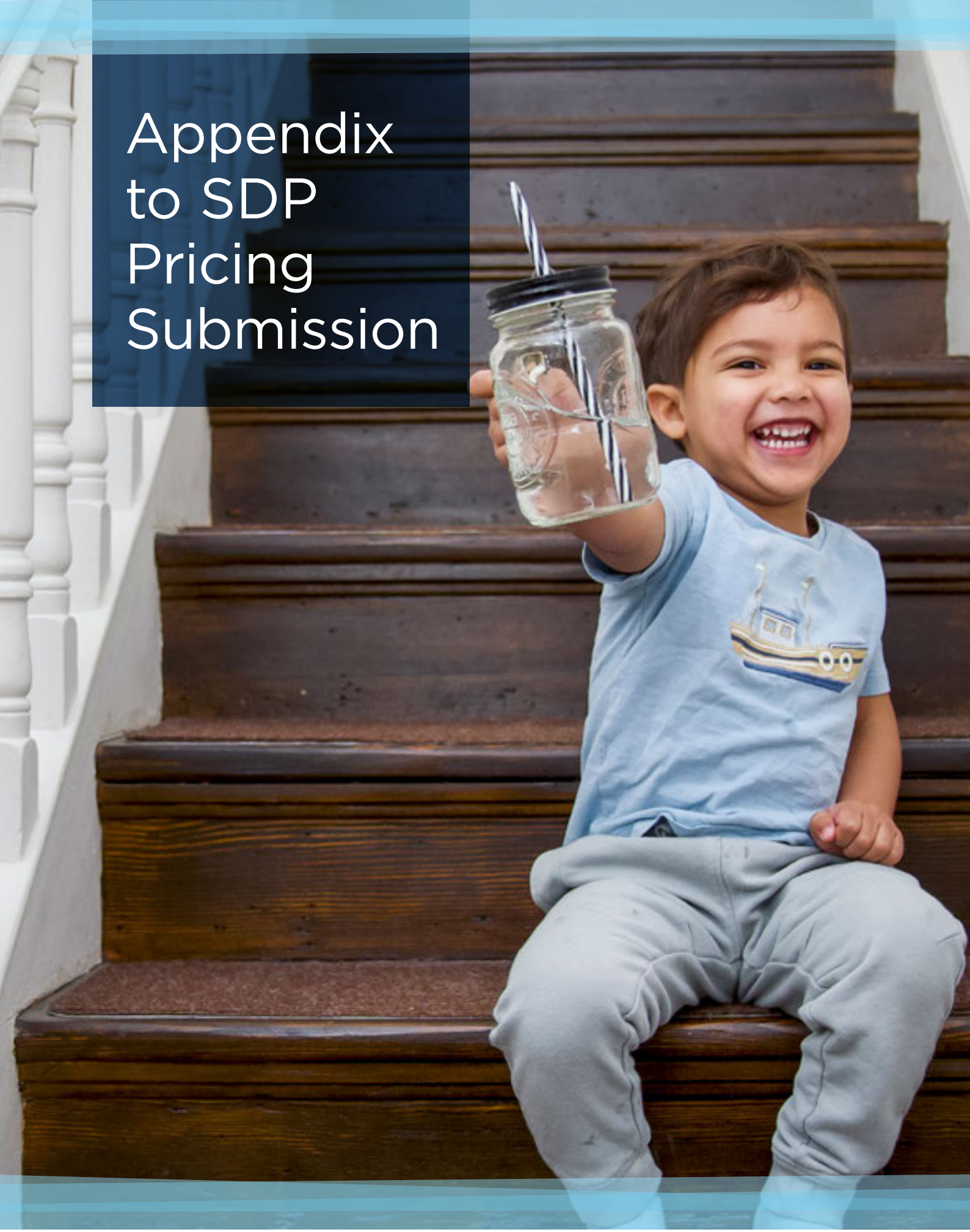
Appendix to SDP Pricing Submission



SYDNEY DESALINATION PLANT

16 September 2022

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SDP Pricing Submission to IPART

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1. About this submission

1.1 CEO's Declaration

Attached separately.

1.2 Chair's Declaration

Attached separately.

1.3 Claims for confidentiality

Attached separately.

1.4 Terms of Reference for Referral of Sydney Desalination Plant Pty Limited to IPART under Section 52 of the Water Industry Competition Act

A copy of the Terms of Reference for Referral of Sydney Desalination Plant Pty Limited to IPART under Section 52 of the Water Industry Competition Act is reproduced below. This can be obtained from IPART's website alongside the accompany letter to IPART from the Minister for Lands and Water and Minister for Hospitality and Racing, dated 16 June 2022.[1]

Terms of Reference for Referral of Sydney Desalination Plant Pty Limited to IPART under Section 52 of the Water Industry Competition Act

Background

On 29 June 2010 Sydney Desallnatlon Plant Pty Limited (***SDP***) was granted a netwok operator licence in relation to the desalination plant. The Minister for Finance and Services has, under sec ion 51 of the Water Industry Competition Act 2006, declared that SDP is a monopoly supplier in relation to the water supply services it provides under its network opera or licence.

SDP is the only supplier of non-rainfall dependent drinking water in New South Wales. Currently, the primary purchaser of drinking water supplied from the desalination plant is Sydney Water Corporation. Sydney Water Corporation purchases bulk water from two main sources, WaterNSW and, since its commissioning, the desalination plant.

The Greater Sydney Waler Strategy (GSWS) charts the long-term vision and direction for delivering sustainable and resilient water services to Greater Sydney, including the Illawarra and the Blue Mountains, for the next 20 years. The GSWS replaces he 2017 Metropolitan Water Plan. The desalination plant is a key element in Sydney's water security plan and the Greater Sydney Water Strategy.

The GSWS provides for an amended operating regime for the Sydney Desalination Plant (**Plant**) to increase its contribution lo water supply security and drought management, and not only as a drought-response service. A Decision Framework is being developed by Sydney Water for my endorsement and will guide the flexible operating approach. It adopts a principle-based approach aimed at enhancing reslllence and Is intended to remain adaptive to the changing circumstances and needs across Sydney Water's network, As part of IPART's review of SDP's network operator's licence, reference to the Decision Framework in the licence will provide additional information about the Intended operation of SDP, and will be consistent with the Government's objectives stated In the GSWS.

Prices set by the Independent Pricing and Regulatory Tribunal (IPART) should therefore reflect the water supply servlces provided by SDP set out below:

1 https://www.ipart.nsw.gov.au/sites/default/files/cm9_documents/Updated-Terms-of-Reference-Sydney-Desalination-Plant-Pty-Ltd-June-2022.PDF

a. the supply of non-rainfall dependant drinking water to purchasers (noting the potential range and variation of production required under the Decision Framework) and

b. the making available of the desalination plant to supply non-rainfall dependant drinking water.

Matters for consideration - pricing principles

Unless indicated otherwise each price determination is to be consistent with the following pricing princlples:

1. Maximum prices should be se so that expected revenue generated will recover the efficient costs of providing the services descrlbed at (a) and (b) above over the life of the assets. Costs include operating costs, a return on the assets and return of assets (depreciation).
2. In calculating the return on invested asses:
    i. The rate of return (or Weighted Average Cost of Capital) should reflect the commercial risks faced by the asset owner In providing the services.
    ii. IPART should determine an appropriate opening asset value.
3. Return of assets (depreciation) is to reflect the economic lives of the assets.
4. The strvcture of prices should encourage SDP to be financially indifferent as to whether or not it supplies water. As such the structure of prices should comprise separate charges for the different water supply services described at (a) and (b) above.
5. The amount of any adjustments under the mechanisms in principle 8 should each be separately quantified and published by IPART.
6. The charges for water supply services In (b) above should be a periodic payment and should reflect fixed costs including, return on assets, return of assets, and the fixed component of operating costs. SDP is to be entitled to charge for providing the water supply services In (b) above irrespective of levels of water in dam storages servicing Sydney or availability of water from other sources.
7. The charges for water supply services in (a) above should reflect all efficient costs that vary with output including variable energy, labour costs, and maintenance costs.

7A. The SDP Project Approval under former s 75J of the *Environmental Planning and Assessment Act 1979* (05_0082) required the development of a greenhouse gas reduction plan (GGRP), to be approved by the Director-General, prior to the commencement of operation of the plant. The GGRP details a strategic plan for the management, minimisation and off-set of greenhouse gas generation associated with electricity supply to the plant. As part of the approved GGRP, certain contracts were entered into with lnfigen (now Iberdrola Australia) to acquire electricity and RECs (GGRP Contracts). The price determination should consider SDP's ability to recover all costs it Incurs in complying with the GGRP and the GGRP Contracts other than costs related to surplus energy in relation to which the energy adjustment mechanism described in paragraph 8 (iii) applies.

8. or each price determination other than the first price determination:
    i. SDP should be allowed lo carryover demonstrate efficiency savings, net or efficiency losses, in operating expenditure in providing the water supply services specified at (a) and (b) above for a period of 4 years following the year in which the efficiency saving was achieved.
    ii. In calculating the national revenue requirement, IPART should determine the demonstrated efficiency savings and treatment of energy gains or losses in aocordance with the Methodology Paper; and
    iii. A mechanlsm(s) is required to a locate the costs or benefits of SDP customers (in Sydney Water's area of operation) or actual gains or losses beyond a core band that result from the difference between SDP's costs of electricity and RECs under its contracts with lnfigen (now Iberdrola Australia) and revenues from the sale of surplus electricity and RECs. The mechanism would only operate at times when SDP complied with its requirements to maintain and operate the desalination plant under clause A2 of its network operator licence.
9. Any other matters tha IPART may consider relevant

Methodology Paper

IPART must publish on its website a methodology paper setting out its approach to implementing pricing principle 8 above (Methodology Paper). IPART may update the Methodology Paper from time to time.

Timing

The determination period to be confirmed as part of the IPART review process. For each successive price determination period, IPART is to make the price determination before a expiry of the current determination period.

2. About SDP

No appendices in this section.

3. SDP's evolving role in Sydney's water supply

This appendix provides further information on SDP's revenue and performance over the historical period. This is defined by IPART in its Guidelines to be the current determination period plus the last year of the previous determination period. Further information is contained in the AIR.

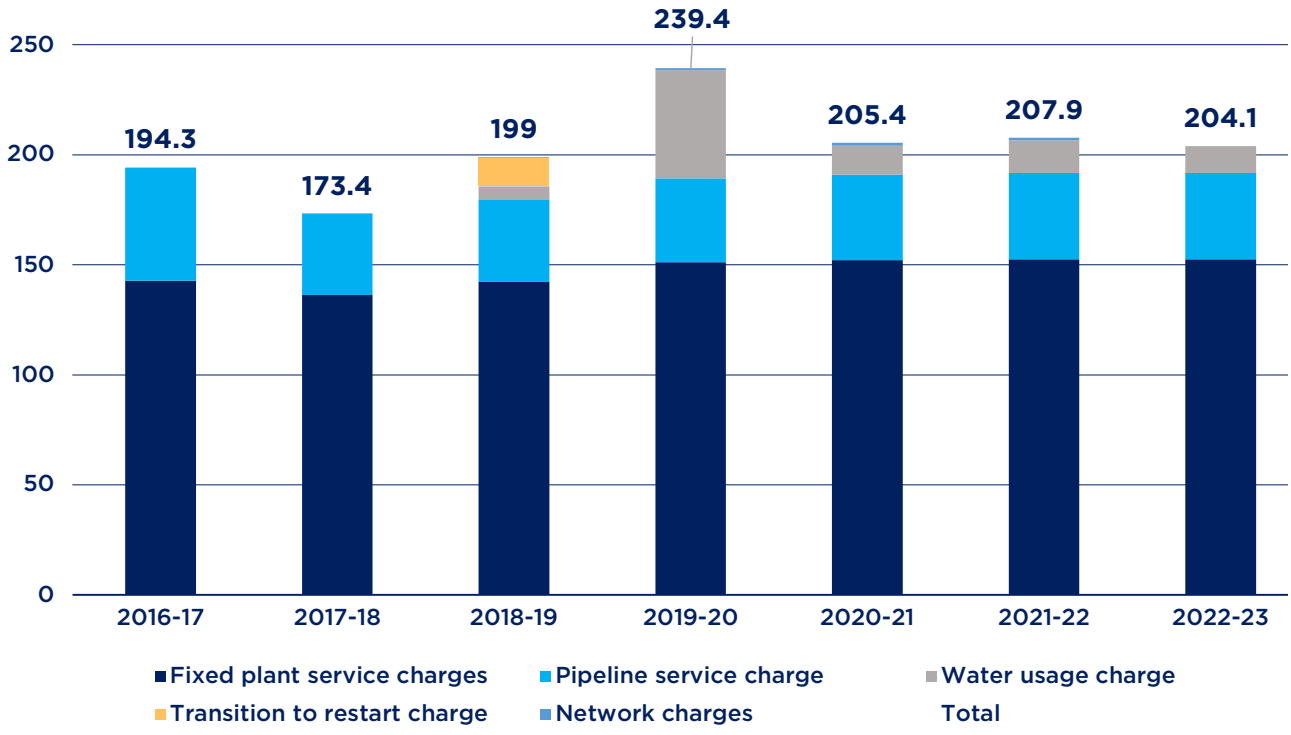
3.1 Revenue over the historical period

SDP's regulated revenue over the historical period is summarised in **Figure 3.1** below.

The regulated revenue reflects the operating modes below and water production (see **Table 3.1**) over this period:

- 2016-17 - Water Security Mode
- 2017-18 – Water Security Mode
- 2018-19 – Water Security Mode (255 days), Operating Mode (110 days)
- 2019-20 – Operating Mode and ERN
- 2020-21 – ERN
- 2021-22 – ERN
- 2022-23 – ERN (projected)

Figure 3.1: *Regulated revenue over the 2017-23 regulatory period ($000, $nominal)*



Source: Sydney Desalination Plant (AIR/SIR return)

3.2 Performance over the historical period

Table 3.1 summarises water production from the Plant compared to the minimum target production for each year to date over the historical period, including 2016-17. It is important to note that that our Network Operating Licence required us to operate to maximise production of drinking water during the Restart and Operating Modes and to produce up to 110% of requested production during ERN Modes. As indicated, we have exceeded the target level of production each year and met all of our obligations under our Network Operating Licence.

Table 3.1:*Water production vs target in the historical period*

	Modes	Target Production (GL)	Actual Production (GL)	Difference (GL)
2016-17	Water Security Mode	0	0	0.0
2017-18	Water Security Mode	0	0	0.0
2018-19	Water Security Mode / Restart	0	7.8*	7.8
2019-20	Restart / Operating Mode / ERN	50.2	71.1*	20.9
2020-21	ERN	18.3	19.6	1.4
2021-22	ERN	23.0	22.3	-0.7
2022-23	ERN	23.0**	n/a	n/a

*Note: * SDP required to operate the Plant with the objective to maximise production under its 2017 Network Operators Licence. **Target production for 2022-23 remains highly uncertain and subject to Sydney Water ERNs. ERN#15 issued in August 2022 was for 250 ML/day.*

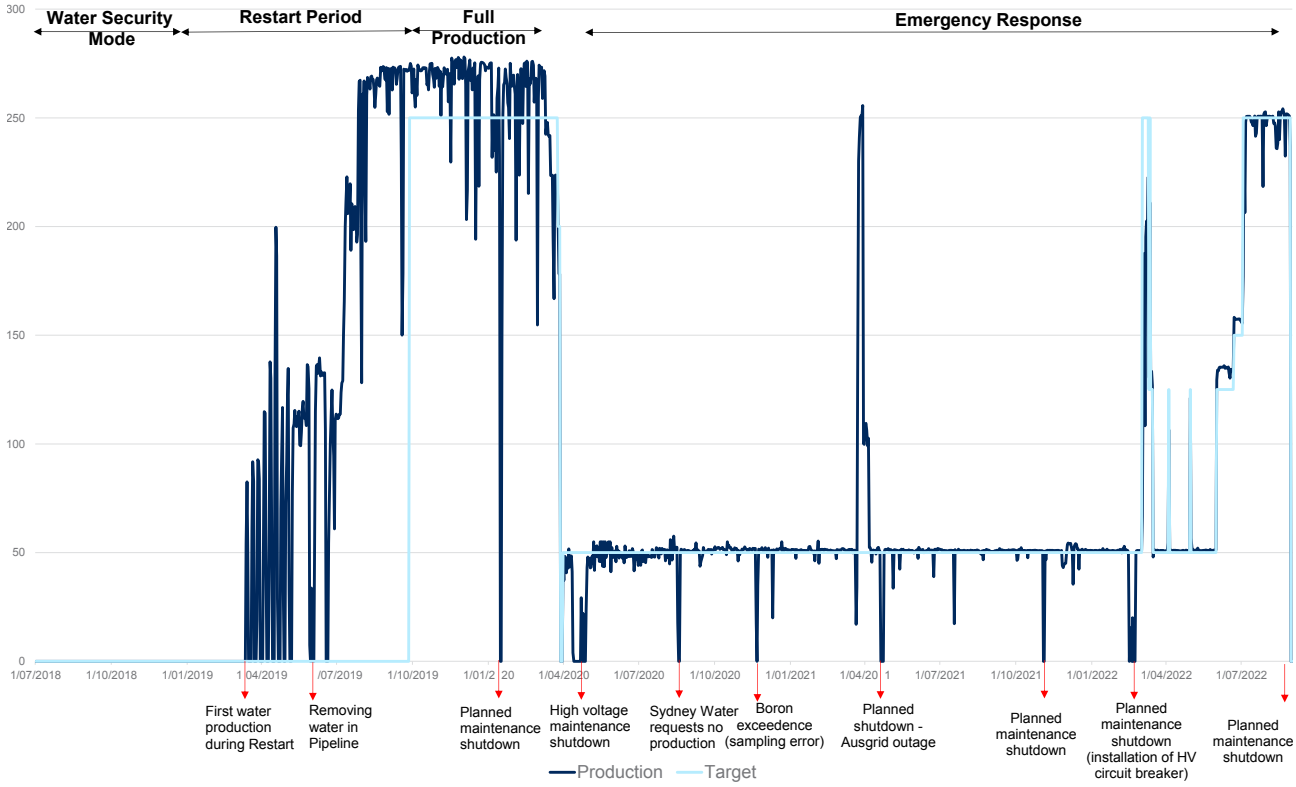
Source: Sydney Desalination Plant

The volume of water requested and produced over the historical period has been highly variable. Our water production during operational periods is also summarised in **Figure 3.2**. The target level of daily production during these periods is shown by the light blue line with key discrepancies to target performance.

This figure shows water production starting during the restart period in early 2019, and full production commencing September 2019.

Following substantial rainfall in early 2020, Sydney dam levels recovered sufficiently to meet the 70% shutdown trigger within the 14-month minimum run time of the Plant (expiring 27 March 2020). On 27 March 2020, however, Sydney Water issued an ERN requesting SDP remain operational until September 2020. The ERN was issued to mitigate water supply and public health risks resulting from the substantial rainfall event in February 2020 and the resultant runoff into Sydney's dams. The Plant has remained operational since 27 March 2020 responding to 15 separate ERNs up to August 2022. The Plant was able to appropriately respond to all requests by Sydney Water allowing mitigation of water supply and public health risks.

