PRICE PROPOSAL UPDATES

Response to the Commission's draft decision for regulated water and wastewater services 2023–28

icon WATER

Acknowledgement of Country

Icon Water acknowledges the traditional custodians of the Canberra region, the Ngunnawal people and pay our respect to their Elders – past, present and emerging. We recognise and value their continuing culture and the contribution they make to the life of the city and the region. We also acknowledge the First Peoples of the broader region in which we live and work.

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OVERVIEW

OVERVIEW

Our revised proposal is for revenue of $1,921.2 million over five years in order to continue providing quality water and reliable wastewater services, and make responsible investments for the city's future. This will see the bill for a typical residential customer consuming 200 kilolitres (kL) of water per year grow by around 6.5 per cent each year. Inflation and economic conditions outside of our control continue to impact prices and are driving almost all of this increase.

We acknowledge the challenging environment, and we are doing everything we can to keep prices as low as possible. Examples of additional actions we have taken include:

- We have increased our operating expenditure efficiency target, to challenge ourselves to find an additional $4.4m of savings over the next five years on top of our original commitment of $12m of savings.
- We have continued to use lower-bound estimates for a number of capital projects and reduced the contingency we are including in the proposal, which has reduced our capital investment plan for the next five years by approximately $40m in addition to the more than $70m excluded in our original proposal.

These actions have helped us to keep the price path as low as possible for customers while continuing to deliver the services our customers value and operate within the bounds of our regulatory framework.

The blue boxes below identify the four key factors that were shaping our operating environment when we developed our regulatory proposal earlier this year – ageing infrastructure, climate change, growing population and government policy. We have since added a fifth operating factor shaping our environment – economic conditions. Inflation and the cost of capital have increased significantly since we made our proposal, which are pushing water and wastewater prices higher.

Our operating environment is being shaped by...

Ageing infrastructure	Climate change	Growing population	Government policy	Economic conditions

Current economic conditions are impacting our costs and the prices we need to charge customers. We share the community's concerns about affordability and the pressure on prices across the economy. We have considered our response to each of the adjustments made by the Independent Competition and Regulatory Commission in its draft decision, with a view to keeping prices as low as possible for customers without jeopardising drinking water quality or the reliability of wastewater services for Canberrans.

"We need to make responsible investments so future generations are not left to pay – either through high bills, environmental damage or poor quality and unreliable services."

Icon Water Board, 2023–28 Price Proposal Overview (pg. 2)

We recognise the cost-of-living pressures facing our community and that more of our customers may need extra assistance managing their bills. This could range from a payment arrangement for extra time to pay a bill through to accessing our long-term financial hardship program, Staying Connected. See page 21 for more information about how customers can access our support programs.

BACKGROUND

BACKGROUND

As the ACT's provider of essential water and wastewater services, our maximum prices are set by an independent regulator to ensure they are no higher than needed to deliver safe, reliable services at efficient cost. This independent regulator is the Independent Competition and Regulatory Commission (the Commission).

The Commission is currently in the process of determining prices for the period 1 July 2023 to 30 June 2028. As part of that process, on 30 June 2022 we submitted our price proposal to the Commission. Our proposal is available on our website iconwater.com.au/priceproposal and outlines our focus on delivering the services our customers told us they value most:

- reliable water and wastewater services
- quality drinking water
- affordable pricing
- responsive customer service.

At the same time, our proposal addresses the increasing need to respond to major factors influencing our operating environment – we must proactively address our ageing infrastructure, the challenges of climate change, a growing ACT population, and changing government policy.

Under the regulatory framework, the Commission must assess each of the components of our proposal for prudency and efficiency. In other words, the Commission determines how much operating and capital expenditure Icon Water needs to deliver a safe and reliable service, and how much demand there will be for our services. Then, these components are added up to work out water and wastewater prices over the five-year regulatory period.

Importantly, the regulatory framework requires each component of the proposal to be assessed on its merits. It does not start with a particular price level in mind, and then work backwards to determine how much we should be allowed to spend. This is because prices can be affected by many factors, including circumstances out of our control. For instance, inflation and market conditions can change significantly from year to year. In contrast, our costs of providing water and wastewater services are more predictable. We believe that the starting point for the regulatory process should always be to determine the right level of expenditure to efficiently deliver the services our customers have told us are most important.

We are also very conscious about affordability for our customers. That's why when we engaged with the ACT community, we spoke to customers about the price impacts of the investments needed to deliver on our customers' expectations. In this way, we worked hard to make sure our proposed expenditure provides value to the community and achieves the community's preferred balance between price and service.

The Commission engaged Marsden Jacobs Associates (MJA) to help assess the prudency and efficiency of our expenditure.

On 21 October 2022, the Commission released its draft decision for the 2023–28 regulatory period and invited public submissions.

This document is Icon Water's submission – it outlines our response to the Commission's draft decision and provides updated information where appropriate.

Timeline

Icon Water price proposal	June 2022
Commission draft report and price direction	October 2022
Submissions to Commission draft report	December 2022
Commission final report and price direction	March – May 2023
New prices take effect	July 2023

CUSTOMER VALUES AND EXPECTATIONS

In preparing this submission, we have continued to consider our customers' values and expectations for how we plan and invest in the future.

Our customers value:

- **Reliable water and wastewater services**
- **Quality drinking water**
- **Affordable pricing**
- **Responsive customer service**

… and expect that

- The community agrees with the need to continue to plan for the future, this includes investing in water security and exploring alternative water sources.
- There is community support for achieving greater environmental sustainability and accelerating net zero while limiting impact on customer prices.
- The community is committed to Icon Water maintaining quality and reliable core services and is willing to pay something towards reducing interruptions or issues for those who experience them more than usual.
- Affordability should underpin any investment decision. If we need to invest to avoid causing issues in the future, we will consider support for vulnerable customers and other impacted customer segments.
- The community considers Icon Water an essential service provider. To be a valued partner in the community customers want us to be more visible – this means being targeted in our partnering initiatives, education and supporting activities, and proactively talking about it with the community.

Our plan for the next five years

Our plan for the 2023–28 regulatory period is summarised in eight customer-focussed outcomes. These outcomes were informed by our customer values and expectations, alongside our business needs and regulatory obligations.

- Prepare and plan for the future
- Care for and protect the environment
- Affordability for all
- Valued and visible community partner
- Maintain core service levels
- Safe and healthy drinking water
- Reliable water and wastewater services
- Contemporary and responsive customer service

GUIDE TO THIS DOCUMENT

GUIDE TO THIS DOCUMENT

Purpose

This document provides a concise summary of our response to the Commission's draft decision. This includes an overview of information that has been updated since we submitted our price proposal, our proposed revenue requirement for the 2023–28 regulatory period and the impact on customer bills.

Our pricing website

A user-friendly and customer-focused website iconwater.com.au/priceproposal enables our customers to explore our price proposal. The website also provides links to this overview and the attachments.

Detailed attachments

More detailed information on the updates to Icon Water's proposal and response to the Commission's draft decision is set out in three attachments. The attachments enable full scrutiny by the Commission ahead of their final decision on prices for the 2023–28 regulatory period.

The attachments cover:

1. Operating expenditure
2. Capital expenditure
3. Other matters

ABOUT US

ABOUT US

As the ACT's supplier of essential water and wastewater services, we are committed to providing a safe, secure and sustainable water supply for the people of the ACT and the region.

We have been part of the Canberra community for over 100 years; we source, treat and supply water and manage wastewater services. We play a fundamental role in the community, providing essential services that contribute to public health and the prosperity and liveability of the region.

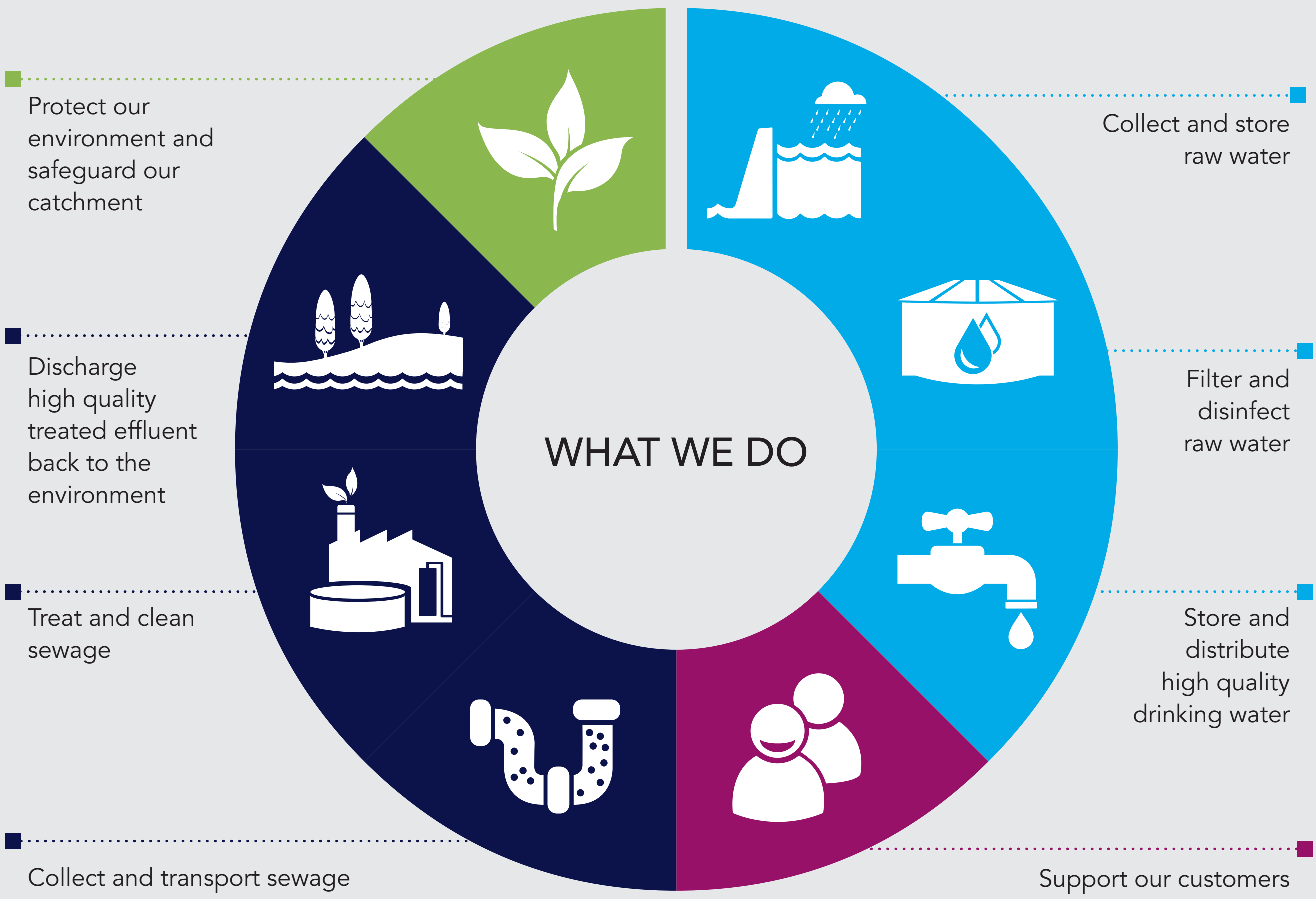
The current value of our assets is around $3.2 billion and includes the territory's network of dams, water treatment plants, wastewater treatment plants, reservoirs, water and sewage pumping stations, pipes and other related infrastructure.

A major part of our role is protecting the environment. We operate one of Australia's largest inland wastewater treatment plants, returning around 70 per cent of the water Canberra uses as high quality flows to the Murrumbidgee River at a standard suitable for beneficial reuse downstream. Our reliability, expertise and community focus mean we are well placed to provide these essential services.

As a Territory-owned corporation we have four obligations under the ***Territory-owned Corporations Act 1990***:

1. To operate at least as efficiently as any comparable business.
2. To maximise the sustainable return to the Territory on its investment in Icon Water and ActewAGL, in accordance with the performance targets in the Statement of Corporate Intent.
3. To show a sense of social responsibility by having regard to the interests of the community in which we operate, and by trying to accommodate and encourage those interests.
4. Where our activities affect the environment, to effectively integrate environmental and economic considerations in decision-making processes.

Our essential services support the wellbeing of the Canberra community, particularly in relation to the ACT Wellbeing Framework domains of health, environment and climate, and economy.



OUR CUSTOMERS

453,324
Population reach

186,833
Residential customers

9,939
Non-residential customers

45.4
Gigalitres of water supplied in 2021–22

OUR TEAM

~400
Employees

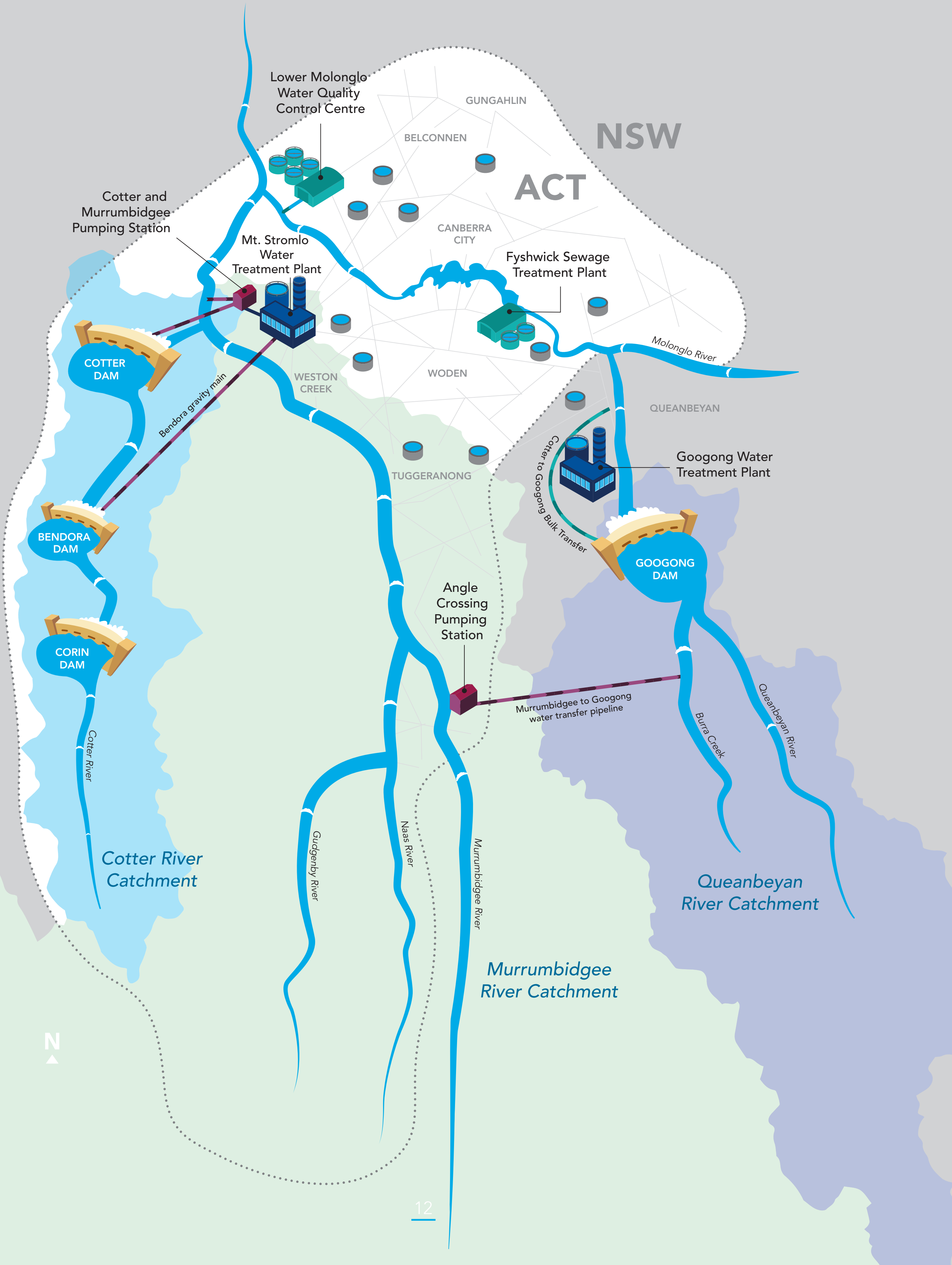
97%
Employed full-time

21%
15+ years loyal

44
Average age

OUR NETWORK

(WATER & WASTEWATER)



OUR ASSETS

$3.2 billion

of water and wastewater related assets

278 GL
Combined dam capacity

3,400km
Network of water pipes

25
Water pumping stations

2
Water treatment plants

50
Reservoirs

3,400km
Network of sewer pipes

27
Sewage pumping stations

4
Sewage treatment plants

UPDATES TO PRICE PROPOSAL

OVERVIEW

Operating expenditure

Operating expenditure refers to the day-to-day costs we incur to plan, operate and maintain our network so we can provide water and wastewater services to our customers. Operating efficiently is important to us and our customers, and over the last five years we challenged ourselves to find savings and achieved efficiencies of 1.7 per cent per year. Despite the significant efficiencies we've already achieved, as well as current challenging economic conditions, we have proposed further efficiencies of 0.7 per cent per year for the next five years.

Based on our prudent and efficient costs, our operating forecast for the 2023–28 regulatory period is $214.6 million per year (in 2022–23 dollars).

This forecast considers the Commission's draft decision, as well as updated assumptions to reflect more recent information.
Key updates to the operating forecast include:

- A reallocation of costs between controllable and non-controllable expenditure, to be consistent with the Commission's draft decision.
- Updated forecasts to reflect the latest available information for forecast inflation, labour, construction, electricity and insurance costs.
- Consistent with the accounting guidance for cloud-based technology projects, we have shifted expenditure from our capital forecast to our operating forecast. This has not increased our total expenditure.
- Allocating additional funding to comply with regulatory requirements, including the critical infrastructure obligations passed earlier this year to protect businesses and their customers from cyber security and other threats.
- Challenging ourselves to find an additional $4.4 million in savings over the next five years on top of our original commitment of $12 million.

Attachment 1 provides further information on the updates to our operating forecast.

This level of operational funding will enable us to strengthen the resilience of the ACT's water and wastewater network while continuing to maximise value for our customers, both of which are in the long term interest of Canberrans.

Capital expenditure

A significant proportion of the ACT's water and wastewater assets were built in the late 1960s and early 1970s during a period of rapid expansion in Canberra, including our main wastewater treatment plant. We have carefully planned our investments for the next five years to ensure we renew assets approaching the end of their service life and upgrade assets reaching capacity in a timely and cost-efficient manner, while minimising disruption to customers. By making these responsible investments, we will make sure that future generations continue to benefit from a safe and reliable water and wastewater network.

Our forecast capex for the 2023–28 regulatory period is $689.1 million (in 2022–23 dollars). This includes $206.8 million for water assets and $482.2 million for wastewater assets. This funding will enable us to renew and upgrade our infrastructure at the right time, so we can continue to deliver quality drinking water and reliable wastewater services to our customers, and preserve our essential, long-lived infrastructure for future generations.

An additional $28.3 million of investment will also be funded by developers through the capital contributions charge.

This forecast considers the Commission's draft decision, as well as updated assumptions to reflect more recent information. Key updates to the capital investment plan include:

- For the top 10 forecast capital projects, we considered MJA's assessment and have provided updated information and forecasts for four projects.
- We removed (either in part or full) nine ICT projects, to reflect the shift in expenditure from capital to operating expenditure. This has reduced our capital investment plan compared to our initial proposal.
- For the remainder of the portfolio, we undertook a risk-based re-profiling of some of our projects, which means a delay in passing on these costs to customers.
- We also made a number of relatively minor changes to reflect updated project cost and delivery timeframe forecasts.

In developing our capital investment plan and making the above updates, we have intentionally omitted a portion of project costs to minimise the upfront impact on customers. If projects move forward as we anticipate and the full project cost is realised in the 2023–28 regulatory period, we intend to submit this prudent and efficient expenditure for review as part of the 2028–33 price investigation.

Attachment 2 provides further information on the updates to our capital forecast.

Other matters

We note and welcome the Commission's commitment to review the wastewater tariff structure in the next regulatory period and look forward to engaging with our customers and the Commission on this topic soon.

Attachment 3 provides further information on the other elements of Commission's draft decision including the demand forecast and weighted average cost of capital.

OUR REQUIRED REVENUE

Icon Water's net revenue, which is the amount we propose to recover from our customers over the 2023–28 regulatory period, is shown in Figure 1.

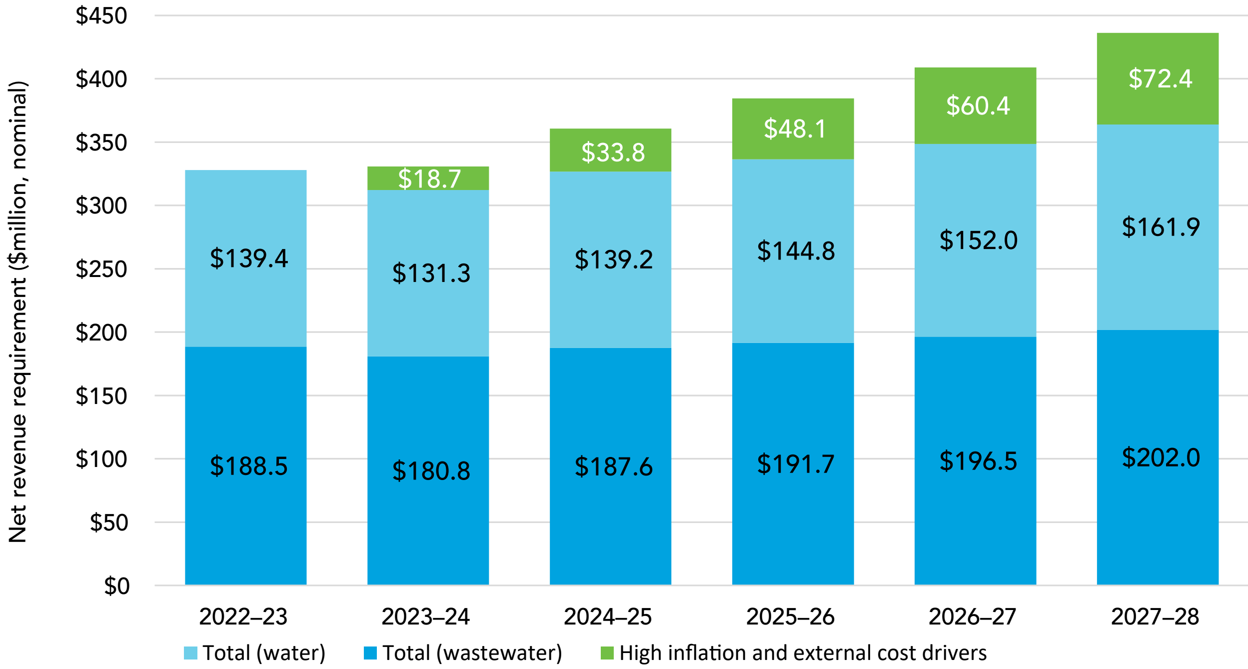


Figure 1 Net revenue requirement for water and wastewater ($million, nominal)

As shown in Figure 1, the increase in the net revenue requirement for the 2023–28 regulatory period (compared to the current financial year) is almost completely driven by higher forecast inflation and higher operating costs outside of Icon Water's control (including higher insurance costs)[1]. This unfortunately mean higher prices for our customers over the next five years; as while our customer numbers will continue to increase, this growth will not offset higher inflation and other costs.

1 High inflation and external cost drivers includes step changes in operating expenditure, inflation above 2.5 per cent and a WACC above 5.11% (consistent with our initial proposal)

Table 1 and Table 2 show Icon Water's net revenue requirement for water and wastewater for the 2023–28 regulatory period.

Table 1: Forecast net revenue requirement – water ($million, nominal)

	2023–24	2024–25	2025–26	2026–27	2027–28
Return on capital	$46.8	$51.2	$55.5	$60.2	$65.1
Depreciation	$38.5	$42.0	$45.1	$48.7	$52.6
Operating expenditure	$79.4	$87.2	$89.9	$91.8	$92.5
Water abstraction charge	$36.0	$37.4	$38.9	$40.5	$42.2
Utilities network facilities tax	$6.8	$7.1	$7.4	$7.7	$8.0
Other non-controllable operating expenditure	$0.8	$0.9	$0.9	$1.1	$1.5
Net tax liabilities	$0.0	$0.0	$0.0	$0.0	$0.9
Total revenue requirement	$208.4	$225.7	$237.7	$250.0	$262.8
Less other adjustments	$19.6	$20.4	$21.2	$21.9	$22.6
Net revenue requirement (water)	$188.7	$205.3	$216.5	$228.2	$240.2

Source: Icon Water
Note: Totals may not sum due to rounding

Table 2: Forecast net revenue requirement – wastewater ($million, nominal)

	2023–24	2024–25	2025–26	2026–27	2027–28
Return on capital	$29.8	$33.3	$37.3	$42.6	$49.9
Depreciation	$36.6	$40.0	$43.6	$48.1	$54.3
Operating expenditure	$84.7	$91.4	$96.4	$98.8	$100.3
Utilities network facilities tax	$5.5	$5.7	$5.9	$6.2	$6.5
Other non-controllable operating expenditure	$1.2	$1.2	$1.2	$1.5	$1.9
Net tax liabilities	$1.4	$1.3	$1.5	$1.9	$2.2
Total revenue requirement	$159.1	$172.9	$186.0	$199.2	$215.1
Less other adjustments	$17.0	$17.5	$18.0	$18.5	$19.0
Net revenue requirement (wastewater)	$142.1	$155.4	$168.0	$180.7	$196.0

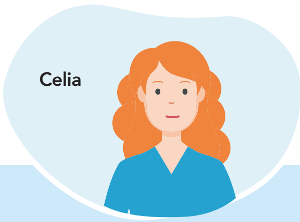
Source: Icon Water
Note: Totals may not sum due to rounding

IMPACT ON TYPICAL BILLS

A typical residential customer consuming 200 kL of water per year is forecast to see an increase in their combined water and wastewater bill of 6.5 per cent (or around $87) per year on average during 2023–28. This includes forecast inflation of 3.35 per cent per year.

Illustrative water and wastewater bills for 2023–28

As part of our customer engagement program, we developed five community personas to help with discussions about tariffs and their impacts on customer bills.



Meet Celia

Celia lives by herself in a small house in Monash, ACT.

She works part-time, so money is reasonably tight. She watches every penny.

Celia doesn't typically use much water and always conserves what she can – her plants are cared for with water saved from the shower!

Celia is interested in ways to save on bills and how residential water users can help improve water security in the ACT.

100 kL of water per year

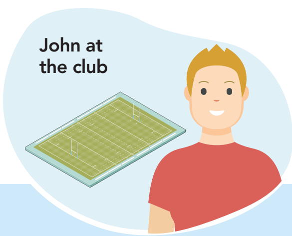
Meet the Smiths

The Smiths are a family of four (plus one furry friend) who live in a house in Kaleen, ACT.

They use water in their day-to-day lives.

They have a lot of laundry to do, as well as a garden to maintain. The Smiths are keen to look at ways to reduce their water use (and bills) without compromising their quality of life.

200 kL of water per year



Meet the local football club

John manages his local football club. He takes pride in maintaining the grounds and pitch and in providing facilities like player shower rooms.

John would like to know how to reduce water use or save costs without compromising service. He has a water tank but doesn't want to rely on this too heavily in case of future dry spells.

30,000 kL of water per year

Meet Blooms Garden Centre

Blooms is a suburban garden centre offering a large variety of plants for purchase and has a number of greenhouses to raise plants to sell.

The owner, Ashlee, knows that despite good water conservation practices the business uses a lot of water. Ashlee finds that her water bills are very high and would like to reduce them, as well as explore ways to recycle and reuse water.

5,000 kL of water per year

Meet Bean Brew Coffee Shop

Kevin is the owner. He and his small team use water to make coffees, for cooking, cleaning and the customer restroom.

Kevin knows his water use is fairly low compared to larger businesses, but he is always looking for ways to be more efficient and return a profit.

Kevin wants to be able to easily and quickly reach out to Icon Water to fix any problems and to minimise the costs of running his business.

300 kL of water per year

The persona approach was positively received so we have extended its use to show the impacts of our proposed prices for different community personas, as shown in Table 3.

Table 3: Forecast bill impacts for community personas ($, nominal)

	2023–24	2024–25	2025–26	2026–27	2027–28
Celia – using 100 kL per year					
Combined water and sewerage bill ($ per annum)	$991	$1,056	$1,126	$1,200	$1,278
Change in bill ($)	$61	$65	$69	$74	$79
Change in bill (%)	6.6%	6.6%	6.6%	6.6%	6.6%
The Smiths – using 200 kL per year					
Combined water and sewerage bill ($ per annum)	$1,253	$1,335	$1,421	$1,513	$1,611
Change in bill ($)	$76	$81	$86	$92	$98
Change in bill (%)	6.5%	6.5%	6.5%	6.5%	6.5%
Bean Brew Coffee Shop – using 300 kL per year					
Combined water and sewerage bill ($ per annum)	$1,719	$1,828	$1,945	$2,069	$2,201
Change in bill ($)	$103	$109	$116	$124	$132
Change in bill (%)	6.4%	6.4%	6.4%	6.4%	6.4%
Blooms Garden Centre – using 5,000 kL per year					
Combined water and sewerage bill ($ per annum)	$24,557	$26,058	$27,650	$29,341	$31,134
Change in bill ($)	$1,414	$1,501	$1,593	$1,690	$1,794
Change in bill (%)	6.1%	6.1%	6.1%	6.1%	6.1%
Local Football Club – using 30,000 kL per year, with 10 billable wastewater fixtures					
Combined water and sewerage bill ($ per annum)	$151,287	$160,555	$170,392	$180,832	$191,913
Change in bill ($)	$8,733	$9,269	$9,837	$10,440	$11,080
Change in bill (%)	6.1%	6.1%	6.1%	6.1%	6.1%

Source: Icon Water.
All prices and bill impacts are inclusive of inflation of approximately 3.35% per year

HOW WE SUPPORT OUR CUSTOMERS

We recognise the cost-of-living pressures facing our community which are impacting our customer segments in different ways.

For many, it's an incredibly challenging time and we understand that more of our customers may need extra assistance managing their bills. We have a range of support options for residential and small business customers which include:

- flexible payment plans
- payment extensions
- personalised case management through the Staying Connected program which has been recently expanded to include small business customers.

Customers can access these support mechanisms by:

- requesting a payment extension through our online self-service portal
- talking to us directly by calling 6248 3111 and selecting option 2
- sending an email to talktous@iconwater.com.au
- visiting our website to contact our Staying Connected team to discuss how we can help. Our website also provides information on how to contact us via language assist services for customers who are deaf or have a hearing or speech impairment.

When talking about our plans for the next five years, customers told us they understood the need for timely investment to ensure affordability over the long-term. At the same time, they asked that we consider financially vulnerable customers in our decisions. The original engagement activities did capture vulnerable customers within the broader engagement activities. As a next step, we will be engaging directly with those experiencing vulnerability and their advocates in 2023 to explore our current customer support programs, potential enhancements to their design and other support opportunities.

HOW WE SUPPORT OUR COMMUNITY

Icon Water administers Community Service Obligations (CSOs) on behalf of the ACT Government, which provide subsidised tariffs for eligible institutions including churches and other religious establishments, hospitals, schools, benevolent institutions and charitable institutions.

Through our Community Support Program, we also support many community services and programs, to give back to our local community and provide direct support to Canberrans in times of need. In 2022–23 we are providing more than $400,000 in sponsorship, donations and in-kind support to local non-for-profit and community organisations such as Lifeline, OzHarvest, Menslink, Karinya House, Roundabout Canberra and Domestic Violence Crisis Support (DVCS).

WHERE TO FROM HERE

The Commission will release its final report and price direction for the 2023–28 regulatory period between March and May 2023. Following this, we will notify our customers of our updated prices which will come into effect on 1 July 2023.

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Canberra ACT 2600

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133 677

Language assistance
13 14 50, 24 hours

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برای کمک زبانی به شماره بالا تلفن بزنید
மொழிபெயர்ப்பாளர் உதவிக்கு மேலே உள்ள இலக்கத்தை அழையுங்கள்
Nếu cần thông dịch viên, hãy gọi đến số trên đây

Information about Icon Water and an electronic version of this report can be found at iconwater.com.au.

iconwater.com.au

Attachment 1

Operating expenditure

December 2022

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1.1 Introduction

This attachment sets out Icon Water's response to the Independent Competition and Regulatory Commission's (the Commission's) assessment of our operating expenditure (opex) over the 2023–28 regulatory period in their Draft Decision of October 2022. As part of our response, we have revised our opex forecast for the next five years, reflecting the prudent and efficient operating costs required to deliver the services our customers have told us they value, including:

- reliable water and wastewater services
- quality drinking water
- affordable pricing
- responsive customer service.

The Commission engaged consultants Marsden Jacobs Associates (MJA) to assess our opex forecast and agreed with MJA's recommendations to significantly reduce our forecast. Icon Water considers that these proposed reductions are unachievable and will not provide a sufficient budget to deliver our services and undertake the necessary planning work to ensure our region's water security and improve climate resilience.

In this attachment, we provide further information to respond to the Commission's Draft Decision. Box 1-1 summarises the key points.

Box 1-1: Key points summarising Icon Water's revised opex forecast

- Icon Water's revised opex forecast for the 2023–28 regulatory period is $1,073.0 million, which is 2.7 per cent higher than our initial forecast of $1,045.1 million, and 9.6 per cent higher than the Commission's Draft Decision of $979.2 million (in real 2022–23 inflation-adjusted terms, noting that inflation has been updated).
- We consider the Commission's Draft Decision to reduce our opex forecast by 6.3 per cent to be unachievable in the current economic environment, with inflation expected to be over 7 per cent in 2022–23 and considering other external drivers impacting costs.
- Although our revised forecast is higher than our initial proposal, holding step changes constant, our opex forecast is 1.2 per cent lower than our initial proposal. Part of the step change has already been assessed as prudent and efficient (either as opex or capex) in the Commission's Draft Decision.
- Our revised forecast maintains the base-step-trend forecasting approach and reflects the most up-to-date data, including:
  - An updated base year (2021–22) to reflect actual costs, including the actual allocation of expenditure between our water and wastewater services. Our forecast also accepts the Commission's Draft Decision base year adjustment for regulatory compliance costs, licence fees, and royalties to be included in non-controllable opex with an annual pass-through provision.
  - Updated labour, chemicals, and electricity cost escalators, which change at a rate different from inflation.
  - A proposed productivity growth rate of 0.7 per cent annually, which is within the range of evidence-based frontier shift and catch-up efficiency while still stretching our capacity to meet reliability and other service standards.
  - Updated step change forecasts for insurance premiums driven by factors outside of our control and meeting Security of Critical Infrastructure (SoCI) regulatory obligations.
  - An additional step change of $25.2 million for ICT Software as a Service (SaaS) investment – a substitution from capex (in our proposal) to opex (in our revised forecast). In its Draft Decision, the Commission considered these costs as part of the

capital investment plan and found them prudent and efficient. Due to clarification of accounting standards, several costs have been reclassified from capex to opex. Our revised forecast has included these costs as opex.

- A step change for additional costs related to delivery of the ACT Government's Managing Buildings Better reforms.
- Acceptance of the Commission's Draft Decision to include a negative step change for efficiencies associated with the Cotter Pump Station upgrade.

Our opex forecast will be sufficient to maintain, but not improve current service performance, and importantly does not put at risk the current level of reliability and service standards.

1.1.1 Improving the resilience of ACT's water and wastewater services

To support achievement of our customer focussed outcomes for the 2023–28 regulatory period, particularly *Outcome 1: Prepare and plan for the future*, we must actively plan for a growing Canberra and a future where climate change has impacted our systems. We must routinely reassess our water security, water catchment quality, drought management actions and wastewater systems to inform our operating and investment decisions.

The significant drought in the ACT from 2016 to 2020 instigated a review of our water supply strategy and an update of our water resource model, completed in early 2022. The model update included improvements to rainfall-runoff models, climate change assumptions, demand and population forecasts, and operating cost models, and incorporated drought management response actions.

The updated model predicts reduced dam inflows during droughts, resulting in lower long-term source water security compared to our previous forecasts. This would result in more frequent water restrictions and bring forward the timeframe for the augmentation of the next water source.

In response to this reduced water availability, we revised how we operate our water supply system. We now operate the system more securely by increasing supply from Cotter Dam and increasing the triggers for the transition from Permanent Water Conservations Measures (PWCM) to temporary water restrictions (TWRs). Operating the system more securely reduces the likelihood of experiencing emergency storage levels (below five per cent of total storage), however, it incurs additional operational costs associated with treatment and pumping.

The outcomes of the model update have brought forward our timeframes for progressing investigations into our next future water source. In the 2023–28 regulatory period, significant investment will be required to progress investigations to maintain water security and climate resilience. The investigations will include consideration of new or augmented dams, additional river pumping, groundwater, demand management, recycled water and desalination.

With our dams currently overflowing and with the recent announcement by the ACT Government to establish the Office of Water, it is an opportune time to build upon our *Let's Talk* engagement program and further engage with the community, customers and stakeholders about how we can best manage our long-term water security as well as prepare for, and respond to, future droughts. In our strategic customer engagement program[1], our customers told us that water security is the top priority, and they expect us to plan for the future. This includes investing in water security and exploring alternative water sources. We need to consider the appetite for demand management, water restrictions and investing in new water supply infrastructure, including alternative water sources such as recycled water. Significant engagement will also be required with the ACT Government's Office of Water as it refreshes the *ACT Water Strategy 2014–44*.

[1] Icon Water, *Price Proposal - Attachment 2, Customer and Community Engagement*, 30 June 2022

Our wastewater services are also nearing capacity, and we are exploring how our wastewater system can best meet Canberra’s future needs. Understanding the critical role that our wastewater system plays in supporting our water supply system, our Drought Management Plan, and achieving our net zero targets, will help drive innovation and inform future investment decisions.

To support increased resilience in the ACT, Icon Water has strategic ambitions to implement an Integrated Water Management Program (IWMP). The IWMP would bring together our system strategies (Water System Strategy, Wastewater Strategy and Non-Drinking Water Strategy) and our Drought Management Plan to inform key future investment decisions and deliver sustainable value for our community and shareholders. The IWMP would also help achieve the objectives of our Climate Change Adaptation Plan, Circular Economy Plan and eMission Possible Plan. This would support the ongoing achievement of other customer-focussed outcomes as outlined in Attachment 3 of our original submission.

This is a significant body of work, which is largely opex in nature, and of critical importance given our role in securing water and wastewater services into the future. This represents a key backdrop for Icon Water’s opex pressures in the coming years.

1.2 Our revised forecast

Our revised forecast maintains the base-step-trend forecasting approach. It involves establishing an efficient base year to trend forward opex, accounting for changes in real input costs, network scale, and productivity. Step changes and non-controllable opex are added to the forecast to capture prudent and efficient costs not accounted for in the base year or the trend components of the forecast.

Icon Water considers that our revised opex forecast is prudent and efficient. The base year reflects operating costs for delivering regulated water and wastewater services at the current service standards. We have accepted the Commission's Draft Decision to adjust the base year for regulatory compliance costs, licence fees, and royalties, which will be included in the non-controllable opex forecast. Opex is trended forward, accounting for updated expectations of labour, electricity, and chemicals prices. The trend also captures changes in network-scale as Canberra’s population and demand increases.

The opex forecast captures costs that the Commission has determined to be prudent and efficient as part of its Draft Decision on capital expenditure (capex), related to ICT expenditure, SoCI, and Managing Buildings Better reforms. Due to relevant ICT market offerings and accounting standards, some capex included in the initial proposal is now included as opex in our revised forecast. The opex forecast also includes an updated step change for insurance premiums, driven by market factors outside our control and not accounted for in other components of the opex forecast. We have accepted the Commission’s Draft Decision to include a negative step change for the Cotter Pump Station upgrade, representing potential efficiencies outlined in the business case.

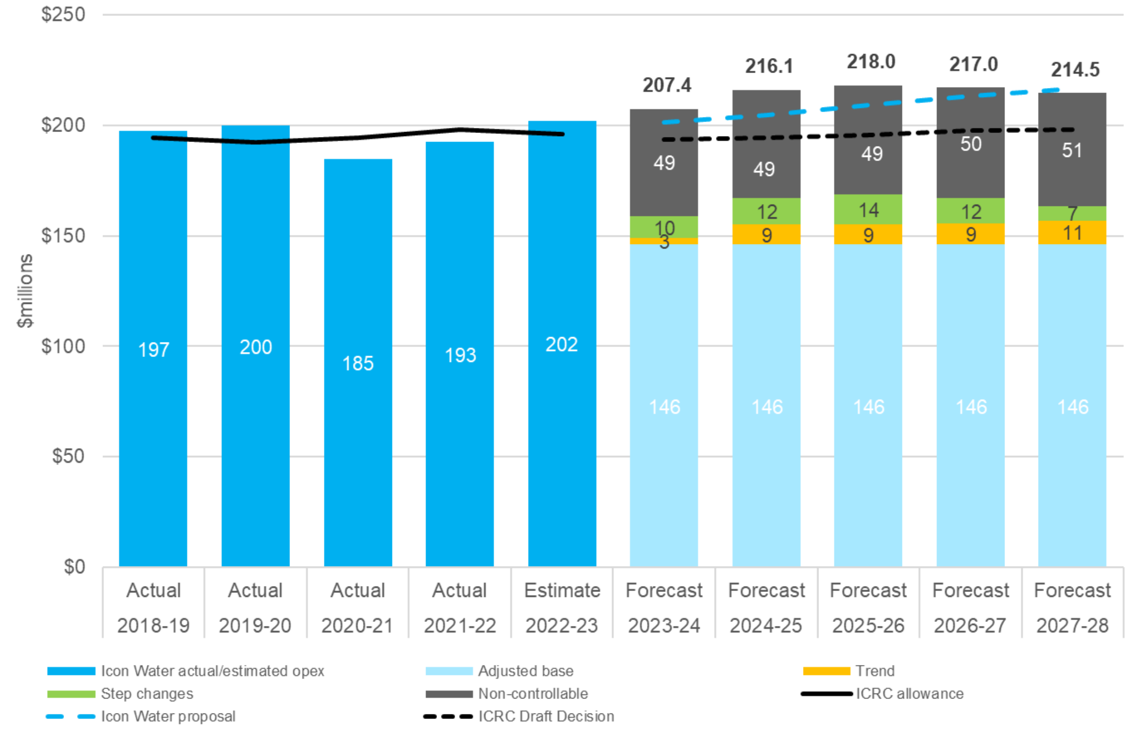
Icon Water’s revised opex forecast reflects the expected expenditure required to maintain current service standards, including a highly ambitious productivity challenge while delivering improved resilience and water security. We consider that the prudency and efficiency of each opex component should be carefully assessed based on the most up-to-date evidence, ensuring we can recover the prudent and efficient costs needed to continue delivering safe and reliable water and wastewater services to our customers. Our revised opex forecast is shown in Table 1-1 and Figure 1-1.

Table 1-1: Operating expenditure forecast components 2023–28 ($millions, 2022–23)

	2023–24	2024–25	2025–26	2026-27	2027–28	Total
Adjusted base	$146.0	$146.0	$146.0	$146.0	$146.0	**$730.2**
Price change	$2.1	$7.2	$5.9	$5.2	$5.4	**$25.9**
Output change	$1.9	$4.1	$6.3	$8.6	$11.0	**$32.0**
Productivity change	-$1.1	-$2.2	-$3.3	-$4.4	-$5.6	**-$16.6**
Step changes	$9.7	$12.1	$13.8	$11.7	$6.6	**$53.9**
Non-controllable	$48.7	$48.9	$49.2	$49.9	$51.0	**$247.7**
Total	**$207.4**	**$216.1**	**$218.0**	**$217.0**	**$214.5**	**$1,073.0**

Source: Icon Water. Totals may not sum due to rounding.

Figure 1-1: Actual, estimated, and forecast operating expenditure ($millions, 2022–23)



Source: Icon Water.

1.3 Base year

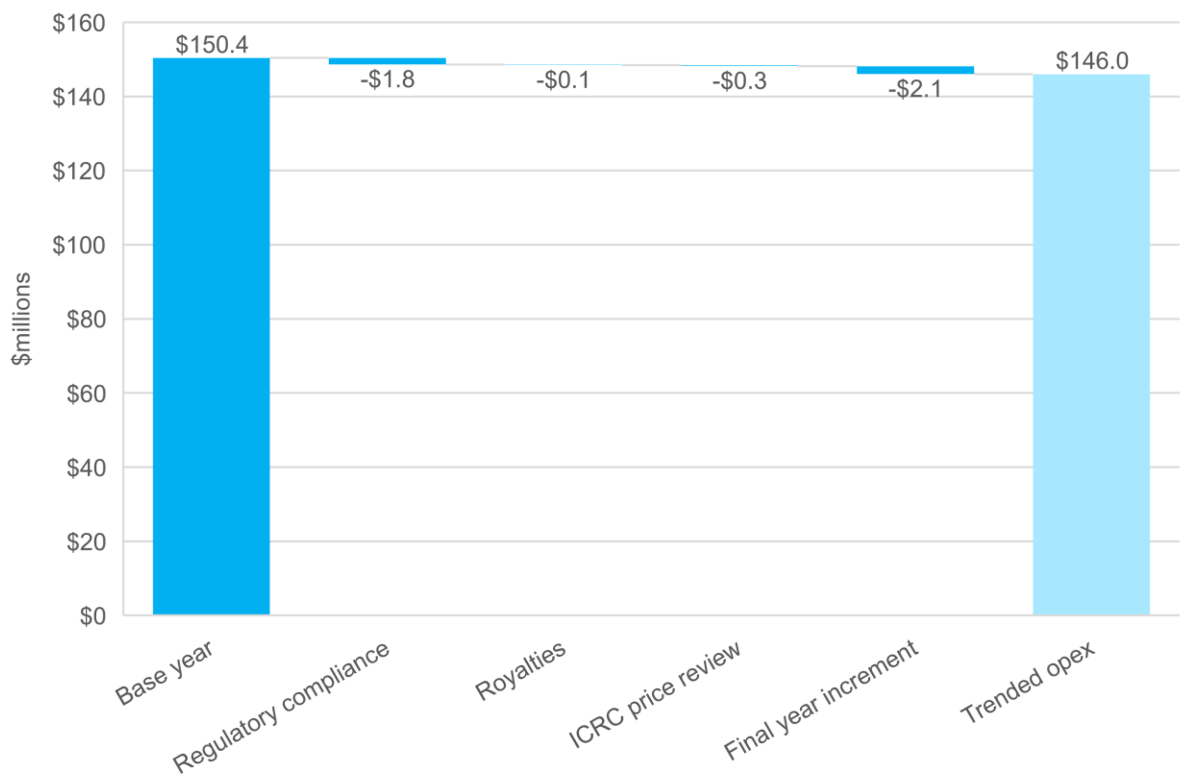
The base year (2021–22) reflects recurrent and sustainable costs needed to deliver services at current reliability and service levels.[2] Icon Water does not undertake the same operating activities annually; we manage the ebbs and flows of costs established in the opex allowance.

The Commission's Draft Decision adopted MJA's recommendations for base year adjustments, including:

- adjusting base year opex for overhead capitalisation, which was impacted by COVID-19 construction disruptions
- treating regulatory compliance and licence fees (including fees we pay to the Commission) and royalties as non-controllable expenditure
- treating price review costs as a step change.[3]

Icon Water has updated the base year for actual incurred expenditure, and removed regulatory compliance and licence fees, as shown in Figure 1-2. Adjustments to the base year are discussed in the following sections.

Figure 1-2: Opex base year adjustments ($millions, 2022–23)



Source: Icon Water.

[2] This includes costs associated with some services that are not price-regulated, with an adjustment made to the revenue requirement to ensure there is no cross-subsidisation from the regulated water and wastewater prices

[3] ICRC, *Draft Report, Regulated water and sewerage services 2023–28,* October 2022, p. 24; MJA, *Icon Water 2023–28 expenditure review – Final Report,* 12 October 2022, p. 35-26

1.3.1 Overhead capitalisation

The Commission's Draft Decision was to accept MJA's recommendation to adjust our base year for differences in overhead capitalisation:

> Icon Water annually capitalises a share of overhead costs, for costs related to capital projects. As shown above, this is an offset to controllable operating costs. In 2021-22, the overhead capitalisation was lower than historical level of capitalisation at $6.19 million. Icon Water noted that the level of capitalisation was lower than average with the COVID-19 construction freezes limiting its ability to allocate existing internal resources to capital work. Icon Water provided a separate forecast for the 2023-28 regulatory period for overhead capitalisation, which averaged $8.1 million per annum. This forecast was based on an internal long-term forecast. We consider it prudent to adjust the base year opex to include the updated forecast capitalisation expected over the 2023-28 regulatory period. This results in an increase in overhead capitalisation of $1.87 million in the base year.[4]

Overhead allocation refers to allocating overhead and indirect costs incurred in managing, administering, and supporting Icon Water's core operations. Core operations comprise activities that are both operational and capital in nature. Overhead capitalisation refers to the portion of overhead costs that are allocated to capital activities (projects). These capital costs are included in the asset values added to the Regulatory Asset Base (RAB). The overhead capitalisation process moves costs from opex to capex, thereby generating an offset (reduction) to opex. The amount capitalised differs annually and is based on Icon Water's cost allocation methodology (CAM) and is consistent with accounting standards.

Icon Water considers that the Commission's overhead capitalisation adjustment was taken out of context, is inconsistent with the CAM, the top-down base-step-trend forecasting methodology, and the building block regulatory approach.

<u>Capitalisation adjustment is taken out of context and inconsistent with accounting procedures</u>

The forecast overhead capitalisation was used in isolation and out of context of the overall forecast from which it was taken, resulting in an anomalous outcome. Further, the adjustment was based on an internal forecast, which had been provided for illustrative purposes only. Icon Water considers that the calculations used to adjust base year opex for capitalisation have been taken out of context.

