tr>
<tr>
<td><strong>Contestable services</strong></td>
<td>Services provided in a market where there is actual or potential competition (entry costs are low or can be recovered on exit by salvaging the equipment and reselling or re-using it).</td>
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<tr>
<td><strong>Cost-effective water recycling</strong></td>
<td>Water recycling schemes which generate benefits to the community which are at least equal to their costs</td>
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<td><strong>Cost-reflective prices</strong></td>
<td>Prices reflecting the costs of providing the service to consumers</td>
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<tr>
<td><strong>Community Service Obligation (CSO)</strong></td>
<td>A Community Service Obligation arises when a government specifically requires a public enterprise to carry out activities relating to outputs or inputs which it would not elect to do on a commercial basis, and which the government does not require other businesses in the public or private sectors to generally undertake, or which it would only do commercially at higher prices.</td>
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<tr>
<td><strong>Declared government monopoly services</strong></td>
<td>A service supplied by a government agency, declared to be a government monopoly service under s 4 Independent Pricing and Regulatory Tribunal Act 1992 (NSW)</td>
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<tr>
<td><strong>Developer charges</strong></td>
<td>Upfront charges from utilities paid by developers (e.g. Sydney Water and Hunter Water) to recover part of the infrastructure costs incurred in service new developments</td>
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<tr>
<td><strong>Diffuse source pollution</strong></td>
<td>Pollution that originates from many sources, such as runoff from agricultural land</td>
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<tr>
<td><strong>Direct potable reuse</strong></td>
<td>Mixing treated wastewater or stormwater directly into drinking water supplies</td>
</tr>
<tr>
<td><strong>Dynamic efficiency</strong></td>
<td>Dynamic or investment efficiency is concerned with ensuring that, over time, optimal levels and types of investment occur.</td>
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<tr>
<td><strong>Efficient Component Pricing Rule (ECPR)</strong></td>
<td>A methodology that addresses access pricing by emphasizing the opportunity cost of the integrated access provider. According to this rule, the wholesale price is equal to the incumbent’s retail press less the incumbent’s avoided cost</td>
</tr>
<tr>
<td><strong>End-use customers</strong></td>
<td>Retail residential and non-residential customers that purchase water supply and/or sewerage services for purposes other than on-supply</td>
</tr>
<tr>
<td><strong>Environment protection licences (EPLs)</strong></td>
<td>Licence issued by the Environmental Protection Authority to the owners or operators of industrial premises, relating to pollution prevention and monitoring, and cleaner production through recycling and reuse and the implementation of best practice</td>
</tr>
<tr>
<td><strong>Equivalent tenements (ET)</strong></td>
<td>A measure of the load a property places on the system, such as the wastewater system, and used to calculate the service charge</td>
</tr>
<tr>
<td><strong>External benefits</strong></td>
<td>Benefits conferred on parties outside of the transaction</td>
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<tr>
<td><strong>Fixed costs</strong></td>
<td>Costs incurred by a firm in the short-run, which are independent from a change in the level of output produced</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Growth Servicing Plans</td>
<td>Plans prepared by the public water utilities to guide the development industry, local councils and the NSW Government on timing for the delivery of water-related services on deliver water-related infrastructure to service urban growth over the next five years.</td>
</tr>
<tr>
<td>Homogeneous products</td>
<td>Products that share the same characteristics.</td>
</tr>
<tr>
<td>Indirect potable reuse</td>
<td>When treated wastewater/stormwater is added to a water body, such as a dam, with the intention that it will mix with other sources and be used to supply drinking water.</td>
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<tr>
<td>Integrated water cycle management (IWCM)</td>
<td>Management approaches to supplying or managing water that considers all aspects of the water cycle. They include reusing wastewater or stormwater, or managing stormwater using Water Sensitive Urban Design (WSUD)</td>
</tr>
<tr>
<td>Joint costs</td>
<td>Costs incurred in a joint process, wherein one input yields multiple outputs</td>
</tr>
<tr>
<td>Judicial review</td>
<td>Court examination of the lawfulness of the decision-making process of a regulator's determination</td>
</tr>
<tr>
<td>Light-handed forms of price control</td>
<td>Less restrictive measures of price regulation (e.g. development of guidelines or a tariff basket) designed to reduce information requirements and high compliance costs, while introducing clear incentives for good performance.</td>
</tr>
<tr>
<td>Liveability</td>
<td>The extent to which a place meets the social, environmental and economic needs of its inhabitants</td>
</tr>
<tr>
<td>Location-based cost-of-service</td>
<td>Pricing approach that reflects the cost associated with providing services to different locations (i.e. lower prices in low cost areas and higher prices in high cost areas)</td>
</tr>
<tr>
<td>Long-run marginal cost (LRMC)</td>
<td>The cost of meeting an incremental change in demand assuming all factors of production can be varied.</td>
</tr>
<tr>
<td>Long-run incremental cost (LRIC)</td>
<td>All the costs of services provided within an increment (with the increments usually defined as the whole group of services using the core network).</td>
</tr>
<tr>
<td>Margin squeeze test</td>
<td>Test used to ensure that the difference between the access price and final retail price be sufficient for a reasonably efficient downstream competitor to earn a normal profit A large enough gap between the two provides sufficient room for profitable entry and expansion, while too narrow a gap ‘squeezes’ entrants’ margins to such an extent that they may not be able to recover their retail costs plus a reasonable rate of return, and would be foreclosed from the market</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Meter size</td>
<td>Meter size measures water consumption by recording the flow rate and water pressure. The meter size determines the service charge for residential and non-residential customers.</td>
</tr>
<tr>
<td>Metropolitan New South Wales</td>
<td>Geographic region covering Sydney, the Illawarra and Blue Mountains.</td>
</tr>
<tr>
<td>Metropolitan Water Plan</td>
<td>The NSW Government’s plan to ensure a secure and sustainable supply of water to meet the needs of the people and environment of the Greater Sydney region.</td>
</tr>
<tr>
<td>National Rules</td>
<td>Body of rules governing the operation of the Australian electricity market.</td>
</tr>
<tr>
<td>Negotiate/arbitrate regime</td>
<td>This approach allows the infrastructure owner and user/s to negotiate a commercial agreement, with binding arbitration available in the event parties are unable to reach commercial agreement.</td>
</tr>
<tr>
<td>Net facilitation costs</td>
<td>The additional costs incurred by a wholesale service provider to supply services to a wholesale customer less any cost saving to the wholesale service provider as a result of the wholesale customer’s activities.</td>
</tr>
<tr>
<td>Non-contestable service</td>
<td>A service which is provide under conditions of monopoly supply with no prospect of entry by competitors.</td>
</tr>
<tr>
<td>Non-market benefits</td>
<td>Benefits conferred on parties outside of the market, (e.g. cleaner waterways, healthier communities, reduced ocean outfall discharges and liveability)</td>
</tr>
<tr>
<td>Non-potable water</td>
<td>Water that has not been treated such that it is safe for drinking, but may still be used for other purposes.</td>
</tr>
<tr>
<td>Out-of-sequence development</td>
<td>Development not identified in a wholesale provider’s growth servicing plan.</td>
</tr>
<tr>
<td>Postage stamp pricing</td>
<td>A system of pricing where customers are charged the same price for the service across a defined area regardless of differences in cost of supplying water and/or wastewater services to customers in different locations on the network.</td>
</tr>
<tr>
<td>Potable top-up</td>
<td>Potable water used to supplement supply of recycled water where there is a shortfall in recycled water produced by the treatment plant.</td>
</tr>
<tr>
<td>Potable water</td>
<td>Water that is safe to drink or use for food preparation.</td>
</tr>
<tr>
<td>Productive efficiency</td>
<td>Resources are allocated such that the organisation’s output is maximised for a given cost, or that cost is minimised for a given output.</td>
</tr>
<tr>
<td>Reasonable efficient competitor (REC) costs</td>
<td>Costs associated with a benchmark firm that is efficient given its scale, but may lack some scale economics enjoyed by the incumbent utility in servicing retail customers.</td>
</tr>
<tr>
<td>Recycled water</td>
<td>Water that has been treated to enable its use for certain industrial, commercial and/or household applications, but is not intended to</td>
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<tr>
<td>Term</td>
<td>Description</td>
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<tr>
<td>Regulated asset base (RAB)</td>
<td>The assets on which regulated firms like Sydney Water and Hunter Water are permitted to earn a return on and of capital in their regulated prices</td>
</tr>
<tr>
<td>Retail-minus approach</td>
<td>An approach to setting access prices under which the access prices are explicitly set based on the end-user or retail prices of the corresponding financial services, with a discount (or minus)</td>
</tr>
<tr>
<td>Retail price determinations</td>
<td>2016 Retail Determinations set prices for services (water, sewerage and stormwater) supplied to properties (as distinct from households) for Sydney Water and Hunter Water</td>
</tr>
<tr>
<td>Ring-fencing</td>
<td>Separating specific components of production or costs from regulated activities</td>
</tr>
<tr>
<td>Riparian zone</td>
<td>Land next to a river or stream (e.g. the corridor of land in which a stream functions)</td>
</tr>
<tr>
<td>Scheme specific review</td>
<td>Review tailored to a particular scheme based on its individual characteristics</td>
</tr>
<tr>
<td>Service charges</td>
<td>Charges for the provision of a specific service which do not vary with the level of service consumed</td>
</tr>
<tr>
<td>Short-run marginal cost</td>
<td>The additional cost of producing an additional unit of a good or service the cost, holding capacity constant.</td>
</tr>
<tr>
<td>South Creek catchment</td>
<td>Area of land encompassing most of the Cumberland Plain of Western Sydney.</td>
</tr>
<tr>
<td>Stormwater</td>
<td>Rainwater that has fallen onto roads or roofs, which may result in erosion of urban areas if not effectively managed</td>
</tr>
<tr>
<td>Stormwater management</td>
<td>Services that provide for an effective management of stormwater runoff</td>
</tr>
<tr>
<td>Stormwater harvesting</td>
<td>Collecting, treating, storing and using stormwater runoff from urban areas</td>
</tr>
<tr>
<td>Stranded asset</td>
<td>An asset that has suffered from unanticipated or premature write-down</td>
</tr>
<tr>
<td>Sunk costs</td>
<td>Cost incurred by entity that cannot be recovered</td>
</tr>
<tr>
<td>System limitation reports</td>
<td>Report published annually by the Distribution Network Service Providers in accordance with the National Electricity Rules providing key information about distribution system constraints and associated costs</td>
</tr>
<tr>
<td>Third-party access</td>
<td>Situations where a third party wishes to obtain access to a bottleneck facility (a point on a network through which all service products must</td>
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</tbody>
</table>
pass to reach the end consumers), to be able to provide goods and services to customers in upstream or downstream markets.

<table>
<thead>
<tr>
<th><strong>Third pipe reticulation systems</strong></th>
<th>Delivering highly treated, recycled water to residential areas through a separate pipe for garden irrigation, toilet flushing, washing machines, car washing and surface cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wastewater</strong></td>
<td>Water that has been affected by human use and must be treated before reuse (e.g. toilets, showers, baths, sinks, laundries and industrial processes)</td>
</tr>
<tr>
<td><strong>Water sensitive urban design (WSUD)</strong></td>
<td>Approach aimed at designing urban areas to make use of stormwater and increase water consumption efficiency in urban and rural areas (e.g. rehabilitating wetlands and natural waterways, increased use of permeable surfaces)</td>
</tr>
<tr>
<td><strong>Water Smart Cities program</strong></td>
<td>Policy introduced by NSW Government focused on integrating water cycle solutions and cost-effective water recycling to reduce demand for water</td>
</tr>
<tr>
<td><strong>Wholesale service</strong></td>
<td>The supply of water by a wholesale service provider (e.g. Sydney Water, Hunter Water) to any entity other than the wider customer base</td>
</tr>
<tr>
<td><strong>WICA licensees</strong></td>
<td>Alternative providers of water (private utilities, developers and large end-customers) that hold a licence pursuant to the <em>Water Industry Competition Act 2006</em> to invest in recycled water schemes</td>
</tr>
<tr>
<td><strong>Willingness to pay (WTP)</strong></td>
<td>The maximum price at or below which a consumer will buy one unit of a product</td>
</tr>
</tbody>
</table>
## Appendix A: Economic regulation and incentives for water recycling

### Table 5: Economic regulatory instruments influencing water recycling in metropolitan NSW

<table>
<thead>
<tr>
<th>Role / function</th>
<th>Instrument</th>
<th>Governance</th>
<th>Current status</th>
<th>Relevance to recycled water</th>
</tr>
</thead>
</table>
| Retail price regulation | - Sets maximum prices for water, wastewater and stormwater drainage services and some recycled water charges (such as Rouse Hill) | ● IPART’s Determinations of prices for Sydney Water Corporation\(^{112}\)  
● IPART’s Determinations of prices for Hunter Water Corporation\(^{113}\) | - Prices apply until 30 June 2020 | ● Prices influence whether Sydney Water and Hunter Water invest in traditional water and wastewater or alternative servicing solutions (incl. recycling wastewater, stormwater harvesting etc.).  
● Prices influence demand for recycled water by end-users  
● Setting of water, wastewater and some recycled water prices influences the economic and financial viability of recycled water provided by WICA licensees (as well as councils that may not be licensed) |
| | - Sets the guiding principles for the setting of metropolitan water and wastewater retail | ● IPART’s review of Price Structures for Metropolitan Water Utilities\(^{114}\) | - Prices apply until 30 June 2020 | - Guiding principles affect the setting of metropolitan water and wastewater retail price structures and levels (see above), which in turn influences the economic and financial viability of recycled water. |