Figure 3.2: *Daily water production vs target from 1 July 2018 to 31 August 2022 (ML/day)*



Note: Target and actual production was zero in 2017-18.
Source: Sydney Desalination Plant

4. Meeting the future needs of Sydney Water, customers and stakeholders

4.1 Expert Report: Level of service provided by SDP under Operating Rules (Ontoit)

This report is attached separately.

4.2 Expert Report: SDP's customer & stakeholder engagement program (RPS)

This report is attached separately.

4.3 Expert Report: Customer research (StollzNow)

This report is attached separately.

5. Key risks to be managed and allocated in providing our services

No appendices in this section.

6. Scope and form of regulation

6.1 IPART correspondence on approach to averaging period for rate of return

This is attached separately.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

7. Proposed changes to the incentive and risk management framework

7.1 Proposed Service Level Incentive Scheme for 2023-27 regulatory period

This Appendix provides further detailed rationale for the proposed SLIS summarised in Section 7.1 of the submission. It is structured as follows:

- Section 7.1.1 provides contextual background on the previous service level incentive mechanism applying in the 2017-23 regulatory period
- Section 7.1.2 discusses the need for a SLIS for the 2023-27 regulatory period
- Section 7.1.3 sets out our approach to designing the SLIS and the range of factors to which we have had careful regard in doing so
- Section 7.1.4 sets out the detailed scope and design and rationale of our proposed SLIS
- Section 7.1.5 summarises how our proposed SLIS compares to the 2017 abatement mechanism
- Section 7.1.6 explains how the SLIS would apply under a range of scenarios
- Section 7.1.7 summarises the key elements of the proposed SLIS.

7.1.1. Background

Economic regulators, including IPART, have increasingly utilised service level incentive schemes (SLISs) alongside cost efficiency incentive schemes to provide balanced incentives "to pursue ongoing improvements in performance and reduced costs."[5] In particular, IPART has flagged that in future it will adopt incentive mechanisms – known as Outcome Delivery Incentive (ODI) mechanisms – which tie financial rewards and penalties to the delivery of key customer outcomes that promote customer value. In the future, IPART will expect regulated businesses to propose relevant customer outcomes, and specific measures for each outcome that will promote customer value.[6]

In the 2017 Determination, the SLIS (known then as the abatement mechanism) related to SDP's performance in fulfilling what was then seen as its primary or core function – that of a drought response asset. Its stated objective was "to provide a financial incentive to SDP to maximise its production and supply of water during drought.[7]" This reflected the obligation under SDP's Network Operator's Licence at the time that "the desalination plant must maximise water production when dam storage levels in Sydney are below a prescribed threshold". The scheme was designed when SDP had been non-operational for an extended period and IPART had concerns regarding SDP's financial incentives to maintain the assets, restart the Plant, and achieve and sustain full production in response to a drought. Under this mechanism, financial penalties were imposed through adjustments to SDP's fixed Plant service charges ('abatable charges') if the Plant failed to maintain full production during a drought period or at other times when requested to provide water (unless an uninsurable force majeure event occurs).[8] (See **Box 1**).

For the 2023-27 regulatory period, SDP's operational role will broaden considerably. Rather than only operating at full capacity during defined periods of drought, SDP will change to flexible full-time operation to enable it to respond to production requests from Sydney Water and provide optionality for Sydney Water as it manages its water supply portfolio. In doing so, however, SDP's Network Operator's Licence makes clear that the dominant imperative (and stricter standard of compliance) is for SDP to respond to Annual Production Requests (APRs) – which can range from 23 GL/pa to 91.25 GL/pa – relative to other types of production requests such as monthly sequencing of the APR and emergency response (where SDP is required to use its best endeavours), recognising the need for flexibility to respond to shorter term

5 IPART, Draft Water Regulatory Framework: Technical Paper, May 2022, p32.

6 IPART, Draft Water Regulatory Framework: Technical Paper, May 2022, p36.

7 IPART Final Report, Sydney Desalination Plant Pty Ltd, Review of prices from 1 July 2017 to 30 June 2022, Final Report, June 2017, p. 33.

8 Abatement does not apply when the Plant is in Water Security Mode outside of drought, but currently does apply if the plant is in restart or has not produced water for more than ten consecutive days and has thus been deemed to be in shutdown mode during a drought.

requests or requests with shorter notice periods. These significant changes to SDP's operating environment and the services it will be asked to deliver mean there is a need to develop a SLIS which, while drawing appropriately on the 2017 abatement mechanism, is fit-for-purpose in this new operating environment.

Box 1: Overview of abatement mechanism in 2017 Determination

The abatement mechanism in the 2017 Determination provides a penalty or temporary reward on the daily fixed Plant service charges during drought or other times when SDP is supplying water (e.g. emergency response or supply to a third party), with a view to encouraging SDP to supply water when required to do so. The abatement mechanism was predicated on a restart from Water Security Mode and provided a grace period during the Plant restart window. It imposes a penalty on daily fixed charges for underperformance, while any reward is temporary and must be 'paid back' at the end of the operational period. However, the 'reward' is able to be used to net off any future underperformance. It provided SDP the ability to build up a buffer and/or recover from previous penalties over the period of a drought in recognition that the Plant was designed to reliably supply a volume of water over the long term, not for short bursts. The abatement charge applies to the Base, Incremental and Membrane Service charges but not to the Transition to Restart, Water Usage or Pipeline charges.

The abatement factor (AF) calculation measures the daily deviation from nameplate production on a rolling 12-month average. The AF can be above or below one and is equal to one when the Plant is producing exactly 250ML/day on average for 12 months. The nameplate capacity for the Plant is below the technical capacity of the Plant (250ML/day versus 266ML/day) thus allowing SDP to undertake up to 21 full days of planned and unplanned maintenance each year at zero output, or equivalent partial reductions in Plant capacity – effectively the Plant design was based on the Plant having a 94% availability relative to theoretical full capacity.

The 2017 Determination defined a number of ways in which abatement would apply (or not apply):

- **Full abatement** is where the abatement factor applies to the relevant fixed charges and SDP's daily production affects the abatement factor;
- **Partial abatement** is where SDP's level of production does not affect the abatement factor – but the most recent 12 month rolling average abatement factor is frozen and applied to the daily fixed charges.
- **No abatement** is where the abatement factor does not apply to SDP's charges, and SDP's level of production is not included in the rolling 12 month average.

In its 2017 Determination, IPART sets out the circumstances under which full, partial or no abatement applies as set out in the table below.

Table 7.1: *When and how abatement applies under the 2017 Determination*

	Inside drought and inside emergency response		Outside drought and outside emergency response		
	During grace period	**After grace period**	**Minimum run time**	**Supplying third party**	**Shutdown**
Business as usual	Partial	Full	Partial	Partial	No
Insurable force majeure	Partial	Full	Partial	Partial	No
Uninsurable force majeure	No	No	No	No	No

Source: IPART

7.1.2. The need for a SLIS

It is firstly important to recognise that SDP's broader regulatory and commercial environment already provides strong incentives to effectively fulfil our roles. In particular, SDP's Network Operator's Licence:

- requires SDP to maintain and operate our Water Industry Infrastructure in accord with Good Industry Practice, having regard to the Capacity of the Water Infrastructure, its duty, age and technological status.
- requires SDP to comply with any APR made by Sydney Water under the Decision Framework, provided that the request is consistent with the Decision Framework.
- requires SDP to use its best endeavours to comply with any request, other than an APR, made by Sydney Water under the Decision Framework, provided that the request is consistent with the Decision Framework.[9]
- notes that SDP has relief from compliance with an APR to the extent non-compliance is caused by responding to other requests as above (and that any change to an APR should consider and be consistent with SDP annual production to date).
- states that SDP is not required to meet these requests "during the time and to the extent that such compliance is prevented wholly or predominantly by an event outside the reasonable control of the Licensee."

Under the WICA, SDP is required to report any licence non-compliances. IPART has the ability to audit SDP's compliance with all licence requirements, and deal with any instances of non-compliance directly.[10] In addition, the corporate reputational damage to SDP of failing to respond to Sydney Water's production requests would be significant. SDP also has strong commercial drivers in its WSA with Sydney Water to fulfil its obligations to supply water when required.

Nevertheless, SDP supports incentive regulation and agrees that in principle a SLIS should apply over the 2023-27 regulatory period to provide balanced incentives "to pursue ongoing improvements in performance and reduced costs."[11]

7.1.3. Approach to designing the proposed SLIS

In designing the proposed SLIS we have:

- Drawn on the existing abatement scheme but modified it to ensure it is fit-for-purpose in SDP's new operating environment
- Had regard to key regulatory principles
- Considered practical operational realities including the design and age of the Plant
- Taken into account IPART's position on incentive schemes as outlined in its recent regulatory framework review
- Consulted with Sydney Water
- Sought to ensure consistency with key elements of the broader regulatory (e.g. SDP's Network Operator's Licence) and commercial framework (e.g. WSA).
- Reviewed service level and incentive schemes applying in other jurisdictions and sectors (see Appendix 7.2).
- Considered SDP's Network Operator's Licence requirements and proposed a SLIS which balances the preference for a simple and easy to administer scheme with the need to account for complexities of the new operational services we provide as an integrated part of Sydney's water supply.

9 We note that such a request would be also made under the terms of the WSA

10 These audits typically occur annually. SDP is required to notify of any non-compliances as they occur, and/or in the annual reporting to IPART. Compliance action can include monetary penalties and suspension or cancellation of the licence (with the approval of the Minister).

11 IPART, Draft Water Regulatory Framework: Technical Paper, May 2022, p32.

7.1.3.1. Drawn on the existing abatement scheme but modified it to ensure it is fit-for-purpose in SDP's new operating environment

Our proposed SLIS retains many features of the 2017 abatement mechanism. However, we consider that the abatement mechanism could be refined to better achieve its fundamental purpose of providing targeted and proportionate financial incentives to SDP to fulfil its new operational role and to better align with good regulatory principles as outlined above.

A comparison between elements of the 2017 Abatement mechanism and the SLIS is set out in **Table 7.3**.

7.1.3.2. Compliance with accepted regulatory principles

The objective of the SLIS is to provide a targeted, proportionate and symmetric set of incentives for SDP to meet or exceed performance standards where these are valued by Sydney Water (and its customers) in responding to production requests and efficiently operate and maintain the Plant in line with Good Industry Practice.

To achieve this objective SDP considers it critical that any SLIS should align with well-accepted regulatory and commercial principles as this will drive behaviour that is in the long-term interests of customers and avoid creating "an incentive to prioritise short-term thinking over improved service performance and long-term innovation."[12] Our proposed principles are summarised in **Table 7.2** below.

12 IPART, Draft Water Regulatory Framework: Technical Paper, May 2022, p32.

Table 7.2: *Key principles for the design of SLIS*

Principle	Implication
Effectiveness	• Incentives should be targeted at key objectives/performance outcomes – particularly those most valued by customers that can be achieved • Financial penalty/rewards should provide sufficient incentive to SDP to meet and improve performance
Proportionate and timely	• Financial penalty/reward should be proportionate to the impact associated with performance or non-performance • Financial penalty/reward should also be applied in a timeframe reasonably proximate to the performance to ensure current behaviour is not impacted by financial incentives from previous behaviours
Reflect controllable performance	• Performance should be assessed against operational realities of the relevant infrastructure including design of the assets and other operating constraints • Performance should reflect SDP's long-term controllable performance to encourage sustainable improvements to service rather than focusing on short-term or one-off infrequent events • Performance should exclude events where SDP is prevented from complying with an APR wholly or predominantly by an event outside its reasonable control to avoid creating 'windfall' financial penalty/rewards.
Symmetric	• Financial incentives should be symmetric (equally reward/ share upside and downside), consistent with best practice for regulatory incentive mechanisms
Minimise adverse incentives	• Scheme design should avoid providing perverse incentives for SDP to operate plant sub-optimally and/or 'over-invest' to manage risks • It should target the desired response in a complex operating environment (e.g. should not incentivise SDP to meet tight volume targets to manage volume risk, when in many cases flexibility is more important). Only significant over- or under-production should be subject to a disincentive • Should reflect Good Industry Practice
Simplicity and clarity	• Scheme should provide ex ante clarity on how it is applied to reflect performance under all scenarios and thus provide regulatory certainty upfront to all parties • The mechanism should minimise upfront and ongoing administrative costs and not be excessively complex.
Congruence and consistency	• Scheme should be consistent with other elements of the regulatory framework (and with IPART's evolving approach to service level incentives schemes generally) and also with SDP's legislative and commercial requirements (including the WSA and WICA Licence). • Scheme should also be consistent with regulatory precedence and best practice adopted in incentive schemes applied by other economic regulators.

7.1.3.3. Practical operational realities

In addition to these well-accepted principles, it is essential to consider the unique features of the Plant and its operating environment. These include:

- The Plant was designed primarily to fulfil a periodic drought response function
- SDP Planning Approval - The SDP planning approval states "the Government has adopted a policy that the proposed desalination plant and associated infrastructure will only proceed to implementation as a contingency in the event of extreme drought conditions". The Plant was designed and constructed to operate in response to drought and is operationally challenged to respond quickly to production requests.
- Basis of design of the Plant - The Plant was designed and constructed to operate primarily as a drought response asset, that could respond in the longer term by producing at various production levels to meet an annual production volume, and/or turn off altogether outside drought. Quick ramp-up and response was not included in the basis of design intent and therefore was not a focus in the design of the Plant. If that had been a key aim, considerably more infrastructure would have been built to increase the Plant's availability, redundancy and ability to respond quickly (ie. additional process equipment, backup systems and addition storage capacity) The Plant does have the ability for flexible operation, although there are cost, reliability, ramp-up and performance expectation limitations that go hand in hand with this, and that are reflected in the competitively tendered O&M Contracts.
- Due to its design, the Plant is best suited to spend considerable time in 'shutdown' mode, and then to operate consistently for relatively long periods during a drought when required, with considerable time (i.e. 8 months) to reliably restart the Plant, rather than to be ready to respond to uncertain production requests at short notice. Once again, the Plant does have the ability for this flexible operation, but the risk of Plant production failures should be given reasonable tolerance allowance tending towards a best endeavours basis.

SDP, Sydney Water and IPART have very limited experience in requesting production, operating, maintaining, overseeing and regulating the Plant running in this more flexible manner:

- The knowledge base and experience as to how the Plant will physically be able to perform in accommodating potentially rapidly changing requests for varying volumes of water over the long term is limited.
- Operating experience over the last regulatory period (see section 3 of our main submission) does however highlight that unanticipated events can occur which can impact on water production at the Plant, particularly over shorter timeframes, even when it is being maintained and operated in line with Good Industry Practice. As highlighted in section 3.1, these uncertainties in Plant performance over short timeframes are inherent to the design of the Plant.

Integration into Sydney Water's portfolio of water supply options

Our customer, Sydney Water is expert at managing its traditional water treatment and supply network but has had limited experience in implementing the new operating environment through operating protocols with SDP and efficiently utilising the Plant as a fully integrated part of the greater Sydney water supply network.

Extreme weather events and rainfall volumes in the Sydney catchment areas and corresponding dam levels are impossible to predict a long time in advance. It is difficult to predict the optimal timing for maintenance to be undertaken in the Sydney Water network and the best time for SDP to increase or decrease its level of production. For this reason, Sydney Water is seeking flexibility in the way it can request SDP to run over the year, and how it can change these requests as better information comes to light. However, if SDP is to be held to account on an annual production request that is subject to change, or if SDP must incorporate other periodic requests into its production schedule, then there must be a process that indemnifies SDP if requests are inconsistent with its Network Operator's Licence conditions, and that ensures SDP is not disadvantaged by these changes such that it is a risk of complying with its licence requirements. Likewise, any incentive mechanism must also recognise these factors.

In the 2017-23 Regulatory period we have experienced challenges in operating under emergency response notices (i.e. outside drought) as elements of the 2017 Determination were designed on the assumption that SDP would not operate or would operate as drought response only. We need to weigh up the effect of implementing an inefficient incentive regime which introduces unintended erosion of flexibility for our customer or undue administrative burden for either SDP, Sydney Water or IPART.

Balancing SDP maintenance requirements with our customer needs

The new operating environment potentially limits SDP's ability to make optimal decisions on maintaining and renewing the Plant's assets given Sydney Water has significantly more control over how and when the Plant is operated through issuing of APRs and other monthly and/or weekly phasing requests, relative to the existing arrangements under the 2017 Network Operator's Licence.

SDP is committed to responding to all Sydney Water's reasonable production requests and helping to mitigate Sydney Water's supply risks in the best interests of customers. However, we will require periods of maintenance where the Plant will be unable to produce water or where the Plant's capacity is reduced. In the 2017-23 Regulatory period, SDP had full control over maintenance scheduling provided long term average production was maintained. Under the new operating environment, we may be asked to defer (or prematurely cut short) reductions in capacity due to maintenance or capital works in order to accommodate production requests. We will support this where possible, provided there is fair and reasonable indemnity from penalty if performance is affected.

No ability to diversify risk

SDP is a single asset business and is not able to diversify performance risk across a portfolio of assets like other water businesses.

We have a single site, a single water source, a single power source, and we deliver water to a single point into the Sydney Water network. There is limited opportunity to manage or control unavoidable risks related to these factors.

These factors underline the importance of ensuring any SLIS to apply to SDP in the 2023-27 regulatory period is designed carefully to reflect these realities. As is common with service level incentive schemes more broadly, the aim should be on encouraging sustainable improvements to service rather than focusing on short-term or one-off infrequent events. A key implication is that SDP's performance should be measured and assessed over suitably long timeframes of operation and against events within its reasonable control.

It also means there is a strong case for the financial incentives under any SLIS to apply to SDP in the 2023-27 regulatory period to be relatively conservative and avoid the potential for windfall penalties or rewards until there is sufficient operational experience with this new operating environment. In addition, because the Plant will now remain continuously operational, significant penalties are not required to ensure that the Plant can operate if called upon (whereas previously the Plant would have been in long-term shutdown and understandably, stakeholders may perceive risks that the Plant could fail to meet restart objectives in the absence of severe financial penalties).

7.1.3.4. Consistency with key elements of the broader regulatory and commercial framework

As noted above, a key principle is that the SLIS should be consistent with other elements of the regulatory framework (and with IPART's evolving approach to service level incentives schemes generally) and also with SDP's regulatory and commercial requirements (including the WSA and SDP's Network Operator's Licence requirements as outlined in Section 7.1.2 above.

We note that SDP's Network Operator's Licence imposes a stronger obligation on SDP to meet the APR issued by Sydney Water than it does in relation to other types of production requests. In this sense the Network Operator's Licence makes clear that having a secure supply of non-rainfall-dependent drinking water over the long term (annually) remains the dominant imperative, and is most aligned to SDP's past role and the Plant's reasonable capabilities. Responding to other types of production requests such as monthly sequencing and emergency response are limited to SDP using its best endeavours, recognising the need for flexibility to respond to potentially changing timing and volume of such requests. In essence, our licence requirements are recognition that SDP being 'held to account' on APR performance is sufficient to also provide a satisfactory oversight on responses to other short-term requests.