Historically, and in the 2023–28 forecast provided, capitalised overhead averaged four per cent of controllable opex, eight per cent of payroll costs, and 60 per cent of direct capitalised labour. The proposed $8.1 million capitalisation ($1.87 million suggested adjustment to the 2021–22 base year) increases the relative measures to six per cent, 11 per cent and 82 per cent, respectively (refer to Table 1-2). The proposed overhead capitalisation adjustment does not reflect the underlying cost base to which it has been applied (refer to Table 1-3), which is unrealistic. In practical terms, the only way to achieve the resultant opex reduction would be to reduce costs elsewhere, which is inconsistent with the overall construct of this proposed adjustment. Icon Water considers that MJA's recommendation is inconsistent with the application of the CAM and standard accounting procedures.

[4] MJA, *Icon Water 2023–28 expenditure review – Final Report*, 12 October 2022

Table 1-2: Icon Water base year capitalisation ($millions, nominal)

	2021–22 Base MJA approach	2021–22 Base Actual
Capitalised overhead ($M)	-$8.1	-$5.8
Controllable opex base year ($M)	$144.0	$144.0
Capitalised overhead/Controllable opex	6%	4%
Capitalised overhead/Payroll costs	11%	8%
Capitalised overhead/Direct labour	82%	60%

Source: Icon Water; MJA.

Table 1-3: Forecast capitalisation rates ($nominal)

	2021–22	2023–24	2023–25	2023–26	2023–27	2023–28
	MJA approach	*Estimate*	*Estimate*	*Estimate*	*Estimate*	*Estimate*
Capitalised overhead/Controllable opex	6%	5%	5%	5%	5%	5%
Capitalised overhead/Payroll costs	11%	10%	10%	10%	10%	10%

Source: Icon Water; MJA.

<u>Capitalisation adjustment is inconsistent with the Cost Allocation Methodology</u>

The amount of overhead expenditure capitalised is relative to two key drivers, the amount of direct labour attributed to capital projects and the amount of overhead incurred by Icon Water. Therefore, the application of a fixed value of overhead is inconsistent with the application of the CAM.

Overhead capitalisation is a function of the underlying overhead expenditure and the amount of direct labour attributed to capex projects. As a relative measure, it is not possible to apply a fixed level of overhead capitalisation to an unrelated expenditure base. Applying the fixed overhead capitalisation adjustment is inconsistent with Icon Water's CAM.

<u>Capitalisation adjustment is inconsistent with the base-step-trend forecasting approach</u>

Additionally, the base-step-trend forecasting approach is predicated on the base year being reflective of recurrent and sustainable costs required to deliver services at the prescribed service levels. This approach fundamentally differs from a bottom-up forecast approach, which would consider individual activities and expense lines that underpin the aggregate. The proposed overhead capitalisation adjustment contravenes the premise of a base-step-trend methodology by adjusting an individual line item in isolation from the overall opex base.

By its nature, overhead is also impacted by inflation and other price changes, which is allowed for in the trend component through real cost escalators. The approach to adjusting capitalisation has disregarded price drivers of capitalisation, including labour costs.

Icon Water considers that a capitalisation opex base year adjustment is inconsistent with the top-down base-step-trend forecasting approach. The opex forecast has not been derived from a bottom-up build, with each cost line item assessed individually. Therefore, isolated adjustments of individual expense lines are not aligned with the forecast methodology.

Capitalisation adjustment is inconsistent with the building block regulatory approach

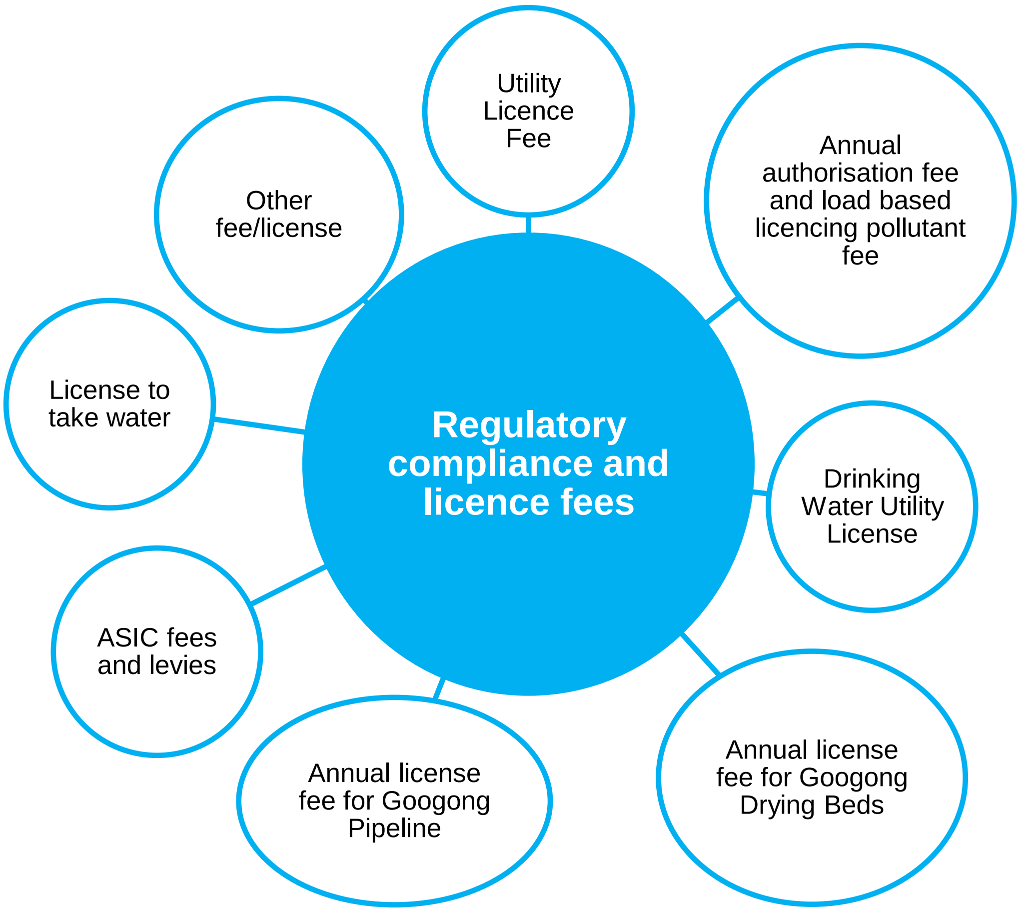
Finally, by definition, an increase in overhead capitalisation (causing an opex reduction) would result in an increase in the amount of overhead transferred from opex to capex, and, therefore, an increase to the capital expenditure allowance. The corresponding capex increase has not been applied through an increase to the RAB. Instead of applying the underlying concepts of the CAM by reflecting the movement of overhead between opex and capex, with no net change in the overhead incurred by Icon Water, this proposed adjustment has effectively reduced Icon Water's opex and, therefore, revenue requirement inconsistently with the building block methodology.

As a capitalisation adjustment is inconsistent with the application of the CAM, accounting procedures, a top-down forecasting methodology, and not assessed from a total expenditure perspective consistently with capex and the RAB, we have not included an adjustment in our revised forecast.

1.3.2 Regulatory compliance, licence fees, and royalties

Icon Water considers that regulatory compliance costs, licence fees and royalties are non-discretionary, government-determined expenditures required to deliver water and wastewater services. Such expenditure includes but is not limited to operating licence fees, wastewater treatment licences, water abstraction fees, fees to the economic regulator and environmental contributions. Regulatory compliance costs and licence fees are presented in Figure 1-3.

Figure 1-3: Costs that contribute to regulatory compliance and licence fees



Source: Icon Water.

The Commission's Draft Decision accepted MJA's recommendation:

> Some non-controllable costs were included in controllable costs. This included regulatory and compliance costs to various agencies including the ICRC, which includes the utility licence fee and additional price review costs, and royalty payments to the ACT government. This approach is consistent with the approach to other non-controllable costs, including the Utilities Network Facilities Tax and Water Abstraction charge. We recommend shifting these from controllable costs into non-controllable costs. These costs are included as a bottom-up forecast, rather than base step-trend approach. We have also included additional ICRC fees of $0.31 million in 2026-27 and $1.0 million 2027-28 for the 2028 price review process under non-controllable costs.[5]

Icon Water considers that moving the Commission's price review costs, regulatory compliance costs, licence fees, and royalties into non-controllable opex with a pass-through provision provides increased transparency. These non-controllable costs do not comprise a material proportion of our annual costs. We agree with MJA's assessment that the Commission's price review costs recovered through Icon Water, regulatory compliance costs, licence fees, and royalty payments to the ACT Government should be treated consistently with non-controllable costs such as the UNFT, including an annual true-up as the costs are imposed on Icon Water and not within our control. As such, we have updated our opex forecast to remove these expenditure items from the controllable opex base year and included an annual pass-through provision to allow a symmetrical true-up for under or over-forecasting costs, detailed in Attachment 3.

1.3.3 Commission price review costs

Many costs are directly attributable to the Commission's five-year price review process, including consumer engagement expenditure and other consultancy fees associated with preparing a regulatory submission and developing an evidence-based revenue forecast. During this process, both the Commission and Icon Water incur additional costs.

The Commission's Draft Decision adopted MJA's recommendation to apply a negative base year adjustment for price review costs and has added a step change to reflect the view that these costs are not recurrent:

> Price review costs – Icon Water has stated that it has incurred $0.93 million controllable price review operating costs in 2021-22, which is made up of external consulting costs. We consider that these costs will not be ongoing and should be removed from the base year. To account for additional price review costs for 2028, we have included $0.93 million as a step change in external consulting costs in 2026-27.[5]

For the following reasons, Icon Water considers that a price review base year adjustment is not a suitable regulatory approach:

- Icon Water's price review costs are incurred over multiple years of the regulatory period. Icon Water's expenditures related to price review costs are aligned to the timing of our price review activities, which vary with each price review cycle. We also incur additional expenditure associated with price reset principles (such as the demand, incentive mechanism and Weighted Average Cost of Capital (WACC) reviews completed in the 2018–23 regulatory period). The recommended base year adjustment disregards the timing over which costs are incurred.

[5] MJA, *Icon Water 2023–28 expenditure review – Final Report*, 12 October 2022

- The adjustment undermines the underpinning principles of the base-step-trend forecasting approach, where the opex forecast is not derived from a bottom-up build of costs. Removing a proportion of opex ($0.94 million) from the base year does not reflect the base-step-trend top-down forecasting approach, which allows Icon Water to manage the ebbs and flows of operating costs. Icon Water undertakes many projects that differ from year to year and may complete more costly projects in years when lower price review costs are incurred so we can continue to deliver safe and reliable services within our resourcing limits set by the Commission's regulatory allowance. Icon Water considers that MJA's price review cost adjustment is inconsistent with the forecasting approach as a bottom-up forecasting methodology has not been proposed or suggested. Price review costs are also incurred in the final year of the current regulatory period, which is not accounted for in the base-step-trend forecasting approach.
- While MJA has suggested that a portion of price review costs are added into the forecast through a step change, it has disregarded multiple drivers of this type of expenditure, such as the increase in real labour prices and the cost of highly specialised contracted services based on the focus and relevant issues addressed in the context of price reviews.
- Icon Water considers that price review costs, as suggested by MJA, do not meet the general regulatory accepted criterion of a step change as it is not due to a new regulatory, legal, or technical obligation and is not driven by any changes to regular business activity.

The actual and estimated costs associated with Icon Water's price review costs, excluding Commission price review costs, are shown in Table 1-4. Notably, the timing of price review expenditure may vary between regulatory periods.

Table 1-4: Icon Water Price review costs ($millions, nominal)

	2018–19	2019–20	2020–21	2021–22	2022–23
	Actual	*Actual*	*Actual*	*Actual*	*Estimated*
Icon Water price review costs	$0.00	$0.00	$0.08	$0.90	$0.10

Source: Icon Water information request OP31.

1.4 Trend

The trend component of the base-step-trend approach to forecasting operating expenditure accounts for:

- real input price change
- the additional operating expenditure needed to service growing customer numbers and volumes (output growth)
- improvements over time in our ability to do more with less (productivity growth).

Icon Water has updated the trend for the most recently available information, including an upper bound estimate of a challenging productivity target for the next regulatory period. The estimated trend components of the opex forecast are presented in Table 1-5 and are discussed in the following sections.

Table 1-5: Estimated opex trend components ($millions, 2022–23)

	Icon Water proposal	Commission Draft Decision	Icon Water revised proposal
Average input price change (annual %)	*0.4%*	*0.3%*	*0.7%*
Input price change ($)	**$10.1**	**$7.6**	**$25.9**
Average output change (%)	*1.7%*	*1.4%*	*1.4%*
Output change ($)	**$40.2**	**$30.6**	**$32.0**
Productivity adjustment (annual %)	*0.5%*	*1.4%*	*0.7%*
Productivity adjustment ($)	**-$12.1**	**-$31.44**	**-$16.6**
Cumulative trend (%)	*8.7%*	*1.4%*	*7.4%*
Trend ($)	**$38.2**	**$6.7**	**$41.3**

Source: Icon Water. Totals may not sum due to rounding.

1.4.1 Real price inputs

Real price inputs capture ACT-specific cost escalators for components of opex that increase at a different rate from inflation, including labour, chemicals, and electricity.

In the Draft Decision, the Commission accepted BIS Oxford Economics (BISOE) forecasts for labour and chemicals and included an alternative cost escalator for electricity prices. The Commission accepted MJA's recommended electricity forecast based on employed market simulation modelling, with results impacted by underlying assumptions such as coal generator retirements, investment expectations, and transmission projects.[6]

We have updated cost escalators to reflect current market conditions and capture more recent publicly available data, shown in Table 1-6. We have projected that materials and other costs will increase in line with the inflation forecast.

[6] ICRC, *Draft Report, Regulated water and sewerage services 2023–28*, October 2022, p. 52

Table 1-6: Real price inputs and weights

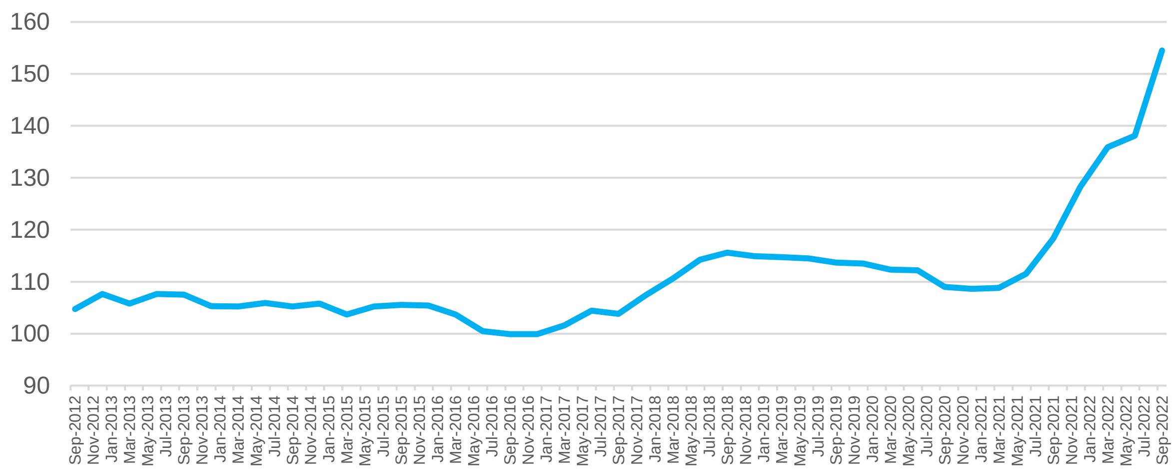
	2023–24	2024–25	2025–26	2026–27	2027–28	*Weights*
Labour [6]	-0.6%	1.4%	1.7%	0.9%	0.7%	*40.2%*
Chemicals	-10.4%	-6.0%	-4.3%	0.1%	-0.1%	*4.1%*
Electricity	30.6%	53.3%	-27.5%	-15.2%	-1.4%	*5.5%*
Other	0.0%	0.0%	0.0%	0.0%	0.0%	*50.2%*

Source: BISOE, November 2022; Icon Water analysis.

As outlined by BISOE, wages in the ACT utilities sector are expected to increase in real inflation-adjusted terms by 0.8 per cent on average over the 2023–28 regulatory period. Wages are expected to increase as the sector is capital-intensive, employees have a specific skill set, there is strong unionisation of the industry, increases in individual agreements are likely to strengthen as the labour market tightens, and demand for labour will be higher with significant utilities investment expected.

Chemical prices have increased substantially over the current regulatory period, as evident in the previous ten years of the Basic Chemical Manufacturing producer price index, shown in Figure 1-4. Chemical prices change at a rate different to inflation as factors outside our control, such as international exchange rates and oil prices drive them. Just as one example, the price of Quicklime which is a chemical in our wastewater treatment process has increased by over 40 per cent compared to last year. We are experiencing examples like this across a number of the chemicals required for our operations.

Figure 1-4: Basic chemical and chemical product manufacturing producer price index



Source: Australian Bureau of Statistics, *Procedure Price Indexes,* https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/producer-price-indexes-australia/latest-release, September 2022.

Notably, the actual price uplift in chemical costs is not directly captured because the base-step-trend forecasting approach does not include the uplift in actual costs incurred in the final year of the current regulatory period and unduly penalises utilities if this is not addressed. Therefore, Icon Water has applied the BISOE geometric six-year average of forecast chemicals escalators of –0.5% annually to smooth cumulative changes in projected expenditure.

Electricity prices are impacted by wholesale costs, spot market prices, network prices, the costs of green schemes, retail prices, and other costs such as metering and ACT Government jurisdictional schemes. Icon Water's updated forecast reflects BISOE's revised methodology based on actual historical data. It is expected that electricity prices will increase substantially in 2023–24 and 2024–25 before significantly decreasing in the later years of the next regulatory period.

1.4.2 Productivity and output growth

Icon Water's proposal

In our pricing proposal, we proposed the output growth factors in Table 1-7 based on econometric modelling of the relationship between cost and customer numbers, water volumes, and wastewater volumes.

Table 1-7: Output growth forecast in June 2022 pricing proposal

	2023–24	2024–25	2025–26	2026–27	2027–28
Output growth	1.64%	1.68%	1.79%	1.82%	1.81%
Output growth (cumulative)	1.64%	3.35%	5.20%	7.12%	9.05%

Source: Icon Water.

We proposed a forecast productivity growth rate of 0.5 per cent per year based on a range of evidence from econometric cost function modelling, recent regulatory decisions, and historical productivity growth.[7] Icon Water submitted a report by Quantonomics, which recommended a productivity growth factor within a range of -0.1 to 0.8 per cent per year based on evidence from econometric cost function modelling.[8]

The Commission's Draft Decision

In its Draft Decision, the Commission accepted Icon Water's approach to forecasting output growth but updated the calculation with inputs consistent with its Draft Decision on demand forecasts.

The Commission did not accept Icon Water's forecast rate of productivity growth but instead included a productivity growth of 1.4 per cent per year. The Commission's Draft Decision was based on recommendations from MJA to revise selected assumptions in the Quantonomics econometric modelling, particularly:

- a shortening of the period over which historical productivity growth is averaged
- redefining the frontier from the 67th percentile to the 75th percentile.

The Commission indicated this forecast rate of productivity growth is conservative because a higher rate would be needed for Icon Water to reach the efficiency frontier within five years. The Commission also had regard to a selection of recent regulatory decisions.

Icon Water's response to the Draft Decision

Icon Water welcomes the Commission's Draft Decision on output growth. However, Icon Water does not accept the Draft Decision on the forecast rate of productivity growth, which is inconsistent with the Commission's application of output growth weights and econometric evidence.

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[7] Icon Water, *Price Proposal - Attachment 6, Operating Expenditure,* 30 June 2022, p. 25-27

[8] Cunningham, M., Lawrence, D. and Hirschberg, J. (Quantonomics), *Final report: Icon Water expenditure benchmarking*, August 2022

We contend in this section that:

- some of MJA's criticisms of the Quantonomics econometric modelling are based on misconceptions, are inconsistent with established practices, or are incorrect or invalid
- MJA's recommended revisions to the use of econometric modelling results, on which the Commission relied, are based on erroneous assumptions and therefore have no sound basis
- a more comprehensive view of the regulatory context shows Icon Water's proposed rate of productivity growth is within the range of what utilities in other jurisdictions have been challenged to achieve.

Some of MJA's criticisms of the Quantonomics econometric modelling are based on misconceptions, are inconsistent with established practices, or are incorrect or invalid

Icon Water engaged Quantonomics, an economic consultancy with significant expertise in benchmarking, to prepare a response to MJA's criticisms of its study, presented in Appendix 1.2. Icon Water considers that:

- Some of MJA's criticisms of the methodology are based on misconceptions, including conflating the Multilateral Törnqvist index with the bilateral or chained Törnqvist index, misunderstanding the practical feasibility of alternative econometric methods, and use of utility-specific time trends in the inefficiency parameters.
- Quantonomics concluded MJA's methodological criticisms, including criticisms of the use of log-log functional forms and the time-varying decay of inefficiency specification in the SFA model, are inconsistent with established practices:

> MJA's methodological criticisms are inconsistent with widely accepted principles and practices among experts in the relevant disciplines of index numbers, and the econometrics of cost and production functions. The criticisms are inconsistent with established empirical literature, the benchmarking practices of regulatory agencies such as the AER and Ofwat, and the established practices in the use of index numbers and in the calculation of productivity trends by Australian and international statistical agencies including the ABS, the OECD and the international standards for Systems of National Accounts. MJA ought to have disclosed this, because we do not believe that a broad-based rejection of widely-accepted principles and practices within the relevant fields of applied economics is, or should be, part of the ICRC's agenda in regulating Icon Water.[9]

- MJA's claim that the effects of economies of scale and other drivers were not accounted for in the Quantonomics productivity forecast is incorrect. As a result, MJA's outlook on productivity growth does not have a sound basis.
- MJA suggested that the Quantonomics study was complex but did not attempt to examine the underlying model.[10] As suggested by Quantonomics in Appendix 1.2, it is unclear why MJA considered the modelling is complex, given it has not reviewed the analysis. Quantonomics also argues that contrary to MJA's assertions, the study is not unduly complex compared to benchmarking analysis used by the Australian Energy Regulator (AER) for electricity network pricing, and changes in the National Performance Report will not mean the study is not replicable. Icon Water considers this criticism to be invalid.

[9] Cunningham, M., Hirschberg, J and Giovani, A. (Quantonomics), *Memorandum*, November 2022, p. 38-39

[10] MJA, *Icon Water 2023–28 expenditure review – Final Report*, 12 October 2022, p. 37

MJA's recommended revisions to the use of econometric modelling results, on which the Commission relied, are based on erroneous assumptions and therefore have no sound basis

MJA used selected results from Quantonomics' econometric modelling to derive its recommended productivity growth rates. The Commission accepted these recommendations in its Draft Decision. The assumptions made by MJA in arriving at its recommendations were based on erroneous assumptions. MJA's recommendations described below and the Draft Decision relying on those recommendations, therefore, have no sound basis.

Continuing efficiency

MJA recommended a forecast continuing (industry-wide) rate of productivity growth of 0.3 per cent per year. This recommendation relied on MJA's claim that there has been a change in the trend of opex productivity during the sample period. Quantonomics use a model with a generalised index of technical change, with a different rate each year, to show that this claim is not borne out by empirical analysis. Quantonomics show that:

> On the contrary, the rate of technical change over recent years has closely tracked the long-term average for the whole sample period.[11]

Quantonomics' survey of a range of other analyses of productivity trends relevant to the water industry, including by the Australian Bureau of Statistics (ABS), the Productivity Commission (PC), the Essential Services Commission (ESC) and the Independent Pricing and Regulatory Tribunal (IPART), supports its opinion in its original report that:

> … a forecast industry productivity trend of zero per cent would be optimistic, whilst a continued decline at –0.9 per cent per year is quite possible.[11]

Catch-up efficiency

MJA recommended a minimum forecast rate of catch-up productivity growth of 1.1 per cent per year. This recommendation relied on MJA's claim that the AER uses the 75th percentile as the frontier in electricity network regulation. This claim is incorrect. The AER uses a 0.75 comparator score, corresponding to a percentile less than the 67th percentile. Additionally, the AER's comparator efficiency score is adjusted for unique operating environment factors to capture material differences between regulated networks. This strongly supports Quantonomics' proposed use of the 67th percentile.

The Commission's decision to use Quantonomics' recommended catch-up period of 10 years is further supported by Quantonomics' discussion of feasibility in the context of long-lived assets in the water industry.

A more comprehensive view of regulatory context shows Icon Water's proposed productivity growth is within the range of what utilities in other jurisdictions have been asked to achieve

The productivity decisions made by regulators in other jurisdictions have not been translated into actual productivity growth. Many utilities spent well above the regulatory forecast in the year prior to the most recent regulatory decision (see Figure 1-5). As a result, most of the productivity growth required by regulators in recent decisions is simply having a second attempt at making productivity gains that were expected but not achieved in the previous period. Given tighter economic conditions, it is yet to be seen whether the efficiency targets will again not be achieved.

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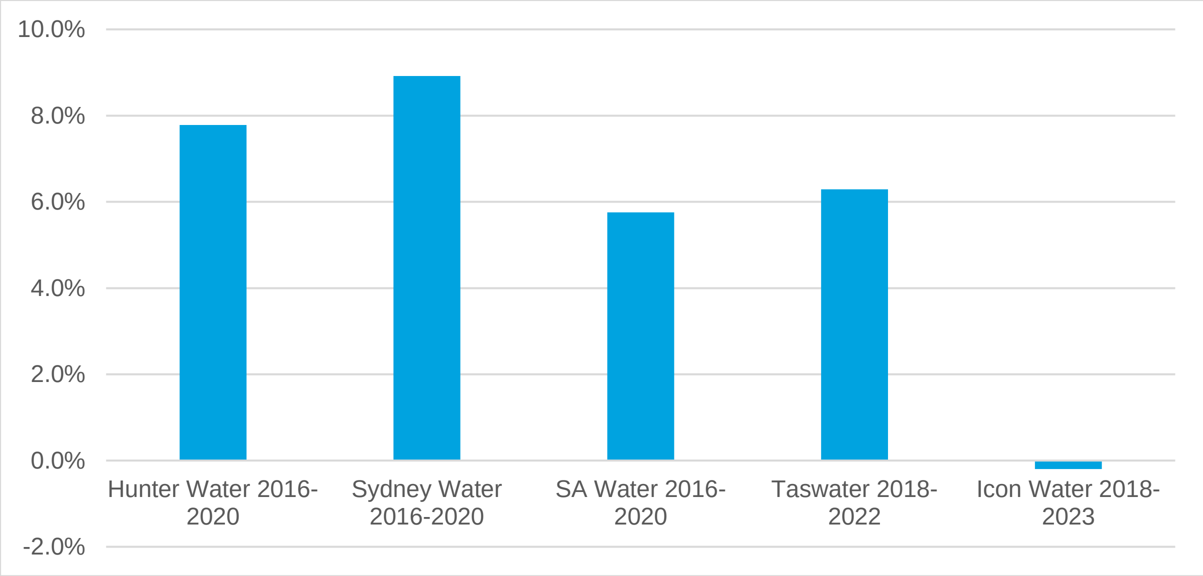
[11] Cunningham, M., Lawrence, D. and Hirschberg, J. (Quantonomics), *Final report: Icon Water expenditure benchmarking*, August 2022

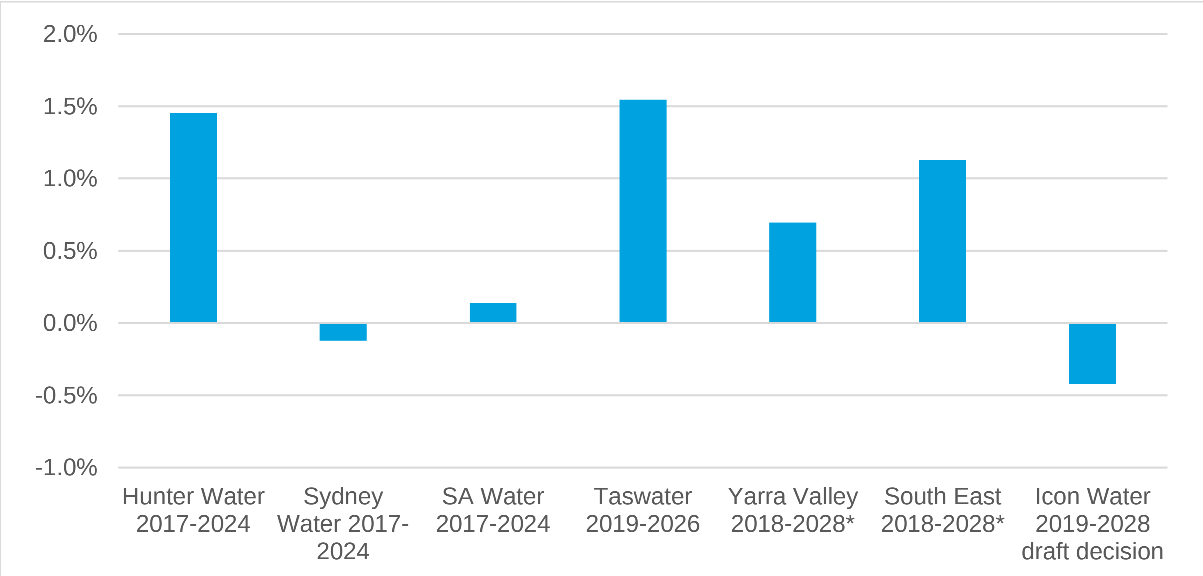
Figure 1-5: Operating expenditure overspend in penultimate year of previous regulatory period



Source: IPART 2020 final report review of prices for Hunter Water from 1 July 2020. IPART 2020 final report review of prices for Sydney Water from 1 July 2020. ESCOSA 2020 SA WATER RD20 final determination statement of reasons. OTTER 2018 Chapter 5 Operating Expenditure. (Note: Icon Water observation uses controllable operating expenditure).

Most utilities have seen a real increase in allowed operating expenditure over two regulatory periods (see Figure 1-6 below). Icon Water, in contrast, achieved significant productivity growth during the 2018–23 period, spending within the forecast productivity growth of 1.75 per cent per year or over 10 per cent cumulatively, despite absorbing additional insurance costs. Therefore, the Commission's Draft Decision requires a significant real decrease in total opex over two periods, which other regulatory decisions have not required.

Figure 1-6: Average annual real change in operating expenditure determined by regulators since the first year of the previous regulatory period



Source: IPART 2020 final report review of prices for Hunter Water from 1 July 2020. IPART 2020 final report review of prices for Sydney Water from 1 July 2020. ESCOSA 2020 SA WATER RD20 final determination statement of reasons. OTTER 2018 Chapter 5 Operating Expenditure. Yarra Valley Water and South East Water price review models submitted to ESC September 2022. * Proposed controllable operating costs.

Comparisons with the metropolitan Victorian utilities need to account for the fact that these utilities are vertically separated from Melbourne Water, and controllable opex forms only around 20 per cent of their total opex. This is compared to Icon Water being a vertically integrated business, providing bulk water supply, distribution, and retailing services whereby controllable opex forms around 80 per cent of our total opex. Quantonomics notes that the 1.4 per cent productivity growth rate noted in recent guidance by the ESC, once adjusted for the productivity growth rate incorporated in Melbourne Water's pricing decision, translates to a productivity growth rate on total opex of around 0.5 per cent.[12] Furthermore, the Victorian businesses proposing 1.4 per cent productivity growth on controllable opex to achieve a 'Standard' rating under the PREMO framework are compensated with a 0.4 percentage point increase in the return on equity relative to a proposal rated 'Basic'.[13] The Commission provides no such compensation in their Draft Decision.

In light of a more-comprehensive regulatory contextual review, Icon Water's pricing proposal is within the range of what utilities in other jurisdictions have been asked to achieve.

1.4.3 Icon Water's revised proposal

In setting the productivity growth rate, Icon Water considers that regulatory decision making should be evidence-based, assessing the approach and reasonableness of the underpinning modelling rather than applying arbitrary assumptions to achieve a particular pricing outcome. This will ensure that efficient and prudent operating costs can be recovered, and financial viability maintained within a volatile economic environment.

For the reasons outlined in the preceding section, Icon Water remains of the view that the evidence points to a productivity growth factor in the range of -0.1 to 0.8.[14] To strive for the best customer outcomes, Icon Water's revised forecast includes a productivity growth factor towards the top end of this range at 0.7. This represents an ambitious efficiency challenge over the 0.5 factor included in our original pricing proposal, which is a stretch goal for Icon Water to achieve in light of the investment needed to improve the resilience of ACT's water security (as outlined in section 1.1.1) and in the context of current economic conditions. Icon Water considers that challenging ourselves to achieve productivity growth outside the range recommended by Quantonomics would result in Icon Water having no choice but to reduce service levels to achieve unsustainable opex savings.[15]

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[12] Cunningham, M., Hirschberg, J and Giovani, A. (Quantonomics), *Memorandum*, November 2022, p. 34

[13] ESC, *2023 water price review – Guidance paper, August amendment*, 2022, p. 43

[14] Quantonomics revised its recommended range to -0.1 to 0.8 per cent per year in its final report, which was considered by the Commission when developing its Draft Decision.

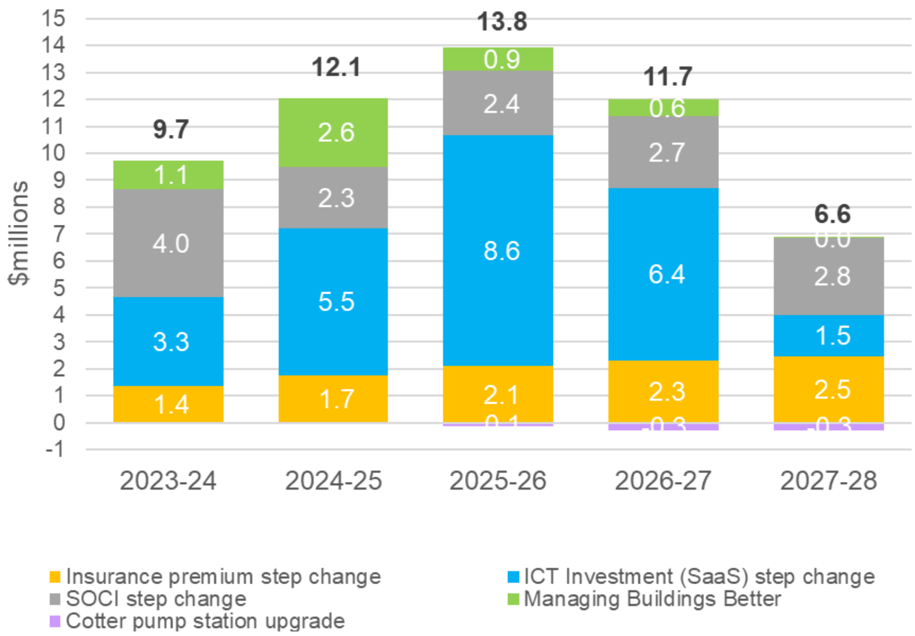
[15] Multifactor productivity growth has been 0.1 on average over the past five years. (PC Insights 2022)

1.5 Step changes

Icon Water is proposing several step changes, including for rising insurance premiums outside of our control; Managing Building Better to reflect the ACT Government policies; meeting our regulatory obligations based on amendments to SoCI legislation; SaaS solutions involving substituting costs from capex to opex; and Cotter Pump Station upgrade efficiencies. Most of our uplift in expenditure for opex is driven by the ICT Investment (SaaS) step change, which affects the opex profile and recurrent nature of costs. In its Draft Decision, the Commission considered a substantial proportion of these costs prudent and efficient capex. Some costs included as capex in our initial proposal are included in our updated opex forecast due to a better understanding and evaluation of current ICT market offerings and how these are treated based on clarification of accounting standards.

Overall, we propose to include $51.8 million of step changes in our revised forecast, detailed in the following sections. The total cost of our proposed step changes by category and year are shown in Figure 1-7.

Figure 1-7: Icon Water step changes ($millions, 2022–23)



Source: Icon Water.

1.5.1 Insurance premiums

Insurance premiums have increased in recent years at very high rates, and Icon Water expects that premiums will continue to increase over the 2023–28 regulatory period.

The Commission's Draft Decision includes an annual insurance premium step change of $0.41 million, based on MJA recommendations, and shown in Table 1-8. MJA suggested that Icon Water's insurance premium step changes were based on revenue and asset growth already captured in the trend and that inadequate information was provided to develop the forecasts for each insurance category.[16] MJA also note that Marsh expects a softening of the insurance market over the forthcoming regulatory period.

[16] MJA, *Icon Water 2023–28 expenditure review – Final Report*, 12 October 2022, p. 59

Table 1-8: Insurance premium step change ($millions, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Icon Water submission	1.23	1.66	2.06	2.33	2.52	**9.80**
Commission Draft Decision	0.41	0.41	0.41	0.41	0.41	**2.03**
Icon Water revised submission	1.35	1.75	2.10	2.32	2.46	**9.98**

Source: Icon Water, ICRC. Totals may not sum due to rounding

Icon Water does not accept the Draft Decision, and we consider that the insurance premium step change included in the Draft Decision is unreasonable and does not reflect the prudent and efficient costs that we expect to incur for several reasons, including:

- Available evidence has been disregarded, including independent information provided by insurance specialists

  The Commission and MJA have disregarded evidence provided by Icon Water suggesting that insurance premiums will continue to increase at a rate different from CPI and the opex trend. MJA suggest that insurance premiums will increase by the same amount each year and are yet to consider that there are several different drivers of each insurance policy, including global events affecting the profitability of insurers, which results in reduced capacity to procure coverage at historical rates. Icon Water considers that the Commission has not assessed the prudency and efficiency of the proposed insurance premium step change, including the available information that describes market conditions outside our control. Box 1-2 provides a summary of publicly available information and Marsh's independent market analysis included in the regulatory proposal, demonstrating insurance market conditions.

  MJA note that Marsh expects a softening of insurance markets over the forthcoming regulatory period, reflected in lower premium increases in the outer years.[17] Icon Water considers that this does not translate to an immediate softening of insurance markets. Interestingly, the Draft Decision has adopted a flat step change without any regard to actual market expectations, including the forecast trend with higher increases at the start of the upcoming regulatory period and lower increases in the outer years. These lower increases will signal a transition toward a softer insurance market which will require sustained profitability of insurers' property portfolios over the next couple of years before they have the confidence to push for growth and market share. However, the persistent occurrences of significant natural catastrophe events in Australia create substantial volatility and make profitable underwriting challenging for insurers and reinsurers.

- There are several differing drivers for each insurance policy

  The Commission's Draft Decision for the insurance premium step change is based on the premise that Icon Water should manage further movements in premium costs over the regulatory period within growth-adjusted baseline opex.[18] MJA have incorrectly concluded that a single factor, such as revenue or asset growth, drives insurance premiums. Instead, several factors influence premium projections, which differ between insurance policies, including Icon Water's risk profile, claims history, insurance policy structure concerning coverage and limits, and the expected global market outlook. For example, Property or Industrial Special Risk (ISR) insurance premiums are heavily dependent on the global insurance market, which is influenced by several

[17] MJA, *Icon Water 2023–28 expenditure review – Final Report*, 12 October 2022, p. 60

[18] MJA, *Icon Water 2023–28 expenditure review – Final Report*, 12 October 2022, p. 60

critical factors outside of Icon Water's control, such as the size of the premium pool, claims paid and/or provisioned, major loss events, cost of reinsurance, and investment returns and flow of additional funds into the sector from the Insurance Linked Securities. Significant weather and natural disasters like bushfires, floods, and hailstorms have also negatively affected insurers' profitability, which has led to 16 consecutive quarters of premium increases.

By its very nature, insurance markets soften and harden over time to reflect global factors. The claims performance of a utility can further compound any premium increase but has limited ability to offset premium increases. Icon Water's claims history is exemplary compared to industry peers, and Icon Water's risk profile is highly attractive for insurers. In particular, due to Icon Water's inland location having no flood-mitigation-dams and having mature risk management practices. Despite this, Icon Water has faced and continues to face significant increases in insurance premiums.

Icon Water considers that it is an oversimplification to suggest that a key reason for adjusting the proposed step change is due to double counting costs included in output growth. Each insurance policy has multiple drivers independent of increases in network scale. Moreover, Icon Water's fleet was not increased for motor vehicles but held constant in the forecasting period. Also, Icon Water's directors' and officers' liability insurance is not driven by changes in the asset base or projected revenue. Therefore, it is an oversimplification to suggest that insurance is double counted in the output growth component of the opex trend as it misrepresents how premiums are derived in markets.

Icon Water has worked with Marsh to update forecasts to hold revenue and asset growth constant to ensure there is no speculative or theoretical overlap or double counting costs between the trend and the insurance premium step change. We have adjusted the insurance premium step change to isolate any potential output growth component for each relevant policy.[19] Our revised forecast does not double count costs in the step change with the trend component of the opex forecast.

- The methodology adopted to calculate the step change is inconsistent with information provided and the base-step-trend forecasting approach.

  The Commission's Draft Decision accepted MJA's recommended revised insurance premium step change, calculated as the difference between 2021–22 actual costs and 2022–23 estimated costs. Icon Water has several concerns with this approach, including:

  1. The adopted approach fails to recognise that the financial years for opex and premiums are different and includes an unexplained adjustment to property premiums.[20] Icon Water's financial year is from 1 July to 30 June, and the insurance premium financial year is from 31 May to 31 May each year.[21] Therefore, taking a difference without an appropriate adjustment does not reflect an efficient and prudent uplift in expected costs.
  2. The opex step change for insurance premiums included in the Draft Decision is based on the difference between the actual costs included in the base year and expected costs in the final year of the current regulatory period, held constant over the 2023–28 period. This is inconsistent with the base-step-trend approach, where opex is forecasted from the nominated base year and trended to account for changes in real

[19] This includes for industrial special risk and general liability coverage. As there was not assumed increase in Icon Water's vehicle fleet, no changes have been made to the forecast costs for the policy.

[20] The unexplained adjustment is not material, reflecting $615 difference between MJA calculations and information provided by Icon Water in OP013.

[21] Marsh, *Price Proposal Appendix 6.4: ICRC Report 2023-2028 Premium Projections and insurance Market Update CONFIDENTIAL*, April 2022, p. 4

costs of inputs. The Commission's Draft Decision does not capture premium increases between the base year and the forecast year of expenditure.

3. The methodology adopted in the Draft Decision does not account for expectations of international insurance markets, including a continuing hard market that is expected to soften in the outer years of the forthcoming regulatory period. Therefore, based on the evidence, Icon Water would not expect a flatlined projection of the incremental change in premiums over a five-year forecasting horizon.
4. The differential between Marsh's original projected total insurance costs for 2022–23 and actual/estimated costs is $0.18 million ($2022–23). The small difference supports the accuracy of premium projections.

Icon Water's regulatory submission pointed to how "recent reviews have found that similar studies from different insurance brokers produced reasonably consistent expectations of future premiums."[22] More specifically, this refers to the AER's 2021–26 Powercor Determination, where the regulator sought to understand the certainty of insurance premium forecasts. While Powercor's opex step change included forecast premiums from Marsh, the AER independently engaged Taylor Fry to assist in the assessment of the efficiency and prudency of insurance premium forecast, finding "that the forecasts provided by Marsh are directionally consistent with Taylor Fry's expectations of future premiums, given its understanding of the prevailing market conditions, and can be considered reasonable."[23] We encourage the Commission to independently assess the evidence supporting the step change to ensure and validate that Icon Water can recover its efficient and prudent insurance premiums in the context of managing risk.

It is Icon Water's view that the Commission should consider available evidence in determining efficient and prudent operating costs for the forthcoming regulatory period. As many relevant factors and variables influence insurance policies, including global events and international markets, premiums are driven by factors outside our control and not captured in output growth.

Icon Water has included an insurance premium step change in the revised opex forecast, reflecting expected market conditions. The proposed step change captures projected prudent and efficient costs for the 2023–28 regulatory period, updated for inflation and wage growth, excluding elements that could speculatively double count costs included in output growth. The insurance premium step change is shown in Figure 1-8.

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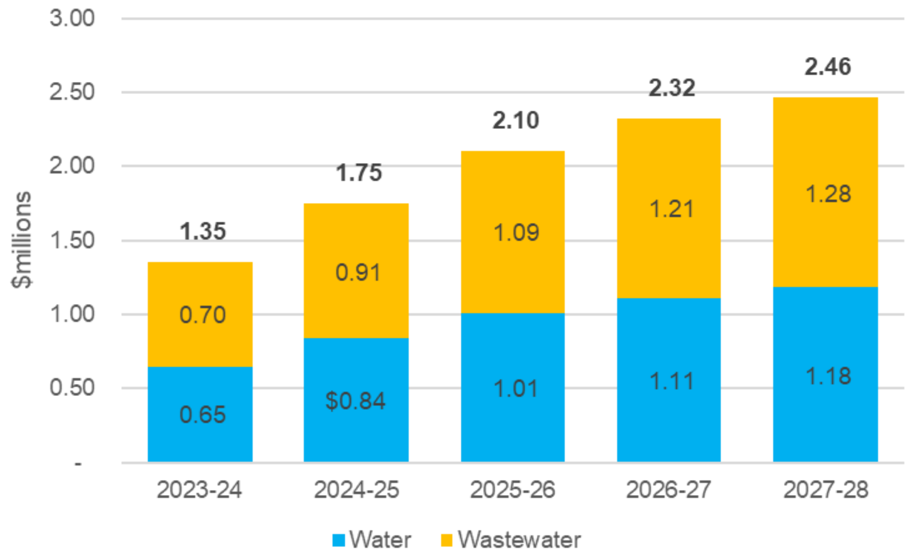
[22] Icon Water, *Price Proposal Appendix 6.3: Insurance premium step change CONFIDENTIAL*, 30 June 2022, p. 6

[23] AER, *Final Decision Powercor Distribution Determination 2021 to 2026 Attachment 6 Operating expenditure*, April 2021, p. 37

Figure 1-8: Revised forecast of insurance premium step change ($millions, 2022-23)



Source: Icon Water.

Box 1-2: Information on current insurance market conditions

The current insurance market is characterised by increasing premiums, selective underwriting, and shrinking capacity, known as a 'hard insurance market'. In addition to the cost implications of premium increases, insurers are also cutting back on coverage enhancements and generous sub limits. This hard market is in response to major weather and natural disaster events like bushfires, floods, and hailstorms, causing widespread property damage and business interruption losses. Summer bushfires in Australia had a negative effect on insurers' profitability. A recent COVID-19 Australian business interruption insurance test case ruling where the NSW Court of Appeal rejected insurers' argument that policies do not cover COVID-19 losses has further added to market stress.

The hard market impacts are evidenced on:

- The Reserve Bank of Australia noted that:

> General insurers have experienced an increase in both the cost and frequency of claims. Higher inflation and labour shortages have increased the cost of claims that are paid, particularly for building repairs. At the same time, the number of insurance claims have increased following several natural disasters along the east coast of Australia. Insurers use reinsurance to mitigate the impact of rising claims on profits, along with increasing premiums.[24]

[24] RBA, *Financial Stability Review*, October 2022, p. 53

- ACT Government directorates and statutory authorities:

  The hard market has impacted the costs of insurance premiums for the ACT Insurance Authority. The Authority provides insurance, claims, and risk management services to ACT Government directorates and statutory authorities.

ACT Insurance Authority	2021–22	2022–23
Premium change %	44.0%	12.4%

- There is consensus among insurance specialists projecting continued increases in insurance premiums. Taylor Fry, an independent insurance expert, noted that for Commercial Property insurance:

> Premiums increased by an average of 16% over FY22 and were particularly high in areas impacted by natural perils.[25]

- Regulated utilities:

  As a result of factors impacting global insurance markets, regulated utilities across Australia have sought to recover the substantial premium rises. The 2021–26 Powercor Distribution Determination insurance step change ($2020-21) was $67.7 million, noting that the AER engaged Taylor Fry, who independently assessed the insurance premium costs of Powercor.

Powercor	2021–22	2022–23	2023–24	2024–25	2025–26
Premium change %	8.50%	14.10%	7.80%	2.90%	3.40%

Source: Icon Water analysis of AER 2021–26 Powercor Distribution Determination[26]

1.5.2 Security of Critical Infrastructure

The Commission's Draft Decision accepted the prudency of our step change to comply with the *Security of Critical Infrastructure (SoCI) Act*. The Draft Decision also largely accepted our cost estimate, with a minor adjustment.

Our regulatory submission in June noted our estimate of opex costs to comply with the SoCI legislation was preliminary. Our submission included costs of $3.55 million to comply with the cyber-security element of the SoCI Act's proposed Positive Security Obligation (PSO) rules.[27] The amendments to the SoCI Act in April 2022 oblige Icon Water to develop a Risk Management Program and mitigate specific hazards. Since then, we have undertaken further analysis to estimate the costs of complying with the PSO rules under SoCI legislation and estimated costs across the operational, environment, procurement, and security aspects of the business.

Under the SoCI Act's draft PSO rules, Icon Water must take a holistic and proactive approach to identify and reasonably mitigate hazards that pose material risks to the availability, integrity, reliability, or confidentiality of Icon Water as an owner and operator of critical water assets. In addition, the PSO

[25] Source: Taylor Fry, *RADAR FY2022*, 2022

[26] AER, *Final Decision Powercor Distribution Determination 2021-26 Opex Model*, 20 April 2021

[27] Icon Water, *Price Proposal - Attachment 6, Operating Expenditure*, 30 June 2022, p. 33

rules require Icon Water to mitigate risks arising from cyber and information security, personnel, supply-chain, and physical and natural hazards.

While Icon Water has implemented a range of controls to partially mitigate these hazards, they may not deliver the Federal Government's desired policy outcome of an uplift in national critical infrastructure security within the SoCI timelines. Consequently, we engaged consultants KPMG and Excellium to assist us in identifying and costing additional activities (including expanding the scope of current risk mitigation activities) necessary to comply with the PSO rules. The costs for cyber-security hazard mitigation were identified in Icon Water's original submission, except those associated with the obligations should Icon Water be declared a System of National Significance (SoNS). Additional costs related to supply-chain security, physical security and natural hazard mitigations are also included in the step change.

Icon Water has comprehensively reviewed the estimated costs of complying with amended SoCI legislation and the relevant rules. All costings have been either independently developed or verified to ensure that they are prudent and efficient. Our revised costs are outlined in Table 1-9. A further breakdown of costs is included in our confidential Appendix 1.5.

