



LIFTING PERFORMANCE

IN THE WATER SECTOR

JUNE 2021

**Response to IPART's Discussion Paper 1
Regulating Water Businesses Special Review**



Acknowledgement of Country

Hunter Water operates across the traditional country of the Awabakal, Birpai, Darkinjung, Wonaruah and Worimi peoples. We recognise and respect their cultural heritage, beliefs and continuing relationship with the land, and acknowledge and pay respect to Elders past, present and future.

Mariin Kaling - All for Water

Saretta Fielding

Saretta

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KEY MESSAGES

IPART invited stakeholders to have their say on potential reforms to lift the performance of the water sector, as part of its special review of how it regulates water businesses. Hunter Water sees IPART's preliminary positions as steps in the right direction.

 IPART's preliminary position	Our assessment	 Comment
Support longer determination periods to promote ongoing engagement and long-term planning, provided there is credible evidence that these proposals are in the best long term interests of customers		The determination period should be principle-based, supported by a clear and comprehensive framework to manage revenue and cost risks. Those principles indicate 5 or 6 years is about right.
Develop a framework for customer choice pricing to allow for a personalised service where it would deliver a win-win for the customer and the business		We support a move towards service offerings that better reflect customers' needs, however we do not envisage widespread application in the short term
Provide the option for businesses to propose different forms of price controls (including a revenue cap)		A revenue cap makes sense for us for water services. Preferred price structures should be set between price reviews.
Introduce a shadow price for leakage to encourage efficient water conservation		A shadow price should apply to real losses, as the controllable part of leakage
Establish a Regulators Advisory Panel to promote information sharing and better regulatory decisions		A panel should be trialled for at least one price review and determination period
Have not formed a preliminary view about how best to align pricing decisions and performance standard setting to enable businesses to make trade-offs between the two		Optimal performance standards should be set during price reviews so that water businesses and customers focus on price-quality trade-offs as a whole.
Have not formed a preliminary view about whether to set performance standards at minimum levels or optimal levels to ensure ongoing performance by businesses		Performance standards for service interruptions should be set in our operating licence at minimum levels

1. A LONG-TERM FOCUS

Hunter Water supports IPART's longer-term focus, including its proposals for:

- **longer determination periods** to enhance price stability, incentives for efficiency gains, and reduce regulatory costs
- **strategic meetings with IPART early in the regulatory cycle** to foster a shared understanding of the key issues and challenges
- **'framework reviews'** to enhance regulatory certainty and transparency, and promote improvements to key elements of the regulatory framework over time.

These proposals would all enhance regulatory certainty and provide a stable environment to support long-term planning, investment and asset management.

However, the following complementary measures are required to allow a longer-term focus and lift the performance of the sector:

- a clear and comprehensive risk management framework - to incentivise risk management and ensure prices reflect efficient costs
- greater upfront clarity around how IPART will assess the efficiency of expenditure proposals – discussed in section 5.1
- greater clarity about how the results of the financeability test will be interpreted and used by IPART in future price reviews.

1.1. A clear and comprehensive risk management framework

Water businesses can be exposed to a range of risks that may impact their costs of supplying services or the revenue they receive from these services. These risks can mean that the costs a water business incurs and/or the revenues it receives in providing its services over a determination period may differ from those assumed by IPART in setting prices.

In some cases, a difference between a water business's costs and revenues may be a reasonable consequence of incentive regulation – eg, if cost under-recovery occurs due to inefficient risk management practices, this provides an ongoing incentive for improvement.

However, if the cost under-recover is due to unforeseeable or uncontrollable events when operating efficiently (eg, due to new regulatory requirements, major and irregular weather events or cyber security attack), then customers will face prices that do not reflect efficient costs and may make inefficient consumption decisions.

There are significant benefits from longer determination periods, particularly as they strengthen the opportunity and incentives for water businesses to pursue efficiency gains and promote a longer-term focus. However, as IPART has noted, there are also risks, as longer determination periods create the risk that prices become less cost-reflective, due to changes in government policy, population growth and a range of other factors. This highlights the importance of ensuring longer-determination periods are supported by a sound framework for managing risks.

IPART's Discussion Paper recognises the importance of risk – including how it is best allocated and managed – in reviewing the different forms of price control.¹

We consider there is scope for IPART to establish a clear and integrated risk-management framework. This would comprise a clear assessment process, risk management principles and a suite of well-designed and applied risk management measures.

We believe a risk-management framework can promote the long-term interests of customers by:

- ensuring efficient customer price signals, intra-period
- minimising unnecessary price volatility
- maintaining incentives for water businesses to manage risks well
- supporting efficient cost recovery and financial viability

¹ IPART, 2021, Lifting performance in the water sector, Discussion Paper, Special Review, page 17.

- providing clarity about how risks will be managed and the process for assessing cost and/or revenue adjustment 'applications'
- enhancing the opportunity for longer determinations, which can strengthen efficiency incentives, promote a long-term focus and reduce unnecessary regulatory burden.

A risk management framework should include:

- a process for assessing key risks faced by the water businesses
- principles that determine the appropriate
 - allocation of risk between water businesses and their customers
 - compensation or allowance for water businesses to efficiently manage risk, where they bear this risk
 - risk management measures to apply in price determinations – including clarity on when and how they would apply
- a suite of well-designed risk management measures, consistent with the above principles, including measures to account for both cost and revenue risks.

We outline key elements of such a framework further below.

1.1.1. Elements of a risk management framework

A risk management framework should involve a clear process for:

- identifying and assessing key risks, including each risk's potential impact on the water business (costs and revenues) and its customers
- determining how the regulatory framework should most efficiently address the potential impact of each risk, taking into account best practice principles of risk allocation.

This could involve the water businesses presenting IPART with information on its key residual risks (after controls) and proposing ways these should be addressed, consistent with IPART's principles for risk management.

1.1.2. Principles for risk allocation and management

Principles for risk management should be consistent with providing appropriate incentives for regulated businesses and ensuring that prices reflect efficient costs. For example, they could include:

- Risk should be allocated to the party best placed to manage the risk, to incentivise efficient behaviour. If it is within a water business's reasonable control to manage the likelihood and/or consequence of an event occurring, allocating the risk to the business provides it with an incentive to efficiently manage or bear the risk (provided it receives an appropriate allowance). However, if a risk is not within the business's reasonable control, allocating the risk to it can mean that customers end up paying more than they should (to compensate it for bearing or trying to manage the risk) or service outcomes are compromised over time (eg, if a business's management attention is unduly focused on risks it cannot control).
- There should be reasonable regulatory certainty and minimal unnecessary administrative costs. This is important for providing confidence to water businesses to invest in, and maintain, their assets, pursue efficiency gains, and innovate over time in the long-term interests of customers.
- Prices should allow regulated businesses to recover the costs of efficiently managing risk or receive compensation for the risks they bear. Prices should allow water businesses to recover the efficient costs of managing business-specific risks (eg, the costs of purchasing an efficient level of insurance to manage a particular risk, or the efficient cost of security or safety measures) and provide adequate compensation when utilities bear systematic risks. It should not include compensation for risks borne by customers (eg, compensation for the cost of volatility in any input prices or volumes that may be passed directly though to customers).
- Risks should be allocated symmetrically. That is, the allocation of risk should apply equally to cost or revenue increases and cost or revenue decreases.

1.1.3. Managing revenue risk

IPART's Discussion Paper recognises that different forms of price control distribute revenue risk differently between water businesses and their customers, and can be used to manage risk:

- Price caps: the water business bears volume-related risk to the extent that price structures do not match the business's cost structure
- Revenue caps: customers bear volume-related risk, through potential changes to price over the regulatory period
- Hybrid price and revenue caps: a price cap may be in place, but measures such as revenue volatility allowances or demand volatility adjustment mechanisms can mitigate risk to the utility of over or under-recovering its efficient costs.

Our views on these price control options are provided in section 2. However, this just considers various forms of managing revenue risks.

1.1.4. Managing risks beyond the form of price control

There are various ways the regulatory framework can address or manage risk:

- Rate of return: water businesses should be compensated for bearing systematic risks through the rate of return they receive on their regulated cost bases, consistent with regulated rate of return principles.
- Cost allowances: water businesses should be able to recover their efficient costs of managing risk. As noted by the Australian Energy Regulator (AER), management strategies include prevention (avoiding the risk), mitigation (reducing the probability and impact of the risk), insurance (transferring the risk to another party) and self-insurance (putting aside funds to manage the likely costs associated with a risk event). An efficient water business will manage its risks by employing the most cost-effective combination of these strategies.²
- Cost pass-through mechanisms: where event avoidance, mitigation, purchasing insurance or self-insurance under ex ante efficient expenditure allowances are either unavailable or inappropriate, then cost pass-through mechanisms can ensure that prices reflect efficient costs without compromising incentives for efficient risk management.

Cost pass-through mechanisms, in particular, can play an important role in accommodating longer determination periods. IPART's 2020 Determination introduced flexible water pricing during drought conditions. This approach recognised the important role that cost pass-throughs can play in ensuring water businesses recover their efficient costs for uncertain events over which they have no control. The alternatives to IPART's approach in these determinations would have been:

- including 'expected value' estimates of the efficient costs, frequency and duration of drought in the water business's expenditure allowances, and hence prices, upfront – in which case, Sydney Water and Hunter Water's water prices would not reflect efficient costs and they would over-recover if drought does not occur as forecast
- including no estimates of the efficient costs of drought in prices and no pass-through mechanism – in which case the water business's prices would not reflect efficient costs and they would under-recover their costs in times of drought.

We consider IPART's approach to cost pass-through mechanisms would be enhanced if it were to conduct in-period assessments and pass through of efficient costs in response to specific, pre-defined events. This could be designed in a way that ensures:

- prices reflect efficient costs, and the regulated business recovers its efficient costs and remains financeable
- the regulated business maintains incentives to manage controllable risks and costs
- there is no undue price volatility.

We would be happy to work with IPART on this concept in the next stages of the review.

² Australian Energy Regulator (AER) 2020, Draft Decision Powercor Distribution Determination 2021 to 2026, Attachment 15: Pass through events, September 2020, p. 15-11.

1.2. Greater clarity around the financeability test

IPART's financeability test is an important element of the regulatory framework.

However, IPART needs to provide greater clarity around how it interprets the results of its financeability assessment and the process it follows when the financeability benchmarks are not met under a price determination. In the 2020 draft water price determinations, Hunter Water (along with Sydney Water and WaterNSW) failed the FFO/debt test.³ IPART found there was no financeability problem and made no adjustments to the draft determinations to address the financeability concern.

We consider that IPART's reasoning was unclear, and it did not appear to have followed the decision-making process that it has established for its financeability tests.

Regulated businesses need to be financeable to innovate and invest efficiently in services that promote the long-term interests of customers and lift the performance of the water sector.

It is important for IPART to clearly and consistently explain how it assesses financeability, how it interprets the results, and the process it will follow if we fail specific metrics.

³ IPART, 2020, Review of prices for Hunter Water Corporation: From 1 July 2020, Water Pricing – Draft Report, Table 12.4, pages 132-134.

2. ALLOWING DIFFERENT FORMS OF PRICE CONTROL

Hunter Water supports a basic revenue cap for water.

Under our proposal, IPART would continue to set the water usage price throughout the regulatory period, with reference to the long-run marginal cost of water supply. IPART would also set the drought usage price and the applicable triggers, incorporating drought-related costs.

IPART's determination would allow Hunter Water to adjust the water service charge, the base 20mm equivalent charge, to reflect the difference between forecast and actual water sales volumes over the previous year. The service charge would act as a balancing item – in much the same way as it works currently.

Hunter Water would use the best available water sales towards the end of the year to calculate the adjustment – around May of each financial year. A subsequent true-up would use final data for the full year. The water revenue cap would ensure regulated customers paid no more or less than efficient costs over time.

Our proposed revenue cap does not differ significantly from IPART's existing demand volatility adjustment mechanism (DVAM).

Under the DVAM model, IPART looks at the difference between actual and forecast water sales over the regulatory period.⁴ IPART applies a plus or minus 5% threshold. If aggregate water sales revenue is more than 5% below allowed revenues over the period, IPART would increase Hunter Water's revenue requirement to recover the incremental difference in the subsequent period. The reverse applies if water sales revenue exceeds the 5% threshold.

Over the 2016-17 to 2018-19 period, Hunter Water's aggregate actual water sales revenue was \$480 million, compared with IPART's 2016 allowance of \$448 million – 7.2% more than forecast.

IPART's 2020 decision applied a DVAM adjustment for the 2.2% increment. This worked out at a \$10 million reduction in Hunter Water's water revenue requirement, smoothed over the current four-year regulatory period.⁵

Hunter Water considers there are good reasons to move to a basic water revenue cap model, as outlined below. This is not an unusual idea. Australian economic regulators typically favour a revenue cap in the water sector. In essence, the water revenue cap moves away from the arbitrary 5% threshold and better aligns the timing of the true-up between forecast water consumption and actual water sales.