We also note that the Network Operator's Licence provides for a tolerance limit of + or – 10% around the Annual Production Request, so that only significant over- or under-production on the Annual Production Request is deemed as a licence breach.

As noted below, the SLIS needs to be seen as part of a package of incentive schemes including an operating expenditure benefits savings scheme and the other financial and reputational incentives.

We have also sought to ensure that the SLIS is consistent with SDP's Network Operator's Licence, Decision Framework, ToR and WSA.

7.1.3.5. Consulted with Sydney Water and IPART

SDP has consulted closely with our customer, Sydney Water, in developing this proposed SLIS. We have also consulted closely with IPART during SDP's WICA licence review, mainly focused on our Network Operator's Licence.

We have sought to design the SLIS so that it reflects the key services and aspects of performance of most importance and value to Sydney Water, and where this performance is within SDP's reasonable control. In particular, as discussed below, we have therefore proposed that the SLIS apply only to an annual production period (i.e when the APR is between 23 and 91.25 GL/pa), and not during an optimised production period when the APR is less than or equal to 23 GL/pa) to minimise and avoid unnecessary production over and above what is required subject to remaining ready to respond to new or changes in varying production requests.

In this regard we also note that IPART stated in its SDP WICA licence review process that "Our understanding from preliminary consultation with stakeholders is that Annual Production Requests made in accordance with the Decision Framework are intended to be binding, but that a "best endeavours" standard should apply to other requests."

It is also important to note that SDP has operated to Sydney Water and customers' satisfaction in responding successfully to emergency response requests during the 2017-2023 Regulatory Period in the absence of strong financial incentives to respond to these ad hoc and fluctuating emergency production requests. We did this despite the unfavourable inflationary and other pressures that SDP and its Operator have experienced which have increased the cost of producing water without a cost recovery mechanism being available within the 2017 Determination. This experience should demonstrate that SDP already has and will continue to have strong reputational, contractual and governance led incentive to act in the best interests of customers.

7.1.3.6. Review of regulatory precedence

We reviewed other schemes relating to incentives for regulated business in the energy and water sectors to meet performance service standards (see Appendix 7.2 below). Almost all jurisdictions that we reviewed had a 'regulated scheme' designed to incentivise a utility to provide 'good service' or meet designated service standards. A common element of both the existing SDP abatement mechanism and other incentive schemes is that all share a similar objective: to create a financial incentive for the utility to meet designated service standards. However, it is worth noting that the incentive schemes we reviewed:

- applied to standard water or energy utilities (with multiple assets and ability to spread risk) rather than a stand-alone desalination plant designed primarily to respond to drought
- related to water/energy networks that serve many end-customers and where breaches of service standards are often localised and unlikely to impact all customers minimising the total risk exposure
- applied a broader range of service standards compared to SDP, including for example, time to respond to customer complaints (thus can be relatively minor breaches of service standards).

Despite these differences we can take the following learnings:

- the financial impacts are symmetric
- rewards and penalties are capped.
- events outside the utility's control are generally excluded and defined clearly upfront, and
- there is flexibility to agree alternative arrangements with the customer.

7.1.3.7. IPART's position on service level incentive schemes

We have also taken into account IPART's position on incentive schemes as outlined in its recent Water Regulatory Framework Review Draft Report.[13]

In its draft report, IPART clearly states its intention to implement financial and service performance incentive mechanisms to encourage businesses, that demonstrate a strong understanding of their customers, to pursue ongoing improvements in performance and reduced costs. IPART proposes an incentive regime comprising:

13 IPART, Draft Water Regulatory Framework: Delivering Customer Value – Technical Paper, May 2022.

- an operating expenditure benefits savings scheme
- a capital expenditure savings scheme, and
- a customer outcomes delivery incentive (ODI) scheme for key customer outcomes.

IPART also makes clear that these incentive mechanisms should be seen as an integrated package, because introducing incentive mechanisms for opex and capex without corresponding schemes for service quality could create a perverse incentive for businesses to underinvest in service quality.

In relation to the third element of this package of incentives which focuses on service levels, IPART notes that ODIs address the information gap on customer preferences by providing financial incentives for businesses to prioritise customer engagement and to deliver on the outcomes that customers value:

> Our proposed outcome delivery incentive (ODI) scheme complements the opex and capex incentive mechanisms above. The scheme is modelled on Ofwat's ODI framework and is conceptually similar to the AER's STPIS and CSIS schemes. ODIs tie financial rewards and penalties to the delivery of key customer outcomes that promote customer value. A service level incentive scheme, similar in design to Ofwat's outcome delivery incentives (ODIs)."

IPART sets out its view on how these incentive schemes should operate. In particular, it proposes:

- Capping the size of the incentive payments under the incentive schemes, because it guards against unintended consequences or unforeseen events that occur.
- The total cap on incentive payments will apply globally, as a net payment across the three schemes (opex, capex and service quality incentive schemes). This provides maximum flexibility for businesses to make price versus service, and opex versus capex, trade-offs within the cap.
- All payments, or return of revenue, be paid out at the end of each regulatory period, rather than at the end of each year within the regulatory period. This approach is administratively simple, manages year-to-year volatility and addresses stakeholder concerns about cautiously introducing the schemes. While it is important to track performance annually, administering the payments annually would create additional complexity for both the business and IPART to administer, with no clear benefit. It would require additional complexity in IPART determinations and models, and an involved QA process to confirm the benefit or loss each year.

7.1.4. Detailed scope and design of our proposed Service Level Incentive Scheme (SLIS)

Taking into account all of the factors outlined above, we have carefully considered how to adapt the 2017 abatement mechanism to design a SLIS which provides targeted, proportionate and symmetric incentives for SDP to meet or exceed performance standards in responding to Sydney Water's production requests and efficiently operate and maintain the Plant in line with Good Industry Practice. While we have sought to specify the proposed scheme in as much detail as possible, we are willing to engage on the precise implementation details which best ensure the scheme achieves the underlying objectives and principles as set out above.

7.1.4.1. Rename the incentive mechanism

The name 'abatement mechanism' does not reflect its stated objective to provide an incentive to respond to Annual Production Requests issued by Sydney Water, nor that a well-designed incentive mechanism should be symmetric. It also better reflects refinements to IPART's broader regulatory framework for the water sector stemming from its recent review.

We propose that the name of the abatement mechanism be changed to the Service Level Incentive Scheme (SLIS) to better reflect the purpose and nature of the scheme. The existing 'abatement factor' would be renamed the 'performance factor'.

7.1.4.2. Limit application of the SLIS to Annual Production Requests above minimum supply

As a general principle, and as suggested by IPART its Draft Framework Report, there is a strong argument that a SLIS should focus on the key services of value to customers. It should also focus on those aspects of performance which are within the reasonable control of the business and the physical limitations of its assets.

Based on these considerations, it is proposed that the SLIS should apply to SDP's performance in responding to Annual Production Requests above 23 GL/pa only – that is, where Sydney Water's issues an APR between 23G and 91.25GL. This is because:

- It is these requests which will apply when the Plant is requested to target a specific volume of water to help ensure security of supply for Sydney at times of actual or impending scarcity, and which represent the services of most value to customers.
- The design of the Plant is most closely aligned to responding to these types of requests
- SDP's obligations to respond to Annual Production Requests is subject to absolute compliance in its Network Operator's Licence, whereas other production requests are subject to a 'best endeavours' requirement.

Critically, focusing the SLIS on these APRs means that it would not apply to both:

- APRs for minimum volumes at times when Sydney Water is not seeking to supplement its supply of water
- Production requests other than APRs (e.g. emergency response requests).

The rationale for excluding each of these types of production requests from the SLIS is outlined immediately below.

Critically, however, we will continue to operate and maintain the Plant in line with Good Industry practice and do what is in our reasonable control in the circumstances to meet other production requests. We will also be accountable for the Plant's performance in meeting these requests by reporting on the Plant's production to Sydney Water and IPART including key factors that may have impacted on production. Sydney Water implicitly recognises that responding to production requests (other than Annual Production Requests) is more challenging than delivering drinking water volume over the long term under an Annual Production Request. Sydney Water and SDP are developing robust operating protocols to ensure communication between the parties leads to timely and clear identification of Sydney Water and its customers' needs, and likewise the status and capabilities of the Plant[14].

Another option which SDP considered was to propose that no SLIS apply to SDP in the 2023-27 regulatory period given the lack of experience with the significantly changed operating environment to apply. The key advantage of this approach would be to use the 2023 regulatory period operating experience to inform the design of a suitable SLIS for the subsequent regulatory period.

On balance, however, SDP considers that a SLIS which applies to Annual Production Requests only represents an appropriate approach for the 2023 regulatory period, provided that it is designed in way which is consistent with the principles and other operational realities described above so that the SLIS provides incentives which are effective but proportionate.

7.1.4.3. Exclude APRs for minimum volumes from the SLIS

We propose to exclude APRs for minimum volumes from the SLIS (when the APR is less than or equal to 23 GL/pa) to minimise and avoid unnecessary production over and above what is required subject to remaining ready to respond to new or varying production requests. This is achieved by not setting a financial incentive for water production under these circumstances, and levying a nil price for water supplied above the APR plus 10% (the tolerance band for over-production). This reflects the value that customers place on Plant availability rather than water supply during this period – most likely periods of high dam levels – with the primary objective being to operate the total system to reduce the risk of dam spill where practical, and respond to system shocks, outages and maintenance as efficiently as possible.

It is important to note that although the primary service requirement is to meet the APR, that other production requests are also important to Sydney Water and customers. This is why we have proposed a prudent and efficient level of operational expenditure, and a minimum annual baseline production of 23 GL/pa as our expert assessment of the volume required to ensure we are best placed to respond to these other requests, namely responding to an emergency.

14 SDP has also proposed a minimum baseload production estimate of 23GL per year in order to best maintain the Plant in a state of readiness and operate it in a way such that SDP can regularly demonstrate and improve the Plant's ability to quickly respond. In this way SDP can work with Sydney Water at an operational level to ensure Plant response is understood and agreed and that the integration of the Plant with the Sydney Water network can be continuously improved through reporting and debriefing after emergency events or other changing circumstances.

However, we recognise that we are moving into a new and untested operating environment and that in some cases, it may be possible to deliver these services at annual volumes below the baseline, particularly if there are periods where Sydney Water may waive the ability to request a production increase. By not providing a financial incentive for water production in a baseline year when the objective is simply to maintain the Plant to be readily available, rather than to actively supplement Sydney Water's supply, we allow SDP to retain the opportunity to work with Sydney Water over time to reduce the annual volume delivered in these circumstances and therefore the cost to customers if operational experience demonstrates this is possible. A rigid, volume-based incentive scheme applying in these circumstances will likely restrain innovation and optimisation in favour of avoiding penalty.

7.1.4.4. Exclude other production requests (e.g. emergency response) from the SLIS

While SDP acknowledges that responding to other production requests (other than Annual Production Requests) is important, we propose that a SLIS should not apply to such requests (e.g. monthly sequencing and emergency response requests) because:

- The potentially quite short-term nature of these other production requests (e.g. emergency response), and the lack of previous experience in operating the Plant in a manner for which it was not designed, means there is a real prospect that a SLIS applied to emergency response and other short-term production request periods will lead to unreasonable financial rewards/ penalties being imposed on SDP for any inability to fully meet these requests in the specified timeframes, even though SDP has operated the Plant in accordance with Good Industry Practice.
- SDP's Network Operators' Licence specifies that responding to these types of requests is subject to 'best endeavours' rather than absolute compliance.
- Defining and incorporating appropriate measures of performance for these types of production requests into a robust and internally consistent SLIS would be very complex given that the objective of these requests is not necessarily to maximise water production.
- Critically, we will continue to operate and maintain the Plant in line with Good Industry practice and do what is in our reasonable control in the circumstances to meet other production requests. We will also be accountable for the Plant's performance in meeting these requests by reporting on the Plant's production to Sydney Water and through compliance reporting and auditing by IPART including key factors that may have impacted on production.
- Reporting is expected to include actual Plant production relative to agreed targets in response to specific production requests, details of any planned or unplanned outages that delayed or reduced the targeted production volume, details on whether such outages were in the reasonable control of SDP and lessons learned, investigations or improvements planned to avoid or mitigate such unplanned outages in the future. Mitigations or improvements may relate to processes and procedures of either SDP, Sydney Water or by both parties. In this way, integration of the Plant with the Sydney Water network can be continuously improved through performance debriefs after emergency events or other changing circumstances.
- Sydney Water has other options within its own diversified network to access alternative water supplies if one part of its network is impacted by a particular event and thus SDP does not hold monopoly power in the event of an emergency.

7.1.4.5. Scope of application - period of measurement

Our Network Operator's Licence conditions are most strongly focussed on our performance in responding to an Annual Production Request. Sydney Water will issue this request each year for a 12 month period taking into consideration the most up-to-date information at hand regarding water storage, weather outlook and other factors detailed in the Decision Framework.

It is also noted that the abatement factor for the 2017-2023 Regulatory Period was measured over a rolling 365 day period.

On this basis we propose that performance is measured on a discrete year-by-year basis following financial years in line with the regulatory process and the APR period.

7.1.4.6. Apply an appropriate measure of performance

A key element of the design of any incentive mechanism is to define an appropriate measure of performance to underpin the calculation of any financial penalties or rewards.

The new operating environment will require the Plant to be operated in a more flexible manner and to respond to an Annual Production Request which may not necessarily require the Plant to maximise production. This requires developing a revised measure of performance which better reflects how well SDP has responded to the requests.

We propose that performance would be assessed by calculating a performance factor (PF) that compares annual production (including any deemed production – see discussion below) each financial year to the relevant Annual Production Request (inclusive of a +/-10% 'tolerance' level).

The 'tolerance level' ensures that relatively minor under- or over- production does not result in financial penalties or rewards being imposed. This ensures that the SLIS operates to provide financial incentives which apply only in circumstances where there is a significant non- or under-production within SDP's control over an extended period.

We also propose that to avoid providing financial incentives for SDP to over-produce water in response to an Annual Production Request that the performance factor is capped at 110%.

The tolerance band ensures critical maintenance can be prioritised during these periods, maximum flexibility can be maintained, and SDP can best target the annual volume requested without needing to overproduce significantly purely to manage risk of negative incentives. By setting the SLIS tolerance band at the same level as the APR production cap, it also means SDP cannot realise windfall positive incentive gains when the Plant has spare capacity, and it is arguably easier to overproduce (i.e. APR's less than 91.25GL/pa).

The performance factor would apply to SDP's fixed daily plant charges (excluding Pipeline service charges) on an annual basis (so the performance factor is effectively reset each financial year), subject to a plus and minus 10% tolerance limit.

Some simple worked examples of how the SLIS would operate under a number of production scenarios are provided in section 7.1.6.1.

7.1.4.7. Ensure the penalty/rewards are proportionate through imposing a cap

Under the 2017 Determination, the abatement mechanism imposes uncapped financial penalties which could feasibly extend to the entire fixed Plant service charges applying at the time. This represents a severe potential penalty which is disproportionate considering:

- There is no cap on financial penalties (and currently no reward for outperformance) as applied in other service incentive schemes.
- The risk profile of the Plant and the abatement regime were defined after the design and build, and operating and maintenance contracts were established – and thus the risks posed under the abatement scheme are not already factored into the Plant's design, nor are these risks 'priced in' to these contracts.
- Abatement does not apply to Water NSW, Sydney Water or Hunter Water in regard to their supply performance, especially during times of drought.
- SDP's understanding is that standard water industry commercial contracts for infrastructure services incorporate abatement arrangements capped at below fixed O&M costs. Additionally, as these services are generally contracted directly by the water utility there are highly specific contractual terms regarding under what conditions the O&M provider is required to respond (notification periods etc) and significant ability for case-by-case discretion by the utility on a performance or cost basis (i.e. best endeavours or cost-plus basis). [redacted]
- SDP already faces sanctions for poor performance including those associated with a breach of its Network Operator's Licence and reputational damage.

The 2017-23 abatement mechanism had never been tested in operations until the 2019 restart. It was designed and implemented when SDP had been non-operational for an extended period and IPART had concerns regarding SDP's financial incentives to maintain the assets, restart the Plant, and achieve and sustain full production in response to a drought. Under SDP's new Network Operator's Licence, this concern is no longer valid because SDP will effectively be in flexible full-time operation. SDP will be clearly and continuously demonstrating its ability to produce high quality drinking water, adequately resource and maintain its assets, and sustain full production capacity. Additionally, contrary to the long period of water security mode under the previous operating licence, SDP will be providing the optionality to customers of daily increased production at short notice on an ongoing basis, with associated tangible and committed costs of delivering this service. It is not appropriate for SDP to be exposed to full fixed Plant revenue at risk even when operating and maintaining the plant in accord with good industry practice.

To ensure that penalties and rewards under the mechanism are proportionate, under the SLIS we propose an annual cap be applied equivalent to +/-2.5% of annual fixed Plant service charges, including for insured events. As set out in **Figure 7.1** this cap would apply to SLIS penalties imposed in the next regulatory period for events that are largely within SDP's reasonable control or are insured. The SLIS would not apply financial rewards/penalties (through deeming of production or adjustment to APR) for events where SDP's ability to comply with the APR is prevented wholly or predominantly by an event outside its reasonable control and for which it is not insured. As set in Appendix 9.14, this approach to risk management underlies SDP's forecast insurance costs (see package #2) and allows SDP to put downward pressure on insurance costs that are being impacted by rising premiums in the global insurance market and the cost of managing emerging risks.

We note that a cap is consistent with IPART's Draft Water Regulatory Framework[15] that "capping the size of the incentive payments… guards against unintended consequences or unforeseen events that occur" and with regulatory precedents for service level incentive schemes.

This cap represents between 1.5% and 1.9% of total revenues (between full operation and baseline production respectively). This is higher than the 1% threshold suggested by IPART for incentive schemes, recognising the importance of these services.

This cap would continue to provide a strong incentive for SDP to respond to Sydney Water's production requests, while striking a reasonable balance in terms of financial loss to SDP and additional cost to Sydney Water and end-customers. Under the settings we have proposed for the tolerance band (10% in line with our Network Operator's Licence) and the cap on production also at 10% to prevent significant overproduction, there will not be any additional cost to Sydney Water and ultimately residential and commercial customers for any outperformance by SDP.

Importantly, this cap would be applied as an annual combined cap on financial incentives across the SLIS and the Efficiency Carryover Mechanism (ECM). That is, the aggregate impacts of the ECM and the SLIS would be capped at 2.5% of annual revenue from Fixed Plant service charges in any one year (i.e. apply the cap (+/-2.5%) to the annual net SLIS + ECM balance in each year of the 2023-27 regulatory period (as 2.5% of annual revenue from Fixed Plant service charges)), with the resulting (present value) balance then paid out to or by SDP over the subsequent regulatory period.

This cap of 2.5% would apply to both annual financial rewards and penalties, including for insured events. Applying the cap jointly to both the SLIS and ECM provides equalised incentives for service and cost efficiency performance as per IPART's Draft Water Regulatory Framework.