Table 1-9: Security of critical infrastructure step change ($millions, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
SoCI step change	4.03	2.27	2.39	2.67	2.84	**14.20**

Source: Icon Water.

1.5.3 Cotter Pump Station upgrade

The Commission's Draft Decision was to accept MJA's recommendation to apply an additional step change to reflect opex efficiency savings identified in our business case for the upgrade to Cotter Pump Station. The proposed opex adjustment for the Cotter Pump Station upgrade is outlined in Table 1-10.

Table 1-10: Cotter pump station upgrade step change ($millions, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Cotter pump station upgrade	-	-	- 0.14	- 0.28	- 0.28	**- 0.70**

Source: Marsden Jacobs Associates.

MJA's recommendation quantifies unrealised but contemplated efficiency savings from the upgrade. Works at Cotter Pump Station are expected to result in efficiency savings relative to the assumptions outlined in the business case. This is due to the upgrade being a more efficient solution that will reduce water pumping costs compared to retaining existing infrastructure.

The size of the efficiency savings in any given year included in the business case are sensitive to electricity prices, the water sourcing strategy and the actual rainfall experienced. A wetter season has reduced savings as less water is abstracted from Cotter Dam, while a drier season will have greater efficiency savings as more water is used from Cotter Dam. At an aggregate level, this may be masked by higher total water abstraction and, therefore costs, than in a standard weather year. Further, Cotter Dam is our most expensive dam to source from due to the requirement to pump to the water treatment plant, leading to increased electricity consumption.

We also note that the assumptions underpinning the business case have changed, whereby we are increasing supply from Cotter Dam to operate the system more securely, which, as outlined in section 1.1.1, will incur additional operating costs. Despite this, we accept the efficiency adjustment.

1.5.4 ACT Government Managing Buildings Better reforms

This revised forecast includes a new step change of $5.17 million related to the Managing Buildings Better reforms.

In 2020, the ACT Government commenced a series of Managing Buildings Better reforms to improve the management of apartments, townhouses, mixed-use developments, and commercial units. One objective of the reforms is to allow "*a more equitable distribution of building costs, such as water, maintenance and insurance*"[28].

The initial package of reforms has been introduced, with no implication for Icon Water. As part of the second stage of reforms, Icon Water understands that the ACT Government is amending legislation related to unit titles to improve the management of apartments, townhouses, mixed-use developments and commercial units. The ACT Utilities Technical Regulator (UTR) is also considering changes to its technical codes as part of the reforms.

Icon Water has included a step change to account for the additional costs we will incur to comply with the second stage of reforms, shown in Table 1-11. Activities that the step change covers include:

1. updating processes, policies, and standards to implement the regulatory change
2. consulting with industry on the standards that require revision as part of the reforms, and communicating the revised standards to developers and customers
3. upgrading Icon Water systems to deliver the increased capability and capacity required by the reforms
4. implementing the updated processes, policies and standards, and ongoing activities required to support the reforms.

Table 1-11: ACT Government Managing Buildings Better reforms step change ($millions, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Managing Buildings Better reforms step change	1.06	2.58	0.86	0.62	0.04	**5.17**

Source: Icon Water.

The inclusion of a step change for Managing Buildings Better reforms is a change in approach from our price proposal as outlined below.

Our price proposal had included the cost of the required system upgrades as part of the capital expenditure forecast

In our price proposal, upgrades to systems (point 3 above) had been included in our 2023–28 capital forecast (as part of *CX11367 Water Meter Management System (WMMS) Stage 3*). In the Commission's Draft Decision, this expenditure was captured in the overall level of capital expenditure, which was determined to be prudent and efficient and "*sufficient to operate the business and to maintain or improve services over the regulatory period*"[29].

Icon Water's WMMS is currently an on-premises solution, and past investment has been capitalised consistently with accounting standards. However, the WMMS is soon transitioning to a cloud system (as part of *CX11247 WMMS Stage 2).* Like the ICT projects included in section 1.5.5, investment occurring as part of both WMMS Stage 2 (in the current regulatory period) and WMMS Stage 3 (in the next regulatory period) will be opex rather than capex. The forecast expenditure for WMMS Stage 3

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[28] ACT Government, Managing Buildings Better - Build, buy or renovate (act.gov.au), accessed 5 December 2022

[29] ICRC, *Draft Report, Regulated water and sewerage services 2023–28*, October 2022, p. 56

has been removed from the capital investment plan and is included in the step change outlined in Table 1-11.

Our price proposal had proposed a new pass-through event for operating costs associated with the reforms

In our price proposal, we had proposed a new pass-through event[30] for additional operating costs Icon Water will incur related to the Managing Buildings Better reforms. The Commission declined the request for a pass-through event without a materiality threshold on the basis that:

> The pass-through materiality threshold provides a balance between:
>
> - minimising the degree of price variability in the regulatory period by limiting the number of occasions that the cost pass-through provisions are likely to be triggered beyond that provided for changes in the WAC, UNFT and subvention payments
> - allowing Icon Water to remain financially viable and meet its service obligations
> - providing Icon Water with incentives to pursue efficiency gains
> - minimising regulatory costs.
>
> In our review, Icon Water's proposal to seek an exception from the materiality threshold for a new pass-through event would affect the balance of risk allocation inherent in the existing arrangement.[31]

Changing the risk allocation was certainly not our intention. Rather, we were wanting to recognise that the reforms have a long implementation timeframe, and therefore the additional costs are incurred across the regulatory period, as observed in Table 1-11, and not in a single financial year.

Given the most recently available information, we have included the additional forecast opex as part of the Managing Buildings Better step change. Alternatively, Icon Water also welcomes the Commission to revisit our original proposal to enable the costs associated with the Managing Buildings Better reforms through a pass-through event with no materiality threshold that recognises the spread of costs across multiple financial years.

Further information on WMMS Stage 3 and other implementation activities is included in Confidential Appendix 1.6.

1.5.5 ICT Investment (Software as a Service)

This submission includes a new step change of $25.2 million for ICT (SaaS) investment. The step change captures expenditure for eight projects forecast for the 2023–28 regulatory period that is shifting from capex to opex. Table 1-12 outlines the forecast step change.

[30] Icon Water, *Price Proposal - Attachment 4, Regulatory Controls*, 30 June 2022, p. 10

[31] ICRC, *Draft Report, Regulated water and sewerage services 2023–28*, October 2022, p. 12

Table 1-12: Software as a service step change ($millions, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Project costs (non-recurrent)	$3.30	$5.45	$8.26	$5.91	$1.07	**$23.99**[32]
Recurrent	$0.00	$0.01	$0.29	$0.46	$0.47	**$1.23**
Total	**$3.30**	**$5.45**	**$8.55**	**$6.37**	**$1.54**	**$25.22**

Source: Icon Water.

In our price proposal, the 2023–28 capital investment plan included $49.5 million in forecast capital expenditure for information and communication technology (ICT) projects.[33]

On 8 September 2022, we wrote to the Commission to advise that in line with industry trends:

Over the last few months, a number of our ICT vendors advised they are moving to 'cloud based' models, under a subscription service or Software as a Service (SaaS), and will no longer support our existing systems under perpetual licences. For the 2023–28 regulatory period, we are not expecting this change will increase our total expenditure requirement (in fact, it may reduce our expenditure requirement) but we will see a shift in our forecast costs from capital to operating expenditure. As accounting standards dictate how costs are treated under the building block methodology used to calculate Icon Water's total revenue requirement, this shift may cause a short-term impact on customer prices for the 2023–28 regulatory period as we transition from capital to operating expenditure.[34]

Since then, we have reviewed each ICT project scheduled for the 2023–28 regulatory to ensure we applied the relevant accounting standards. The Commission's Draft Decision acknowledged that the AER had recently considered similar shifts from capex to opex and suggested that the AER's assessment approach provides useful guidance to Icon Water. The Commission stated that as part of this approach:

We consider the AER's assessment approach provide useful guidance. Icon Water should demonstrate that the proposed costs are prudent and efficient. That is, the proposed cloud-based service is needed to provide water and sewerage services and the associated expenditure program provides the least cost option over the life of the project, compared to other potential alternatives. Icon Water should demonstrate that there is no double counting with other expenditure activities, and any cost shift to operating expenditure is accompanied by an appropriate decrease in capital expenditure. Icon Water should also demonstrate that the affected cost categories fall within the relevant categories impacted by the IFRS guidance. If Icon Water expects to incur recurrent and non-recurrent (one-off) costs in transitioning ICT projects to a SaaS delivery model, it should identify them separately. This separation will ensure that one-off expenses are excluded from the consideration of base year operating expenditure in future price investigations.[35]

As suggested by the Commission, we considered the AER's assessment approach, and an overview of each component is included below.

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[32] In Icon Water's initial price proposal, $21.3m was included in the forecast capital investment plan for 2023–28 and the balance in the capital investment plan for 2018–23

[33] Icon Water, *Price Proposal - Attachment 7, Capital Expenditure*, 30 June 2022, p. 52

[34] Icon Water, letter to the Commission "*Regulated Water and Sewerage Services 2023–28: Revisions to Capital Investment Plan*", 8 September 2022. Available at: https://www.icrc.act.gov.au/

[35] ICRC, *Draft Report, Regulated water and sewerage services 2023–28*, October 2022, p. 36

Proposed costs are prudent and efficient

All projects within the step change are being managed as part of our Investment Planning and Design (IPaD) framework. In relation to this framework, the Commission concluded:

> The IPAD process is designed to achieve consistent decision-making, identify and manage risks, ensure efficient project delivery and control the progressive release of funding based on stage-by-stage justification. This process aligns with good industry practice.[36]

Additionally, eight projects were included in our original regulatory submission as part of the capital investment plan. For the purpose of the Commission's Draft Decision, the projects included in the SaaS step change are therefore already captured in the overall level of capital expenditure the Commission had determined to be prudent and efficient and "sufficient to operate the business and to maintain or improve services over the regulatory period"[37].

One of the projects included in the step change was reviewed in detail as part of MJA's assessment of prudency and efficiency of the top 10 forecast projects. The Asset Management Information System (AIMS)[38] project comprises over half of the value of the proposed ICT investment (SaaS) step change, meaning that MJA has already conducted a detailed review of project documentation for $13.2 million of the $25.2 million step change. In its report, MJA concluded that:

> We deem the project prudent. There is very little supporting information to deem the project efficient, but it is clearly more efficient than replacing the current Oracle solution. We therefore recommend the original proposed sum of $12.3 million [$13.2m in $2022–23] be allowed for Icon Water to deliver the uplift in Oracle capability it requires to create a cohesive and beneficial asset management information landscape with mobility functionality that is stable and supported into the future.[39]

Further information to support the prudency and efficiency of the step change is provided at Appendix 1.4.

No double counting with other expenditure activities

In our original price proposal, seven of the eight projects in the SaaS step change were included in the capital investment plan for 2023–28. The eighth project had been included in the 2018–23 capital investment plan, but as delivery has since been delayed, a portion of the project has been pushed into the 2023–28 regulatory period. The step change only captures the expenditure forecast for the 2023–28 regulatory period. For all eight projects, the capital investment plan has been adjusted to remove the portion of expenditure shifting from capex to opex. Additionally, the step change only includes the incremental cost (on top of the base year). Further information on this adjustment is outlined in Attachment 2.

Affected cost categories fall within the relevant categories impacted by the IFRS guidance

Historically, Icon Water's ICT environment has largely consisted of on-premises hardware and systems using perpetual software licences. As outlined in Table 1-13, expenditure of this nature is generally capex and the assets recorded on Icon Water's fixed asset register.

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[36] ICRC, *Draft Report, Regulated water and sewerage services 2023–28*, October 2022, p. 55

[37] ICRC, *Draft Report, Regulated water and sewerage services 2023–28*, October 2022, p. 56

[38] The Asset Management Information System project reference is CX11366

[39] MJA, *Icon Water 2023–28 expenditure review – Final Report*, 12 October 2022, p. 162

Under the new International Financial Reporting Standards (IFRS) guidance published in April 2021, the accounting treatment for ICT has been clarified. Around half of our investment in ICT systems (captured in the capex forecast in our regulatory proposal) is now included in an opex step change based on SaaS services offerings as the industry shifts to subscription models and cloud-based hardware.

Table 1-13: Summary of IFRS application to ICT investments

Capital expenditure	Operating expenditure
• System solutions using perpetual software licences • On-premise hardware • Physical ICT devices	• Software as a Service • System solutions using subscription-based software licences • Cloud based hardware

Source: Icon Water.

Summary of key assumptions related to the updated ICT capital investments:

- Costs associated with on-premise hardware and physical devices have continued to be classified as capital expenditure.
- Costs associated with perpetual license software (including design, build and implement) have continued to be classified as capital expenditure.

<u>Recurrent and non-recurrent (one-off) costs should be identified separately</u>

For each project we have identified the incremental costs that are:

- Recurrent costs: includes a regular amount incurred annually (for example, licences).
- Project costs: relate to system upgrades, with the frequency and quantum of costs varying based on the system's requirements. For example, some systems require minor upgrading every three years, others require more significant upgrades every five years. Systems that require continued investment are therefore project costs and not 'one-off' costs, but forecasts are lumpier compared to recurrent costs.

This step change does not impact Icon Water's overall forecast costs for the 2023–28 regulatory period, but it does change the timing of when we pass the cost to customers. We anticipate the step change will put upward, but temporary, pressure on prices as some ICT services are no longer available as an on-premise solution given the evolving nature of the industry.

An alternative to treating ICT investment (SaaS) costs as an opex step change is to include the eight ICT projects as capex for the 2023–28 regulatory period resulting in a misalignment between the economic and accounting treatment. This is not Icon Water's preferred option.

Another option would be to allow Icon Water to continue to treat expenditure for the eight ICT projects as capital investment for the 2023–28 regulatory period with the view of addressing the accounting issue as part of the 2028–33 price investigation. This would result in a misalignment between economic and accounting treatment for the current regulatory period and therefore is not our preferred solution.

Additional information on the SaaS step change is provided in confidential Appendix 1.4.

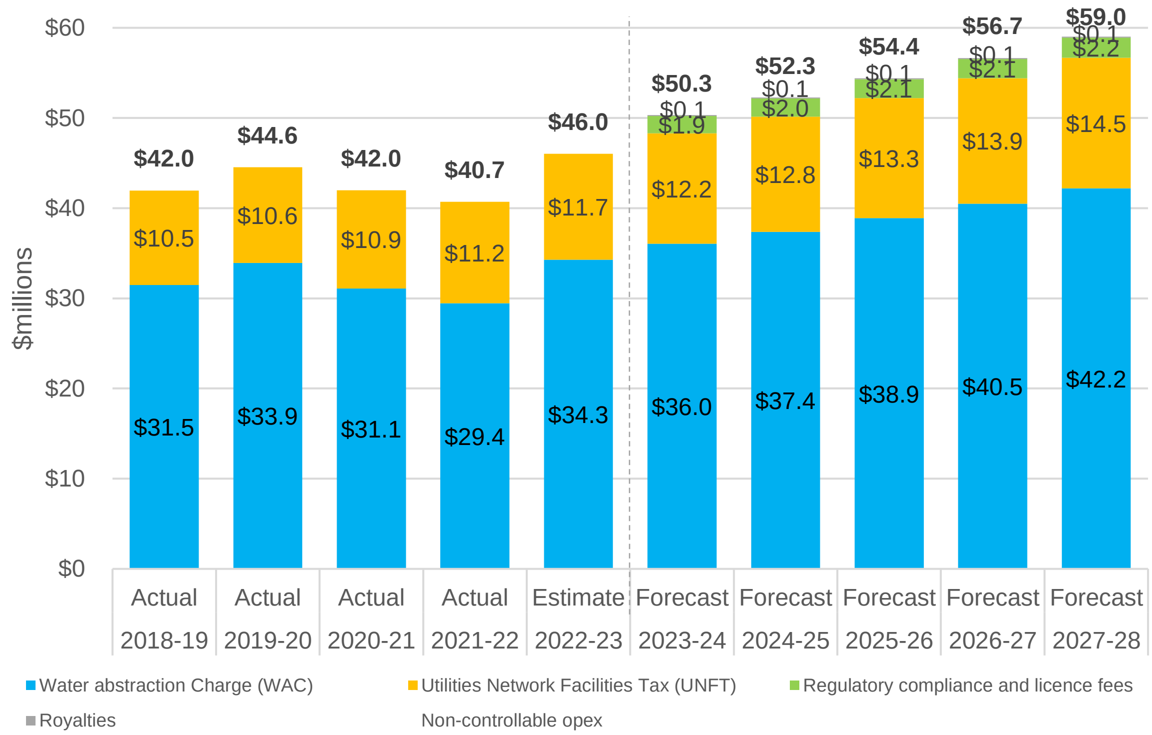
1.6 Non-controllable opex

Non-controllable opex captures costs outside our control and are trued-up annually through a pass-through provision. Non-controllable opex includes the Water Abstraction Charge (WAC) and the Utilities Network Facilities Tax (UNFT), which reflects ACT Government fees and charges.

Icon Water has revised the non-controllable opex forecast to reflect more updated data and information, including actual 2021–22 costs. We have also accepted the Commission's Draft Decision to include regulatory compliance costs, licence fees, and royalties, along with an annual true-up for either an under or over recovery of the forecast non-controllable costs.

Historical and forecast nominal non-controllable opex is shown by component in Figure 1-9. The split of forecast non-controllable costs between water and wastewater services in real inflation-adjusted terms is shown in Table 1-14.

Figure 1-9: Forecast non-controllable opex ($millions, nominal)



Source: Icon Water.

Table 1-14: Forecast non-controllable opex ($millions, 2022–23)

	2023-24	2024-25	2025-26	2026-27	2027-28	Total
Utitlies Network Facilities Tax (UNFT)						
Water	$6.57	$6.63	$6.69	$6.75	$6.82	**$33.46**
Wastewater	$5.28	$5.33	$5.38	$5.43	$5.48	**$26.91**
Total UNFT	**$11.85**	**$11.96**	**$12.07**	**$12.18**	**$12.30**	**$60.36**
Regulatory compliance and licence fees						
Water	$0.76	$0.76	$0.76	$0.76	$0.76	**$3.80**
Wastewater	$1.07	$1.07	$1.07	$1.07	$1.07	**$5.36**
Total fees	**$1.83**	**$1.83**	**$1.83**	**$1.83**	**$1.83**	**$9.16**

	2023-24	2024-25	2025-26	2026-27	2027-28	Total
Royalties						
Water	$0.05	$0.05	$0.05	$0.05	$0.05	**$0.23**
Wastewater	$0.05	$0.05	$0.05	$0.05	$0.05	**$0.25**
Total royalties	**$0.10**	**$0.10**	**$0.10**	**$0.10**	**$0.10**	**$0.49**
ICRC price review						**$0.00**
Water	$0.00	$0.00	$0.00	$0.15	$0.48	**$0.63**
Wastewater	$0.00	$0.00	$0.00	$0.16	$0.52	**$0.68**
Total costs	**$0.00**	**$0.00**	**$0.00**	**$0.31**	**$1.00**	**$1.31**
Water abstraction Charge (WAC)						
Water	$34.88	$35.00	$35.23	$35.50	$35.78	**$176.39**
Total non-controllable opex	**$48.65**	**$48.89**	**$49.23**	**$49.93**	**$51.01**	**$247.71**

Source: Icon Water. Totals may not sum due to rounding.

Appendices

Reference number	Appendix title	Author
1.1	Opex Model (confidential)	Icon Water
1.2	Quantonomics Memorandum	Quantonomics
1.3	Cost escalators	BIS Oxford Economics
1.4	ICT Investment (SaaS) step change paper (confidential)	Icon Water
1.4.1	ICT Investment (SaaS) step change model (confidential)	Icon Water
1.4.2	ICT Investment (SaaS) step change project documents (confidential)	Icon Water
1.5	SoCI step change paper (confidential)	Icon Water
1.5.1	Estimated costs for Icon Water's pathway to compliance under SOCI reforms – NaturalHazards & Supply Chain (confidential)	KPMG
1.5.2	Security of Critical Infrastructure Act 2018 Physical Security Remediation Cost Validation (confidential)	Excellium
1.5.3	KPMG costings (confidential) i. Natural Hazards ii. Supply Chain	KPMG
1.5.4	Cyber for SOCI costings with reconciliation (confidential)	Icon Water
1.5.5	Estimated costs for Icon Water to Prepare for Enhanced Cyber Security Obligations (confidential)	KPMG
1.6	Managing Buildings Better Reform design and implementation – Activities (confidential)	Icon Water
1.6.1	Managing Buildings Better Reform design and implementation – Costings (confidential)	Icon Water
1.6.2	Managing Buildings Better Reform WMMS Stage 3 Initiative Summary (confidential)	Icon Water
1.6.3	Managing Buildings Better Reform WMMS Stage 3 Costings (confidential)	Icon Water

Abbreviations and acronyms

ABS	Australian Bureau of Statistics
AER	Australian Energy Regulator
AIMS	Asset Management Information System
BISOE	BIS Oxford Economics
CAM	cost allocation methodology
capex	capital expenditure
Commission	Independent Competition and Regulatory Commission
ESC	Essential Services Commission
ICT	information and communication technology
IFRS	International Financial Reporting Standards
IPaD	Investment Planning and Design
IPART	Independent Pricing and Regulatory Tribunal
ISR	Industrial Special Risk
IWMP	Integrated Water Management Program
MJA	Marsden Jacobs Associates
opex	operating expenditure
PC	Productivity Commission
PSO	Positive Security Obligation
PWCM	Permanent Water Conservations Measures
RAB	regulatory asset base
SaaS	Software as a Service
SoCI	Security of Critical Infrastructure
SoNS	System of National Significance
TWRs	temporary water restrictions
UNFT	Utilities Network Facilities Tax
UTR	Utilities Technical Regulator
WAC	Water Abstraction Charge
WACC	Weighted Average Cost of Capital

WMMS	Water Meter Management System

1.1 Opex Model

Quantonomics

QUANTITATIVE ECONOMICS

Memorandum

Date:	18/11/2022
From:	Michael Cunningham, Joe Hirschberg, Alice Giovani
To:	Ashlyn Napier, Cameron Shields (Icon Water)
Subject:	Response to Independent Competition and Regulatory Commission Draft Report for Regulated Water and Sewerage Services Prices 2023–28

This memo responds to criticisms that Marsden Jacob Associates (MJA) makes of the Quantonomics (2022) benchmarking study of Icon Water, which has informed the Independent Competition and Regulatory Commission (ICRC) draft decision on regulated water and wastewater service prices for the regulatory period 2023–28. MJA makes these criticisms in an advisory report prepared for the ICRC (Marsden Jacob 2022).

1 Complexity and Replicability

MJA has suggested that the benchmarking study is too complex to be properly evaluated in the ICRC's current review process, and says that the study may not be replicable, thereby insinuating that it could not be corroborated by other studies. We will argue that both these suggestions are false.

1.1 Is the benchmarking analysis too complex to evaluate?

> *"The Quantonomics approach is complex, in particular the stochastic frontier model. Marsden Jacob notes that we have not examined the underlying model or attempted to replicate the results using the same data applied by Quantonomics. Therefore, we are not able to verify whether the model is producing reliable and accurate results. .... Further research could be undertaken to provide independent verification but preferably outside of the current regulatory review given complexities in the modelling approach." (p.36)*

MJA says that it has not *attempted* to reproduce the results,[1] and it is only for this reason that it is not "*able* to verify" the results. This is a limitation of MJA's review, not of Quantonomics'

[1] The terms replicable and reproducible research are often confused. 'Reproducibility' means obtaining the same results when using the same data and code as the original study (National Academies of Sciences, Engineering, and Medicine 2019, p.72). This is an important criterion of transparency and rigour.

study. We have fully documented our methodology in the report, and responded fully to information requests.

Regulatory decision-making should be evidence-based. The benchmarking study provides an empirical basis for addressing relevant questions when determining Icon Water's opex benchmarks for the forthcoming regulatory period. Evidence submitted in a review process should be properly evaluated.

MJA suggests a shortcoming of the benchmarking study is its undue 'complexity'. On the contrary, the methods used are parsimonious and similar to those used by the Australian Energy Regulator (AER) in electricity benchmarking. It is unclear why they are considered too complex to be evaluated in the ICRC's current regulatory review of Icon Water.

1.2 Is the benchmarking analysis replicable?

> *"We also understand that the National Performance Report data metrics are being reviewed and could change, which means this approach may not be replicable." (p.36-37)*

MJA's claim that the study "may not be replicable" is incorrect. 'Replicability' refers to when a new study can be conducted aimed at answering the same research question using newly collected data and obtaining similar results (National Academies of Sciences, Engineering, and Medicine 2019).[2] MJA does not mean our study has failed to be replicated, or that another researcher has attempted to replicate it but found some impediment to doing so. Rather, they suggest there is likely to be a data constraint preventing such a study because:

(a) the NPR data used in the benchmarking analysis will not be available in future; *and*

(b) other data which can be used to address similar questions or supplement NPR data could not be obtained from other sources.

Both propositions are untrue. MJA's comment is motivated by the *National Performance Reporting Framework Indicator Review* (HARC, Risk Edge & Aither 2021), which will retire around 39 indicators and introduce about 47 new indicators. The detailed recommended changes to the NPR have been available since October 2021 and all of the indicators required for water benchmarking will continue to be available, and indeed, more detailed data will be available for key data such as opex and capex and asset values and important new information on asset condition. Before discussing that review, we begin by addressing proposition (b) and then return to the future availability of NPR data.

[2] 'Replicability' is an important test of the robustness of the findings of the first study. The degree of similarity of the results needs to be referenced to their uncertainty, as suggested by their confidence intervals. When a study fails to be replicated this means that another study is carried out with new data and obtains inconsistent results. Further, "a successful replication does not guarantee that the original scientific results of a study were correct, nor does a single failed replication conclusively refute the original claims" (National Academies of Sciences, Engineering, and Medicine 2019, p.72)

As a logical matter, the continuance of relevant NPR indicators is not essential for replicability if other sources of data are or would be available. As discussed in section 0 of this memo, several other Australian studies using different data sources have produced similar results for the trends of water industry productivity. Further, the draft report of the NPR indicator review explains that some of the indicators to be retired "overlap with other current or proposed national reporting schemes" (HARC, Risk Edge & Aither 2021, p.6). It emphasises that the NPR is focussed on performance measurement and recommends a refreshed urban water reform dialogue in which other, more specialised data gathering should be considered for other requirements as part of that process. We also note that regulators have the means for gathering information for benchmarking purposes. For example, the AER gathers the information it uses for benchmarking directly from regulated businesses by issuing regulatory information notices. In the water sector, State or Territory regulators gather detailed data from regulated businesses at present, and there is no reason to suppose that they could not continue to gather the information they need or share it for benchmarking purposes.

Turning to proposition (a), in actuality, the NPR indicator review has emphasised that support for economic benchmarking remains a key purpose of the NPR, so that it can:

> "… inform industry benchmarks and can lead to 'competition by comparison.' It informs an understanding of the financial health of service providers, customer and community outcomes and generates insight into affordability. Publicly reporting on costs can also support the assessment of policy and investment decisions and inform regulatory decisions and policy development." (HARC, Risk Edge & Aither 2021, p.23)

The table on pages 27 to 48 of HARC *et al* (2021) shows all of the current NPR indicators, indicating those that will be retired and new indicators to be added.[3] Table A.2 in Appendix A of the benchmarking report listed all the NPR indicators used in our analysis. Appendix A of this memo shows each indicator used in the benchmarking analysis alongside the draft recommendations in HARC *et al* (2001) relating to that indicator. Only one of those indicators will be discontinued (greenhouse emissions relating to water supply), but another greenhouse measure will remain as an alternative. Some data we sourced elsewhere, such as the cost of bulk water purchases and temporary water restrictions, will henceforth be available in the NPR. Many of the new indicators can improve the benchmarking analysis, such as (for each of water supply and wastewater services):

[3] The main changes are: (i) a number of indicators relating to greenhouse emissions will be replaced by a single indicator; (ii) a few indicators related to customer service and non-payment will be replaced by different indicators, including a new customer satisfaction indicator. There will be additional hardship-related and community engagement measures; (iii) several financial performance indicators will be replaced by better-defined measures; (iv) new indicators for activities promoting water efficiency; (v) improved and additional drinking water quality measures; (vi) a new asset age and condition indicator, and measures of full-time equivalent (FTE) staffing levels; (vii) asset base values, operating expenditure ('opex'), and capital expenditure ('capex') will all be reported in more detail.

- a breakdown of opex into major types including bulk water purchases, recycled water purchases, maintenance costs and other opex, complemented by data for employee full-time equivalents;
- a breakdown of capex into asset renewal capex and other capex;
- additional asset base variables. In additional to the real replacement costs of fixed wastewater assets, new indicators include annual statutory depreciation, regulatory depreciation, and Regulated Asset Base (RAB) value. This will be complemented by an indicator for asset age and condition;[4]
- there will be a new customer satisfaction measure (which in some studies has been used as an output).

We have shown that MJA's suggestion that the benchmarking approach "may not be replicable" is misinformed and incorrect.

2 Criticisms of Econometric Modelling Choices

> *"[W]e have identified issues with the modelling which warrants some further analysis by Quantonomics to provide confidence that the analysis is producing statistically robust and unbiased results." (p.37)*
>
> *"[O]ne limitation of the Quantonomics approach is that cost functions should not be log-linear in outputs. If cost functions are log-linear in outputs, then the associated output sets are unbounded, meaning there is no limit to the amount of output that can be produced using a given amount of inputs (e.g., O'Donnell, 2018, p.287)". (p.40)*
>
> *Additionally, the elasticity values from the stochastic frontier model may not be correctly estimated because of issues with the stochastic frontier model (i.e. the time invariant inefficiency and time decay aspects of the model) as the estimates of inefficiency may be biased and inconsistent. …". (p.42)*

Econometric modelling requires the use of skill and judgement to make sensible choices about the model specification and estimation methods (Leamer 2012, p.26). There simply are far too many possible combinations of methods and specifications for all to be tested. In regulatory applications, modelling choices are often made on the basis of methods previously used by other researchers or regulators which have proven to be reliable. Simplicity and parsimony are also relevant considerations.

Appendix B explains why we used the approaches we did, and how these approaches derive from earlier work and take stakeholder feedback on that work into account. The methods we

[4] This additional information in relation to assets will assist to improve measurement in an area that we have emphasised has data consistency and reliability issues, and for that reason we used two alternative measures of capital input.

used are also closely related to those used by the AER in electricity network benchmarking (AER 2021a).

This section discusses several methodological criticisms made by MJA relating to:

- the use of the Cobb-Douglas functional form;
- the specification of the SFA stochastic inefficiency term, and
- whether the Multilateral Törnqvist index is a 'proper index'.

2.1 Opex cost functional form

> *"[O]ne limitation of the Quantonomics approach is that cost functions should not be log-linear in outputs. If cost functions are log-linear in outputs, then the associated output sets are unbounded, meaning there is no limit to the amount of output that can be produced using a given amount of inputs". (p.40)*

MJA claims that the chosen Cobb-Douglas functional form for the opex cost function is inappropriate. This criticism is based on Professor O'Donnell's view that cost functions should not be log-linear in outputs. This criticism is inconsistent with generally accepted principles in a relevant discipline of the econometrics of production and cost.[5] We first discuss commonly accepted practices in regulatory benchmarking and then consider the theoretical basis for and inferences drawn from O'Donnell's views on cost functional forms.

In regulatory applications, it is appropriate to choose widely-used, well-established, and reliable analytical methods in preference to relatively untested or novel approaches. Coelli *et al* (2005, p.211) list seven of the most commonly used functional forms for production, cost or profit functions. Among them are the Cobb-Douglas and Translog specifications, both log-log forms that are linear in parameters. O'Donnell (2018, pp.286–287) acknowledges that "it is common to assume they [cost functions] are either translog or double-log functions" and cites several studies as examples. The Translog function is a second-order flexible function, whereas Cobb-Douglas is a first-order flexible function. Choosing a functional form involves balancing different considerations. Coelli *et al* (2005) list four criteria: (a) flexibility; (b) linear in the parameters; (c) regular; and (d) parsimonious. All of the seven functions they discuss satisfy criteria (b) and (c), but criteria (a) and (d) need to be balanced.

> "All other things being equal, we usually prefer functional forms that are second-order flexible. However, increased flexibility comes at a cost – there are more parameters to estimate, and this may give rise to econometric difficulties (eg., multicollinearity). … The

[5] This is not a criticism of Professor O'Donnell. We are not suggesting that his views, as an expert in the field of efficiency and productivity analysis, should concur with those of other experts. However, the MJA report should have disclosed that the views presented are inconsistent with widely accepted views of experts in this field, since this is relevant information for the regulatory decision to be made by the ICRC.

> principle of parsimony says we should choose the simplest functional form that 'gets the job done adequately'." (Coelli et al. 2005, pp.211–2)

In its econometric estimation of electricity distribution networks' operating cost functions, the AER uses both the Cobb-Douglas and Translog functional forms (AER 2021a). However, O'Donnell claims that both these functional forms are unsatisfactory. We also see that Ofwat uses either the Cobb-Douglas functional form or a log-log hybrid between the Cobb-Douglas and Translog functions:

> "At PR19 our starting point is the Cobb-Douglas (or "constant elasticity") model. This model assumes that scale or density effects are constant. That is, a percentage change in the explanatory variable (for example scale or density) results in the same percentage change in costs for all companies. Starting with the Cobb-Douglas specification, we would add non-linear or cross-product terms only when there is a clear economic or engineering rationale for doing so and statistical tests show such non-linear effects to be important. ... The majority of companies agreed with this approach. Some companies expressed concerns about the use of translog cost functions due to instability over different modelling specifications, multicollinearity and difficulty of interpretation."

The Translog function has the advantage of being more flexible, but the Cobb-Douglas function is more parsimonious and easier to implement.[6] In summary, we have shown that MJA's criticism is inconsistent with widely used empirical methods in the field of applied producer economics and is out of touch with established regulatory practice in regard to the estimation of cost models.

We turn now to the *theoretical* basis for, and inferences drawn from, O'Donnell's claim that a cost function cannot be of the Cobb-Douglas form because, in some circumstances, in such a function, output is 'unbounded'. O'Donnell (2018) sources this proposition from O'Donnell (2016) who, using the duality between the cost and distance function, in turn sources this proposition from Coelli and Perelman (1999). The latter authors note in passing that Lawrence Klein in 1953 observed that "the Cobb-Douglas transformation function would not be an acceptable model of a firm in a purely competitive industry because it is not concave in the output dimensions" (Coelli & Perelman 1999, p.329).[7] We have three observations to make about this issue:

(a) Although the Coelli and Perelman (1999) study preferred to use the Translog distance function rather than the Cobb-Douglas distance function in their application, we have

[6] SFA is estimated using the maximum likelihood method, which usually uses iterative numerical algorithms to search for the parameter vector that maximises the likelihood function. Hence, when more complex models are used, depending on the characteristics of the data sample, there can sometimes be difficulty obtaining a solution.

[7] Notwithstanding this comment about applications to competitive markets, Klein used a multi-output Cobb-Douglas transformation function in his econometric analysis of railway passenger and freight services (Coelli & Perelman 1999, p.332).

already discussed the views of Coelli et al (2005) on cost functional forms, and they certainly do not reject or criticise the use of the Cobb-Douglas specification.

(b) Urban water utilities in Australia are natural or statutory monopolies within their specified supply areas. They do not operate in a "purely competitive industry" and therefore, this argument against the Cobb-Douglas specification may have been misapplied if it depends crucially on that premise.

(c) In any econometric analysis, the choice of functional form represents an approximation to the relationship of interest *within the domain of estimation and application*. The properties of the function outside that domain, such as when extrapolated to some extreme, are immaterial. Hence, even if the argument were applicable (which we have questioned), it would be incumbent on MJA to show that this point is relevant to the domain of data and forecasts relevant to the study, which they have not done. Since Icon Water is a mid-sized water utility in the data sample,[8] there is no application of the model which is not far inside the domain defined by the dataset used for estimation.

2.2 SFA inefficiency term specification

> *"Additionally, the elasticity values from the stochastic frontier model may not be correctly estimated because of issues with the stochastic frontier model (i.e. the time invariant inefficiency and time decay aspects of the model) as the estimates of inefficiency may be biased and inconsistent. … Quantonomics has developed cost efficiency scores under the assumption that the inefficiency effects (the u variable in equation 2) are either time-invariant or they decay over time. The effect of this approach is shown in Figure 13 which shows the cost efficiency scores over time across the water businesses. There does not appear to be a theoretical rationale for this restrictive assumption and it potentially has the effect of leading to biased and inconsistent estimates of efficiency if these restrictive assumptions are not correct. Moreover, this approach implies that firms do not learn from their mistakes, and the time-decay model says that if water business A is the k-th most efficient business in the sample in period 1, then it will be the k-th most efficient business in every period. … Importantly, the approach does not allow us to understand how variable cost inefficiency is changing over time for different water businesses. … Our overall assessment is that the firm specific analysis may not be useful for providing insights into Icon's variable cost inefficiency (or input-oriented technical efficiency as discussed in O'Donnell, 2018) relative to other water businesses unless the inefficiency effects are allowed to vary in the stochastic frontier model over time by firm." (pp. 42-47)*

To clarify, our benchmarking report uses the time-varying decay SFA model due to Battese and Coelli (1992), with the inefficiency terms having a half-normal distribution. The report

[8] The number of Icon Water's customers is about 9 per cent of Sydney Water's, and the number of Byron Water's customers is approximately 6 per cent of Icon Water's.

could have been clearer on some aspects of this, but it is discussed on pages 34-35, and the results in Table 4.1 include the parameter ‘eta’, which is the decay parameter, and the parameter ‘mu’ has a value of zero associated with the half-normal assumption.

MJA is critical of the time-varying decay modelling choice but also rejects a time-invariant inefficiency specification (Pitt & Lee 1981; Battese & Coelli 1988). We will argue that these two SFA models are among the most widely used in the empirical literature and hence, this criticism is inconsistent with generally accepted principles in a relevant discipline of the econometrics of production and cost.[9] We also argue that MJA has not put forward a credible alternative which is demonstrated to be feasible in this application.

In SFA, the stochastic part of the model has two components: (a) a normally distributed random variable intended to capture the effects of statistical noise; and (b) a one-sided (ie, strictly positive or strictly negative) random variable intended to capture the effects of technical or cost inefficiency. Alternative distributions can be assumed for the one-sided component. The half-normal and exponential distributions are simplest, being single-parameter distributions, while the truncated-normal and Gamma distributions are more flexible two-parameter distributions. Kumbhakar & Lovell (2000, p.9) remark that single parameter distributions “remain the distributions of choice in the vast majority of empirical work”.

Particularly when panel data is used, the stochastic inefficiency term may be specified as the product of a cross-sectional stochastic component and a deterministic part: $u_{it} = u_i . g(\mathbf{z}, t)$; where u_i is a cross-sectional inefficiency term, and $g(.)$ is a function of time (t) and possibly other variables ($\mathbf{z}$). Important special cases are the time-invariant inefficiency model, in which g is a constant and equal to 1, and the time-varying decay inefficiency model, in which $g(t) = \exp[-\eta(t - T_i)]$; where η is the decay parameter and T_i is the last period in the sample for utility i. These specifications are simple and relatively robust given the challenges of estimating SFA models previously mentioned, and they are among the most widely used SFA models when applied to panel data. This is evidenced by the fact that these are the only two options offered in standard Stata (the *xtfrontier* command).[10]

In short panels, time-invariant efficiency may be assumed, but the “longer the panel, the less tenable this assumption becomes” (Kumbhakar & Lovell 2000, p.10). Hence, the time-varying inefficiency may be preferable in longer panels. Our study uses the time-varying decay model.

This discussion supports the view that the assumptions we employed, using a half-normal distribution for inefficiency parameters, and the time-varying decay model are consistent with widely-used practices with a panel dataset, as used in the study.

[9] This is not a criticism of Professor O’Donnell. We are not suggesting that his views, as an expert in the field of efficiency and productivity analysis, should concur with those of other experts. However, the MJA report should have disclosed that the views presented are inconsistent with widely accepted views of experts in this field, since this is relevant information for the regulatory decision to be made by the ICRC.

[10] A wider set of SFA models is available in the user-contributed command, *sfpanel* (Belotti et al. 2012).

MJA argues that the time-varying decay model is not flexible enough, and there should be utility-specific time trends in the inefficiency parameters. Greater flexibility comes at a cost, namely the need to estimate a great many more parameters. For example, with a sample of 64 urban water businesses, adding a separate linear inefficiency trend term for each utility would increase the number of parameters to be estimated from 25 to 88 (or more). Such a proliferation of time-trend parameters can produce a number of estimation problems, including an inability to adequately estimate the effects of the main variables in the model (the outputs and capital stock) and the possibility (or likelihood) of spurious estimates for the trended efficiency effects due to multi-collinearity.[11]

MJA has not specified the actual approach they are proposing, nor referred to any studies where their proposed approach has been carried out. Hence, it is not possible to respond specifically to this argument. However, the points we have raised above, and the lack of examples where such an approach has been employed, strongly suggest that it is doubtful that MJA's proposed approach would be feasible in practice in this application.

2.3 Is the Multilateral Tönrqvist index improper?

> *"The multilateral Opex PFP is essentially a Törnqvist index … one concern is whether the Törnqvist indices are proper indices which means that they meet the axioms listed in O'Donnell (2018, Ch. 3) . The implication is that the multilateral indices will provide a misleading picture of productivity unless the output or input weighting shares are constant over time (which is what would be required for a proper index)." (p. 44)*

MJA appear to have made an error by failing to distinguish between the ordinary bilateral or chained bilateral Törnqvist index and the Multilateral Törnqvist index used in our study.[12] This distinction is important because these two types of indexes perform differently against the usual tests, including importantly the 'circularity' test. Thus, criticisms of the chained bilateral Törnqvist index not satisfying the circularity (or 'transitivity') test do not carry over to the Multilateral Törnqvist index.

In addition to highlighting this possible error, we also point out that MJA's statements about the chained bilateral Törnqvist index, while not applicable to our study, are also inconsistent with generally accepted principles in a relevant discipline of the index numbers and

[11] This point is exemplified by the additional modelling presented in Appendix C and discussed in section 4.2 These models add an additional 14 parameters to the benchmarking model (for time-varying technical change), increasing the number of parameters to be estimated to 39. Here we see the wastewater collected output is not statistically significant (at a 0.05 level) in either the real financial capital or the physical capital models. This highlights our point that multiplying the parameters to be estimated using time-trend effects make it more difficult to adequately estimate the main effects of the model. Increasing the number of parameters to 88, in this sample, would greatly amplify this problem and be likely render all the main effects insignificant, and the resulting model unreliable.

[12] A chained bilateral index compares a sequence of observations over time. A multilateral index compares cross-sectionally (eg, countries or firms) and over time.

inconsistent with the practices of Australian and international statistical agencies.[13] We do not believe that a broad-based rejection of widely-accepted principles and practices within the applied economics and statistics field of index numbers is, or should be, part of the ICRC's agenda in regulating Icon Water.

2.3.1 Transitivity, characteristicity and the Multilateral Törnqvist index

Numerous index number formulae have been developed and the well-established approach to choosing among them involves specifying a number of desirable characteristics (either in the form of tests or axioms) and finding those that meet or best meet the chosen criteria. Among the various criteria (Coelli et al. 2005, pp.95–96), one is circularity/transitivity, whereby the index formula when applied to two periods, say 0 and 2, is equal to the product of the indexes between these periods via another period; eg, $I_{0,2} = I_{0,1} \times I_{1,2}$. Another criterion often considered important is 'characteristicity', which means that when comparing two observations, an index should use information sufficiently closely related to those two observations. One problem that arises is in balancing the circularity and characteristicity criteria. Caves *et al* (1982, p.74) state "... 'characteristicity and circularity are always... in conflict with each other.' The implication is that some degree of characteristicity must be sacrificed to obtain circularity".

It is well known that the chained bilateral Törnqvist index does not satisfy the circularity (ie, transitivity) test, and the same applies to the Fisher Ideal index (Coelli et al. 2005, p.96). However, the Multilateral Törnqvist index *does* meet this test. Caves *et al* (1982, p.84) state: "These indexes provide transitive multilateral comparisons that maintain a high degree of characteristicity". And Fox (2003, p.407) states:

> "Multilateral index numbers are used for price, output, input and productivity comparisons across economic entities, such as countries. They satisfy a circularity (transitivity) requirement so that the same result is achieved if countries are compared with each other directly, or with each other through their relationships with other countries. Standard (bilateral) index-number formulae do not satisfy this circularity requirement."

Caves *et al* (1982) observe that even though 'superlative multilateral indexes' such as the Multilateral Törnqvist index satisfy the circularity test:

> "… they are not necessarily preferable to chain-linked bilateral indexes for time series comparisons. This follows because chronology provides a natural ordering of time series data that is lacking for cross-section or panel data" (p.84).

[13] This is not a criticism of Professor O'Donnell. We are not suggesting that his views, as an expert in the field of efficiency and productivity analysis, should concur with those of other experts. However, we think that MJA ought to have disclosed that the views presented are not widely held among experts in this field, which is relevant to the regulatory decision to be made by the ICRC.

When additional data is added, the Multilateral Törnqvist index will result in changes in index numbers over all observations, which is an undesirable property in many time series indexes. This is why statistical agencies such as the Australian Bureau of Statistics (ABS) most often use chain-linked bilateral indexes which do not satisfy the circularity test.

This discussion shows that MJA appears to have incorrectly conflated the Multilateral Törnqvist index with the chained Törnqvist index, since these two index formulae perform differently against the criteria of the test approach. Importantly, the Multilateral Törnqvist index satisfies the property of circularity/transitivity while maintaining a high degree of characteristicity.

2.3.2 Transitivity, characteristicity and the chained Törnqvist index

It is also relevant to examine MJA's general criticism that the Törnqvist index is not a 'proper index', which we take to be mainly directed to the chained bilateral Törnqvist index's not satisfying the circularity test, although we acknowledge that MJA also makes the stronger claim that a 'proper index' should have fixed weights. This discussion will highlight the nature of some of the criticisms made of our study, which are motivated by a broad-based rejection of widely-accepted principles and practices within the applied economics and statistics field of index numbers.

The claim that the chained Törnqvist index is not a 'proper index', and that output or input weights should be constant, is not widely accepted in the relevant discipline. Professor O'Donnell's view has been specifically criticised by other experts in the productivity and efficiency field:

> "O'Donnell (2012, 2014, 2016) takes … Circularity (or "Transitivity") as an essential property for his output and input quantity indexes. ... The U.S. Bureau of Economic Analysis used … [fixed price weights] to compute its historical series of real GDP for the US economy for many years but they eventually switched to chained Fisher quantity indexes because they found that whenever they updated their old historical series using a new set of price weights, they dramatically changed US economic history. Fisher (1922; p. 274) noted that … "the only formulae which conform perfectly to the circular test are index numbers which have constant weights..." Fisher (1922; p. 275) went on to assert: "But, clearly, constant weighting is not theoretically correct. If we compare 1913 with 1914, we need one set of weights; if we compare 1913 with 1915, we need, theoretically at least, another set of weights. ... Similarly, turning from time to space, an index number for comparing the United States and England requires one set of weights, and an index number for comparing the United States and France requires, theoretically at least, another." Frisch (1936; p. 6) was even blunter in his criticism of fixed weight price indexes: "The fundamental difficulty is that, in most cases, particularly for geographical comparisons or comparisons between remote points of time, it is absurd to assume constant q's". Thus along with Fisher and Frisch, we do not favor the fixed weight quantity indexes used by O'Donnell." (Diewert & Fox 2017, p.279)

It is common practice for statistical agencies to use chained indexes (with changing weights) for official statistics, and the Törnqvist and Fisher Ideal index formulae, which do not satisfy the circularity test, are widely used by Australian and international statistical agencies for measuring productivity. The OECD manual on *Measuring Productivity* (Schreyer 2001, p.83) recommends using chain index number formulae, where indexes are rebased and linked in successive years, and not a fixed weights index formula. The *System of National Accounts 2008* (SNA08) recommends the use of chain indexes for inter-temporal comparisons over longer periods because:

> "… over time the pattern of relative prices in the base period tends to become progressively less relevant to the economic situations of later periods to the point where it becomes unacceptable to continue using them to measure volume changes from one period to the next. … The more frequently weights are updated the more representative will the resulting price or volume series be. Annual chain indices result from compiling annual indices over two consecutive years each with updated weights" (United Nations et al. 2009, p.299).

The SNA08 also states: "It has been shown on theoretical grounds that long time series of volume and price indices are best derived by being chained" (United Nations et al. 2009, p.306).

On the choice of the specific index number formula, the OECD observes that when the different formulae are tested against a number of criteria, the Fisher and the Törnqvist index come out first on most criteria, and they both produce very similar empirical results (Schreyer 2001, p.83). Coelli *et al* (2005, p.97) similarly conclude that "the choice of formula is essentially between the Fisher and Törnqvist indices." For calculating its productivity measures, the ABS uses the Törnqvist index formula for each constituent input index (Australian Bureau of Statistics 2021a, pp.513–16).

We have shown that the claims that the Törnqvist index is not a 'proper index' and that fixed weight indexes should be used are inconsistent with widespread practices and express recommendations of Australian and international statistical agencies. Also, they are inconsistent with the view of many experts in the relevant fields of the economic and statistical theory of index numbers and of productivity measurement. We do not believe that a broad-based rejection of widely-accepted principles and practices within the applied economics and statistics field of index numbers is, or should be, part of the ICRC's agenda in regulating Icon Water.

3 Output and Productivity Forecasts in the Base-Step-Trend Framework

> *"Our analysis indicates that scaling the output weightings to sum to unity is appropriate provided that the productivity growth factor (currently 0.5 per cent proposed in Icon's price submission) incorporates*

factors that are not just scale related but includes other drivers of productivity. This provides some evidence that the value of the productivity growth factor is above 0.5 per cent per annum." (p.38)

"[The modelling] indicates increasing returns to scale as a 1 per cent increase in output quantities increases variable costs by 0.76 per cent. This straight application approach is not used by Icon Water in setting output growth. Rather, the elasticities have been used to create weightings that sum to unity, thereby ensuring a constant return to scale assumption (i.e., a 1 per cent increase in output quantities increases variable costs by 1 per cent)." (p.41)

We will argue that the foregoing statements are mistaken, and the conclusions reached are incorrect. MJA appears to be unclear about our methodology and calculations used to derive output weights and productivity trends from the estimated opex cost function, even though these methodologies and calculations are clearly set out in our report, and we have responded in detail to questions raised by MJA on these matters. Furthermore, some of MJA's recommendations are inconsistent with the base-step trend method of forecasting opex.