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<table>
<thead>
<tr>
<th>Role / function</th>
<th>Instrument</th>
<th>Governance</th>
<th>Current status</th>
<th>Relevance to recycled water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price structures and levels</td>
<td></td>
<td>1992 (the IPART Act)</td>
<td>Residential water and wastewater service charges should be standard for all customers, unless there are material cost differences.</td>
<td>Financial viability of recycled water provided by WICA licensees (as well as councils that may not be licensed).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The wastewater usage charge should apply to non-residential customers over a particular consumption threshold, and be set with reference to (but not necessarily equal to) the short-run marginal cost (SRMC) of supply.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The total revenue collected from non-residential customers should reflect the costs incurred in servicing them, and customers imposing similar costs should pay similar charges.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sets the guiding principles for setting maximum recycled water prices</td>
<td>IPART Pricing arrangements for recycled water and sewer mining Sydney Water Corporation, Hunter Water Corporation, Gosford City Council and Wyong Shire Council</td>
<td>Section 11 of the IPART Act</td>
<td>Guiding principles include:</td>
<td>Prices influence whether Sydney Water and Hunter Water invest in traditional water and wastewater or alternative servicing solutions (incl. recycling wastewater, stormwater harvesting etc.).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IPART has signalled that it intends to review its 2006 Guidelines on the regulation of recycled water prices &amp; developer charges in 2018-19 post the INSW review</td>
<td>Prices influence demand for recycled water by end-users.</td>
</tr>
<tr>
<td>Provides IPART’s guidance on assessment for recycled water</td>
<td>IPART recycled 2006 water</td>
<td>Section 15 of the IPART Act</td>
<td>Sets the guiding principles (including ‘user pays principle’) for setting maximum recycled water</td>
<td>The guidelines influence the risk (incl. whether IPART revises the approved avoidable costs as part of</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role / function</th>
<th>Instrument</th>
<th>Governance</th>
<th>Current status</th>
<th>Relevance to recycled water</th>
</tr>
</thead>
<tbody>
<tr>
<td>water scheme avoided costs that may be recovered through water and wastewater charges</td>
<td>avoidable cost guidelines(^{116}) IPART 2011 recycled water avoidable cost assessment process guidelines(^{117})</td>
<td>prices-including full direct costs + share of any indirect or joint costs to be recovered by the regulated public utilities from users of the recycled water scheme (i.e. not from water and wastewater postage stamp price customers), except where:</td>
<td>its ex-post prudency test) to public utilities from investing in recycled water schemes and the potential reward (incl. how these savings are shared with customers).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developer charges</td>
<td></td>
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<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^{116}\) IPART, Pricing arrangements for recycled water and sewer mining – Sydney Water Corporation, Hunter Water Corporation, Gosford City Council and Wyong Shire Council - Final Report, September 2006—Appendix C: Guidelines for the Calculation and Treatment of Avoided and Deferred Costs (Guidelines)

\(^{117}\) IPART, Assessment Process for Recycled Water Scheme Avoided Costs – Guidelines, January 2011
<table>
<thead>
<tr>
<th>Role / function</th>
<th>Instrument</th>
<th>Governance</th>
<th>Current status</th>
<th>Relevance to recycled water</th>
</tr>
</thead>
</table>
| stormwater developer charges for metropolitan water agencies | metropolitan water agencies\(^{118}\)  
- IPART 2013 Determination for Gosford City Council and Wyong Shire Council\(^{119}\)  
- and Hunter Water under section 18 (2) of the IPART Act. | | IPART is currently reviewing the developer charges determinations for both the “active” and “inactive” water, wastewater and stormwater developer charges in the event the Government decides to change the 2008 direction. | |
| | • Sets a methodology for fixing maximum recycled water developer charges for metropolitan water agencies | • IPART Pricing arrangements for recycled water and sewer mining Sydney Water Corporation, Hunter Water Corporation, Gosford City Council and Wyong Shire Council\(^ {120}\)  
- Section 13A of the IPART Act 1992 | | May affect developers’ financial incentives to provide for recycled water supply |
| Wholesale price regulation | • Sets a framework for regulating wholesale services provided by public water utilities | • IPART 2017 Determination on wholesale water and wastewater services\(^ {121}\)  
- Section 11 of the IPART Act | • Provides framework for negotiation with ability for parties to seek scheme-specific reviews | Establishes the price at which wholesale services required by private recycled water proponents are supplied |

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\(^{118}\) IPART, Sydney Water Corporation, Hunter Water Corporation, Gosford City Council, Wyong Shire Council Developer Charges from 1 October 2000, Determination No. 9, 2000, September 2000

\(^{119}\) IPART, Gosford City Council and Wyong Shire Council – Review of calculation parameters for developer charges, Final Report, May 2013

\(^{120}\) IPART, Pricing arrangements for recycled water and sewer mining – Sydney Water Corporation, Hunter Water Corporation, Gosford City Council and Wyong Shire Council - Final Report, September 2006

\(^{121}\) IPART, Prices for wholesale water and wastewater services, Sydney Water Corporation and Hunter Water Corporation, Final Report, June 2017
<table>
<thead>
<tr>
<th>Role / function</th>
<th>Instrument</th>
<th>Governance</th>
<th>Current status</th>
<th>Relevance to recycled water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Third party access</td>
<td>Third party access regime</td>
<td>WICA</td>
<td>Third party access regime exists but not utilised in practice</td>
<td>Establishes the price at which access services required by private recycled water proponents are supplied – but in practice not used as doesn’t match recycled water supplier’s business models</td>
</tr>
</tbody>
</table>

**Licensing**

- IPART administers operating licences for Sydney Water, Hunter Water and Central Coast regarding customer protection (incl. pricing), service levels (including levels of water conservation) and environmental impacts.122
  - Approval of Sydney Water’s 2015-20 Operating Licence
  - Approval of Sydney Water’s Economic Level of Water Conservation
  - Section 24(F) of the IPART Act
  - Operating licences for Sydney Water, Hunter Water and Central Coast will be reviewed every five years
  - Sydney Water’s 2015-20 Operating Licence (Section 3) requires it to develop and implement a methodology for an economic level of water conservation, including water recycling and IPART monitors compliance with this obligation.
- IPART licenses and manages audits and compliance for WICA licensees.
  - WICA licences
  - WICA
  - Changes to the WICA licensing regime were passed by the NSW parliament in October 2014 but the Water Industry Competition (General) Regulation 2008 is still being revised. It is now scheduled to commence in late 2019.
  - Impose entry requirements and conditions on WICA licensees who wish to undertake recycled water schemes
  - Most local government recycled water providers (particularly in metropolitan NSW) are not currently licensed as utilities under...

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122 The final licences are approved by the Minister for Lands and Water and the Governor. Sydney Water is required to provide an annual State of Compliance with its Operating Licence. IPART completes annual operational audit of Sydney Water’s compliance with obligations outlined in its licence.
123 Sydney Water’s licence is “granted to enable and require Sydney Water to provide, construct, operate, manage and maintain efficient, co-ordinated and commercially viable systems for providing the Services within the Area of Operations”. Sydney Water 2015-20 Operating Licence – Section 1
124 Sydney Water, Water Conservation Report: 2016-17
<table>
<thead>
<tr>
<th>Role / function</th>
<th>Instrument</th>
<th>Governance</th>
<th>Current status</th>
<th>Relevance to recycled water</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WICA Act. This is being reviewed as part of potential amendments to the WICA Regulations.</td>
</tr>
</tbody>
</table>

Source: Frontier Economics
Appendix B: IPART’s approach to setting prices for water, wastewater and stormwater services provided by public utilities

IPART determines the maximum prices to be charged for declared government monopoly services provided by water utilities, such as Sydney Water and Hunter Water.

IPART’s determinations establish both the level and structure of prices for water, wastewater and stormwater services. This firstly involves setting the total revenue requirement for each service to be recovered through prices (see Figure 13).

Figure 13: IPART’s approach to setting maximum retail water and wastewater prices

<table>
<thead>
<tr>
<th>Key Steps in IPART’s approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Consider the requirements of the regulatory framework and other contextual factors (incl. enviro and health regulatory policy frameworks)</td>
</tr>
<tr>
<td>2. Decide on the length of the regulatory period and key aspects of the form of regulation</td>
</tr>
<tr>
<td>3. Make decisions on the revenue requirements (‘building block’ costs) – incl. key inputs such as operating and capital expenditure, RAB and RoR – to establish the notional revenue requirement (NRR)</td>
</tr>
<tr>
<td>4. Establish the forecast demand and volume of usage</td>
</tr>
<tr>
<td>5. Determine the structure of maximum prices</td>
</tr>
<tr>
<td>6. Set maximum prices to be recovered by agency</td>
</tr>
<tr>
<td>7. Undertake customer bill and finance-ability analysis</td>
</tr>
</tbody>
</table>

Source: Frontier Economics

In determining the total level of efficient costs to be recovered from retail customers (known as the ‘revenue requirement’) IPART applies a ‘building block’ methodology. This includes a return on and of assets based on their regulatory asset value as well as operating and maintenance expenditure based on IPART’s assessment of the efficient level of costs required to provide services to customers while complying with its legal and regulatory obligations.

A key component of this ‘building block’ revenue is the valuation applied to assets known as the regulatory asset value (RAB). As capital expenditure occurs, new assets are added
in to the RAB at cost, which is subsequently recovered over the life of the asset via the return of (regulatory depreciation and return on assets).

It then involves allocating the revenue requirement across customer classes (residential and non-residential, based on volume shares) and establishing tariff structures designed to recover these amounts given assumed demand forecasts.

In doing so, IPART has established some key guiding principles (see Table 6). These principles focus on ensuring that the regulated businesses can recover their efficiently incurred costs, while doing so in a way which is equitable and where feasible signals to users the cost of their consumption decisions.

Table 6: IPART water and wastewater pricing principles

<table>
<thead>
<tr>
<th>Pricing principle</th>
<th>Rationale and implication</th>
</tr>
</thead>
<tbody>
<tr>
<td>The total revenue collected from residential and non-residential customers is to reflect the respective costs incurred in serving those customers. The total water revenue (usage and service charges) and the total (wastewater revenue (usage and service charges) collected from non-residential customers is to reflect the costs incurred in providing each of those services to those customers.</td>
<td>Allows the utilities to recover the efficient cost of service provision Cost-reflectivity to ensure customers’ charges reflect the costs they impose on the system</td>
</tr>
<tr>
<td>Customers imposing similar costs on the system should pay similar charges.</td>
<td>Horizontal equity and cost-reflectivity to ensure customers’ charges reflect the costs they impose on the system</td>
</tr>
<tr>
<td>The residential water service charge and the residential wastewater service charge is to be a standard annual charge for all residential dwellings unless there is evidence that there are material differences in the costs of servicing different residential property types.</td>
<td>All residential customers receive equal benefits from the availability of water supply and wastewater services in their home, and should all pay the same</td>
</tr>
<tr>
<td>The water usage charge is to be a standard variable charge for all customers – residential and non-residential – and be set with reference to the utility’s long-run marginal cost (LRMC) of supply.</td>
<td>The LRMC of supply represents the costs of the next augmentation to the supply network The aim of setting water usage charges at LRMC is to encourage the efficient use and allocation of resources, by signalling to customers the cost of their decisions to consume an extra unit of water</td>
</tr>
<tr>
<td>The non-residential wastewater usage charge is to be a standard variable charge for all customers set with reference to, but not necessarily equal to the utility’s short run marginal cost (SRMC) of transporting, treating and disposing of domestic-strength effluent.</td>
<td>Aims to send appropriate price signals within the constraint of postage stamp pricing</td>
</tr>
</tbody>
</table>


IPART also observed in its 2012 review of tariff structures:
“In practice, there is a range of options for setting the fixed charge that can be consistent with the economic efficiency criteria and the avoidance of cross-subsidies. The key test from the perspective of economic efficiency is that the fixed charge should not vary with the level of water consumed or discharged. A uniform fixed charge that was the same for a residential household and a large industrial plant would meet this criteria, but it would not be considered reasonable or fair. In contrast, fixed charges that are the same for similar classes of customers, but vary by meter size meet the efficiency criteria and often find community support. The fixed charge does not vary with actual consumption but it is consistent with a notional allocation of residual costs based on the capacity to use the assets.”

Efficient prices for water and related services will be those that balance supply and demand at the lowest long-term net community cost and provide efficient signals about the cost of providing a service.

If prices of these retail water and wastewater services are too high or too low, this will encourage either too little or too much water recycling. The following discussion examines key elements of the current approach to regulation of retail prices and assesses where these may constitute barriers to cost-effective water recycling.

The regulation of retail prices by IPART is also heavily affected by NSW Government policy directives applying to the regulatory framework. In particular, the NSW Government has a long-standing policy of postage stamp pricing for water and wastewater services across the public water utilities’ areas. Section 41.3 of WICA defines this as follow:

“These principles must be implemented in a manner that is consistent with any relevant pricing determinations for the supply of water and the provision of wastewater services, including (where applicable) the maintenance of “postage stamp pricing” (that is, a system of pricing in which the same kinds of customers within the same area of operations are charged the same price for the same service).”

IPART has defined pricing principles for trade waste services levied by Sydney Water and Hunter Water:

- Standards for acceptance should be set on the basis of the capacity of current systems to transport, treat and dispose of the waste, having regard to the health and safety of wastewater workers.
- Trade waste charges should cover the efficient costs to the water supplier of handling these wastes, including an allocation of corporate overheads.
- Charges should vary to reflect differences in the cost of treating waste to the required standards at particular locations.

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○ Water suppliers should set charges and standards in a manner that is transparent and accurate. The method of measurement should be reliable and the basis for setting charges should reflect costs incurred as far as possible.