This cap is reflected in SDP's proposed insurance allowance including BI insurance (see Section 9.8). This would include, but not limited to, insurable events (see **Figure 7.1** below) that have a BI impact and are covered by insurances [redacted]. The cap will put significant downward pressure on SDP's insurance costs that are being impacted by rising premiums in the global insurance market and the cost of managing emerging risks, thereby reducing SDP's charges needed to recover these costs. If IPART sets a higher or lower SLIS cap then prudent and efficient insurance cost estimates would need to be revised to align with this.

7.1.4.8. Retaining rewards for outperformance – incentive symmetry

The 2017 abatement mechanism provides for an abatement factor above one to be applied to the relevant fixed charges at times when SDP has supplied more water than the specified daily amounts, and thus to receive higher than normal revenue during this period.

15 IPART, Draft Water Regulatory Framework: Delivering Customer Value – Technical Paper, May 2022.

In the context of SDP's Network Operator's Licence requirements over the 2017-23 regulatory period, where there was a defined drought period that could be expected to last for multiple years the ability to carry forward over or under-recoveries served an important purpose. Over-recovery allowed SDP to build up a revenue buffer for consistent outperformance of its production requirements to protect against a period of under-production later in the drought. Likewise lost revenue could be recovered later in the drought period for a previous underperformance. This is because over-recovery was considered over the entire duration of the drought.

However, the abatement mechanism also incorporated a true-up adjustment which required SDP to pay back any additional revenue accrued due to a high abatement factor over a drought period at the end of the drought period (and thus any financial reward is temporary only). In contrast, any under-recovery due to poor performance remains a permanent penalty borne by SDP.

This aspect of the abatement mechanism is not symmetric as it provides for a penalty for poor performance but no reward for out-performance. This feature is not aligned with good practice regulatory principles and IPART's Draft Water Regulatory Framework[16]. Given the change to SDP's Network Operators Licence that requires SDP to remain operational to meet APRs, and following our proposal above to measure performance each financial year, an ongoing carry-over mechanism and true-up for over-recovery is no longer appropriate.

We propose that, in line with good regulatory practice, the SLIS should provide symmetric financial incentives to SDP where appropriate. We propose that under the SLIS, SDP would receive financial rewards for out-performance, by removing the true-up which returns this additional revenue to Sydney Water. This would be subject to a cap as discussed above.

Symmetric incentive arrangements including caps on annual financial penalties/rewards are a common feature of regulatory service standard incentive schemes. The caps act to preserve the financial viability of the utility and also limit the upside that is paid for by customers (refer to Appendix 7.2 for further information on regulatory precedents.

7.1.4.9. Apply the financial penalty or reward as a true-up at the end of the regulatory period

Under the 2017 abatement mechanism any penalty or reward would be calculated on a rolling 365-day basis, applied to daily service charges, and reflected in monthly invoices issued by SDP to Sydney Water. This would then be subject to a 'true-up' at the end of the relevant period (i.e. at the end of a drought), whereby any so-called 'over recoveries' accruing to SDP due to outperformance would be refunded to Sydney Water.

While it is important that any financial penalties or rewards are imposed in a timeframe which is reasonably proximate to the performance, these arrangements were excessively complex and administratively cumbersome. In line with IPART's recent guidance on the implementation of incentive schemes (see section 7.1.3.7 above) we therefore propose that the incentive at the end of each financial year would be calculated, and a final total over the regulatory period calculated, including an adjustment for the time value of money, set equal to that used for the EAM (i.e. 3-yr BBB corporate bond rate). Any total incentive would then be applied as a revenue adjustment over the subsequent regulatory period.

7.1.4.10. Amend the treatment of events beyond SDP's reasonable control

A key tenet of incentive mechanisms is that they should focus on the controllable performance of the regulated business and avoid providing 'windfall' penalties or rewards due to unintended consequences or unforeseen events that occur which are beyond the entity's reasonable control. This is also reflected in IPART's proposed approach in its Draft Water Regulatory Framework. This implies that:

- Performance should be assessed against physical and operational realities of the relevant infrastructure including design limitations of the assets and other operating constraints
- Performance should reflect the entity's long-term controllable performance to encourage sustainable improvements to service levels rather than focusing on short-term or one-off infrequent events
- Performance should exclude events outside of its reasonable control to avoid creating 'windfall' financial penalty/rewards.

In our view, the 2017 abatement mechanism did not fully reflect these principles.

16 IPART, Draft Water Regulatory Framework: Delivering Customer Value – Technical Paper, May 2022.

While the abatement mechanism in the 2017 Determination did provide for 'abatement non-application days' which are exempt from the application of abatement at a time when abatement would otherwise apply, the only circumstance which qualified for such an exemption is the occurrence of an 'uninsurable force majeure' event.[17] In SDP's view, there are many events that are not able to be managed through commercially available insurance but are largely outside SDP's reasonable control (whether or not they are deemed to be 'force majeure' events). Examples include:

- Source seawater quality excursions such as an oil spill leading to hydrocarbons in intake water. This would stop production if hydrocarbons were detected as hydrocarbons will damage RO membranes. Industrial Special Risks (ISR) insurance policies only respond with business interruption payments where there is material damage. As a consequence, in the event SDP elected to close off the seawater intake and stop production to avoid material damage from an oil spill, SDP would not be able to claim insurance because there would be no plant damage.
- Source seawater quality conditions, such as jellyfish swarm clogging intake screens. This could result in reduced production (e.g. half capacity) until the intake/screens could be unclogged which may be a difficult process, including divers. Again, if there is no material damage to the plant, business interruption insurance would not respond under an ISR policy.
- Catastrophic failure of an asset (e.g. due to a latent defect) that could not have been predicted or prevented acting in accordance with good industry practice.

Further examples are provided and expanded upon in section 7.1.6 below.

Under the 2017 abatement mechanism, SDP could be penalised even where it was operating in line with good industry practice. The nameplate capacity of the Plant does not allow for situations where SDP needs to undertake prudent and efficient capital works that require full or partial Plant shutdowns for major upgrades, renewals and refurbishments, particularly as the Plant ages. This sort of major capital works can significantly reduce production from the Plant for a period of period of days to weeks at a time.

In addition, SDP could be abated in situations where Sydney Water does not accept water as the WSA includes a 5-day grace period for Sydney Water to accept water. While under the current abatement mechanism IPART places the onus on Sydney Water to reimburse SDP for any consequent under-recovery of costs outside of the Determination, Sydney Water has some relief from this through the WSA (through a 5-day grace period).

To ensure that SDP is not arbitrarily penalised or rewarded for events beyond its reasonable control, and to simplify the implementation of the incentive mechanism, we propose that the SLIS would not would not apply (either through deeming of production or an adjustment to APR) for events for which it is not insured where SDP's ability to comply with the APR is prevented wholly or predominantly by an event outside its reasonable control (as per SDP's Network Operator's Licence) including:

- SDP undertaking capital works that are necessary to ensure it maintains and operates its Plant and related equipment in accordance with Good Industry Practice
- Sydney Water does not accept SDP's supply for reasons not relating to water quality non-compliances as managed under the WSA.
- A new request made by Sydney Water under the Decision Framework which gives rise to non-compliance with the original APR due to SDP endeavouring to comply with the new request, where it would not be possible for SDP to comply with both the APR and the other request.

Figure 7.1 summaries how the SLIS would be applied across a range of different events that could impact SDP's ability to comply with the APR.

7.1.4.11. Clarifying uninsured events outside SDP's reasonable control on an ex-ante basis

The 2017 Determination states that where SDP can insure, on reasonable commercial terms, against events that may impede its ability to maximise supply during drought, it will abate SDP's fixed charges for such events. SDP faces considerable uncertainty as to what constitutes 'reasonable commercial terms', and

17 The 2017 Determination defines a Force Majeure Event as any event or circumstance which:
(a) reduces the amount of Desalinated Water the Plant is capable of supplying to SDP's customers, including by means of the Pipeline;
(b) is outside the reasonable control of SDP (including its contractors); and
(c) could not have been prevented, avoided or overcome by SDP and its contractors acting in accordance with Good Industry Practice.

therefore our potential abatement risk exposure. This uncertainty has the potential to put at risk SDP's ongoing financial viability.

SDP has proposed that the 2.5% cap would apply to SLIS financial rewards/penalties imposed in the next regulatory period for events that impact SDP's ability to comply with the APR that are largely within SDP's reasonable control or are insured. To provide regulatory certainty this requires IPART establishing on an ex-ante basis what is reasonably commercially insurable and included in the insurance cost component of the opex allowance (see Section 9.14).

7.1.5. Summary comparison to the current abatement mechanism

The discussion of our proposed SLIS has focussed on the key changes relative to the existing abatement mechanism. However, our proposed SLIS retains many features of the existing abatement mechanism.

Table 7.3 summarises how the application the proposed SLIS would vary from the 2017 Determination abatement mechanism.

Table 7.3: *Summary of comparison between abatement mechanism and proposes SLIS*

Item	RP2 Abatement	Proposed SLIS
Scope of application	Drought response and ERN (volumes and response times by agreement) Note: grace period applies	Applies to APR > 23 GL/pa only
The basis for measuring performance (calculation of performance factor)	Comparing performance to known volume requirement on a rolling 365-day basis (i.e. across FYs). Scaling of production to 250 ML/day basis.	Comparing annual production to APR over each FY (with a +/-10% 'tolerance' band).
Reset of PF at end of period	Abatement Factor (AF) <1 retained, >1 reset at end of drought response period	Reset each Financial Year for new APR
Financial incentive	Disincentive only	Disincentive < 10% tolerance band > Incentive. Due to the production cap, at a 10% tolerance, there are effectively no positive incentives.
Production cap	No cap for drought, ERN request capped at 110% for AF purposes	Capped at 110% of the APR
Charging base to apply performance factor	Fixed Plant charges	Fixed Plant charges
Tolerance band	No tolerance (although ERN by agreement)	+/-10% 'tolerance' limit to promote flexibility of operation and avoid primarily incentivising maximised production ahead of flexibility. Only targeting significant under- or over-production.
Timeframe for payments or return of revenue	Progressive adjustment to Plant fixed charges	End of regulatory period revenue adjustment, adjustment amount to be recovered by customers over the subsequent regulatory period

Item	RP2 Abatement	Proposed SLIS
Financial incentive cap	No cap	Capped at 2.5% of annual revenue from fixed Plant service charges, including for insured events (applied across SLIS and ECM in aggregate as outlined in section 7.1.4.7 above) This cap is reflected in SDP's proposed insurance allowance including BI insurance (see Section 9.8).
Events beyond SDP control	Provided for exclusions due to 'uninsurable force majeure' events, but provided limited clarity	The SLIS would not apply financial rewards/ penalties (either through deeming of production or an adjustment to APR) for events for which SDP is not insured where SDP's ability to comply with the APR is prevented wholly or predominantly by an event outside its reasonable control (as per SDP's Network Operator's Licence). These exclusions are reflected in SDP's proposed insurance allowance including BI insurance (see Section 9.8). To provide regulatory certainty this requires IPART establishing on an ex-ante basis what is reasonably commercially insurable and included in the insurance cost component of the opex allowance.
Changes to APR, or effect of other production requests	SWC pays any SDP abatement if constraining/ changing drought request, ERN requests by agreement.	Risk of not complying with APR is not increased by a subsequent change to APR – performance to that point is deemed as satisfied if remaining APR capacity is available or at minimum considered. Risk of not meeting APR is not increased by responding to any other request – APR is adjusted where required or deemed to be satisfied as per SDP's Network Operator's Licence.

In our view, the proposed amendments will better achieve the underlying objective in the new operating environment, provide a targeted, proportionate and symmetric set of incentives for SDP to meet or exceed performance standards where these are valued by Sydney Water (and customers) in responding to production requests and efficiently operate and maintain the Plant in line with Good Industry Practice. The amendments also allow some 'in-built' allowance for situations predominantly outside the control of SDP, such as changing production requests from Sydney Water, constraints on when and how we complete our maintenance and capital works, and source seawater changes or other events as discussed in section 7.1.4.

7.1.6. How the SLIS would apply under various scenarios impacting Plant production

To inform our proposed changes to the existing abatement mechanism we undertook an exercise to assess our exposure to different events that affect Plant production.

Figure 7.1 below provides a summary of how our proposed SLIS would apply to certain events that affect the Plant's production and the reason why the proposed SLIS should or shouldn't apply financial rewards/ penalties as a result of performance following these events.

Underpinning this is the proposed risk management framework (see submission section 5) and the principles that incentives be consistent with legislative requirements, SDP's Network Operator's Licence and good industry practice, and that SDP not be penalised for events beyond its reasonable control, and that any or rewards financial rewards/penalties be proportionate.

7.1.6.1. Application under Business as Usual (BAU)

We first consider how the SLIS would apply under circumstances were there were no extenuating factors affecting SDP's ability to respond to an APR which was subject to the SLIS. These are considered BAU scenarios.

As noted in Section 7.1.7, SDP is proposing an annual cap on SLIS financial rewards/ penalties of 2.5% (in combination with other efficiency mechanisms) of annual fixed plant charges. The 2.5% cap would apply to SLIS financial rewards/penalties 'trued-up' at the end of the regulatory period, for events that impact SDP's ability to comply with the APR that are largely within SDP's reasonable control or are insured. This cap is reflected in SDP's proposed insurance allowance including BI insurance (see Section 9.8). This would include, but not limited to, insurable events (3rd last row of **Figure 7.1** below) that have a BI impact and are covered by insurances [redacted].

Box 2 sets out a number of indicative or worked examples to highlight how performance would be measured on annual basis under the proposed SLIS and financial rewards/penalities calculated. Any rewards or penalties would be 'trued-up' at the end of the regulatory period, with a revenue adjustment in the following period.

Box 2: Worked examples of SLIS under various BAU scenarios

In these worked examples:

FaR = Fee at Risk = the daily fixed charges used to calculate the incentive = $150m

Incentive Cap = 2.5% * FaR = 0.025 * $150m = $3,750,000

APR = the Annual Production requested by Sydney Water through the WSA that complies with the Decision Framework

PR = the production ratio of actual annual produced volume versus APR

Tolerance band = adjustment to the production ratio to ensure only significant under or over production is incentivised = +/- 10% = PR of 0.9 to 1.1

PF = the performance factor =
If PR > 1.1, then PF = PR - 1.1, (subject to cap under operating licence) else
If 0.9 ≤ PR ≤ 1.1, then PF = 0, else
If PR < 0.9, then PF = PR - 0.9

Incentive payment = PF * FaR

Scenario 1: insignificant over-production
Sydney Water set an APR of 50 GL/a; SDP target >45GL and capped at 55 GL; SDP produce 51 GL
PR = 51/50 = 1.02,
PR is between 0.9 to 1.1 therefore PF = 0,
Incentive payment = PF * FaR = 0 * $150m = $0

Scenario 2: insignificant under-production
Sydney Water set an APR of 50 GL/a, SDP target >45GL and capped at 55 GL, SDP produce 48 GL
PR = 48/50 = 0.96,
PR is between 0.9 to 1.1 therefore PF = 0,
Incentive payment = PF * FaR = 0 * $150m = $0

Scenario 3: significant under-production
Sydney Water set an APR of 50 GL/a, SDP target >45GL and capped at 55 GL, SDP produce 44 GL
PR = 44/50 = 0.88,
PR is < 0.9 therefore PF = 0.88 – 0.9 = - 0.02
Incentive payment = PF * FaR = - 0.02 * $150m = - $3,000,000

Scenario 4: significant under-production, incentive capped
Sydney Water set an APR of 50 GL/a, SDP target >45GL and capped at 55 GL, SDP produce 43 GL
PR = 43/50 = 0.86,
PR is < 0.9 therefore PF = 0.86 – 0.9 = - 0.04
Incentive payment = PF * FaR = 0.04 * $150m = - $6,000,000 reduced to cap of - $3,750,000

Scenario 5: significant over-production – "drought" production capped
Sydney Water set an APR of 91.25 GL/a, SDP target >82.125GL and capped at 100.375GL, SDP produce 100 GL
PR = 100/91.25 = 1.095,
PR is between 0.9 to 1.1 therefore PF = 0
Incentive payment = PF * FaR = 0 * $150m = $0

7.1.6.2. Application under other events which affect Plant production

We secondly consider events that impact Plant production.

The SLIS would not apply financial rewards/penalties (either through deeming of production or an adjustment to APR) for events for which it is not insured where SDP's ability to comply with the APR is prevented wholly or predominantly by an event outside its reasonable control (as per SDP's Network Operator's Licence). This could capture events that SDP can t control, and events that SDP cannot fully insure against (2rd last row of **Figure 7.1** below). This is consistent with the intent of the 'Abatement Non-Application Day' defined in the 2017 Determination.

Figure 7.1: *How our proposed SLIS applies to different events that affect Plant water production*

Events increasingly outside SDP's control*

Event that impacts water production	Reasonably within SDP's control?	Insurable?	Accounted for in nameplate capacity?	Accounted for in deeming volume or adjustment to/cap of APR?	Financial incentive applies (up to the annual cap and outside the tolerance band)?
Outage due to SDP/operator	Yes	Partially	No	No	✓
Planned maintenance	Partially	No	Yes	No	✓
Prudent & efficient capital works	Partially	No	No	Yes	X
Unplanned maintenance	Partially	No	Yes	No	✓
Insured force majeure event	No	Yes	No	No	✓
Uninsured events outside the reasonable control of SDP e.g: • Power outage (Ausgrid) • Inlet water quality issue (e.g oil spill) • Natural disaster beyond insurance term	No	No	No	Yes	X
Sydney Water unable to accept water	No	No	No	Yes	X

Uninsured residual risks ✓ SLIS applies to annual cap X SLIS does not apply

* i.e. "compliance is prevented wholly or predominantly by an event outside the reasonable control of the Licensee" as per SDP's Network Operator's Licence

Source: Sydney Desalination Plant

Case 1: Deferral of maintenance

Issue:

Under the 2017-23 Network Operator's Licence conditions and determination, SDP had full discretion as to the timing of planned or unplanned maintenance outages. SDP was required to meet a rolling 365 day average production to avoid financial penalty and could plan its major maintenance to this singular requirement. Sydney Water was required to accept all water from SDP at any time (or compensate SDP for any loss due to abatement). Under the revised Network Operator's Licence conditions, SDP may be requested to vary its production at any time to meet Sydney Water's operational needs, thus limiting SDP's autonomy in relation to how it manages its Plant and assets. While responding to emergency requests from Sydney Water through 2020 to 2023, SDP has been asked to defer its prudent major maintenance on multiple occasions so it can best support Sydney Water to mitigate pressing public health incidents. These deferrals meant critical major maintenance was not undertaken for many months after it was due to be completed. SDP is committed to responding in the best interests of Sydney Water and customers, but is put in a difficult position if the incentive scheme is too rigid and deferred major maintenance contributes to future outages for which SDP is then held to account. In addition to the asset failure risk, the deferral of major maintenance, particularly at short notice, will likely lead to additional costs to SDP for rescheduling

equipment, materials and contractors, and these additional costs may not be considered prudent or efficient and/or costs incurred will be higher than the expenditure allowance.