In this section we repeat the main steps in the calculations, as set out in the benchmarking report, to clarify the nature of the foregoing errors. Section 3.1 addresses a confusion, implicit in the quotes above, about the base-step-trend method of forecasting opex. Section 3.2 shows that certain statements of MJA, also implicit in the quotes above, incorrectly claim that constant returns-to-scale has been assumed in forecasting opex. Section 3.3 shows that the "other drivers of productivity" mentioned in the quotes above are taken into account in our productivity forecast and are separately shown in our report. Finally, in section 3.4, some concluding comments are made.

3.1 The base-step-trend method

In section 4.4 of the benchmarking report we clearly stated our methodology for using the results of the econometric opex cost function to: (i) calculate output weights, which are used to forecast the output index from individual output forecasts; and (ii) project trends in productivity based on the distinct effects of technical change, economies of scale and the effects of changes in the (quasi-fixed) capital stock. In Table 6.1 of our report, we show each component of the drivers of opex growth, including the separate elements determining the forecast productivity growth rate. This method of using the opex cost function to separately forecast output growth and productivity is consistent with the base-step trend method.

MJA criticizes our method, saying:

> "A more significant concern is the application of the output weights in Table 13 to generate an overall output growth figure which is used to calculate the rate of change in Equation 1. A straight application of the results of the stochastic frontier analysis would be to place forecasts for each of the variables (x, q, z and λ) into Equation 2 to forecast future variable costs" (Marsden Jacob 2022, p.41).

This statement is to be inconsistent with the base-step-trend approach for forecasting opex, which requires, among other things, separate forecasts of output growth and opex productivity growth. The method which we clearly present in the report *does* use the opex cost function, but uses it in a format that is consistent with the base-step-trend approach. We separately forecast the rate of output growth and opex partial factor productivity (PFP_o) consistent with the model.

3.2 Is constant returns-to-scale implied?

MJA incorrectly claims that constant returns-to-scale has been assumed in forecasting opex, stating: "This approach implies constant returns to scale as it results in a 1 per cent increase in overall output quantities increasing variable costs by 1 per cent" (Marsden Jacob 2022, p.40).

The derivation of our forecast productivity growth in Table 6.1 clearly shows a positive effect of output growth on productivity growth of 0.34 in 2024 increasing to 0.44 in 2028. This is the benefit to productivity arising from economies of scale. We proceed to explain this in more detail.

By definition of the rate of change in opex partial factor productivity ($P\dot{F}P_o$), the rate of change in real variable cost ($\dot{VC}$) is:[14] $\dot{VC} = \dot{Q} - P\dot{F}P_o$ (where dots above variables indicate rates of change, and $\dot{Q}$ denotes the rate of change in the output index). This is in the format of the base-step-trend method and is the format of presentation in Table 6.1 of the report.

In equation (4.4) of the report, we show that the effect of changes in scale on $P\dot{F}P_o$ is: $(1 - \varepsilon_Q)\dot{Q}$, where $\varepsilon_Q \equiv \sum_{m=1}^{M} \varepsilon_{q_m}$, the sum of the individual cost-output elasticities is called the *elasticity of scale*. It follows that the proportionate effect of output growth on variable cost growth is: $\dot{VC}/\dot{Q} = 1 - (1 - \varepsilon_Q) = \varepsilon_Q$. Table 4.3 of the report shows the estimated value of the elasticity of scale for the Australian urban water industry is 0.76, which is consistent with economies of scale because it is less than 1. This shows that MJA's statement that "a 1 per cent increase in overall output quantities increasing variable costs by 1 per cent" is false. A 1 per cent increase in the output index increases the variable cost (ie, opex) by the value of the elasticity of scale (0.76).

This is clearly presented in Table 6.1. The effect of output growth on variable cost growth is equal to:

- the direct effect, which as Table 6.1 shows is 1.43 per cent in 2024, increasing to 1.83 per cent in 2028, *minus*

[14] The opex cost function model uses real variable cost as the dependent variable, defined as nominal variable cost deflated by a price index of opex inputs. Real variable cost is a measure of the quantity of non-capital inputs. The opex partial factor productivity is defined as: $PFP_o = Q/VC$.

- the effect of output growth on PFP, which is 0.34 per cent in 2024 increasing to 0.44 per cent in 2028.

The net result of these two effects, divided by the output growth rate is equal to the elasticity of scale: (1.43 – 0.34)/1.43 = 0.76 in 2024, and (1.83 – 0.44)/1.83 = 0.76 in 2028. Hence, we have shown that MJA is incorrect in its claims concerning the assumed returns to scale as increasing returns to scale is implied.

3.3 Calculation of the opex PFP growth measure

Equation (4.4) of our report explains how the rate of productivity change, $P\dot{F}P_o$, is calculated using the estimated parameters of the opex cost function. Equation 4.4 is derived to calculate partial factor productivity (PFP), and is given as:

$$P\dot{F}P_o = (1 - \varepsilon_Q)\dot{Q} - \varepsilon_{x_k}.\dot{x}_k - \sum_n \gamma_n \frac{z_n}{\partial t} - \left(\lambda + \frac{\partial u}{\partial t}\right) \quad (4.4)$$

We now discuss each of the terms on the right-hand side of equation (4.4):

- $(1 - \varepsilon_Q)\dot{Q}$ is the effect of economies of scale (output) discussed in section 3.2 above, which contributes 0.34 percentage points to Opex PFP change in 2024 increasing to 0.44 percentage points in 2028;
- $-\varepsilon_{x_k}.\dot{x}_k$ is the effect of changes in the capital stock, which as Table 6.1 of the report shows, contributes –0.08 percentage points in 2024 decreasing to –0.17 percentage points in 2028;
- $-\sum_n \gamma_n \frac{z_n}{\partial t}$, is the combined effect of changes in the OEFs. As the report states (p.45), there is assumed to be no change in any of the OEFs for the purpose of forecasting Opex PFP. This a common assumption, reflecting the nature of OEFs as background conditions which are assumed to be relatively stable over short spans of time, and these effects are generally small (Economic Insights 2019, pp.76–77, 2020, pp.74–75);
- $-\left(\lambda + \frac{\partial u}{\partial t}\right)$ represents the two remaining components of productivity change, namely the rate of frontier shift (λ), and the average rate of catch-up productivity change for the industry ($\partial u/\partial t$). Equation (4.5) of the benchmarking report shows that in the time-varying decay SFA model: $\partial u/\partial t = -\eta\bar{u}$, where $\bar{u}$ is the mean value of u_i (the inefficiency measures for each business in the sample), and η (eta) is the estimated rate of decay of inefficiency over time. Averaging over the two models (ie, the financial capital and physical capital models), the average value of λ is 0.208; the average value of η is 0.303, and the average of the reported values of $\bar{u}$ is 0.278. Hence the rate of underlying industry-wide productivity change is –1.23 per cent per year, which is shown in Table 6.1 of the report.

- The rate of Icon Water's catch-up productivity change is in excess of the average industry rate of catch-up gain and forecast separately based on Icon Water's estimated degree of efficiency (see section 7.4 of the report), and hence is not part of the calculation in Table 6.1 of the report.

This shows that:

- the estimated opex cost function *has* been used in making the forecasts shown in table 6.1 of the report in a way that is consistent with the base-step-trend method, and as used in previous regulatory benchmarking studies (eg, Economic Insights 2019, 2020).
- the other drivers of productivity, such as the effects of changes in the capital stock and the effects of economies of scale have not been excluded. We have accounted for *all* the drivers of variable costs.

3.4 Concluding comments

We have shown that MJA is incorrect to claim that the effects of economies of scale and of "other drivers of productivity" were not accounted for in our forecast. However, these claims by MJA formed the basis of their argument that "the value of the productivity growth factor is above 0.5 per cent per annum" (Marsden Jacob 2022, p.42). Therefore, we have established that MJA's views on the outlook for productivity growth do not have a sound basis.

4 Estimating Industry Productivity Trends

> *"A further concern is that the growth rate of -0.9 per cent per annum used by Quantonomics for the industry wide component appears to be too low when considering the movement in the index in recent years. Much of the negative growth rate appears to have been driven by large falls in productivity in the first half of the total modelled period and the cumulative average annual growth rate for the second half of this period (i.e. 2012 to 2020) is 0.3 per cent per annum. This suggests that a more relevant productivity figure may well be 0.3 per cent per annum than -0.9 per cent per annum." (p.45)*
>
> *"… it is possible that the impact of the frontier shift on Opex PFP over the period 2006 to 2020 has occurred because of shifts in the frontier in the first half of this period. This conclusion could be validated by placing two time variables for two different time periods into the stochastic frontier model (e.g. 2006 to 2012 and 2013 to 2020). However, it is noted that this addition may not to be necessary if the time invariant inefficiency and time decay restrictions are removed from the model." (p.46)*

In section 3 we discussed how we forecast Icon Water's underlying opex productivity change (or 'frontier shift'), which does not include its forecast 'catch-up' productivity (ie, its improvement relative to the more efficient cohorts of urban water businesses). Icon Water's catch-up productivity is discussed in section 5 below.

This separation of Icon Water's productivity forecast into frontier shift and catch-up is not accurately characterised by MJA as 'industry-wide' and 'firm-specific' factors.[15] Nevertheless, we showed that using the Opex PFP index from the Multilateral Törnqvist index analysis, the average industry Opex PFP rate of change of –0.9 per cent per annum is similar to the estimated rate of frontier shift for Icon Water, which was also estimated to be –0.9 per cent per annum. This section contests MJA's assertion that this estimate "appears to be too low".

We have previously identified MJA's error in relation to whether the effects of scale and other factors affecting productivity were taken into account when forecasting Icon Water's underlying productivity trend using the econometric model. This section discusses:

- MJA's use of the pattern of the Opex PFP index over time to infer a change in the historical opex productivity trend and its claim that using a historical average trend to forecast the rate of technical change is "backward-looking" (section 4.1);
- the empirical question of whether there has been a change in the time-trend of technical change over the sample period and whether MJA's claim that this can be characterised as a faster decline in the first half of the sample period and a slower decline in the second half (section 4.2); and
- whether MJA's subjective judgement that the productivity trend "appears to be too low" has any empirical support from other studies relevant to Australian water industry productivity trends (section 4.3).

4.1 Opex PFP Index & Structural Change in the Productivity Trend

> *"Another concern is that the use of a partial productivity index, which only uses one of the inputs (i.e. operating expenditure), is not a holistic examination of productivity since it provides insights into historical movements in Opex PFP which may have been influenced by changes in historical capital expenditure. This is relevant as the interrelationship between these two variables is not considered in setting a productivity adjustment for operating expenditure and highlights the limitation of using Opex PFP to provide guidance on setting a future productivity adjustment for operating expenditure. … Additionally, a further limitation of the analysis is that estimating the productivity growth factor using the methods applied by Quantonomics is a backward-looking approach since it assumes that historical productivity growth provides insights into future productivity growth." (p. 45)*

In the quoted statements, MJA argues that the Opex PFP index, as a partial productivity index, provides an unreliable basis for setting a future productivity adjustment for operating expenditure. And they also criticise the use of historical productivity trends as a basis for opex forecasting productivity trends as being 'backward-looking'. However, MJA contradicts both

[15] As previously noted, Icon Water's frontier shift (or underlying Opex PFP change) includes some effects such as economies of scale and the effects of changes in the capital stock which will differ in degree between utilities. Firm-specific 'catch-up' productivity gain is only one kind of firm-specific effect on productivity.

of these opinions because it relies on historical movements in the Opex PFP index (Marsden Jacob 2022, pp.45–46, Table 17 & Figure 12) to reach its main conclusion about the industry-wide opex productivity trend in the period 2013 to 2020, on which it bases its forecast of the industry-wide opex productivity component over the next regulatory period.

As previously discussed, MJA also rejects the Multilateral Törnqvist index number method we used (because Professor O'Donnell regards a 'proper index' as one with fixed weights). However, they state that the Opex PFP measure is not subject to this particular criticism because the output index has constant weights over all periods and utilities; but they do not discuss the opex input index. Section 2.4 of the report discusses the variables used in the report and shows in detail how each variable is calculated. The measure of non-capital (or, 'opex') input is an index combining two components, (a) an index of the real operating expenses excluding expenditure on bulk water (or 'real net operating expenses'); and (b) an index of the quantity of bulk water purchases. "Weights are based on the per utility average cost share of bulk water in total opex; which is constant for each utility but varies between utilities" (Quantonomics 2022, p.13). Thus, the non-capital input index is not a fixed-weight index; it is unlikely to meet the axioms which O'Donnell (2018) uses to define a 'proper index'. If not, then MJA has also contradicted this criticism by relying on the Opex PFP index.

In this section we argue that:

- the use that MJA makes of the Opex PFP index is potentially misleading; and
- using historical trends of estimates of the rate of technical change is a widely used method for aggregate productivity projections by official agencies, also for determining productivity factors in economic regulation plans.

4.1.1 Use of Opex PFP trends

MJA arbitrarily divides the sample period into two halves, without regard to the long-lived nature of water and wastewater assets, and estimates that there has been a slow average rate of increase in the Opex PFP index in second of these two periods. It is then inferred that there has been an opex productivity increase in more recent years:

> "Much of the negative growth rate appears to have been driven by large falls in [Opex PFP] productivity in the first half of the total modelled period and the cumulative average annual growth rate for the second half of this period (i.e. 2012 to 2020) is 0.3 per cent per annum. This suggests that a more relevant productivity figure may well be 0.3 per cent per annum than -0.9 per cent per annum". (Marsden Jacob 2022, p.45)

This observation forms the basis of its main recommendation to the ICRC, even though it has expressly stated that the Opex PFP index provides an unreliable basis for forecasting productivity and that historical averages in general do not provide a good guide for forecasting productivity. That is, MJA has used a methodology which it has explicitly rejected.

We have relied on the results of the econometric opex cost function to forecast Icon Water's underlying opex productivity trend and used the Multilateral Opex PFP index analysis to provide additional information. We found that the trend of industry-wide opex productivity using the index approach was similar to Icon Water's projected rate of frontier shift using the econometric model. And as discussed in section 4.1.2, we do not agree with MJA's suggestion that historical average rates of productivity change should not be used for forecasting productivity trends.

It should be noted that when calculating averages over sub-periods of a data sample, the results can be strongly affected by the choice of the start and end years of the sub-period, and many sub-periods that could be defined for a sufficiently long sample period. Hence, MJA's method of arbitrarily choosing to divide the sample into two halves can be misleading, if relied on to reach strong conclusions about changes in trends. In section 4.2 we consider whether MJA's claim that there has been an underlying change in the rate of industry opex productivity in recent years is empirically supported by undertaking further econometric analysis of the opex cost function for the Australian urban water industry. This analysis will further clarify our point that the choice of sub-periods can produce misleading inferences.

4.1.2 Is the use of historical average productivity trends "backward-looking"?

The rate of technical change is typically estimated as the residual, after controlling for the observable factors which determine productivity change (such as scale economies and 'catch-up' effects). By implication, it is problematic to develop a deterministic forecast of technical change based on the expected future values of its determinants because the causal determinants of technical change are difficult to quantify. A common approach is to view technical change as having an underlying trend, although with considerable year-to-year volatility. Technical change is often forecast by extrapolating its trend into the future, assuming no shocks that cause volatility. The trend component may be determined using the average growth rate over a long period, or by using a more sophisticated time series analysis method. In either case, this involves extracting historical trends from historical data.

For instance, Petropoulos et al. (2022, p.74) observe with respect to aggregate productivity forecasting:

> "The most common approach for forecasting productivity is to estimate the trend growth in productivity using aggregate data. … The Office for Budget Responsibility (OBR) in the UK and the Congressional Budget Office (CBO) in the US follow similar approaches for generating its forecasts of productivity based on average historical growth rates as well as judgments about factors that may cause productivity to deviate from its historical trend in the short-term. Alternative approaches include forecasting aggregate productivity using disaggregated firm-level data … and using time-series models."

This leaves the important issue of the historical timeframe over which the trend rate of growth should be calculated, and judgements to be made about other factors that could cause deviation from past trends, but confirms that the use of historical trend is common practice for forecasting productivity.

In applications of productivity forecasting in economic regulation, the historical average growth rate is widely used. Lowry and Kaufmann (2002) describe the North American approach to performance-based regulation, in which utility price movements are constrained by a price cap index (PCI). The PCI can be formulated in a variety of ways, with one approach being for the PCI for each forthcoming year to be calculated using a formula using recent actual movements in an index of input prices and on the historical trend in productivity. The productivity trend component may be based on a rolling average of recent firm-specific outcomes, or the long-term industry TFP trend, with the latter being typical. For example, Pacific Economic Group (PEG) forecast productivity growth based on the long-run average rate over its sample period of 11 years (PEG 2007, p.22).

In Australian regulation of electricity distribution, the AER has adopted a forecast opex productivity factor of 0.5 per cent per year, based in part on historical time trend for opex productivity in the gas distribution industry and historical opex PFP trends in the electricity distribution industry (AER 2019).

Kaufmann (2010, p.14) finds that "observed data from Victoria and other jurisdictions shows that this longer-trend trend [in the TFP index] is in fact relatively stable". According to Lowry and Getachew (2009a, p.328): "The recent long run trend in an industry's TFP is often, if not always, a good proxy for the prospective trend over the next several years". These authors specifically recommend the approach of separating the effects of technical change, returns-to-scale and the catch-up effect on which our approach is based. In this approach, only the technical change component of productivity changes is forecast based on its historical trend.

We have shown that using historical trends of estimates of the rate of technical change is a widely used method for aggregate productivity projections by official agencies, and also for determining productivity factors in economic regulation plans. MJA has not mentioned what method of forecasting technical change it considers superior to relying on a historical trend. Therefore, we must reject MJA's claim that such methods are 'backward-looking' as being unfounded.

4.2 Is there a change in the rate of opex productivity in recent years?

> *"[T]he stochastic frontier model should be tested with two time variables to reflect the structural change that may be present for the first and last half of the total time period. However, it is noted that this addition may not to be necessary if the time invariant and time decay restrictions are removed from the model." (p.48)*

MJA recommends that further econometric analysis be carried out to establish whether there is a structural break in the time trend of opex productivity during the period 2006 to 2020. They propose that the sample period should be arbitrarily divided into two halves using a dummy variable and applying this to the time-trend variable to yield separate estimates of the rate of technical change in each of the two sub-periods. This is an inappropriate procedure because assumes that the timing of a possible structural break is known. The usual approach to testing for a structural break involves: (i) testing for a structural break of unknown timing; and (ii) estimating the timing of the structural break if one is found (Hansen 2001).

We investigate this question using a more general approach, by estimating the SFA variable cost function for the period from 2006 to 2020 with a change in specification following Baltagi and Griffin (1988), which is used to estimate a fully general index of opex productivity for the urban water industry. Rather than including a time trend variable to estimate a constant average rate of opex productivity change, in this specification there is a separate dummy variable for each year in the sample (except the first year). In all other respects the models are the same as those presented in Table 4.1 of the benchmarking report. The model estimated is specified as:

$$\ln VC_{it} = \beta_0 + \beta_1 \ln x_{k(i,t)} + \sum_{m=1}^{M} \phi_m \ln q_{m(i,t)} + \sum_{n=1}^{N} \gamma_n z_{n(i,t)} \qquad (4.1b)$$

$$+ \sum_{s=2}^{15} \lambda_s D_{s(i,t)} + u_{(i,t)} + v_{(i,t)}$$

using the same notation as equation (4.1) of the benchmarking report, and with $D_{s(i,t)} = 1$ if $t = s$, and equals zero otherwise. The estimated models are presented in Appendix C. The estimated λ coefficients are similar for the two estimated models (ie, using the real financial capital measure and the physical capital measure).

We aim to compare the time-varying technical change estimated using this model with the constant rate of technical change estimated using the model shown in Table 4.1 of the benchmarking report.[16]

Using the Baltagi-Griffin specification, the coefficients on the dummy variables for years (ie, the λ) yield a time-varying index of opex technical change (P). This index has a value of 1.0 in year 1 (2006), and in each subsequent year is:

$$P_t^{PG} = \exp(-\lambda_t), \qquad t > 1$$

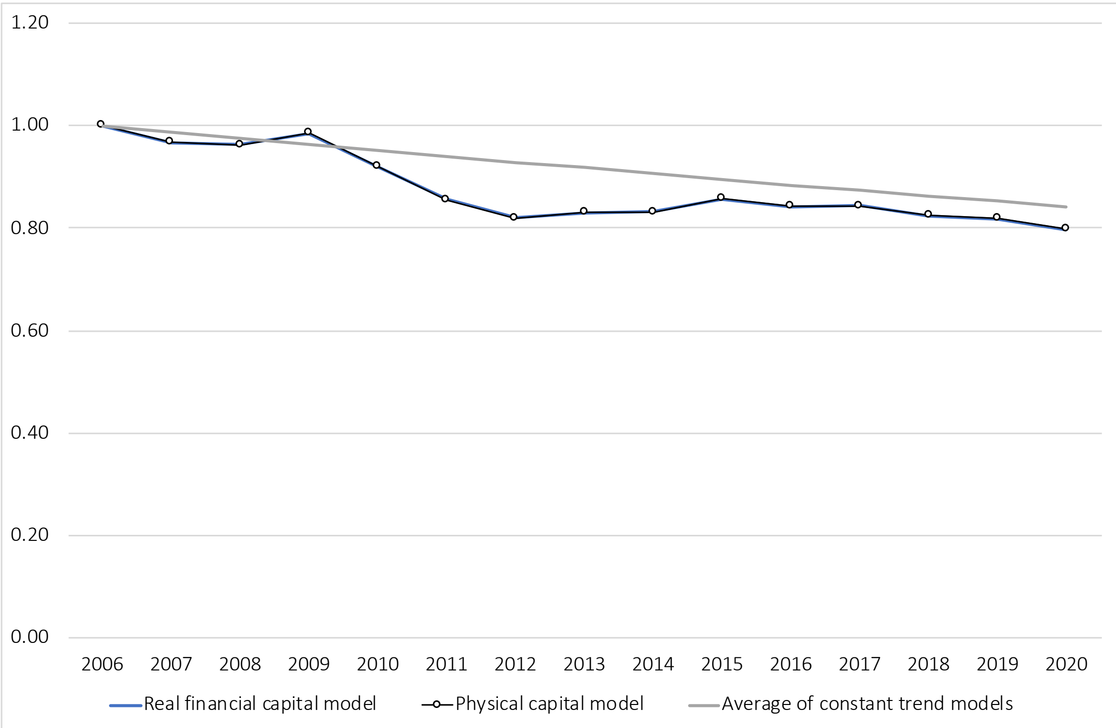
[16] This does not include the effect of the industry 'catch-up' effect via the time-varying decay terms.

This can be compared to an index calculated from the constant trend model, which again has a value of 1 in 2006 and in each subsequent year is:

$$P_t^{CT} = P_{t-1}^{CT} \exp(-\lambda), \qquad t > 1$$

These indexes also need to be adjusted for the industry-wide catch-up effect.[17] Figure 1 shows the resulting time-varying opex productivity index compared to the constant trend case from the average of the two models in the benchmarking report.

Figure 1: Industry opex cost efficiency underlying trend



Source: Quantonomics analysis.

Key observations:

- The two models with a time-varying opex technical efficiency index generate almost identical generalised indexes of technical change.
- The average decline in opex technical change is slightly greater when the generalised index of technical change is used.
- Over the recent period from 2015 to 2020, the average rate of decline in the generalised index of technical change is very close to the constant trend rate of change.

[17] That is, $P_t^j \times I_t^j$, where j represents the model, and $I_t^i = I_{t-1}^i \exp(\eta^j \bar{u}^j)$, for $t > 1$, and is equal to 1.0 for $t = 1$.

It can be seen that the generalised index of technical change dipped below trend in the period 2010 to 2014. Consequently, calculating an average with an end-point in that period will produce a misleading estimate of the recent trend. This is clearly shown by the fact that from 2015 to 2020, the generalised index of technical change declines at an average rate of 1.5 per cent per year, which is similar to:

- the average rate of decline of the same index over the period 2006 to 2020, which is 1.6 per cent per year;
- the constant rate of decline of the constant trend model, which is 1.2 per cent per year.

This analysis demonstrates that MJA's claim that the industry-wide productivity trend declined sharply in the first half of the sample period and then improved in the second half of the sample period is not supported by empirical analysis.

4.3 Other evidence of decline in water industry productivity

> *"A further concern is that the growth rate of -0.9 per cent per annum used by Quantonomics for the industry wide component appears to be too low when considering the movement in the index in recent years." (p.45)*
>
> *"In relation to productivity growth, using the Quantonomics results as they stand, our assessment of the Quantonomics modelling indicates that productivity growth rate should be 1.4 per cent per annum allowing for a 10 year adjustment period. A higher value (2.4 per cent) could be used assuming a shorter adjustment period." (p.38)*

In our benchmarking report we stated (p.50)

> With industry-wide Opex PFP having declined slowly over the period 2006 to 2020, there are clearly difficulties in forecasting industry-wide Opex PFP trends over the next five years. … in our view, since the reasons for declining productivity are not well understood, the likelihood that such underlying trends may continue should not be lightly dismissed. The results suggest that a forecast industry productivity trend of zero per cent would be optimistic, whilst a continued decline at –0.9 per cent per year is quite possible.

MJA draws from the Quantonomics study, applies its own judgement, and forms an opinion about the future trend of industry-wide productivity. Little attention is given to other relevant sources of information on productivity trends, which might reasonably be used to inform judgements on the appropriate industry-wide component of the opex productivity factor.

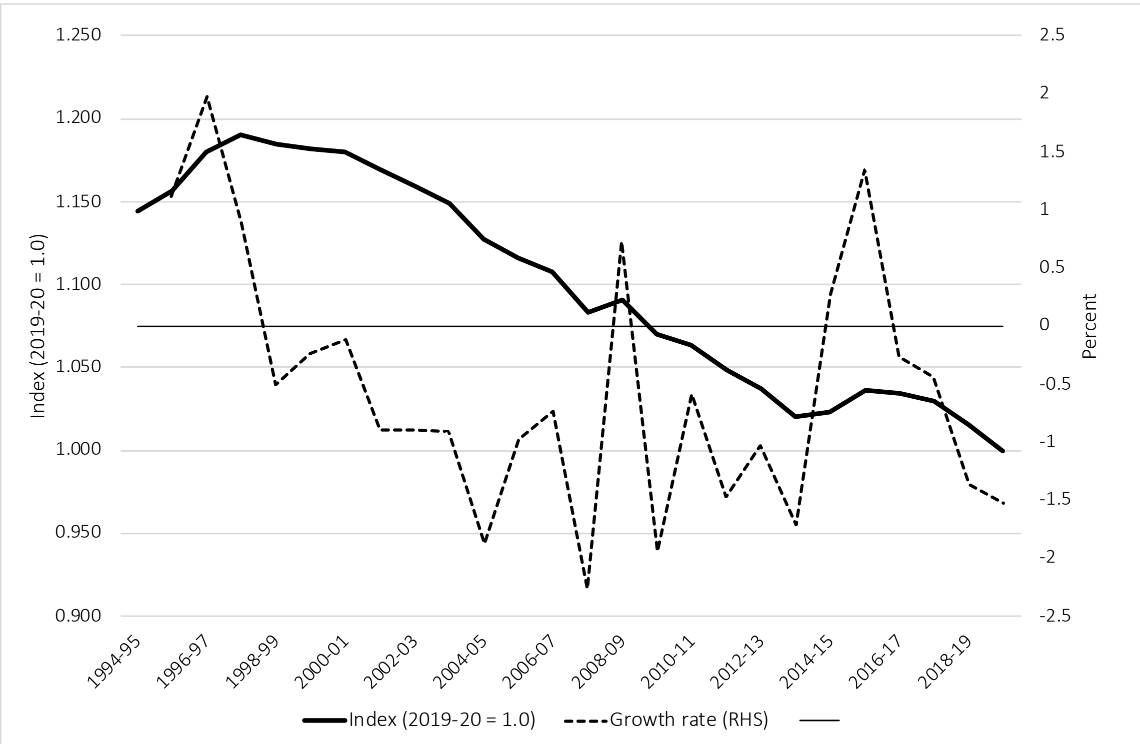
This section reviews a range of productivity estimates, including by the Australian Bureau of Statistics (ABS) for the Australian Electricity, Gas Water and Waste (EGWW) industry and the Productivity Commission's (PC) analysis of the Water industry component of that sector. Also reviewed are productivity studies of urban water businesses produced or commissioned by economic regulators, the Independent Pricing and Regulatory Tribunal (IPART) and the

Essential Services Commission of Victoria (ESC). All show a large and ongoing decline in the productivity of the urban water industry. We also consider the reasons for the ongoing water productivity decline which are discussed in some of those studies.

4.3.1 Relevant studies by the ABS and PC

The finding of an average decline in the opex productivity of the Australian urban water industry is not unusual. The ABS produces estimates of multifactor productivity (MFP) for Australian industry sectors, including the EGWW sector. The most pertinent measure for comparing the results with industry productivity studies is Gross Output based MFP.[18] Figure 2 shows the trend in the MFP index and the annual growth rates for the EGWW sector published by the ABS. The MFP index for the EGWW sector has almost continuously declined since 1997-98. Over the last 22 years, there have only been three years with positive MFP growth. And between 2005-06 and 2019-20, the average rate of change in the MFP index is –0.8 per cent per year.

Figure 2: Trend is EGWW Total Factor Productivity



Data source: ABS 5260.0.55.004 Estimates of Industry Level KLEMS Multifactor Productivity, Table 4.

[18] MFP is synonymous with total factor productivity (TFP). For the EGWW sector, the KLEMS Multifactor Productivity index (Australian Bureau of Statistics 2021b) produces almost identical results to the Gross Output based MFP index on quality-adjusted hours worked basis (Australian Bureau of Statistics 2021c).

Unfortunately, there is limited current research on the reasons for this productivity decline. In a now-dated PC staff paper, Topp and Kulys (2012), examined the reasons for the decline in EGWW productivity over the period 1997-98 and 2009-10. Using the same data and methods as the ABS, the study examined the largest subdivisions of the EGWW industry; (a) Electricity supply and (b) Water supply, sewerage and drainage services (WSSD); and (c) Gas supply. The study found that WSSD productivity increased strongly from the mid-1980s to the late 1990s, but was generally negative over the period from the late 1990s to 2009-10. The decline in MFP from the peak of around 1997-98 through to 2019-10 was found to be greater in the WSSD industry than in the wider EGWW sector.

Topp and Kulys identified some of the factors that substantially impacted productivity in the WSSD sector in the period examined; (i) restrictions on water use in response to drought conditions; (ii) stricter sewage treatment standards; (iii) cyclical investment patterns, and (iv) a shift to higher-cost sources of new water supplies. The authors warned that if the reduced household water consumption in the drought years (through water-saving initiatives and changes in attitudes to water use) persists as a structural demand change, the recovery of productivity may take a long time. In addition to the uncertain effects of long-term changes in the structure of electricity demand, the study also highlighted the possible effects of government policies (including as owners of water utilities), regulatory settings and external shocks (especially shifts in weather patterns associated with climate change). Developments of these kinds can require additional investments, reduce utilisation or alter the maintenance costs of existing assets, or impose new sources of operating costs.

This reference to long-term movements in weather patterns raises the issue of climate change. A report by the National Water Commission in 2012 observed that water utilities are likely to incur climate change-related costs, such as adapting to lower and more variable water availability and mitigating risks associated with possible climate events (National Water Commission 2012, pp.xiii–xiv).

4.3.2 Studies by or for regulators

An investigation of productivity trends of NSW state-owned corporations in the urban water sector was carried out by IPART (2010). The study found that after 2003-04, the productivity of both Sydney Water and Hunter Water decreased substantially. IPART said (p.25):

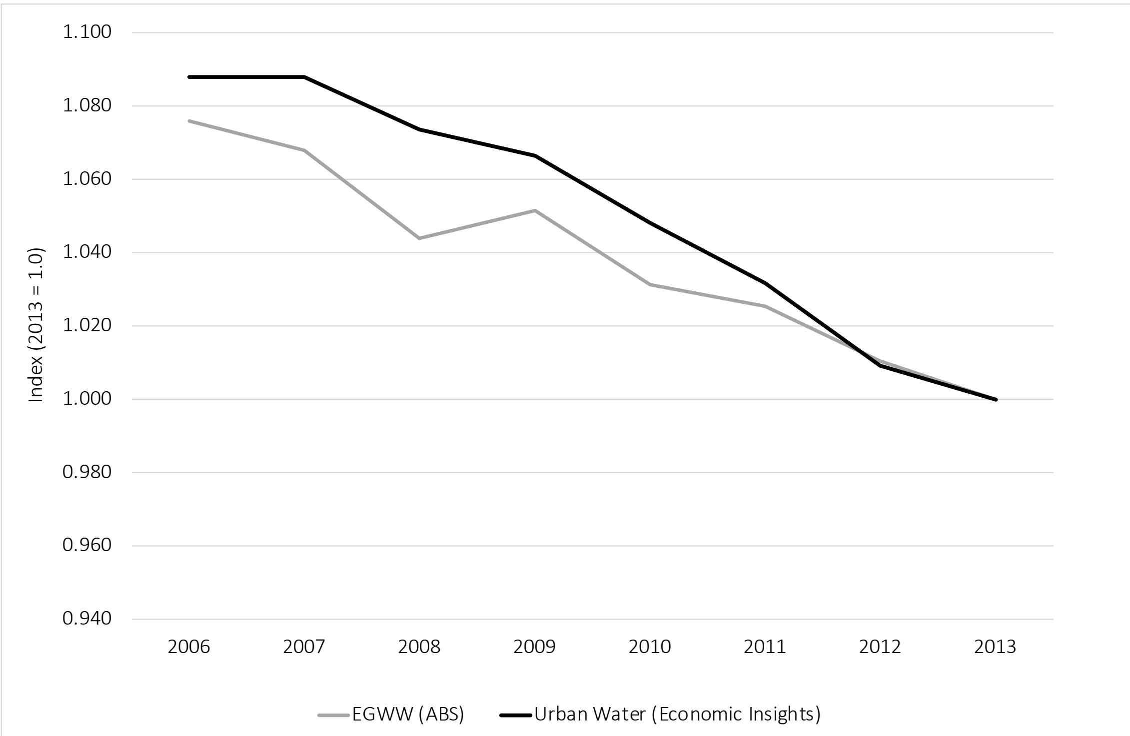
> "Indicators of Sydney Water and Hunter Water's compliance with their water quality, water security, environmental and other requirements show that they met all key requirements over the analysis period. We note that increases in these requirements, some of which are set out in their licences and others in government policies, were the main driver of the increases in their capital expenditure."

IPART predicted that there would be further deterioration of productivity due to these factors, observing that "the quality of planning and decision making on the public policy objectives that drive their expenditure will be critical for future productivity performance" (p.25). Policy requirements or standards are significant drivers of cost for urban water corporations, but the benefits are not included in the outputs used for productivity measurement. Indeed, since water businesses are almost all government-owned, policy requirements in relation to water services can be ubiquitous and often not transparent.

IPART also observed that urban water businesses often operate under policies to conserve water and reduce per-capita consumption, and hence when outputs include water volumes supplied, then in this aspect of their operations they are actually working to reduce productivity. Even though IPART did not include water volumes as an output measure, it still observed the productivity declines after 2003-04 mentioned above.

Another study of urban water productivity was done by the ESC (2012a), which involved an econometric analysis of the Translog distance function using stochastic frontier analysis (SFA). It used a large sample of urban water utilities represented in the National Water Report and earlier statistical publications of the Water Services Association of Australia (WSAA). The study estimated the industry average rate of change in TFP over the period 2006 to 2010 at –0.5 per cent per year. A subsequent study for the ESC by Economic Insights (2014a) estimated that for the period 2006 to 2013, the industry average annual rate of TFP change was –1.2 per cent per year. Figure 3 compares the trend in the TFP index derived in the Economic Insight study against the ABS's productivity index for the EGWW sector.

Figure 3: Trends in Urban Water and EGWW Total Factor Productivity



Data source: Economic Insights (2014a, p.35), ABS 5260.0.55.004.

4.3.3 Discussion

Since the foregoing studies of urban water productivity were conducted, productivity in the broader EGWW sector has mostly continued to decrease (with the exception of 2014-15 and 2015-16). Given the importance of the water industry in the EGWW sector and the reported findings that in the past the productivity trends in the water industry have been similar to the EGWW sector, there is every reason to conclude that more recent trends in EGWW MFP are likely to provide a reasonable guide to water industry productivity trends. The finding of the Quantonomics study of an average decline in the opex productivity of the Australian urban water industry is consistent with this expectation and with the results of previous studies.

Explanations of productivity movements at aggregate levels such as an industry are inherently difficult. In principle, productivity movements represent a combination of the internal performances of firms and external factors that cannot easily be observed, such as technology change or changes in standards, policies or regulations, to name just a few. The foregoing discussion has highlighted some of the external factors that may be impacting urban water industry productivity trends:

- long-term changes in household water demand patterns, particularly towards greater conservation of water use (eg, the installation of increasingly water-efficient household dishwashers and washing machines);
- climate change-related costs, such as adapting to lower and more variable water availability, and mitigating risks associated with possible climate events;
- increases in the marginal costs of water sources or supply infrastructure in the context of population growth and water security concerns associated with climate change;
- changes in regulatory settings or government policies impacting urban water industry productivity, which may include:
  - higher drinking water quality standards or compliance enforcement;
  - higher service quality standards;
  - higher safety, security of supply or technical standards;
  - greater emphasis by water businesses on environmental or social objectives; or
  - increases in regulatory compliance and policy-engagement costs.

Most of these factors are difficult to measure or explicitly incorporate into a productivity analysis. They only appear in the 'residual'—that is, the measured trend in underlying productivity of the sector.

MJA's comment that "industry wide component appears to be too low" is not reflective of the available empirical evidence. Our results are consistent with those of the previous studies we have reviewed in this section. MJA has not indicated that it had regard to other productivity analyses of the sector in assessing the reasonableness of our results. There is good reason for our opinion that "a forecast industry productivity trend of zero per cent would be optimistic, whilst a continued decline at –0.9 per cent per year is quite possible" (Quantonomics 2022, p.50).

MJA's opinion that the water industry productivity trend is likely to be positive over the forthcoming regulatory period is one of two key planks in its recommended productivity factor of 1.4 per cent per year. We have shown that MJA's forecast of future growth in water industry productivity of 0.3 per cent per year is unrealistic and at odds with the available evidence on water industry productivity trends.

4.4 Summary comments

We have shown that even though MJA rejects that use of the Opex PFP for the purposes of ascertaining productivity trends, and also rejects forecasts as 'backward-looking' if they rely on the extrapolation of historical trends, MJA actually relies on the trend in the Opex PFP index over the 2013 to 2020 period to derive its key conclusion on the likely future trend of industry-wide opex productivity growth. MJA has therefore applied a method which it has expressly rejected as unsound.

We show that using historical trends of estimates of the rate of productivity change is a widely used method for aggregate productivity projections by official agencies, and also for determining productivity factors in economic regulation plans. We have also argued that the arbitrary selection of a sample sub-period for averaging can be misleading if one of the chosen end-points is in some way unrepresentative, and therefore strongly influences the average growth rate.

For the purpose of assessing MJA's claim that there has been a change in the trend of opex productivity during the sample period (from sharp decline in the first half of the period, to slow growth in the second half) we have estimated the benchmarking model with a different parameter for technical change in each year, rather than a single time trend. Instead of a single average rate of technical change, this alternative approach yields a generalised index of technical change, with a different rate in each year. Using this approach, we show that MJA's supposition about a change in trend of opex PFP is not borne out by this empirical analysis. On the contrary, the rate of technical change over recent years has closely tracked the long-term average for the whole sample period.

This section has also surveyed a range of other analysis of productivity trends relevant to the water industry. The results of our study are consistent with those of the previous studies we have reviewed in finding a large and ongoing downward trend in productivity in the water industry over an extended period encompassing the sample period used in our study. This survey provides solid grounds for our opinion, expressed in the report, that "a forecast industry productivity trend of zero per cent would be optimistic, whilst a continued decline at –0.9 per cent per year is quite possible" (Quantonomics 2022, p.50). This evidence is also inconsistent with MJA's claim that our finding for the "industry wide component appears to be too low".

This survey shows that MJA's forecast of future growth in water industry productivity of 0.3 per cent per year is unrealistic and at odds with the available evidence on water industry productivity trends.

5 Forecasting Icon Water catch-up productivity

The second key plank of MJA's recommended productivity factor of 1.4 per cent per year is its rejection of the proposed target efficiency threshold of the 67th percentile, in favour of a threshold of the 75th percentile. This would result in an increase in the 'catch-up' component of the productivity factor from 0.8 per cent per annum to 1.1 per cent per annum. With regard to the timeframe over which this threshold is to be achieved, MJA does not reject our proposed 10-year timeframe. MJA calculates the 'catch-up' component for both 5-year and 10-year timeframes, and while they note that a five-year period would align with the regulatory period, they express uncertainty over whether the 75th percentile would be achievable within a 5-year period (which would imply a catch-up factor of 2.1 per cent per annum).

We will argue in section 5.1 that MJA has made a fundamental error in its argument for the 75th percentile target based on the AER's practice in electricity network regulation. When this error is rectified, it is seen that this precedent supports our recommended 67th percentile threshold. In section 5.2 we discuss important considerations relevant to the timeframe over which the threshold can feasibly be achieved. These considerations support our recommended catch-up period of 10 years.

5.1 The threshold 67th percentile

> *"A further issue with the approach of Quantonomics is the choice of the 67th percentile to set the target for future efficiency gains. As an arbitrary target, the choice of percentile could be set at a higher level. For example, the AER has previously used the 75th percentile to define an efficient benchmark for electricity distribution companies. Applying the 75th percentile results in a productivity catchup rate of 1.1 per cent per annum, noting the caveats with the time invariant specification of the stochastic frontier model." (pp. 47)*

Although we accept that there is a considerable degree of judgement in the proposed standard of comparison at the 67th percentile, we do not accept that it is arbitrary (as stated in the quote above) since we did provide some reasoning in support of that recommendation. We discuss that reasoning below. A more significant issue is that MJA has incorrectly characterised the AER's used of benchmarking efficiency scores. The AER uses an *efficiency score* of 0.75 as a comparator point, not the 75th percentile. We will first elaborate on MJA's error and then revisit the reasons we gave in support of using the 67th percentile.

In its 2021 Jemena decision, the AER states: "The best possible efficiency score is 1.0. We use a 0.75 *comparator point* to assess the relative efficiency of distribution businesses" (Australian Energy Regulator (AER) 2021b, pp.6–19). In its 2021 benchmarking report for electricity distribution network service providers (DNSPs), the AER says that it compares "the efficiency scores of individual DNSPs against a benchmark *comparison score* of 0.75 (adjusted further for OEFs …" (AER 2021a, p.60). The AER does say that the comparator efficiency score of 0.75 "reflects that we consider the upper quartile *of possible efficiency scores* are efficient" (Australian Energy Regulator (AER) 2020, pp.6–37, emphasis added). The range of *possible* efficiency scores is from 0 to 1. This does not refer to the distribution of the estimated *actual* efficiency scores of the 13 DNSPs the AER benchmarks (which is not uniformly distributed over the interval from 0 to 1).

The estimated efficiency scores for all DNSPs, including most importantly the averages over four econometric models, are published in the benchmarking reports. The 2021 results for average efficiency scores using the sample period 2006 to 2020 are presented in Economic Insights (2021, p.30, Table 3.4, last column).[19] The average of the efficiency scores is 0.69; the 67th percentile score is 0.77; and the 75th percentile score is 0.80. Hence, the AER's threshold efficiency score of 0.75 *corresponds to a percentile less than the 67th percentile*.

The AER's practice in electricity distribution recognises that the comparative efficiency scores obtained in benchmarking studies are subject to significant measurement error, and need to be applied with appropriate caution. Their use of a threshold less than the 67th percentile in electricity distribution strongly supports our proposed use of the 67th percentile for Icon Water.

We now turn to reasons for choosing a particular comparator standard. Lowry & Getachew (2009b) provide a useful discussion of standards of comparison in benchmarking. "While it is possible to use frontier benchmarking methods to implement the competitive standard, care must be taken in determining the reference performance against which firms are evaluated. This requires the adjustment of benchmarks from frontier methods to reflect performance some distance from the estimated frontier" (Lowry & Getachew 2009b, p.1328). The 75th percentile score is one of the possible comparator standards. Our report explains why we suggested the 67th percentile may be an appropriate benchmark standard for the urban water industry. We stated: "The choice of standard should also have regard to the degree of diversity or heterogeneity of comparator firms, with higher thresholds being less reliable for more diverse groups of firms, as is the case in Australia where many [water] utilities are not price regulated, have wide variation in their scale of operation, and differ in their structure and ownership (eg, as part of local governments or as state-owned enterprises)" (Quantonomics 2022, p.44).

[19] The AER also uses efficiency scores estimated over the shorter 2012 to 2020 period, but for brevity we refer here only to those for 2006 to 2020.

5.2 Catch-up period

> *"…a more reasonable value would be 1.4 per cent per annum allowing for a 10-year adjustment period. A higher value (2.4 per cent) could be used assuming an adjustment period of 5 years (which would be consistent with the length of the regulatory pricing period. However, it is unclear whether this is achievable within the 5-year forecast period. The recommended adjustment using a 5 year or 10 year transition period is shown in Table 19". (p.48)*

Our benchmarking report suggested a 10-year period for Icon Water to catch up to the 67th percentile. MJA presents results for both 10-year and 5-year catch-up periods, but gives greater emphasis to the longer period. In this section we discuss some of the relevant considerations that inform a reasonable catch-up period.

The urban water industry has particularly long-lived assets, with average lives of 50 years or more. As observed by Lawrence and Diewert (2006, p.235), the capital-intensive nature of infrastructure businesses can restrict the rate at which productivity gaps can be bridged, and "a time frame of a decade, or two five-year regulatory periods, is likely to be necessary for businesses performing near the bottom of the range to lift themselves into the middle of the pack" (Lawrence & Diewert 2006, p.235).

A related, but distinct, consideration is the amount of capital expenditure relative to the overall asset base. Coelli *et al.* (2003, pp.100–101) note:

> "One factor to keep in mind when assessing a firm's ability to achieve a particular X-factor is to look at the amount of new investment in capital that is planned for that firm over the next regulatory period (usually five years). The point is that technical change can be both embodied and disembodied, and a firm that has significant investment plans, either because of demand growth or because of replacement of existing capital, will find that TFP growth is easier to achieve than a firm that has less planned investment activity."

When capital is long-lived and not subject to substantial rates of replacement, this will influence not only the ability to improve the productivity of capital inputs, but also the ability to improve the productivity of non-capital inputs, much of which is tied to the operation and maintenance of existing plant and equipment.

For these reasons, our suggested catch-up period of 10 years is reasonable, and a shorter catch-up period would be likely to impose excessive risk.

5.3 Summary comments

We have shown that MJA has made an error in claiming that the AER uses the 75th percentile target in electricity network regulation. The AER uses a 0.75 *comparator score* to assess whether a distribution business is inefficient. The AER's threshold efficiency score of 0.75 *corresponds* *to a percentile less than the 67th percentile*. This strongly supports our proposed use of the 67th percentile.

We have also discussed important considerations relevant to the timeframe over which the threshold can feasibly be achieved. Key considerations are the longevity of assets, since businesses with long-lived assets will find it more difficult to improve productivity when part of its opex is related to the operation and maintenance of existing plant and equipment. The rate of capex relative to the capital stock can also be important, since embodied technical change may be more concentrated when a higher proportion of 'lumpy' capital is replaced. The water industry has particularly long-lived assets and therefore, these considerations support our recommended catch-up period of 10 years.

6 Precedents in other regulatory decisions

> *"An overall productivity growth of 1.4% is consistent with the minimum expectations for Victorian water business set by the Essential Services Commission for their 2023-28 operating expenditure forecasts. It is also comparable to the Office of the Tasmanian Economic Regulator's recent decision for TasWater which applied an annual productivity growth rate of 1.5% to its operating expenditure forecasts."*

In drawing examples of productivity adjustment factors adopted by other regulators, MJA has selected for comparison just one regulatory decision (Office of the Tasmanian Economic Regulator (OTTER) 2022), together with another regulator's stated expectation in preliminary guidance material prior to receiving proposals and undertaking consultations (Essential Services Commission (ESC) 2021). We will argue that:

- the narrowness of these comparisons gives a distorted picture of the pattern of recent regulatory decisions on urban water productivity factors, and
- the ESC example, which should be based on actual decisions, ignores the fact that productivity factors applied to Victorian metropolitan water utilities relate to a much narrower concept of 'controllable' opex due to their greater degree of vertical separation compared to other comparators.[20]

MJA also argues that the recommended productivity adjustment factor for Icon Water "is materially less than the productivity growth adjustment applied in the current regulatory period of 1.75 per cent" (Marsden Jacob 2022, p.42), which was put forward by Icon Water for the 2018–2023 period and accepted by ICRC (Calibre 2018, p.58). We see no reason why

[20] It is also important to note, and relevant when we come to compare actual productivity factors of Victorian water businesses to other water businesses, that the ESC provides offsetting benefits to water businesses that propose ambitious opex productivity targets by providing a higher return on equity in its rate of return decisions. The implications of this for comparisons is briefly noted in the discussion below of the ESC's 2018 decisions for the three Melbourne metropolitan water businesses.

a productivity forecast made five years ago for the 2018–2023 period should be regarded as an appropriate forecast of Icon Water's productivity trend for the 2023–2028 period. For example, it may have included some known areas of productivity improvement which are since exhausted. Or it may be been based on different expectations about industry-wide productivity change at that time.