○ Where environmental reasons are made for variations from the pricing principles detailed above, sufficient evidence needs to be available to justify these variations. The basis for calculating charges above the cost of service, where environmental justifications exist, should also be supported by sufficient evidence.
Appendix C: Pricing principles under the Water Industry Competition Act (WICA)

Many of the issues involved in setting wholesale prices are analogous to access pricing and therefore it is relevant to consider the access pricing principles under WICA – with which IPART is required to comply in its role as arbitrator (See Box 20).126

Box 20: Pricing principles under WICA: section 41(3)

(1) For the purposes of this Part:
   a) IPART must have regard to the pricing principles when deciding whether or not to approve an access undertaking for an infrastructure service, and
   b) an arbitrator must have regard to the pricing principles when determining a dispute in relation to the pricing of access to an infrastructure service the subject of a coverage declaration.

(2) For the purposes of this section, the pricing principles in relation to any infrastructure service are as follows:
   a) the price of access should generate expected revenue for the service that is at least sufficient to meet the efficient costs of providing access to the service, and include a return on investment commensurate with the regulatory and commercial risks involved,
   b) the price of access should allow multi-part pricing and price discrimination when it aids efficiency,
   c) the price of access should not allow a vertically integrated service provider to set terms and conditions that discriminate in favour of its downstream operations, except to the extent to which the cost of providing access to other operators is higher,
   d) the price of access should provide incentives to reduce costs or otherwise improve productivity.

(3) These principles must be implemented in a manner that is consistent with any relevant pricing determinations for the supply of water and the provision of wastewater services, including (where applicable) the maintenance of “postage stamp pricing” (that is, a system of pricing in which the same kinds of customers within the same area of operations are charged the same price for the same service).

126 The close links between wholesale pricing and access pricing and the need for congruence between them implies IPART should also have regard to these principles in relation to regulation of wholesale charges.
Appendix D: Assessing access and wholesale pricing methodologies

This appendix identifies and assesses alternative pricing methodologies typically adopted for access services.

In broad terms, there are two main approaches to setting prices for wholesale or access services:

- **A ‘bottom up’ or ‘cost of service’** approach, which seeks to explicitly identify the service being provided and establishing the costs of providing this service.

- **A ‘top down’** approach, which starts with the final price for the end-to-end retail service and deducts the costs of those elements of this bundled service that are not used by the wholesale customer, leaving a charge for the wholesale service being provided (IPART’s proposed retail-minus methodology fits into this category).

Within each of these broad categories, a vast array of potential sub-options have been suggested and/or applied in different utility sectors at different times. Experience suggests there is no universal ‘best’ solution for efficient prices for these services – rather, there is a need to carefully consider the circumstances of each setting.

**Factors for consideration in assessing access and wholesale pricing methodologies**

As part of our analysis, we have examined several alternative wholesale pricing methodologies that are commonly applied and/or have been suggested by participants in this review (see below).

While it can be instructive to draw on wholesale/access pricing models applied elsewhere, this needs to be done with due care to avoid drawing inappropriate conclusions, including advocacy of models used in other sectors with quite different market settings and/or policy objectives (Box 21 and Table 7).

Experience with wholesale/third party access pricing across a range of sectors suggests there is no universal ‘best’ solution for efficient prices for these services – rather, there is a need to carefully consider the circumstances of each setting. As noted by Biggar:

“There is a wide range of forms of access pricing. The most appropriate form in any given context depends very closely on what objectives are sought and what instruments are available to achieve those objectives. Where there are fewer instruments than objectives, access pricing may need to make trade-offs between the objectives. It is very important to specify clearly at all times what assumptions are being made about the objectives being pursued and the instruments available”.

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This means that it is important to adopt an approach that is appropriate to the circumstances of the NSW urban water sector. While it can be instructive to draw on wholesale/access pricing models that have been applied elsewhere, this needs to be done with due care to avoid drawing inappropriate conclusions. This includes advocating models used in other sectors with quite different market settings and/or policy objectives.

Box 21: Factors affecting choice of wholesale pricing methodology

Retail-minus access pricing can in general provide a more appropriate basis for setting wholesale prices when:

- Retail prices are set by regulation that seeks to (1) ensure they do not include monopoly rents and (2) minimise the inefficiencies that may be part of the access providers cost structure
- Uniform retail price obligations apply to incumbents
- Parties are competing to provide relatively homogenous products to the same group of customers
- Assets are long-lived and rates of technological change are slow, such that the cost of a loss of productive efficiency resulting from the duplication of assets may not be off-set by innovation and gains in dynamic efficiency that result from competition
- The extent of demand for access is unclear and the information required to develop building block access prices is not readily available.

Alternative access pricing methodologies (bottom up ‘cost of service’ approaches) may be more appropriate:

- Where the access provider does not compete in the downstream retail market
- Where the access seeker and provider negotiate their own commercial terms
- Where there are no pricing distortions imposed on final retail prices
- Where final retail prices are not regulated
- When entry is likely to lead to technological gains and improvements in dynamic and productive efficiency
- Where new entrants are seeking to provide a differentiated or new service, for which there is no prevailing retail price.

Table 7: Issues for consideration given the metropolitan NSW water market

<table>
<thead>
<tr>
<th>Broad issues for consideration</th>
<th>Relevant circumstances in metropolitan NSW water market</th>
</tr>
</thead>
<tbody>
<tr>
<td>The nature of competition in the market, including:</td>
<td>In the case of water recycling, it is important to recognise competition is not just limited to the retail and reticulation ‘last mile’ activities: water recycling competes with the supply of potable water (at present limited to non-potable uses) as well as the transport, treatment and disposal of wastewater. This makes the analysis different from many other sectors where the competition is only at the end (upstream and/or downstream) of the monopoly network.</td>
</tr>
<tr>
<td>- Which services are contestable and which are essential monopoly inputs</td>
<td></td>
</tr>
<tr>
<td>- Whether competition is ‘in’ and/or ‘for’ the market, etc.)</td>
<td></td>
</tr>
<tr>
<td>- Opportunities to bypass the network</td>
<td></td>
</tr>
<tr>
<td>Existence of regulatory constraints (e.g. regulated postage stamp retail prices)</td>
<td>In the NSW urban water sector, several existing policy constraints on competition in the market to supply services to end-customers (especially ‘postage stamp’</td>
</tr>
</tbody>
</table>
Whether the owner of the monopoly network also competes in the downstream market

Where there has been vertical separation of the monopoly and contestable parts of an industry 'cost of service' approach has typically been adopted whereas a 'retail-minus' approach is only potentially applicable when no such vertical separation has occurred.

In the NSW urban water sector, both Sydney Water and Hunter Water supply wholesale service via their centralised networks and compete in retail markets to end-users (and so are vertically integrated at least to this extent).

The nature of the wholesale/access service

The theory and practice of access regulation distinguishes between so-called 'one-way' access services and 'two-way' access services (where suppliers both purchase and sell network access), which are more common in telecommunications.

Whether the final retail market is regulated to ensure no monopoly power is exercised

In the NSW urban water sector, IPART regulates the final retail prices charged by Sydney Water and Hunter Water with the objective of ensuring they do not charge monopoly prices. This addresses one of the major criticisms often made of retail-minus – that it preserves monopoly profits.

Practical implementation issues including availability of information

A cost of service approach requires information on the cost of all services provided by an integrated supplier, as it requires allocating costs across monopoly and contestable activities; whereas a retail-minus approach only requires information on avoidable costs of the activities not used by the wholesale/access customer. However, implementing a retail-minus approach requires 'looking through' the wholesale customer to its end-use customers, which may require detailed information on these customers.

Source: Frontier Economics

Alternative wholesale pricing methodologies

Non-residential pricing

To date, wholesale charges have been negotiated commercially between incumbents and new entrants and have typically been set at the price for an equivalent ‘non-residential’ retail customer. This is in effect a form of average cost pricing, given that the non-residential charge is the same across the utilities’ areas regardless of differences in the cost of servicing different locations.

One consequence of this is that as the non-residential charge is the same regardless of location, while it blunts the potential for ‘cherry-picking’ based on geographical cost differences, it sends no price signals as to where water recycling is likely to be most cost-effective (for example, in locations where there are major capacity constraints in existing water or wastewater networks). Similarly, the low and uniform non-residential wastewater usage charge would not provide appropriate signals as to the value of recycled water
schemes in displacing volumes from constrained elements of the centralised wastewater systems.

However, it does not prevent another form of ‘cherry-picking’ that relates to arbitrage across different price classes.

A non-residential water charge comprises a fixed service charge (based on meter size) plus a water usage charge based on metered consumption and a non-residential wastewater charge comprises a fixed service charge (again based on meter size) and a (low) wastewater usage charge based on deemed wastewater discharge. They are largely charges that recover a contribution of each customer to the sunk costs of the network.

This means that the margin available to new entrants will largely reflect mostly arbitrary differences in the allocation of fixed costs inherent in the retail charges of the end-use customers relative to the allocation of these costs under the wholesale charge. That is, the allocation of fixed charges at the retail level will be based on the number of residential and non-residential end-use customers (as well as the number of different sized meters in the case of non-residential customers), whereas the allocation at the wholesale level will be based on the meter size of a single non-residential customer. The resulting margin does not therefore necessarily reflect the relative costs of the new entrant and the incumbent in servicing demand for future water and wastewater services: it is more about how costs of the existing capacity are allocated under the retail and wholesale charges respectively.

The strong support for continuation of this approach by new entrants appears to assume that charges based on a single non-residential price will be a lot lower than those based on IPART’s proposed retail-minus methodology. This perception may in part reflect:

- Confusing incorporation of avoided future augmentation costs within the term ‘net facilitation costs’
- Absence of clear guidance or worked examples on what these values might be and how they would be incorporated in the calculation of retail-minus wholesale charges.

However, as discussed below, it will not necessarily be the case that a non-residential charge will be lower than a retail-minus charge as this will depend on the size of the deductions under the IPART methodology, particularly for the long-run avoidable costs of the water and wastewater networks attributable to the recycled water plant. This is explored further in the following discussion.

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128 For example, for a single wholesale customer with an 80mm water and an 80mm wastewater meter, its total annual service charges would be approximately $10 000. This is equivalent to the combined service charges that would be applicable to around only 70 non-residential customers. For any developments larger than this, the service charges payable by a wholesale customer as a single non-residential customer would be significantly less than the retail service charges for the residential customers they serve – for a small in-fill development of 2000 non-residential properties, this would be around $290 000 p.a. This difference effectively represents a subsidy to the wholesale customer in competing with the incumbent (although this may be somewhat offset by the levying of wastewater usage charges which are not paid by residential customers).
Non-residential wholesale charges may be too low

Where the long-run avoidable costs are small (such as where there are relatively few emerging system constraints), then entry is not likely to create value. Therefore, there is a risk that the relatively low wholesale charge under the non-residential price will simply reduce the contribution to the costs of supplying existing capacity by the wholesale customer (on behalf of the end-users which it supplies). This could encourage new entrants to develop recycling schemes even where their total forward-looking costs of servicing customers are higher than if they were to continue to be supplied from the incumbent’s network. This would occur so long as the net present value of the reduction in fixed charges is greater than the difference in these forward-looking costs.

While this incentive is mitigated by the fact that a new entrant needs to invest in recycled water assets to benefit from the reduction in fixed charges by being classified as a ‘non-residential’ customer (rather than being charged as an aggregation of residential customers), it nevertheless provides an arbitrary subsidy to them.\textsuperscript{129}

Entry that is viable only because of this reduction in the allocation of fixed charges under the non-residential price would be inefficient, as it would increase the total costs of supplying water and wastewater services to the overall customer base and thus total bills to customers. Moreover, the sunk costs of the network would then have to be recovered from a smaller number of customers, increasing their service charges and thus the potential benefit from being supplied by a new entrant rather than the incumbent. This may lead to a ‘spiral’ where yet further recycling projects that are not cost-effective become financially viable even though they are essentially duplicating existing infrastructure that could supply the services at lower cost.

An analogous issue has arisen with the pricing of distribution services to customers with distributed generation in the electricity sector (see Box 19). Such an outcome may arise under any wholesale pricing methodology that entails a significant redistribution of the share of fixed costs away from customers of the new entrant to the customers remaining with the incumbent, even though these costs are sunk (that is, the network capacity cannot be reduced in response) and there is no corresponding decrease in costs.\textsuperscript{130}

Box 22: The downward spiral: the case of distributed generation

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\text{Electricity distribution network prices have historically been structured to recover most of the network provider's regulated revenue through volumetric usage prices, with a relatively small share recovered via fixed daily charges. At the same time, network providers' regulated revenues are derived from a 'building block' approach that is largely driven by the fixed and sunk costs of network infrastructure such as poles and wires. As a result, the marginal cost of network usage is typically}\]

\textsuperscript{129} That the perceived benefit to wholesale customers from a wholesale charge set based on a retail charge must stem from a redistribution of fixed costs is evident from the fact that if there was no such redistribution, the incumbent would be collecting revenues that cover their entire costs (including those for the contestable services) for the provision of only wholesale services. This implies that they would be overrecovering their total costs.

\textsuperscript{130} Some regulators have sought to prevent such outcomes, even where the stranding of the asset is due to market factors. For example, in the rural water sector the ACCC allows irrigation infrastructure operators to levy termination fees on irrigators who leave irrigation systems and leave the operators exposed to not recovering their committed fixed costs, which may create revenue uncertainty for operators and undermine investment.
minimal in the short run. Although the long-run marginal cost (LRMC) of network usage is usually higher than short-run marginal cost (SRMC), LRMC generally remains below the average cost of the network due to the natural monopoly characteristics of electricity networks.

Against the backdrop of a largely fixed network cost structure and a largely volumetric network price structure, Australian Federal and State governments from 2009 began offering electricity customers generous subsidies to install solar photovoltaic (PV) panels at their homes and businesses. These panels use solar power to generate electricity, which a customer can consume or inject back into the network if the output of the customer’s solar PV unit exceeds its own demand. In either case, the solar PV units enable the customer to significantly reduce its network bill and in some cases receive a rebate.