2.1. Recovering efficient costs

IPART's 12-month price review process is primarily aimed at ensuring Hunter Water's prices recover the efficient cost of delivering water, wastewater and stormwater services. This is important for ensuring Hunter Water receives sufficient revenue to efficiently invest in, operate and maintain assets, and for sending efficient price signals to customers.

IPART engages expenditure consultants to undertake comprehensive reviews of past and future capital programs. The consultants scrutinise each line of past and forecast operating cost. Corporate costs are split by product based on a detailed activity-based costing model. IPART makes decisions on each building block based on this bottom-up assessment.

IPART takes the revenue requirement and divides it by water demand and connection forecasts to derive maximum prices. This is the opposite of how prices are set in competitive markets. But we are working in the world of monopoly businesses and economic regulation, where the regulator attempts to replicate commercial outcomes, in a necessarily abstract way.

⁴ IPART's 2020 Determination applied the DVAM adjustment to the first three years of the previous regulatory period: 2016-17 to 2018-19. Hunter Water was not able to provide actual sales data for these years, noting that IPART made final decisions before the end of the 2019-20 financial year. IPART stated that it would consider final water sales data for 2019-20 and the three years to 2022-23 as part of any DVAM adjustment in the next regulatory period starting 1 July 2024.

⁵ IPART, 2020, Review of prices for Hunter Water Corporation from 1 July 2020, Final Report, page 69.

After all the work in reviewing and adjudicating efficient costs, the regulated utility faces a mismatch between its allowed and actual revenue requirement, depending on actual water consumption and connection growth. We are exposed to the vagaries of the weather.

When considering the form of price control, it is important to bear in mind that the revenue mismatch under maximum prices works both ways – a mix of under and over recovery – for the utility and its customers.

2.2. Credit rating agencies look at revenue risk

Hunter Water relies heavily on the water usage charge to recover allowed water revenues.

IPART's 2020 Determination of prices for Hunter Water set the water usage charge at \$2.46/kL and the residential water service charge at \$24.26 per annum in 2020-21. The typical residential household in the Lower Hunter consumes about 175 kilolitres per annum. This gives a typical residential water bill of about \$455 per annum, meaning the water usage component accounts for almost 95% of the total.

NSW Treasury appoints a credit-rating agency to undertake annual credit-rating assessments of Hunter Water. Moody's has undertaken this review over recent years. Moody's publishes a methodology for water utility reviews, incorporating quantifiable financial metrics and qualitative factors. Moody's assessment looks at revenue risk, the stability and predictability of the regulatory regime and timeliness of cost recovery.

Moody's has raised concerns with downside scenarios: *"adverse hydrology conditions resulting in the introduction of severe water restrictions that materially affect water sales revenues"*. Moody's observed that Hunter Water is exposed to water volume volatility, particularly in periods of drought. Moody's took some comfort from IPART's implementation of a drought water usage price and the existence of the DVAM mechanism.

More recently, NSW Treasury appointed FitchRatings to undertake the annual credit-rating assessment for Hunter Water and has commenced its review of Hunter Water's financial position. This has included a list of questions about water revenue risk and the financial impact of long drought periods.

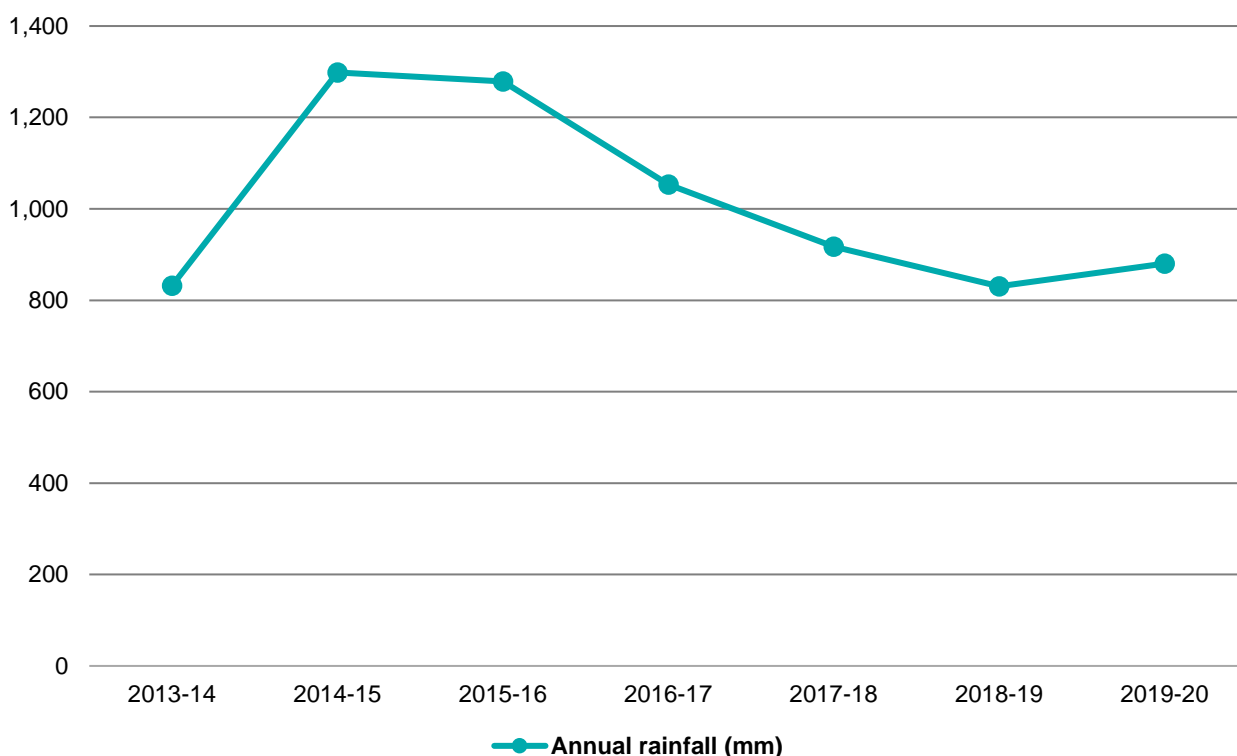
All bulk water providers are exposed to rainfall variability to some extent. A shift to a water revenue cap, via a service charge adjustment, would mitigate the financial risks associated with drought and restrictions. In turn, the rating agencies would view the revenue cap as strengthening the stability and predictability of the regulatory framework.

2.3. Maximum prices offer price certainty, not bill stability

Hunter Water uses the Integrated Supply-Demand Planning (iSDP) model to calculate water demand forecasts. Hunter Water's iSDP model provides a water demand forecast for average climate conditions. The model is not intended to reflect the impact of climate variability on consumption levels over multiple years – no forecasting model can.

Unanticipated climate events such as drought or above average rainfall can have a major bearing on annual water consumption outcomes within a regulatory period. Annual rainfall in the Lower Hunter over the past seven years is shown in Figure 2.1.

Figure 2.1 Annual rainfall in the Lower Hunter, millimetres



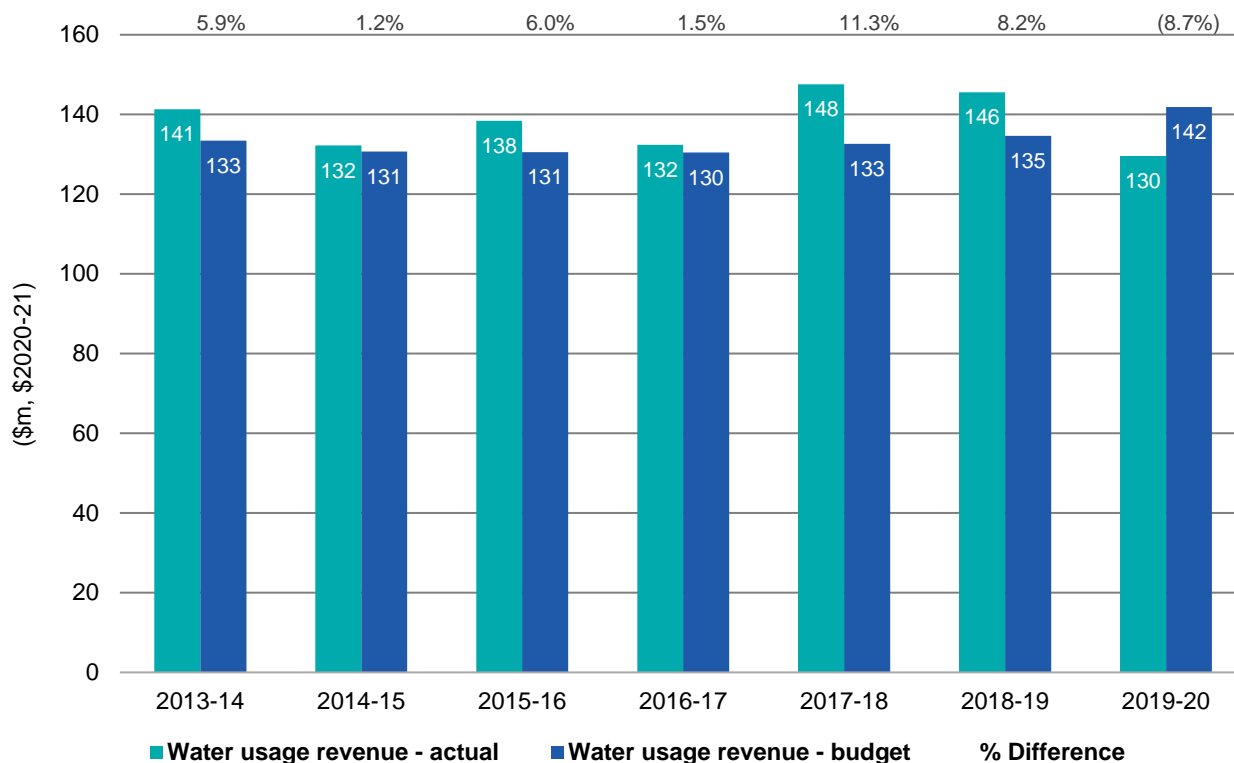
Variable rainfall has a material impact on typical residential consumption – primarily through higher or lower outdoor use in summer months. Figure 2.2 shows the range of annual residential water consumption over the last two regulatory periods – a high of about 180 kL in 2014-15 and 2018-19, and a low of 156 kL in 2019-20.

Figure 2.2 Average annual residential water consumption and connections



Hunter Water over-recovered water sales revenue in most years of the past two regulatory periods (see Figure 2.3). In some years, actual water sales revenue was within 2% of allowed revenue. In other years, the difference was greater than 8%, both up and down. Hunter Water over-recovered a net \$33 million in water sales over the seven years.

Figure 2.3 Forecast and actual water sales, \$million, \$2020-21



A water revenue cap would not mean customers are worse-off. If water sales increase as a result of a hot, dry year, we would reduce the water service charge in the following year. Similarly, if there is a year of relatively mild, wet conditions, we would recover revenues in the following year.

Using the last two regulatory periods, Hunter Water has assessed the highest over-recovery year, 2017-18, and highest under-recovery year, 2019-20. Under a water revenue cap, we would have reduced the base water service charge by \$61 per property in 2018-19 and increased the service charge by \$47 per property in 2020-21.

Hunter Water does not have a problem with IPART putting in place a side-constraint to limit annual movements in the service charge adjustment – possibly defined as a pre-determined percentage cap on bill movements. This would provide an additional level of bill stability for customers. We would make a simple adjustment to the true-up mechanism underpinning the water revenue cap, where the amount above the side-constraint is recovered in the subsequent year.

2.4. Demand forecasting is difficult

Hunter Water's experience during IPART's 2019-20 price review highlights the difficulties of accurately forecasting residential and non-residential water sales over a period of years.

Water sector forecasting tools are designed to predict water consumption under average conditions.

In early 2019, the Department of Planning, Industry and Environment oversaw an independent external review of Hunter Water's ISDP demand forecasting methodology. DPIE commissioned this review as part of preparatory work for the Lower Hunter Water Security Plan. The external review identified a number of improvements to Hunter Water's methodology.

Hunter Water's 2019 pricing proposal included water consumption forecasts using an older version of the iSDP model. Our response to IPART's 2019 Issues Paper provided revised demand forecasts – lower residential and higher non-residential forecasts, drawing on the recommendations from the external review.