6.1 Summary of recent relevant regulatory decisions

This section summarizes a number of decisions of Australian regulators on productivity adjustment factors for water businesses, focussing only on large urban water businesses subject to independent regulation. The Queensland Competition Authority (QCA) does not regulate urban retail water businesses,[21] and the Economic Regulation Authority (ERA) in Western Australia does not regulate the Water Corporation.[22] The non-Victorian comparators include:[23]

- *Sydney Water*: with IPART determining annual productivity factors of 0.75 per cent in 2016, and 0.8 per cent in 2020;
- *Hunter Water*: with annual productivity factors of 0.25 per cent in 2016, and 0.8 per cent in 2020;
- *TasWater*: with OTTER determining annual productivity factors of 1.5 per cent in both 2018 and 2022;
- *SA Water*: with the Essential Services Commission of South Australia (ESCOSA) establishing annual productivity factors of 1.25 per cent in 2016, and 0.5 per cent in 2020.

These productivity factors are generally applied to 'controllable opex', and for most of these businesses the majority of opex is controllable. For all of these water businesses with the exception of Sydney Water, controllable opex appears to account for close to 100 per cent of total opex. For Sydney Water approximately 68.5 per cent of opex was controllable in 2016 (IPART 2016a, p.81) and 73.0 per cent in 2020 (IPART 2020a, p.36).

In the ICRC's application of the base-step-trend method, the productivity factor is applied to total controllable opex, including across bulk water supply, distribution and retailing services.[24]

[21] http://www.qca.org.au/project/urban-retail-water/.

[22] https://www.erawa.com.au/water.

[23] In all cases, the productivity adjustment factor includes both frontier shift and catch-up when these two components are explicitly identified. If the productivity factor varies over the regulatory period, the average is used.

[24] For Icon Water, controllable opex was 76.7 per cent in 2018 (Calibre 2018, p.46). We treat Icon Water and Sydney Water, Hunter Water, TasWater and SA Water as being comparable in the sense that the majority of their opex is controllable.

We now turn to the Victorian metropolitan urban water businesses. As noted by MJA, the ESC (2021, p.82) suggests that it would expect a 'standard submission' for opex would incorporate a rate of efficiency improvement of approximately 1.4 per cent per year, similar to the average for such businesses in the 2018 water price review. However, one needs to look at the *actual* 2018 decisions to get a clear understanding of the comparative productivity factors that were actually applied over the five-year period 2018–2023, which are more reliable comparators than a statement of expectations.

Table 1 shows a summary of the stated productivity factors used by the three Victorian metropolitan water retailers in 2018 under the PREMO ("performance, risk, engagement, management and outcomes") framework (ESC 2016a). These factors apply to metropolitan water businesses' 'controllable cost', which is opex minus charges from Melbourne Water for bulk potable water supply and wastewater treatment, and minus licence fees and the Government Environmental Levy. The charges from Melbourne Water represent a large part of the operating costs of Melbourne water businesses, whereas Icon Water has a vertically-integrated structure.

Table 1: Metropolitan Melbourne urban water PREMO decisions 2018

Utility	*Productivity factor (%)*	*Controllable opex (% of total)*	*Comparative productivity factor (%)*
City West Water	2.0	22.6	0.45
South East Water	2.3	19.0	0.44
Yarra Valley Water	2.5	20.1	0.50

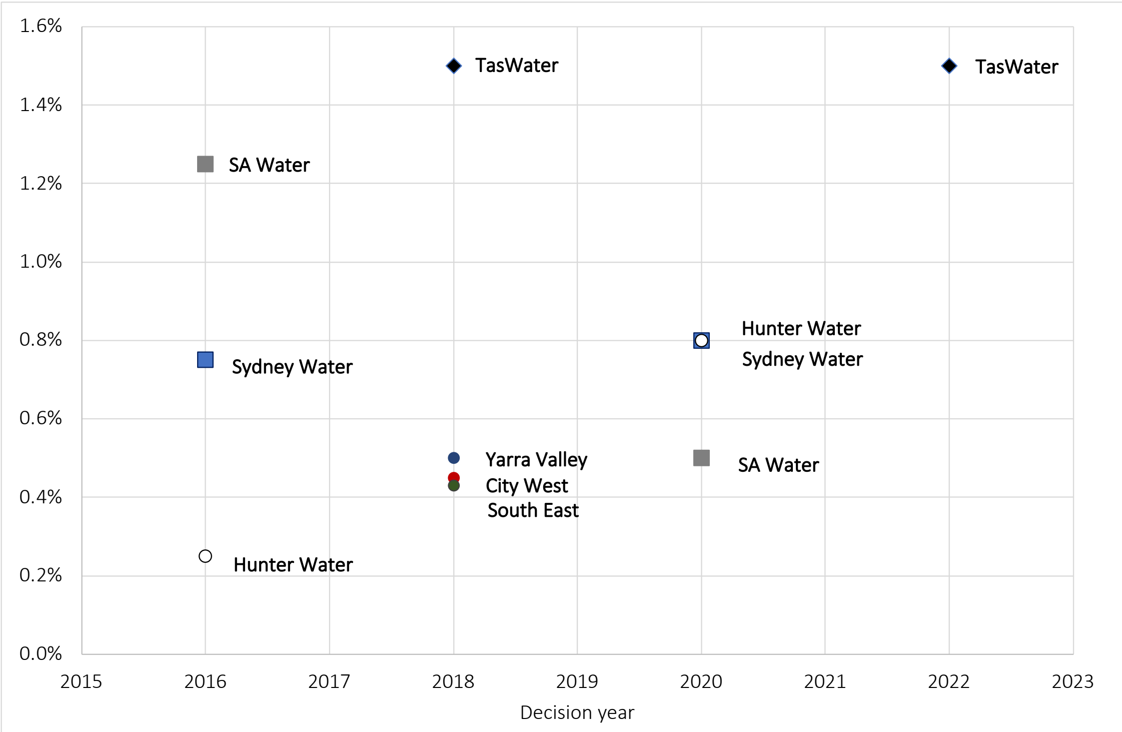
Sources: ESC (2018a, pp.10–13, 2018b, pp.11–14, 2018c, pp.11–14)

The regulatory decision applicable to Melbourne Water at the time these decisions were made, applying to the 2016–2021 period, did not have any opex productivity adjustment factor; and incorporated some significant opex increases due partly to the increased costs of the pollution response and waterways and drainage services (ESC 2016b). Hence, to provide a relevant comparison to Icon Water, the productivity factors of the three urban water distributors need to be multiplied by the percentage of their opex which was 'controllable' opex. Table 1 shows this calculation, and the comparative productivity factor for these three urban water businesses ranged from 0.45 to 0.50. MJA's reference to the ESC's expectation of 1.4 per cent is misleading because it fails to acknowledge that for metropolitan Victorian water businesses, controllable opex represents only a comparatively small proportion of total opex.[25]

[25] This calculation does not make any adjustment for the fact that all three Melbourne metropolitan water businesses were rated by the ESC as having Advanced proposals, and it is our understanding that they consequently received a higher return on equity (ROE) than water businesses with proposals rated as Standard. This was a substantial benefit, with the indicative difference in ROE between a Standard and an Advanced proposal being an increase from 4.5 per cent to 4.9 per cent (ESC 2016a, p.13). Hence, these businesses received some financial benefit in part for their ambitious productivity proposals. If that part of the ROE uplift attributable

Figure 4 summarises the decisions of Australian regulators on productivity adjustment factors for water businesses discussed above. This includes the comparable productivity factors for Victorian metropolitan urban water businesses shown in Table 1, as well as TasWater, Sydney Water, Hunter Water and SA Water. Figure 4 shows the opex productivity factor applied in eleven recent regulatory decisions for the seven closely comparable large urban water businesses.

Figure 4: Regulator decisions on Opex Productivity Factors



Data sources: OTTER (2018, p.140, 2022, p.41), ESCOSA (2016, p.89, 2020, p.204), Atkins and Cardno (2016, p.16), IPART (2016b, p.53, 2020b, p.45, 2020a, p.36); and Table 1.

Figure 4 shows that the one actual regulatory decision that MJA referred to, namely TasWater's in 2022, is at the top of the range of productivity factors determined by Australian regulators for major urban water businesses in recent years. Similarly, the productivity adjustment factor of 1.4 per cent recommended by MJA is also at the upper end of the range of decisions for closely comparable businesses. The average of the 11 decisions for major water businesses as shown in Figure 1 is 0.8 per cent. The productivity factor we proposed 0.5 per cent per year is much closer to the average of these regulatory decisions than MJA's recommended productivity factor.

to the more ambitious productivity proposals could be identified and removed from the opex savings, the effective productivity adjustment would be smaller.

6.2 Concluding comments

MJA used only single actual regulatory decision, and one statement of expectations, when referring to the decisions on urban water businesses on productivity factors. In this section we have examined a much wider range of decisions relating to major Australian metropolitan urban water utilities from 2016 to 2022. We have shown that:

- MJA's refers to the ESC's expected annual productivity factor of 1.4 per cent in recent guidance material. This reference is misleading because it fails to acknowledge that with their vertically-separated structure, the controllable opex of the metropolitan Victorian water businesses represents only on average approximately 20 per cent of total opex. In the latest actual regulatory decisions for these businesses in 2020, the average productivity factor was approximately 2.3 per cent per annum, but there was no corresponding productivity factor for Melbourne Water. Hence, the effective productivity factor was, on average, approximately 0.5 per cent per annum—considerably lower than that suggested by MJA.
- Eleven regulatory decisions are presented for seven major metropolitan urban water businesses from 2016 to 2022. This survey shows that the only actual regulatory decision that MJA referred to, namely TasWater's in 2022, is at the top of the range of productivity factors determined by Australian regulators for major urban water businesses in recent years. Similarly, the productivity adjustment factor of 1.4 per cent recommended by MJA is also at the upper end of the range of decisions for closely comparable businesses. The average of the 11 decisions for major water businesses as shown in Figure 1 is 0.8 per cent. The productivity factor we proposed 0.5 per cent per year is much closer to the average of these regulatory decisions than MJA's recommended productivity factor.

7 Conclusions

This section begins by addressing one further criticism of our study by MJA (in section 7.1), and then provides a summary of the main conclusions of the foregoing sections (section 7.2).

7.1 Usefulness of benchmarking in water industry regulation

> *"The approach used in the Quantonomics report is similar to the approach used in the electricity sector, but it has rarely been applied in the water sector." (p.37)*

The statement might be interpreted as insinuating that the application of benchmarking methods in water industry regulation is novel, and ought to be accorded less weight because of that. Benchmarking studies are not entirely novel in water industry regulation, since we have noted that the ESC has previously carried out benchmarking analysis of Victorian water utilities against other Australian utilities, and Ofwat in the UK has used benchmarking for many years. The Queensland Competition Authority (QCA) has benchmarked Sunwater's local area and corporate support costs against the rural water utilities Southern Rural Water and Lower Murray Water (rural) (QCA 2020). And the Department of the Environment has benchmarked the Murray Darling Basin's River Murray Operations against a group of rural water authorities (Economic Insights 2014b). We have also noted that the National Performance Reporting Framework Indicator Review has emphasised the importance of benchmarking for competition by comparison in the water industry.

It is important that regulatory decision-making be evidence-based. The benchmarking study provides a useful source of information relating to some parameters of the decision the ICRC needs to make. Indeed, in reaching its recommendations, MJA has drawn on (and as we have shown, misapplied) the benchmarking analysis, and offered very little, if any, other empirical investigation. It is difficult to see how the parameters that are needed to apply the base-step-trend method could be obtained without an empirical study. Hence, MJA's observation on the novelty of the application of benchmarking in the regulation of water businesses should not be taken as having any particular significance or implications.

7.2 Main conclusions

In section 1 we have shown that:

- The benchmarking study is *not* unduly complex. It is parsimonious and broadly similar to opex benchmarking econometric analysis carried out by the AER for electricity distribution network service providers;
- MJA is *incorrect* to claim that changes to the NPR may mean that the benchmarking study is not replicable in future. A study is replicable if other data sources may be available, and it is unreasonable to suggest that regulators could not gather such data. Furthermore, detailed information on the future changes to the NPR has been available since October 2021, and it clearly shows that support for benchmarking remains one of its priority purposes, and we have shown that the future NPR will have more, not less, data suitable for benchmarking purposes, including the data we have used in our study.

In section 2 we have discussed MJA's methodological criticisms:

- With regard to the criticism of the use of the log-log functional forms, including the Cobb-Douglas specification used in our study, we have shown that such functional forms are among the most widely used the field of applied producer economics and benchmarking, among those recommended in leading texts in this field, and are also widely used in benchmarking studies carried out by, or for, economic regulators. MJA's criticism is inconsistent with accepted academic and research practice in the relevant fields of applied producer economics and benchmarking.

- We have also noted two conceptual weaknesses in Professor O'Donnell's claims relating to the use of log-log functional forms in the present application. First, the theoretical premises on which Professor O'Donnell relies include a 'purely competitive industry' and to the extent this is a crucial premise, his argument against the Cobb-Douglas specification in the urban water business may have been misapplied. Second, in econometrics, a functional form serves as an approximation to the 'true' relationship within the domain of estimation and application, and O'Donnell has not shown that his argument relates to this relevant domain.
- With regard to the criticism made of modelling choices relating to the SFA model, and particularly the time-varying decay of inefficiency specification, we have shown that the modelling choices we adopted are among the most widely used in econometric frontier analysis applied to panel data. This is evidenced by the fact that the specifications which O'Donnell criticises are the only two options offered in standard Stata. Although there are model complicated SFA specifications, they can be difficult to implement, and for this reason they are used less often in the literature.
- Although MJA argues that the time-varying decay model is not flexible enough, and there should be utility-specific time trends in the inefficiency parameters, it has not referenced any studies where this has been done, or shown its feasibility in the present application. We believe that with the large number of utilities in the sample and the great proliferation of time-trend parameters to be estimated, it would be infeasible to adequately estimate the effects of the main variables in the model (the outputs and capital stock) and most likely yield spurious estimates for the trended efficiency effects due to multi-collinearity. The lack of examples where such an approach has been employed, strongly suggest that it is doubtful that MJA's proposed approach would be feasible in practice in this application.
- With regard to the criticism made of the Multilateral Törnqvist index and the claim that only a fixed-weighted index is a 'proper index', we have shown that MJA has incorrectly conflated the Multilateral Törnqvist index with the bilateral or chained Törnqvist index. The Multilateral Törnqvist index satisfies the test of circularity, which O'Donnell has emphasised as a test that chained indexes do not satisfy.
- MJA's methodological criticisms are inconsistent with widely accepted principles and practices among experts in the relevant disciplines of index numbers, and the econometrics of cost and production functions. The criticisms are inconsistent with established empirical literature, the benchmarking practices of regulatory agencies such as the AER and Ofwat, and the established practices in the use of index numbers and in the calculation of productivity trends by Australian and international statistical agencies including the ABS, the OECD and the international standards for Systems of

National Accounts.[26] MJA ought to have disclosed this, because we do not believe that a broad-based rejection of widely-accepted principles and practices within the relevant fields of applied economics is, or should be, part of the ICRC's agenda in regulating Icon Water.

In section 3 we have shown that:

- MJA's claim that the effects of economies of scale and of "other drivers of productivity" were not accounted for in our productivity forecast is incorrect. Our methods and formulas were fully explained in the report, and in this memo we have further highlighted where the effects of scale and other factors are accounted for.
- These mistaken claims by MJA form a key plank of their argument that the productivity growth factor should be above 0.5 per cent per annum. Therefore, we have established that MJA's view on the outlook for productivity growth does not have a sound basis.

In section 4:

- It is shown that the method used by MJA to develop its forecast of the industry-wide productivity trend component of 0.3 per cent per annum is to use the trend in the Opex PFP index over the 2013 to 2020 period. This directly contradicts MJA's explicit rejection of both the use of the Opex PFP index for inference in general, and the use of historical averages for forecasting productivity. That is, MJA uses a method which it has explicitly rejected as unreliable, and hence therefore, as a matter of logic, their forecast must be rejected.
- We reject MJA's statements about the use of historical trends for forecasting productivity by showing that this is a widely used method for aggregate productivity projections by official agencies, and also for determining productivity factors in economic regulation plans.
- For the purpose of assessing MJA's claim that there has been a change in the trend of opex productivity during the sample period, we estimate the benchmarking model with a less restrictive specification of technical change, which yields a generalised index of technical change, with a different rate in each year. Using this approach, we show that MJA's supposition about a change in trend of opex PFP is not borne out by this empirical analysis. On the contrary, the rate of technical change over recent years has closely tracked the long-term average for the whole sample period.

[26] This is not a criticism of Professor O'Donnell. We are not suggesting that his views, as an expert in the field of efficiency and productivity analysis, should concur with those of other experts. However, we think that MJA ought to have disclosed that the views presented are not widely held among experts in this field, which is relevant to the regulatory decision to be made by the ICRC.

- We surveyed a range of other analysis of productivity trends relevant to the water industry, including by the ABS, the PC, the ESC and IPART. The results of our study are consistent with the of the previous studies in finding a large and ongoing downward trend in productivity in the water industry over an extended period encompassing the sample period used in our study. Various factors that are influencing this trend are discussed. Nevertheless, many of the factors affecting water industry, such as higher operating and service standards, new regulations, wider environmental responsibilities and changing markets are not accounted for in the modelling and hence affect productivity. These effects are not well understood. This survey supports our opinion that "a forecast industry productivity trend of zero per cent would be optimistic, whilst a continued decline at –0.9 per cent per year is quite possible" (Quantonomics 2022, p.50).
- This survey of studies does not support MJA's claim that our finding for the "industry wide component appears to be too low". It suggests that MJA's forecast of future growth in water industry productivity of 0.3 per cent per year is unrealistically at odds with the available evidence on water industry productivity trends.

In section 5:

- We have shown that MJA has made an error in claiming that the AER uses the 75th percentile target in electricity network regulation. The AER uses a 0.75 comparator score to assess whether a distribution business is inefficient. The AER's threshold efficiency score of 0.75 corresponds to a percentile less than the 67th percentile. This strongly supports our proposed use of the 67th percentile.
- We also discussed important considerations relevant to the timeframe over which the threshold can feasibly be achieved. Key considerations relating to the longevity of assets in the water industry support our recommended catch-up period of 10 years.

Section 6 shows that MJA presents a very narrow basis of comparison of their recommended productivity factor against other relevant decisions on productivity factors by other regulators. We have shown:

- MJA's reference to the ESC's expected annual productivity factor of 1.4 per cent in recent guidance material is potentially misleading by failing to acknowledge that with their vertically-separated structure, the controllable opex of the metropolitan Victorian water businesses, to which the productivity factor applies, represents only on average approximately 20 per cent of total opex. When adjusted to a comparable basis, the 2018 decisions for the Victorian water businesses' productivity factors averaged close to 0.5. This supports our recommended productivity factor and is inconsistent with MJA's recommendation.

- By reviewing regulatory decisions from 2016 to 2022 for the seven major metropolitan urban water businesses which are subject to economic regulation (eleven regulatory decisions in total)—including correcting the Victorian metropolitan water utilities to put them on a comparable basis—we find that:
  - the only actual regulatory decision that MJA referred to, namely TasWater's in 2022, is at the top of the range of productivity factors in these determinations;
  - the productivity adjustment factor of 1.4 per cent recommended by MJA is close to the upper end of the range of decisions;
  - the average productivity factor for the 11 decisions is 0.8 per cent per annum;

  The productivity factor we proposed 0.5 per cent per year is much closer to the average of these regulatory decisions than MJA's recommended productivity factor.

Appendix A: NPR Review Draft Recommendations on Relevant Indicators

Table A.2 of our benchmarking report listed all of the National Performance Report (NPR) indicators used in the analysis. Table A.1 below lists the same indicators and reports the draft recommendations pertaining to each indicator in the *NPR Framework Indicator Review* (HARC, Risk Edge & Aither 2021). Further information is included in footnotes.

Table A.1: NPR indicators used in the analysis & relevant HARC recommendations

Indicator	*Description*	*Recommendation*
W1	Surface water (e.g. dams, rivers or irrigation channels) (ML)	Kept
W2	Sourced from groundwater (ML)	Kept
W3.1	Water sourced from desalination of marine water (ML)	Kept
W5.3	Received from other service providers or operational areas (ML)	Kept
W7	Total water sourced (ML)	Kept
W8.3	Water supplied to residential customers (ML)	Kept
W9.3	Water supplied to non-residential customers (ML)	Kept
W14	Water exported to other service providers or operational areas (ML)	Kept
W16	Volume of wastewater, excluding trade waste, collected (ML)	Kept
W17	Volume of trade waste collected (ML)	Kept
W27	Recycled water as a % of total wastewater collected	Kept
A1	Number of water treatment plants providing full treatment	Kept
A2	Length of water mains (km)	Kept
A4	Number of wastewater treatment plants	Kept
A5	Length of sewer mains & channels (km)	Kept
A9	Infrastructure leakage index (ILI)	Kept[27]
C4	Total connected properties - water supply (000s)	Kept
C8	Total connected properties - sewerage (000s)	Kept

[27] Other alternative measures are also available and retained: A8—Number of water main breaks, bursts and leaks, per 100 km of water mains; A15—Number of property connection sewer breaks and chokes per 1,000 properties.

Indicator	*Description*	*Recommendation*
C9	Number of water quality complaints per 1000 water customers	Retain with updated definition/supporting notes providing greater clarity on reporting of complaints indicators.[28]
C15	Average duration of an unplanned interruption: water supply (minutes)	Modified to 80th percentile duration of an unplanned interruption
C17	Number of unplanned interruptions per 1,000 water customers	Modified to Percentage of properties that experience more than 1 unplanned interruption in the last 12 months.
E1	Percentage of sewage treated to a primary level (%)	Kept
E2	Percentage of sewage treated to a secondary level (%)	Kept
E3	Percentage of sewage treated to a tertiary or advanced level (%)	Kept
E9	Greenhouse emissions: water (tonnes CO2-equiv. / 1000 water properties)	Retired[29]
H3	Percentage of population where microbiological compliance was achieved (%)	Kept
H4	Number of zones where chemical compliance was achieved (eg 23/24)	Modified to Percentage of population provided with chemically compliant drinking water. This is an improvement on our measure which involved dividing H4 by H4a to obtain the percentage of zones that were chemically compliant.
F9	Written-down value of fixed water supply assets ($000s)	Kept and complemented with several new indicators.[30]
F10	Written-down value of fixed sewerage assets ($000s)	Kept and complemented with several new indicators.[31]
IF11	Operating cost - water ($'000s)	Replaced by more detailed new indicators which can be summed to obtain this indicator.[32]

[28] There will also be a new customer satisfaction indicator.

[29] IE12—Total net greenhouse gas emissions will be retained, and could be used as an alternative.

[30] The additional new indicators are: Real replacement costs of fixed water supply assets; Annual statutory depreciation: water supply assets; Regulatory depreciation: Water supply; and Regulated Asset Base (RAB) Value: Water.

[31] The additional new indicators are: Real replacement costs of fixed wastewater assets; Annual statutory depreciation: wastewater assets; Regulatory depreciation: wastewater; and Regulated Asset Base (RAB) Value: Wastewater.

[32] The new indicators are: Operating cost: purchase bulk potable and raw water; Operating cost: purchase bulk recycled water; Operating cost: maintenance water supply; Operating cost: water supply – any other costs.

Indicator	*Description*	*Recommendation*
IF12	Operating cost - sewerage ($'000s)	Replaced by more detailed new indicators which can be summed to obtain this indicator.[33]
F14	Capital expenditure: water supply	Kept with additional indicator which can be used to breakdown into renewal and the remainder (expansion).[34]
F15	Capital expenditure: wastewater	Kept with additional indicator which can be used to breakdown into renewal and the remainder (expansion).[35]
F16	Total water supply and sewerage capital expenditure ($000s)	Kept
F26	Capital works grants - water ($000s)	Kept
F27	Capital works grants - sewerage ($000s)	Kept

[33] The new indicators are: Operating cost: maintenance wastewater; Operating cost: bulk wastewater transfers; Operating cost: wastewater – any other costs.

[34] The new indicator is: Capital expenditure – asset renewal: water supply.

[35] The new indicator is: Capital expenditure – asset renewal: wastewater.

Appendix B: Discussion of Modelling Choices

All modelling exercises involve methodological choices which must be made to focus the analysis within a practical scope and to yield reliable results. Our approach has been to build on and seek to improve approaches taken in the past. The benchmarking report explains that there are limitations to the study, including those associated with data availability. This appendix discusses the modelling choices made in the benchmarking study.

B1 Overall modelling strategy

In our benchmarking of Icon Water we have sought to maintain a degree of continuity with previous urban water benchmarking carried out by the Essential Services Commission of Victoria (ESC 2012a, 2012b) and Economic Insights (2014a) on behalf of the ESC. The main aspects of the study which differ from those earlier studies are:

- A variable (ie, opex) cost function is modelled rather than an input-oriented distance function. This choice is based on the present regulatory application in which the model is intended to shed light on opex efficiency, which is directly relevant to the ICRC's base-step-trend method. This is analogous to the AER's use of an opex cost function in its benchmarking of electricity distribution network service providers (AER 2021). The distance function approach used by the ESC and Economic Insights assesses technical efficiency rather than cost efficiency, and is more suited to a general appraisal of efficiency not directly for use within the building block price regulation framework.
- The inclusion of a wider range of operating environment factors (OEFs), including cross-sectional census data on urban density and the mix of dwelling types. Table B.1 compares the OEFs used in the different studies. Some of the variables used as OEFs were previously used to make *ex ante* adjustments to the water supply and wastewater collection outputs. By making them separate variables our model specification is less restrictive in this regard than the previous models. The use of a wider set of OEFs is consistent with stakeholder feedback from previous modelling which has emphasised the heterogeneity of operating conditions of urban water businesses. We have sought to take account of this by including a wide range of OEFs, as is evident in Table B.1.
- The use of a Cobb-Douglas specification for technology, rather than the more flexible translog specification, is motivated by the greater use of OEFs, and the desire to reasonably limit the dimensionality of the explanatory variables in the model, and better enable the effects of the OEFs to be identified.

Table B.1 Operating environment factors used compared to previous studies

	ESC 2012	*Economic Insights 2014*	*Quantonomics 2022*
Share of residential customers in total water supplied to customers	×	×	✓
Share of trade waste in total wastewater collected	✓	✓	✓
Share of surface water (or of groundwater) in total water sourced	✓	✓	✓
Share of desalinated marine water in total water sourced	×	×	✓
Share of recycled water in total water supplied to customers	×	✓	✓
Share of flats in total dwellings (cross-sectional value only)	×	×	✓
Log customer minutes off supply	×	×	✓
Log infrastructure leakage index (ILI), an indicator of asset quality	×	×	✓
Log net water supply greenhouse emissions per ML of water supplied, a proxy for energy use per ML	×	✓	✓
Log average rainfall	×	×	✓
Log average maximum temperature	×	×	✓
Dwelling density measured by the number of dwellings per square km in the supply area (cross-sectional value only).	×	×	✓
Indicator variable which takes the value of 1 if the utility owns one or more dams and 0 otherwise	×	×	✓
Adjustment factor for temporary water restrictions	Included as an adjustment to water supplied	Included as an adjustment to water supplied	✓
Log index of drinking water quality	Included as an adjustment to water supplied	Included as an adjustment to water supplied	✓
Log index of quality/standard of wastewater treatment	Included as an adjustment to wastewater collected	Included as an adjustment to wastewater collected	✓
Share of sewerage penetration	✓	✓	×

The aspects of the study which are consistent with those earlier studies by the ESC and Economic Insights include:

- The use of stochastic frontier analysis (SFA). While the earlier studies also used a random effects specification in addition to SFA, we have sought to keep reasonable limits to the scope of the modelling exercise and have not used the random effects model.
- The use of a wide sample of urban water utilities from the National Performance Report (NPR) for urban water utilities, being all those utilities for which there was data. By doing so, we are benchmarking Icon Water against the industry as a whole, rather than against selected utilities.
- The treatment of urban water utilities as integrated providers of water supply and sewerage services. This is discussed in more detail later in this memo. This approach assumes there are economies of scope between water supply and wastewater collection activities, especially in relation to the provision of customer-related services. It also avoids data errors associated with differences between businesses in the allocation of common costs between water and wastewater services. This specification is used in the studies of Saal and Parker (2006), Saal, Parker & Weyman-Jones (2007), which influenced the approach taken by the ESC, and by Economic Insights on behalf of the ESC. Among the 64 water supply regions included in the analysis, 60 are serviced by integrated water and sewerage providers. Four have been combined together.
- The specification of outputs and inputs is similar to the ESC and Economic Insights studies, with three outputs, customer numbers, water supplied and wastewater collected, and two inputs capital inputs and non-capital inputs. Non-capital inputs are measured by an index which aggregates two component non-capital inputs, bulk water purchases and all other non-capital inputs.

The output specification uses measures of water supply volume, wastewater volume and customer numbers as outputs. Mains length was not used as an output because it is a major component of the physical capital inputs measure, so it would be inappropriate to also include it as an output. In saying this, we are not suggesting that mains length should never be used as an output. Mains length is often used as an output to measure the spatial dimension of the supply activity. Our study used a measure of the urban density of the areas supplied by each utility as an OEF. Since all the variables are in log form, and customer numbers is included as an explanatory variable, this adequately captures the spatial dimension of supply.

These specification choices are based on previous consultation with industry stakeholders in the benchmarking exercises of the ESC and Economic Insights on behalf of the ESC, has highlighted that industry participants do not regard the financial capital measures in the NPR to be reliable. For this reason, we have used two alternative capital measurement methods, one of which relies on mains length and physical measures of other capital inputs.

B2 Sampling choices

We used a broad sample of Australian urban water utilities, representing all distribution businesses in the NPR for which there was sufficient data. We aimed to benchmark Icon Water against the industry overall, rather than against selected peers. We have not undertaken an analysis of a subset of utilities. The econometric methods we used are most effective when there are a large number of utilities in the sample.

We accept that with further research it would be desirable to identify utilities that are most comparable to Icon Water and to make direct comparisons with those peers. To some small extent we have done this in our discussion of partial productivity indicators, where we have made most comparisons against utilities with similar customer density.

HARC (2021) suggests that in future, the NPR will classify urban water businesses (excluding bulk water providers) as either: (a) economically regulated and price-guided service providers; (b) stand-alone service providers operating without formal economic regulation; or (c) local government-based service providers. These categories will be useful in identifying more closely comparable peers in future benchmarking exercises.

B3 Combined analysis of water supply and sewerage services

The study treats water supply and wastewater collection as the two key outputs of integrated water and sewerage suppliers which use a multi-output technology and captures economies of scope from services provided. This corresponds to the approach used by the Essential Services Commission of Victoria (ESC 2012a, 2012b) and Economic Insights (2014a). The ESC's approach benefited from considerable input of industry expertise and stakeholder consultation.

The approach of analysing the integrated water and sewerage industry is consistent with a number of studies of the productivity of the UK water industry, including Lynk (1993), Hunt and Lynk (1995), Saal and Parker (2001, 2006), Saal, Parker & Weyman-Jones (2007) and Frontier Economics (2017). The vertically integrated structure of the water businesses studied resulted from the 1973 UK water industry reforms which were predicated on assumed substantial economies of scope between water and wastewater services and assumed substantial economies of scale. Abbot and Cohen note that this vertically integrated structure is common worldwide, reflecting a general view that there may be economies of scope between water distribution and sewerage collection.

Several Australian studies have modelled water supply activities excluding wastewater services, such as Woodbury and Dollery (2004), Coelli and Walding (2006), Byrnes *et al* (2010) and Worthington (2011). None of these studies modelled wastewater services activities. Hence these studies *do not* support the contention in the question that water and wastewater services are commonly modelled separately.

Among a large number of studies of water industry productivity and efficiency surveyed by Abbott and Cohen (2009, pp.241–243), many model water supply services alone (especially among the earlier studies) and many include water supply and sewerage treated as separate outputs of integrated utilities. Very few studies examine sewerage services separate from water supply. An example of separate efficiency analyses of water supply and sewerage services is Thanassoulis (2000, 2002).

Ofwat (2019) does separately model wholesale water supply and wholesale wastewater activities, and indeed uses further disaggregation. In water supply it uses separate models for: (a) the upstream activities of water resources, raw water distribution and water treatment; and (b) treated water distribution. It also has models for wholesale water activities in total. For wastewater activities, it has separate models for: (a) sewage collection; (b) sewage treatment; and (c) bioresources. It also has models for combined sewage treatment and bioresources activities. Ofwat uses the random effects estimation method and has moved away from translog models to the Cobb-Douglas specification, or a hybrid where specific nonlinear terms can be justified with an engineering rationale.[36]

The NPR for Australian urban water businesses provides a separation of costs and assets associated with water supply services and wastewater collection services. Hence, it would be possible to model these two activities separately, if they are essentially separate operations. This approach would rely on all water utilities adopting similar methods of allocating costs (eg, customer costs and corporate costs) between water and wastewater activities. However, a common observation of industry stakeholders about NPR data is that urban water businesses in different states, or with different structures, have adopted differing accounting standards and methods of reporting, which may mean different approaches are used for allocating common costs between water supply and wastewater. The Quantonomics study models water and wastewater costs together, which reduces assumptions required for cost allocation between services.

As previously stated, the decision to treat water supply and wastewater services as joint products assumes there are economies of scope between these activities. Abbott and Cohen's (2009) literature review of water industry productivity and efficiency studies finds that "with regard to economies of scope between water supply and wastewater activities, there is considerable support for the view that there are economies of scope that accrue to a company that operates both jointly" (Abbott & Cohen 2009, p.237). Lynk (1993) finds economies of scope between water supply and wastewater collection. Conversely, Saal *et al* (2013) find that the empirical evidence for economies of scope between water and sewerage activities is mixed.

[36] Ofwat states: "While the translog has appealing properties in that estimated elasticities2 vary with company size, in practice we find that individual company elasticities can have a counter-intuitive sign, that some translog terms are highly insignificant and (individually) unstable, and that the specification takes up degrees of freedom that could be dispensed with more relevant cost drivers" (Ofwat 2019, p.7).

The surveys emphasize that more research is needed on this question. We noted this debate on page 8 of our report.

As the foregoing discussion and the literature surveys cited show, the analysis of water supply and wastewater services as joint products of combined entities is the most common approach in the literature. Although there are also many studies, among them several of the Australian studies, that have analysed only water supply services and excluded wastewater services, there are very few studies that analyse wastewater services and exclude water supply services. Ofwat's disaggregated modelling approaches are an exception, reflecting the mature development of a very well-established benchmarking framework over many years, which benefits from information gathering powers. Urban water benchmarking in Australia within regulation frameworks does not have the same maturity, accuracy, and consistency between utilities.

We are not suggesting that the separation of water supply and wastewater services benchmarking lacks merit. In fact, it represents a useful direction of further research and analysis. However, given that the widespread practice in the benchmarking literature, including among some leading studies carried out in the UK, is to treat water supply and wastewater services as joint products, we feel it is not necessary to justify this modelling choice on the basis of separate analyses of water and wastewater activities.

B4 Own-supply versus buying of bulk water

Non-capital inputs are defined in section 2.4.2 of the report. Opex is deflated by an opex input price index which is effectively a weighted average of bulk water prices and a price index for other non-capital inputs. The weights of this index are specific to each utility. For a utility which has no bulk water purchases, the deflator is equal to the Consumer Price Index (CPI), whereas for a utility with bulk water purchases, the deflator is a weighted average of the price index for that utility's bulk water purchases and the CPI. The weight is based on the average proportion of bulk water costs in its total opex.

B5 Period of sample

The period of 15 years was the maximum period of reliable data for most of the utilities in the sample, given that the National Water Commission began publishing NPR data from 2006. There is earlier data from 1998 published by the Water Services Association of Australia (WSAA), but this is only available for a smaller number of major utilities. That data was used in the ESC and Economics Insights (2014) studies, but since it is less recent and causes the panel to be much more unbalanced, we decided to omit that data for this study.[37] Although the resulting dataset over 15 years is not balanced, it is much closer to being balanced.

[37] A balanced panel is one which has data for the same periods for each unit in the panel (here utility). This is not the case for an unbalanced panel—eg, there is data for a longer period for some utilities than for others.

We tested three sub-periods each of 5 years. However, we found that the models were not sufficiently stable in the 5-year sub-periods. In our view, with such a heterogenous sample of utilities, it is only with the full 15-year sample period that the number of observations is large enough to produce stable and reliable results.

B6 Scaling of Output Weights to Unity

To calculate any output index, the weights applied to the constituent outputs must sum to unity. This is elementary. For example, if weights are defined by revenue shares of products, those revenue shares are defined as: $w_i = R_i/\sum R$ (where R is revenue and i refers to product i), and the must sum to unity. Similarly, when elasticities are used, the weights are defined as: $w_i = \epsilon_i/\sum \epsilon$ (where ϵ is the cost-elasticity with respect to output i), and again, they must sum to unity. Otherwise the result would not be an index number.[38]

The rationale for using elasticities rather than revenue shares in a regulated setting is because regulated businesses are not constrained by market forces to set prices for their different outputs in proportion to the marginal costs of those outputs, which is a standard result of microeconomics for competitive markets. Each elasticity is defined as:

$$\epsilon_i = \frac{\partial \ln C}{\partial \ln q_i} = \frac{\partial C}{\partial q_i} . \frac{q_i}{C}$$

where C is cost, q_i is the quantity of output i and $\partial C/\partial q_i$ is the marginal cost of producing output i, which serves as the shadow price of output i. Hence: $(\partial C/\partial q_i)q_i = V_i$ is the shadow value of the quantity of output i produced. Further:

$$\frac{\epsilon_i}{\sum_k \epsilon_k} = \left(\frac{V_i}{C}\right) \Big/ \left(\frac{\sum_k V_k}{C}\right) = \frac{V_i}{\sum_k V_k}$$

The weight applying to product i is its shadow value as a share of the total shadow value of all products produced. This is directly analogous to using revenue shares for the output index where revenue is calculated using shadow prices (marginal costs) rather than market prices. This is a standard approach in applying productivity analysis to regulated businesses: see Denny, Fuss and Waverman (1981), and Coelli *et al* (2003 ch. 3).

[38] Quantity index numbers can be expressed as weighted averages of 'quantity relatives' (eg, ratios of quantities between periods of the products included in the index) and price index numbers can be expressed as weighted average of 'price relatives' (eg, ratios of prices between periods of the products included in the index). The weights must sum to unity. See Yeomans (1968 ch.4, esp. s. 4.2 'Weighted index numbers') or Allen (Allen 1975 s 1.4 'Choice of Formula: Aggregative/Weighted Average Approach').

Appendix C: Additional Econometric Results

This appendix presents results of estimating the SFA variable cost function for the period from 2006 to 2020 using an alternative method of estimating opex productivity trend, due to Baltagi and Griffin (1988). Rather than including a time trend variable to estimate a constant average rate of opex productivity change, in this specification there is a separate dummy variable for each year in the sample (except the first year), which yields a time-varying index of opex productivity. The models presented in table C.1 are the same as those presented in Table 4.1 of the report in all respects except that the time trend variable is replaced by a series of dummy variables for years. The notation of the variables remains the same, and for convenience, it is listed below the table. The dummy variables for years 2007 to 2020 are denoted λ_2 to λ_{15}.

Table C.1: Estimated SFA Variable Cost Function 2006–2020, Baltagi-Griffin Method

	Real financial capital measure		*Physical capital measure*	
	coef	*t-stat*	*coef*	*t-stat*
$\ln q_1$	0.5427	(7.35)	0.5034	(7.08)
$\ln q_2$	0.1750	(3.25)	0.1797	(3.27)
$\ln q_3$	0.0835	(1.79)	0.0843	(1.83)
$\ln x_k$	0.0149	(0.23)	0.0563	(1.61)
z_1	0.5563	(4.34)	0.5639	(4.32)
z_2	0.1555	(2.72)	0.1518	(2.65)
z_3	-0.0865	(-2.36)	-0.0974	(-2.65)
z_4	0.1512	(0.83)	0.1131	(0.62)
z_5	-0.0002	(-1.39)	-0.0003	(-1.46)
z_6	1.7084	(3.72)	1.8255	(4.10)
z_7	-0.0017	(-0.14)	-0.0009	(-0.08)
z_8	-0.0147	(-1.16)	-0.0156	(-1.23)
z_9	0.0541	(1.86)	0.0501	(1.89)
z_{10}	-0.0424	(-1.92)	-0.0426	(-1.94)
z_{11}	-0.0522	(-0.35)	-0.0447	(-0.29)
z_{12}	0.1909	(3.18)	0.2239	(3.41)
z_{13}	0.4034	(6.64)	0.4174	(6.68)
z_{14}	-0.3276	(-3.16)	-0.3415	(-3.29)
z_{15}	0.1915	(2.78)	0.1851	(2.69)
z_{16}	0.1053	(1.53)	0.1189	(1.72)
λ_2	0.0431	(1.38)	0.0423	(1.36)
λ_3	0.0560	(1.72)	0.0554	(1.71)
λ_4	0.0414	(1.30)	0.0414	(1.30)
λ_5	0.1193	(3.62)	0.1185	(3.62)
λ_6	0.1980	(5.61)	0.2002	(5.68)
λ_7	0.2520	(6.97)	0.2531	(7.05)
λ_8	0.2477	(6.89)	0.2471	(6.94)
λ_9	0.2549	(6.82)	0.2538	(6.88)
λ_{10}	0.2327	(6.03)	0.2323	(6.12)
λ_{11}	0.2612	(6.55)	0.2601	(6.69)
λ_{12}	0.2668	(6.46)	0.2667	(6.65)
λ_{13}	0.2978	(6.89)	0.2969	(7.07)

	Real financial capital measure		*Physical capital measure*	
	coef	*t-stat*	*coef*	*t-stat*
λ_{14}	0.3148	(7.17)	0.3145	(7.40)
λ_{15}	0.3496	(7.84)	0.3496	(8.17)
cons.	-1.8619	(-2.69)	-2.0886	(-2.88)
mu	0.0000		0.0000	
eta	0.0320	(4.47)	0.0315	(5.63)
sigma_u	0.3468		0.3543	
sigma_v	0.1468		0.1464	
N	867		867	
BIC	–384.38		–387.08	

Notation:

- q_1: customer numbers output;
- q_2: water supplied output (ML) including bulk water exports to other utilities;
- q_3: wastewater collected output (ML);
- x_k: fixed capital input;
- z_1: share of residential customers in total water supplied to customers;
- z_2: share of trade waste in total wastewater collected;
- z_3: share of surface water in total water sourced;
- z_4: share of desalinated marine water in total water sourced;
- z_5: share of recycled water in total water supplied to customers;
- z_6: share of flats in total dwellings (cross-sectional value only).
- z_7: log customer minutes off supply;
- z_8: log infrastructure leakage index (ILI), an indicator of asset quality;
- z_9: log net water supply greenhouse emissions per ML of water supplied, a proxy for energy use per ML;
- z_{10}: log average rainfall;
- z_{11}: log, average maximum temperature;
- z_{12}: dwelling density measured by the number of dwellings per square km in the supply area (cross-sectional value only).
- z_{13}: indicator variable which takes the value of 1 if the utility owns one or more dams and 0 otherwise;
- z_{14}: adjustment factor for temporary water restrictions;
- z_{15}: log index of drinking water quality;
- z_{16}: log index of quality/standard of wastewater treatment.

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INPUT COST ESCALATION FORECASTS TO 2027/28

PREPARED BY BIS OXFORD ECONOMICS FOR ICON WATER

UPDATE - FINAL

DECEMBER 2022

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December 2022

The modelling and results presented here are based on information provided by third parties, upon which BIS Oxford Economics has relied in producing its report and forecasts in good faith. Any subsequent revision or update of those data will affect the assessments and projections shown.

To discuss the report further please contact:

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1. EXECUTIVE SUMMARY

BIS Oxford Economics (BISOE) was engaged by Icon Water to provide forecasts and a report on expected wage changes, future electricity prices and forecasts of construction and chemical costs relevant to the water and wastewater business in the Australian Capital Territory for the period to 2027/28. These forecasts will be used by Icon Water to develop their operating and capital expenditure forecasts which, in turn, will be included in Icon Water's response to the Independent Competition and Regulatory Commission (ICRC) Draft Decision, covering the five-year period from 2023/24 to 2027/28 inclusive.

This brief report and the accompanying forecasts are updates to the full report and forecasts prepared in late February/early March and delivered to Icon Water on 3rd March 2022. These latest forecasts for wages, chemicals and construction costs use the same methodology as those provided in March, while the methodology for forecasting electricity prices has been amended, in response to comments and suggestions from the ICRC and their consultants, Marsden Jacobs Associates (MJA).

The input escalation forecasts incorporate the latest data and macro-economic forecasts as at mid-November 2022, including the September quarter 2022 releases of the Consumer Price Index (CPI), Wage Price Index (WPI) and Producer Price Index (PPI), plus the Reserve Bank of Australia (RBA) forecasts for the CPI and WPI contained in the RBA November 'Statement of Monetary Policy'. Note that most of the references to historical data and forecasts of wages are in nominal terms unless specifically stated that the data/forecasts are in real (inflation-adjusted) terms.

1.1 WAGES & INFLATION OUTLOOK

BIS Oxford Economics expects **real** wage costs for the Australian Electricity, Gas, Water and Waste Services (EGWWS or 'Utilities') sector — as measured in the Wage Price Index (WPI) — will grow (escalate) by an average of 0.66% per annum over the five years to 2027/28, 0.3% higher than the national 'All Industries' average over the same five-year period. Over the same five-year period to 2027/28, the **ACT EGWWS WPI** is forecast to average 0.52% p.a., which will be 0.11% higher than the ACT all industries WPI average of 0.41% p.a. (all in real terms).

In terms of **overall wage costs**, the **full 0.5% for the Superannuation Guarantee (SG) increases** each year should be **added to the forecast WPI increases** in each of the years from 2022/23 to 2025/26 inclusive, to arrive at the total percentage increase in labour costs. The Superannuation Guarantee Charge (SGC) is not included in the regular wage measure preferred by the Australian Energy Regulator or the ICRC – the Wage Price Index (WPI). The SGC is in effect a labour 'on-cost'. In terms of escalating wage costs over the regulatory period, the SGC therefore needs to be added to the forecast increases in the WPI.

National and ACT utilities wages are forecast to increase by more than the national and state/territory All Industries averages over the forecast period because of the following factors:

- the electricity, gas and water sector is a capital intensive industry whose employees have higher skill, productivity and commensurately higher wage levels than most other sectors.
- the strong union presence in the utilities sector will ensure outcomes for collective agreements (which cover 65% of the EGWWS workforce) remain above the wage increases for the national All Industries average. In addition, as EBAs wage rises are normally higher than individual agreements and, as there is a higher proportion of employees on EBAs in the EGWWS sector compared to the national average (38%), this means higher overall wage rises in the EGWWS sector.

- increases in individual agreements (or non-EBA wages) are expected to strengthen from the recent subdued pace as the labour market tightens, especially from 2022/23 with the unemployment rate now around 3.5% and expected to remain below 4% over the next three years.
- demand for skilled labour will pick up and strengthen with the high levels of utilities investment from 2021/22to 2027/28, with overall utilities investment levels expected to remain elevated over the next 6 years. BIS Oxford Economics is forecasting electricity-related engineering construction to be 45% higher in 2027/28 compared to 2020/21 levels. This will also be a key driver of wages going forward.
- the overall national average tends to be dragged down by the lower wage and lower skilled sectors such as the Retail Trade, Wholesale Trade, Accommodation, Cafés and Restaurants, and, in some periods, also Manufacturing and Construction. These sectors tend to be highly cyclical, with weaker employment suffered during downturns impacting on wages growth, such as what occurred in the wake of the COVID-19 impacts. The EGWWS sector is not impacted in the same way due to its obligation to provide essential services and thus retain skilled labour.

During the COVID-19 crisis, the EGWWS sector fared much better than just about all other sectors, along with the Education, Health & Social Assistance and Finance and Insurance sectors, in terms of wage increases over 2019/20 and 2020/21. However, relatively low quarterly increases of 0.1% in each of the March and June quarters 2021 resulted in annual growth in the EGWWS WPI in 2021/22 slip below the All Industries average for only the second time in the past two decades. Overall, EGWWS WPI growth was 1.5% in 2021/22, around 0.6% lower than the All Industries average. BISOE believes this will be a short-lived aberration and that the EGWWS WPI will rebound strongly over the next year to again outpace the national average. Driving this will be much higher EBAs negotiated in an environment of very high inflation and a very tight labour market, particularly for the types of skilled labour that dominate in the sector.

EBA outcomes were weaker over 2020/21 and remained subdued in 2021/22, compared to the five years to 2019/20, when EBAs averaged around 2.9%. EBAs in the EGWWS industry have been dragged down by an extremely low agreement in Western Australia in the June 2021 quarter and a relatively low agreement in NSW in the September 2021 quarter, which will have a short-term impact as both sets of agreements run for less than two years. We expect the next rounds of EBAs negotiated in the sector to rise strongly over the next 2-3 years due to a number of factors, including:

- CPI inflation will remain high (as the RBA expect it will average well above 6% in 2022/23 and above 4% in 2023/24),
- the demand for skilled labour remains strong, and
- the recent high enterprise agreement outcomes in the construction sector will influence negotiations in the EGWWS sector, as some skills can be transferable.

A key element adding to wage pressures in 2021/22 and over 2022/23 is the rapid tightening in the national labour market that is now apparent. Employment as of October 2022 was well above pre-COVID levels, with the unemployment rate at 3.4% and labour force participation rates at record levels. A key to the outcomes has been little growth in the pool of available labour. The cessation of international migration to Australia since March 2020 has seen population growth plummet to just 0.2% in the year to June 2021, while the working age population (above 15 years old) increased by only 50,000 (+0.2%) over 2020/21 and 206,000 in 2021/22, compared to over 330,000 persons in 2018/19 and in the year to March 2020. Growth in the labour force has been facilitated by a marked increase in the labour force participation rate to record levels. However, there is now little scope to raise the participation rate further and, with the underemployment rate pushing lower and job vacancies well above pre-COVID levels, wage pressures are building.