The provision of subsidies combined with the ability of customers to avoid volumetric network charges led to a sharp increase in solar PV installations across Australia from 2010 onwards. As customers with solar PV benefitted from lower bills, a larger proportion of network businesses’ regulated revenues were recovered from customers without solar PV, who faced higher network prices and bills. This resulted in more customers who would formerly have been marginal beneficiaries of solar PV units to find PV installation financially attractive.

The cycle of rising solar PV penetration and rising network bills attracted the attention of policymakers, who were concerned that the strong financial incentives for solar PV installation were leading to outcomes that were both inefficient and inequitable. The inefficiency arose because customers were installing solar PV to avoid paying volumetric network charges, even though the (unsubsidised) cost of the PV units installed exceeded the network costs avoided as a result of the PV installations. The inequity arose because customers with the financial wherewithal to pay the up-front costs of solar PV installation tended to be better-off than other customers.

In response to these concerns, in 2014 the Australian Energy Market Commission (AEMC) made changes to the National Electricity Rules to oblige distribution networks to reflect the LRMC of network usage at times of peak loading on the network and to recover their remaining regulated revenues in a least-distortionary manner. This would mean that to the extent customers with solar PV did not reduce their demand for grid-sourced power at peak times, those customers would not enjoy lower network bills. Once implemented, such ‘cost-reflective network tariffs’ should reduce the artificial incentives customers face to install solar PV units or to engage in other inefficient forms of partial network bypass.

**Non-residential wholesale charges may be too high**

Conversely, a wholesale charge based on a single non-residential tariff could be too high, and provide insufficient incentives for cost-effective investment in recycled water in some circumstances. This could occur where the forward-looking costs of supplying services are high due to approaching capacity constraints in the water and/or wastewater system, which would require costly augmentations to address. For example, Sydney Water is facing significant constraints in its wastewater system, which would be expected to lead to very high estimates for LRIC for wastewater services, particularly if new environmental regulatory constraints are imposed (such as the adoption of zero ocean outfall obligations). Under this scenario, the non-residential charge could be above the charge that would apply under IPART’s retail-minus methodology. This has the potential to lock-out private suppliers from helping to solve the problem through decentralised recycling schemes and leave Sydney Water to implement potentially more costly solutions. This would be a perverse outcome stemming from the fact that the non-residential wholesale charge is not linked to the forward-looking costs of providing services.
Conclusion

In summary, continuation of wholesale charges based on a single non-residential tariff is not likely to promote cost-effective water recycling for the following reasons.

- As observed by IPART, as incumbents are required to levy different charges for residential and non-residential customers, there is scope for new entrants to enter through profitable arbitrage opportunities, rather than through being more efficient. While the scope for this inefficient entry is reduced in cases where the new entrant incurs significant costs in recycled water infrastructure, it is still present.

- As the non-residential charge is the same regardless of location, it sends no price signals as to where water recycling is likely to be most cost-effective (for example, in locations where there are major capacity constraints in existing water or wastewater networks).

Cost of service approaches

Cost of service approaches seek to explicitly identify the service being provided and establish the costs of providing this service. A cost-based approach aims to estimate the efficient costs of all service elements purchased by a third party, including an appropriate margin. This reflects the incumbent water company’s efficient incremental costs of supplying wholesale water and wastewater service up to the boundary between its network and the asset of the new entrant.

Flow Systems suggested that a cost-reflective approach would enable wholesale prices to be set on the basis of an actual (rather than deemed) level of service, supplemented with a contribution to fund postage stamp pricing if necessary. However, as discussed below, defining a ‘cost-based’ approach is not necessarily straightforward.

A key issue here is clearly defining the wholesale services that are being provided to wholesale customers in each case. This may not necessarily be accurately characterised as physical delivery of a volume of potable water to the supply point of a wholesale customer (or the converse in the case of wastewater); it may also include the ability to utilise the capacity of the network. As discussed below, this definition of the service being provided becomes important when considering appropriate wholesale pricing methodologies and in particular how the joint costs are (or are not) recovered, including the contribution from wholesale customers.

Cost of service approaches vary depending on the nature of the costs included in the access charge (see Box 20).

Box 23: Alternative cost concepts

Key cost concepts on which wholesale/access pricing could be based include:

- **Short-run marginal cost (SRMC):** this refers to the costs of providing additional demand in the short term where capital is fixed. This will be below the average costs of production where production is characterised by significant economies of scale and spare capacity.

- **Long-run marginal cost (LRMC):** this represent the additional cost (OPEX and CAPEX) of meeting additional water demand over the long term, when all costs are variable.
- **Long-run incremental cost (LRIC):** Based on the costs that could be avoided in the long run if access to the service were no longer provided. It aims to mimic the workings of a competitive market and implies that historically incurred costs may not necessarily be an appropriate cost benchmark for future prices.

- **LRIC plus (LRIC+):** This is based on LRIC but includes a contribution to common costs that are not directly attributable to an activity. Typical mark-up rules use Ramsey pricing methods (recovering a greater proportion of common costs through the most inelastic products) or a proportional mark-up approach, where the allocation is based on the incremental costs of different products and services.

- **Fully allocated cost:** An accounting method for attributing all the costs of a company to its various products and services.

- **Stand-alone cost:** The cost of meeting a defined service or product increment on its own.

A cost-plus approach is often applied in other regulated utilities. For example, access charges in the telecommunications sector are often set based on the forward-looking long-run incremental cost (LRIC) of an efficient hypothetical operator. This aims at achieving productive efficiencies in the provision of these non-contestable services, while at the same time promoting competition in the contestable services.

In broad terms, cost of service approaches require that, at a minimum, the wholesale/access charge at least covers the forward-looking incremental costs of providing the relevant service but typically also includes at least some contribution to the joint and common costs associated with the network.

The most common bottom up methodology in use in Australian regulation is a ‘building block’ approach, where the access charge is set to ensure an access provider is able to recover the efficient costs of providing its services, estimated by summing a number of ‘blocks’ of cost, including a return on capital for the assets required to provide the relevant services, a return of that capital (depreciation) and operating and maintenance costs. It is premised on the wholesale customer/access seeker contributing to the costs of the incumbent in providing the relevant assets in a way that is proportionate to that customer’s use of those assets.

**Cost-reflective locational pricing**

Ideally, the simplest way of setting efficient wholesale charges to promote cost-effective water recycling would be to have cost-reflective wholesale charges.

The difficulty with applying this approach to the NSW urban water sector is that under current arrangements, water and wastewater charges at the retail level are deliberately not cost-reflective in that they are geographically averaged consistent with the NSW Government’s postage stamp pricing policy.

As observed by IPART, as incumbents are required to charge the same price for the same type of services to customers regardless of their location, there is scope for new entrants to take advantage of profitable arbitrage opportunities, rather than entering the market through being more efficient. In these circumstances, cost-reflective wholesale charges are not likely to promote cost-effective water recycling.

In addition, a practical issue is that the public water utilities do not yet have good information on costs of providing services to different types of customers in different
parts of the system (although IPART is understood to be commencing a project on component pricing to address this gap, the results are not likely to be available until at least early 2019). This information would be a prerequisite to being able to allocate the existing RAB of the utilities across their different activities in the supply chain to establish the costs associated only with the services being provided to the wholesale customer.

While this may represent a viable approach if complementary retail tariff reform was undertaken – and in particular if the postage stamp pricing policy was ended – this is unlikely to happen in the short to medium term. In any event, this would require careful consideration of the costs and benefits of the postage stamp pricing policy adopted by the Government, which raises issues that extend beyond the promotion of cost-effective water recycling.

**Average cost approaches**

In the presence of postage stamp pricing, a possible alternative form of cost of service wholesale charges would be some form of averaged cost approach, which allocates these costs (including the joint or common costs) to wholesale customers and customers of the incumbent based on their proportionate use of the relevant services. The intent would be for this to leave a margin for new entrants to compete in the contestable services, without being able to do so purely based on ‘cherry-picking’ the cross-subsidies inherent in the postage stamp pricing policy imposed on final retail prices levied by incumbents. However, this approach will not fully address the problem of ‘cherry-picking’ if the costs of providing the contestable services also vary by location.

Such an approach would also require allocating the existing regulatory asset base (RAB) of the utilities across their different activities in the supply chain – a potentially significant task that has not yet been undertaken. A further potential complication is that the resultant wholesale charge may leave little margin for the new entrant, to the extent that the current RAB for the assets used to supply contestable activities is at a significant discount to the replacement cost of these assets faced by new entrants.

Another key issue is determining precisely how the costs would be averaged in establishing wholesale charges, and how to avoid arbitrage across customer classes through redistribution of the fixed charges designed to recover joint and common costs of the network (as discussed under non-residential pricing above).

A standard approach to access charging would allocate these costs based on the proportionate use of or demand on the network. However, if this approach were to be applied in the context of water recycling, this could lead to a significant reallocation of the fixed charges to recover the joint costs. For example, Flow Systems noted that the actual use of any incumbent wastewater service will fall to between 3% and 22% of the scheme’s wastewater output following the establishment of a water recycling scheme. If the allocation of fixed charges varied with usage, this might imply lower fixed wholesale charges. However, this could provide a margin for new entrants, reflecting a redistribution of the shares of fixed costs allocated to their end-use customers (and shifted to other customers) and providing an incentive to invest in recycling plants on
this basis, rather than necessarily being more efficient (as the reduction in volumes does not reduce the existing network’s costs). \(^{131}\)

This highlights the question of appropriately defining the service being provided to wholesale customers. Rather than just being the supply of a given volume of water to a wholesale connection point or the acceptance of a given volume of wastewater for treatment and disposal, the service must instead be conceived of as comprising both a physical supply of the service and access to the capacity of the network. Particularly where the network provides a back-up in case of emergency, this could justify a fixed charge based on the peak capacity demands on the network of the wholesale customer on behalf of its end-customers, rather than a share of typical or average volumes. This might offer an avenue for better aligning retail and wholesale tariff structures to reduce the scope for arbitrage so that new entry was more likely to reflect genuine efficiencies in the supply of services. However, this would also require complementary reform of tariffs at the retail level.

**Conclusion**

Setting wholesale charges to reflect the cost of service has considerable intuitive appeal as it provides a clear link between the price and the efficient cost of delivering the service: ideally, the simplest way of setting efficient wholesale charges to promote cost-effective water recycling would be to have cost-reflective wholesale charges. However, in the particular circumstances of the urban NSW water industry, there are considerable challenges both in practice (for example, undertaking a cost allocation exercise to distribute the utilities’ RAB across their activities) and in designing wholesale and retail tariffs that promote efficient entry rather than inefficient duplication of existing assets. Nevertheless, if these issues can be resolved, this may be a viable option in due course.

**Retail-minus approaches (‘top down’)**

**Overview**

The retail-minus approach calculates the wholesale price as the vertically-integrated firm’s retail price of the service less the costs avoided (or avoidable) in providing the wholesale service rather than the retail service. The retail-minus approach is a rule for setting the price of an input that is necessary to compete in a downstream market, when that input is controlled by a regulated, vertically integrated monopolist. \(^{132}\)

The retail-minus approach is closely related to the Efficient Component Pricing Rule (ECPR), which holds that policies for efficient entry should allow for the integrated

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\(^{131}\) Another issue is that end-use customers could claim they draw less from the network than the ‘average’ customer of their type. As noted in section 7, while non-residential retail customers can request a review of their individual discharge factors applying to wastewater service charges (and wastewater usage charges), at present individual residential retail customers cannot.

\(^{132}\) The retail-minus approach is closely related to the Efficient Component Pricing Rule (ECPR) or the Baumol-Willig pricing rule, as has been extensively discussed in the economic literature on access prices.
monopolist to continue to recover existing contributions to fixed and common costs in its access prices.

Several variants of retail-minus have been adopted and/or proposed in various settings depending on the way in which avoided/avoidable costs are estimated. These include:

- Retail minus avoided costs
- Retail minus avoidable costs
- Retail minus ‘efficient new entrant’ costs.

In all variants, any costs incurred by the incumbent in providing access are typically added to determine an access price. These are known as ‘facilitation costs’. Facilitation costs could include the costs associated with establishing and maintaining the agreement (such as negotiation, ongoing monitoring) as well as the capital costs of additional infrastructure needed to provide the wholesale service (for example, if an interconnection is required).

There are also several practical implementation issues to be addressed in determining a retail-minus price; for example, how to estimate costs no longer incurred and how transaction costs should be treated.

**Retail minus avoided costs**

This variant focuses on the costs the incumbent would actually avoid as a result of the activities of the entrant as an alternative supplier.

This tends to produce a very low ‘minus’ as the short timeframe under consideration (usually the life of an access agreement) limits the avoided costs to variable costs. In the water industry, these are typically very low as most of costs are fixed in nature.

As discussed in Appendix F, this variant was the subject of the Competition Appeals Tribunal (CAT) decision in the UK Albion Water case.

**Retail minus avoidable costs**

Avoidable costs can be defined as the costs the incumbent would avoid over the long run as a result of the activities of the entrant as an alternative supplier. Under this approach, an entrant competes on the avoidable costs – when its costs to serve are less than the costs that would be avoided by the incumbent in the long term.

This methodology tends to produce a higher ‘minus’ component than the ‘avoided cost’ approach because the longer the timeframe under consideration, the more costs are potentially avoidable (including capital costs).