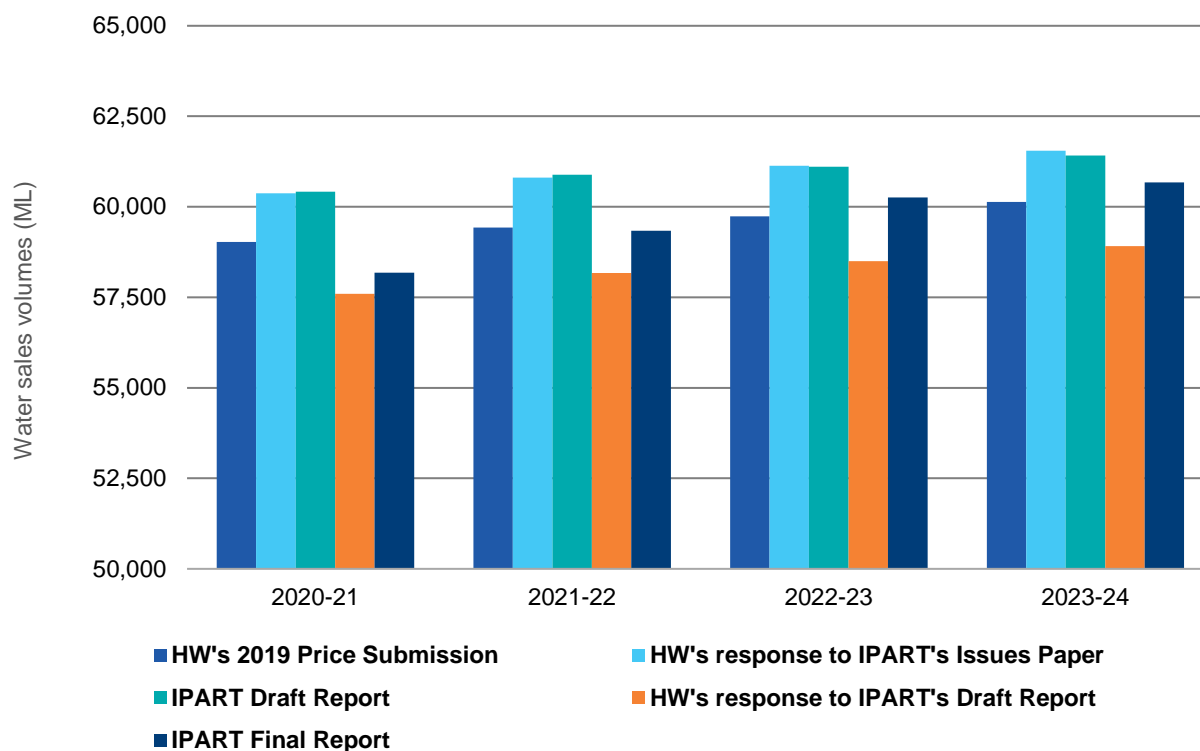
Hunter Water's storages continued to deplete as drought conditions worsened throughout 2019. For the first time since the early 1990s, the NSW Government introduced level 1 water restrictions in the Lower Hunter in late September 2019. This progressed to Level 2 restrictions on 20 January 2020 - the first time in 40-years. Above average rainfall in February provided a welcome boost to storage levels and allowed a return to Level 1 restrictions on 24 February 2020.

Hunter Water provided revised demand forecasts to IPART in April 2020 as part of our response to the draft report. These forecasts reflected the latest water sales forecasts, including an ongoing lowering of demand in response to restrictions and awareness campaigns. IPART's June 2020 Final Report did not accept Hunter Water's revised forecasts (see Figure 2.4).

IPART's price review process involves an external review of Hunter Water's demand forecasting tools and results. This takes up considerable time and effort during the price review process. A move to water revenue cap would reduce, but not eliminate, the regulator's concern with getting forecasts exactly right.

Hunter Water would still have a strong incentive to ensure all infrastructure planning is informed by robust consumption numbers. DPIE Water would continue to monitor and review Hunter Water's forecasting tools.

Figure 2.4 *Hunter Water's water consumption forecasts, IPART's decisions*



2.5. Disincentive to invest in water conservation

Under IPART's price cap approach, Hunter Water faces a financial disincentive to invest extra effort and resources in water efficiency, conservation awareness and behavioural change activities during a regulatory period. All else being equal, we will under recover our costs if we go beyond IPART's allowance for water efficiency initiatives, and we sell less water than forecast.

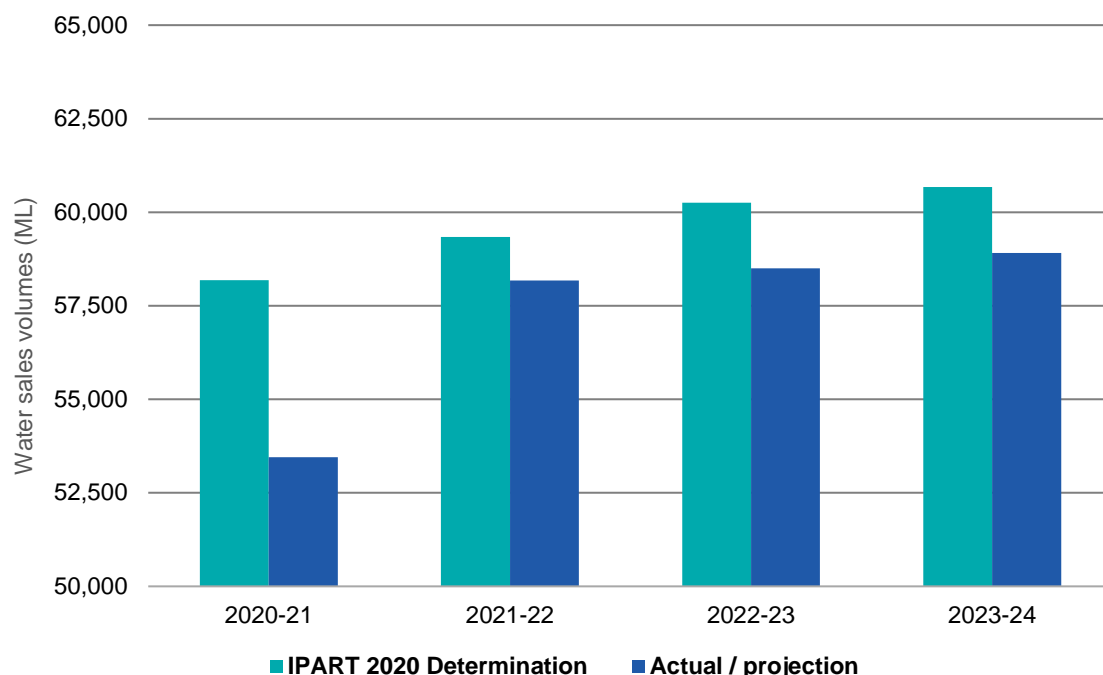
Hunter Water's forecast water sales are well below IPART's 2020 final decision (see Figure 2.5).

Our current best estimate for 2020-21 is water sales of 4,750 ML below IPART's 2020 decision. This includes 4,150 ML due to cool, wet conditions throughout the year, and 580 ML attributable to ongoing awareness work. We now expect an under-recovery of more than \$11 million in 2020-21.

Hunter Water has set internal targets to reduce potable water consumption over the near term. The Lower Hunter Water Security Plan, to be finalised in 2021, will include a higher level of water conservation activity.

Implementing a water revenue cap would remove the incentive for water utilities to understate forecast water sales and over-recover revenues. More importantly, it would remove a financial barrier to doing more to reduce to potable water sales. Ambitious internal efficiency targets, particularly around awareness and behaviour activities, would no longer have a negative impact on net earnings and credit metrics.

Figure 2.5 *IPART's forecast water sales, Hunter Water's forecasts, 2020-21 to 2023-24*



2.6. Water and wastewater connections

This response has focused on the mismatch between actual and forecast water sales to all regulated customers – the dominant revenue risk. Hunter Water is also exposed to a mismatch between forecast and actual new connections for water and wastewater services, and a smaller mismatch in wastewater discharges by non-residential customers.

Hunter Water has only a minor influence on the rate of new development in the Lower Hunter, primarily in the delivery of regional and local infrastructure, and the timeliness of issuing compliance certificates

We consider there is merit in applying the revenue cap to all water and wastewater revenues. A revenue cap for both services would require a simple true-up of the service charge – effectively a 'goal seek' on the 20mm base charge to repay or recover amounts from one year to the next.

We do not have a firm position on this issue at the current time. Our 2023 pricing proposal will include a detailed analysis of past mismatches in connection numbers and discharge volumes. At that time, we may make a case for an annual true-up of all water and wastewater revenues.

We see merit in incorporating an annual true-up of penalties and rewards under any incentive scheme, including the proposed shadow price of leakage.

Historically, Hunter Water's forecasts of stormwater drainage customers have closely matched the actual number of connections. This is a much easier task given we are only estimating new infill development in the smaller stormwater catchments.

3. CUSTOMER CHOICE PRICING

Hunter Water supports the concept of customer choice pricing, as outlined in IPART's Discussion Paper.

Our understanding of IPART's customer choice pricing model is as an extension of the existing unregulated pricing agreements. Under the current framework, we are able to negotiate the terms and conditions of water and wastewater supply with large customers.

IPART's 2016 Determination introduced the category of large customer – a non-residential customer consuming more than 7.3 ML per annum.⁶ IPART considers that these large non-residential are likely to operate large commercial business, and are well-placed to negotiate with Hunter Water. IPART expanded the definition to include customers with multiple properties and combined consumption exceeding 7.3 ML per annum.⁷

Hunter Water has entered into an unregulated pricing agreement with the Central Coast Council, varying the bulk water transfer price. We are currently working on an unregulated agreement with a large water customer. We contemplated, but did not progress, a small number of other agreements in recent years.

IPART's customer choice pricing model would move beyond the definition of a large non-residential customer to include all regulated customers, subject to pre-defined pricing principles.

3.1. Categorising customer opt-in services

We understand that IPART customer choice pricing is targeting category 2 in the range of service levels and funding arrangements shown in Figure 3.1: a regulated basic service plus an improvement in a service attribute or attributes.

Figure 3.1 Range of service levels and funding arrangements



Source: Hunter Water.

Hunter Water does not have specific examples of where the customer opt-in model might apply. We can think of a lot of reasons why this may not happen in practice: transaction costs, monitoring costs, lead times, uptake rates, accounting complexities and revenue risks.

Nonetheless, we are supportive of IPART's customer choice pricing model and the flexibility it provides. We do not see any downside from a voluntary arrangement. We have operated in a world of IPART-determined prices for more than 20 years. Our planning, operations and billing teams may identify specific instances where a tailored agreement would work. They would first need to know that flexible pricing was a feasible way of solving a problem or responding to a customer request. The model would work in win-win situations, where there are net benefits for both parties.

We would only execute an opt-in contract if the benefits outweighed all of the establishment, administration and investment costs.

⁶ IPART, 2016, Review of prices for Hunter Water Corporation from 1 July 2016 to 30 June 2020, Final Report, pages 23-28.

⁷ IPART, 2020, Review of prices for Hunter Water Corporation from 1 July 2020, Final Report, pages 34-35.

Hunter Water agrees with IPART that it is important to establish pricing principles for customer choice pricing. The opt-in mechanism goes beyond those large non-residential customers with the commercial acumen to negotiate a supply agreement.

We agree with the four pricing principles outlined in IPART's Discussion Paper: defining services, unregulated, ring-fencing and information provision.⁸ These principles provide the foundation for this concept to work in practice.

IPART would have a role in monitoring the utility's performance in delivering the service improvement through time, thereby providing a safeguard for smaller customers.

In addition to IPART's pricing principles, Hunter Water would include the principle of 'avoiding complexity where possible'. Hunter Water would be less likely to explore customer opt-in arrangements if there was heavy burden of reporting on top of the effort to design and execute individual agreements.

3.2. Revenue sharing

Hunter Water considers there is a difference between customer opt-in pricing and those instances where we use regulated assets to earn an external commercial revenue stream – category 4 in Figure 3.1.

We see customer opt-in pricing applying where there is scope to improve the existing regulated water, wastewater or stormwater service. Hunter Water would recover the incremental costs of the change in service level. Those costs would include transaction and investment costs, as well as a margin for project risk.

Hunter Water currently earns commercial rental income from the owners of telecommunications towers, typically located next to water reservoirs. We share these earnings 50:50 with the broader customer base.

IPART has provided detailed guidance on the financial treatment of bio-diversity offset credits. We are currently exploring various options to treat biosolids at a central point using different digestion technologies, including processes that generate surplus electricity or biogas.

We would continue to ask IPART for guidance on the treatment of commercial income streams from the use of existing regulated assets, including under-utilised assets. This can occur as part of an IPART price review or between reviews.

⁸ IPART, 2021, Lifting performance in the water sector, Discussion Paper, Special Review, page 14.