Fig. 1.1 Australia: Employment and Unemployment

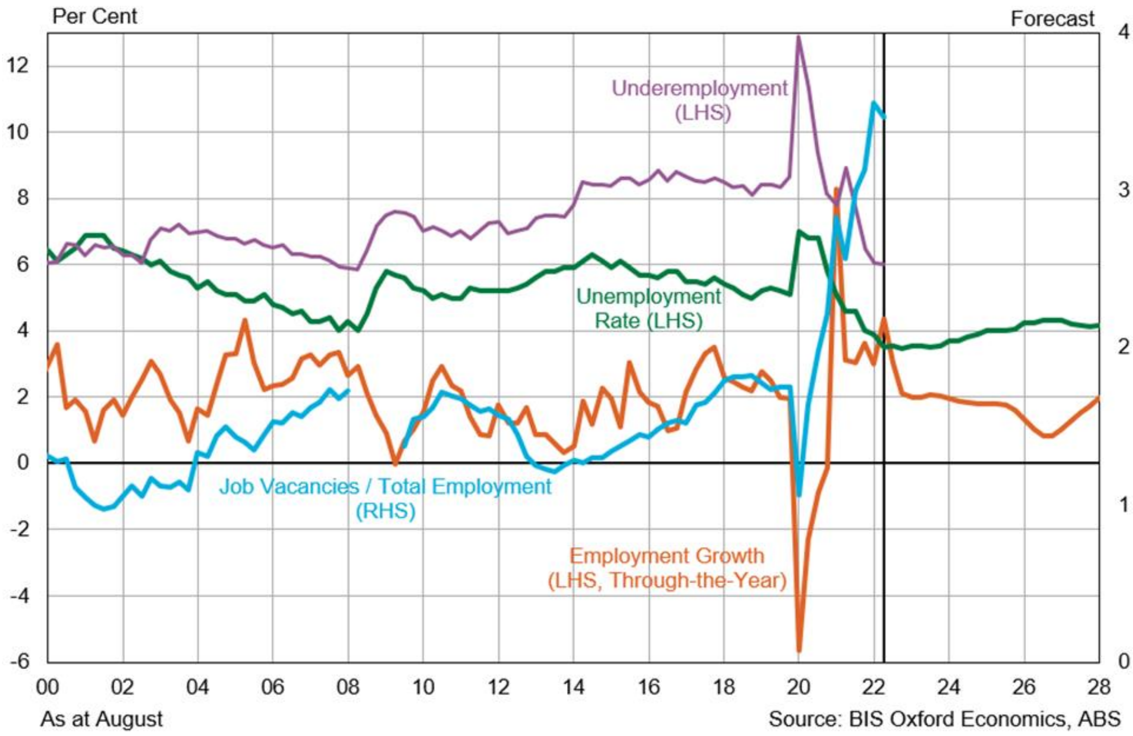
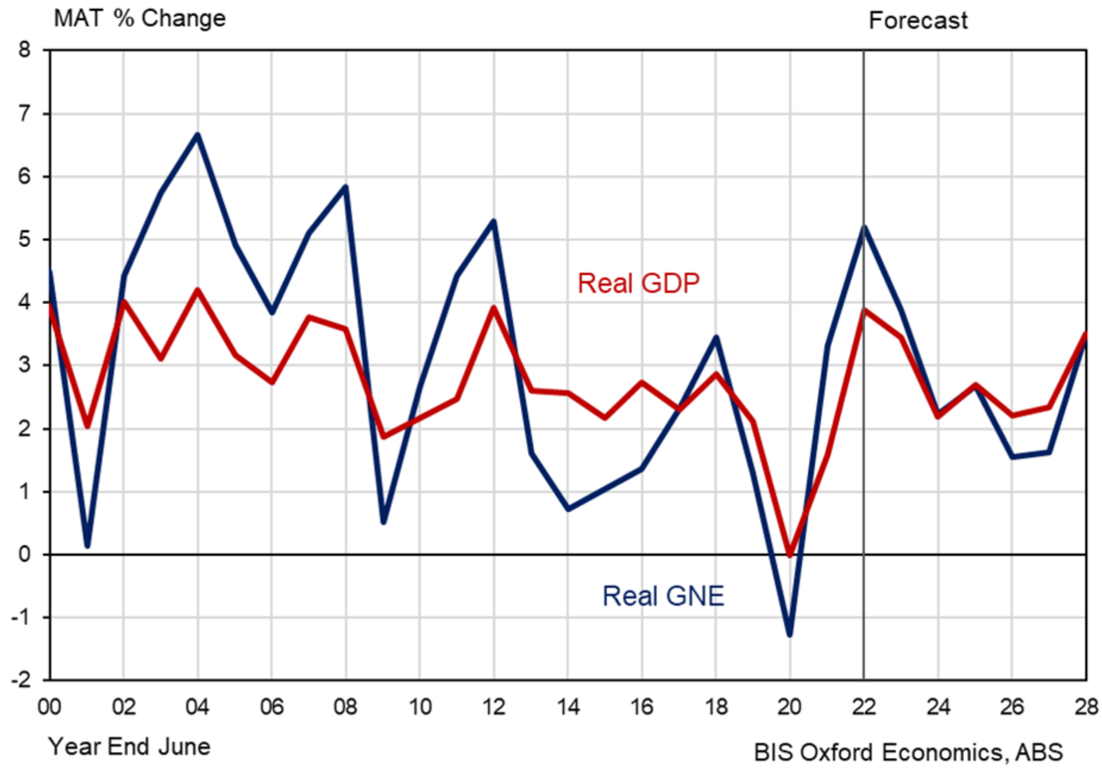


Figure 1.2 Australia Key Indicators



As the economy continues to remain resilient over 2022/23 to 2024/25 (albeit with weaker GDP growth than previously forecast in March), we expect to see sustained tightness in the labour market, with labour demand increasing and the unemployment rate remaining around 3.5% to 4% over 2022/23 to 2024/25. Although BISOE's economic growth (GDP) forecasts are modestly weaker for 2022/23 and 2023/24, we still expect the labour market to remain tight. Skill shortages, which have already emerged, are expected to broaden and worsen in many areas of the economy. The tightening labour market will see wage pressures increase. The Australian **All Industries WPI** is forecast to pick up to 3.2% in 2022/23 (from 1.5% in 2021/22) and then strengthen further as the labour market tightens and in response to high CPI inflation. Wages will be slower to pick up compared to the inflation rate, due to lags in the transmission of wage increases, particularly in the enterprise bargaining segment, where the duration of agreements runs for 2-3 years. But as agreements are re-negotiated in an environment of a very tight labour market (with the unemployment rate expected to be below 4%) and high consumer inflation, there will be a commensurate lift in wage increases. The Australian All industries WPI is forecast to increase to 3.9% in 2023/24 and average around 4% in 2024/25 and 2025/26, before easing over the subsequent two years as the economy cools, the unemployment rate rises back above 4% and CPI inflation eases.

A **key difference between the latest wage forecasts and those provided in March** 2022 is the significant lift in CPI inflation forecasts. In February 2022 Statement of Monetary Policy (SoMP), the RBA forecast that CPI would rise and peak at 3¾% in the June quarter 2022, and then subsequently ease to 2¾% by June 2023 and stay there until June 2024. The RBA's November 2022 SoMP forecasts the headline CPI rate to be 8% in the December 2022 quarter, easing to 6 ¼% in the June quarter 2023 (giving a year average of 7.1% for 2022/23). An easing to 4¾% is forecast for the December quarter 2023 and then to 4.2% in the June quarter 2024 – giving a year average CPI rate of 4.8% for 2023/24. The RBA's CPI forecast for December 2024 is 3.2%, after which we have the annual rate easing to its long-run rate of 2.5% by June 2024 - giving a year average CPI rate of 3.0% for 2023/24. Beyond the RBA's forecast from the SoMP, we assume the CPI averages 2.5% over the medium-to-long term.

As discussed in the previous March report – and in the subsequent 'Request for Information' in August - the key determinants of nominal wage growth are consumer price inflation, productivity, economic growth (i.e., output or GDP) and the relative tightness of the labour market (i.e. the demand for labour compared to the supply of labour), as measured by the unemployment rate and the under-employment rate. It is important to note that wage growth usually lags changes in the labour market, inflation and economic conditions, because of the inherent lags in wage setting mechanisms.

In the short-term, we analyse the expected future wage movements in the three main methods of setting pay. In terms of those workers on awards who have their pay determined by the Fair Work Commission (FWC) in the annual National Minimum Wage (NMW) case, the increase given in June for the 2022/23 financial year was much higher than we anticipated in February – with the FWC awarding a 5.2% increase to workers on the minimum wage, although workers on award rates will only receive a 4.6% increase (minimum $40/week increase for award rates below $870/week).

A key element of this decision was the very high CPI inflation rate of 5.1% in the March quarter 2022 (which was latest available quarter). Given that CPI inflation has moved higher, it is likely that the minimum and award increases provided by the FWC will remain high for the next 1-3 years, particularly given the support for higher wages from the new Federal Labor Government (which the previous government did not support). These FWC decisions will also influence the strength of wage increases given to those who receive their wages via 'individual arrangements' pay setting arrangements. As discussed above, employees on the third form of wage-setting – collective agreements or enterprise bargaining (EBAs) – will also pursue higher wage outcomes due to higher inflation, as their current agreements expire. Although wage increases related to the NMW and relevant awards are set each July, many enterprise agreements – covering 38% of the full-time workforce – run for an average of 2-3 years. These agreements averaged 2.6% over the four years to June 2021, having been set in an environment of low inflation and a much less tight labour market. However, as these previous (low wage increases) agreements expire, we expect the next round of agreements to be materially higher, due to both high CPI inflation and because of widespread skilled labour shortages. The bottom line is that the next round of wage rises negotiated by workers will be much higher than in recent years.

Returning to the outlook for EGWWS wages, we expect to see the continuation of critical skilled labour shortages and competition for scarce labour, which are now emerging - particularly from the mining and construction sectors, which will push up wage demands in the utilities sector. Mining investment is now picking up and we expect to see significant increases over the next 2 years to 2023/24 and remain at elevated levels until the end of the decade. Meanwhile, there is similar strong growth coming through in the Construction sector, with solid increases across all segments of the overall construction sector (residential building, non-residential building and civil engineering & infrastructure construction) over 2021/22 to 2024/25, leading to strong labour demand in that sector, particularly from 2024 when activity surpasses the 2018 levels. With regard to utilities investment, BIS Oxford Economics forecasts steady increases over the next seven years, with electricity-related engineering construction projected to be 45% higher in real terms in 2078/28 compared to 2020/21 levels, including a 14% increase over 2023/24 to 2027/28.

Employers are already reporting an increasing shortage of technicians and trade workers, and employees with STEM skills. These are essential workers in the utilities sector. A key problem is that the TAFE (technical and further education) systems across the country have simply not been training enough workers. BIS Oxford Economics research shows this is being compounded by new graduates in the trades stream, in particular, not increasing fast enough to replace retiring workers, with new graduate numbers in some trades actually falling. Despite government announcements that they are moving to address the TAFE system, it is unlikely that these issues will be fully addressed within the next five years. Added to this is that skilled immigration is recently returning after being suspended since early 2020. Although now resumed, it is likely to be a slow ramp-up, meaning that the skill shortages will persist and will not be easily or quickly solved by migration.

With strong competition for similarly skilled labour from the mining and construction industries, firms in the utilities sector will need to raise wages to attract and retain workers. In other words, the mobility of workers between the EGWWS, mining and construction industries means that demand for workers in those industries will influence employment, the unemployment rate and spare capacity in the EGWWS labour market. Businesses will find they must 'meet the market' on remuneration to attract and retain staff. Accordingly, we expect wages under both individual arrangements and collective agreements to increase markedly over the 2022/23 to 2025/26 period.

Wages in the ACT utilities sector are forecast to lift in 2022/23 to 3.1% (from an estimated 1.5% in 2021/22), as a new round of EBAs are negotiated and non-EBA wages pick up due to higher inflation and the tightening labour market in the ACT and NSW. Thereafter, wages in the ACT utilities sector are expected to move in line with – but remain slightly lower than - the national utilities sector average through most of the forecast and regulatory period (see table 1.1). This is due to relatively weaker growth in utilities construction and overall construction in the ACT, compared to other states.

Nevertheless, there is expected to be strong and sustained growth in utilities-related construction over the forecast period, which will drive strong wage pressures in the utilities sector in the Territory. Meanwhile, total construction activity in the ACT is forecast to lift 20% over the next two years, before dropping back over 2024/25 to 2026/27 and again rising strongly to the end of the decade. In addition, there will be strong wage pressures emanating from NSW, also due to high and increasing levels of utilities and overall construction activity.

ACT EGWWS WPI growth is forecast to average 3.6% per annum in nominal terms over the five years to 2027/28 inclusive (i.e., over Icon Water's next regulatory period) – or 0.5% in real (inflation-adjusted) terms (see Table 1.1). Compared to the EGWWS WPI forecast in March 2022, the nominal wage growth is higher (it was 3.2%), but the real increase is lower – it was 0.7% in March – because the CPI inflation forecast is materially higher, now forecast to average 3.1% compared to 2.6% in the March forecasts.

The 'All Industries' WPI for ACT is used to escalate Icon Water's **general labour** (i.e., non-network and non-external professional labour) costs. Growth in total or 'All Industries' wages at the state level usually depends on the relative strength of the state economy and labour markets, compared to the national average. Over the 2022/23 to 2027/28 period, we expect the ACT all industries WPI to continue track the movements in the Australian average, but with the ACT average slightly below the national average. The lower wage growth in the ACT vis-à-vis the national average is in line with the growth differentials between the ACT and Australian economy, although lower wage growth in the ACT public sector will continue to keep overall wages growth relatively muted over 2022/23 to 2025/26, compared to the national All Industries average. Conversely in 2026/27 and 2027/28, we expect slightly higher growth than the national average, due to stronger economic growth in the ACT over 2025/26 and 2026/27. In the five years to 2027/28, we are forecasting the total territory (All Industries) WPI in the ACT to average 3.5% in nominal terms, close to the national average. In real (inflation-adjusted) terms, the average annual increase is forecast to be 0.4% (see Table 1.1).

Table 1.1 Summary – Labour & Materials Cost Escalation Forecasts: ACT
(per cent change, year average, year ended June)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Average (h)
	Actuals						Forecasts	Next Revenue Determination Period					
NOMINAL CHANGES													
Australian Capital Territory Wages: All Industries Wage Price Index (a)	1.8	2.0	2.1	2.3	1.4	2.5	3.1	3.6	3.7	3.5	3.3	3.2	3.5
Electricity, Gas, Water and Waste Services Wages: Australian Capital Territory - Wage Price Index (b)	2.3	2.2	2.8	2.7	1.9	1.5	3.1	3.7	3.9	3.7	3.4	3.2	3.6
Electricity Price: ACT - Large Industrial Users (c)	17.0	28.4	7.8	-12.8	-0.8	9.2	-1.1	35.4	56.4	-25.0	-12.7	1.1	11.0
Chemical Prices (d)	-1.7	7.9	15.2	-3.7	-0.1	7.9	27.6	-5.7	-3.0	-1.8	2.6	2.4	-1.1
Construction Costs (e)	0.1	1.3	3.1	2.7	2.2	5.2	5.4	2.9	3.4	3.0	3.0	2.9	3.0
Consumer Price Index (headline) (f)	1.7	1.9	1.6	1.3	1.6	4.4	7.1	4.8	3.0	2.5	2.5	2.5	3.1
REAL CHANGES (g)													
Australian Capital Territory Wages: All Industries Wage Price Index (a)	0.1	0.0	0.4	0.9	-0.2	-2.0	-4.0	-1.1	0.7	1.0	0.8	0.7	0.4
Electricity, Gas, Water and Waste Services Wages: Australian Capital Territory - Wage Price Index (b)	0.6	0.2	1.2	1.3	0.2	-3.0	-4.0	-1.1	0.9	1.2	0.9	0.7	0.5
Electricity Price: ACT - Large Industrial Users (c)	15.3	26.5	6.2	-14.2	-2.4	4.7	-8.2	30.6	53.3	-27.5	-15.2	-1.4	8.0
Chemical Prices (d)	-3.4	5.9	13.5	-5.1	-1.7	3.4	20.5	-10.4	-6.0	-4.3	0.1	-0.1	-4.1
Construction Costs (e)	-1.7	-0.6	1.5	1.4	0.5	0.8	-1.7	-1.9	0.3	0.5	0.5	0.4	0.0

Source: ABS, RBA, Icon Water, BIS Oxford Economics

(a) Wage price index. Ordinary time hourly rates of pay excluding bonuses.
(b) EGWWS WPI historical data is estimated for Australian capital territory
(c) Icon Water's Electricty price proxied by price for large industrial users in ACT
(d) Icon Water's chemical prices proxied by Australian Basic Chemical Manufacturing Producer Price Index (PPI)
(e) Construction costs proxied by Water & Sewerage Construction Implicit Price Deflator for Australia
(f) Inflation forecasts are RBA forecasts to December 2024 from latest 'Statement of Monetary Policy'. Beyond that, inflation forecasts are based on the mid-point of RBA inflation target (2.5%).
(g) Real price changes are calculated by deducting the inflation rate from nominal price changes.
(h) Average for the next revenue determination period i.e. from 2023/24 to 2027/28 inclusive.

1.2 CONSTRUCTION COSTS

The water supply and sewerage construction IPD (implicit price deflator) tracks movements in water supply and sewerage construction costs. The water supply and sewerage IPD is an input-based index, and so does not include contractor margins. For this project, we performed additional research into the construction of the IPD to find the inputs which provide the best fit to historical cost movements in the index. The input weightings used to forecast the IPD were set out in the previous report.

Construction costs – as proxied by the Water & Sewerage Construction implicit price deflator (IPD) – are forecast to show no real increase (0% in real terms) over the five years from 2023/24 to 2027/28. This compares to the average 0.34% real increase predicted in the March report. In nominal terms, the construction IPD is forecast to increase by an average of 3.03% p.a. which, while slightly higher than the 2.9% forecast in March 2022, is effectively eroded by the higher CPI inflation projection. However, it is important to note that the 2022/23 base of construction costs is expected to be much higher than the March prediction, with the actual outcome in 2021/22 almost 1% higher than the March estimate and the forecasts 3.5% higher – in March we forecast 1.9% growth in construction costs in 2022/23, but now we expect a nominal increase of 5.4%. The latest June 2022 quarter data showed that the Water & Sewerage Construction IPD was 5.7% higher than the June quarter 2021, which will underpin a high increase in 2022/23. The bottom line is that construction costs will be at much higher levels than in the five years to 2020/21.

The key driver of increased costs over the forecast period will be strong growth in construction wages (which comprise 60% of the overall index), due to skilled labour shortages and rising construction activity, with total construction activity set to surpass the previous peak by 2023/24 and remain at elevated level to 2025/26. These higher activity levels will also see other related construction inputs, such as plant and equipment hire, concrete, etc, all rise sharply over 2022/23 and remain at elevated levels in the period to 2025/26, before easing as construction activity falls back. The Construction WPI has recorded much faster growth than the All Industries WPI over the past year and is forecast to outstrip the All Industries WPI over the next few years.

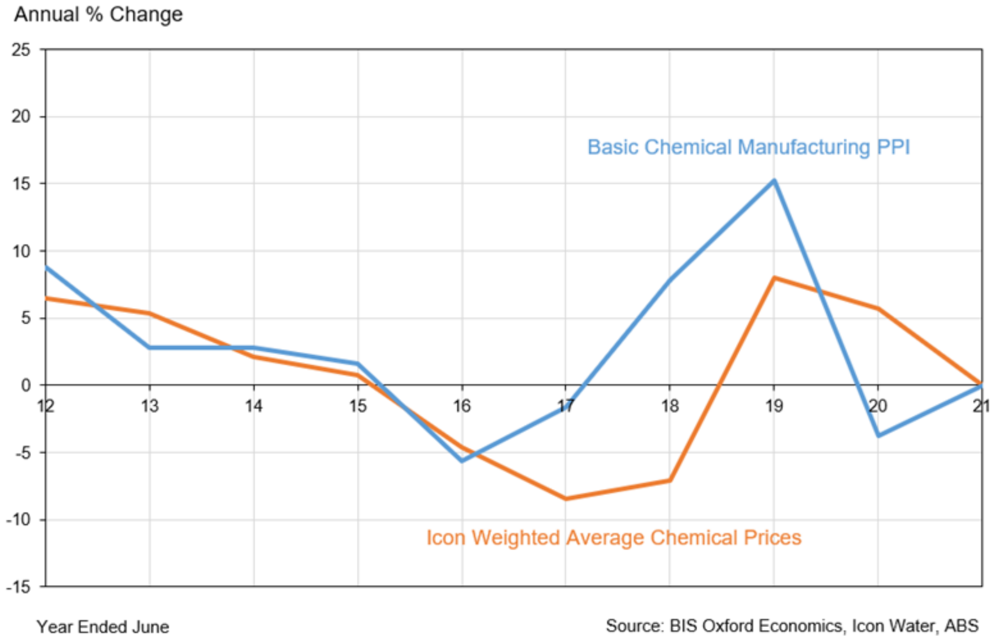
However, expected declines in some commodity prices over the next 2-3 years will feed through to some of the inputs into the Water & Sewerage construction IPD, including steel and oil prices, the latter pushing down prices for plastic piping and freight costs. Weaker growth in these prices or price declines (from current high levels) will tend to mute the price growth in the overall IPD over 2023/24 and 2024/25.

1.3 CHEMICALS PRICES

We have used the producer price index (PPI) for Basic Chemical Manufacturing to proxy Icon Water's chemical price changes. The main drivers of prices include: the price of oil, which we understand is used in the manufacturing process for numerous chemicals purchased by Icon Water (noting that this also would capture the use of natural gas used to manufacture chemicals given that the price of oil and gas are related); a manufacturing input price index from the ABS called 'Non-Metallic Mineral Quarrying' – which covers the quarrying of materials such as alum and salt; plus manufacturing wages, the exchange rate, and electricity and gas prices.

We chose to represent price movements with the index for a number of reasons – firstly, the index allows for a more detailed view of historical prices than the series provided by Icon Water. Furthermore, for any pricing submissions to regulatory agencies, there is often a focus on official price series such as the ABS producer price indices (or wage price indices, or consumer price index). Finally, we find a strong correlation between the ABS index and the weighted average of the prices provided by Icon Water. This is illustrated in Figure 1.3, with a comparison between FY12-21 (the most recent date that is available from the Icon Water data).

Fig. 1.3 Weighted Average of Icon Water Chemical Prices and ABS Producer Price Index



The strong price increase in 2021/22 (+7.9% in nominal terms) in the Basic Chemical Manufacturing PPI is expected to be followed by a substantial 27.6% lift in 2022/23. The latest September 2022 quarter data showed that the PPI was up 29.5% through-the-year compared to the September 2021 index level, with this high current level expected to underpin the very large increase in 2022/23. These very strong price increases are being driven mainly by the jump in oil prices, further reinforced by the lower exchange rate, which are also driving up quarrying costs via the higher price of diesel. Going forward, prices are expected to fall back from current peaks over 2023/24 to 2025/26, as firstly oil prices decline, and then gas and electricity prices ease back. Prices are then expected to rise over 2026/27 and 2027/28 as wages and other input prices rise, including oil prices, with an expected fall in the exchange rate in 2026/27 (mainly due to a cut in interest rates) putting upward pressure on A$ oil prices.

Over the next regulatory period of 2023/24 to 2027/28, nominal prices are forecast to decline by an average of -1.1% p.a. In real terms, real prices are forecast to decline by an average of -4.1% p.a., with the higher CPI inflation outlook driving prices down from the historic highs of 2022/23.

Quoted market prices Icon Water provided for the 2022/23 financial year, showed substantial increases and are in line with the very large increases in the Basic Chemicals Manufacturing PPI over the past 18 months. Given the lags in the PPI and the average chemical prices paid by Icon Water – see figure 1.3 above - it is likely that the high prices of 2022/23 will see further price rises in 2023/24, particularly as Icon Water may need to enter into longer contracts to ensure security of supply. This is in line with the recent changes to the *Security of Critical Infrastructure Act (2018)*, which received royal assent in December 2021, and some further expected changes under the *Security Legislation Amendment to Critical Infrastructure bill (2022)*.

2. ELECTRICITY COSTS FORECASTS

This section of the report provides the latest electricity forecast outlook for Icon Water, to be used in their operating and capital expenditure forecasts. This is an update to the forecasts prepared for Icon Water in March 2022.

The key changes to the forecasts in this report include an update for the more recent historical data and reflect the latest economic outlook. The methodology for the wholesale component of the retail forecasts has also been revised, following feedback from the ICRC and their consultants, Marsden Jacob Associates (MJA). The network charge forecasts also incorporate the latest EN24 Draft Proposal by Evoenergy to the Australian Energy Regulator (AER) for the 2024/25-2027/28 regulatory period.

Wholesale electricity price forecasts (nominal)

Energy Fuel Costs

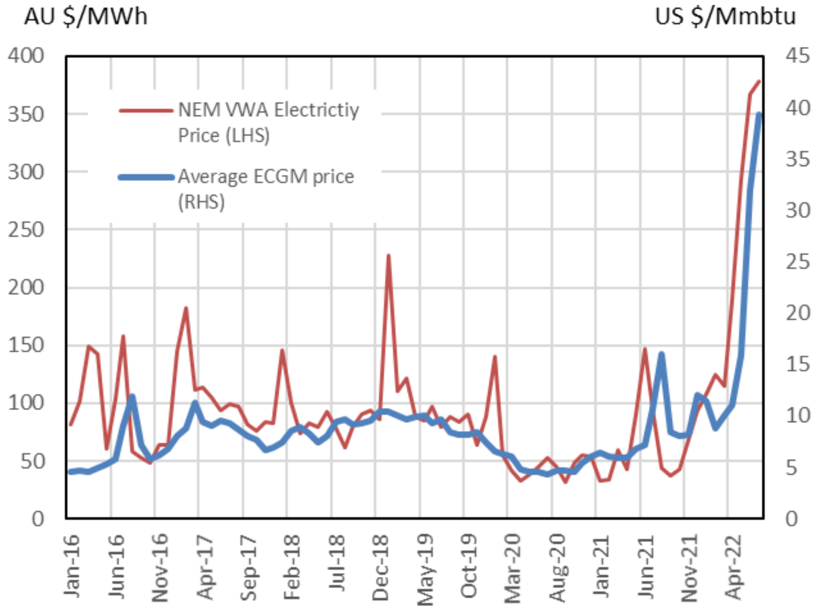
The economic environment has changed significantly since March 2022. While the world emerged from lockdowns at the start of this year, ongoing supply chain bottlenecks meant supply was unable to catch up with the strong recovery in demand for goods. This put upward pressure on global commodity prices, particularly energy. Since then, the worsening Russia-Ukraine conflict and subsequent curtailment of gas supply to Europe has added further upward pressure to gas prices in Europe.

Eventually this has spread to other markets across the world, including the Japanese-Korea Marker (JKM) – the reference price for Australia's LNG exports. As a result, the upward price pressure has permeated domestic gas prices in Australia as well. The gas netback price (ex-Wallumbilla) is estimated to have been $66/GJ in October 2022 compared to $30/GJ in March 2022[1], significantly higher than the average gas price of $7.5/GJ between 2018-19 to 2020-21.

The rise in gas prices has also translated to strong wholesale electricity spot market, as gas powered generators (GPG) more frequently set the market price, illustrated in the figure below. Thermal coal prices in the export market have also seen a similarly strong price rise this year, owing to supply chain bottlenecks. This has also contributed to the recent strong electricity wholesale price rises.

[1] Historical and futures ex-Wallumbilla gas prices are available on the ACCC website. For more details, please see https://www.accc.gov.au/regulated-infrastructure/energy/gas-inquiry-2017-25/lng-netback-price-series.

Fig. 2.1 Australia: NEM Volume Weighted Average (VWA) Wholesale Electricity Price vs. Average East Coast Gas Market Price (ECGM)[2] - History



AER/ BIS Oxford Economics

Going forward, gas and thermal coal near-term forecasts are sourced from the *Consensus Economics* monthly publication *Energy & Metals Consensus Forecasts (E&MCF).* For Thermal Coal, the longer-term forecasts are supplemented by forecasts from the official Commonwealth Government commodity forecaster, the Department of Industry, Science and Resources' Office of the Chief Economist publication *Resource and Energy Quarterly* (REQ)[3]. The gas forecasts in the longer-term are anchored to *Consensus E&MCF* Brent Oil forecasts and are assumed to return to the historical relationship between gas and oil by the end of the forecast period.

For both fuel sources, prices are expected to peak in 2023-24 ($389/tonne for coal and $70/GJ for gas). From 2023-24, it is expected that prices will take some time to correct. Thermal coal price only returns to historical levels by the end of the forecast window while gas prices still remain elevated (at $22/GJ) compared to history, by 2028-29.

It is worth noting that considerable **uncertainty** surrounds the pace of normalisation in these prices. With the ongoing conflict in Ukraine and Europe now heading into winter, the risk remains significantly weighted to the upside for prices.

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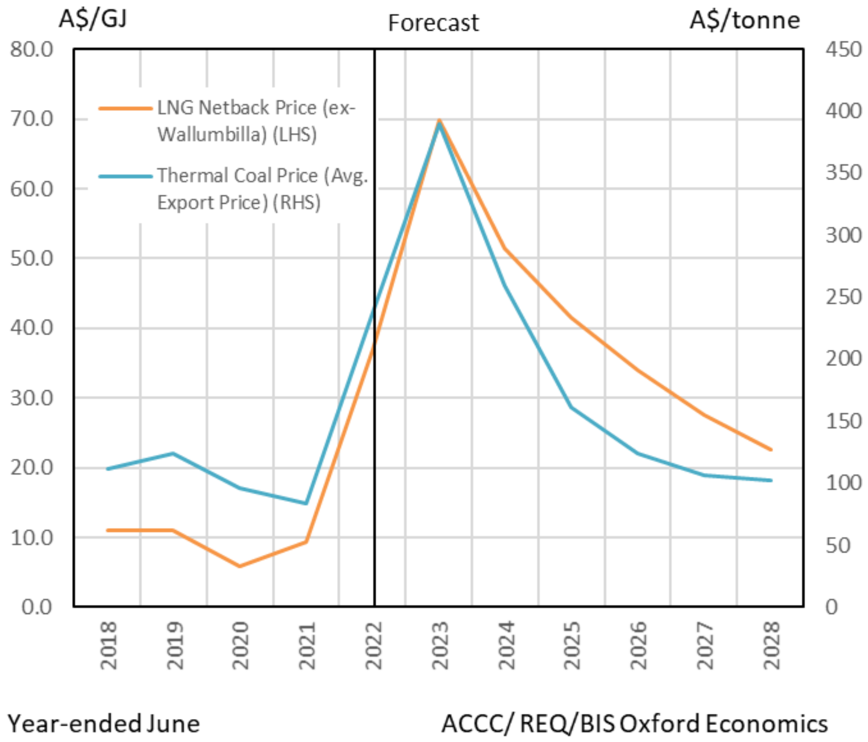
[2] The ECGM is derived by the AER and references the Short Term Trading Market (STTM), Gas Supply Hub (GSH) and Declared Wholesale Gas Market (DWGM) in Victoria. For more information please see AER's *Wholesale Markets Quarterly Report – Q2 2022* https://www.aer.gov.au/wholesale-markets/performance-reporting/wholesale-markets-quarterly-q2-2022#:~:text=This%20Wholesale%20Markets%20Quarterly%20report,to%20keep%20the%20lights%20on

[3] Resource and Energy Quarterly, March 2022, https://www.industry.gov.au/publications/resources-and-energy-quarterly-march-2022

Fig. 2.2 Australia: LNG Netback Price & Thermal Coal Price – History & Forecast



Wholesale Electricity Spot Market Prices

The wholesale electricity price forecasts take into account the marginal cost of producing electricity. As a result, the forecast profile is largely driven by the fuel price profile for thermal coal and gas.

To develop the wholesale price forecasts, we have analysed historical market setting behaviour by fuel type. In New South Wales, Black Coal has historically set the price most frequently, followed by Hydro, as shown below.

Over the outlook, we expect the frequency with which black coal sets prices to fall over time as coal generators shut down and other renewable sources ramp up. This is also consistent with the key assumptions made by MJA in their report. In the case of New South Wales, we expect that this source of renewable energy will be mostly hydro.

In particular, BISOE have adjusted the outlook to account for:

- Closure of Liddell Coal Generator – all units are assumed to be decommissioned in 2023-24, per the Australian Energy Market Operator (AEMO) assumptions[4].
- Closure of Erraring Coal Generator – all units are assumed to be decommissioned in 2025-26, per AEMO's assumptions.
- Snowy Hydro 2.0 coming online – assumed to be in 2025-26, as per AEMO's assumptions.

[4] AEMO Inputs, Assumptions and Scenarios Report (IASR) https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp/current-inputs-assumptions-and-scenarios

Fig. 2.3 New South Wales: Market Price Setting Frequency by Major Fuel Type

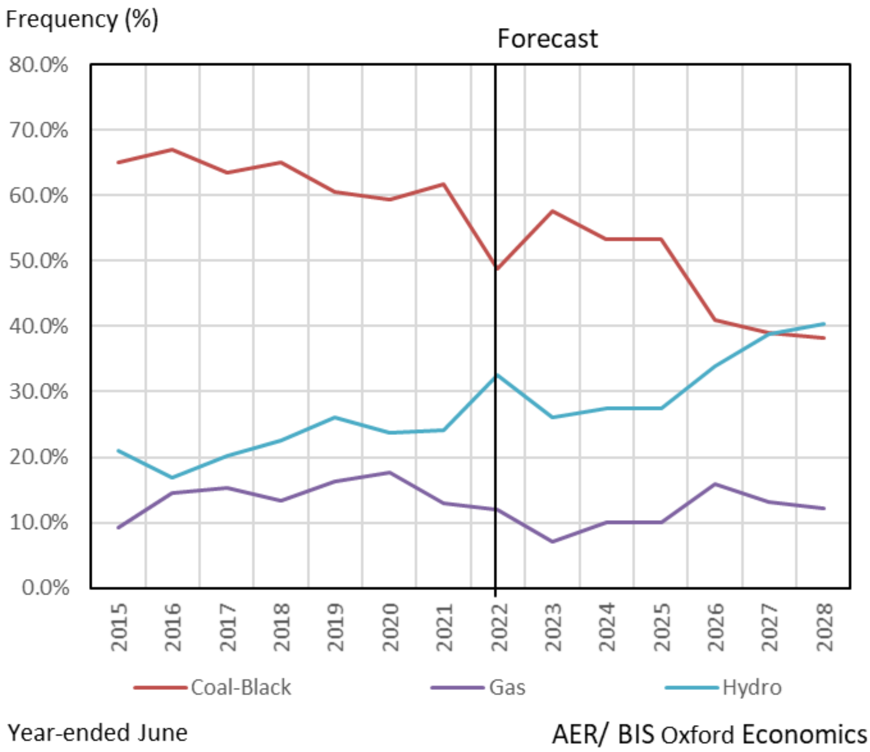
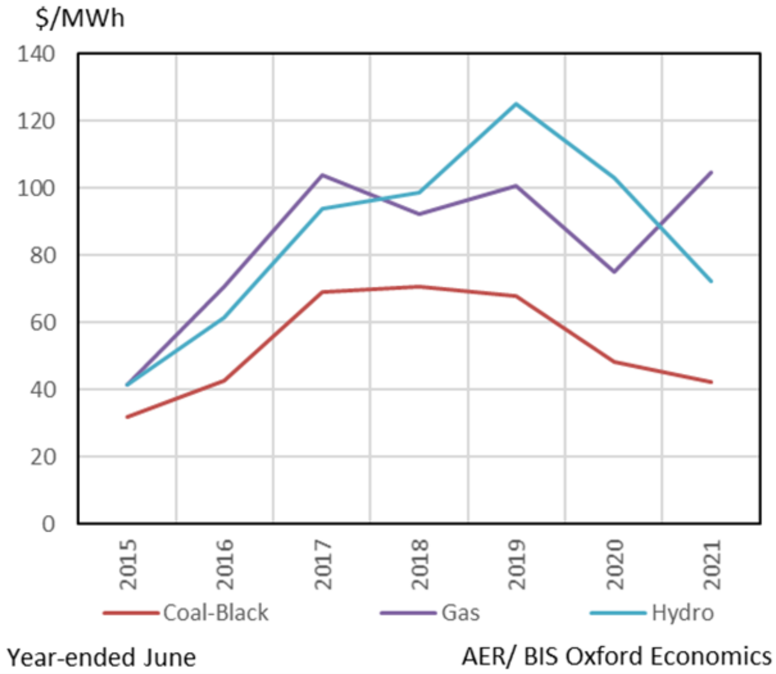


Fig. 2.4 New South Wales: Average Price Set by Fuel Type



Translating this to prices, we take a market price setting frequency – a weighted fuel cost approach to deriving the wholesale forecasts. Regarding the chart above, the other fuel types not included are brown coal, solar and wind – which accounted for an average of 2.6%, 2.7% and 1.3% respectively over the past three years to 2021/22. Note that Hydro tends to adopt shadow pricing rather than pricing at own short run marginal cost, estimated at $7/MWh by AEMO[5]. Hydro tends to price to the next highest bidder, which has typically been gas, as shown in figure 2.4.

For this reason, in the case of Hydro we assume its price setting behaviour follows gas over the outlook. Therefore, despite an increase in renewable penetration (through Hydro) we do not expect this to significantly weigh on wholesale electricity prices. This is in contrast to MJA, who assume that increased renewable penetration begins to weigh on prices from 2025-26. BISOE believe our assumptions are consistent with historical behaviour.

Over the outlook period the spot market wholesale price is forecast to rise next year, as the global energy market price pressures continue to flow through. We expect wholesale electricity spot market prices to peak at 2023-24 before steadily correcting for the remainder of the forecast.

Risk to the Wholesale Electricity Price Outlook

It is worth noting that there are several factors of upside risk to the wholesale electricity price outlook. Some of these are transitory factors – the uncertainty of the Russia-Ukraine war and winter heating demand in Europe – while others could be more structural risks.

We assume in the baseline that renewable sources (hydro, solar, wind) come online to displace fossil fuel generation (black coal and gas). However, signficant transmission capacity is required to enable this to happen. There remains uncertainty around how fast the new high voltage transmission lines can be developed to enable increased renewable energy sources. Delays, in particular to construction, in the current supply constrained environment, is a pertinent risk.

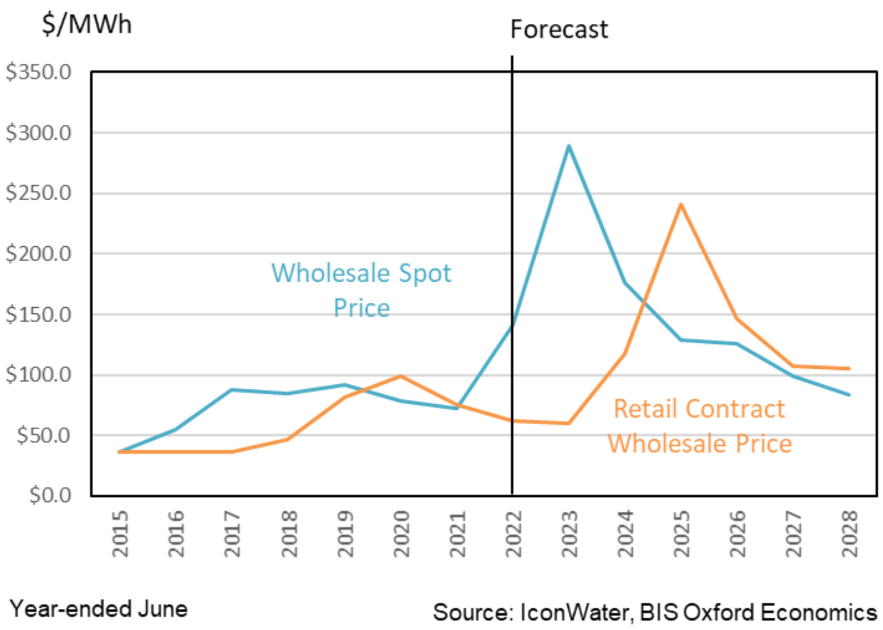
Meanwhile, the exit of already aging coal fleet is assured. Therefore, the implication from any delays to renewable generation coming online would be greater reliance on gas powered generation. This could result in higher wholesale electriricty prices if the current tighteness in global gas markets do not abate any time soon.

There is also an elevated risk from additional outages at the ageing coal-fired plants, due to minimum expenditure on maintenance as the plants approach their retirement dates. These outages would also require greater relaince on gas genearation.

The wholesale spot market price is assumed to be come through into the wholesale component of Icon Water's retail contract pricing with a lag, only peaking in 2025-26 before starting to correct. This is consistent with the historical experience (see figure 2.5), where there appears to be around a two-year lag between the spot wholesale price and the contracted wholesale price, due to the length of forward contacts.

[5] See AEMO Inputs, Assumptions and Scenarios Report (IASR) https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp/current-inputs-assumptions-and-scenarios

Fig. 2.5 Wholesale Electricity Spot Price Forecast vs. Icon Water Retail Contract (Wholesale Price component)



Network price growth profile

We used current AER determinations for Evoenergy in the Australian Capital Territory (ACT) to track the likely path of electricity transmission and distribution prices for the current pricing period (up to 2023/24). Beyond this, we have used the latest Draft Plan, prepared by Evoenergy for the regulatory period of 2024/25 – 2027/28[6].

Table 2.1 Distribution and Transmission X-Factors, CPI, 2024-25 to 2027-28

	2024-25	2025-26	2026-27	2027-28
Distribution X-Factor	-4.6%	-2.4%	-2.4%	-2.4%
Transmission X-Factor	0.3%	0.0%	0.0%	0.0%
CPI	3.0%	2.5%	2.5%	2.5%
CPI - X	7.3%	4.8%	4.8%	4.9%

Additionally, the ACT Government Feed in Tariff[7] (FiT) costs increased considerably in the 2022-23 financial year for all consumers of electricity. FiT costs here refer to the small/medium and large Feed in Tariffs. For the short term (up to 2022/23), FiT costs were taken from the AEMC's Residential Electricity Price Trends report[8]. This report states the forecast growth in costs were provided directly

[6] https://www.evoenergy.com.au/about-us/about-our-network/electricity-five-year-plan#:~:text=Consultation%20on%20Evoenergy's%20Draft%20EN24,Energy%20Regulator%20in%20January%202023.&text=Our%20current%20five%20year%20plan,the%20Australian%20Energy%20Regulator%20website.

[7] The ACT Feed in Tariff considered within the network cost component are those associated with the ACT legislation: *Electricity Feed-in (Large-scale Renewable Energy Generation) Act 2011*

[8] The AEMC Residential Electricity Price Trends: https://www.aemc.gov.au/market-reviews-advice/residential-electricity-price-trends-2021

from the ACT government. Beyond this period, we have assumed the FiT costs will increase in line with consumer price inflation.

Costs of green schemes

The green scheme costs consist of the national schemes, including:

- Large-scale renewable energy target (LRET),
- Small-scale Renewable Energy Scheme (SRES), and
- ACT's Energy Efficiency Improvement Scheme (EEIS).

Our LRET and SRES forecasts are based on current and forward trading prices of certificates (LGC and STC, respectively)[9]. Electricity consumers pay a percentage of the certificate price per MWh of electricity consumed. These percentages are provided by the Clean Energy Regulator. We have assumed the present year percentages for the duration of the forecast.

The current cost for the EEIS was provided to us by Icon Water. We have assumed this cost will increase in line with consumer price inflation.

Other costs

Other costs consist of metering costs, NEM fees and other ACT scheme costs. They contribute a small proportion of the total electricity price. Current costs were provided by Icon Water or sourced from the ICRC. We have assumed these costs will increase in line with consumer price inflation.

Table 2.2 Electricity Price Forecasts
(per cent change, year average, year-ended June)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Average (c)
	Actuals						Forecast	Next Revenue Determination Period					
NOMINAL ELECTRICITY PRICE CHANGES FOR INDUSTRIAL USERS													
Australian Capital Territory - Large Industrial Users	17.0	28.4	7.8	-12.8	-0.8	9.2	-1.1	35.4	56.4	-25.0	-12.7	1.1	11.0
Consumer Price Index - Headline (a)	1.7	1.9	1.6	1.3	1.6	4.4	7.1	4.8	3.0	2.5	2.5	2.5	3.1
REAL ELECTRICITY PRICE CHANGES FOR INDUSTRIAL USERS (b)													
Australian Capital Territory - Large Industrial Users	15.3	26.5	6.2	-14.2	-2.4	4.7	-8.2	30.6	53.3	-27.5	-15.2	-1.4	8.0

Source: BIS Oxford Economics, Icon Water

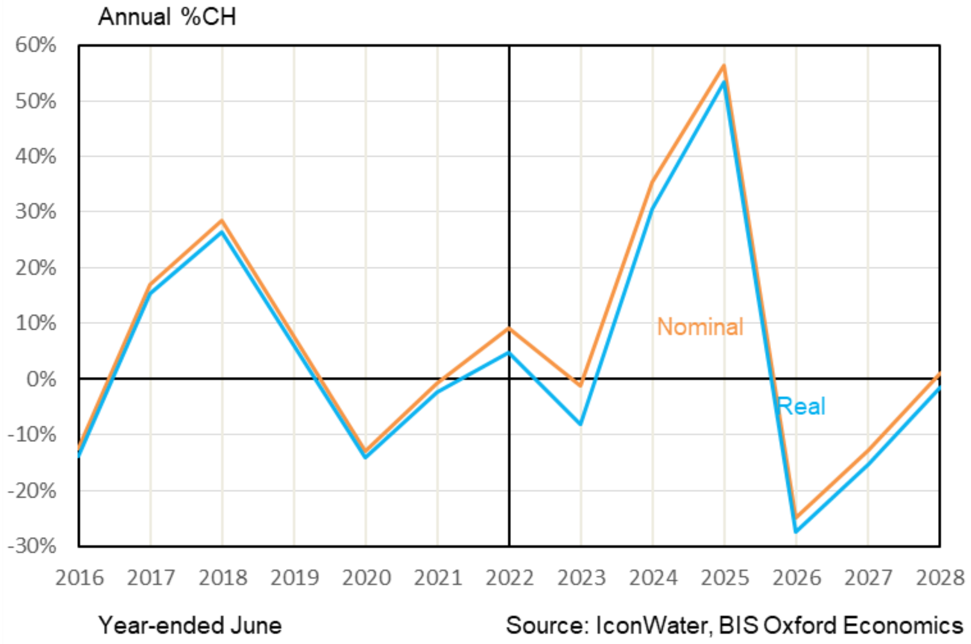
(a) Inflation forecasts are RBA forecasts to December 2024 from latest 'Statement of Monetary Policy'. Beyond that, inflation forecasts are based on the mid-point of RBA inflation target (2.5%).
(b) Real price changes are calculated by deducting the inflation rate from nominal price changes.
(c) Average for the next revenue determination period i.e. from 2023/24 to 2027/28 inclusive.

Final Retail Price Forecasts

The final retail price forecast takes into account existing retailer contracts for 2023-24, which is expected to fall by 1.1% from 2022-23 prices. Beyond this, we expect the current wholesale market price rises to come through, peaking in 2025-26 before correcting through 2026-27.

[9] Publicly traded certificate prices reported by Mercari: https://www.mercari.com.au/environmental/

Fig. 2.6 Industrial User Electricity Price Forecasts



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1.4 ICT Investment (SaaS) step change paper

(confidential)

1.4.1 ICT Investment (SaaS) step change model

(confidential)

1.4.2 ICT Investment (SaaS) step change project documents

(confidential)

1.5 SoCI step change paper

(confidential)

1.5.1 Estimated costs for Icon Water's pathway to compliance under SOCI reforms – NaturalHazards & Supply Chain

(confidential)

1.5.2 Security of Critical Infrastructure Act 2018 Physical Security Remediation Cost Validation

(confidential)

1.5.3i KPMG costings - Natural Hazards

(confidential)

1.5.3ii KPMG costings Supply Chain

(confidential)

1.5.4 Cyber for SOCI costings with reconciliation

(confidential)

1.5.5 Estimated costs for Icon Water to Prepare for Enhanced Cyber Security Obligations

(confidential)

1.6 Managing Buildings Better Reform design and implementation – Activities

(confidential)

1.6.1 Managing Buildings Better Reform design and implementation – Costings

(confidential)

1.6.2 Managing Buildings Better Reform WMMS Stage 3 Initiative Summary

(confidential)

1.6.3 Managing Buildings Better Reform WMMS Stage 3 Costings (confidential)

Attachment 2

Capital expenditure

December 2022

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2.1 Introduction

This attachment sets out Icon Water's response to the Independent Competition and Regulatory Commission's (the Commission's) assessment of Icon Water's capital expenditure (capex) program delivered over the 2018–23 regulatory period, and the investment program planned for the 2023–28 regulatory period, in their Draft Decision of October 2022.

As part of our response, we have updated our capital investment program for the next five years. We have also identified opportunities to provide further information to support cost estimates assessed by the Commission and its expenditure consultants Marsden Jacobs Associates (MJA).

Our revised capital investment plan for the 2023–28 regulatory period is necessary so we can renew and expand the critical infrastructure required to provide water and wastewater services to the region.

Box 2-1: Key points

- Icon Water's revised gross capex over the 2023–28 regulatory period is $717.4 million, or $689.1 million net of capital contributions, including $206.8 million for investment in water services assets and $482.2 million for wastewater service assets. This includes a $97.3 million investment in non-system assets.[1] Our forecast is 2.1 per cent lower than the forecast submitted to the Commission in June 2022, with the decrease mostly being driven by the decision to defer and reprofile some expenditure, as well as the shift in accounting treatment for some ICT projects from operating expenditure (opex) to capex.
- Actual prudent capex investment in water and wastewater assets during the 2018–23 regulatory period will amount to $516.5 million ($2022–23), including $212.0 million for water services and $304.6 million for wastewater services. This estimate is 6.1 per cent higher than our estimate submitted in June 2022.[2] We updated our estimate for 2022–23 which produced a slightly higher overall estimate and added the cost of capitalised leases that were omitted from our proposal. We have also provided further information to the Commission to support the prudency and efficiency of projects undertaken during the 2018–23 regulatory period.
- We provide our response to matters raised in the Commission's Draft Decision, including:
  - Reprofiling of our capital investment plan based on a recommendation from MJA. We have considered the likely delivery frameworks given updated information and reflected reprofiling for some projects.
  - Applying a 2.3 per cent adjustment to projects not individually assessed as part of the expenditure review. We consider this position to be inconsistent with the Commission's previous assessment of the incentives Icon Water faces and produces a forecast that does not reflect efficient costs.
  - The expenditure review assessment of individual projects undertaken by MJA and accepted by the Commission. We have provided further information to support higher estimates for some projects.
- We have also provided further information to demonstrate how we intend to deliver our capital investment program over the next five years. Our 2023–28 capital investment program is similar in magnitude to the program we have delivered over 2018–23, except for the addition of significant projects at the Lower Molonglo Water Quality Control Centre (LMWQCC). We have already undertaken work to commence planning for these significant projects.