As discussed below, IPART has applied this approach to the long-term avoidable cost in the other parts of the incumbents’ water and wastewater systems associated with the supply of a wholesale services.
Retail minus ‘efficient new entrant’ costs

A further retail-minus variant is where the minus is calculated based on ‘efficient new entrant’ costs rather than ‘avoidable’ costs:

This may be a response to a situation where incumbents are thought to have specific advantages that cannot be matched by competitors. An example might be that incumbents have access to scale economies that even an efficient small entrant would not have. In that case, the higher costs of the new entrant would lead to lower access prices. An alternative reason for this approach is that it might be easier to calculate – for example, if the incumbent cannot verify its avoidable costs.

IPART has applied this approach to the retail and reticulation costs avoided when a wholesale service is provided by an incumbent.

IPART retail-minus approach

IPART’s wholesale price decision outlines the regulatory framework for wholesale services. IPART defines ‘wholesale customers’ to be those that purchase water supply and/or wastewater services from Sydney Water and Hunter Water for the purposes of on-supplying water and wastewater services to customers.

The key elements of IPART’s approach are:

- Existing schemes would continue to be subject to existing pricing agreements or retail price determinations.
- New schemes without a recycled water plant and which are on-selling water and wastewater services (although such schemes may be uncommon) would be subject to regulated system-wide prices, unless the parties agree to opt out of the determination and enter into an unregulated pricing agreement or seek a scheme-specific price determination.
- New schemes with a recycled water plant would be subject to unregulated pricing agreements (or where applicable, retail price determinations), unless a wholesale customer or service provider seeks a scheme-specific price determination.
- Non-residential retail pricing would apply for the supply of drinking water to top-up a recycled water plant and disposal of waste (such as trade waste) from a recycled water plant that is not used for on-selling wastewater services.

IPART proposes to apply a retail-minus approach to most (but not all) of the wholesale services provided by incumbents to new entrants. This approach (see below) should be applied for ‘on-selling’ water and wastewater services, including where a wholesale customer operates a recycled water plant.

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133 IPART, Prices for wholesale water and wastewater services, Sydney Water Corporation and Hunter Water Corporation, Final Report, June 2017
IPART’s key rationale for adopting a retail-minus approach (in preference to alternatives) is as follows:

- Retail-minus pricing ensures that wholesale service providers and wholesale customers are on a level playing field in competing for the provision of ‘upstream’ and ‘downstream’ services to end-use customers. Other pricing approaches such as location-based cost-of-service or non-residential retail prices would result in inefficient pricing signals.

- Sydney Water and Hunter Water are bound to set postage stamp retail prices and, as such, inefficient price signals would be created under location-based cost-of-service wholesale prices.

- A non-residential price creates an arbitrage opportunity for on-selling.

IPART has decided upon a particular version of a retail-minus framework, with minus values for reasonably efficient competitor costs of retail and reticulation functions plus net facilitation costs.

Figure 14: IPART’s ‘retail-minus’ approach to wholesale price regulation where there is a recycled water plant

This version of retail-minus is justified by IPART on the basis that:

- Retail-minus provides appropriate incentives for efficient entry in the presence of postage stamp retail prices by creating a margin that reflects the cost of the contestable services.

- A ‘reasonably efficient new competitor cost’ benchmark in providing services from the point of wholesale purchase to end-use customers provides greater scope for competition and therefore dynamic efficiency gains over time than other approaches.
(such as the ‘as efficient competitor’ or ‘avoidable’ cost approach), even though it may risk some productive inefficiency in the shorter term.

- Facilitation costs should be reflected in wholesale prices and, where relevant, should account for avoidable water and/or wastewater costs from recycled water.

IPART also outlined a process for setting scheme-specific prices for future recycled water schemes, given that IPART was unable to estimate the typical or system-wide average impacts of a recycled water plant in a wholesale service provider’s costs with a reasonable degree of accuracy (because the size, location and operation of a recycled water plant will influence avoidable costs). In such cases, parties would need to engage with IPART to set a scheme-specific price.

Is IPART’s retail-minus approach a barrier to cost-effective recycling?

Some stakeholders have suggested that a retail-minus methodology will represent a major barrier to the uptake of water recycling in metropolitan NSW, as it would “render current and future IWCM schemes uneconomic”. In particular, it has been claimed that:

- Retail minus methodologies have never been applied by regulators in Australia and are internationally discredited.
- IPART’s methodology will lead to major increases in wholesale charges relative to those based on a single non-residential customer.
- IPART’s methodology will prevent efficient entry and enshrine the monopoly position of incumbents.

The following discussion addresses each of these claims.

Retail-minus is discredited and has never been applied by any regulators in Australia

It is certainly true that retail-minus has been controversial, both in the economic literature and in regulatory practice. One of the main criticisms of retail-minus is that it allows the incumbent to retain monopoly profits since the access price is based on the retail tariff. However, this criticism is not applicable in the NSW urban water sector where IPART regulates the public utilities.

During this review, some stakeholders suggested retail-minus was not appropriate under any circumstances. For example, Flow Systems contended that:

- Retail-minus has never been applied under the IPART Act or any other regulatory application in Australia other than in telecommunications.

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Retail-minus is internationally discredited and is no longer applied in the UK water sector following a CAT decision in 2006.

Flow Systems has also argued that the existence of postage stamp pricing does not justify the use of a retail-minus methodology:

“Postage stamp pricing applies in a range of regulated and formerly regulated sectors of the economy. Aside from water, this includes electricity and gas networks, public transport, telecommunications and of course postal services. Wholesale inter-connection prices exist for electricity and gas networks, telecommunications and postal services. Where wholesale price regulation remains in these sectors, retail-minus pricing methods are not used to set regulated prices.

Postage stamp pricing is not unique to wholesale water services. IPART has not referred to examples in any other sector where postage stamp pricing has led to the adoption of retail-minus instead of cost based approaches to regulated price setting.”

We concur that cost-based approaches have generally been preferred by regulators and, as noted above, would in most circumstances recommend such an approach. However, we note that:

- In the electricity and gas sectors, where there has been vertical separation of monopoly and contestable elements of the supply chain, there is no need to consider retail-minus methodologies. Access to networks can be provided on geographically-averaged cost-based terms as there is commonly little prospect of bypass of transmission and distribution networks, even in low cost areas.
- In the telecommunications sector, retail-minus approaches have been used in the past on several occasions:
  - For example, the ACCC used retail-minus pricing for local call resale (LCS) services because a cost-based methodology would harm competition; the retail price for the service had been held below Telstra’s costs by retail price controls. The ACCC has subsequently moved to a building block approach for LCS because the costs of LCS have declined below the retail price. We also note that there is no longer regulation of retail call prices, meaning that (unlike in the water sector) higher costs of serving different customers can be reflected in retail prices.
  - In Europe, regulators such as Ofcom\textsuperscript{136} have widely used ‘\textit{ex ante} margin squeeze tests’ for regulating access prices to wholesale high speed broadband services. This is because there has been some concern that in the fast-developing, higher-risk market for these services, it is better to let incumbent networks have some freedom over retail prices while still offering other

135 Flow Services Submission, Prices for wholesale water and wastewater services, Sydney Water Corporation & Hunter Water Corporation, 10 May 2017, p23
downstream suppliers the opportunity to compete. The margin squeeze test provides for such flexibility by examining costs incurred by downstream competitors and removing these from retail prices (as for retail-minus).

- In the water sector, there have been very few examples of competitive reforms involving the establishment of access regimes and provision for new entry, but in these limited cases retail-minus has been common:
  - In the UK, Ofwat applied a retail-minus approach. While its version (involving retail-minus only short-run avoidable costs) was rejected in a legal case (see below), this approach has not been ruled out more broadly and variants of it are under active consideration at present.
  - In South Australia, under the recently enacted third party access regime, a Ministerial Direction has mandated the use of a retail-minus methodology, given the State Government’s policy for uniform prices across the State for retail water and wastewater services.
  - The ACCC’s 2007 determination in the Services Sydney case adopted a retail-minus methodology in recognition of the postage stamp pricing regime that applied at retail level for wastewater services.

- In postal services, GB Post, which has a universal service obligation, is subject to a margin squeeze test based on retail-minus less the cost of the upstream service. A recent review has retained this form of regulation.

In Appendix F, we examine in more detail the CAT decision regarding Albion Water and explain why this decision should not be interpreted to rule out a retail (wholesale)-minus price as an appropriate pricing scheme in general. A specific concern with the application of ECPR in the CAT decision was that the ‘minus’ component was based on an estimate of short-run avoidable costs (rather than long-run avoidable costs as is being proposed by IPART). It should also be noted that postage stamp retail pricing did not apply in the UK case; nor were retail prices regulated — features commonly seen as most suited to the application of a retail-minus approach. In contrast to Flow System’s claim that ‘retail-minus is no longer applied in the UK water sector’, we show recent examples of retail (wholesale)-minus pricing being proposed by Ofwat to facilitate new entry into particular segments of the supply chain.

**Impacts on wholesale charges**

Another key criticism is that retail-minus can result in wholesale/access prices being set too high, imposing a ‘price squeeze’ on potential new entrants that forecloses new entry. Several stakeholders have suggested that the introduction of IPART’s retail-minus

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137Ofcom 2013, ‘Modification to the control preventing Royal Mail margin squeeze: Statement, 26 February
Pricing framework will lead to very large price increases (for example, Flow Systems claimed the price increase could be in the order of 1000% in some cases).\textsuperscript{138}

However, this modelling of wholesale prices under IPART’s retail-minus methodology does not appear to include any allowance for ‘negative facilitation costs’ potentially associated with deferral or avoidance of augmentation of upstream potable water supply or downstream wastewater treatment and disposal infrastructure, as no information was available on these costs. The modelling only appears to have included system-wide avoidable costs for reticulation and retail costs (based on the ‘reasonably efficient new entrant’ benchmark) for which IPART has provided estimates.

The effect of this is that Flow System’s estimated wholesale charges represent upper bound estimates, which would only apply in circumstances where the recycled water scheme does not give rise to any avoidable costs for the supplier of wholesale services in upstream or downstream parts of their networks. In some cases, recycled water schemes can lead to significant benefits in deferring or avoiding the need for augmentation of potable water supply or and/or wastewater treatment and disposal assets.

Inclusion of these potentially significant avoidable costs (in IPART’s formulation via ‘negative facilitation costs’) is likely to lead to much larger ‘minus’ amounts to be deducted in establishing the ‘retail-minus’ wholesale charge. This will lead to much lower estimates of what wholesale charges would arise from applying IPART’s methodology, particularly where the recycled water scheme is in an area with major emerging capacity constraints in the incumbent’s network. Some worked illustrative examples are provided in Appendix D. These suggest that under a reasonable set of assumptions about these avoidable augmentation costs, the resultant wholesale charge under IPART’s methodology would be significantly lower than suggested by Flow System’s modelling.

We also note that the key issue here is about establishing an approach to wholesale charges that is consistent with promoting cost-effective water recycling. Even if this involves in some cases a significant increase in the level of wholesale charges from those that would apply under the previous practice of setting them equal to a single non-residential customer, this may reflect previous prices being set unsustainably low, rather than new prices being excessively high.

\textit{Prevent efficient entry and enshrine monopoly position of incumbents}

In assessing whether IPART’s retail-minus methodology represents a barrier to cost-effective recycling, the key question is whether it is likely to promote efficient entry. As noted above, the relevant test for efficient new entry is whether a new entrant can provide the (bundle of potable water, recycled water and wastewater) services at the same or lower long-term forward-looking cost than the incumbent. If a new entrant can build and operate new assets to provide those services at a cost below the incumbent’s long-

\textsuperscript{138} Flow Systems 2017, 21st Century NSW Water Policy Flow submission to INSW Recycled Water Review, p.8
run incremental costs, then under an appropriately applied retail-minus methodology it will be able to enter the market to do so. As observed by IPART:

“Retail-minus pricing creates a margin for the new entrant (the minus) that reflects an estimate of the cost of the contestable services. This ensures the wholesale service provider (incumbent) and wholesaler customer (new entrant) are competing on the basis of their respective costs of supplying the contestable services, rather than on the basis of an arbitrage opportunity or artificial margin by virtue of the nature of regulated retail prices.”

The reasonably efficient competitor (REC) costs of retail and reticulation, together with the upstream and/or downstream avoidable costs to be included in ‘net facilitation costs’ effectively represent the incumbents’ long-term incremental costs of providing those services.

It should also be recognised that a new entrant may not just compete on price: to the extent that it can offer service attributes which are valued by end-customers and/or developers (such as greater reliability, a ‘greener’ product and/or a faster solution to service a new development), it may be able to compete even if its costs are correspondingly higher than the incumbent.

Clearly, under this approach new entrants will find it difficult to compete with an incumbent where the incumbent has very low long-run incremental costs of providing the services/s (such as where it has substantial excess capacity in an existing network), whereas a new entrant has to construct and operate new assets. On the other hand, where the incumbent’s long-run incremental costs are high (for example, where it faces imminent capacity constraints in its existing network or will have to extend its network to service a development on the urban fringe), a new entrant will be more likely to be able to compete – as the wholesale charge will be correspondingly low (because the deductions for avoidable costs are likely to be very high). Appendix D provides worked examples under different scenarios.

That said, one of the common criticisms of retail-minus methodologies is that they focus on ensuring static productive efficiency at the expense of the potential longer-term dynamic efficiency benefits of competition. That is, wholesale charges that do not allow new entrants to recover their costs might reduce competitive pressures, which would lower costs to customers in the longer term, even if total cost are higher in the shorter term. In this regard, Flow Systems argued that:

“The underlying rationale for IPART’s decision appears to be a view that competition is not efficient where the entrant is substituting for existing capacity. On this view, competition is efficient (and is to be permitted) only where: a) the entrant is competing with new capacity, and b) the entrant’s new capacity cost is lower than the incumbent’s new capacity cost. The intention of these arrangements

139 IPART 2017, Prices for wholesale water and sewerage services Sydney Water Corporation and Hunter Water Corporation Final Report, p42
appears to be that competition should be permitted only where the introduction of a water recycling scheme would result in material avoided costs for Sydney Water/Hunter Water.