4. INCENTIVISING LEAKAGE REDUCTION

4.1. Rationale for change

4.1.1. The need for a resilient water supply

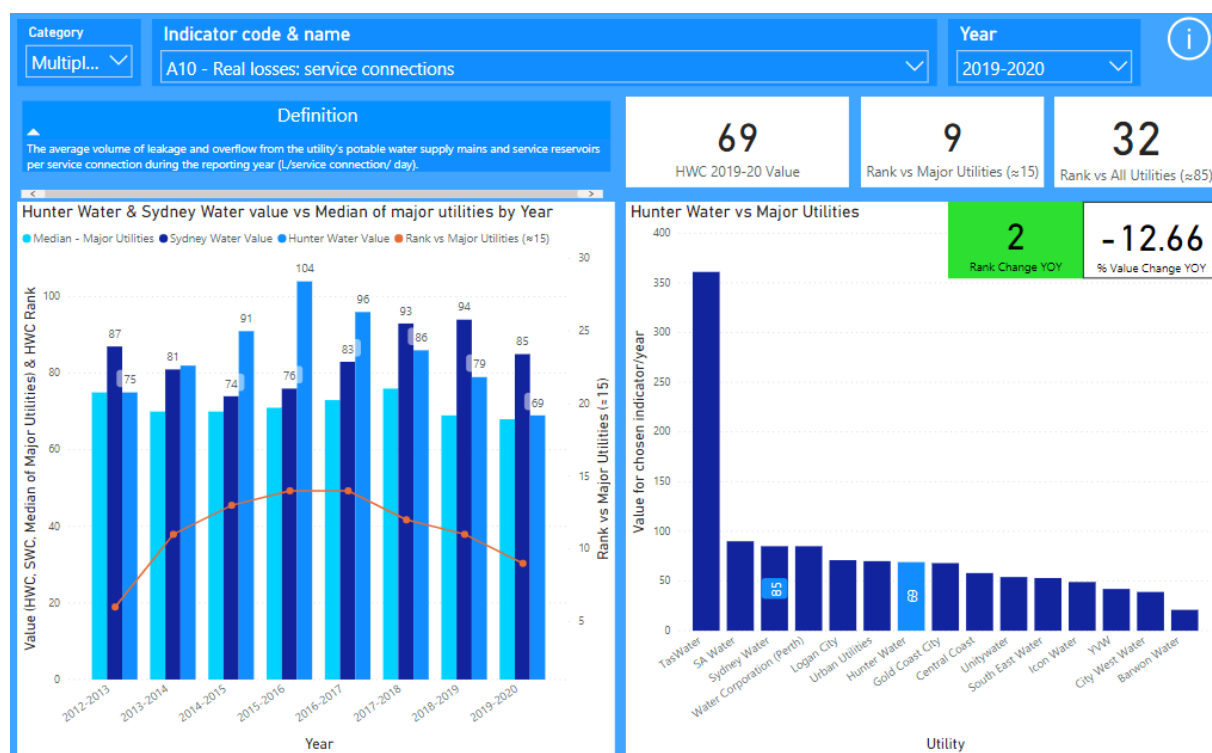
Hunter Water is facing the challenges of a more variable and changing climate, population growth and increasing community expectations. These challenges, coupled with the recent experience of the 2018 to 2020 drought, have reinforced the need to provide additional resilience to our water supply system.

Over the last few years, we have worked closely with our customers and community to conserve water. Customers expect us to 'do our bit' to reduce leakage. This is important if our *Love Water* and *Smart Water Choices* campaigns are to have credibility, and hence be effective, in the local community.

4.1.2. Our leakage reduction journey

In 2016, Hunter Water was the poorest performer in water loss per connection in the National Performance Report and our leakage was getting worse year-on-year (see Figure 4.1, refer 2012-13 to 2015-16). In addition to relatively high and increasing leakage from our system, we were not actively encouraging more efficient water-use behaviour.

Figure 4.1 Hunter Water's dashboard showing leakage performance trends



Source: Data from Bureau of Meteorology, 2020, National Performance Report 2019-20: urban water utilities, Part B.

Over recent years we have increased our investment in leakage management and understanding customer water-use behaviours and how to influence them. By 2019-20, leakage from our water supply system has reduced from highs of about 100 litres per connection per day to 69 litres per connection per day - the median for our cohort of major Australian urban water utilities (see Figure 4.1).⁹

Hunter Water's 2019 pricing proposal outlined a plan to invest \$33 million over five years to save water that would otherwise be wasted (see Box 1). IPART's expenditure reviewer, Aither, found the expenditure for this program 'efficient' and "*appropriate to invest in from a water conservation perspective*".¹⁰

Now in 2021, Hunter Water's Towards 2024 Business Plan includes a strategic priority to *deliver sustainable, resilient and valued services*, with the aim of *reducing the volume of potable water consumed by residential and commercial customers and by Hunter Water, including through leakage*. We have set a long-term leakage target is 50 litres per connection per day, with interim targets along the way.

⁹ Bureau of Meteorology, 2020, National Performance Report 2019-20: urban water utilities, Part A, pages 57 and 58.

¹⁰ Aither, 2019, Hunter Water expenditure review: A review of capital and operating expenditure and demand forecasts, A Final Report prepared for the Independent Pricing and Regulatory Tribunal, pages 56 and 229.

Case study - Reducing water leakage

We are proposing to invest \$33 million over five years to save water that would otherwise be wasted and reduce the chance of unplanned interruptions, which cause inconvenience to our customers.

This investment provides time to consider future technologies which could help us save more water and potentially delay the need for a new water source indefinitely.

Active leak detection

Each year, our contractors physically walk and check all of our network - more than 5,000 kilometres of water mains. We use 'listening equipment' to identify hidden leaks and water escaping into the ground, which otherwise may not be found - about 25 new leaks each week. A major benefit of the program is finding small leaks, before they get bigger. Large leaks can be very inconvenient for our customers due to water supply interruptions and possible damage to property.

Pressure management

High water pressure in our system contributes to water-main leaks and breaks, and the excessive pressure reduces the life of our assets. Our Operating License states that we need to provide customers with a minimum pressure of 20 meters, but some parts of our network have water-main pressure as high as 80 meters. Reducing water pressure extends the life of our water-mains, reduces leaks and water-main breaks which inconvenience customers.

District metering

District metering involves installing network flowmeters and zone valves to segment the network into smaller 'districts'. Water movement in each district is then monitored and analysed. Any unusual water use may indicate a leak in that district. Dividing the network into segments means we can find leaks more quickly, which reduces costs and customer interruptions. Using smart technology helps us to identify small leaks, before they grow and possibly burst the pipe.

Point sources

This program resolves water lost, or likely to be lost in the near future, at our major assets, including reservoirs and trunk water mains. We have recently rehabilitated and relined the Black Hill Reservoir, which was losing 700,000 litres of water each year.

33%
reduction
in leakage
since
2015-16

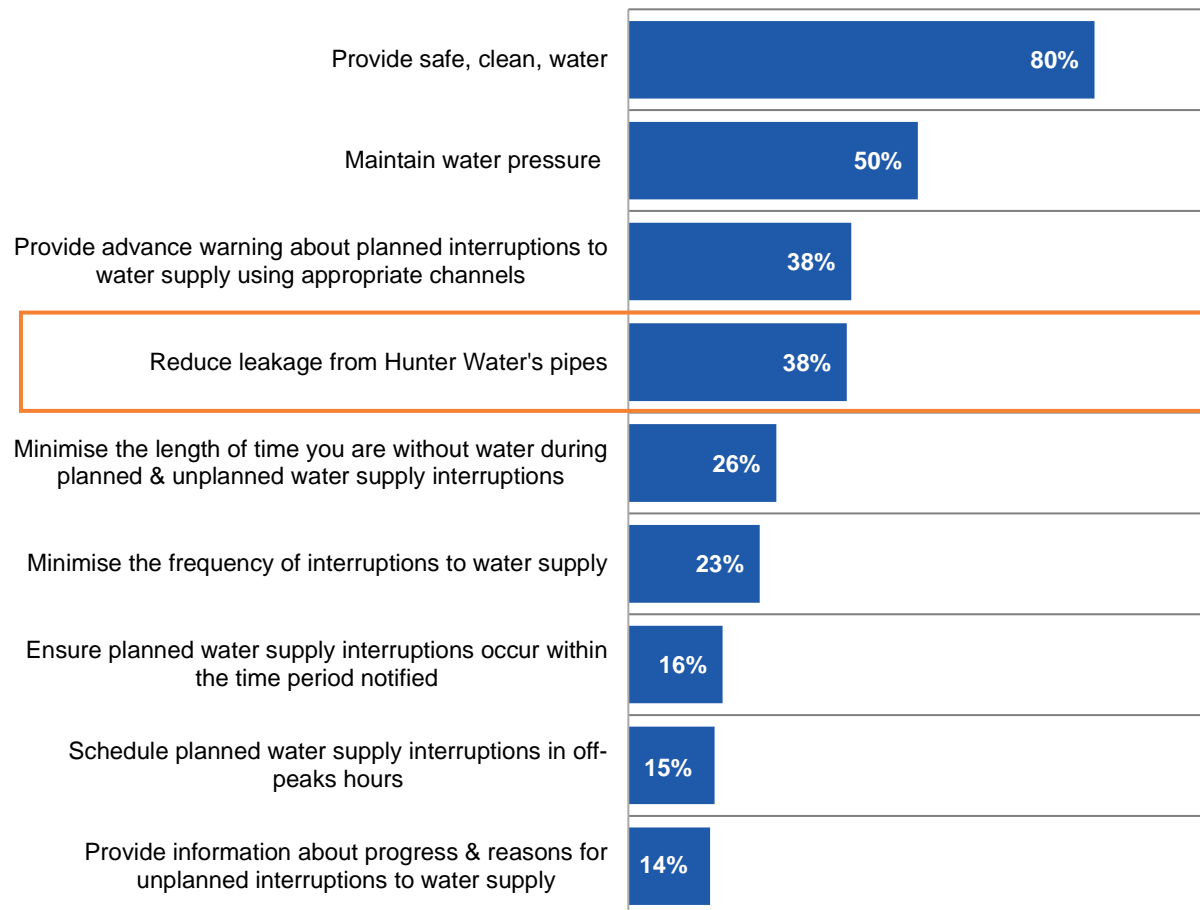
As part of our commitment to Love Water, we have made significant inroads in reducing leakage across our water network, contributing to deferral of investment in new water supply infrastructure, and conserving precious water as we entered the current drought.

Source: Hunter Water, 2019, Pricing Proposal, page 21.

4.1.3. Aligning with community priorities and expectations

In 2020 we surveyed our customers to understand the aspects of our services valued by customers. Reducing leakage from Hunter Water's pipes ranked in customers' top three aspects of water supply services (see Figure 4.2). This finding was consistent across all demographics.

Figure 4.2 Customer feedback on the most important aspects of their water supply

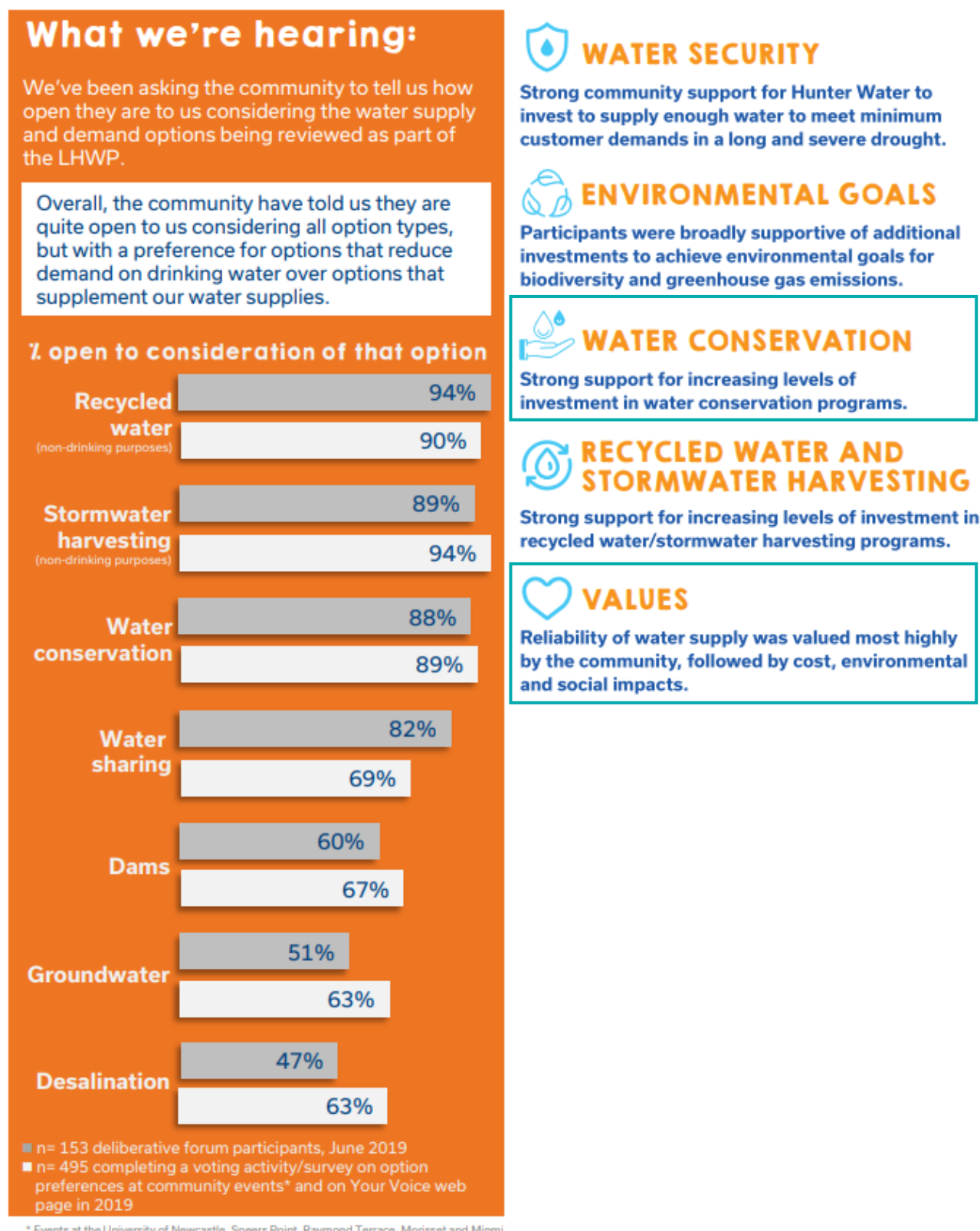


Source: Q4. Provided below is a list of aspects or elements relating to water supply. Please read through the list and select the 5 that are most important to you. The chart shows the proportions who included each water supply service in their top three most important water supply services. Base: n=1,010

In parallel, we have worked with our customers and stakeholders over the past three years to understand their values around water and their views on the different water supply and demand options as part of the review of the Lower Hunter Water Security Plan.