Proposed treatment under the SLIS:

To the extent that SDP is prevented from fully or partially complying with an APR due to any other request which requires SDP to supply water at a time when it had committed to undertake planned maintenance, the SLIS would not apply financial rewards/penalties, and/or adjustment though deeming production or a change in the APR may be required. Additionally, the basis of measuring performance over a long period (a year) and the 10% tolerance band provides relief to SDP in this situation.

Case 2: Sydney-wide weather emergency

Issue:

The majority of emergency requests SDP has responded to over the 2020-23 period have been due to impacts on Sydney Water's source water or water supply assets due to excessive rainfall. For the most part, SDP assets are also affected by the same weather events, with a high risk of water ingress into complex electrical assets and other sensitive equipment. This has caused outages to the Plant on some occasions and made responding to changing production requests very challenging. [redacted]. Bulk chemical or other deliveries to the Plant were also affected. Our Plant operational availability can be affected by severe events and this will not always be within our reasonable control. Weather emergency conditions also contribute to poor sea water quality due to increased stormwater runoff to the ocean that can have material impacts on the treatability of seawater, further constraining SDP's production during a period when SDP is trying to respond to an emergency request by Sydney Water.

Proposed treatment under the SLIS

To the extent that SDP is preventing from fully or partially complying with an APR due to an event such as this which is clearly outside its reasonable control, the SLIS would not apply financial rewards/penalties. Additionally, the basis of measuring performance over a long period (a year) and the 10% tolerance band provides relief to SDP in this situation.

Case 3: Source water quality - high rainfall and high turbidity

Issue:

The Plant was designed with a seawater source water design envelope in mind (levels of acceptable salinity, turbidity, concentration of individual salts etc). Under our O&M contracts, if the source seawater parameters are outside of this seawater envelope the Plant output is held to best-endeavours levels only. Even within this seawater envelope, sudden changes can have significant effects. At approximately 2pm on 9th of February 2020, the turbidity of the feed seawater increased from 0.17 NTU, to 7.95 NTU within 3 hours – a sizable increase to a key seawater quality parameter. This issue persisted until the evening of 10th February 2020 and had a significant impact to Plant operations and production, particularly in the pre-treatment and wash-water areas. The challenges are very similar to the source water issues Sydney Water has experienced that have led to SDP operating under emergency response notices. The Plant responded successfully, however an extended period of poor source seawater quality would have likely downrated capacity of the Plant outside the reasonable control of SDP. Commercially viable insurance is not available against source seawater deviations from the original Plant design specification unless that seawater quality causes equipment damage.

Proposed treatment under the SLIS

To the extent that SDP is preventing from fully or partially complying with an APR due to a severe event such as this which is clearly outside its reasonable control, the SLIS would not apply financial rewards/penalties. Additionally, the basis of measuring performance over a long period (a year) and the 10% tolerance band provides relief to SDP in this situation.

Case 4: Source seawater contamination - oil spill

Issue:

Reverse osmosis membranes can be irretrievably damaged by oil and hydrocarbons. For this reason the Plant utilises real-time hydrocarbon water quality analysers to automatically stop Plant production and prevent membrane damage. While this risk is often classified as highly unlikely, on 4 July 2022 the

cargo ship Portland Bay, carrying nearly 1,000 tonnes of fuel oil, lost its main engine in the vicinity of the Plant seawater intake structure leaving it stricken in seas of up to 8 metres in size and in 42-knot winds. Thankfully, the ship was stabilised by tugboats and prevented from running aground. However, if it had run aground and spilled oil, it would likely have prevented Plant operation for an extended period. Hydrocarbon water quality analysers on the Plant seawater intake system would have prevented operation of the Plant's seawater intake pumps until the seawater contamination had subsided. This event would have been an uninsurable force majeure event given the Plant control system operated correctly to avoid equipment damage.

Proposed treatment under the SLIS

To the extent that SDP is preventing from fully or partially complying with an APR due to an event such as this which is clearly outside its reasonable control, the SLIS would not apply financial rewards/penalties.

Case 5 – general operational considerations

Issue:

Several issues could arise reflecting general operational considerations which could impact on SDP's ability to comply with an APR.

Post-treatment lime dosing

The lime dosing system is a complex array of equipment and is best operated at a constant flow rate. Typically, lime dosing systems do not respond well to large fluctuations in flow rates associated with sudden with sudden Plant production rate changes (such as seen in an emergency response). SDP's lime system was designed to suit its original operating environment – consistent full production, and as a result, significant, quick changes in production present several risks to asset reliability and water quality stability during an emergency event.

In periods of low production, of the three lime saturators, only one operates whilst the other two units remain available but are shut down (there is insufficient water throughput to keep these operational). In an emergency response scenario, these two saturators must be brought online from a complete shut-down situation. They are required to produce a high-quality saturated 'limewater' which is directly dosed to the final product water. Under emergency conditions, the start-up of the two lime saturators takes considerable time to produce good quality saturated lime (with a low turbidity) so that the final drinking water consistently meets water quality requirements. It can take several days before the lime system is at a fully stable and reliable position to meet water quality requirements. While SDP aim to bring the system online more quickly, we cannot compromise safe and consistent water quality. Overall, a fully operating lime system is less problematic than a stop-start operating lime system.

Shock chlorination

The seawater intake tunnel supplies water into the Plant. To inhibit marine growth inside the seawater intake tunnel and ensure the asset maintains its hydraulic capacity over its lifetime, chlorine is periodically dosed within the tunnel and then neutralised (termed shock chlorination). Shock Chlorination is required on an intermittent frequency (typically every 48 hours) at varying duration (typically 8 hours) and concentrations to ensure it inhibits the varying species of marine growth. Chlorine will irreversibly damage RO membranes, so during a shock chlorination period, the Plant has interlocks that prevent new RO trains from being started to mitigate any risk of chlorine passing to the reverse osmosis system. Since 2020, there have been multiple instances whereby SDP has been requested to increase production at short notice and has been limited in its ability to respond due to the timing of the request coinciding with a shock chlorination period. As above, response can be delayed by up to 8 hours.

Out of hours requests

The timing of any emergency request will impact the ability of SDP to respond. When transitioning from a High Availability mode to Emergency Production, a series of checks must be undertaken and setpoints reviewed to prepare the facility for the new production mode. In addition, due to the many interlocks and controls designed to ensure safe ramp-up and asset protection, it is usual to expect some operational trips upon the Plant ramp-up which require operator intervention and maintenance inspection.

If an emergency notification is made during normal business hours, maintenance and additional operations personnel are on hand to support an increase to production, these tasks can be performed more efficiently and achieved more quickly. After-hours response will require a more 'slow and steady' progressive increase in production and may require 'on-call' resources to be made available. However there is a trade-off of additional cost and loss of productivity (on-call hours are limited and will disrupt normal working hours the following day). In the event of a high voltage electrical and/or high-pressure system fault, the issue can be investigated or rectified by the on-call maintenance technicians. In many cases, it may require specialised

external contractors or complex isolations and permit to work processes which cannot be achieved out-of-hours. An ongoing higher level of nightshift staff is not considered prudent and efficient (note, currently there are two operators physically onsite after hours).

The two most recent (March and June 2022) emergency response ramp-up requests have been received at a time when response is constrained (i.e. on a weekend afternoon and late on a weeknight). These emergency response ramp-up requests were a result of unprecedented rainfall, and resultant challenges in the Sydney Water network, but they also have knock-on effects of making it challenging for SDP to ramp-up quickly, regardless of how well the Plant is maintained.

General RO preventative maintenance

In order to efficiently maintain the RO system, it can reasonably be expected that at least one RO train (out of 14 in total) will be down for maintenance at any given time. This maintenance typically takes the form of leak management, preventative asset maintenance tasks and inspections. Whilst the RO train remains 'available' during this period of maintenance, in practice, there is a period of 12 to 24 hours to reinstate the RO train to operating condition, before it can then be brought online to produce drinking water. The timing of emergency requests will have a significant impact on this response, as returning a RO train to service will often involve multiple maintenance trades, as well as the removal of any permit to work.

Delivery pipeline turbidity

Since 2020, SDP has operated the Plant and Pipeline under low flow conditions, with several emergency ramp ups. An observed phenomenon is the brief spike (up to 2.5NTU for several hours) in turbidity at the delivery point to the Sydney Water network following significant step up in drinking water pump (DWPS) flowrate. This is due to the high velocity in the pipeline disturbing any settled sediment. It can take up to five days to clear the issue.

The resultant high turbidity is not reflective of the quality of water produced by the Plant (typically <0.05NTU) and presents a drinking water compliance issue for SDP. To date, this has been managed by temporary relaxations on turbidity compliance values between SDP, Sydney Water and NSW Health, however it remains a risk to SDP, and potentially SDP could have its drinking water rejected by Sydney Water whilst it is attempting to respond to an emergency (likely requiring a purge of the water in the pipeline). Some management controls have shown promise in reducing these spikes, such as reducing the flow rate increase frequency on the DWPS, however this also often doesn't align with the objectives of Sydney Water during an emergency. SDP has proposed an efficient baseline production level to allow more regular ramp-ups as a potential response to this issue, but implementation of this is not possible prior to new operating environment being in place and acceptance of baseline production.

Further discussion of these and other risks to rapid increase in production are presented in the report by Ontoit as Appendix 4.1.

Proposed treatment under the SLIS

The key to addressing these events outside the control of SDP is setting the basis of measuring performance over a long period (a year) and applying a 10% tolerance band, in line with our licence conditions, to ensure that SDP is incentivised only to avoid significant over or under-production.

Case 6 – Third party impacts - Ausgrid maintenance or unplanned outage

Issue

While SDP maintains a regular dialogue with Ausgrid and has a good relationship with them, Ausgrid are an essential service and reserve the right to maintain their infrastructure, with timing of maintenance and testing at their full discretion. Such maintenance and testing, and any unplanned maintenance can cut off electrical supply to the Plant which would leave SDP unable to produce water until power supply is restored.

Proposed treatment under the SLIS

To the extent that SDP is preventing from fully or partially complying with an APR due to an event such as this which is clearly outside its reasonable control, the SLIS would not apply financial rewards/penalties.

Case 7 – [redacted]

Issue

[redacted]

[redacted]

Proposed treatment under the SLIS

To the extent that SDP is preventing from fully or partially complying with an APR due to an event such as this which is clearly outside its reasonable control, the SLIS would not apply financial rewards/penalties.

7.1.7. Proposal

We propose:

- A new Service Level Incentive Scheme (SLIS) that replaces the 2017 Determination abatement mechanism to provide a more targeted, proportionate and symmetric incentive scheme which reflects SDP's new operating environment, and efficient operation and maintenance of the Plant and other assets in line with Good Industry Practice. The proposed SLIS encompasses a number of key refinements to the 2017 Determination abatement mechanism:
    a. A single SLIS would apply to Annual Production Requests only where the Annual Production Requests is above the minimum baseline volumes of 23 GL/pa to provide financial incentives for significant over- or under- production in circumstances where water supply is valued by Sydney Water consistent with SDP's requirements under its revised Network Operator's Licence.
    b. Performance would be assessed by calculating a performance factor (PF) that compares annual production (including any deemed production) each financial year to the relevant Annual Production Request (inclusive of the +/-10% 'tolerance' level). The PF is capped at 110%.
    c. The performance factor is reset each financial year.
    d. The performance factor would apply to SDP's fixed daily charges (excluding Pipeline services charges) on an annual basis, subject to performance against the Annual Production Request (inclusive of the +/-10% 'tolerance' limit).
    e. Any rewards or penalties would be 'trued-up' at the end of the regulatory period, with an adjustment to the Notional Revenue Requirement (NRR) for the following period. A financial 'unders and overs' account would be kept with balances accruing an appropriate rate of return to reflect the time value of money.
    f. SDP would retain any financial reward for out-performance, by removing the true-up in the current abatement regime which returns additional revenue to Sydney Water.
    g. An annual combined cap on financial incentives across the SLIS and the Efficiency Carryover Mechanism (ECM) of 2.5% of fixed plant fees would apply to both annual financial rewards and penalties for events that impact SDP's ability to comply with the APR that are largely within SDP's reasonable control or are insured (I.e. the combination of the ECM and SLIS incentive cannot exceed +/- 2.5% of plant fixed charges in any one financial year). This cap is reflected in SDP's proposed insurance allowance including BI insurance (see Section 9.8). To provide regulatory certainty this requires IPART establishing on an ex-ante basis what is reasonably commercially insurable and included in the insurance cost component of the opex allowance.

h. The SLIS would not apply financial rewards/penalties (either through deeming of production or an adjustment to APR) for events for which SDP is not insured where SDP's ability to comply with the APR is prevented wholly or predominantly by an event outside its reasonable control (as per SDP's Network Operator's Licence), including:

   - SDP undertaking capital works that are necessary to ensure it maintains and operates its Plant and related equipment in accordance with Good Industry Practice
   - An uninsured event that is outside the reasonable control of SDP (including its contractors), and could not have been prevented, avoided or overcome by SDP and its contractors acting in accordance with Good Industry Practice (see below)
   - Sydney Water does not accept SDP's supply for reasons not relating to water quality non-compliances as managed under the WSA.
   - A new request made by Sydney Water under the Decision Framework which gives rises to non-compliance with the original APR due to SDP endeavouring to comply with the new request, where it would not be possible for SDP to comply with both the APR and the other request.

i. IPART would assess SDP's insurance arrangements during its expenditure review at the beginning of the regulatory period and establish on an ex-ante basis what constitutes insurance available on reasonable commercial terms and the resulting insurance premium is included in the operating cost allowance - and hence, what is 'insured' for the purposes of the SLIS.

j. The scheme would come into effect on 1 July 2023.

7.2 Regulatory precedents for service standard incentive schemes

7.2.1. Overview

This appendix provides a summary of regulatory precedents for service standard incentive schemes and the key findings that we have drawn on for our proposed SLIS for the 2023-27 regulatory period.

We reviewed a range of regulated service incentive schemes applied in the infrastructure sector with a focus on water and energy sectors (see **Table 7.4** for detail on these schemes).

Almost all jurisdictions that were reviewed had a 'regulated scheme' designed to incentivise a utility to provide 'good service' or meet designated service standards.[18] A common element of both the existing SDP abatement mechanism and other incentive schemes is that all share a similar objective: to create a financial incentive for the utility to meet designated service standards. However, it is worth noting that the incentive schemes reviewed here:

- applied to standard water or energy utilities rather than a stand-alone desalination plant designed primarily to respond to drought;
- related to water/energy networks that serve many end-customers and where breaches of service standards are often localised and unlikely to impact all customers minimising the total risk exposure (i.e., some diversification of risk of material changes in revenue);
- applied a broader range of service standards compared to SDP, including for example, time to respond to customer complaints (thus can be relatively minor breaches of service standards).

Despite these differences we can take the following learnings:

- the financial impacts are symmetric
- rewards and penalties are capped
- events outside the utility's control are generally excluded and defined upfront
- there is flexibility to agree alternative arrangements with the customer.

18 While service standard incentive schemes are common, the Broken Hill Pipeline is an example of where an IPART-regulated asset has many similarities with SDP (both these assets have similar water security objectives, cost structures incl. long term contracts with the customer and highly variable demand) but no regulated service incentive scheme applies to the Broken Hill pipeline.

The following discussion provides more details of each of these key learnings.

7.2.2. The financial impacts are symmetric

Of the service standard incentive schemes we reviewed where the potential financial penalty was material (>1% of annual revenue) the service level incentive scheme was symmetric, meaning the utility may also be rewarded for outperforming service standards. This was the case for the AER's Service Target Performance Incentive Scheme (STPIS) and Ofwat's Customer Measure of Experience (C-MEX) scheme.

The AER noted the following in developing the STPIS:

> We considered that a symmetrical scheme approximates the operation of a competitive market more closely than an asymmetrical scheme in that consumers are generally prepared to pay more for a higher quality product, and will consider lower quality products if the price is sufficiently low enough. Accordingly, the AER implemented a symmetrical STPIS[19].

The symmetry of an incentive mechanism is consistent with good regulatory practice. It is consistent with principles in IPART's May 2022, Delivering customer value, Draft Regulatory Framework Report and earlier discussion paper[20].

7.2.3. Rewards and penalties are capped

The incentive schemes we reviewed where the penalty/reward was potentially material (>1% of annual revenue) included a cap as a proportion of the annual revenue requirement (see **Table 7.4**).[21]

In developing its STPIS, the AER recognised the introduction of a service incentive mechanism results in additional risk for utility. To address this risk it capped the financial impact of the scheme.

> A key element of the incentive properties of a STPIS is the overall level of revenue that is at risk from the potential rewards and penalties provided for under the scheme. Placing a financial limit on the revenue at risk provides certainty to a DNSP of the maximum penalty that it might receive and, correspondingly, also provides a maximum reward that customers might pay for[22]

The cap effectively limits the additional amount that customers pay for outperformance and limits the financial liability for the utility for underperformance. This is also consistent with principles in IPART's May 2022 Draft Water Regulatory Framework Paper on Delivering Customer value[23].

There are additional schemes we reviewed where we were unable to calculate the proportion of annual NRR at risk through the incentive scheme. Based on the descriptions for these schemes, and the amounts paid per breach of service standards, it is likely that these would be up to 1% as with other 'guaranteed service level' schemes.

Apart from IPART's 2017 abatement mechanism, the two standouts in the table are Ofwat's C-Mex scheme and the AER's STPIS which are capped at 2.4% and 5% pa. These schemes differ from the other 'guaranteed service level' schemes in that the maximum reward or penalty is a function of the revenue requirement, as opposed to rebates paid directly to customers. Under the C-Mex scheme, the incentive or penalty is based on relative customer service scores for Ofwat regulated water utilities measured through customer surveys.

19 AER, Proposed Electricity distribution network service providers service target performance incentive scheme - Explanatory statement and Discussion paper, April 2008, pp. 7.

20 IPART, May 2022, Delivering customer value, Draft Water Regulatory Framework: Technical Paper, and its earlier August 2021 paper on incentive schemes (Discussion Paper on Encouraging Innovation).

21 We calculated the same percentage for the other service standard incentive schemes we reviewed (where possible), or compared the cap for the scheme (where a cap existed).

22 AER, Proposed Electricity distribution network service providers service target performance incentive scheme - Explanatory statement and Discussion paper, April 2008, pp. 14-15.