This is inconsistent with IPART’s legislated objective of encouraging competition where efficient. IPART is implicitly adopting a view that productive efficiency is the principal aspect of efficiency. Productive efficiency is where the supply cost for an industry (serving a defined market and volume) is minimised. Where competition reduces productive efficiency (raises the industry cost curve), regulated prices should be set so that competition does not arise.

In other words, IPART is overlooking or denying there are benefits from dynamic efficiency gains from competition. Dynamic efficiency is a separate aspect from productive efficiency as it refers to efficient responses over time to changing technology and market (consumer demand) conditions. While the industry supply cost curve may increase in the short term, it may be reduced over a longer period, due to competition and innovation.

IPART is maintaining a view that water and waste water services are natural monopolies and not subject to technology or market (demand) change. In other words, IPART’s argument is circular and not based on sound policy principles or evidence. 140

The concern expressed here is that retail-minus does not provide a sufficient margin for new entrants to enter the market and recover their own costs (including a reasonable return on investment). Flow Systems suggested that they had to effectively ‘pay twice’, by having to pay for their own IWCM assets which partially bypassed the centralised networks (by reducing the volumes going through them), as well as having to pay for the bypassed assets in the form of wholesale charges. It suggested that wholesale charges to pay for inefficient past investments effectively appropriated revenues needed to fund their own assets, whereas in a normal competitive market it would be expected that the value of incumbent’s existing assets would be written down to reflect any loss of revenues. Such ‘stranded costs’ occur when a change in a regulatory regime (such as opening a market to competition) prevents the recovery of some sunk costs (where loss of sales means that revenues no longer enable a return on and recovery of past investments).

In considering these arguments, we note that:

- The retail-minus methodology does not involve not making a judgement about what is the most efficient long-term technological solution. Rather, it just recognises the reality that sunk assets exist, which are likely to be uneconomic to duplicate in cases where they embody significant spare capacity.
- Except in special cases where wholesale customers completely disconnect from the network (for example, by tankering water in or wastewater out), they will still be relying on the monopoly networks for the supply of an essential product. It is

therefore appropriate they still make some contribution to the recovery of the cost of these assets: what may be at issue is the appropriate level of this contribution.

- It is in the interests of all users of the monopoly networks (including wholesale customers) that they are maintained to a level that provides a satisfactory ongoing level of service. Any uncertainty about recovery of efficient investment required to do this may put this at risk.

- In a normal competitive market, participants are free to respond to the price/service offerings of their competitors. In this case, the regulatory framework means that incumbents cannot easily respond to competitive threats by lowering price to reflect their costs (such as by reducing prices to incremental costs for those customers who have bypass opportunities). This means that existing assets may be stranded not by being replaced by more efficient alternatives but also because of the regulated tariff structure.

Notwithstanding this, it is recognised that the possible trade-off between productive efficiency and dynamic efficiency has sometimes been seen as justifying the deduction in the retail-minus formula going beyond the incumbent’s avoidable costs to include a deduction in the contribution to joint and common costs. For example, Oxera have suggested that:

“In taking forward wholesale-minus access pricing, taking dynamic efficiency considerations into account would involve considering what costs might become avoidable over the longer term were there to be more prevalent entry. Furthermore, to be compliant with competition law principles, the margin between access charge and wholesale prices would need to be sufficient to ensure that an ‘as-efficient’ entrant would be able to earn a competitive return. This requires consideration of whether a share of joint costs should also be included in the cost standards (as alluded to in the Albion case”).

Indeed, this thinking underlies the REC approach applied by IPART in relation to calculating the avoided retail/reticulation costs. IPART has explicitly acknowledged that while this might risk some inefficient entry in the short term, in its view this is justified by the scope for dynamic efficiency gains from competition.

IPART does not appear to have considered a similar approach in relation to calculating avoidable costs of the other parts of the supply chain which are becoming contestable – for example, the supply of water (for non-potable purposes) and the treatment of wastewater – where the scope for dynamic efficiency gains might be more significant than in retail/reticulation functions. However, it would be extremely difficult to balance the risk of inefficient duplication of assets with spare capacity against the potential dynamic efficiency benefits of competition. In particular, the value of potential benefits from dynamic efficiency is not likely to be well-reflected simply in the volumes of water

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141 Oxera Consulting, Options for access pricing methodology, Upstream market reform, Prepared for Severn Trent, June 2015, p28
or wastewater displaced from the incumbent’s network associated with specific recycled water schemes.
Appendix E: Illustrative examples of retail-minus methodology

To highlight the signals for investment in water recycling provided to new entrants by different wholesale charges under different methodologies and assumptions, this appendix sets out several hypothetical but realistic examples of the pricing of a wholesale water and wastewater service being provided to a wholesale customer.

It assumes a development serviced by a WICA licensee with a recycled water plant, who provides a non-potable water service and wastewater service to 2000 end-use customers.\(^\text{142}\)

**Current wholesale framework (non-residential pricing)**

As summarised in Figure 15, if the price of wholesale services is set in line with single non-residential customer charges, wholesale charges in this case are approximately $565k per annum, leaving an operating margin of around $1.2m per annum.\(^\text{143}\)

The key issue with this approach to setting wholesale charges is that because the non-residential price does not reflect costs in supplying wholesale services to different locations (it is a single average postage stamp price), the operating margin is not indicative of relative long-term costs of supply by a new entrant compared to the incumbent. This sends no price signal as to where recycling is likely to be most cost-effective (such as where there are major capacity constraints in existing water or wastewater networks).

Setting wholesale charges based on ‘non-residential’ retail customer tariffs is not likely to promote cost-effective water recycling as:

- Incumbents are required to levy different charges for residential & non-residential customers.
- New entrants can take advantage of profitable arbitrage opportunities, rather than being more efficient. While scope for ‘cherry-picking’ is reduced where new entrant incurs significant costs in recycled water infrastructure, it is still present.

\(^{142}\) It assumes 80% of the wastewater at the site is treated, which requires the public utility (wholesale provider) to provide some potable water & dispose of some wastewater.

\(^{143}\) It assumes that total retail charges are approximately $1.8m per annum based on SWC’s retail potable water and wastewater regulated service and usage charges (that is, the WICA licensee sets retail charges for the development in line with SWC’s postage stamp prices).
Retail-minus framework

As summarised in Figure 16 and Figure 17, if the price of a wholesale service is set in line with IPART’s proposed retail-minus methodology, a different wholesale charge will apply and therefore a different price signal for entry will be sent – one which depends on the extent to which there are capacity constraints in the upstream drinking water and downstream wastewater networks (that is, the size of the avoidable costs).

In Figure 16, the wholesale charge is based on the Sydney Water retail charges for drinking water and wastewater,144 less amounts reflecting the reasonably efficient competitor cost of retail and reticulation, as well as a deduction for the long-run avoidable costs in upstream drinking water and downstream wastewater networks. In this example, we have made some conservative assumptions about the length of the water and wastewater reticulation network and the size of these avoidable upstream water costs ($1.30/kL for water as suggested by IPART’s 2017 wholesale final report based on the LRMC of bulk water in the 2016 Sydney Water review; and $1.10/kL for wastewater).

While in this example the wholesale charge ($959k per annum) is higher than the single non-residential charge under the current wholesale pricing framework, it provides a considerably higher margin that simply deducting the retail and reticulation costs, which

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144 The total retail charges are approximately $1.8m, based on SWC’s retail potable water and wastewater regulated service and usage charges.
appears to be the approach underpinning some of the impact modelling conducted by stakeholders to date.

The key point here is that the avoidable costs in the upstream drinking water and downstream wastewater networks in IPART’s retail-minus methodology represent a significant component of the incumbent’s LRIC of providing the relevant service. If a new entrant can build and operate new assets to provide those services at a cost below the incumbent’s LRIC, then under the retail-minus methodology it will be able to enter the market to do so, resulting in lower costs (and lower charges for water-related services) to society.

Figure 16: Case study 2: Retail-minus framework (base case)

In Figure 17, the wholesale charge incorporates a higher value for the long-run avoidable costs, reflecting assumed capacity constraints in the upstream drinking water and downstream wastewater networks. In this example, we have assumed a LRMC of $3/kL for drinking water and $5/kL for wastewater, reflecting emerging capacity constraints in parts of the WaterNSW and Sydney Water networks.

Applying these higher deductions for long-run avoidable costs (via the facilitation costs as part of IPART’s formula) results in a significantly lower wholesale charge (around $511k per annum) that is below the wholesale charges under the current framework (see Figure 17). In turn, this provides a higher operating margin for wholesale customers, sending a pricing signal to facilitate more entry as now there is a greater prospect that the
entrants’ long-term forward-looking costs will be lower than the incumbent utility’s long-term forward-looking costs.

Figure 17: Case study 3: Retail minus framework (capacity constraint case)

Source: Frontier Economics

As summarised in Figure 18, different wholesale pricing methodologies will provide different operating margins for new entrant providers of recycled water, and different signals for entry (as represented by the difference between the final retail charges in the red bar at the left and each of the bars to the right showing the wholesale charges under different methodologies and assumptions). This shows that the retail-minus approach signals where water recycling will be most cost-effective.
Figure 18: Current wholesale framework (non-residential pricing) vs retail-minus framework: Comparison of wholesale charges

Source: Frontier Economics
Appendix F: Potential for double counting under IPART’s retail-minus methodology

Background

It is not yet fully clear how IPART will apply its methodology in practice, as IPART’s framework entails undertaking scheme-specific reviews to determine wholesale charges, including the value of any avoided upstream or downstream costs to be reflected in ‘net facilitation costs’. However, IPART’s report provided some indication of its likely approach:

- In calculating the ‘retail’ component for potable water wholesale charges, the retail water usage price would be applied to the wholesale volumes measured at the point of wholesale connection.\(^\text{145}\)

- In calculating avoidable bulk water supply costs, the LRMC of water supply could be applied to the volume of potable water displaced (we therefore assume a similar approach for wastewater).\(^\text{146}\)

As noted in section 8.1, Sydney Water expressed concern that the avoided costs associated with reduced potable water usage would already be accounted for in reduced volumetric charges (due to reduced demand because the wholesale customer produces its own recycled water) as part of the calculation of the retail-minus wholesale price, so that inclusion of the suggested minuses/avoided costs would be double counting.

Any such double counting could result in wholesale charges that are too low, which would not be consistent with facilitating cost-effective water recycling.

To assess this claim, we have developed a stylised example.

Stylised example

Key assumptions

Suppose there is a development comprising 10 residential customers, each of whom uses 10 kl of water (six for potable uses and four for non-potable uses). The development can either be serviced traditionally by the incumbent\(^\text{147}\) or by a new entrant with a recycled water plant and ‘last mile’ reticulation network.

The incumbent would supply the 100 kl of water for potable and non-potable uses, with no recycling. The incumbent treats 75 kl of wastewater.

\(^{145}\) IPART, Final Report, Appendix D, 2017

\(^{146}\) IPART, Final Report, Chapter 6, 2017

\(^{147}\) Assumes a water usage charge of $2/kl, no usage charge for wastewater, fixed service charge of $30/customer for water and $30/customer for wastewater
The recycled water plant would supply the 40 kl of water for non-potable use, with the 60 kl of potable water demand being purchased from the incumbent as a wholesale service.

The new entrant also supplies wastewater services to end-users via its recycling plant and disposes only 35 kl back to the incumbent’s wastewater network (as a wholesale service).

It is helpful to recognise here the nature of potential competition, which goes beyond mere on-selling:

- The new entrant is competing to supply 60 kl of potable water (via wholesale purchases), so for these volumes the contestable activities relate only to retail and reticulation services.
- The new entrant is competing to supply 40 kl of water for non-potable uses via its recycled water plant, so the contestable activities extend beyond retail and reticulation to bulk water supply.
- The new entrant is competing to supply wastewater services of 75 kl of which 35kl are via the incumbent’s network (so contestable activities are limited to retail and reticulation) and 40 kl are via its recycled water plant (so contestable activities extend to wastewater transport, treatment and disposal).

We consider three alternative scenarios where the long-run marginal cost of the incumbent for both water and wastewater services varies, as does the ‘non-LRMC’ or residual cost elements of the revenue requirements.\(^{148}\)

In the base case, where the incumbent is the supplier, its cost structure is as shown in Table 8 for each of the three scenarios.

In the case where a new entrant with a recycling plant now serves the development, the incumbent’s cost structure under each of the scenarios is as shown in Table 9, where the incumbents’ avoidable (forward-looking LRMC) costs are $120, $240 and $60 across the three scenarios respectively.\(^{149}\)

Table 8: Incumbent cost structure: base case

<table>
<thead>
<tr>
<th>Water cost structure</th>
<th>Scenario 1: Moderate LRMC</th>
<th>Scenario 2: High LRMC</th>
<th>Scenario 3: Low LRMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRMC costs</td>
<td>100kl x $2/kl = $200</td>
<td>100kl x $3/kl = $300</td>
<td>100kl x $1/kl = $100</td>
</tr>
<tr>
<td>Non-LRMC costs</td>
<td>$300</td>
<td>$200</td>
<td>$400</td>
</tr>
</tbody>
</table>

\(^{148}\) These scenarios have been defined in a way whereby the LRMC and or residual cost elements of the revenue requirements vary inversely so that the total revenue requirement of the incumbent is the same across each scenario.