In 2019, we found that most in our community are open to water conservation as a means of securing our water supply (see Figure 4.3). In early 2021, we found strong support for additional water efficiency and conservation measures (see Figure 4.3).

Figure 4.3 Lower Hunter Water Security Plan customer engagement findings on water conservation



Source: LHS 2019 community engagement summary. RHS LHWSP Engagement Summary_Nov-Feb 2021.pdf. Both available at: <https://yourvoice.hunterwater.com.au/water-future>.

4.1.4. The need for symmetrical incentives

We agree with IPART's observation that the regulatory framework could “do more to support efficient investment in water conservation and leakage reduction”.¹¹

Under our operating licence, we are required to develop and assess a range of water conservation projects using an Economic Level of Water Conservation (ELWC) method, and to publish the results in a five year plan.¹² The Economic Level of Leakage (ELL) is essentially a component of the ELWC, based on applying the ELWC method to potential projects to reduce leakage.

The ELWC method is a cost-benefit analysis that compares the cost of water conservation projects with the value of water saved, both assessed from a societal perspective.¹³ Hunter Water can choose to implement those projects considered to be economically efficient under its ELWC assessment, subject to funding availability.

We do not face the same financial incentive for implementing water conservation actions as customers. We only incur the average short run cost of supply rather than the retail water usage charge (set with reference to the long run marginal cost). More importantly, we forego a smaller financial saving if we do not implement efficient projects, creating a weak incentive for us to keep leakage at efficient levels.

A shadow price for leakage would set consistent incentives for water conservation between customers and water businesses. It would hold us accountable for delivering projects approved in the price review, and establish an incentive to do more.

4.2. Introducing a shadow price for leakage

4.2.1. Defining leakage

Leakage is the water ‘lost’ through a pipe or a fixture (eg, tap or valve) that cannot be used for its intended purpose. Leakage in the drinking water system can occur before or after the customer meter, with water businesses responsible for efficiently investing to reduce the former and customer water efficiency programs targeting the latter.

A water business's leakage often refers to ‘real losses’ (see Figure 4.4). Real losses average around 10% of water sourced by Australian urban water businesses.¹⁴ Real losses include leakage from water pipes and fittings, leakage and overflows at reservoirs, and leakage on the service connection between the water main in the street and the customer's meter.

The other component of water losses are ‘apparent losses’, mainly attributable to inaccuracies in mechanical customer meters. There are existing drivers for water businesses to replace inaccurate meters:

1. A mandate, based on the *National Measurement Act 1960* and *National Trade Measurement Regulations 2009*, to verify that in-service meters of a certain size maintain a level of accuracy $\pm 4\%$.
2. A financial incentive to derive additional revenue by moving this to the ‘billed metered’ part of the water balance.

¹¹ IPART, 2020, Regulating water businesses, Position Paper, Special Review, page 17.

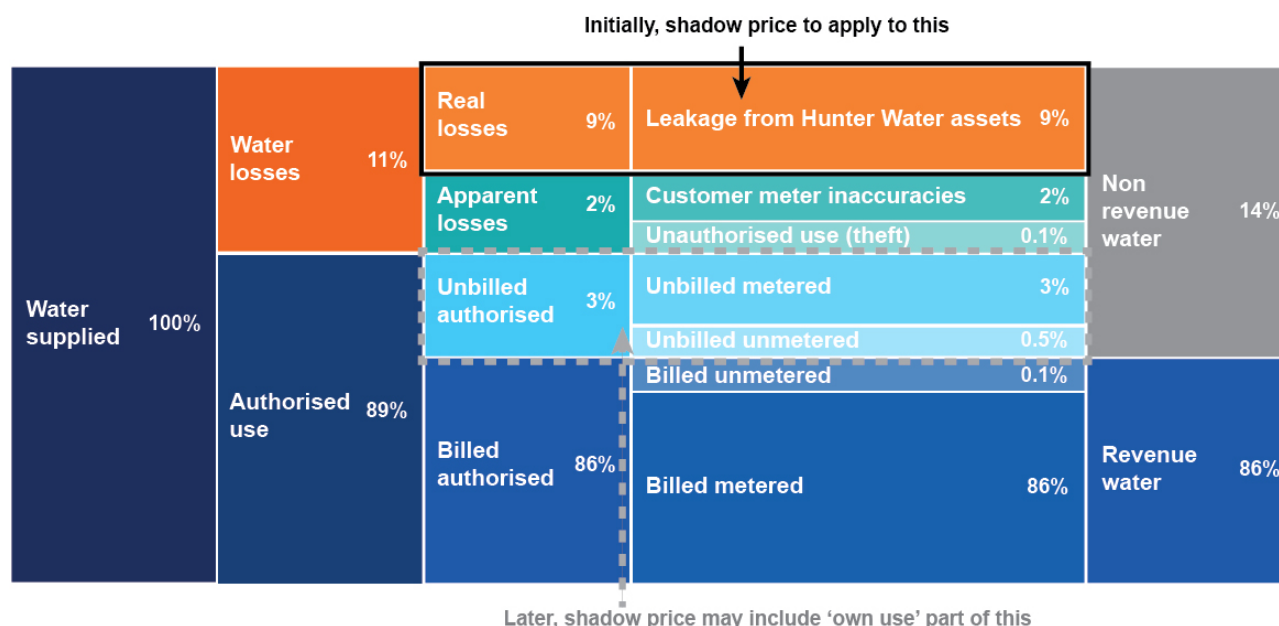
¹² Hunter Water's 2017-2022 Operating Licence, clause 2.2.

¹³ A societal perspective includes customer costs or benefits, Hunter Water costs or benefits and other costs or benefits such as environmental impacts.

¹⁴ Bureau of Meteorology, 2020, National performance report 2019-20, urban water utilities. Based on indicators A10, C4 and W7.

Figure 4.4

Water balance showing components of usage



Source: Based on WSAA, 2019, Reducing leakage in Australia and Hunter Water performance from 20 April 2019 to 20 April 2020.

In addition to leakage, water businesses are able to influence their use of water in providing water and wastewater services. As an example, drinking-quality water may be used as process water at a wastewater treatment plant. Water is also used at the utility's offices and depots. Generally, 'own usage' is a component of the 'unbilled authorised consumption' part of the water balance. Most water business do not disaggregate from other unbilled authorised uses such as water for firefighting.

We propose that a shadow price for leakage:

- **Initially apply only to real losses downstream of water treatment plants.** This approach is simple, consistent with operating licence conditions and can be applied consistently across vertically integrated or separated water businesses.¹⁵
- **Not apply to apparent losses.** These are more challenging to accurately estimate and minimising water loss is incentivised through other mechanisms.
- **May apply to water businesses' own usage in a future stage of regulatory reform.** It may be useful to incentivise water businesses to more accurately estimate, meter or record their usage, to enable disaggregation from other authorised unbilled consumption. Failure to undertake this foundational step may introduce an unnecessary complexity. It may discourage legitimate unbilled unmetered water uses (eg, firefighting) or encouraging data gathering in situations where the costs outweigh the benefits.

4.2.2. Valuing the water leaked or saved

The first step in implementing the shadow price would be to establish the value of water leaked or conserved. In our ELWC method, we use a different value of water saved depending on the duration and permanency of the water savings for the project under consideration – essentially short-term and long-term. The long-term value of water saved is the non-drought water usage price. Almost all leakage management interventions have long-term benefits and therefore we adopt the long-term value of water saved to determine the ELL.

We agree with IPART's proposal to set the value of water leaked at the usage charge that customers pay for water (drought and non-drought).¹⁶ This is the simplest option to implement and easiest for customers to understand. It is also broadly consistent with the ELWC method.

¹⁵ See for example Hunter Water's 2017-2022 Operating Licence clause 2.2.

¹⁶ IPART, 2021, Lifting performance in the water sector, Discussion Paper, Special Review, page 21.

We realise that it is technically more correct to net off average short-run operating costs, to avoid double-counting the existing financial incentive or penalty. We would not object to this adjustment.

4.2.3. Implementing the shadow price

We support, in-principle, the first step of the two-step approach to implementing the shadow price proposed by IPART whereby:¹⁷

$$\text{Incentive or penalty} = (\text{actual leakage} - \text{target leakage}) \times \text{water usage price} + \sum \text{holding costs}$$

A plausible, but hypothetical, worked example of the application of a shadow price of leakage mechanism is provided in Appendix 2. In the worked example, the net reward across the price period is less than \$1m – less than one per cent of our notional revenue requirement over the current four year price period.¹⁸

The second step relates to the timing of revenue adjustment. We see merits in both inter- and intra-period options (see Table 4.1). In the realistic worked example, the inter-period adjustment is just under \$1 million because it smooths out the year-on-year variations. The intra-period adjustment in the example ranges from rewards of \$1.4 million and \$0.2 million to a penalty of \$0.8 million.

We would prefer the flexibility for each water businesses to propose whether the resulting reward or penalty applied inter- and intra-period, and associated rationale, particularly the first time a shadow price for leakage is applied.

IPART would establish clear processes to provide assurance for the economic level of leakage forecasts (i.e. targets) and prudence of actual projects delivered. The existing expenditure review or annual operational audits are the most likely examples.

Table 4.1 **Timing options for adjustment of revenue for the shadow price of leakage**

	Advantages	Disadvantages
At the end of the determination period	May result in smoother adjustments due to multi-year aggregation of performance and deliberate multi-year smoothing of the adjustment to the notional revenue requirement	Weaker incentive signal due to delay
At the end of each financial year	Accords with a revenue cap form of price control and annual 'true-up' for the actual cost of debt No need to account for holding costs	May result in 'lumpier' adjustments, however the shadow price of leakage would be small relative to the other adjustments

One further enabler involves ensuring that the value of water saved (or leaked) is consistent between project planning and delivery incentives. Currently, the ELWC method must be used to assess leakage projects.¹⁹ Under the ELWC method, the ELL is determined by using the short-term value of water saved for one type of leakage program (active leakage control) and using the long-term value of water saved for all other leakage programs.²⁰ That is, investment planning to set ELL targets is based on a combination of short- and long-term values of water saved whereas the shadow price for leakage incentive only applies the long-term value of water saved.²¹

¹⁷ IPART, 2021, Lifting performance in the water sector, Discussion Paper, Special Review, page 21. Holding costs would only apply if the adjustment is made inter-determination period rather than intra period.

¹⁸ The total Notional Revenue Requirement is \$1,370.1 million over four years. IPART, 2019, Review of prices for Hunter Water Corporation from 1 July 2020, Final Report, pages 3 and 63.

¹⁹ Hunter Water's 2017-2022 Operating Licence, Clause 2.2.2(a).

²⁰ We note that active leakage control could be argued as delivering either short-term or long-term savings and therefore a case could be made to compare use either the short-run value of water saved or long-run value of water saved.

²¹ The drought uplift to the water usage price only applies a small subset of additional costs incurred during drought and therefore understates the short-term value of water saved at most drought water storage levels.

In order to avoid unnecessary complexity, we recommend that both the ELL (target setting) and delivery incentive are based on the long-term value of water saved (drought and non-drought water usage price).

IPART will soon commence an end of term review culminating in recommended conditions for Hunter Water's 2022-2027 Operating Licence. It may be appropriate to remove leakage from the list of water conservation program types to be covered by the ELWC method, or to alter the ELWC method as applied to leakage so that it reflects the shadow price of water mechanism. This would facilitate adoption of a shadow leakage price for the 2024 determination period. We are comfortable with a requirement to continue to publish a five-year leakage management program, either as a licensing or pricing requirement.

5. EFFICIENT PROCESSES

5.1. Expenditure reviews

There is a need for greater upfront clarity around IPART's expenditure review.

IPART's Discussion Paper outlines its expectations of the water businesses, including that they submit proposals with robust long-term plans and cost information. We agree with these expectations.

However, we also consider it is reasonable to expect IPART to provide greater upfront clarity around how it will specifically assess the efficiency of water businesses' actual and forecast operating and capital expenditure. This would be consistent with good regulatory practice and the practice other economic regulators, such as the AER. It would also deliver significant benefits, and assist in lifting the performance of the sector.