23 IPART, May 2022, Delivering customer value, Draft Water Regulatory Framework: Technical Paper, p. 38.

Table 7.4: *Summary of financial penalties under service standard incentive schemes*

Scheme	Proportion of annual NRR 'at risk'
IPART 2017 Determination for SDP: abatement mechanism	approximately 80% per annum (uncapped across years)
IPART 2019 Determination for Broken Hill Pipeline	n/a (no mechanism in Determination, water supply agreement between WaterNSW and Essential Water)
IPART's customer contract/operating licence for Sydney Water – customer rebates for guaranteed service levels	0.2% currently paid in annual rebates
The Essential Services Commission's PREMO water pricing framework – Melbourne Water Draft Decision	2.2% reduction to NRR as a result of PREMO rating downgrade
Ofwat's Customer Measure of Experience for retail water utilities (C-Mex)	Up to +/-2.4 pa%
AER's Service Target Performance Incentive Scheme (STPIS) – electricity distribution	Up to +/- 5% pa
New Zealand Commerce Commission's Quality standard and incentive scheme (electricity distribution)	Up to 1% pa

Source: Various (see ***Table 7.5*** *below)*

7.2.4. Events outside the utility's control are generally excluded and defined upfront

For the service level incentive schemes we reviewed, events that are outside the control of the utility, and in some circumstances those associated with one-off infrequent events, were generally carved out of the scheme. In other words, if the event causing the utility to be non-compliant with service standards was reasonably outside its control, then they are not liable for a penalty.

The literature indicates the intent of excluding these events is to focus the utilities on those outcomes that are within their reasonable control – consistent with standard risk allocation principles relating to allocating risk to those parties best able to manage the specific risk – with a view to "encourage sustainable improvements to service rather than focusing on one-off infrequent events."[24] That is, to provide ongoing incentives not 'punishment' that can impact financial viability, and limiting rewards or penalties to those that relate to events within the utility's reasonable control.

The nature of the events that are considered outside the reasonable control of the utility are typically defined upfront to provide regulatory certainty to all parties, noting in some cases utilities propose ex-post applications for exclusion (in line with published exclusion criteria) and regulators review these applications. Some examples are provided below.

24 AER, Proposed Electricity distribution network service providers service target performance incentive scheme - Explanatory statement and Discussion paper, April 2008, pp. 24.

Sydney Water Customer Contract (Operating Licence 2019-23)

Any incidence you experience of:

- an unplanned interruption to your water supply service
- a wastewater overflow on your property due to a failure in our wastewater system • low water pressure, or
- dirty water

that is caused by a disaster event will not be taken into account to determine your entitlement (if any) to a rebate under clauses 7.2, 7.3 or 7.4.

Disaster event - A major event affecting a significant portion of our water system or wastewater system that was caused by events outside our control such as a natural disaster (e.g. tsunami or earthquake) or a terror event, the risks of which we could not reasonably have mitigated.

https://www.sydneywater.com.au/web/groups/publicwebcontent/documents/document/zgrf/mdc0/~edisp/dd_074203.pdf

ICRC Consumer Protection Code 2020

Utilities must comply with all applicable Guaranteed Service Levels set out in the Schedules of this Code, except to the extent that:

1. alternative arrangements or standards have been agreed between the Utility and a Customer; or
2. events or conditions outside the control of the Utility including emergencies declared under the Emergencies Act 2004 (ACT) or any other Law, prevent the Utility from complying with the applicable Guaranteed Service Levels in Schedule 1 or Schedule 2 of this Code.

https://www.icrc.act.gov.au/__data/assets/pdf_file/0011/1456580/Final-decision-Attachment-1-Consumer-Protection-Code-2020.pdf

7.2.5. Flexibility to agree alternative arrangements with the customer

For some of the incentive schemes we reviewed, it was possible for the utility to agree variations to service standards. If the utility met the agreed variation, this was not considered to be a non-compliance. For example, the ICRC scheme for rebates for breaches of guaranteed service levels excludes situations where an alternative arrangement has been agreed with the customer.

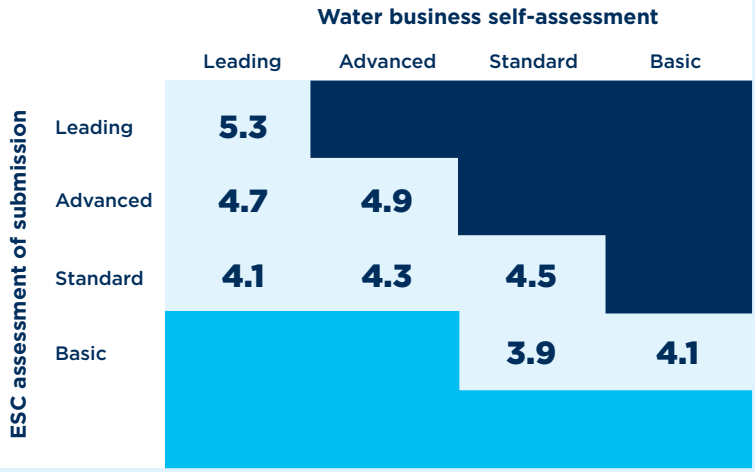
7.2.6. Summary of regulatory precedents: Service level incentive scheme

Table 7.5: *Summary of regulatory precedents: Service level incentive scheme*

Jurisdiction (Regulator) Industry Year Business	Mechanism overview	Amount of reward/penalty
NSW (IPART) Water 2021 Sydney Water	Rebates for service faults Various rebates are available to Sydney Water customers as set out in the Customer Contract required under the business' operating licence with IPART. For example: Water supply service interrupted > five hours by a planned interruption = rebate of $20 Water supply service interrupted > five hours by an unplanned interruption = rebate of $40 for each of up to two unplanned interruption events. If a customer experiences three or more unplanned interruptions that last for over one hour each in a rolling 12 month period, they are entitled to a rebate equal to the whole annual water service charge Wastewater overflow due to a failure of the wastewater system = rebate of $75 Dirty water (water that is not suitable as drinking water), may be entitled to a rebate of $40 for each occasion (Syd Water) may be entitle to compensation (Hunter Water) Disaster events outside Sydney Water's control do not result in rebates, eg a major event affecting a significant portion of the water system or wastewater system that was caused by events outside our control such as a natural disaster (eg, tsunami or earthquake) or a terror event.	The penalty/ rebate varies depending on type of service fault, duration and frequency. In 2019-20, Sydney Water paid out $5.2 million in customer rebates compared to the NRR of $2.5b (approx. 0.2% of annual revenue requirement)
NSW (IPART) Water 2020 WaterNSW (Greater Sydney)	WaterNSW Operating Licence Water NSW is licensed under the Water NSW Act 2014 (the Water NSW Act). The Water NSW Act requires Water NSW to hold an operating licence that is issued by the Minister and reviewed annually by IPART. This licence contains a number of standards that Water NSW must meet, or risk facing penalties associated with a breach of licence conditions. Water NSW is also required to establish arrangements with Sydney Water under the Water NSW Act, which include the standard of quality of the water supplied, the continuity of water supply and the maintenance of adequate reserves of water by WaterNSW. These arrangements are included in a RWSA Raw Water Supply Agreement with Sydney Water. Note this arrangement is more 'compliance enforcement' rather than a performance incentive scheme.	In 2019 IPART imposed penalties on WaterNSW for contravening clause 2.1.1 (Water Quality Management System) and clause 5.1.1 (Asset Management System) of its operating licence. The penalty was $50,000 in total.

Jurisdiction (Regulator) Industry Year Business	Mechanism overview	Amount of reward/penalty
NSW (IPART) Water 2019 WaterNSW (Broken Hill Pipeline)	No regulated service incentive scheme WaterNSW has entered into a Raw Water Supply Agreement with its primary customer, Essential Water (a division of Essential Energy). The agreement sets out the services and service standards to apply to WaterNSW's provision of transportation services to Essential Water. Under the agreement, WaterNSW is required to use its reasonable endeavours to extract raw water from the River Murray and operate and maintain the pipeline to supply that water to the Broken Hill. While IPART required WaterNSW to report on a number of performance indicators through its Annual Information Return, IPART did not establish a service level incentive scheme in the 2019 Determination.	n/a
England & Wales (Ofwat) Water 2020 All water businesses under Ofwat regulation	Customer measure of experience (C-Mex) C-MeX is a mechanism designed to incentivise water companies to provide residential customers with excellent levels of service. Each company receives a C-MeX score based on the results from two surveys: the customer service survey – a customer satisfaction survey of a sample of residential customers who have contacted their company; and the customer experience survey – a customer satisfaction survey of a randomly selected sample of a company's overall residential customer base. Both survey scores contribute equally to the overall C-MeX score for each company. Those companies that score above the median company score will receive outperformance payments for that year of up to 12% of that year's annual allowed residential retail revenue. Those that score below the median company score will incur underperformance payments of up to 12%. https://www.ofwat.gov.uk/regulated-companies/company-obligations/customer-experience/	Up to +/- 2.4% of annual allowed retail revenue

Jurisdiction (Regulator) Industry Year Business	Mechanism overview	Amount of reward/penalty
ACT (ICRC) Water Ongoing Icon Water	Rebates for breach of guaranteed service levels. The Commission requires Icon Water to deliver services to certain Guaranteed Service Levels (GSLs) imposed through the Consumer Protection Code (the Code). Rebates are payable when Icon Water does not meet the GSLs. Exceptions to this include: • where alternative arrangements have been agreed with the customer, • where events or conditions outside the control of the Utility including emergencies declared under the Emergencies Act 2004 (ACT) or any other Law, prevent the Utility from complying with the GSL. Rebates are not intended to compensate customers for loss or damage suffered as a result of a failure to meet a GSL. Examples include: • Connection times – Icon must provide services to connected customers on the same day as a request (if the request is made before 2.00pm) or as otherwise agreed. Otherwise a rebate of $60 per day (to a maximum of $300) may be payable. • Responding to complaints - all complaints received by will be acknowledged as soon as possible and responded to within 20 working days or a rebate of $20 may be payable. • Response times to network faults - in cases where a network fault is likely to affect public health or is causing (or has the potential to cause) substantial harm to the community or damage to property, Icon must respond within six hours. In all other cases it will respond within 48 hours and resolve the issue in accordance with any time specified in the response. In cases where this obligation is not met a rebate of $60 may be payable. • Planned interruptions - Icon will provide at least two business days' notice to each premise that may be affected by an interruption. It will take reasonable steps to ensure that the interruption does not exceed the specified timeframe and does not exceed 12 hours. If it fails to provide notification of the interruption or if the interruption exceeds 12 hours a rebate of $50 may be payable. • Unplanned interruptions - When an interruption occurs due to an unexpected fault and associated repair, Icon are not able to provide notification to individual premises. In such circumstance it will work to restore services as quickly as possible. If services are not restored within 12 hours a rebate of $20 may be payable. https://www.iconwater.com.au/my-home/my-account/rebates/guaranteed-service-level-rebates.aspx	Varies depending on type of service fault, duration and frequency

Jurisdiction (Regulator) Industry Year Business	Mechanism overview	Amount of reward/penalty
VIC (ESC) Water Ongoing All VIC water businesses	PREMO incentive mechanism The ESC's PREMO incentive mechanism links the rate of return b a er u es t h l el o m i o price submission and to how well a business delivers on the m m s it es t o r Ambition is assessed against the five elements of PREM one of which is 'performance' and whether the performance outcomes to which the business committed in its price submission been met or exceeded. The best outcomes for a water business in terms of the return on equity will be achieved when the Commission and the business align in their respective assessments. Situations of aligned assessments are represented by the upper diagonal of the matrix shown below. The more ambitious the submission according to both the business and the Commission, the greater will be the allowed return on equity. The grey shaded area above this diagonal indicates the Commission will not assess a price submission more favourably than the water business's self-assessment. This provides an incentive for the business to put forward its best offer, and to provide an honest assessment of the appropriate price submission rating. But water businesses have an even more powerful incentive not to overstate their level of ambition. If the Commission finds a water business has overstated its ambition, then the return on equity will be lower than had the water business accurately assessed itself. This can be seen in the diminishing values moving left along each row in the figure below. This design feature penalises water businesses that seek to 'bluff' the regulator. **FIGURE 2.1** Indicative regulated return on equity (REAL)  	Not directly identifiable[25]

25 Recently Melbourne Water received its draft decision from the ESC under PREMO. It rated itself 'advanced' for each element, however the ESC assessed it as 'standard' (a lower rating). As a consequence, instead of a 4.8% return on equity, the ESC used a 4.2% return on equity, reducing the revenue requirement by around 2.2% relative to the annual NRR. Note this reduction in the NRR was due to more than just the ESC's assessment of service outcomes for customers – all elements of PREMO are included.

Jurisdiction (Regulator) Industry Year Business	Mechanism overview	Amount of reward/penalty
VIC (ESC) Water Ongoing All VIC water businesses	Rebates for breach of guaranteed service levels The Essential Services Commission requires all water businesses to implement a guaranteed service level (GSL) scheme. A GSL scheme provides incentives for water businesses to make efficient investment decisions, or internalise the costs of making investment decisions that leave some customers with poor service outcomes. It also provides a form of recognition that an individual customer has received relatively poor levels of service. Where businesses do not meet certain defined service standards, they pay (or rebate) a pre-determined amount to affected customers. For example, South East Water will give a: • $60 rebate if it cuts water for more than five hours, customers receive more than five unplanned water supply interruptions in any 12 month period, it allows more than three unplanned sewerage interruptions during any 12 month period, it fails to restore a sewerage service interruption within four hours. • $1,000 rebate if it fails to contain a sewer spill on a property within five hours of being notified. • $1,500 rebate if there's a sewer spill inside a premises caused by its infrastructure and it takes longer than one hour to contain it. Water businesses generally include exclusions, for example South East Water's Customer Charter states where the failure to meet a GSL is as a result of an event caused by, or is the responsibility of, the customer concerned or a third party, a GSL rebate won't be provided. https://southeastwater.com.au/about-us/our-role/our-service-guarantees/	Varies depending on type of service fault, duration and frequency
SA (ESCOSA) Water 2020 SA Water	No existing mechanisms The Commission considered financial incentives and/or penalty schemes as part of SA Water's regulatory determination 2020 (SAW RD20). The Commission did not consider that a scheme funded from SA Water's annual revenue requirement was necessary for SAW RD20, given there were no material or persistent issues with SA Water's performance against the current service standards. The Commission also did not consider that a Guaranteed Service Level (GSL) scheme was required. It noted there is a similar tension in trying to provide the regulated business with an incentive to improve service, where it is funded by customers, where customers have not expressed support for service improvements through a willingness to pay study. SA Water would need to provide clear evidence that customers valued and were prepared to pay for such a scheme if it was included as part of the set of proposed service standards.	n/a

Jurisdiction (Regulator) Industry Year Business	Mechanism overview	Amount of reward/penalty
Multiple (AER) Electricity Ongoing Regulated distribution businesses	Service Target Performance Incentive Scheme (STPIS) The STPIS is intended to ensure that distributors do not reduce their service levels as a result of their efforts to improve efficiency which typically are associated with a reduction in expenditure. It encourages distributors to improve service reliability but only where customers are willing to pay for these improvements. A financial reward for improved customer reliability is paid by customers while penalties to distributors for a reduction in reliability performance mean customers get a price reduction. https://www.aer.gov.au/system/files/AER%20-%20Service%20Target%20Performance%20Incentive%20Scheme%20v%202.0%20-%2014%20November%202018%20%28updated%2013%20December%202018%29.pdf	Up to +/-5% of the annual revenue requirement
New Zealand (NZCC) Electricity Ongoing Aurora Energy	Quality standard and incentive scheme The NZCC applies quality standards for Aurora Energy with respect to planned and unplanned interruptions. The scheme incentivises Aurora to prevent further deterioration of reliability and improve it where it is cost effective to do so, including restoring outages efficiently. https://comcom.govt.nz/__data/assets/pdf_file/0018/251640/Final-decision-Aurora-Energy27s-Proposal-to-customise-its-price-path-31-March-2021.pdf	Unplanned interuptions penalty up to 0.58% of allowable revenue. Planned interuptions penalty up to 0.98% of allowable revenue

7.3 Expert Report: Surplus Electricity Sales Analysis (Seed Advisory)

This report is attached separately.

7.4 Proposed process for end-of-period true-up of movements in Uncontrollable Costs

7.4.1. Background

SDP is exposed to several costs that are driven by market forces or decisions which are outside of SDP's control. These costs can be material, difficult to forecast, and cannot be effectively managed by SDP. The relevant charges are:

- Subordinate GGRP costs, including but not limited to ancillary service charges, AEMO market fees, and network losses, unaccounted for energy (UFE), Reliability and Emergency Reserve Trader (RERT) charges and generator compensation fees and charges;
- Land tax and council rates;
- Chemical costs; and
- Insurance premiums.

(collectively referred to as **'Uncontrollable Costs'**)

In its Draft Water Regulatory Framework, IPART has proposed a framework for managing uncertain and unforeseen costs within a pricing period. This framework incorporates the use of cost pass-throughs, ex post-true ups, letters of comfort, and partial or full replacements of a pricing determination.[26]

SDP is proposing to apply a:

- **cost pass through** for some Uncontrollable Costs – including UFE charges, RERT charges and generator compensation charges – that SDP is not able to forecast (and for which it has not included a forecast of costs in regulated revenues). These items would be in addition to the existing network electricity pass through; and
- **an end-of-period true-up** for all other Uncontrollable Costs, for which SDP has proposed an allowance but the cost items are subject to significant uncertainty. SDP proposes that a materiality threshold of 1% of annual regulated revenue apply to this end-of-period true-up.

In this appendix, we refer to the subset of Uncontrollable Costs that are subject to an end of period true-up as **'Uncontrollable True-up Costs.'**

SDP has proposed a process for undertaking the end-of-period true-up. We have designed this process to allow both SDP and IPART to transparently monitor movements in the Uncontrollable True-up Costs and to implement the true-up in the subsequent regulatory period. This process and the principles on which it has been developed are set out below. For the avoidance of doubt, SDP proposes that the process set out in this appendix only apply to the Uncontrollable True-up Costs, and not the Uncontrollable Costs for which SDP has proposed to be covered by a cost pass through.

7.4.2. Principles for undertaking an end-of-period true-up

We consider that the end-of-period true-up should only cover differences between the forecast benchmark prices and allowance used to set charges in the 2023 Determination and an updated benchmark or actual price and allowance over the 2023-27 regulatory period. That is, the true-up is not designed to address movements in costs driven by other factors – say movements in energy costs related to changes in energy efficiency – that should be considered within SDP's control. We consider that this approach is consistent with IPART's Draft Water Regulatory Framework and its recent Draft Determination for WaterNSW's Broken Hill pipeline.

In our view, the mechanics of an end-of-period true-up bear similarities to IPART's EAM methodology. In light of this, and reflecting the benefits in maintaining a consistency of approaches across regulatory mechanisms, we propose a true-up process that utilises a similar process to the EAM. Like the EAM, our proposed end-of-period true-up for Uncontrollable True-up Costs is structured around three periods:

- **Review year:** which is the year in which the true-up amount is determined, and would typically be the final year of the regulatory period (i.e., for the 2023-27 regulatory period, it would be FY26-27 which is the year in which we expect IPART to determine SDP's prices for the following regulatory period);
- **Application period:** which for the 2023-27 regulatory period, is the period from FY22-23 to FY25-26, and for each subsequent period is the period from the start of the preceding review year to the start of the current review year;[27]
- **Adjustment period:** which is the determination period immediately following the review year in which the true-up will be applied.

Figure 7.2 illustrates these time periods for the next true-up process.