\(^{149}\) Note it has been assumed here that the incumbent’s cost fall by an amount equal to the LRMC multiplied by the displaced volumes of water and wastewater (40 kl) now provided by the new entrant, while its non-LRMC or residual costs remain the same. In practice, reduced volumes are likely to cause the incumbent’s costs to fall only by a small amount (reflecting SRMC) in the short term, and by LRMC in the longer term.
<table>
<thead>
<tr>
<th>Total costs</th>
<th>$500</th>
<th>$500</th>
<th>$500</th>
</tr>
</thead>
</table>

**Wastewater cost structure**

<table>
<thead>
<tr>
<th>LRMC costs</th>
<th>Non-LRMC costs</th>
<th>Total costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>75kl c $1/kl = $75</td>
<td>$225</td>
<td>$300</td>
</tr>
<tr>
<td>75kl c $3/kl = $225</td>
<td>$75</td>
<td>$300</td>
</tr>
<tr>
<td>75kl c $0.50/kl = $37.50</td>
<td></td>
<td>$300</td>
</tr>
</tbody>
</table>

**Total Costs**

| $800 | $800 | $800 |

Table 9: Incumbent cost structure: new entrant with recycling plant

<table>
<thead>
<tr>
<th></th>
<th>Scenario 1: Moderate LRMC</th>
<th>Scenario 2: High LRMC</th>
<th>Scenario 3: Low LRMC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water cost structure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LRMC costs</td>
<td>60kl x $2/kl = $120</td>
<td>60kl x $3/kl = $180</td>
<td>60kl x $1/kl = $60</td>
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<tr>
<td>Non-LRMC costs</td>
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<td>$200</td>
<td>$400</td>
</tr>
<tr>
<td>Total costs</td>
<td>$420</td>
<td>$380</td>
<td>$460</td>
</tr>
<tr>
<td><strong>Wastewater cost structure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LRMC costs</td>
<td>35kl x $1/kl = $35</td>
<td>35kl x $3/kl = $105</td>
<td>35kl x $0.50/kl = $17.50</td>
</tr>
<tr>
<td>Non-LRMC costs</td>
<td>$225</td>
<td>$75</td>
<td>$262.50</td>
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<tr>
<td>Total costs</td>
<td>$260</td>
<td>$180</td>
<td>$280</td>
</tr>
<tr>
<td>Total Costs</td>
<td>$680</td>
<td>$560</td>
<td>$740</td>
</tr>
</tbody>
</table>

**Wholesale charges under IPART’s apparent formulation**

The wholesale charges that would apply under each scenario under IPART’s apparent formulation are shown in Figure 19. For simplicity, we have assumed zero deductions for avoided retail and reticulation costs.

The simple illustrative example demonstrates that deducting the avoidable long-run augmentation costs (as represented by LRMC) as an additional minus via the ‘net facilitation costs’ term under IPART’s apparent formulation does represent a form of double counting which could lead to wholesale charges not consistent with facilitating efficient entry.

Since (unlike most applications of retail-minus pricing) there is no ‘retail price’ for the displaced volumes from which these avoided costs are being deducted, the incumbent will be unable to compete with the new entrant even if it is equally efficient. In each example, the new entrant can undercut the incumbent by $80 (equal to the incumbent’s foregone revenues on the lower water sales), even where both have identical LRMCs.

This outcome arises because for the wholesale service volumes that a wholesale customer is receiving, the only elements being avoided are the retail and reticulation elements upstream or downstream of the bundled water or wastewater service. For the volumes
being displaced by the recycling plant, avoidable costs can only be deducted if a retail price is effectively being charged in the first place.

However, simply removing these deductions will in general not promote efficient entry either. In the first two cases, not deducting the net facilitation costs from the retail prices as levied on the volumes supplied to the wholesale customer will mean that the new entrant will not be able to compete with the incumbent, even though it may be equally efficient (that is, it has identical LRMCs). In the third case, it will still be able to out-compete the incumbent, even though it has the same LRMCs.
Figure 19: Retail-minus under IPART’s apparent formulation: stylised example

Wholesale charges under modified retail-minus

One option would be to modify the retail-minus formula to impose the same effective tax/subsidy on the new entrant as the incumbent:

- This could be achieved by deducting the value of the term (LRMC – retail usage charge) x displaced volumes, rather than just the LRMC x displaced volumes.
- The wholesale charge can then be seen more generally as being based on the incremental costs of the incumbent in supplying the wholesale water volumes plus a contribution/subsidy toward funding the departure from cost-reflective pricing.
- It still ensures wholesale charges embody the right signals as to where capacity constraints mean recycled water schemes are likely to be most cost-effective (such as when the incumbent’s LRMC is high, as in the second scenario).

This is shown in Figure 20. Under each of the scenarios, the margin for the new entrant is exactly equal to the LRMC of the incumbent. This implies that the wholesale charges now provide appropriate incentives for efficient entry.
Impact on incumbent’s revenue and cost recovery

Under the base case, where the incumbent serves the development, its total costs are $800 under each scenario, which it recovers from end-customers through the fixed service charges for water and wastewater and the water usage charge.

Where the new entrant with a recycled water plant serves the development, the incumbent’s total costs fall under each scenario (as explained in the earlier Table 9), reflecting the lower volumes of water and wastewater services it now provides. Its revenue is now comprised solely of wholesale charges levied on the new entrant. Under IPART’s apparent formulation, these wholesale charges fall short of the (lower) total costs of the incumbent. Under the modified retail-minus methodology, the wholesale charges are just sufficient to allow recovery of the incumbent’s costs.

It can also be seen that the wholesale charges under this modified retail-minus methodology are the same as those that would apply under a cost of service approach. These would involve levying usage charges equal to the relevant LRMCs and a service charge designed to raise revenue exactly equal to the incumbent’s fixed costs under each scenario, as shown in Table 8.
Table 10: Incumbent’s revenue and cost recovery under alternative scenarios

<table>
<thead>
<tr>
<th></th>
<th>Scenario 1: Moderate LRMC</th>
<th>Scenario 2: High LRMC</th>
<th>Scenario 3: Low LRMC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Incumbent serves development</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Total costs</td>
<td>$800</td>
<td>$800</td>
<td>$800</td>
</tr>
<tr>
<td>Total revenues</td>
<td>$800</td>
<td>$800</td>
<td>$800</td>
</tr>
<tr>
<td><strong>New entrant serves development</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total costs</td>
<td>$680</td>
<td>$560</td>
<td>$740</td>
</tr>
<tr>
<td>Total revenues from wholesale charges: IPART formulation</td>
<td>$600</td>
<td>$480</td>
<td>$660</td>
</tr>
<tr>
<td>Total revenues from wholesale charges: modified retail-minus formulation</td>
<td>$680</td>
<td>$560</td>
<td>$740</td>
</tr>
</tbody>
</table>
12 Appendix G: Retail (Wholesale)-minus pricing in the UK water sector

Context

The most recent decision by the regulator, IPART, set out its methodology to regulate charges for wholesale services provided by the public utility incumbents to new supplier licensees under a retail-minus methodology (where the minus reflects the cost of a ‘reasonably efficient competitor’, plus net facilitation costs (see attached IPART Final Report decision).

Some new private entrants have alleged this to be a barrier to entry. One of these new entrants, Flow Systems, has contended that retail-minus is “internationally discredited” and legally banned including in the UK water sector.150

This appendix provides a summary based on Frontier Europe’s experience in the UK water sector of the use of retail (wholesale)-minus pricing. In particular:

○ We explain why retail (wholesale)-minus pricing is a highly relevant pricing principle for facilitating effective competition ‘for the market’.

○ We examine in more detail the CAT decision regarding Albion Water, referred to by Flow Systems, and explain why this should not be interpreted to mean that a retail (wholesale)-minus pricing scheme itself would not be appropriate.

○ In contrast to Flow System’s claim that ‘retail-minus is no longer applied in the UK water sector’, we show recent examples of retail (wholesale)-minus pricing being proposed by Ofwat to facilitate new entries into particular segments of the supply chain.

In conclusion, retail (wholesale)-minus price provides a has sound economic foundation to price access to a part of an existing monopoly network; the CAT decision on Albion Water does not rule out retail (wholesale)-minus pricing as an appropriate pricing scheme in general; and Ofwat is now looking to make wider use of wholesale-minus pricing within the UK water sector.

Difference between cost-plus and retail (wholesale)-minus pricing

Using the power of the Water Act 2014, Ofwat promotes competition ‘for the market’ by facilitating new entrants into the existing value chain traditionally owned and operated by regional monopolies. These new entrants enter into the market by providing service

150 Flow Systems 2016, Submission to IPART April 2016 Discussion Paper: Prices for wholesale water and sewerage services
only on a part of the value chain, while paying an access price (or equivalent) for the rest of the value chain (still owned and operated by the monopolies).

In principle, there are several ways to set the access price of the wholesale service that an incumbent water company provides to a new entrant for the service up to the boundary of the new entrant’s asset.

A cost-plus approach aims to estimate the efficient costs of all service elements purchased by a third party, including an appropriate margin. This reflects the incumbent water company’s efficient incremental costs of supplying wholesale water and wastewater service up to the boundary between its network and the asset of the new entrant.

Retail-minus is an alternative approach to the cost-plus approach. In the UK, due to the separation of retail businesses from the incumbent wholesale companies, the relevant concept becomes a wholesale-minus approach. Wholesale-minus starts with the incumbent water company’s wholesale tariff(s) and deducts all the costs of the services (including an appropriate margin) that the incumbent water company would no longer provide.

These two approaches are examined further below.

**Cost-plus approach**

A cost-plus approach provides strong incentives for the incumbent to become more efficient in the provision of non-contestable elements of the service to the boundary of a new development. At the same time, it allows competitors to challenge the incumbent for the contestable elements of the service. A cost-plus approach is often applied in other regulated utilities. For example, access charges in the telecommunications sector are often set based on the forward-looking LRIC of an efficient hypothetical operator. This aims at achieving productive efficiencies in the provision of these non-contestable services, while at the same time promoting competition in the contestable services.

**Wholesale-minus approach**

A wholesale-minus approach determines the access price by starting from the incumbent’s standard wholesale price, from which an efficient level of the cost of owning and operating the contestable services is then deducted.

A wholesale-minus approach allows new entrants to compete for contestable services in the value chain. Competition from new entrants provides incentives for incumbent water companies to be efficient in the provision of the contestable services.

Even though a cost-plus approach could in principle achieve a similar outcome, the regulatory burden on new entrants and incumbent water companies could potentially be larger under a cost-plus approach than a wholesale-minus approach. To decide on a determination under a cost-plus approach, one would need to estimate the cost of supply for services that represent a large proportion of total costs. Under a wholesale-minus approach, this assessment would be limited to a much smaller set of costs. A wholesale-minus approach could limit the risk of incurring errors.
CAT determination does not rule out retail-minus pricing

Flow Systems refers to the CAT decision on Albion Water and Shotton Paper. In our view, it has mischaracterized the CAT decision regarding the ECPR and retail-minus pricing approach.

Albion Water Limited appealed to the CAT against Ofwat’s pricing decision from May 2004, where Ofwat determined that the price of 23.2p/m³ (“the First Access Price”) offered by Dŵr Cymru Welsh Water (DCWW) to Albion in March 2001 for the “common carriage” of non-potable water across the Ashgrove system, did not constitute an abuse of a dominant position contrary to the Section II prohibition imposed by section 18 of the 1998 Water Act.

Shotton Paper is supplied with non-potable water via the Ashgrove system, which is owned by DCWW. The water is extracted by United Utilities. Until 1999, Shotton Paper was supplied by DCWW. In 1999, Albion obtained an inset appointment to operate as a statutory water undertaker for the premises of Shotton Paper. Under the various supply arrangements between the parties, DCWW sold the water in question to Albion at the premises of Shotton Paper under a Bulk Supply Agreement at a price of 26p/m³.

Albion re-sold the water to Shotton Paper under its supply agreement with the latter at the same price of 26p/m³. In 2000, Albion requested DCWW to quote a common carriage price for the partial treatment and transportation of water through the Ashgrove system. Albion’s proposal was that Albion would buy the water directly from United Utilities, and resell the water to Shotton Paper, paying DCWW a price for the use of the Ashgrove system.

In February 2001, DCWW quoted Albion a common carriage price of 23.2p/m³. Albion complained to Ofwat in March 2001 that the access price was (i) excessive and (ii) gave rise to a “margin squeeze”. The alleged margin squeeze arose because Albion could not acquire the water from United Utilities (at a cost of over 3p/m³), pay the access price of 23.2p/m³, and resell the water to Shotton Paper, except at a price above Dŵr Cymru’s retail price of 26p/m³.

In May 2004, Ofwat rejected Albion’s complaint. On the allegation of excessive pricing, Ofwat found that on an average accounting cost basis a common carriage price of 19.2p/m³ would have been justified, comprising 3.2p/m³ for treatment costs and 16p/m³ for ‘distribution’ costs. In addition, Ofwat applied a retail-minus approach (ECPR), which involved taking the retail price and deducting the short-term avoidable cost of the incumbent avoiding the supply. Applying that approach, Ofwat found that an access price of 22.5p/m³ would have been justified.

The CAT considered the reasonableness of access pricing decisions reached by Ofwat. The findings of the CAT included the following:

- The ECPR approach applied in the Ofwat decision would insulate the incumbent water company from competition, require the entrant to support the incumbent’s overheads and require the entrant to be ‘super-efficient’ compared to the incumbent.