5.1.1. Recognising the importance of certainty and extending this to efficiency assessments

IPART's Discussion Paper recognises the importance of it providing reasonable levels of certainty to regulated businesses. IPART notes that the 'strategic meeting early in the regulatory cycle' would provide the regulated business with more certainty, and that separate framework reviews *"provide more certainty for businesses in preparing their pricing proposals"*.²²

Hunter Water welcomes the strategic meeting early in the regulatory cycle, and we agree that it would be beneficial. However, to complement such a meeting, it is important that IPART provides comprehensive written guidance on how it will assess the efficiency of water businesses' expenditure proposals.

Similarly, we welcomed the framework reviews that IPART has completed to date. Some of these have significantly enhanced clarity and certainty. For instance, IPART's WACC methodology is clear, consistent and well-understood. This means it can also be subject to external scrutiny and hence, when justified, improved and refined over time.

We see benefits in extending the concept of framework reviews to other elements of the regulatory framework, including price structures and estimates of the long run marginal cost of supply. However, currently, the most significant improvement would be to clarify how IPART, and its consultants, assess the efficiency of expenditure proposals – which is the key element of price determinations.

5.1.2. Providing greater upfront clarity around how IPART assesses the efficiency of expenditure proposals

IPART's high level principles for assessing the efficiency of expenditure proposals are reasonably clear, but how it translates this into practice is less clear. IPART's approach can vary across reviews, over time and the range of expenditure consultants it uses. This can create unnecessary uncertainty, regulatory cost and sub-optimal outcomes.

Other regulators have published documents explaining their processes and techniques for assessing efficient expenditure.²³ This enhances clarity about the 'rules of the game' and is consistent with best practice. This is important for providing confidence to water businesses to invest in, and maintain their assets, pursue efficiency gains, meet the market in digital services and innovate over time in the long-term interests of customers.

IPART should provide greater upfront written guidance on the specific process and techniques it will use to assess the efficiency of proposed expenditure.

²² IPART, 2021, Lifting performance in the water sector, Discussion Paper, Special Review, page 8.

²³ For example, see AER, Expenditure Forecast Assessment Guideline for Electricity Distribution, November 2013; AER, Expenditure Forecast Assessment Guideline for Electricity Transmission, November 2013; and AER, Explanatory Statement – Expenditure Forecast Assessment Guideline, November 2013.

This would include details on:

- the expenditure review process
- the general methodology to be applied to the expenditure review (e.g., scope, catch-up and continuing efficiency adjustments, or alternative approaches)
- how it will assess the efficiency of actual capex incurred over the current determination period (i.e., the ex-post capex review) and the efficiency of forecast capex, forecast opex, and corporate costs – including the specific techniques it will use for each element of its review (eg, when and how it will use trend analysis, market and industry benchmarking, review of cost-benefit or business case analyses, review of procurement processes, etc)
- what constitutes ‘discretionary expenditure’ – particularly around digital, technology and the customer interface, given developments and customer expectations in unregulated (competitive) sectors.

Such guidance could be the focus of one of IPART’s framework reviews mentioned in the Discussion Paper. Like other framework reviews, the Final Report could outline IPART’s guidance and methodology for assessing expenditure proposals. Once established, it will be important for IPART to consistently adhere to this guidance – until periodically reviewed and updated (through a process involving all stakeholders).

We consider there could be further, dynamic benefits of such an approach. For instance, clear guidance around how IPART assesses the efficiency of expenditure proposals can also be accompanied by criteria to determine what constitutes a high-quality expenditure proposal. In turn, IPART could introduce reputational and other incentives into the price review process – for example, proportionately less detailed reviews for high quality proposals. This can shift more accountability to the water businesses and provide further impetus to submit high quality, efficient expenditure proposals.

5.2. Licensing reviews for public water utilities

IPART administers operating licences for Hunter Water, Sydney Water, and WaterNSW. Licensing functions include compliance monitoring and recommending new licence conditions following end of term reviews.

Hunter Water considers that IPART has a mature approach to public water licensing as:

- licences have transitioned over time from output-based to system-based and outcome-focussed
- potential changes to licence conditions are subject to transparent cost-benefit analysis
- Hunter Water’s operating licence has passed the four key stages of the NSW Licensing Framework, confirming that the licence is well designed, administered effectively and efficiently, and the most efficient option to deliver the policy objectives.²⁴

As observed by IPART during the last review of Hunter Water’s licence, *“there is little scope to reform this licence”*.²⁵

Public water utility operating licence reviews typically take a year from the release of an IPART Issues Paper to the Governor’s approval and gazettal of a new licence package. The process can be resource intensive as each clause is probed in detail.

Given this context, Hunter Water considers it would be more efficient to review clauses ‘by exception’, where one or more stakeholders identify clauses that may no longer be effective. Focussing operating licence reviews for on the areas of highest value serves the long term interests of customers by streamlining stakeholder efforts whilst safeguarding achievement of the policy objectives.²⁶

²⁴ IPART, 2014, Assessment of Hunter Water Corporation Operating Licence: Application of the Licensing Framework, Regulation Review – Case Study.

²⁵ IPART, 2016, Review of the Hunter Water Corporation Operating Licence, Water Licensing – Issues Paper, Appendix A.

²⁶ The policy objectives are to protect public health, protect consumers (in addition to public health), protect the environment and other policy objectives. These are listed in more detail in IPART, 2016, Review of the Hunter Water Corporation Operating Licence, Water Licensing – Issues Paper, page 2.

6. PRICE-QUALITY TRADEOFFS

Service level outcomes are an expression of quality which, coupled with price, shape the value that consumers place on all goods and services.

IPART seeks to replicate the outcomes achieved in competitive markets whereby customer preferences for combinations of cost and quality are revealed through purchasing choices. To do so, IPART:

- Includes system performance standards in the Operating Licence.
- Specifies rebates for service failures in the Customer Contract, which are intended to signal 'fair play' for inconvenienced customers and consumers.
- Sets Hunter Water's prices on the basis that they recover the efficient costs of compliance with mandatory standards (including operating licence requirements and those set by environmental, health and water extraction regulators).

Hunter Water's 2017-22 Operating Licence contains five prescriptive system performance standards in relation to water continuity, water pressure and dry weather wastewater overflows onto private properties.²⁷ Each system performance standard sets a hard limit on the maximum number of affected properties in any one year. A property count above the target level for any of the performance standards would represent a breach of the operating licence.²⁸

There is room for improvement in the current approach:

- it is unclear whether the measures underpinning system performance standards are based on service qualities that are valued by customers. Limits (thresholds) could be considered somewhat arbitrary given their weak nexus with performance drivers that Hunter Water is able to influence.
- trade-offs between cost and service quality are not informed by an understanding of customer willingness to pay.
- there is limited scope in pricing processes for assessing whether customers got what they paid for, or incentivising water businesses to understand their customers, then plan and act in their long-term interests.

6.1. Defining roles between Hunter Water and IPART

We agree with IPART's comment in the discussion paper that *"businesses need a deep understanding of the trade-offs between service standards and costs"*.²⁹

We accept we have an obligation to know what's important for our customers, what we are doing well, and what we can do better.

The onus is always on Hunter Water to understand customer preferences and values: what do customers think about service levels, ease of communicating, ease of transacting, bill affordability.

We see IPART's job as twofold:

1. Assuring the quality and extent of our engagement work; testing that we have the evidence to form a view on service levels and customer outcomes.
2. Holding us accountable for achieving the customer outcomes that we commit to deliver.

²⁷ System performance standards are performance standards specified in relation to service interruptions.

²⁸ Breaching the hard limits on the number of affected properties/customers would constitute a breach of the operating licence and result in reduced compliance grades, enforcement actions or penalties (eg, 17 and 17A of the Hunter Water Act 1991 (NSW) provides for penalties such as a letter of reprimand; monetary penalty up to \$150,000; or cancellation of the operating licence).

²⁹ IPART, 2021, Lifting performance in the water sector, Discussion Paper, Special Review, page 9.

6.2. Defining functions between pricing and licensing

The regulatory framework should encourage and allow Hunter Water to deliver the services that customers value, rather than relying on a regulation or licence alone to set expectations.

Hunter Water prefers performance standards for a small sub-set of customer outcomes related to interruptions to the provision of our water services and wastewater services to be set in our operating licence as minimum standards. Any optimisation of performance against those measures, along with all other service levels and customer outcomes, are best addressed through pricing processes.

Our proposed approach is in the long-term interests of customers through:

- simplifying administration and auditing compliance with minimum standards
- promoting consistency between the water businesses that IPART regulates with, and without, an operating licence
- providing room for water businesses to propose a more innovative suite of incentives to deliver on commitments that reflect customer preferences
- Keeping water businesses and customers focussed on cost-service level trade-offs, particularly the collective impacts on bill affordability and the overall value proposition.
- Providing flexibility for water businesses to respond to changes in customer preferences intra-period, which is not possible for hard-wired standards in a five-year licence.
- Encouraging innovation in achieving customer outcomes at a lower cost intra-period, for performance improvements that may not have a net benefit in point-in-time cost-benefit analysis for the operating licence review but may do so over time if new methods or technologies become available.

Licensing is a rigid construct. As we progress with customer engagement work to inform a review of the system performance standards and service level rebates for our next operating licence and customer contract, we are becoming more aware that these instruments are constraining our ability to innovate in how we demonstrate our accountability for delivering service outcomes that customers value. Two examples follow, the first relating to performance standards and the second relating to rebates.

In 2020, we sought to gain a contemporary understanding of service qualities that are valued by customers. Around 1,200 participants indicated their priorities across approximately 30 service level attributes (see Figure 6.1 and Figure 6.2). Almost all attributes contributed to satisfaction amongst a portion of customers. This was reflected in deliberative discussions on an online bulletin, in customers' own words, and in survey responses from a randomly selected, statistically significant, representative sample.

Figure 6.1

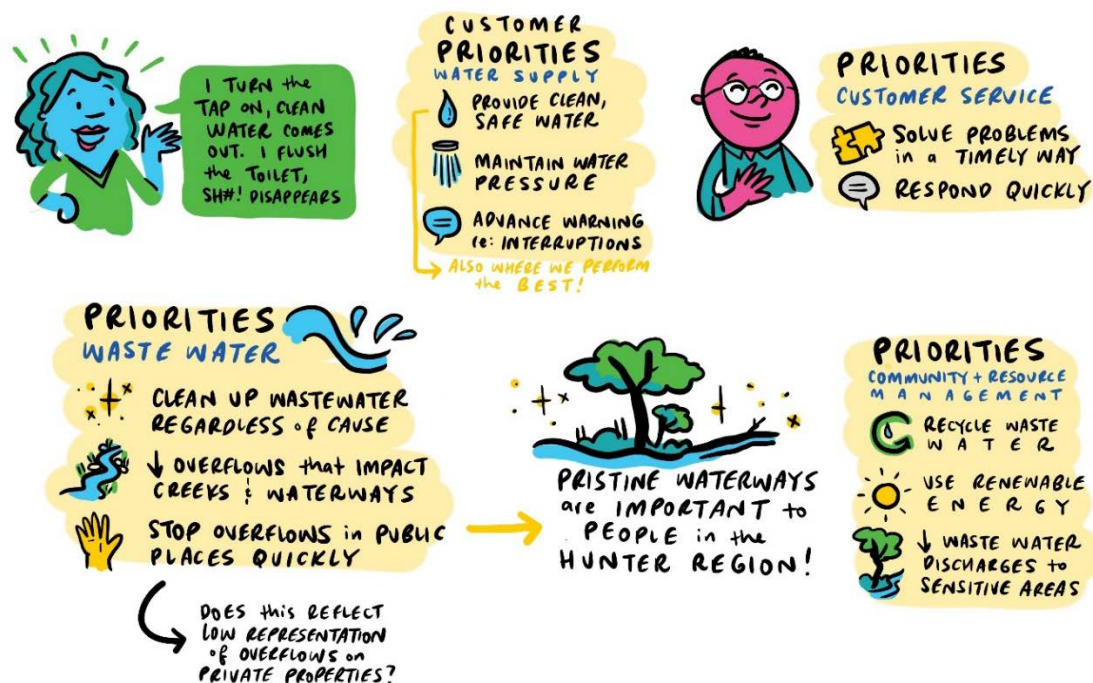
Customer expectations of Hunter Water



Source: Online Bulletin Board, 29 April 2020. Q: What do you expect from Hunter Water? What do you see as their key responsibilities/areas of priority? And of these what is the most important or most valuable to you? (n = 44)

Figure 6.2

Customer priorities for Hunter Water



Session one 10

Source: Customer survey, 2020, Q4, Q7, Q10, Q13B. eg, Q4: Provided below is a list of aspects or elements relating to water supply. Please read through the list and select the 5 that are most important to you. (n ≤ 1,039)

We have distilled the attributes into candidates for operating licence system performance standards using the following criteria:³⁰

1. Standards should relate to a service interruption. This reflects a requirement in the Hunter Water Act 1991.³¹
2. Standards should relate to outcomes (benefits) important to customers.
3. Standards should be focused on IPART's regulatory responsibilities and avoid duplication with other regulators and regulatory requirements.
4. Standards should be capable of being influenced by Hunter Water's actions.
5. Standards and measures should be capable of efficient and effective data collection and reporting, along with objective assessment.