26 P.51

27 For example, for the regulatory period commencing 1 July 2027, it would be the period from FY26-27 to FY31-32.

Figure 7.2: *True-up application period, review year and adjustment period*

23-27 Determination Period				27-33 Determiation Period				
23-24	24-25	25-26	26-27	27-28	28-29	30-31	31-32	32-33
Application Period			Review Year	Adjustment Period				
1	2	3		1	2	3	4	5

We propose that the end-of-period true-up is implemented as follows:

1. **Prices in the 2023 Determination are based on a forecast of Uncontrollable True-up Costs:** Our proposed prices will include an estimate of efficient Uncontrollable True-up Costs over the 2023-27 regulatory period. SDP's approach to developing forecasts of Uncontrollable True-up Costs is summarised in **Table 7.6**.
2. **Calculate the annual change to efficient costs due to movements in each Uncontrollable True-up Costs:** SDP will monitor changes in the Uncontrollable True-up Costs over the 2023-27 Determination Period. In the Review Year, SDP will calculate the difference between forecast costs, and actual or updated benchmark costs, for each Uncontrollable True-up Cost for each year of the Application Period. The process for calculating these cost impacts is summarised in **Table 7.6**.
3. **Calculate the annual change to efficient costs due to movements across all Uncontrollable True-up Costs:** The annual cost impacts for each Uncontrollable True-up Cost calculated in the Step 2 will be summed in each year to provide an aggregate cost impact for all Uncontrollable True-up Costs in each year of the Application Period.
4. **Apply materiality threshold:** We consider applying a materiality threshold is consistent with IPART's broader cost pass through principles and regulatory best practice. We have proposed that IPART apply a materiality threshold of 1% of annual regulated revenue for each year of the Application Period. If the annual cost impact calculated in Step 3 exceeds this materiality threshold, then IPART will apply a true-up for these costs in the Adjustment Period. If the annual cost impact calculated in Step 3 is lower than the materiality threshold, IPART will not apply a true-up in the Adjustment Period.
5. **Calculate the present value of cost impacts that exceed the materiality threshold:** For each year of the Application period, if the cost impact calculated in Step 3 exceeds the materiality threshold, IPART will escalate these costs to present value terms. To do this, the annual cost impacts (assumed to be mid-year values) will be escalated to a present value in the Review Year (assumed to be an end of year value for the Review Year) using the same escalation factor that is applied to the EAM.
6. **Calculate true-up value:** IPART will calculate a true-up value based on an annuity over the Adjustment Period. The cash flows of this annuity (calculated as end of year values) are set such that the present value of the annuity at 30 June 2027 is equal to present value of the cost impacts calculated in Step 5. The cash flows of the annuity (end of year values) are each discounted back six months to arrive at the true-up allowance (mid-year values). We propose to use the same discount rates that are applied in the EAM.

7.4.3. Process for estimating differences between forecast and actual Uncontrollable True-up Costs

Our proposed approach to forecasting Uncontrollable True-up Costs and determining the actual value or updated benchmark costs in the Review Year is set out in **Table 7.6** below. SDP has proposed an approach for each cost item based on the timing and availability of relevant cost information.

Table 7.6: *Timing and process for end-of-period true-up*

Cost	Regulator / Party	Timing and process
Ancillary service charges	AEMO	• AEMO publishes historical data on weekly ancillary services costs for customers in NSW (and other regions). Tariffs for the 2023-27 regulatory period include a forecast of ancillary service charges (in $/MWh) based on the average ancillary service costs over the last five years. • In the Review Year, SDP will calculate the difference between forecast and actual ancillary service charges (in $/MWh) over the Application Period. This will be done on a weekly basis using the actual weekly ancillary service charges for the NSW region published by AEMO for the Application Period. SDP will multiply these price differences by benchmark energy volumes approved by IPART in the 2023-27 Determination to determine the impact on SDP's costs.[28] The weekly cost impacts will be summed for each year to produce an annual cost impact for each year of the Application Period.
Market fees	AEMO	• AEMO publishes a schedule of market fees for each year. Tariffs for the 2023-27 regulatory period include a forecast of market fees (in $/MWh) based on the latest fee schedule published by AEMO (i.e., for 2022-23). • In the Review Year, SDP will calculate the difference between forecast and actual market fees (in $/MWh). This will be done on an annual basis using actual market fees published by AEMO for each year of the Application Period. SDP will multiply these price differences by benchmark energy volumes approved by IPART in the 2023-27 Determination to determine the annual impact on SDP's costs for each year of the Application Period.
Network losses	AEMO	• Total network losses are based on a distribution loss factor and marginal loss factor published by AEMO for each year. Tariffs for the 2023-27 regulatory period include a forecast of network losses (in $/MWh) based on the latest loss factors published by AEMO (i.e., for 2022-23). • In the Review Year, SDP will calculate the difference between forecast and actual network losses (in $/MWh). This will be done on an annual basis using actual distribution loss factors and marginal loss factors published by AEMO for each year of the Application Period. SDP will multiply these price differences by benchmark energy volumes approved by IPART in the 2023-27 Determination to determine the annual impact on SDP's costs for each year of the Application Period.

28 For the avoidance of doubt, the benchmark energy volumes would be equal to the sum of the fixed and variable energy volumes during plant operation that are approved by IPART in the 2023-27 Determination, where the variable energy volumes are equal to the variable energy benchmark in operation mode (in MWh/ML) that is approved by IPART in the 2023-27 Determination multiplied by actual volumes for each year of the Application Period.

Cost	Regulator / Party	Timing and process
Land tax	Revenue NSW	• Land tax is calculated by Revenue NSW using land valuations provided by the NSW Valuer General and the land tax threshold. Tariffs for the 2023-27 regulatory period include a forecast of land tax based on a forecast of SDP's land value [redacted] and current land tax rates published by Revenue NSW. • In the Review Year, SDP will calculate the difference between forecast and actual land tax for each year of the Application period (in $). This will be done using the Land Tax Assessment Notice issued by Revenue NSW in January of each year.
Council fees	Local council	• Council fees are calculated by Sutherland Shire Council based on council rates published in its Operational plan in June of each year, and land valuations provided by the NSW Valuer General. Tariffs for the 2023-27 regulatory period include a forecast of council fees based on a forecast of SDP's land value [redacted] and current council rates published by Sutherland Shire Council. • In the Review Year, SDP will calculate the difference between forecast and actual council fees for each year of the Application period (in $). This will be done using the rate Notice issued by Sutherland Shire Council in July of each year.
Chemical costs	Market	• ABS publishes a quarterly producer price index - component "18 Basic chemical and chemical product manufacturing". These are a market based index measuring changes in chemical prices facing Australian consumers of chemicals, like SDP and other water utilities. SDP (and Veolia) are price takers in a market, and there is little to no opportunity to influence or hedge these cost movements. • In the Review Year, SDP will calculate the difference between the benchmark chemical cost allowance and updated benchmark chemical cost allowance due to changes in the benchmark chemical price component as measured by the real movement in the ABS PPI component "18 Basic chemical and chemical product manufacturing". This true-up will avoid any windfall gains or losses while retaining an incentive for SDP to 'beat the benchmark' in efficiently procuring chemicals.
Insurance	Market (via Aon)	• Insurance premiums are determined annually in June ahead of policy renewals on 1 July. Tariffs for the 2023-27 regulatory period include a forecast of insurance premiums for SDP developed by Aon based on forecast movements in the insurance market. • In the Review Year, SDP will calculate the difference between forecast and actual insurance premiums for each year of the Application period (in $). This will be done using Aon's Policy Renewal Report and holding the level of coverage constant.

7.5 Proposed process for re-opener of determination to manage material movement in efficient costs resulting from unforeseen events

7.5.1. Background

We recognise that proposing to re-open a determination has always been an option for businesses, but also acknowledge that this process is rarely used. In view of this, we are seeking to provide greater clarity on the circumstances in which SDP would apply to IPART for a determination re-opener, and the process we would expect to satisfy IPART and stakeholder that there has been a change in circumstance that warrants the 2023 Determination being amended. In our view, greater clarity on when a re-opener is appropriate and the process to be followed is in SDP, IPART and customers' interests.

We are seeking that IPART treat events which possess the following characteristics as re-opener events;

- the event is exogenous (i.e., SDP has no ability to control whether the event occurs);
- the event has resulted in (or has the potential to result in) a material increases or decrease in SDP's efficient costs, where material is defined as greater than or equal to 1% of total regulated revenue; and
- alternative risk management measures are not appropriate to mitigate or prevent the impact of the event (i.e., the cost impact of these events cannot be predicted with sufficient certainty for it to be included in expenditure allowances, while insurance is not likely to be commercially available on a cost-effective basis).

Should any event occur during the 2023-27 regulatory period that meets these criteria, SDP would apply to IPART for an amended determination. In this application, SDP would identify the efficient costs that it has (or will) incur because of the event over the remainder of the 2023-27 regulatory period. IPART would review SDP's application and approve an amount of efficient costs and the period over which the amount would be recovered in prices. IPART would then update SDP's prices to account for the material increase or decrease in the efficient cost of service provision. The exception to this process would be changes in energy network costs, subordinate GGRP energy costs, land tax and council rates, chemical costs and insurance, which (as set out above) are captured by separate mechanisms.

7.5.2. Examples of re-opener events

SDP is seeking that IPART pre-define certain events that are likely to satisfy the above criteria and therefore give rise to a re-opener. SDP notes that events described below are examples only – it is not an exhaustive list, and events may occur that fall outside of the examples below but which still meet the criteria to be classified as a re-opener event. Where possible, these events have been defined consistent with other regulatory determinations that apply to infrastructure services in Australia.

7.5.2.1. Regulatory change event

A regulatory change event occurs when there is a change to a regulatory obligation that is imposed on SDP, e.g. by the Commonwealth or State Governments, that materially changes SDP's costs (increasing or reducing SDP's costs). An example could be the imposition of more stringent cyber security compliance requirements relating to SDP's critical infrastructure. Events that change the standards or nature of SDP Water Services are addressed separately, by the service standard event defined below.

7.5.2.2. Service standard event

A service standard event relates specifically to changes to SDP's Water Services, including changes to the minimum standard of service, scope of services, or way services provided. The service standard event may occur as a result of a change to legislation, licences, administrative act or a Government decision. An example of a service standard event could be a change to the nature of water services provided by SDP e.g. a new operating mode created by changes to SDP's Network Operator's Licence.

7.5.2.3. Tax change event

A tax change event relates to changes to relevant taxes that have a material impact on SDP's costs. Relevant tax means any Tax payable by SDP other than:

- income tax, fringe benefits tax, GST and capital gains tax;
- stamp duty, payroll tax, financial institutions duty and bank accounts debits tax;
- penalties, charges, fees and interest on late payments, or deficiencies in payments, relating to any Tax; or
- any Tax that replaces or is the equivalent of or similar to any of the Taxes referred to in sub-clauses (a) to (c) (including any State equivalent tax), and also includes any fee payable by SDP in respect of a Licence.

Tax is any tax, levy, impost, deduction, charge, rate, rebate, duty, fee or withholding which is levied or imposed by an Authority.

7.5.2.4. Insurance coverage event

An insurance coverage event addresses the risk of incurring liability losses that exceed SDP's insurance coverage. The insurance coverage event addresses costs that are incurred above SDP's insurance policy limit (an insurance cap event) or beyond the limits of SDP's coverage (an insurance coverage event).

The second element of the insurance coverage event addresses any changed circumstances in the insurance market that are beyond SDP's reasonable control, but mean that it is no longer possible to take out an insurance policy on reasonable commercial terms. This second arm of the coverage event has been included in reopeners for energy network businesses in the national energy markets. This is in recognition that there have been changing conditions in insurance markets that have made previously available insurance more expensive and difficult to procure. A particular concern for energy networks were the adverse changes in the bushfire insurance market following bushfire events in Australia and overseas. Similar adverse changes may be seen in relation to cyclone and flood insurance in Australia.

7.5.2.5. Insurer credit risk event

This is an event where costs are incurred as a result of an insurer becoming insolvent and, as a result, in respect of an existing or potential claim for a risk that was insured by the insolvent insurer, SDP is subject to a higher or lower claim limit or deductible than would have otherwise applied under the insolvent insurer's policy, or SDP incurs additional costs associated with funding an insurance claim which would otherwise have been covered by the insolvent insurer.

7.5.2.6. Natural disaster event

The cost impact of a natural disaster event can be significant. Potential natural disasters that could cause significant property damage include, but are not limited to, bushfires, earthquakes, storms and floods. SDP's insurance cover provides a level of protection against property damage caused by natural disasters. However, the cost impact of a natural disaster could materially exceed the coverage provided by these policies.

The natural disaster event is complementary to the insurance coverage event specified above, addressing the unexpected, material costs that an insurance policy would not ordinarily cover. Any pass through amount claimed for a natural disaster event would be net of any insurance payout made to SDP and any amounts recovered through an insurance coverage re-opener event.

7.5.2.7. Terrorism event

As with a natural disaster event, a terrorism event may impost cost that materially exceed the limits of prudent insurance policies. Terrorism events are excluded from SDP's insurance policies. They are a standard exclusion from policy coverage in Australia. Any pass through amount claimed in a pass through application for a terrorism event would be net of any payout made to SDP by, for example, the Federal Government and any amounts recovered through an insurance coverage re-opener event.

7.5.3. Process for undertaking a mid-period re-opener

In developing a process for undertaking a mid-period re-opener, SDP has had regard to the following principles:

- Ensuring the trigger event is clearly defined and can be identified in any cost pass through application.

- Requiring SDP to substantiate the efficient increase (or decrease) in costs associated the eligible events (within a reasonable timeframe, say 90 business days, following the event), including actions taken to reduce the magnitude of any increase in costs.
- Ensuring IPART (and potentially stakeholders) have sufficient time to review, consult on and assess the proposal (say up to 90 business days) to ensure that only material (1% of annual regulated revenue) increases (or decreases) in the efficient costs associated with the event are passed through to customers.
- Allowing prices to be updated, following IPART's decision, within a reasonable timeframe (ensuring SDP is not worse off for any delays) to allow SDP to continue to invest, operate and maintain a water supply and water security service as required by SDP's Network Operator's Licence.
- Where possible, drawing from other regulatory precedents, including in Australia.

A summary of how the proposed cost pass-through mechanism would apply is provided in **Figure 7.3** below. We have drawn on other regulatory frameworks (See Appendix 7.7) and our understanding of IPART's legislative obligations. It is proposed that the process would involve the following steps:

1. An eligible event occurs that results in a material increase or decrease in costs of providing SDP's water services in accordance with our Network Operator's Licence.
2. Within 90 days of the event, SDP applies to IPART (or IPART initiates) a mid-period decision re-opener. The application will be supported by evidence substantiating the increase (or decrease) in costs of providing SDP's water services in accordance with our Network Operator's Licence.
3. IPART will undertake a public consultation on the proposed increase (or decrease) in costs from the eligible event, and the likely impact on prices if the cost impacts are passed through.
4. Within 90 days of initiating a mid-period re-opener, IPART will determine the efficient increase or decrease in costs to be passed through to customers, and notify SDP (and stakeholders) of the decision and the prices to apply in each remaining year of the regulatory period within which the eligible event occurs.

Figure 7.3: *Process for undertaking a re-opener of the Determination following a material change in efficient costs over the 2023-27 regulatory period*

Re-opener event occurs

Examples of re-opener events

- **Regulatory change event** for changes to regulatory obligations
- **Service standard event** for changes in standards of service
- **Tax change event** for changes in relevant taxes and charges
- **Insurance coverage event** which addresses costs incurred beyond an insurance cap and beyond reasonably available insurance cover
- **Insurer's credit risk event** if an insurer becomes insolvent
- **Natural disaster event** such as cyclone, flood or earthquake
- **Terrorism event** such an event involving force or violence

Event results in material increase or decrease in costs of providing SDP's water supply or water security services

SYDNEY DESALINATION PLANT

SDP applies to IPART to pass though the efficient costs

IPART

IPART reviews SDP application and determines the effecient costs

SYDNEY DESALINATION PLANT

IPART updates SDP prices where there has been a material increase or decrease in the efficient cost of service provision

Source: Sydney Desalination Plant

We would welcome engagement with IPART, Sydney Water and other stakeholders in developing the process and mechanism for undertaking a mid-period re-opener. This would include the items discussed above, as well as specification of other matters such as:

- the information provision requirements on SDP as part of any re-opener application
- the timeframe and decision-making process – including matters to be considered by IPART in determining the efficient increase (or decrease) associated with the event are passed through to customers – and reporting requirements on IPART in making a decision.
- the price control formula that would include mechanisms to update prices to account for the proposed mid-period re-opener mechanism.

7.6 Regulatory precedent: Re-opening price determinations to account for movements in efficient costs

This section provides examples of price determination re-openers where notional revenue requirements and prices are adjusted to pass through the approved change in efficient costs following defined trigger events (some of which are defined as 'general' events, some as 'specific' events). It highlights these mechanisms are standard features across many regulatory frameworks covering a range of industry sectors and jurisdictions nationally and internationally.

As shown in **Table 7.7**, clearly defined price determination reopeners have been established previously by IPART.

Table 7.7: *Summary of regulatory frameworks that manage unforeseen events through reopeners*

Industry	Regulator	Defined trigger events	Key features
1. Electricity Distribution Networks[29]	IPART (NSW) (2004-05 to 2008-09)	Trigger events (outside the control of businesses) include: • Change in regulatory obligation • Change in taxation obligation • Specified (foreseen but uncertain) events: – OHS requirements for live line work – Electricity Supply Act amendments – Guaranteed Customer Service Standards payments – Interval metering.	General reopeners events: Symmetrical: Incremental cost increases and reductions. Materiality threshold: 1% of average annual smoothed revenue requirements over the regulatory period per event. Process: Application within 90 working days of event; Tribunal will approve a total amount that can be passed through, as well as a profile of recovery over the remainder of the regulatory period. Recovery: All approved cost pass through amounts for the year (either specific or general) recovered as a single additional charge on top of the total network tariff (i.e. outside the weighted average price cap and price limits). Specific cost reopeners events: Not subject to a materiality threshold – as these were foreseen but not certain events.

29 IPART 2004. NSW Electricity Distribution Pricing 2004/05 to 2008/09 Final Report, pp. 125-131.

Industry	Regulator	Defined trigger events	Key features
2. Retail electricity[30]	IPART (NSW) (2010-2013)	• Trigger events include: • Regulatory change event (including green energy schemes, hardship policies, AEMO charges, ROLR event) • Taxation change event	Symmetrical: Incremental cost increases and reductions. Materiality threshold: 0.25% of the Standard Retailers' regulated revenue for the previous year per event Process: Initiated by IPART or a Standard Retailer within 90 days of the event. IPART issues draft report inviting stakeholder comments within 30 business days of receiving a Standard Retailer's application and issuing a final report within a further 30 business days (unless IPART notifies stakeholders of an alternative timeframe) Recovery: Provides for a price change on a date agreed by IPART once it has approved the total costs to be passed through and the costs incurred.
3. Electricity transmission[31]	AER (National Electricity Rules) (May 2022)	Trigger events include: • Regulatory change event • Service standard event • Tax change event • Insurance event • Inertia shortfall event • Fault level shortfall event • Any other event specified in a transmission determination as a passthrough event for the determination	Symmetrical: Incremental cost increases and reductions. Materiality threshold: 1% of the maximum allowed revenue for the provider for that regulatory year Process: Application to the AER within 90 days of the event. AER to make a decision on the approved reopeners amount and regulatory years it is passed through within 40 business days. AER can extend this period by up to another 60 business days for complex matters. The AER may consult with the TNSP and other stakeholders.