The CAT stated that “[w]hile, in view of the Tribunal’s other findings, it is
unnecessary to decide whether ECPR is in all circumstances intrinsically contrary to the Section II prohibition, such an approach to pricing at the very least requires close scrutiny under that prohibition”. [para 32]

- The CAT decided that the “ECPR approach used in the Decision cannot be safely relied on in this case since (i) the ‘retail’ price used in the calculation is not shown to have been reasonably related to costs; and (ii) the evidence strongly suggests that that price was excessive.” These findings related to the setting of the retail price itself rather the ‘minus’ component. [para 33]

- A specific concern with the application of ECPR in the Decision was that the ‘minus’ component was based on an estimate of short-run avoidable costs. The CAT cited evidence that the calculation should be long-run avoided costs averaged across the likely scale of entry. [para 33]

- In addition, the CAT considered the arguments used in favour of ECPR, namely that “(i) ECPR enables incumbents to continue to recover their sunk and common costs, and to fund their investment requirements; (ii) ECPR protects customers ineligible to benefit from competition from increased costs, particularly the costs of stranded assets; and (iii) ECPR maintains the cross-subsidies implicit in regional average pricing”. The CAT found that these arguments were not relevant to the specific circumstances of the case, without commenting on their more general relevance. [paras 36-40]

Overall, the CAT’s conclusion was the ECPR approach in the Decision was not a safe methodology to use in that particular case. While highlighting some general concerns about the ECPR approach, the CAT did not reach a finding on the general use of ECPR for setting access prices.

**Recent precedent of retail (wholesale)-minus pricing**

While the CAT’s findings on the general ECPR (retail-minus) approach was inconclusive, Ofwat has recently referred to the wholesale-minus pricing principle in a number of cases related to opening up a part of the market to competition. Examples include the new connections market and water resource market.

The former refers to where new entrants, called New Appointments and Variations (NAVs), compete against incumbents to build and run the ‘last-mile’ network that connects incumbent companies existing networks to residential houses in new property development areas. The latter refers to new water resource providers paying incumbent water companies for access to the water network in order to carry out bilateral trade with water retailers.

**NAV bulk supply pricing**

The NAV regime in England and Wales provides a mechanism to facilitate new entry into the sector and to allow those already present to expand into other geographic areas. The introduction of this form of competition ‘for the market’ was intended to challenge
incumbent water companies, drive efficiencies and stimulate innovation. It was hoped that it would benefit developers and end-customers through lower prices, better quality of services, innovative and environmentally friendly solutions and more choice.

A new development requires the roll-out of on-site infrastructure that needs to be connected to the incumbent water company’s existing water and/or waste water mains. A developer can do this work itself or sub-contract it to a third party. The latter could be the incumbent water company, a Self-Lay Organisation (SLO) or a NAV. If the developer chooses a NAV, it not only builds the on-site infrastructure, but also provides some services to the end-user customers on the site. These can include retail, other on-site services and, in some rare instances, also water and waste water services.

In December 2016, Ofwat commissioned Frontier Economics to:

- Investigate how the NAV market is working
- Consider the extent to which any factors currently act to prevent, distort or restrict effective competition
- Set out options that Ofwat might consider to address the issues identified.

Frontier’s study found that the bulk supply price could be a key factor that determines whether or not new entrants (NAVs) are facing barriers to enter the market. More specifically, Frontier’s study found that the largely cost-based Large User Tariffs may create barriers for entry at relatively smaller development sites, and proposed a wholesale-minus approach (consistent with ECPR) to setting the bulk supply price for NAVs.

Ofwat published the Frontier study, together with a consultation document proposing new ways for incumbent water companies to set bulk supply charges for NAVs. In this consultation document, Ofwat looked at the cost-plus approach and the wholesale-minus approach, and examined the high-level pros and cons of the two in terms of how they perform regarding:

- Efficient on-site entry – the approach ensures that efficient entrants have an incentive to compete for a developer’s services
- Productive efficiency – the approach provides incentives to minimise the costs of provision to customers
- Risk of errors – the approach minimises the risk of Ofwat making errors in a determination.

Taken together, Ofwat considered that these criteria, if met, would lead to good results for developers and end-customers. On the basis of its high-level assessment, Ofwat has reached a preliminary conclusion that a wholesale-minus approach would be preferable for the purpose of setting the bulk supply price for NAVs.

In particular, Ofwat is concerned that a cost-plus approach may fail to achieve a level playing field between incumbent water companies, SLOs and NAVs. In particular, because of the geographic average nature of retail and wholesale tariffs in the water
sector, a cost-plus approach may prevent NAVs from competing for developers’ services, even when they are efficient.

**Access pricing for water resources**

As part of the Water 2020 programme, Ofwat is proposing to set separate wholesale price controls for the network component and the resource components of the wholesale water and wastewater businesses. In its latest methodology paper, Ofwat has proposed an access pricing scheme for the incumbents’ non-contestable network assets for potential new entrants into the water resource market to facilitate the bilateral market between the new water resource provider and the retailer. This access pricing scheme is akin to that of a wholesale-minus approach:

- First of all, a cost-based charge will remunerate the incumbent for the costs of providing network plus water services. This will be the starting point for the access price that a new water resource entrant has to pay to use the incumbent’s network to carry out bilateral trade with a retailer to provide the water supply to customers.

- An equalisation payment is made, when applicable, from the incumbent to the new entrant to ensure that efficient third party providers, who are able to provide additional water resources at lower cost, are able to compete against incumbents in the bilateral market.

The equalisation payment is a discount on the common access price to enable third party providers to compete with incumbents on an equal footing in the bilateral market. It would apply to third party providers making water available in Water Resource Zones (WRZs) where the incumbent is proposing to build new water resource options. It will be set to reflect the difference between the average price of water resources and the cost of developing new water resources in each WRZ.

The payment is structured in this way because developing new water resources is typically considerably more costly than is suggested by the cost of existing water resources. Without the equalisation payment, it is unlikely that third party providers would be able to offer retailers a commercially attractive proposition. This is because, in order to match the incumbents’ wholesale rates, they would only be able to charge retailers the incumbent’s price of water resources, which would be insufficient to cover the higher cost of new water resources.

Once the bilateral market opens, and during 2020-25:

- For WRZs where there is no new capacity development beginning in the period, the equalisation payment would be zero.

- In all WRZs where an incumbent is proposing to begin work on a new option, whether or not the option will deliver new capacity in 2020-25, the equalisation payment would be set to reflect the difference between the average price of water resources and the cost of developing new water resources in each WRZ.
The exact design of this equalisation payment is still under consultation, but it is clear that it will represent a form of wholesale-minus access charging scheme for the use of the incumbent network services, with the ‘minus’ component reflecting the incremental cost that the incumbent would have to incur if it were to undertake to provide the new service.
Appendix H: Broader regulatory and policy settings

This section provides an overview of the broader regulatory and policy settings in metropolitan NSW.

Broader policy and regulatory settings also have the potential to affect the uptake of recycled water initiatives. These include:

- Environmental regulation
- Health regulation
- Planning and development approvals.

**Environmental regulation**

Several aspects of the supply of urban water (including recycled water), wastewater and drainage services impact on the environment, including:

- The abstraction of water impacting on flows in waterways
- The impacts of treated and untreated wastewater discharges and stormwater runoff on the receiving environment including waterways, groundwater and land from irrigation
- The impact of diffuse source pollution including stormwater
- Odour and noise emissions primarily associated with treatment infrastructure
- The management of solid and other waste by-products of treatment processes.

Environmental regulation seeks to manage these potential impacts and encompasses:

- Specification of required environmental flows
- Establishing the health of receiving waterways and then determining, monitoring and enforcing associated discharge licence conditions/standards for sewage treatment plants discharging into receiving environments including rivers, oceans, groundwater and land
- The establishment of guidelines for the management of stormwater
- Monitoring the management of chemicals used in drinking water, wastewater and recycled water schemes (including transport, receipt, storage and management of hazardous chemicals)
- Establishing and managing approval processes for infrastructure work that impact on the environment (such as treatment plants and recycled water schemes)
- Overseeing the management and monitoring of odours, noise, waste and biosolids emanating from water sector processes.
In NSW, the *Protection of the Environment Operations Act 1997* (POEO Act) allocates responsibilities for pollution prevention and control to the Environment Protection Authority (EPA), local councils and other public authorities. EPA is responsible for:

- Regulating activities listed in Schedule 1 of the POEO Act (including wastewater treatment systems) and the premises where these scheduled activities are carried out
- Ensuring compliance with environment protection licences
- Regulating activities carried out by the state or a public authority.

Premises that undertake scheduled activities and meet the licensing threshold are licensed and regulated by DECCW. Environment protection licences (EPLs) issued under the POEO Act set environmental performance requirements. Licences may specify a required performance outcome or a specific environmental management practice. Licence conditions take into account factors such as the surrounding environmental conditions, the type of activity and the available technology. Pollution-reduction programs and pollution studies are often attached to licences, requiring licensees to carry out work within a specified timeframe to comply with environmental requirements.

Environmental regulation can affect recycled water directly and indirectly:

- Directly, recycled water schemes can be affected through environmental approval processes, as well as through regulation of the impact of recycled water on the environment when it is used. In particular, guidelines on use of effluent for irrigation issued by the NSW Government\(^{151}\) outline how the beneficial use of effluent can be accomplished in an ecologically sustainable and socially responsible way. The guideline is educational and advisory, not a mandatory or regulatory tool. Discharge of recycled water to waterways is also regulated as a pollutant.

- Indirectly, the uptake of recycled water can be affected through regulation of other parts of the supply chain. For example, regulation of wastewater discharges can impact on the cost of wastewater services and make recycled water attractive as an alternative to wastewater treatment and disposal. Use of high quality recycled water can also potentially be used as environmental flows (as per the St Mary’s advanced water treatment plant).

### Health regulation

The provision of recycled water could have impacts on public health – for example, microbial pathogens in wastewater are a major concern for human health – and the key health requirements are around ensuring that recycled water is treated to a standard that is appropriate for its intended use (currently limited to non-potable uses) and that recycled water that is unfit for its intended use is not supplied to consumers. If recycled water is fit

for the intended use – by managing the level of wastewater treatment and/or use of recycled water – exposure to pathogens will be low and infection unlikely.¹³²

Establishing, monitoring and enforcing compliance with recycled water standards is a key element of managing potential health risks associated with water recycling and reuse. National Guidelines for Water Recycling have been released through the National Water Quality Management Strategy and adopted by NSW. These guidelines focus on human health risk assessment and management and are most relevant where there is human exposure to recycled water such as in urban reuse schemes.

The Australian Guidelines for Water Recycling (AGWR, 2006) are made up of several guides such as:

- Managing health and environmental risks arising from recycling water – Phase 1 (2006)
- Augmenting drinking water supplies – Phase 2 (2008)
- Harvesting and reusing storm water (2009)

Prior to the introduction of the AGWR, the National Water Initiative noted concerns that public health regulation had been excessively conservative and/or too prescriptive, constituting an institutional barrier to water recycling. The AGWR are intended to provide a flexible, robust, scientifically defensible and transparent method to manage a recycled water scheme while protecting public and environmental health.

Many jurisdictions including NSW rely on or reference the AGWR. For example, under its Operating Licence, Sydney Water must maintain a Recycled Water Quality Management System that is consistent with the AGWR, except to the extent that NSW Health specifies otherwise.

Public health and environmental regulation does not prohibit use of recycled water for potable purposes if it complies with ADWQ guidelines (AGWR: Augmentation of Drinking Water Supplies 2008) and related approvals.

NSW Health does not have a published policy statement on potable reuse, but advises that a comprehensive (quantitative) human health risk assessment would be necessary to determine if a scheme could be safely implemented (as per the AGWR) and has general powers under the Public Health Act to issue orders to suppliers of water to ensure public health risks are managed.

¹³² Given the risk relates to the concentrations of pathogens in the recycled water and the amount of water ingested.
Planning and related regulation

The uptake of recycled water can also be influenced by broader land use and infrastructure planning and related regulation.

This includes strategic or master planning to determine approaches to servicing new growth and brownfield developments.

At the regional level, the Greater Sydney Commission (GSC) is responsible for leading metropolitan planning for the Greater Sydney region. In November 2017, the GSC released a Draft Regional Plan for Greater Sydney, which proposes reshaping Greater Sydney as a metropolis of three cities – the Western Parkland City, Central River City and Eastern Harbour City – over the next 40 years. The Plan sets the planning framework for the region and seeks to integrate land use, transport and infrastructure planning between the three tiers of government and across State agencies. It also seeks to inform district and local plans and the assessment of planning proposals, assist infrastructure agencies to plan and deliver for growth and change and to align their infrastructure plans to place-based outcomes, and inform the private sector and the wider community of the growth management and infrastructure investment intentions of government. Outside of Sydney, the NSW Department of Planning and Environment (DPE) has developed Regional Plans for the remainder of NSW, including a draft Metropolitan Plan for Greater Newcastle.

The principal legislation regulating land use in NSW is the Environmental Planning and Assessment Act 1979 (EP&A Act) administered by the DPE. The Act governs planning and related development approvals by local government and other relevant agencies and provides for a number of key instruments including:

- A Local Environmental Plan (LEP) developed for each local government area to guide development, planning decisions and protect natural resources. This can include waterways and heritage within local government areas, and the zoning and development controls that allow councils and other consent authorities to manage the ways in which land is used
- A Development Control Plan (DCP), which provides detailed planning and design guidelines to support the planning controls and is prepared and adopted by councils. It identifies additional development controls and standards for addressing development issues at a local level
- State environmental planning policies (SEPPs), which provide the planning rules for specific environmental matters and contain particular development controls to protect or manage certain environmental values of State or regional environmental planning significance.

All of these instruments can affect the uptake of recycled water by defining the processes for and imposing conditions on planning approvals for new development, including water-related infrastructure, and imposing restrictions on the use of recycled water. Of particular relevance for recycled water is the NSW Building Sustainability Index (BASIX),
which mandates energy and water savings targets for new developments.\textsuperscript{153} To achieve the BASIX target, developments need to incorporate alternative water supplies such as rainwater tanks or recycled water systems.

\textsuperscript{153} Under provisions contained in the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) and State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 (the BASIX SEPP)
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