When applying these criteria, performance standards in the licence would exclude service outcomes of medium to high importance to customers in relation to:

- Odours from the wastewater system
- Aesthetic aspects of water quality such as taste, odour or discolouration
- Customer interfacing and troubleshooting
- Environmental sustainability such as reducing carbon emissions, waste management, and improving wastewater system performance beyond environmental licence requirements.

Hunter Water sees merits in exploring with customers the trade-offs between costs and service outcomes in these areas. However, under the current regulatory framework, any proposal to improve our performance in these areas would need to be assessed through the discretionary expenditure framework, which, in its current form, is impractical and disproportionately more complex and resource intensive, often for a low materiality of expenditure (eg, $\leq 1\%$).

In its September 2020 Position Paper, IPART observes a trend amongst several other regulators towards increasing the accountability of water businesses to their customers for service outcomes set during price reviews.³² We note Victorian water businesses are able to propose the form of accountability for underperformance against service outcome commitments. Innovative incentives and penalties include:

- Westernport Water committed to provide a scaled performance rebate ranging from \$5 to \$20 to each customer in the first year of the next price period, if its outcome targets are not met. This is in addition to service level rebates associated with failing to achieve Guaranteed Service Levels (GSLs).³³
- Yarra Valley Water, reflecting its customers' preference for a financial penalty, committed to return \$1.5m through lower prices the following year for every target not achieved, plus reducing prices to reflect the saved interest if any of their top 10 capital projects is deferred.³⁴
- Gippsland Water committed to pay into a fund for water-related community investment (eg, water fountains) each time it fails to achieve a GSL of a communal nature (service level failure situations when it is not feasible to identify an individual counter-party).³⁵

³⁰ These criteria were based on GHD, 2006, Review of System Performance Standards for Hunter Water and Sydney Water, Report for the Independent Pricing and Regulatory Tribunal, page 12.

³¹ Hunter Water Act 1991, Section 13(1)(c) *"The operating licence is subject to the terms and conditions determined by the Governor but must include terms or conditions under which the Corporation is required to ensure that the systems and services meet the quality and performance standards specified in the operating licence in relation to water quality, service interruptions, price levels and other matters determined by the Governor and set out in the operating licence."*

³² IPART, 2020,

³³ Westernport Water, 2017, Price submission 2018-23: Our best offer, pages 17 and 18.

³⁴ Yarra Valley Water, 2017, Price submission, page 14.

³⁵ Gippsland Water, 2017, 2018 Water Price Review: Gippsland Water's Price Submission, page 26.

In our 2020 research on service levels that are valued by customers, we also explored customer expectations of a rebate for service level deficiencies. A large proportion of survey respondents considered that rebates were only warranted in very limited circumstances. For even the most disruptive situations, only around half indicated that a rebate was always necessary.

Moving rebates to the pricing proposal would provide greater flexibility for Hunter Water to establish credible customer outcome metrics, potentially with better targeted redress schemes.

In the next phase of service level customer engagement, currently underway, we have included a survey to gauge the acceptability of alternatives to rebates if we do not achieve certain customer outcomes. We could consider allocating funds to:

- Expanding the annual Love Water grants program for community projects that support water conservation and education in the Hunter
- Starting a new grants program for community projects, with customer and community participation in project selection (eg, projects selected by the Customer and Community Advisory Group or via Your Voice)
- Assisting customers experiencing financial hardship
- Donating to WaterAid Australia, a registered charity that enables the world's poorest people to gain access to clean water, decent toilets and good hygiene.

A longer term, novel approach may involve offering the property owner choice in how the funds are used every time they become eligible for a rebate. This work would need to consider the benefits to customers and the cost of enabling business process and system changes.

We would like to work with IPART in a mutually supportive endeavour to improve customer outcomes. In practical terms, this means defining outcome measures and performance indicators, supported by accessible reporting dashboards.

We are open to incentive schemes – both financial and reputational – tied to our actual performance in delivering services that customers' value. If we ask for expenditure to deliver an outcome or service level in the pricing proposal, we should be held accountable over the regulatory period – penalised if we do not deliver, rewarded if we outperform. Failure to deliver outcomes should be tracked and reported.



6.3. Sequencing of pricing and licensing reviews

In an ideal world, service levels and customer engagement on cost-quality trade-offs should be considered concurrently. This would ensure that the cost implications of changes with regard to specific aspects of service are integrated into pricing decisions.

Changes to outputs and outcomes from other regulators, such as environmental, health, water extraction and safety do not often neatly align with price reviews. We need to develop approaches to deal with uncertainty, rather than seeking to eliminate it. In addition, key resources involved in licensing are the same ones involved in pricing, particularly in smaller water businesses. Concurrent setting of prices and performance standards in licences can stretch resources for water businesses, IPART and other stakeholders.

It makes sense to define a small set of performance standards for service interruptions as minimum standards during an operating licence review that takes place before a price review. That way, the expenditure required to meet mandatory performance standards is known when water businesses prioritise their other expenditure needs, including expenditure to deliver other outcomes valued by customers. This prioritisation generally occurs one year before water businesses lodge their pricing proposals. Hunter Water's upcoming end of term licence review will serendipitously align this way relative to the 2023-24 price review.

6.4. Optimising performance standards

Hunter Water supports optimising performance through pricing processes, which are more dynamic, for the reasons outlined in section 6.2. Whilst optimisation is conceptually sound, we are cautious that many assumptions and modelling simplifications may result in spuriously accurate thresholds that do not reflect real world conditions. As an example, there are at least as many external factors that influence the number of wastewater overflows from wastewater systems as controllable factors (see Table 6.1). We are therefore of the opinion that optimisation is unsuitable for hard-coded standards that expose us to potentially-severe enforcement actions, such as the operating licence.³⁶

Table 6.1 *Levers influencing uncontrolled dry weather wastewater overflow performance*

Levers available to water businesses	External factors
Infrastructure upgrades eg, lining/replacements/rehabilitations/renewals	Soil types
Triggers for CCTV inspection [or CCTV (to check for obstructions) then jetting (to remove obstruction) then CCTV (to check pipe condition)]	Climate, rainfall and season (eg, dry weather encourages root intrusion into mains; self-clearing of partial obstructions during wet weather; changing weather conditions and soil moisture levels cracking pipes).
Dedicated crew(s) with jetting truck	Number/frequency of obstructions
	Types of obstructions (eg, solids, rags, pipe pieces, congealed grease/fats, root, broken seals, wet wipes, gravel/debris)
	Non-compliant household plumbing (eg, . inadequate differential height between gully and floor waste; gully lid covered).

We are open to trialing, testing and piloting good ideas – expanding the things that work in future reviews. This applies to both licensing and pricing. We note that major changes in approach, such as adopting licence performance standards set at a theoretically optimal level rather than as a minimum standard, may benefit from a trial period. Trial periods could be informative for all parties, for example revealing the risk of unintended consequences (eg, tension between a water interruptions standard and efficient leakage management).

³⁶ Breaching the hard limits on the number of affected properties/customers would constitute a breach of the operating licence and result in reduced compliance grades, enforcement actions or penalties (eg, 17 and 17A of the Hunter Water Act 1991 (NSW) provides for penalties such as a letter of reprimand; monetary penalty up to \$150,000; or cancellation of the operating licence).

7. COLLABORATING ACROSS THE SECTOR

7.1. Regulators Advisory Panel

Hunter Water strongly supports IPART's proposal to establish a Regulators Advisory Panel.

The Panel would include members from IPART, NSW Health, NSW Environment Protection Authority (EPA) and the NSW Department of Planning, Industry and Environment (DPIE), and meet under an agreed charter.

We offer our endorsement without qualification. We believe there are considerable coordination and communication benefits in regulators and policy makers meeting periodically, supported by input and advice from regulated utilities as issues arise.

The Panel would provide a forum for regulators to discuss issues of common concern, provide updates on key initiatives and share insights on regulatory approaches in different sectors. We believe there would be other broader benefits as well, as outlined below.

7.2. Balancing cost, health and environmental outcomes

The NSW Environment Protection Authority is responsible for regulating and monitoring Hunter Water's environmental performance. The EPA issues Environment Protection Licences under the *Protection of the Environment Operations Act 1997 (NSW)* for Hunter Water's treatment works, sewerage network and pumping stations. NSW Health is responsible for regulating the quality and safety of Hunter Water's drinking water.

IPART has no role in setting the environmental, health or liveability objectives of the community, or determining the best way for such objectives to be met. Rather, IPART's task is to ensure that Hunter Water's prices allow it to recover the efficient costs of delivering services while complying with regulatory obligations.

IPART examines the prudence and efficiency of investment decisions when assessing expenditure proposals. The utility passes the prudence test by demonstrating the regulatory or licensing requirement that it must satisfy. The utility passes the efficiency test by showing that it has chosen the option that best satisfies the requirement. This requires a business case that assesses capital and operating costs of different options over the life of a program or project.

There is an inherent trade-off in balancing higher levels of service and the consequent impact on utility costs and customer bills. In the past, IPART would first often become aware of the financial impact of a new or tighter regulatory requirement when we lodged our detailed four-yearly pricing proposal.

Building a shared understanding amongst regulators of emerging regulatory obligations would give all parties a better view of the combined impact on utility investment programs. We agree with IPART's observation:

A more formal approach to information sharing between policy makers and regulators could promote the long-term interests of customers, by encouraging better long-term planning in the sector and improving how the inherent trade-offs between costs, health and environmental outcomes are balanced. (p.23)

Best practice regulatory process suggests that, before setting a regulation (or in reviewing regulation), the regulator should:

- identify the objective of the regulatory action
- consider all viable options to achieve that objective
- assess the costs and benefits of each option – including costs to business, consumers, the government, and the broader community (which will likely need to involve customer and community consultation to identify and value these costs and benefits)
- ideally, select the option that generates the greatest net benefit (or least net cost) to society – unless there is a good reason to select an alternative option.

NSW Treasury's 2017 guide to cost-benefit analysis sets out the reasons for undertaking a full assessment of the broader impacts of a proposal (and its potential alternatives):³⁷

Cost-benefit analysis (CBA) is an evidence-based method for systematically organising and presenting information to help government understand all the impacts of policies and projects, including economic, social and environmental impacts. CBA helps decision makers identify the best means to improve social welfare and assess competing proposals.

Establishing the Regulators Advisory Panel will not solve the difficulty of balancing competing demands for improvements in service outcomes. Nonetheless, we see this as an important step towards better coordination and communication between regulators and policy makers, taking account of trends and compliance obligations across all streams of regulation.

The Panel also provides an opportunity for regulators to share experiences and practical outcomes in applying cost-benefit analysis, assessing the results and making regulatory decisions. IPART expresses this well:³⁸

Policy makers and regulators have a shared social licence to deliver water that is affordable, respond to the challenges of climate change, and promote positive environmental outcomes. However, there are trade-offs to be made to balance these objectives. With the right members, this panel could boost understanding of these tensions and promote the use of cost benefit analysis in making these trade-offs, where appropriate.

7.3. Encouraging regulatory innovation

The Regulators Advisory Panel offers the prospect of facilitating innovation in the way regulators in New South Wales carry-out their various statutory responsibilities.

Regulated water utilities, wherever the location, invest in long-lived infrastructure to provide essential drinking water and sewerage services. They face the same job of maintaining and renewing existing assets, and investing to support new development in parts of the system. Ageing infrastructure, a changing climate and urban growth are common challenges.

IPART's current review of the regulatory framework draws on the practice and experience of economic regulators in other sectors and jurisdictions. IPART commenced this review by publishing a report by Cambridge Economics Policy Associates looking at case studies in the water and energy sectors from Australia, Canada and the United Kingdom.

Economic regulators typically set allowed revenues by applying the building block model. But there are marked differences in the tools and techniques that regulators use to compare performance, incentivise outcomes and incorporate customer engagement. There is no right or wrong way to do specific tasks. The lessons from elsewhere can help refine the existing framework or prompt a shift to a new approach to achieving a specific purpose.

Hunter Water notes that the NSW EPA is currently finalising its Regulatory Strategy 2021, after releasing a draft strategy for public comment in 2020. The scope of the EPA's strategy is set out below.

The EPA set out its plan to become a world-class regulator. The EPA focused on five commitments: an outcomes focus, being service-oriented, a learning mindset, being responsive and adaptive, and being purpose and people centred.

Hunter Water has met with the EPA to discuss the principles underpinning the strategy. We were impressed with the EPA's commitment to re-evaluating and constantly refining its approach and practices. There are valuable lessons in the EPA's work to develop the strategy that could be usefully shared in a formal way with the Regulator Advisory Panel.

³⁷ NSW Treasury, 2017, NSW Government guide to cost-benefit analysis, Policy and Guidelines Paper, TPP 17-03, page i.

³⁸ IPART, 2021, Lifting performance in the water sector, Discussion Paper, Special Review, page 24.