[1] Our forecast investment in non-system assets is lower than our June 2022 regulatory submission. This is largely driven by projects moving from opex to capex as part of our ICT investment (SaaS) step change.

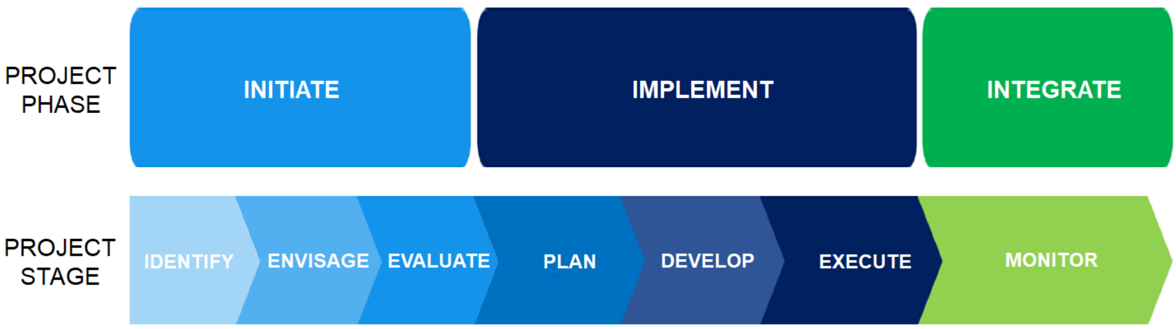
[2] The increase is also being driven by updated inflation estimates used to present the nominal forecast in real terms.

2.2 Response to the Commission's Draft Decision on portfolio adjustments

The Commission engaged MJA to assess the prudency and efficiency of our capital investment program for the 2023–28 regulatory period. MJA raised concerns with the maturity of projects and programs that we included in our regulatory proposal.[3]

MJA noted that approximately 68 per cent of projects in our forecast were in the evaluate stage in our Investment Planning and Delivery (IPaD) process (see Figure 2-1).

Figure 2-1: Icon Water's Investment Planning and Delivery (IPaD) process



Source: Icon Water.

While this was true at the time of our proposal, it masks the underlying maturity of our capital investment forecast. Our regulatory proposal submitted in June 2022 included:

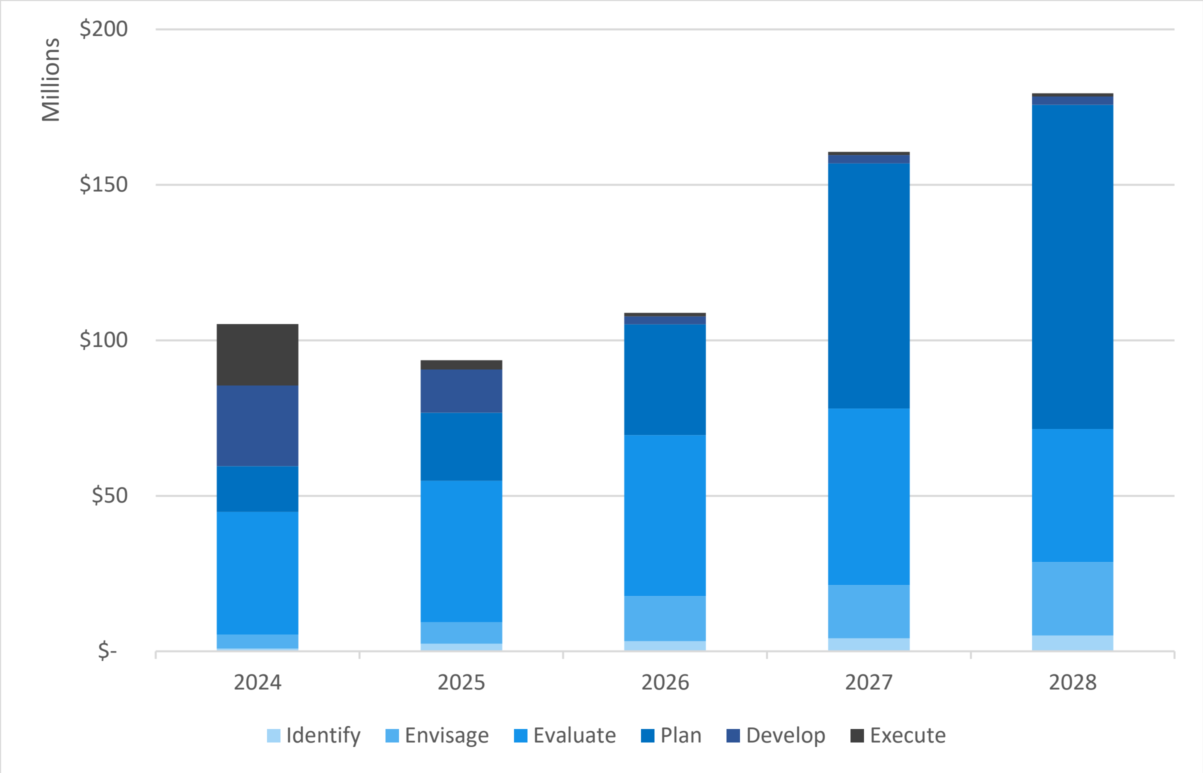
- Seven per cent (12 projects) that had reached the 'implement' phase of development with work occurring prior to the 2023–28 regulatory period.
- 35 per cent (two large projects at LMWQCC) with business cases in development, which are now available. These two projects distort the overall maturity assessment.
- 28 per cent of projects that had not yet reached the 'implement' phase, but which represent ongoing programs of work that require less intensive planning to deliver, and where we have high confidence in the forecast.
- 20 per cent of projects in the 'identify' stage which are reflective of work expected to commence in the current and 2023–28 regulatory periods, which are included in the asset management plans.

The assessment also underestimates the speed in which projects and programs can progress through the IPaD process; to date, several projects have reached key milestones since the original proposal was submitted. Our revised capital investment forecast reflects this updated maturity.

Our revised capital investment forecast includes approximately 51 per cent of projects having reached at least the 'plan' stage (see Figure 2-2 and Figure 2-3). We consider the maturity of our forecast reflects a reasonable balance between efficiently planning for the next five years and providing cost certainty to the Commission and our customers. We provide more information on our asset management and governance framework in section 2.2.3.

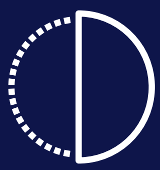
[3] ICRC, *Draft Report, Regulated water and sewerage services 2023–28*, October 2022, p. 49

Figure 2-2: Icon Water's revised capex forecast by IPaD stage gate ($millions, $2022–23)



Source: Icon Water.

Figure 2-3: Icon Water's Revised Investment Portfolio

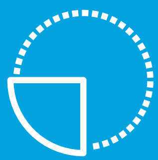


Implement

51% of the portfolio is in implement phases.

This means there is an approved solution, and Icon Water is actively implementing the solution. The activities that occur in this phase include finalising design, undertaking procurement, and obtaining external approvals such as Development Approvals.

The two large LM projects have just moved to this phase.

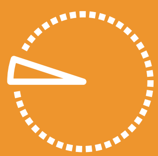


Programs of Work

27% of the portfolio would be described as ongoing 'programs of work'. There are 19 'programs' in the capital investment plan that fall in this category.

These represent ongoing budget allocations for activities that are undertaken every year. While these programs may be in 'evaluation', this is to formally review and confirm the updated approach based on improvements identified from the previous programs. These programs can therefore be forecast with high confidence.

Examples of these include sewer and water main renewals.



ICT

3% of the portfolio is for ICT projects.

Most of this is for projects still in early identification phases. As technology is rapidly changing in this space, business cases cannot be completed until closer to delivery.

Initiate

The remaining 20% of the portfolio is pre-business case; with most of the projects actively being investigated and evaluating feasible options. A number of these, particularly for growth projects, are supported by servicing strategies or standard equipment lists which streamline option evaluation.

About 1/3 of these is related to renewal of major components of water reservoirs. Icon Water expects to utilise similar design and construction techniques as per previous projects delivered from 2018–23.

Source: Icon Water.

2.2.1 The Commission made a Draft Decision to reprofile our capital investment forecast

The Commission noted its concern with our capacity to deliver our capex program and accepted MJA's recommendation to reprofile 39 per cent of the program, representing projects not individually assessed as part of its expenditure review, to reflect a simplistic view of deliverability.[4]

Our high-level response is that:

- Our revised forecast includes approximately 51 per cent of projects having reached the implement phase in our IPaD process. About half of the remaining forecast reflects ongoing programs of work in areas of our core business, which do not require the same level of investigation or additional forward planning to deliver. Refer to Figure 2-3.
- Eight per cent of projects represent IT projects or corporate initiatives which require smaller planning processes and lead times to deliver. Applying a high-level and simplistic reprofiling of our forecast based on IPaD stage gate does not reflect the true and likely delivery timeframe.
- The reprofiling does not reflect a prudency adjustment because it does not consider the optimum delivery timing we need to achieve to provide value to our customers.
- We will deliver our forecast capital investment plan and have already commenced market sounding activities with the intention to propose an updated delivery model by the end of 2022–23 and engage delivery partners for 2023 and beyond.
- Our revised forecast, outlined in section 2.3, takes into consideration the Commission's view and we have undertaken a comprehensive analysis of all project delivery assumptions to ensure we can deliver the program over the next five years.

We provide additional information in the following sections to further explain and clarify our planning processes and the maturity of our forecast.

2.2.2 The Commission made a Draft Decision to apply an efficiency adjustment

The Commission made a Draft Decision to apply an efficiency adjustment to projects not individually assessed by MJA as part of its expenditure review – representing approximately 39 per cent of our capital investment forecast for the 2023–28 regulatory period.

The Commission arrived at 2.3 per cent because it represents the same amount of total adjustment to the top 10 projects recommended by MJA as part of the expenditure review.

Our high-level response is that:

- Our IPaD process, which the Commission has found prudent and efficient, produces reasonable cost estimates across the planning and delivery process. Our internal estimates suggest, if anything, our process on average slightly underestimates future delivery requirements and costs. We undertake regular and iterative reviews to better understand and improve our processes over time.
- The Commission's position is inconsistent with the findings of its 2020 review of the incentive mechanisms applying to the regulation of Icon Water, where it found its current approach of a two-stage prudency and efficiency assessment of Icon Water's proposed capital expenditure performs well against the Commission's assessment criteria.[5] We provide further information to support this position in section 2.2.5.

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[4] ICRC, *Draft Report, Regulated water and sewerage services 2023–28*, October 2022, p. 55

[5] ICRC, *Water and Sewerage Services Price Regulation: Incentive Mechanisms*, August 2020, p. 29

- The adjustment of 2.3 per cent does not arrive at the actual prudent and efficient costs of the top 10 projects, with our revised proposal providing compelling evidence to support revised cost estimates.
- The Commission's two-stage prudency and efficiency assessment should reflect the likely and assessed costs of our capital investment program. The adjustment does not provide a true incentive to find efficiencies because it is not symmetrical and does not enhance the existing suite of incentives faced by Icon Water.

The following sections expand on the positions summarised in this section.

2.2.3 Icon Water's asset management and governance framework is efficient

We have a developed Asset Management Framework as described in our *Strategic Asset Management Plan* and Attachment 5 of the original proposal. The key artefacts are updated regularly and show the long-term (20 year +) forecast and assumptions that underpin our planning. These plans are available to the technical and economic regulators, although not all plans are shared publicly to minimise probity issues.

The Commission's position on future expenditure is summarised in its draft report, where it recognises the 'fluid' nature of longer-term portfolio forecasts and allows Icon Water to adjust the actual projects undertaken during the regulatory period.

> We do not determine which projects Icon Water should or should not undertake. This approach recognises the fluid nature of capital programs, and that Icon Water may need to re-prioritise its capital expenditure program in response to new circumstances over the course of the regulatory period. For example, Icon Water may need to undertake projects that it did not anticipate during the time of our investigation. Also, Icon Water may not need to complete some of the projects it proposed if circumstances change.[6]

<u>The timing of business cases needs to balance competing factors</u>

Our Asset Management Framework includes mature and comprehensive guidance of investment planning and project delivery. The programming of business cases is assessed by the portfolio prioritisation team, which considers the feasibility, complexity, priority and strategic alignment of each project or program. The timing of business cases needs to balance a number of competing factors. Business cases need to be developed with sufficient time ahead of the required delivery to allow for project planning and overall business budgeting.

However, they cannot be developed too far in advance otherwise assumptions and analysis become outdated. Movements in costs, technical regulations and technological development may change the preferred option if a business case is completed too far ahead of the required delivery timing. This requires an individual assessment of the requisite timing for each business case rather than applying over-simplified rules.

MJA expressed a preference, which appears to be endorsed by the Commission, that most projects and programs in our portfolio forecast have a business case.[7] In practice, this would mean that business cases approving technical solutions would need to be developed up to six years prior to actual implementation. If this was to occur, it would lead to rework as analysis and design needs to be redone closer to implementation to reflect changes in technology, regulations and cost. Icon Water would like to work constructively with the Commission to better understand a workable solution that balances

[6] ICRC, *Draft Report, Regulated water and sewerage services 2023–28*, October 2022, p. 44

[7] MJA, *Icon Water 2023–28 expenditure review – Final Report, 12 October 2022*, p. 10

efficiency by minimising cost with providing certainty to the Commission when it assesses our program forecasts for our next regulatory submission.

We have taken measures to ensure that the early forecasts – pre-business case – are still reliable at a portfolio level for the purposes for establishing customer prices. Projects and programs which have a material impact on the portfolio (total project cost over $5 million) have had independent estimates produced by a third-party estimator or have been developed using an equivalent recent project we have delivered. This estimate is based on the typical industry solution for the scale of problem.

In addition, our estimates are normally supported by an early strategic or feasibility study, which will eliminate operational controls as a long-term solution. This typically gives reliable estimates, as outlined in the case study in Box 2-2. We consider that for the purposes of an ex-ante review of expenditure, using a lower bound estimate is sufficiently reliable to estimate the amount to recover through customer prices.

Box 2-2: Fyshwick Sewage Pumping Station – case study

To support our 2018–23 regulatory submission, Icon Water engaged WT Partnership to prepare capital cost estimates for projects funded through the Water and Sewerage Capital Contribution (WSCC) Code. Upgrading the capacity of Fyshwick Sewage Pumping Station was one of these projects. Our project estimates were updated over time in line with our IPaD process, and produced the following estimates:

- A P50 estimate prepared in 2017 indicated that the project's cost to provide additional capacity at the site was $16.3 million ($2021).
- In April 2021 a concept design statement for a standard industry solution was approved by our Investment Review Committee (IRC) based on these estimates.
- In December 2022 a business case for the preferred solution was presented to our IRC. This business case was based on a concept design of the preferred solution with capital cost estimates of $16.25 million.

In this example the business case estimate was within one per cent of the initial P50 estimate produced in 2017.

Source: Icon Water.

The reliability of our forecast needs to be considered at a portfolio rather than an individual project level. Uncertainty, represented by project contingency, generally has an offsetting effect between projects. The largest source of uncertainty in the portfolio is establishing the need for the project and a capital solution. MJA's assessment of the top 10 projects showed that for all projects Icon Water established a clear need for the project, irrespective of the project stage.

We used guidance from the Essential Services Commission (ESC) to inform how we incorporated uncertain projects in our regulatory submission. The ESC's guidance suggests opportunities for water utilities to balance financing risk, while minimising speculative capital expenditure being passed on to customers before it is incurred. The ESC's guidance notes:

1. Include sufficient expenditure to cover only the development costs of the project, with efficient actual construction costs incurred during the period to be rolled into the RAB at the end of the period, along with any accumulated interest. This provides sufficient revenue allowance for the project to proceed during the next regulatory period, with cost recovery to commence in the following regulatory period at no net loss to the business.

2. Include development costs and a notional allowance for construction, with the balance of efficient construction costs (plus associated interest if required) to be rolled into the

RAB at the end of the period. This allows a reasonable portion of the project, based on the various options and cost estimates at the time of preparing the price submission, to be included in prices.

3. Identify the project as a possible ‘uncertain or unforeseen event’ to be addressed via the mechanisms outlined in Section 3.20 during the regulatory period.[8]

Icon Water has applied a combination of these approaches to many of the projects in our portfolio, noting that these choices mean the projects may not have been fully funded in our 2023–28 regulatory submission.

For a small number of projects in the ‘identify’ and ‘initiate’ phases, including the Googong Water Treatment Plant (GWTP) water quality upgrade and Bendora Dam Strengthening works, only sufficient expenditure to cover development costs (i.e. business case and design) were included. This means that only about 15 per cent of the total project costs were included in our regulatory submission, which will support the development of business cases in the following regulatory period. The remaining expenditure for this project will be assessed by the Commission and rolled into our regulatory asset base (RAB) in the next regulatory period.

Another subset of projects only included development costs and a notional allowance for construction. In particular, this was applied to the large projects at LMWQCC (bioreactors and biosolids), as well as the sewer and water mains replacement projects. For the remainder of the program in evaluate stage, only 66 per cent of the total project costs were included in the portfolio which represents the notional allowance for construction of the lower bound option we have identified.

While not explicitly covered in the proposal, there were several projects that were identified by Icon Water but not included in the portfolio forecast for 2023–28 as the timing and need were not sufficiently clear. This includes upgrades to the Stromlo Water Treatment Plant (SWTP) to increase capability to treat for algae blooms with deteriorating water quality in the Cotter catchment, plus any capital upgrades required for water security or drought response and potential green house gas (GHG) offsets or capture to meet the ACT Government net-zero targets.

2.2.4 The Commission made a Draft Decision to reprofile our capital investment forecast

The Commission’s Draft Decision accepted MJA’s recommendation to reprofile 39 per cent of our capital investment forecast because of concerns about deliverability.

We consider MJA’s assessment is simplistic and a generalisation of how quickly projects move through the investment planning and delivery cycle. Further, their approach does not recognise delivery complexity or consider the prudent delivery timing needed to maximise benefits for our customers.

We have considered feedback from the Commission and MJA regarding deliverability. Our revised forecast reflects some reprofiling after careful consideration of the likely delivery of key projects.

Icon Water will continue to deliver programs that our community values

Our asset management approach aims to balance prudency and efficiency. We undertake detailed planning and assessment of projects to ensure we balance technical requirements with the need to provide cost certainty to our customers. Projects are timed and sequenced to minimise disruption to customers, and to extract the maximum return over the technical life of an asset.

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[8] Essential Services Commission, *2023 Water price review: Guidance Paper*, 26 October 2021

We developed out capital investment plan consistent with the process described in section 2.2.1, which is consistent with these principles.

Our planning process is designed to enable prudent and efficient investment practices and deliver value to customers. If we delivered our program as suggested by MJA it would increase costs for customers. Therefore, we consider the recommendation is neither prudent nor efficient and undermines Icon Water's planning and management of assets.

<u>Investments in non-system assets do not require the same level of options assessment, planning and delivery complexity or timelines as major engineering projects</u>

The individual projects in our investment program have differing levels of complexity which contributes to how they are delivered and the risk that project delays will occur. For example, ICT project teams can be stood up to deliver critical projects in short timeframes to meet business needs. Other projects represent ongoing programs of work that are our core business and are delivered in a uniform and predictable way.

MJA's assessment does not consider this nuance and they have reprofiled projects based only on their status within our IPaD process.

<u>MJA's reprofiling recommendation is arbitrary and does not reflect prudent delivery timing</u>

MJA's recommended approach does not recognise delivery complexity or the maturity of our forecast. As this is a program for the next five years, naturally we have some projects which are ready to go now, and other projects that won't start for another four years and are therefore earlier in the planning cycle. In applying the reprofiling, MJA has assumed that all projects have the same planning and delivery timeframe with the same expenditure profile.

In reality, projects and programs have particular "deadlines" for completion. For example, some projects need to be in place before specific property development occurs, or to support decommission of an ICT platform. Icon Water's original timing of project completion reflected these dates. In addition, projects and programs will move through planning and delivery in their own timeframe, depending on the complexity of options assessment and delivery. Some problems have common and simple solutions and require limited design and reconfiguration; other projects require more substantial options assessment, coordination, and configuration in design. The reprofiling undertaken by MJA does not reflect this.

The reprofiling is also inconsistent with the findings from the top 10 projects reviewed by MJA. MJA reviewed several programs of work (sewer mains, water mains, and water meters) and did not recommend a reprofiling of the expenditure. However, they did then reprofile programs of work, or annual allocations which were not in the top 10. MJA also reviewed projects in 'identify' phase and did not recommend reprofiling of expenditure for these projects, yet then reprofiled expenditure on all projects in 'initiate' phase to only include ~75 per cent of what was in the original proposal for the 2023–28 regulatory period.

The reprofiling does not recognise that many of the project forecasts may extend across regulatory periods. This is particularly the case for projects planned to commence towards the end of the 2023–28 regulatory period, where only the costs of undertaking options assessment and design are included in the forecast, and the delivery costs are beyond 2028.

<u>Icon Water will deliver its proposed capital investment program forecast</u>

We regularly assess our ability to deliver the forward program and align our delivery structure and methods accordingly. We have recognised that the total program proposed in the 2023–28 regulatory period is an increase on the 2018–23 regulatory period. It contains several major projects, requiring a combination of specialised engineering disciplines, complex technical challenges, and comprehensive stakeholder management. Due to the scale and complexity of these projects, Icon Water requires additional capacity and capability to supplement its existing project delivery resource base.

An internal corporate project has been created (Project Delta) to undertake an assessment of potential delivery models for all Icon Water engineering related projects. There are multiple options being considered that span the broader asset acquisition process, from strategic asset planning through to asset handover.

At this stage, a market sounding activity is being undertaken with industry peers (other utilities and local governments) and industry providers (engineering and construction firms) to gather information relating to the various delivery models that are available.

This information will inform the development of delivery model options. Options will be assessed for suitability against set criteria that includes value for money, flexibility and scalability, risk and opportunities, and alignment to strategic objectives.

At this stage, Project Delta is targeting a preferred delivery model for these services to be endorsed by the Icon Water Board by the end of 2022–23. Implementation of the preferred delivery model will begin shortly after and is anticipated to result in preferred providers and suppliers being identified and ready by the middle of 2023–24. This is in line with the timeframes for the delivery of the two major projects at Lower Molonglo.

As noted in section 2.2, our capital forecasts for the next 10 years are dominated by two large projects at LMWQCC. We are forecasting a total of over $450 million for these projects across their entire lifecycle, and we have only included a portion of the costs in our 2023–28 regulatory proposal in recognition of risks outside our control that may lead to small delays in project commencement.

The remainder of the program is similar in magnitude and maturity to the 2018–23 program so the existing project delivery resource base and other internal resources have suitable capacity to deliver on the program. Project Delta is likely to identify opportunities to augment delivery capacity across the entirety of the engineering program.

<u>Our revised forecast includes reprofiling to address the Commission's concerns</u>

Our revised forecast considers the Commission's concerns about deliverability and its reprofiling recommendation. We have identified opportunities to accept some reprofiling to further share portfolio delivery risk with our customers. We utilised the same factors as MJA, and applied them to some projects, which has the effect of delaying the recovery of some revenue, with some expected costs associated with early-stage projects moved to the 2028–33 regulatory period. MJA's approach assumes that all projects take longer than six years to go from evaluate stage to completion; and at least six years to go from having a business case to completion.

Our reprofiling exercise differs from that recommended by MJA in the following ways:

1. The percentages have been applied to the current project phase, rather than the project phase that applied when MJA conducted their assessment.
2. We have not reprofiled annual programs of works or budget allocations such as minor capex allocations. This is consistent with MJA's findings on the water and sewer mains renewal programs.
3. In addition, the remaining ICT projects were not reprofiled. The timing assumptions around the reprofiling are not valid for an ICT project as the project lifecycle for these is shorter. These forecasts only include the portion of the project that can be capitalised, which for ICT projects is a smaller subset of activities.
4. The projects that are co-funded through the WSCC have also not been reprofiled, as this reprofiling will introduce inconsistencies with the WSCC funding model, and population forecasts. We have a high degree of confidence in the individual project forecasts, and the aggregate timing of these projects.

Our revised forecast reflects reprofiling that applies to 23 per cent of the remaining portfolio; and has a smaller impact as more projects have moved past initiate phases.[9]

2.2.5 The Commission applied a capex efficiency adjustment to our capex forecast

The Commission made a Draft Decision to apply an efficiency adjustment of 2.3 per cent to projects not individually assessed by MJA as part of its expenditure review – representing approximately 39 per cent of our capital investment forecast for the 2023–28 regulatory period.

The Commission did not accept MJA's recommendations to apply catch-up or ongoing efficiency adjustments to all capital expenditure in our forecast. We agree with this position, which is consistent with the Commission's findings in previous reviews where it did not apply broad efficiency adjustments, and instead adopted project specific efficiency adjustments.[10]

The Commission notes for its Draft Decision it arrived at the 2.3 per cent efficiency adjustment because it represents the aggregate adjustments identified in assessing the top 10 projects.[11]

We disagree with the Commission's Draft Decision. Icon Water has a proven track record of responding to incentives to find cost efficiencies in our capital expenditure program and to undertake investment decisions in the interests of our customers.

As a public utility we experience regulatory and public interest in our investment decisions. Our commitment to public transparency further strengthens our incentives to invest prudently and efficiently in community assets. Further, as a Territory owned corporation, we are incentivised by legislative objectives and parliamentary oversight.

<u>The Commission's position on efficiency adjustments is inconsistent with the findings of its review of incentive mechanisms</u>

In 2020 the Commission undertook a review of the incentive mechanisms that apply to water and sewerage service price regulation in the ACT. The review looked at expenditure incentive mechanisms, including the suite of incentives that Icon Water faces across its forecast capital expenditure.

The Commission found:

> For capital expenditure, the Commission conclude that its current approach of a two-stage (ex-ante and ex-post) prudency and efficiency assessment of Icon Water's proposed capital expenditure performs well against the Commission's assessment criteria. The Commission found evidence that the approach had been effective in giving Icon Water incentives to find cost efficiencies in its capital expenditure program and to undertake investment decisions after good planning that considers consumers' long-term interests in the quality, safety, reliability, and security of regulated services.[12]

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[9] The next ex-post expenditure review can only compare actual and forecast expenditure over 5-years and not over each year of the regulatory period due to the misalignment of revenue recovery (reflected in the re-profiled expenditure) and our expected delivery timeframes

[10] ICRC, *Draft Report, Regulated water and sewerage services 2028–23*, October 2022, p. 69

[11] ICRC, *Draft Report, Regulated water and sewerage services 2028–23,* October 2022, p. 56

[12] ICRC, *Water and Sewerage Services Price Regulation: Incentive Mechanisms*, August 2020, p. 29

The Commission also found:

> Further, as a well-established and widely adopted approach, the Commission's two-stage prudency and efficiency assessment approach for capital expenditure is straightforward and cost effective for the Commission and Icon Water to implement. It is also well understood by stakeholders and transparent in how it is implemented.[13]

Despite this review being undertaken only two years ago, the Commission has deviated from the positions established in its stand-alone review of incentive mechanisms. We also note the inconsistency with other sections of the draft report that suggest no changes to incentive mechanisms:

> Our draft decision had been to continue the range of control mechanisms and incentive mechanisms that applied for the current period.[14]

We seek clarification why this additional incentive is required, when the Commission's recent review found the current arrangement were sufficient. If the Commission's views have changed since 2020, we consider the best course of action is to undertake another stand-alone review as a reset principle to further explore the incentives Icon Water faces.

<u>The Commission has found our IPaD process produces efficient cost estimates</u>

The Commission's 2.3 per cent efficiency adjustment was applied to projects that were not individually assessed as part of MJA's expenditure review. The Commission's position suggests our IPaD process does not produce efficient estimates of likely project costs, despite finding our IPaD process aligns with good industry practice:

> Icon Water prepared documentation as per the IPaD process and timelines. The IPaD process is designed to achieve consistent decision-making, identify and manage risks, ensure efficient project delivery and control the progressive release of funding based on stage-by-stage justification. This process aligns with good industry practice.[15]

We provide further information on our process in Attachment 5 of our regulatory submission:

> Icon Water's Investment Planning and Delivery (IPaD) Guide describes the processes for the initiation and approval of all significant investment projects. These governance processes ensure that only projects that are efficient, prudent, and benefit the community and stakeholders are approved. Our IPaD process was acknowledged by other water utilities during previous WSAA asset management benchmarking as an example of leading practice.[16]

The IPaD process ensures that consistent governance and decision-making criteria are applied to all projects and programs, as they move from problem and opportunity identification, through to solution assessment, and solution delivery and integration. Each stage gate consists of rigorous review before

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[13] ICRC, *Water and Sewerage Services Price Regulation: Incentive Mechanisms*, August 2020, p. 29

[14] ICRC, *Water and Sewerage Services Price Regulation: Incentive Mechanisms*, August 2020, p. xii

[15] ICRC, *Draft Report, Regulated water and sewerage services 2028–23*, October 2022, p.73

[16] Icon Water, *Price Proposal - Attachment 5, Asset Management Governance*, 30 June 2022, p. 21

submission for endorsement to ensure appropriate contingency allocation and that options considered are based on the most likely cost estimates.

Our internal analysis suggests this process produces slightly lower cost estimates during the early phases compared to the final actual cost. We consider this is likely due to estimates in early project stages reflecting typical industry solutions, rather than risk adjusted estimates for solutions potentially providing additional long term customer value and resolving secondary issues.

We face a constant incentive to find efficiencies during implementation without the adjustment applied by the Commission. This is supported by our procurement processes, which are designed to select suppliers that balance cost and quality outcomes for our customers.

We undertake regular and iterative reviews to better understand and improve our processes over time.

Our revised forecast and additional evidence support no efficiency adjustment

In responding to the Commission's draft report, we have undertaken a comprehensive reassessment of our capital investment forecast. We have considered the Commission's findings and sought opportunities to reflect them in our updated forecast.

Our assessment has produced higher cost estimates for some projects evaluated as part of MJA's expenditure review of the top 10 projects. We have provided additional information to support higher estimates for these projects.

Reassessing the basis for the efficiency adjustment may suggest a different estimate given this additional information. Further, using the 2.3 per cent identified in the top 10 projects as the basis to calculate the efficiency adjustment is flawed, because two of the projects only reflect partial estimates, because we decided to defer some forecast expenditure for projects at LMWQCC to reduce customer prices. If the percentage reduction is recalculated using our revised cost estimates for the top 10 projects, and considering the total cost of the two LMWQCC projects, then the true adjustment for the top 10 projects is less than 0.5 per cent. However, we still consider the adjustment should not be applied because it is arbitrary and will not lead to a more efficient outcome for consumers.

The Commission's two-stage prudency and efficiency assessment should reflect the likely and assessed costs of our capital investment program

The costs in our forecast should reflect the likely and assessed costs we will face over the next regulatory period. The terms of reference state:

> …minimising the potential for significant price fluctuations during the regulatory period, while ensuring the recovery of the prudent and efficient costs of Icon Water Limited.[17]

In relation to the proposed efficiency adjustment:

- Applying the adjustment means the Commission is no longer reflecting the prudent and efficient costs of assessed projects. The position put forward by the Commission is inconsistent because they have found our IPaD process produces efficient cost estimates but have still applied an additional reduction on top of these estimates.
- We also note that the efficiency adjustment does not provide an additional incentive for Icon Water to reduce costs. As previously noted, Icon Water already faces a constant incentive to reduce costs and find efficiencies across the regulatory period.

[17] ACT Government, *Independent Competition and Regulatory Commission (Regulated Water and Sewerage Services) Terms of Reference Determination 2021. Disallowable instrument DI2021-278 made under the Independent Competition and Regulatory Commission Act 1997*, 2021

- We have already sought opportunities to reduce the costs that customers face, and the efficiency adjustment applied by the Commission will impact our ability to deliver services to our customers.

2.3 Revised capital forecast

This section sets out our revised capital investment forecast. In responding to the Commission's Draft Decision, we have undertaken a comprehensive reassessment of our capital investment forecast. Our revised forecast reflects:

- updated information to reflect revised forecasts for some projects
- a reprofiling of some expenditure that applies to some of our portfolio
- a reduction for some ICT projects that have been reclassified as operating expenditure
- updated inflation and escalators.

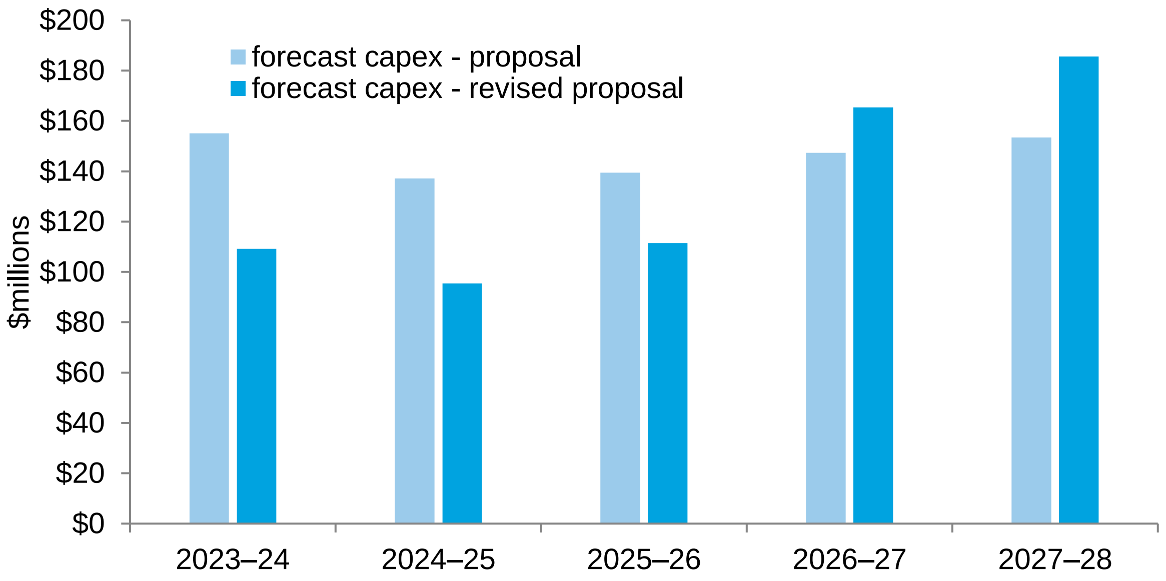
2.3.1 Overview

Icon Water's revised expenditure forecast for our planned capital program over the 2023–28 regulatory period is $717.4 million ($2022–23), or $689.1 million net of capital contributions. Our forecast is 3.4 per cent lower than the forecast submitted to the Commission in June 2022. Our revised forecast includes:

- $206.8 million for investment in water services assets
- $482.2 million for investment in wastewater services assets.

Figure 2-4 compares our forecast gross capex from our revised estimate, with the estimate we submitted to the Commission in June 2022.

Figure 2-4: Comparison of Icon Water's capex forecasts ($millions, $2022–23)



Source: Icon Water.

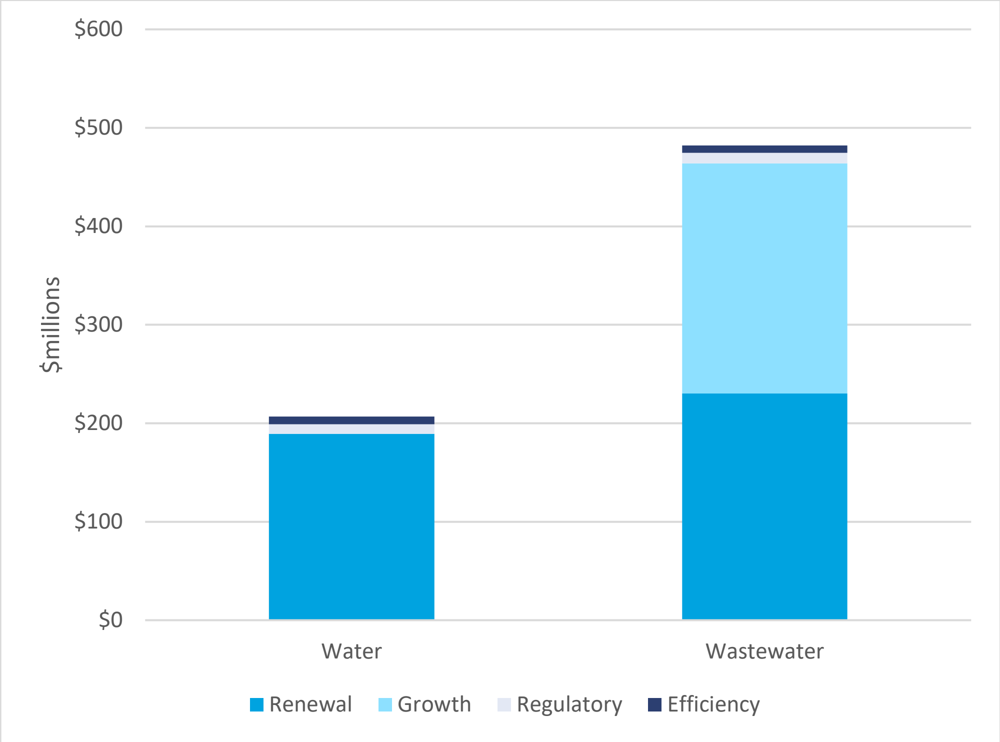
Table 2-1 and Figure 2-5 show a breakdown of our forecast for our revised proposal by driver and split into water and wastewater expenditure.

Table 2-1: Icon Water's 2023–28 forecast capex by driver ($millions, $2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Water						
Renewal	$50.1	$30.7	$35.7	$39.2	$33.4	$189.1
Growth	$0.0	$0.0	$0.0	$0.1	$0.1	$0.2
Efficiency	$1.0	$1.4	$2.0	$2.5	$2.8	$9.7
Regulatory	$0.6	$1.0	$1.7	$2.3	$2.2	$7.8
Total capex water	$51.8	$33.2	$39.4	$44.0	$38.5	$206.8
Wastewater						
Renewal	$41.2	$37.7	$36.5	$46.1	$68.5	$230.1
Growth	$14.6	$25.9	$36.2	$76.6	$80.4	$233.7
Efficiency	$2.8	$1.3	$1.8	$2.4	$2.5	$10.8
Regulatory	$0.5	$0.8	$1.6	$2.3	$2.5	$7.7
Total net capex, wastewater	$59.0	$65.7	$76.2	$127.4	$153.9	$482.2
Plus capital contributions	$2.0	$7.0	$6.0	$8.1	$5.2	$28.3
Total gross capex, wastewater	$61.1	$72.7	$82.1	$135.5	$159.2	$510.6
Total gross capex	$112.8	$105.9	$121.6	$179.5	$197.6	$717.4
Total net capex	$110.8	$98.9	$115.6	$171.4	$192.4	$689.1

Source: Icon Water. Totals may not sum due to rounding.

Figure 2-5: Forecast capex 2023–28 by driver ($million, 2022–23)



Source: Icon Water.

2.3.2 Updates to projects at LMWQCC

Since our regulatory submission in June 2022, we have finalised business cases with updated cost estimates for two projects at LMWQCC. The Secondary Treatment Bioreactors Capacity Upgrade and Biosolids Management Renewal Project represent significant, intergenerational investments in Canberra's wastewater network. These projects are further described in sections 2.4.1 and 2.4.2.

Business cases for both projects were endorsed by our Investment Review Committee in November 2022 and approved by the Icon Water Board in December 2022. We have since commenced market sounding activities as we seek a suitably qualified delivery partner for these projects.

With refinement of the preferred option, the total project cost of each project and forecast project expenditure prior to 2028 has marginally increased from the information we provided in June 2022. However, we maintain that our original delivery and timing assumptions remain accurate and therefore have kept the total project forecasts for the 2023–28 regulatory period consistent with our original submission.

Deferring some costs is prudent to reduce the prices customers face and share risks with the community. If the total costs of the project differ from our estimate, we intend to update the information in our next regulatory submission in 2027.

2.3.3 Water and Sewerage Capital Contribution Code

Our revised forecast includes 12 growth projects that will be co-funded by developers through the WSCC Code. We estimate approximately $28.3 million will be collected from developers to co-fund these projects (and will therefore not be recovered through regulated water and wastewater prices). Table 2-2 shows our estimate of the portion co-funded by developers.

Table 2-2: WSCC Code developer co-funding ($millions, $2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
WSCC Code developer contributions	$2.0	$7.0	$6.0	$8.1	$5.2	$28.3

Source: Icon Water.

In our June submission the developer-funded portion of projects identified for co-funding were inadvertently netted off our net capex forecast. This had the effect of underestimating the size of our capex program. However, the total project costs were assessed as part of the expenditure review. Our revised forecast corrects this issue, which appeared only in our regulatory proposal, and has not impacted customer prices.

2.3.4 ICT projects

Our capital investment plan had included $49.5 million (updated to $50.0 million using the latest inflation forecast) in forecast capital expenditure for ICT projects for the 2023–28 regulatory period.

On 8 September 2022, we wrote to the Commission to advise:

> Over the last few months, a number of our ICT vendors advised they are moving to 'cloud based' models, under a subscription service or Software as a Service (SaaS), and will no longer support our existing systems under perpetual licences. For the 2023–28 regulatory period, we are not expecting this change will increase our total expenditure requirement (in fact, it may reduce our expenditure requirement) but we will see a shift in our forecast costs from capital to operating expenditure. As accounting standards dictate how costs are treated under the building block methodology used to calculate Icon Water's total revenue requirement, this shift may cause a short-term impact on customer prices for the 2023–28 regulatory period as we transition from capital to operating expenditure.[18]

Since then, we have reviewed each ICT project scheduled for the 2023–28 regulatory period to ensure we applied the relevant accounting standards. In their Draft Decision, the Commission acknowledged it had received our correspondence. The Commission also acknowledged that the Australian Energy Regulator (AER) had recently considered similar shifts from capital to operating expenditure for regulated energy businesses and suggested that the AER's assessment approach provides useful guidance to Icon Water. The Commission stated that as part of this approach:

> Icon Water should demonstrate that there is no double counting with other expenditure activities, and any cost shift to operating expenditure is accompanied by an appropriate decrease in capital expenditure.[19]

In updating our capital investment plan as part of this submission, we have adjusted the ICT component to ensure no double counting. This is demonstrated in Table 2-3 which outlines movements in our forecast ICT capital investment for the 2023–28 regulatory period.

[18] Icon Water, letter to the Commission *"Regulated Water and Sewerage Services 2023–28: Revisions to Capital Investment Plan"*, 8 September 2022. Available at: https://www.icrc.act.gov.au/

[19] ICRC, *Draft Report, Regulated water and sewerage services 2028–23*, October 2022, p.36

Table 2-3: Movement in ICT capital investment plan for 2023–28 ($millions, 2022–23)

Description	2023–28
Original Capital Investment Plan (2023–28 Price Proposal, June 2022)	50.0
Less, ICT investment shifted from capital to operating expenditure	-25.3[20]
Less, ICT investment removed from 2023–28 plan or deferred into 2028–33	-0.7
Less, ICT investment reduced by reprofiling	-2.9
Plus, inflight ICT investment deferred from 2018–23 to 2023–28	3.0
Updated Capital Investment Plan (Icon Water Submission, December 2022)	24.1

Source: Icon Water. Totals may not sum due to rounding.

Refer to Attachment 1 for further information on the accounting treatment of forecast ICT investments and the impact on 2023–28 operating expenditure forecasts.

2.3.5 New regulatory obligations

Icon Water will incur additional expenditure during the 2023–28 regulatory period to comply with new regulatory obligations related to critical infrastructure and distribution of costs for unit titles. Further detail of these obligations and the associated operating expenditure is outlined in Attachment 1.

These new regulatory obligations will also require Icon Water to incur additional capital expenditure in the 2023–28 regulatory period. This expenditure is not yet captured in our capital investment plan; rather we would seek to include any prudent and efficient capital expenditure associated with these regulatory obligations in the *ex-post* review as part of the 2028–33 price investigation.

2.3.6 Updated actual capex for 2018–23

Icon Water has updated its actual forecast capex for the 2018–23 regulatory period, which is $516.5 million. This is $14.0 million higher than our estimate in our regulatory proposal and $55.8 million higher than the Commission's 2018 final decision, which allowed for capex of $460.7 million ($2022–23) during the 2018–23 regulatory period. The breakdown between water and wastewater services is shown in Table 2-4.

[20] This expenditure is captured across three step changes:

- Security of Critical Infrastructure (SoCI): $1.51m
- Managing Buildings Better: $2.46m
- ICT investment (SaaS): $21.3m

Table 2-4: Icon Water's 2018–23 capex against the Commission's 2018 decision ($millions, $2022–23)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Water						
ICRC's 2018 decision	$38.0	$54.1	$45.1	$30.4	$24.3	$191.9
Actual / forecast	$49.0	$63.6	$45.8	$25.8	$27.8	$212.0
Variance	$10.9	$9.6	$0.6	-$4.6	$3.5	$20.1
% variance	28.7%	17.7%	1.4%	-15.0%	14.4%	10.5%
Wastewater						
Commission's 2018 decision	$76.8	$59.8	$55.1	$33.6	$43.6	$268.8
Actual / forecast	$73.3	$67.8	$54.9	$59.6	$48.8	$304.6
Variance	-$3.4	$8.1	-$0.2	$26.1	$5.3	$35.8
% variance	-4.5%	13.5%	-0.4%	77.7%	12.1%	13.3%
Combined total						
Commission's 2018 decision	$114.8	$113.8	$100.2	$64.0	$67.9	$460.7
Actual / forecast	$122.3	$131.4	$100.7	$85.5	$76.6	$516.5
Variance	$7.5	$17.6	$0.4	$21.5	$8.7	$55.8
% variance	6.5%	15.5%	0.4%	33.6%	12.9%	12.1%

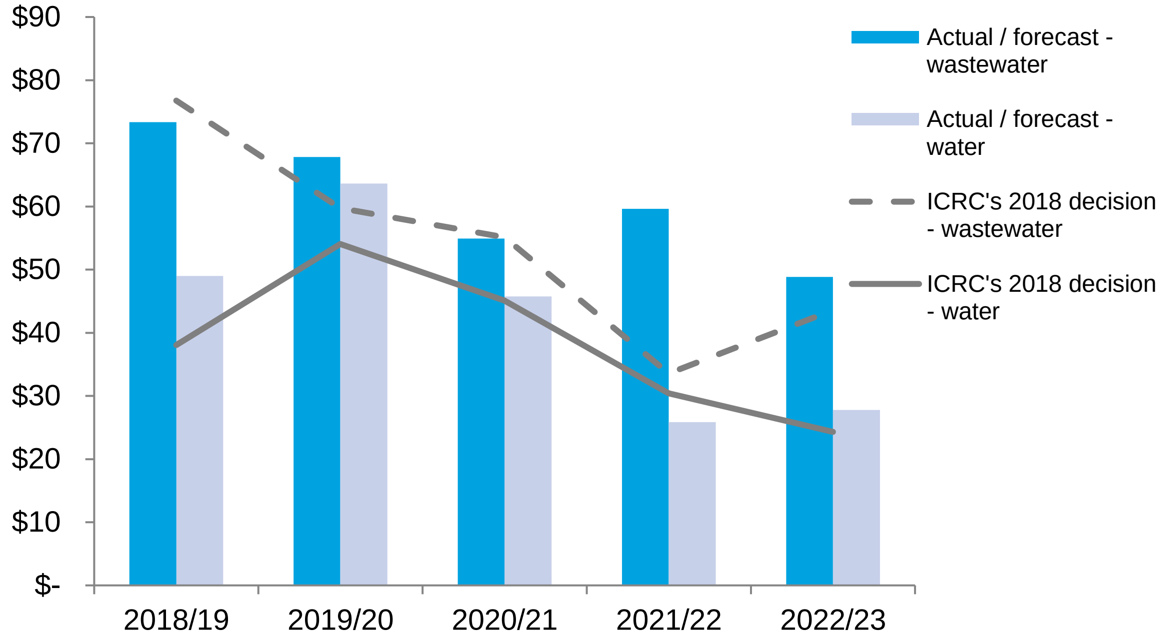
Source: Icon Water. Totals may not sum due to rounding.

We have updated our cost estimate to:

- include capitalised lease costs which were inadvertently omitted from our original proposal
- remove double counting of minor assets which we identified and updated as part of the expenditure review process with the Commission
- provide an updated capex forecast for the 2022–23 financial year. Any variance between our forecast for 2022–23 and the actual costs we incur will be trued-up during the next regulatory review.

Figure 2-6 shows Icon Water's water and wastewater capex spend against the Commission's 2018 decision in each year of the 2018–23 regulatory period.

Figure 2-6: Annual capex for water and wastewater, 2018–23 ($million, 2022–23)



Source: Icon Water.

2.4 Response to Commission's Draft Decision for individual projects

This section sets out Icon Water's response to the Commission's Draft Decision for individual projects. The Commission accepted the recommendations of MJA for all projects individually assessed as part of its expenditure review.

Our responses provide additional information for several projects to support revised cost estimates. We have also updated our estimates for our Secondary Treatment Bioreactors Capacity Upgrade and Biosolids Management projects at LMWQCC.

Table 2-5 summarises the cost estimates provided in our proposal, the Commission's Draft Decision and our revised proposal supported by additional information. In some cases, we accept the Commission's Draft Decision to reduce cost estimates for individual projects.

Table 2-5: Summary of Icon Water's response to MJA assessment of top 10 projects ($millions, 2022–23)

Project and project code	Icon Water Proposal	Draft Decision	Revised Icon Water Proposal	Difference to Draft Decision
Secondary Treatment Bioreactors (CX11061)	$192.1	$192.1	$192.2	$-
Biosolids Management Renewal (CX11262)	$66.0	$61.9	$66.0	$4.2
Water Meter Renewals Program (CX11313)	$33.4	$26.7	$30.0	$3.3
Office Space Utilisation (CX11337)	$12.7	$1.5	$4.6	$3.1
Sewer Mains Renewal Program (CX11311)	$63.0	$63.0	$63.0	$-
Water Mains Renewal Program (CX11312)	$13.1	$13.1	$13.1	$-
Cotter Pump Station Upgrade (CX11266)	$24.0	$25.1	$25.1	$-
Lower Red Hill Reservoir Tank B (East) (CX11082)	$12.6	$9.1	$10.4	$1.3
Vehicle Lease Renewals Program for Heavy Vehicle Fleet (CX11319)	$13.8	$12.9	$12.9	$-
Asset Information Management System (AIMS) (CX11366)[21]	$13.2	$13.2	$-	-$13.2
Project Axle	$18.0	$10.9	$18.0	$7.1

Source: Icon Water. Totals may not sum due to rounding.

Note that throughout this section we have applied consistent escalators to the 'Icon Water Proposal', 'Draft Decision' and 'Revised Icon Water Proposal' so that they are comparable.

[21] AIMS has been taken out of our capex forecast and included in the ICT investment (SaaS) opex step change.

2.4.1 LMWQCC Secondary Treatment Bioreactors Capacity Upgrade

The Commission's Draft Decision accepts MJA's recommendations and findings for its assessment of the Secondary Treatment Bioreactors Capacity Upgrade project at LMWQCC. MJA found our initial cost estimate prudent and efficient, noting:

> … the $178.9m included in the period is an effective balance of risk and therefore considered an efficient allowance of capital expenditure to the period.[22]

Since this assessment, the project has progressed through our IPaD process with a business case approved by our Investment Review Committee in November 2022 and the Icon Water Board in December 2022. We have subsequently commenced market sounding activities as we seek a suitably qualified delivery partner for this project.

As noted by MJA, and outlined in our original proposal, Icon Water chose to only include a portion of the project's total expenditure (approximately 50 per cent) in the 2023–28 regulatory period to avoid passing costs on to customers too early if unforeseen delays impact project commencement. To clarify, this represents our lower-bound estimate of expenditure for this period, and not the expenditure which has a greater than 50 per cent probability of being incurred in that time, as outlined in our proposal:

> Our 2023–28 price proposal adopts a lower-bound estimate of forecast expenditure for the Biosolids Management Renewal and Secondary Treatment Bioreactors Capacity Upgrade projects at LMWQCC. Both projects are critical and the majority of the works in the 2023–28 regulatory period are expected to occur in 2026–27 and 2027–28. Actual expenditure for the projects may vary depending on the preferred options and we intend to include actual expenditure for ex-post review in our next regulatory proposal. Icon Water's decision to include the lower-bound estimate of forecast expenditure for the two projects minimises the short-term impact on customers' wastewater bills.[23]

In our revised proposal, we have maintained our initial estimate, with a minor update to the expected cashflow in the first two years, despite our business case suggesting a slightly higher estimate is appropriate. Our revised forecast is outlined in Table 2-6.

Table 2-6: Revised cost estimate for Secondary Treatment Bioreactors Capacity Upgrade ($millions, 2022–23)

Description	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Icon Water regulatory proposal	$17.1	$9.8	$27.9	$64.4	$72.9	$192.1
Commission's Draft Decision	$17.1	$9.8	$27.9	$64.4	$72.9	$192.1
Icon Water revised forecast	$10.6	$16.7	$28.0	$64.2	$72.9	$192.2
Difference	-$6.5	$6.8	$0.0	-$0.2	-$	$-

Source: ICRC Draft Report, *Regulated water and sewerage services 2023–28, October 2022*; Icon Water analysis. Totals may not sum due to rounding.

[22] MJA, *Icon Water 2023–28 expenditure review – Final Report*, 12 October 2022, p. 126

[23] Icon Water, *Price Proposal - Attachment 7, Capital Expenditure*, 30 June 2022, p. 33

2.4.2 LMWQCC Biosolids Management Renewal

The Commission's Draft Decision accepts MJA's recommendations and findings for its assessment of the Biosolids Management Renewal project at LMWQCC. MJA found the project prudent but recommended a minor adjustment to the profile of expenditure for the project, which shifts some expenditure into the 2028–33 regulatory period.

The minor adjustment was recommended because our delivery timing assumed some preliminary earthworks would be accelerated to align with site works for the Secondary Treatment Bioreactors Capacity Upgrade project to realise delivery efficiency. Without evidence to support our position, MJA did not find this assumption efficient.

Since this assessment, the project has progressed through our IPaD process with a business case identifying the preferred technical option endorsed by our Investment Review Committee in November 2022 and the Icon Water Board in December 2022. We have subsequently commenced market sounding activities as we seek a suitably qualified delivery partner for this project.

As noted by MJA, and outlined in our original proposal, Icon Water chose to only include a portion of the project's total expenditure (approximately 27 per cent) in the 2023–28 regulatory period to avoid passing costs on to customers too early because unforeseen delays may impact when the project commences.

Icon Water accepts that, at this point in time, there is limited information to quantify the efficiency benefit of aligning site preparation and civil earthworks with the Secondary Treatment Bioreactors Capacity Upgrade project. Accordingly, we have adjusted our proposed forecast to remove this assumption and accept MJA's assessment.

As delivery planning for the two major projects occurs, we will seek opportunities to identify delivery efficiencies. This would be consistent with the Commission's position that Icon Water may need to re-prioritise expenditure over the course of the regulatory period. Our revised forecast is outlined in Table 2-7.

Table 2-7: Revised cost estimate for Biosolids Management Renewal ($millions, 2022–23)

Description	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Icon Water regulatory proposal	$8.3	$6.0	$25.2	$11.2	$15.2	$66.0
Commission's Draft Decision	$3.6	$3.6	$7.3	$14.6	$32.8	$61.9
Icon Water revised forecast	$3.8	$3.9	$7.8	$15.6	$35.0	$66.0
Difference	$0.2	$0.2	$0.5	$1.0	$2.2	$4.2

Source: ICRC Draft Report, *Regulated water and sewerage services 2023–28, October 2022*; Icon Water analysis. Totals may not sum due to rounding.

2.4.3 Water Meter Renewals Program

The Commission's Draft Decision accepts MJA's recommendation to reduce the allowance for our Water Meter Renewals Program. MJA's recommendation to reduce the expenditure forecast for meters was based on a reduction in the number of reactive renewals and number of new meters. MJA accepted Icon Water's forecast for proactive meter renewal and the unit rates for each of the programs.

The Water Meter Renewals Program covers four pieces of work to support metering, including:

- proactive water meter renewals for small meters
- proactive water meter renewals for large meters (typically non-residential customers)

- reactive renewal of faulty meters
- issue and inspection of new meters for developers.

We have reviewed the water meter forecasts for new meters and our estimate of reactive renewals in response to MJA's assessment and adjusted our forecast.

<u>MJA's new meter forecast underestimates future demand</u>

MJA proposed adjusting our estimate of new meter installations by using the average of the last three years of new meter installations. Using this time period to estimate future meter numbers is problematic, as 2019–20, 2020–21 and 2021–22 were all impacted by COVID-19 lock-downs which reduced the annual roll-out of new meters. These impacts included temporary shut-down of construction for some periods of time, as well as extended delays on some construction sites due to state and territory border closures, and supply chain issues in the construction industry. As such, this period is not reflective of future growth.

MJA's forecast also does not align with the ACT Government's policies on development growth, as outlined in our original submission.

> The ACT Government's current land release program is forecasting the development of around 16,434 dwelling sites across the ACT between 2021–22 and 2025–26. This is supplemented by private sector releases of approximately 7,500 new dwellings. This would be an increase of over 12 per cent in dwelling numbers that will require water and wastewater services. The majority (70 per cent) of these are expected to be multi-unit dwellings. In addition, the ACT Government's current land release program is for about 500,000m^2 of additional non-residential land across the ACT between 2021–22 and 2025–26.[24]

The forecast from MJA on the growth of total meter numbers also does not align with the Commission's forecast increase in connection numbers.

[24] Icon Water, *Price Proposal – Attachment 7, Capital Expenditure*, 2022, p. 45

Table 2-8: Forecast annual increase in total meter and connections

Description	Initial meters or connections (2022–23)	Forecast increase in meter numbers or connections					Total increase from 2022–23
		2023–24	2024–25	2025–26	2026–27	2027–28	
Icon Water regulatory proposal	130,880	2,774	3,127	3,530	3,992	4,507	*13.7%*
MJA forecast increase in meters	130,880	1,764	1,764	1,764	1,764	1,764	*6.7%*
Commission's forecast connections	198,459	201,002	203,957	207,061	210,061	213,761	*8%*
Annual increase in forecast connections		*2,543*	*2,955*	*3,104*	*3,000*	*3,700*	
Icon Water revised forecast	130,880	1,949	2,047	2,152	2,267	2,304	*8%*

Source: ICRC Draft Report, *Regulated water and sewerage services 2023–28, October 2022*; Icon Water analysis. Totals may not sum due to rounding.

Icon Water has adjusted our new meter forecast to grow at the same rate as the Commission's increase in connection numbers. This assumes that the fraction of new connections with a meter remains at historic levels where approximately 70 per cent of new connections have a meter, with the remainder (i.e. multi-unit dwellings) assumed to have a bulk meter (i.e. multiple 'connections' per meter).

The actual numbers of new meters issued is sensitive to assumptions around the ACT Government land release program and timing of new connections. Given the Commission's forecast is lower than the ACT Government program, Icon Water is taking some risk in having a lower forecast, and we would anticipate adjusting the actuals on this program to reflect the actual development profile and adjust it accordingly in the *ex-post* review.

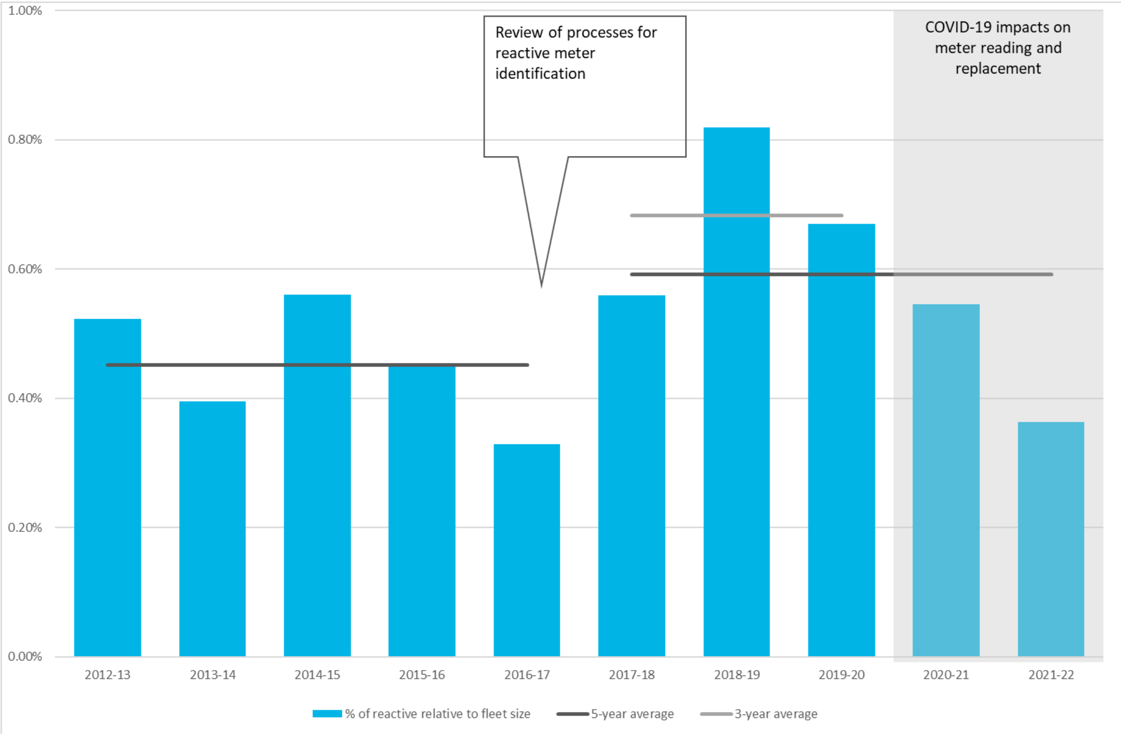
Reactive meter renewal

MJA proposed adjusting the reactive meter renewal forecast to be the average of the last five years of new meters issued. The use of these time periods to estimate future meter numbers based on absolute numbers of meters replaced is problematic due to several factors:

1. 2019–20, 2020–21 and 2021–22 were all impacted by the COVID-19 response which included pauses and interruptions to the meter replacement programs and meter reading. As such, the identification of meters requiring reactive replacement was reduced, and therefore the last three-year period is not reflective of longer-term reactive meter replacement.
2. Our practices and processes have changed over time. Icon Water conducted a review of the metering processes in 2017 which included reviewing the practices and processes for identification of 'failed' water meters. This increased the number of meters replaced through improved identification. A continuous improvement program to refine the identification of failed meters was implemented in 2021–22 and this is anticipated to drive up the volume of reactive replacements.
3. The use of 'absolute' numbers of reactive meter replacements fails to account for growth in the meter fleet through increased connection numbers. Given the meter fleet is projected to increase by at least eight per cent over the next five years, it would be expected that reactive failure numbers will also increase by this quantum. MJA's forecasts are not adjusted for the increase in the meter fleet.

Figure 2-7 shows the reactive meter replacement rate, with the five-year average for each regulatory period shown. The impact of COVID-19 is clear with a significant decrease in the rate of reactive replacement.

Figure 2-7: Reactive meter replacement rate



Source: Icon Water.

Icon Water has adjusted the reactive meter forecast for the 2023–28 regulatory period to have the same fraction of reactive meter replacements as the 2018–23 regulatory period (refer to Table 2-9). This is based on a total meter fleet growing as per the revised new meter connections.

Table 2-9: Reactive meter forecast

Description	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Icon Water regulatory proposal	1,150	1,341	1,615	1,915	2,289	8,310
MJA forecast of reactive replacement	741	741	741	741	741	3,705
Icon Water revised forecast	859	872	885	899	914	4,429

Source: ICRC Draft Report, *Regulated water and sewerage services 2023–28, October 2022*; Icon Water analysis. Totals may not sum due to rounding.

<u>Impact on cost forecast</u>

The financial adjustment proposed by MJA applied a simple percentage calculation, thereby assuming that each of the four pieces of work covered by the program have the same unit rate.

This did not allow for the differences in unit rates between the new meter forecast, which has the lowest cost per unit, to the replacement program forecast which has a higher cost per unit. The new meter program only covers the cost of issuing the meter, with installation occurring at the cost of the developer. Refer to Table 2-10 which shows the activities undertaken for each program and cost of each meter replacement relative to a new meter issue. The renewal programs also require investigation and potential reconfiguration to either ensure that the meter matches the consumption profile, or to upgrade older meter installation with the current standard configuration of valving and location.

Table 2-10: Comparison of unit rates and activities undertaken at Icon Water's expense during meter installation

Program	Relative unit rate as a multiple of new meter issue ($ is the lowest unit cost)	Meter issue	Meter Installation	Meter Inspection	Investigation, reconfiguration or upgrade to current standard
Proactive – small	$$	✓	✓	✓	20% of meters
Proactive – large	$$$$$	✓	✓	✓	✓
Reactive	$$	✓	✓	✓	✓
New meter issue	$	✓	-	✓	-

Source: Icon Water.

As MJA applied the largest changes to the programs with lower Icon water costs, it has overestimated the total adjustment required.

Icon Water has adjusted the total project forecast, using the meter numbers outlined above and applied appropriate unit rates for each type of replacement forecast. Our revised forecast is outlined in Table 2-11.

Table 2-11: Revised cost estimate for Water Meter Renewals Program ($millions, 2022–23)

Description	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Icon Water regulatory proposal	$6.3	$6.6	$6.7	$6.8	$7.0	$33.4
MJA forecast	$4.9	$5.2	$5.3	$5.5	$5.7	$26.7
Icon Water revised forecast	$5.6	$5.9	$6.0	$6.1	$6.3	$30.0
Difference	$0.7	$0.7	$0.7	$0.7	$0.6	$3.3

Source: ICRC Draft Report, *Regulated water and sewerage services 2023–28, October 2022*; Icon Water analysis. Totals may not sum due to rounding.

These forecasts assume that the metering policies and regulations remain the same as 2018–23. The potential impact of the ACT Government's Managing Building Better reforms on this program is included in Attachment 1.

2.4.4 Office Space Utilisation Project

The Commission's Draft Decision accepts MJA's recommendation to provide an allowance of $1.5 million ($2022–23)[25] during the 2023–28 regulatory period to strategically plan the Office Space Utilisation project but provides no funding to deliver the project.

[25] $1.4 million ($2021–22) in the MJA report.

A key objective of the Office Space Utilisation project is to relocate approximately 40 staff from a current premises when its lease expires in December 2024. This lease is capital expenditure.

On 8 September 2022 we notified the Commission[26] that a number of leases (including the lease to accommodate 40 staff that expires in December 2024) had been erroneously left off the 2018–23 capital investment plan following a change to accounting standards effective 1 July 2019. As part of this submission, we have updated the capital investment plan for the 2018–23 regulatory period to correct this oversight.

For the 2023–28 regulatory period, we accept the $1.5 million allowance to develop the project to "*enable Icon Water to implement a robust, prudent and efficient accommodation solution in 2028–2033*"[27] as it is a reasonable reflection of this component of the project. In the meantime, there are 40 staff who will continue to need office space once the existing lease expires in December 2024. We have updated our 2023–28 capital investment plan to include an annual allowance to accommodate these staff for the period January 2025 to June 2028, following expiry of the current lease. The annual allowance is calculated based on the current lease costs and considered a lower-bound estimate for accommodating these staff, pending implementation of the Office Space Utilisation project.

The revised capital forecast for this project for the 2023–28 regulatory period is $4.6 million (Table 2-12).

Table 2-12: Revised cost estimate for Office Space Utilisation Project ($million, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Icon Water original forecast	$8.1	$4.7	$-	$-	$-	$12.7
MJA forecast	$1.5	$-	$-	$-	$-	$1.5
Icon Water revised forecast	$1.5	$0.5	$0.9	$0.9	$0.9	$4.6
Difference	-$0.0	$0.5	$0.9	$0.9	$0.9	$3.1

Source: ICRC Draft Report, *Regulated water and sewerage services 2023–28, October 2022*; Icon Water analysis. Totals may not sum due to rounding.

2.4.5 Sewer Mains Renewal Program

The Commission's Draft Decision accepts MJA's assessment that this project is prudent and efficient because it is similar in scope and costs to the same program in the 2018–23 regulatory period and delivers similar outcomes.[28] We do not propose any changes to the capital forecast for this project.

2.4.6 Water Mains Renewal Program

The Commission's Draft Decision accepts MJA's assessment that the proposed level of water main renewals is prudent and the cost estimate for the delivery of the program is based on the costs to complete similar works in the 2018–23 regulatory period.[29] We do not propose any changes to the capital forecast for this project.

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[26] Icon Water, letter to the Commission "*Regulated Water and Sewerage Services 2023–28: Revisions to Capital Investment Plan*", 8 September 2022. Available at: https://www.icrc.act.gov.au/

[27] MJA, *Icon Water 2023–28 expenditure review – Final Report*, 12 October 2022, p. 170

[28] ICRC, *Draft Report, Regulated water and sewerage services 2028–23*, October 2022, p. 54

[29] ICRC, *Draft Report, Regulated water and sewerage services 2028–23*, October 2022, p. 54

2.4.7 Cotter Pump Station Upgrade

The Commission's Draft Decision accepts MJA's assessment.[30] We do not propose any changes to the capital forecast for this project.

2.4.8 Lower Red Hill Reservoir Tank B (East)

The Commission's Draft Decision accepts MJA's recommendation to provide an allowance of $9.1 million ($2022–23) during the 2023–28 regulatory period for this project. This is $3.5 million ($2022–23) lower than the forecast included in our original proposal.[31]

MJA's assessment was based on a reduction in costs for project management and detailed design, as well as a reduction in costs associated with improving site access and restorative landscaping. This also reduced the contingency, and overall contractor margins. Table 2-13 outlines our response to each of MJA's adjustments.

Table 2-13: Response to MJA's adjustments for Lower Red Hill Reservoir Tank B East

Description	MJA's rationale to recommend removal	Icon Water's response
Icon Water project management and stakeholder review cost during detailed design	Reduced by 80% due to overall reductions in project forecast and assumed lower external support	Accepted; and reforecast.
Site access improvements	Reduced to 45% of original estimate	Accepted; noting actual costs will depend on road condition during and post construction.
Site restoration and landscaping	Complete removal	Icon Water disagrees with this assessment and propose to include the original $0.38 million. The demolition and construction works will disturb a sizable area within Red Hill Nature Reserve which will require reinstatement on completion. The allowance includes replanting 3000 sqm with variable treatments, stormwater management and reinstatement of site security fences.
Contingency	Removed	Modified contingency forecast to only include for demolition, site access and landscaping as these do not have benchmarked comparators.
Contractor preliminaries, contractor margins and Icon Water project management	Reduced based on previous adjustments	Recalculated noting adjustment above.

Source: Icon Water.

The revised capital forecast for this project for the 2023–28 regulatory period is $10.4 million as outlined in Table 2-14.

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[30] ICRC, *Draft Report, Regulated water and sewerage services 2028–23*, October 2022, p. 54

[31] In the MJA report, the recommended allowance was $8.5 million ($2021–22) which is $3.5 million ($2021–22) lower than our original price proposal.

Table 2-14: Revised cost estimate for Lower Red Hill Reservoir Tank B East ($million, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Icon Water original forecast	$5.1	$7.6	$-	$-	$-	$12.6
MJA forecast	$3.6	$5.5	$-	$-	$-	$9.1
Icon Water revised forecast	$0.3	$2.7	$7.4	$-	$-	$10.4
Difference	-$3.3	-$2.8	$7.4	$-	$-	$1.3

Source: ICRC Draft Report, *Regulated water and sewerage services 2023–28, October 2022*; Icon Water analysis. Totals may not sum due to rounding.

2.4.9 Vehicle Lease Renewals Program for Heavy Vehicle Fleet

The Commission's Draft Decision accepts MJA's assessment that the allowance for heavy vehicle fleet renewals for the 2023–28 regulatory period is $12.9 million ($2022–23). We do not propose any changes to the forecast for this project and note that this allowance is consistent with additional information we provided to the Commission on 8 September 2022.[32]

2.4.10 Asset Management Information System

The Asset Management Information System (AMIS) project includes:

- replacing the current on-premises Oracle mobility solution (MWM), which will not be supported from 2025
- upgrading the current on-premises version of the Oracle Works and Asset Management (WAM) system
- upgrading the current on-premises Oracle Utilities Application (OUA).

The Commission's Draft Decision accepts MJA's recommendation that:

> We deem the project prudent. There is little supporting information to deem the project efficient, but it is clearly more efficient than replacing the current Oracle solution. We therefore recommend that the original proposed sum of $12.3 million to deliver the uplift in Oracle capability required to create a cohesive and beneficial asset management information landscape with mobility functionality that is stable and supported into the future.[33 ,34]

Documentation supplied to MJA during its expenditure review[35] confirmed that the Oracle roadmap for each of the in-scope systems requires Icon Water to move to a cloud/SaaS solution during the 2023–28 regulatory period. Shifting from on-premises to cloud/SaaS will mean a change in accounting

[32] Icon Water, letter to the Commission "*Regulated Water and Sewerage Services 2023–28: Revisions to Capital Investment Plan*", 8 September 2022. Available at: https://www.icrc.act.gov.au/

[33] MJA, *Icon Water 2023–28 expenditure review – Final Report*, 12 October 2022, p. 162

[34] The $12.3 million ($2021–22) per the MJA report has been escalated to $13.2 million ($2022–23) for the purpose of this response

[35] *AMIS Roadmap – Discovery Phase Final Report*, February 2022. Internal Icon Water document previously provided to MJA.

treatment, from capital to operating expenditure. Refer to section 2.3.4 for further information on the accounting treatment of ICT investment for the 2023–28 regulatory period.

Consistent with the change in accounting treatment, this project has been removed from the 2023–28 capital investment plan (refer to Table 2-15) and a corresponding opex step change for $13.2 million in included in this submission (refer to Attachment 1).

Table 2-15: Revised cost estimate for Asset Management Information System ($million, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Icon Water original forecast	$-	$1.7	$7.0	$4.4	$-	$13.2
MJA forecast	$-	$1.7	$7.0	$4.4	$-	$13.2
Icon Water revised forecast	$-	$-	$-	$-	$-	$-
Difference to MJA forecast	$-	-$1.7	-$7.0	-$4.4	$-	-$13.2

Source: ICRC Draft Report, *Regulated water and sewerage services 2023–28, October 2022*; Icon Water analysis. Totals may not sum due to rounding.

2.4.11 Project Axle – Asset Management and Maintenance Solution

The Commission's Draft Decision includes an adjustment of $6.63 million to the cost of Project Axle, referencing the analysis provided by MJA as part of its expenditure review of Icon Water, finding:

> Icon Water upgraded its asset management system, providing additional functionality and improving its operations data. The project budget for 2018–23 was $9.5 million, but actual costs were $16.8 million. Based on the information provided, MJA found costs exceeded the budget due to issues with the design and delivery of a large-scale ICT project. Despite higher costs, the original scope was not completed. MJA recommended the total cost of the project be adjusted by $6.6 million. This removed the costs related to issues with the project design and management, and scope not delivered.[36]

However, we note that MJA's report provides the following analysis:

> Our ex-post review of Icon Water's expenditure in 2018–23 resulted in very little adjustment to its expenditure to be rolled forward in the RAB.
>
> Most notably, Icon Water experienced a significant overspend in Project Axle, which **we recommend is allowed**[37] on the basis that Icon Water had limited experience in the design and delivery of large-scale ICT projects of this type and has demonstrated diligence in analysing its learnings and implementing systemic change at Icon Water to prevent this type of overspend in the future. Learnings must occur somewhere and some allowance for this should be made, however, overspends of this type in the future are not expected based on Icon Water's demonstrated learnings and its commitment to systemising the changes.[38]

[36] ICRC, *Draft Report, Regulated water and sewerage services 2028–23*, October 2022, p. 46

[37] Emphasis added

[38] MJA, *Icon Water 2023–28 expenditure review – Final Report*, 12 October 2022, p. 70

Icon Water agrees with this section of MJA's analysis of Project Axle. However, we note the inconsistency with other sections of the report which suggest inefficiencies occurred in the delivery and management of the project. We consider additional information not requested as part of the expenditure review can further demonstrate the project's efficiency. Our response includes independent audit reports undertaken during the project, which demonstrate good governance and efficient project management and delivery, including active decisions to ensure efficiency.

However, irrespective of the additional information we can provide to support the efficiency of Project Axle, we consider MJA's assessment does not support a conclusion that the project's expenditure was inefficient.

<u>Project Axle was efficient and supported Icon Water's core business</u>

Project Axle upgraded Icon Water's asset management and maintenance ICT solution that provides works management and asset management functionality to multiple work groups across Icon Water. The project replaced multiple bespoke ICT systems with a single solution, replaced systems coming to the end of their technical life and improved productivity.

Icon Water commenced an approach to market for an asset management and maintenance system in April 2016. The approach involved a phased procurement exercise to identify the best value-for-money asset management and maintenance system that would achieve the following targeted outcomes:

- replace ageing, end of life and unsupported IT systems
- address key issues with asset management processes
- support future flexibility to external drivers
- support efficiency gains across the business.

<u>The total overspend was not as high as indicated by MJA</u>

The total cost of the project was $36.0 million, which was $6.03 million (or 20%) more than our initial estimate of $29.97 million. This initial cost estimate also identified a project contingency of $3.2 million, bringing the total project cost to $33.2 million.

MJA's focus on the project overspend, which is its basis for calculating inefficiency, is based on our mid-range estimate of the project's costs.

Approximately $16.8 million of the expenditure was incurred in 2018–19 and hence fell into the 2018–23 regulatory period, with $19.2 million of the expenditure occurring in the 2013–18 regulatory period. The actual project overspend in comparison to the total cost including contingency was only $3.0 million, and not $6.6 million as suggested in the Commission's Draft Decision.

The project was assessed by the Commission and its expenditure consultants Calibre in 2017 as part of its ex-post review of Icon Water's 2013–18 capital expenditure.[39] The Commission found in its 2018 review that the expenditure on the project to date was efficient.[40]

<u>Evidence provided to demonstrate efficiency was mischaracterised by MJA</u>

The amount MJA quantified to demonstrate inefficiency was based on information provided to the Icon Water Board to approve the last phase of delivery and request release of the contingency for this project. Notwithstanding that this governance arrangement demonstrates effective oversight and executive involvement, the Board Paper does not quantify inefficiency as described by MJA.

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[39] Calibre, *Final Report, Review of Icon Water's Capital and Operating Expenditure for Water and Sewerage Services*, July 2018, p. 78

[40] ICRC, *Final Report, Regulated water and sewerage service prices 2018–23*, May 2018

The paper provided to the Board in September 2018 requested an increase in the Project Axle budget and release of the $3.2 million contingency identified at project inception. The paper provides a detailed overview of how Icon Water had mitigated key risks associated with the project's implementation. The paper provided a comprehensive snapshot of the budget implications of external and internal factors impacting the project.

Figures in the Board Paper compared actuals against earlier indicative project budgets that were anticipated at project inception and iteratively updated over time. The factors MJA characterised as being inefficient were presented as additional areas of focus for the project team to control total project expenditure for the remainder of the project.

Icon Water provided a significant suite of documents to support the efficiency of Project Axle. These documents show appropriate governance and executive oversight. While the suite of documents does document issues the project faced, they also demonstrate the effective management and governance actions that were undertaken to mitigate identified risks.

Research from Standish Group notes that over 50 per cent of IT projects are categorised as 'challenged' compared to a success rate of just under 30 per cent and a failure rate of approximately 20 per cent.[41] Research from McKinsey and Company suggests the average cost over-run for large IT projects is approximately 45 per cent.[42] Project Axle experienced a 'cost over-run' of about 10 per cent relative to the initial project estimate plus contingency.

MJA's recommendation does not recognise the significant challenges companies like Icon Water face to deliver large IT projects and ensure their successful implementation. MJA's recommendation seeks to hold Icon Water to a higher standard than comparable companies and fails to acknowledge the successes and operational benefits that result from Project Axle.

An overspend or delay in a project's cost is not in itself evidence of ineffective management nor inefficiency. Projects of this size are complex, which can lead to underestimation of cost, which we consider was the primary driver of the overspend, and not inefficient management.

<u>Management decisions were effective and supported successful completion of the revised project's scope</u>

Despite being a large and complex project to implement and administer, we consider management decisions that underpinned governance of Project Axle were efficient.

MJA's report lists three key concerns that it attributes to the projects overspend, including:

- delayed contract negotiations
- being the first in the world to deploy WAM v2.0 meaning there were limited skilled resources available
- replacement of the project team and the project reset.

We consider these concerns to be good examples that demonstrate effective management decisions that minimised costs and ensured successful delivery of the project. It is important to note that the first two concerns raised by MJA were not wholly within Icon Water's control, and therefore should not be used as the basis to deem project expenditure inefficient.

Delays in contract negotiations were minimal and in and of themselves did not lead to additional expenditure being incurred. Staff were re-deployed and utilised on other projects during the time that negotiations were occurring. Further, Icon Water made a decision to engage external support to assist

[41] Standish Group, *Chaos Report 2015*, p.1

[42] McKinsey & Company, *Delivering large-scale IT projects on time, on budget, and on value*, October 2012

with contract negotiations as soon as it was identified as a potential risk impacting project commencement.

In selecting the Oracle WAM product suite, we recognised the risks associated with being an early adaptor of WAM v 2.0 in Australia. Once it became evident that Icon Water would be the first to deploy WAM v 2.0 globally, we set in place mitigation activities such as engaging skilled resources with appropriate skills to help us implement and keep project delivery on track. The actions we took to mitigate this project risk are documented in external assurance reports. It is also important to note that management could not have foreseen that the slow uptake of the newly released WAM v2.0 would lead to Icon Water also becoming the first to deploy the version internationally.

Both delayed contract negotiations and being the first to deploy WAM v 2.0 were to a certain extent outside of Icon Water's control. The additional information we have provided to support the prudency and efficiency of Project Axle demonstrate the effective management actions taken to mitigate these and other project risks.

The decision to move forward with the preferred solution was backed by significant work that considered the best information available at the time. The Commission's Draft Decision and MJA's analysis suggests Icon Water should favour conservative approaches, despite our prudent and efficient asset management processes having identified WAM as the preferred option. IT systems need replacing often and selecting new and innovative solutions can be in the interest of customers because it means they have a longer asset life before becoming obsolete and needing replacement.[43]

Replacement of the project team and the project reset were efficient management actions that mitigated project overspends. We provided full and transparent information to the Commission's expenditure consultants that detailed project learnings from the implementation of WAM v 2.0. The significant amount of documentation listed by MJA to support its analysis shows the prudent management practices in place. The audit reports we have provided with this submission further demonstrate these practices.

The project was governed by a Steering Committee and had oversight by the Icon Water Board, the Risk and Assurance Committee, and Executive Committee; and external assurance at regular intervals. The decision to stand down the project team and reset the project were effective management decisions that mitigated further delays and project overspends.

The decision to stand down the project team led to greater efficiencies being realised moving forward. The revitalised project team immediately began to deliver more work in successive sprints. The additional information we have provided demonstrates a progressive improvement in project outcomes which is a testament to the project's successful governance.

In the absence of these actions the project overspend could have been significantly higher. MJA's assessment of the project does not consider the counterfactual – that management decisions led to cost savings and lower project overspends relative to what could have happened.

<u>We have provided further information that supports the efficiency of the project</u>

We have provided two independent audit reports that were undertaken during Project Axle's implementation that demonstrate effective governance and efficient management decisions.

In February 2018, Icon Water's Risk and Assurance Committee sought to engage an independent external expert to undertake a health check of the project. The external audits included recommendations to address identified issues, which were considered and adopted by the Risk and Assurance Committee.

[43] It is important to note that the second option not selected, which also met technical and operational requirements had an estimated implementation cost of approximately $50 million.

The reports, provided in April and October document the effective management actions and governance framework in place to support Project Axle. While the first report showed that the project was generally progressing well, it noted key challenges and areas to address to ensure successful completion.

Importantly, the second report demonstrates improvement in the project's performance relative to the issues identified in the first report. The second report found Project Axle was progressing well and that issues had been addressed through our actions.

We have also provided a status report for Project Axle from July 2018. This status report, which falls between the two independent audit report shows the progress the team made during this critical phase of project delivery and documents the focus areas where the project manager and team sought to improve to ensure effective delivery.

We consider this additional information that was not requested by MJA during its initial expenditure review demonstrates the project's efficiency. Project Axle was a transformative project that resulted in a number of documented learnings that will ensure Icon Water will continue to successfully deliver large and complex projects of this nature in the future.

We seek to work with the Commission and their expenditure consultants before the final decision to further demonstrate the efficiency of this project.

Appendices

Reference number	Appendix title	Author
2.1	2023–28 Capital Investment Plan (confidential)	Icon Water
2.2	Detailed Lower Red Hill Reservoir cost adjustments (confidential)	Icon Water
2.3	Project Axle independent assurance review and other reports (confidential) i. Status report (July 2018) ii. Independent Health Check (October 2018) iii. Independent Health Check follow-up review (April 2019)	Multiple

Abbreviations and acronyms

AER	Australian Energy Regulator
AIMS	Asset Management Information System
capex	capital expenditure
Commission	Independent Competition and Regulatory Commission
ESC	Essential Services Commission
GHG	green house gas
GWTP	Googong Water Treatment Plant
IPaD	Investment Planning and Design
IRC	Investment Review Committee
LMWQCC	Lower Molonglo Water Quality Control Centre
MJA	Marsden Jacobs Associates
MWM	Mobile Works Management
opex	operating expenditure
OUA	Oracle Utilities Application
RAB	regulatory asset base
SaaS	Software as a Service
SoCI	Security of Critical Infrastructure
SWTP	Stromlo Water Treatment Plant
WAM	Works and Asset Management
WSCC	Water and Sewerage Capital Contribution

2.1 2023–28 Capital Investment Plan

(confidential)

2.2 Detailed Lower Red Hill Reservoir cost adjustments

(confidential)

2.3i Project Axle independent assurance review and other reports - Status report (July 2018)

(confidential)

2.3ii Project Axle independent assurance review and other reports - Independent Health Check (October 2018)

(confidential)

2.3iii Project Axle independent assurance review and other reports - Independent Health Check follow-up review (April 2019)

(confidential)

Attachment 3

Other matters

December 2022

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3.1 Introduction

This attachment sets out Icon Water's response on the Independent and Regulatory Commission's (the Commission's) assessment in their Draft Decision of:

- the Weighted Average Cost of Capital (WACC)
- form of control, including pass through events
- demand forecast.

This attachment also includes our views on the pass through of costs for new non-controllable operating expenditure (opex) categories proposed by the Commission, and the Draft Decision to review wastewater tariffs as a reset principle.

We also ask the Commission to update inflation for 2022–23 based on the most recently available information at the time of the Final Decision. The Commission's draft decision used a placeholder estimate for 2022–23 based on forecast inflation, which should be updated to reflect actual/expected inflation before making its final decision.

Box 3-1: Key points

- Icon Water agrees with the Commission's Draft Decision for the WACC. Our revised revenue requirement provided as part of our response to the Commissions' Draft Decision includes an updated WACC estimate. We note that the Commission will update the WACC again before its final decision.
- Icon Water agrees with the Commission's Draft Decision to review wastewater tariffs as a reset principle.
- Icon Water agrees with the Commission's Draft Decision on the demand forecast.
- Icon Water agrees with the Commission's Draft Decision to treat some costs including regulatory compliance costs, licence fees and royalties as non-controllable operating costs. However, we consider these costs should be 'trued-up' to be consistent with other non-controllable operating costs.

3.2 Rate of return

3.2.1 The WACC Draft Decision

The Commission's Draft Decision largely accepted Icon Water's proposed WACC, including our proposed debt averaging periods. The Commission did not accept Icon Water's proposed value of imputation credits of 0.25 and instead adopted a value of 0.50.

The Commission adopts a benchmarking approach to determine the WACC and the Draft Decision largely reflects positions put forward in a recent review of the WACC which was undertaken as a reset principle in the current regulatory period.[1]

In our submission we estimated a WACC of 5.11 per cent using a placeholder estimate for market risk premium (MRP) of 6.1 per cent, consistent with the Australian Energy Regulator's (AER) 2018 Rate of Return Instrument (RORI). The Commission noted Icon Water's position that the WACC should reflect current benchmark data. Consistent with this, in its Draft Decision the Commission updated the WACC estimate proposed by Icon Water to 5.93 per cent, reflecting the MRP the AER included in its draft determination for the 2022 RORI released in June 2022.

In its Draft Decision, the Commission further considered the AER's RORI draft determination as well as other evidence and determined a WACC of 5.85 per cent, using an MRP of 6.5 per cent, representing parameters derived using the benchmarking approach. Icon Water accepts this Draft Decision on the WACC.

The WACC parameters determined by the Commission in the Draft Decision and accepted by Icon Water are set out in Table 3-1.

Table 3-1: Weighted average cost of capital parameters

Parameter	2018 Decision	Icon Water proposal	Draft Decision	Revised proposal
Risk free rate	2.8%	2.2%	3.38%	3.82%
Debt raising costs	0.125%	0.108%	0.108%	0.108%
Equity beta	0.7	0.7	0.7	0.7
Market risk premium	6.5%	6.1%	6.5%	6.5%
Gearing ratio	60%	60%	60%	60%
Return on equity	7.34%	6.51%	7.93%	8.37%
Return on debt	4.75%	4.20%	4.46%	4.54%
Nominal post-tax vanilla WACC	5.78%	5.11%	5.85%	6.07%
Value of Imputation credits	0.4	0.25	0.50	0.50

Source: Icon Water.

The remainder of this section discusses information that Icon Water submits the Commission should consider and incorporate into the final decision.

[1] ICRC, *Final Report, Review of Methodologies for the WACC*, April 2021

Risk-free rate

The risk-free rate reflects the return an investor would expect in the absence of default risk. The Commission's Draft Decision includes a placeholder risk-free rate of 3.38 per cent noting it will update before the final decision. Our revised proposal reflects an updated risk-free rate, which is higher than the value used for the Draft Decision.

The Commission calculated its estimate of the risk-free rate using the methodology set out in the 2021 WACC review, which is to reflect data for a period of 40 business days as close as possible to the start of the 2023–28 regulatory period. Icon Water agrees with this approach.

Debt raising costs

Icon Water accepts the Commission's Draft Decision for a debt raising cost allowance of 0.108 per cent, as proposed by Icon Water.

Equity beta

The equity beta adjusts the market risk premium to reflect the risk of the entity, in this case Icon Water, to the broader market. The Commission benchmarked values used by other Australian regulators for the equity beta, giving greater weight to more recent decisions. The Commission accepted Icon Water's proposed equity beta of 0.7, which was consistent with the value it found reasonable in its 2021 WACC review.

Market risk premium

The MRP is the expected return by which a market portfolio exceeds the risk-free rate. The Commission considers a broad range of methods to estimate the value of the MRP including historical estimates and dividend growth models (DGM). The Commission favours using arithmetic averages when estimating historical excess returns and cautions against using estimates heavily based on dividend growth models.

In its Draft Decision, the Commission considered a range of recent regulatory estimates for MRP and noted the mix of methods (historical estimates and DGM) used. Icon Water supports the benchmarking approach the Commission used to estimate the MRP and accepts the MRP estimate of 6.5 per cent.

Icon Water notes that one of the regulator estimates used was the AER draft decision for the 2022 RORI, released in June 2022. In November 2022, the AER notified stakeholders that it will delay its final decision on RORI until February 2023[2] to consider further evidence regarding the potential impacts of recent quantitative easing and other monetary policies associated with the post-Global Financial Crisis period on the AER's standard approach to estimating the market risk premium using a historical excess returns approach.

We are concerned that the AER's review may introduce data unavailable to other regulatory bodies and, given the limited time between its expected release and the Commission's final decision, it will not give stakeholders sufficient time to consider its implications if it is included in the benchmark approach. Icon Water considers the existing draft decision released by the AER in June 2022 is the most appropriate input to the benchmark approach for estimating MRP.

Return on debt

The value of the return on debt is a methodological process determined using nominated data sources and averaging periods. In 2018 Icon Water proposed and the Commission accepted a change to the

[2] See AER Website: https://www.aer.gov.au/publications/guidelines-schemes-models/rate-of-return-instrument-2022/draft-decision

trailing average method for estimating the return on debt and in 2022 Icon Water proposed this approach continues.

The Commission uses a benchmarking approach to set the benchmark credit rating and we accept the Draft Decision where a BBB credit rating is used. The return on debt is the simple average of two third-party data series, Reserve Bank of Australia (RBA) and Bloomberg, for 10-year BBB yields corporate bonds.

Icon Water submitted a return on debt averaging period consistent with the Commission's WACC methodology and the Commission accepted this averaging period.

Proposed value for imputation credits

The value of imputation credits is a factor in the revenue building block model to account for the value of imputation (or franking) credits when making an allowance for corporate tax.

The Commission analysed the approach other Australian regulators use to set this allowance and the value of this allowance. The Commission decided to use the utilisation method to set gamma, compared with the market value concept proposed by Icon Water. In making this decision the Commission noted the arguments put forward by Icon Water in support of the market value method and considered the analysis of other Australian regulators and concluded the utilisation method represents the approach used by most other regulators. The Commission determined a value of 0.5 for imputation credit.

While Icon Water disagrees with this position, we accept the Draft Decision to value imputation credits at 0.5 for this regulatory period as it will result in lower prices for customers in the short term.

3.3 Water and wastewater tariffs

The Commission made a Draft Decision to:

- retain the two-tier inclining block water tariff structure and apply price changes uniformly across all water tariff components
- maintain the existing wastewater tariff structure, comprising a fixed annual supply charge for all customers, and a flushing fixture change applying to non-residential customers
- conduct a review of the wastewater tariff structure over the next regulatory period. This is given effect through a reset principle in the price direction.

Icon Water agrees with the Commission's approach, including the Draft Decision to undertake a future review of the structure of wastewater tariffs in the ACT.

Our regulatory proposal submitted in June 2022 proposed to retain the current water tariff structure. To inform this proposal, we undertook a comprehensive engagement process, including asking our customers about the current tariff structure and their preferences for possible future structures. We found that while some customer segments strongly supported continued tariff rebalancing and/or introducing a non-residential tariff, there was not a broad level of support across all customer segments to pursue changes at this time.[3] Therefore, we proposed to retain the current wastewater tariff structure.

Our regulatory proposal submitted in June 2022 also outlined the work we are undertaking to better understand the impact of liquid trade waste (LTW) on our network and the associated costs to inform how we can best manage LTW in a way that protects our people and assets, while delivering a fair outcome for customers.[4] This work will continue into the 2023–28 regulatory period to inform the Commission's review of wastewater tariffs.

We acknowledge that some non-residential customers, particularly those in the hotel and accommodation sector, feel the flushing fixture charge is too high and does not reflect their impact on the wastewater network, particularly when compared to residential customers.[5] The current wastewater tariff structure, with a flushing fixture charge for non-residential customers, is designed to approximate the volume of wastewater produced by different customers and their associated impacts on the wastewater network. The design reflects the fact that Icon Water cannot accurately measure wastewater discharges for individual customers at this time.

During the 2023–28 regulatory period, Icon Water will continue its investigations into LTW[6]. This is expected to provide a better understanding of non-residential discharges, their impacts, and how Icon Water can manage these discharges. This may include the potential for new wastewater pricing options. We look forward to working with the Commission and stakeholders as part of the future review of wastewater tariffs.

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[3] Icon Water, *Price Proposal - Attachment 12, Tariff structure and proposed prices*, 30 June 2022, p. 14

[4] Icon Water, *Price Proposal - Attachment 1, Our role, operations and business context*, 30 June 2022, p. 29

[5] For example, see Australian Hotels Association and Accommodation Association, *Regulated Water and Sewerage Service Prices 2023-28, submission to the Independent Competition and Regulatory Commission's Issues Paper*, 8 April 2022: https://www.icrc.act.gov.au/__data/assets/pdf_file/0010/1996516/Australian-Hotels-Association-and-Accommodation-Association.pdf

[6] It is expected that Icon Water's risk-based management of LTW customers will continue throughout the 2023–28 regulatory period, although practices may be refined based on the results of these investigations.

3.4 Demand forecast

The Commission's Draft Decision accepted Icon Water's approach to forecast water and wastewater services demand, but updated data inputs into the demand forecasting model. The Commission will update the demand forecast again before making its final decision.

The demand forecast in our proposal adopted the methods set out in the 2021 decision by the Commission on demand forecasting methodologies.[7]

To determine the prices Icon Water can charge, the Commission divides Icon Water's revenue requirement by a forecast of demand for the five-year regulatory period. Some components of Icon Water's revenue requirement are also calculated using the demand forecast.

For each regulatory period, Icon Water must develop forecasts for four demand components which are directly used to set water and wastewater prices:

1. dam abstractions
2. billed water sales
3. connection numbers and wastewater billable fixtures
4. wastewater volumes

Forecasting water demand can involve a degree of uncertainty, especially on shorter timescales when demand is highly influenced by the weather. The Commission applies a demand 'deadband' mechanism to help appropriately share the risk of demand volatility between Icon Water and customers.

<u>We agree with the Commission's Draft Decision</u>

We have reviewed the approach the Commission used to forecast demand for the 2023–28 regulatory period. We agree with the Commission's approach, which is consistent with its 2021 decision on demand forecasting methodologies.

We note, however, that we were unable to exactly replicate the water volumes forecast. We suggest this slight difference may be due to a missing data observation for dam abstractions on 3 May 2022, which we included in our analysis.

[7] ICRC, *Final Report: Review of water and sewerage services demand forecasting methods*, 2021

3.5 Pass through of non-controllable operating expenditure

The Commission made a Draft Decision to accept the recommendation made by Marsden Jacobs Associates (MJA) to treat some additional opex costs (including regulatory compliance costs, the Commission's price review costs, licence fees and royalties) as non-controllable.

Non-controllable opex captures costs that are outside our control and are trued-up annually through a pass-through provision. Non-controllable opex includes the Water Abstraction Charge (WAC) and the Utilities Network Facilities Tax (UNFT), which reflects ACT Government fees and charges.

As outlined in Attachment 1, we agree with the Commission's Draft Decision that these opex costs could be treated the same as other non-controllable costs such as the UNFT and WAC. The Commission's Draft Decision is not entirely clear, but to avoid doubt we consider there is a need to clarify that these costs will also attract an annual true-up, to ensure they are treated consistently with other non-controllable costs.

This approach recognises that the costs are not within Icon Water's control and should reflect actual costs in each year of the regulatory period. Under this framework, customers do not pay more than is necessary to recover the costs to pay taxes, fees and charges recovered through regulated water and wastewater prices.

Within the Commission's regulatory framework this means our revised proposal reflects a forecast of non-controllable costs, but this forecast is updated with actual costs when prices are adjusted annually to reflect new information for some variables. Not providing an annual true-up for these costs would be inconsistent with the Commission's treatment of other non-controllable operating costs and could mean that customers pay too much if taxes, fees and charges are lower than forecast. We support classifying these costs as non-controllable only on the basis that there is an annual true-up.

Abbreviations and acronyms

AER	Australian Energy Regulator
Commission	Independent Competition and Regulatory Commission
DGM	dividend growth models
LTW	liquid trade waste
MJA	Marsden Jacobs Associates
MRP	market risk premium
opex	operating expenditure
RBA	Reserve Bank of Australia
RORI	Rate of Return Instrument
UNFT	Utilities Network Facilities Tax
WAC	Water Abstraction Charge
WACC	Weighted Average Cost of Capital