Scope of this strategy

This Regulatory Strategy sets out:

- our objectives and our commitments
- the principles that guide our work
- our regulatory challenges
- what we do and how we do it
- who we work with.

This Strategy is connected to the corporate EPA Strategic Plan and links to other important EPA policies, strategies and plans.



8 Regulatory Strategy

How the Regulatory Strategy fits into the big picture

Strategic Plan 2017 - 2021

New EPA Strategic Plan to be launched in mid-2021

Regulatory Strategy

Regulatory Policy

Regulatory Policy to be in-force from mid-2021. Will replace current Compliance Policy.

Prosecution Guidelines

New guidelines commenced in 2020.

Figure 1 - Context of the Regulatory Strategy

The Regulatory Policy sits under this Strategy and explains how we identify appropriate regulatory actions and apply an escalating regulatory response to an environmental issue or non-compliance based on relevant factors.

We use a range of approaches from education and influence to enforcement to protect the environment and human health.

Principles



10 Regulatory Strategy

We are guided by the principles of ecologically sustainable development, which applies to our work through provisions in the legislation we administer.

We apply the precautionary principle. Scientific uncertainty is not a reason for the EPA to not act to prevent harm or future harm to the environment or human health.

We act to safeguard inter-generational equity. We aim to ensure the environment is maintained or enhanced for the benefit of future generations.

We act to conserve biodiversity. We aim to protect and restore the quality of the environment for our native plants and animals.

We encourage businesses to include environmental factors in the cost of goods and services. Businesses should understand and properly consider the cost of minimising environmental harm is part of the cost of producing goods and providing services.

We apply the 'polluter pays' principle: those who generate pollution and waste should pay for it.

We apply a risk-based approach to regulation. This helps us make informed decisions and focus our regulatory activities on the biggest risks to the environment and human health.

We use evidence as the basis for our decisions and actions, and to help solve environmental problems and regulatory challenges. This is informed by sound science – research, environmental monitoring, technical expertise, partnering with other research bodies, the community, government and experts.

We use intelligence-led regulation, based on data and insights from which we draw to inform our regulatory policies, programs and actions. This helps us focus our efforts on current and emerging risks and opportunities to achieve the best possible outcomes.

7.4. Piloting and trialling new regulatory approaches

The Regulators' Advisory Panel would provide an excellent forum for policy makers, regulators and utilities to discuss the funding of trials and pilots of new regulatory approaches.

Hunter Water is currently undertaking a 'pollution study and reduction program' for five wastewater treatment plants along the Hunter River. Early modelling and investigative work has identified wetland rehabilitation works that could deliver significant environmental improvements in parts of the Hunter River system. Investing in wetland rehabilitation may deliver a better environmental outcome for the same or lower cost of treatment plant upgrades.

We recognise that the EPA would need to be assured that any claimed nutrient improvements associate with wetlands projects are genuine and enduring. As the Hunter River project progresses, Hunter Water may seek guidance from IPART on the prudence of costs incurred in rehabilitating and monitoring a trial site. This is a good example of where the EPA, IPART and Hunter Water could work together, via the Regulators Advisory Panel, to deliver better overall community outcomes.

We note that the Productivity Commission's February 2021 Draft Report on National Water Reform recommended that economic regulators provide allowances to water utilities for Research and Development that has the potential to lead to efficiency improvements and better outcomes.³⁹

7.5. Establishing a charter and membership

Hunter Water agrees with the purpose and commitment outlined in IPART's draft charter for the Panel. IPART has prepared a succinct and well-crafted charter with the right emphasis on encouraging long-term planning in the sector, and the collaborative sharing of ideas and information.

Hunter Water supports the proposed membership of the Regulators Advisory Panel. IPART recognises that there must be opportunities for regulated businesses to "*present ideas, test assumptions, and bring conflicting directions to the attention of the group*". The Panel would invite regulators from other sectors as associate members to help with the exchange of new ideas.

Hunter Water does not have a firm view on the seniority of representatives or the frequency of meetings. Hunter Water would welcome CEO-level input, from all parties, in strategic annual meetings.

³⁹ Productivity Commission, 2021, National Water Reform 2020, Draft Report, page 190.

APPENDIX 1 RESPONSES TO IPART QUESTIONS

Long term focus



IPART sought feedback on the appropriate length of determination periods:

- How should each review period be sequenced to promote outcomes in the best long-term interest of consumers?
- Should the determination period be based on a set of principles (for example, our current principles in Box 2.1)? Or should we set a default determination period that we would only deviate from in exceptional circumstances?



We support longer determination periods, as they can provide enhanced incentives for efficiency gains, reduce regulatory costs, and promote a longer-term focus by regulated businesses and IPART. However, to support longer determination periods, IPART should establish a clear and comprehensive risk management framework comprised of principles and measures to holistically manage cost and revenue risk.

Understanding price-quality trade-offs



- How should performance standards be set, for businesses with, and without, an Operating Licence?
- How best to align pricing decisions and performance standard setting to enable businesses to make trade-offs between the two. For businesses with an Operating Licence, should IPART's Operating Licence and Price review processes be run concurrently?



In an ideal world, service levels and customer engagement on cost-quality trade-offs should be considered concurrently. This would ensure that the cost implications of changes with regard to specific aspects of service are integrated into pricing decisions.

However, we live in a second-best world that deals with uncertainty through flexibility.

Operating licences are rigid instruments, containing conditions that are auditable and static intra-period. They are akin to environmental protection licences, which contain minimum standards for managing environmental risks.

In this context, we consider it reasonable to define a small set of hard-coded minimum performance standards for service interruptions in the operating licence in advance of a pricing review. This approach also spreads the workload for resource-constrained stakeholders. It would work best if water utilities know these minimum standards at least one year before their pricing proposals are due to IPART, in order to integrate into expenditure proposal and provide context for other cost-quality trade-offs.

Further details are provided in section 6.

Customer choice pricing



IPART sought feedback on how it could develop a framework for customer choice pricing.

- What are the appropriate pricing principles for customer choice pricing?
- How can IPART assist the water businesses in utilising customer choice pricing?



We support the option of having customer choice pricing, as these arrangements can promote innovation, a greater customer focus and 'win-win' servicing arrangements.

Potential pricing principles for customer choice pricing could include:

- services to be provided are clearly specified
- prices reflect efficient costs
- costs and revenues from customer choice pricing arrangements are clearly identified and ring-fenced from the regulated cost/revenue base.

IPART can assist in promoting customer choice pricing by adopting a suitably 'light handed' approach to oversight and regulation where it is clear there is genuine customer choice.

Form of price control



IPART sought feedback on whether it should provide more flexibility for the business to propose different forms of price control.

- What would be the appropriate side constraints and pricing principles under a revenue cap approach, or a weighted average price cap, to ensure efficient and equitable outcomes?



We support more flexibility in terms of forms of price control. In particular, we see significant benefit in applying a revenue cap for water services. Appropriate side constraints would include that the water usage price is set with reference to estimates of the long run marginal cost of water supply, and annual adjustments to fixed water service charges (as the balancing item) are limited to a specified cap to minimise annual price volatility.

Shadow price for leakage



IPART sought feedback on whether it should introduce a shadow price for leakage.

- Should the value of water used in the shadow price be based on a short run marginal cost or a long run marginal cost of supplying water?
- How we can account for unbilled water under a shadow price for leakage?



We support a shadow price for leakage. It would set consistent incentives for water conservation between customers and water businesses. It would also hold us accountable for achieving economically efficient leakage levels.

Under the shadow price approach, the value of water leaked should be set at the usage charge that customers pay for water (drought and non-drought) – which, in turn, should be set with reference to estimates of the long run marginal cost of water supply. This is the simplest option to implement and easiest for customers to understand. We realise that it is technically more correct to net off average short-run

operating costs, to avoid double-counting the existing financial incentive/penalty. We would not object to this adjustment.

In the first instance the shadow price should only apply to real losses downstream of water treatment plants – the component we are most able to influence. There are merits in subsequently considering scope expansion to include all of our 'own' water usage.

Further details are provided in section 4.

Regulators Advisory Panel



IPART sought feedback on whether it should introduce a Regulators Advisory Panel. And if so:

- What would be the goals of the Regulators Advisory Panel (RAP)?
- Who might participate in the RAP?
- How would the panel operate?



We strongly support IPART's proposal for a Regulators Advisory Panel (the RAP).

The goals of the RAP should be:

- promoting effective coordination, communication and information sharing between regulators
- promoting and sharing best practice regulatory design and evaluation (including cost benefit analysis) as it relates to the water sector
- promoting innovation and better outcomes for water customers and the broader community.

The RAP should include IPART, NSW Health, the EPA and DPIE, and allow participation by regulated water businesses – to test ideas, provide information and identify any potential inconsistencies and issues to resolve between regulators.

We generally support IPART's outline of how the RAP should operate – see section 7 for further information.

APPENDIX 2 SHADOW PRICE FOR LEAKAGE WORKED EXAMPLE

Our interpretation of the shadow price for leakage mechanism described in IPART's Discussion Paper is set out below. Many of the concept are consistent with the demand volatility adjustment mechanism, as applied in 2020 Price Determinations.⁴⁰

1. Limit the analysis to ' $t-1$ ' years of actual water leakage data, where ' t ' is the length of the determination period for which the shadow price applies. This is because actual water leakage for final year of the determination period will not be available until after IPART's next price determination has commenced. A staggered approach would be taken in subsequent determination periods.
2. Determine the variation between the economic level of leakage (forecast in the pricing proposal) and actual leakage in each year. Both the economic level (target) and actual leakage should initially only apply to current annual real losses.
3. Value of water is based on the water usage price, with drought vs non-drought price applied at a high level eg, if say the actual leakage in a year is 1,000 kL better than the ELL and the drought price applied 20% of that year, then 200kL of the shadow price would be at the drought price and 800kL would be at the non-drought price. It would be unnecessarily complex and spuriously accurate, for little benefit, to attempt a daily reconciliation.
4. Calculate holding costs using the pre-tax WACC from the prevailing Price Determination.
5. Apply a resulting amount penalty amount as a revenue adjustment (decrease) to the unsmoothed building block model notional revenue requirement. It is subsequently spread in an NPV-neutral way.

Note, in section 4 we describe two potential variations on this approach:

- The value of water is based is the water usage price net of estimated average short-run operating costs. Due to financial reporting timing constraints, there would be a one-year lag in updating the average short-run operating cost estimates. This is not shown in Figure 7.1.
- Intra-period revenue adjustment in the following year, potentially as part of a revenue cap form of price control. This obviates the need to calculate holding costs and is shown in Figure 7.1.

⁴⁰ IPART, 2020, Review of prices for Hunter Water Corporation from 1 July 2020, Appendix D.

Figure 7.1

Hypothetical worked example of a shadow price for leakage mechanism

		Price determination period 1				Price determination period 2				
		Price review				Price review				
		Year PD ₁ (1)	Year PD ₁ (2)	Year PD ₁ (3)	Year PD ₁ (4) = Year PD ₂ (-1)	Year PD ₂ (1)	Year PD ₂ (2)	Year PD ₂ (3)	Year PD ₂ (4)	Year PD ₂ (5) = Year PD ₃ (-1)
	Days per year	365	365	366	365	365	365	366	365	365
Economic level of leakage (forecast in pricing proposal)	ML/day	17.8	18.2	18.4	18.6	18.0	18.2	18.5	17.9	18.1
Real losses (actual)	ML/day	17.6	18.2	19.6	18.5	16.5	18.2	19.4	17.7	Unknown
Net (positive is good, negative is bad)	ML/day	0.2	0	-1.2	0.1	1.5	0	-0.9	0.2	Unknown
	kL/year	73,000	0	-439,200	36,500	547,500	0	-329,400	73,000	Unknown
Volume subject to shadow leakage price for PD ₃	kL					291,100				
Proportion of time that the drought price applied	%					20%	50%	0%	0%	
Water usage charge - drought	\$/kL (\$PD ₂ (1))					3.00	3.00	3.00	3.00	
Water usage charge - non-drought	\$/kL (\$PD ₂ (1))					2.50	2.50	2.50	2.50	
Shadow leakage reward/penalty	\$/kL (\$PD ₂ (1))									
Drought						328,500	0	0	0	
Non-drought						1,095,000	0	-823,500	182,500	
Sub-total (positive is a reward, negative is a penalty) (applicable if there's an intra-period adjustment)						1,423,500	0	-823,500	182,500	
Shadow leakage reward/penalty excluding holding costs to be used to adjust Notional Revenue Requirement for PD ₃	\$/ (\$PD ₂ (1))					782,500				
Holding costs @ real pre-tax WACC for PD ₂	4.2%									
Holding costs - adjustment factor						1.179	1.131	1.086	1.042	1.000
Shadow leakage reward/penalty including holding costs						1,678,141	0	-894,127	190,165	
Shadow leakage reward/penalty including holding costs to be used to adjust Notional Revenue Requirement for PD ₃ (applicable if there's an inter-period adjustment)	\$/ (\$PD ₂ (1))					974,179				

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