30 IPART 2010. Review of regulated retail tariffs and charges for electricity 2010-2013 Final Report, pp. 158-165.

31 AEMC, 'National Electricity Rules', version 182 (May 2022), Clause 6A.7.3.

Industry	Regulator	Defined trigger events	Key features
4. Electricity distribution[32]	AER (National Electricity Rules) (May 2022)	Trigger events include: • Regulatory change event • Service standard event • Tax change event • Retailer insolvency event • Any other event specified	Symmetrical: Incremental cost increases and reductions. Materiality threshold: 1% of the annual revenue requirement for the provider for that regulatory year Process: Application to the AER within 90 days of the event. AER to make a decision on the approved amount and regulatory years it is passed through within 40 business days. AER can extend this period by up to another 60 business days for complex matters. The AER may consult with the DNSP and other stakeholders.
5. Gas distribution[33]	AER (National Gas Rules) (April 2022)	Trigger events may typically include the following events: • Regulatory change event • Service standard event • Tax event • Insurance cap event • Insurer credit risk event • Natural disaster event • Terrorism event	Materiality threshold: Typically 1% of smoothed annual revenue requirement. Process: Defined in the access arrangement. For example, notify the AER within 90 business days of the event. AER determination within 40 days, with a possible extension for complex matters to a maximum of 90 days.
6. Water[34]	ESC (VIC) (October 2021)	The PREMO regulatory framework applied by the ESC allows for price adjustments to account for uncertain or unforeseen events including: • Regulatory, legislation or ministerial directive changes • Exposure to natural disasters or extreme weather events • Differences between forecast and actual desalination costs	Price adjustments can occur during or at the end of the regulatory period, and can be initiated by a business or by the ESC. The ESC will approve adjustments if: The event is outside the control of the business It would have a material impact (including on costs and revenue) that is verifiable The business has done what it can within its control to mitigate against the event Customers are not unduly exposed to risk or price fluctuations.

32 AEMC, 'National Electricity Rules', version 182 (May 2022), Clause 6.6.1.

33 AEMC 'National Gas Rules,' version 60 (April 2022), clause 97(1)(c); AER, 'Jemena Gas Networks (NSW) Access Arrangement 1 July 2020 – 30 June 2025' pp 7-8.

34 Essential Services Commission (October, 2016), 'Water Pricing Framework and Approach: Implementing PREMO from 2018'; ESC (October 2021), '2023 Water Price Review: Guidance Paper,' pp 56-7; ESC (June 2020) 'Western Water Final Decision: 2020 Water Price Review', p 30.

Industry	Regulator	Defined trigger events	Key features
7. Water[35]	ESCOSA (SA) (2020- 2024)	Defines a re-opener revenue variation adjustment mechanism. Pass through events are defined as: • A change in a legal obligation event • An extraordinary event.	Materiality threshold: Total cost/ expense of the event meets or exceeds $10 million, or if < $10million it has a significant impact on SA Water or its customers. Process: A pass-through event revenue adjustment statement must be submitted to ESCOSA providing details of the event, its financial impact and why it could not be controlled or substantially mitigated by SA Water (acting prudently and efficiently).
8. Water[36]	QCA (QLD) (November 2021)	Re-opener in the case of 'review events' including: • Drought response events • Emergency events • Law or government policy events	Re-opener events: • In-period adjustments allowable only for material cost impacts caused by emergency and law or government policy events. • No in-period adjustments for drought response events – this is unnecessary given drought allowance. For feedwater quality events: • Provide businesses with an upfront allowance to take on feedwater quality risk, rather than passing through costs to customers as a review event.

35 ESCOSA (July 2020) 'SA Water's Water and Sewerage Retail Services: 1 July 2020 – 30 June 2024 Price Determination', pp 3, 12.

36 QCA, Seqwater Bulk Water Price Review (Draft Report, November 2021), pp 115-19.

Industry	Regulator	Defined trigger events	Key features
9. Rail[37]	QCA (QLD) (July 2018, June 2021)	• Force majeure events which include: – Compliance with a lawful requirement, order, demand or direction of an Authority – A strike, lockout, boycott, go low or labour disturbance – War, invasion, or act of terrorists – Equipment failure or breakdown where such failure or breakdown could not have been prevented by prudent practices – Fire, floods, storm surge and other natural disasters – Epidemic or quarantine restrictions	Access undertaking provides for the network to seek approval from QCA to vary reference tariffs in response to a "Review Event" including a force majeure event. For example, Queensland Rail's access undertaking provides that QR may submit a variation of a Reference Tariff to the QCA within 3 months of a force majeure event which has caused QR to forego more than 2.5% of contracted annual revenue.[38] Under s 138(2) of the QCA Act QCA must consider whether approval of the review event: • Promotes economically efficient operation, use and investment in regulated infrastructure • Promotes competition in related markets • Encompasses the legitimate interests of the regulated business, access seekers and access holders and the public more broadly
11. Electricity distribution[39]	NZ Commerce Commission (NZ) (May 2020)	The price-quality path may be reconsidered by the Commission under of range of defined events including a catastrophic event, a change even, an error event, a major transaction or WACC change.	The Commission determines the extent of any amendment to the price path.

37 Aurizon Network (October 2016), 'Aurizon Network Access Undertaking: Review Event Submission - Central Queensland Flooding 2016', p 12; Aurizon Network 2017 Access Undertaking (UT5) FY22 Annual Review of Reference Tariffs Approved by the QCA on 22 June 2021; QCA (July 2020), 'Queensland Rail's Access Undertaking 2' pp 75, 86, 123.

38 QCA (July 2020), 'Queensland Rail's Access Undertaking 2' pp 86, 123; QCA (Final Decision Notice, July 2018), 'Queensland Rail's Application: New Hope Review Event 1 July 2018' p 2.

39 Commerce Commission 2020, Electricity Distribution Services Input Methodologies Determination 2012, This consolidated determination consolidates the principal determination and all amendments as of 20 May 2020, p. 182

Industry	Regulator	Defined trigger events	Key features
12. Water[40]	Ofwat (December 2019)	Trigger events are circumstances which have a substantial adverse or favourable effect on the business and include[41]: • Increases in Environment Agency charges • Increases in bad debt costs • Increased land purchase costs for the Thames Tideway Scheme	Interim determinations can be triggered by the company or Ofwat. Ofwat make determinations about uncertainty mechanisms in accordance with statutory duties to: Protect the interests of consumers Secure that a company is able to finance the proper carrying out of its functions as a water or sewerage undertaker; and Promote economy and efficiency In addition to materiality and triviality, Ofwat consider the extent to which management is able to control the risk or the impact of that risk.

7.6.1. Recent regulatory decisions - Reopeners

This section outlines a number of recent Determination re-openers that have been approved.

ElectraNet: 2021-22 Increased Insurance Premiums

In December 2021, ElectraNet submitted a cost-pass through application to the AER seeking an increase in allowed revenue of $3.4 million to recover additional insurance premium costs incurred in 2021-22. ElectraNet submitted that insurance premiums have significantly increased due to the repricing of bushfire risk and a retraction in available market capacity.[42] [redacted].

ElectraNet's actual 2021-22 insurance premium of $6.57 million exceeded its forecast by $3.4 million. This discrepancy accounted for more than one per cent of ElectraNet's maximum allowed revenue for 2021-22 ($332.7 million). This satisfied the definition of a positive pass through insurance event had occurred under the NER. The AER was satisfied that ElectraNet demonstrated reasonable steps to ensure its premium costs were efficient, including ongoing engagement with insurers, benchmarking their cover and costs against other network providers and consideration of alternative approaches for containing premium increases. Based on this assessment, the AER approved ElectraNet's proposed pass through amount of $3.4 million to be recovered in 2022-23.[43]

Endeavour Energy: 2019 20 bushfires

In August 2020, Endeavour Energy submitted a cost pass through application to the AER seeking recovery of actual and forecast costs arising from the bushfire events in its network area from November 2019 to February 2020. Endeavour Energy stated that the bushfires affected approximately 45% of its service area, destroying many homes and businesses, and interrupting supply to many more. It requested a cost pass through of $31.3 million for a range of bushfire related costs, including emergency response, asset inspection, asset replacement, network reconnections, tree clearing, additional labour, and additional herbicide application to manage bushfire regrowth.

The AER concluded that the bushfires satisfied the requirements of a 'natural disaster pass through event', as the damage did not follow as a consequence of any acts or omissions by Endeavour Energy, and it incurred significantly increased costs as a result. However, it did not approve the additional costs associated

40 Commerce Commission 2020, Electricity Distribution Services Input Methodologies Determination 2012, This consolidated determination consolidates the principal determination and all amendments as of 20 May 2020, p. 182

41 Ofwat (November 2013) 'Final Determination of Thames Water's IDoK application' pp 3-5.

42 AER (March 2022) 'Determination: ElectraNet's 2021-22 Insurance Cost Pass Through', p 2.

43 AER (March 2022) 'Determination: ElectraNet's 2021-22 Insurance Cost Pass Through', pp 5-7.

with additional herbicide application, finding they were not necessary to restore service to pre bushfire levels. It approved the collection of an additional $26.7 million from customers over three years.

AusNet Services: 2020 21 easement land tax

The AusNet Services electricity transmission network is built on a series of easements, which are subject to the Victorian Government's easements land tax. AusNet Services' Annual Revenue Requirement includes an allowance for the easements land tax. It also includes a provision to pass through any actual costs to customers where these are higher or lower than the forecast. This is referred to as an easements tax change event. In February 2019 it applied to the AER for a cost pass through of approximately $27 million, the difference between its actual tax liability ($171 million) and the forecast liability ($144 million).

The AER considered that the easements land tax cost pass through satisfied the requirements of a positive change event. It approved the cost pass through, deciding that the full amount of $27 million could be collected from customers in the following year.

Anglian Water (UK): 2021 Direct Procurement for Customers (DPC) Interim Determination

In June 2021, Anglian Water applied to Ofwat for an interim determination to increase charges to consumers to allow it to deliver two components its DPC project, the Elsham Transfer and Treatment scheme, in-house instead of including them in the tender for the DPC project.[44] The application requested £87.9 million to deliver a large transfer pipeline and conditioning plant in-house and proposed a reduction to the DPC costs allowed in PR19 by £4.4 million.

Anglian Water were entitled to apply for an interim determination under Condition B of their licence because they satisfied the definition of a 'DPC Event' which qualifies as a 'relevant change of circumstances'. Ofwat deemed that most of the requested costs within the application were appropriate and efficient and in total exceeded the materiality threshold for DPC projects. Ofwat's determination accepted the majority of the application, with only minor amendments to the value of the DPC costs that the company should return to customers.

Essential Energy (NSW): 2021 Critical Infrastructure Licence Conditions

In September 2021, Essential Energy submitted a cost pass through application to recover costs in relation to stronger cyber and physical security requirements imposed by new Critical Infrastructure Licence Conditions. Essential Energy sought to recover $33.2 million which reflected the costs associated with compliance during the current regulatory control period.[45]

The AER concluded that this was a service standard event and positive change event, as defined in the NER. The Regulator was satisfied that Essential Energy is likely to incur materially higher costs to comply with the Critical Infrastructure Licence Conditions and determined that the majority of Essential Energy's proposed positive pass through amount reflects a necessary and efficient response to, and has been solely incurred as a consequence of, the new conditions. The determination was to approve a positive pass through amount of $30.6 million to be recovered over the two remaining regulatory years of Essential Energy's 2019-24 price control period.

44 Ofwat (August 2021) 'Final Determination of Anglian Water's Interim Determination Application' p 3.

45 AER (March 2022) 'Determination: Essential Energy Critical Infrastructure Licence Conditions' p 1.

8. Revenue requirement for our water supply and security services

No appendices in this section.

Revenue requirements for 2027-28 as per IPART's request is contained in the AIR.

9. Further detail on forecast operating expenditure

This appendix provides supporting information on our forecast operating expenditure set out in chapter 9 of our submission.

9.1 Our approach to forecasting operating expenditure

To forecast opex for the 2023-27 regulatory period we took the following steps:

We allocated our opex to four main categories as (operating and maintenance, energy, corporate and insurance)

1. We considered the services that SDP will be required to provide under its amended Network Operator's Licence (which involves a step-change in SDP's operations and its costs) and sought to estimate the most efficient way of delivering those services.
2. We considered the optimal mix of expenditure and interdependencies across cost categories. For example, our variable energy and treatment costs are interdependent on our membrane replacement program outlined in Chapter 11 of our submission. If an older average membrane life were to be targeted, this would increase energy and chemical needs. Another example is our RAM forecasts, which are interdependent with our forecasts of onsite labour costs. If RAM was reduced, more highly qualified/specialised staff may be required onsite to monitor and maintain assets in line with good industry practice.
3. We considered the risk management and allocation framework as (set out in Chapter 5 of our submission) and evaluated those risks to be managed through the proposed opex allowance for the 2023-27 regulatory period, and any interaction between opex and capex. For example, our opex forecasts are based on our proposed SLIS outlined in section 7.1 of our submission, our proposed cost pass through framework in sections 7.4 to 7.6 and our proposed membrane replacement program outlined in Chapter 11 of our submission and in this appendix. This ensures a holistic approach to efficiently manage risks and removes risk of any double-counting.
4. For each expenditure category, we forecast this expenditure using a 'fit for purpose' method that ensures we identify the relevant drivers of each expenditure category. For example, utilising 'a base, step, trend' approach for where base year costs are representative of future costs or can be adjusted for future changes in our circumstances and operating environment changes, as well as using 'specific year-on-year' method for items where base year costs are not representative of future costs (see **Table 9.1**)
5. We summed the forecast operating expenditure for each category to obtain our total forecast operating expenditure by mode, consistent with our obligations to operate and maintain the Plant in line with good industry practice and to use insurance to efficiently manage risks as required by our Network Operating Licence.

Table 9.1: *Forecast method for each operating expenditure category*

Cost category	Base-step-trend method	Specific year-on-year method
Operating & Maintenance		
Labour & other fixed costs (including R&D)	✓	
Routine asset maintenance		✓
Treatment costs		✓
Energy		
Electricity costs		✓
Renewable (LGC) costs		✓
Corporate costs		
Remuneration costs	✓	
Professional fees		✓
[redacted]	✓	
Premises	✓	
Land tax and council rates	✓	
Other corporate		✓
Insurance costs		
Insurance	✓	

Box 4 explains the methods and the key variables and assumptions we used in forecasting costs for each opex category.

Box 4: Approach used to forecast costs for each opex category

- **Base-step-trend method** – for items where base year costs are representative of future costs or can be adjusted to account for future changes in our operating environment and other cost inputs over the regulatory period.
- To apply this method we:
  - Used 2021-22 as our base year for most opex categories. For insurance and O&M, our 2022-23 costs are known as they have been prepaid or committed, respectively. We subtracted costs relating to non-recurrent events and circumstances that are not expected to endure
  - Trended the adjusted base year costs forward, escalating or de-escalating the forecast to reflect changes in key cost inputs (including where any real cost escalators may be required) and productivity improvements. We have not sought to apply real cost escalators to the majority of the opex categories including O&M, and the majority of corporate opex categories. For some opex categories such as insurance, we have sought expert advice on real cost escalators.
  - Added or subtracted step changes in opex not captured by the base year expenditure or trend escalation, to reflect other expected events or programs over the 2023-27 regulatory period, such as changes to regulatory obligations including Network Operator's Licence
- **Specific year-on-year method** – for items where base year costs are not representative of future costs, including energy and professional fees, we estimated the forecast costs for each year of the 2023-27 regulatory period utilising the specific cost drivers for that category.

9.1.1. Base year operating expenditure

We have used the most recent set of information over which we have confidence in the accuracy and efficiency of these costs. For O&M and Insurance this is 2022-23. All other opex categories use 2021-22 as an efficient 'Base year'.

In the case of O&M costs, 2022-23 costs reflect changes in our approach to operate and maintain the Plant assuming long-term, flexible operation. This required us to renegotiate costs with our Operator that reflect a higher level of routine maintenance, labour and fixed costs of maintaining the plant sustainably in a state where the Plant can respond to production requests in line with the defined level of service.

Table 9.2 summarises our approach to establishing base year expenditure for each opex category.

Table 9.2: *Summary of operating expenditure categories base year*

Category	Base year
O&M	2022-23 (Plant responding to ERN)
Energy	2021-22
Corporate	2021-22*
Insurance	2022-23

Note: Certain components of corporate costs are averages due to abnormal events or separately itemised non-recurrent expenditures (e.g. regulatory submission costs).

Source: Sydney Desalination Plant

9.1.2. Step changes

These are change factors that increase or decrease forecast costs as a result of responding to changes in our operating environment and Sydney Water and customers' needs. These factors represent forecast costs not captured by the base year expenditure or trend escalation. The step changes under our opex forecasts are set out in the remaining sections of this chapter.

9.1.3. Trend adjustments

Trend adjustments consider two main issues:

- real price escalation (i.e. price escalation different to the change in CPI)
- application of a continuing efficiency factor to reflect ongoing productivity improvements in the water sector.

To take account of trend changes in costs over the 2023-27 regulatory period, we:

- Mapped Base Year expenditure into cost category
- Assigned weights to each cost category, based on historical data
- Identified whether any real cost escalators are required for each cost category (i.e. whether CPI escalation of cost allowances and prices is sufficient)
- Identified productivity improvements or continuing efficiency savings of 0.3% p.a. in the water sector that may be achievable by a prudent service provider acting efficiently over the 2023-27 regulatory period and to which costs types these savings would reasonably apply (i.e. those within SDP's control).
- Applied any real cost escalators and efficiency factors to our forecasts
- In some cases, proposed an end-of period true-up to account for material differences between forecast and an updated benchmark or actual costs incurred over the 2023-27 regulatory period.

Table 9.3 below summarises the outcomes of the process outlined above.

Table 9.3: *Trend changes included in forecast opex ($2022-23, $millions)*

Cost category	Real cost escalator	Continuing efficiency factor	End of period true-up for cost movements
O&M (Plant & Pipeline)			
Labour & other fixed costs (including R&D)	X	✓ (from FY25)	
Routine asset maintenance	X	✓ (from FY25)	
Treatment costs	X	✓ (from FY25)	✓
Energy			
Electricity	X	X	
Renewable energy certificates	X	X	
Subordinate GGRP costs	X	X	✓

Cost category	Real cost escalator	Continuing efficiency factor	End of period true-up for cost movements
Corporate costs			
Remuneration costs	✓	✓	
Professional fees	X	✓	
[redacted]	X	✓	
Premises	X	✓	
Land tax and council rates	✓	X	✓
Other corporate	X	✓	
Insurance			
Insurance costs	✓	X	✓

Source: Sydney Desalination Plant

We are transitioning to a new Network Operator's Licence with significant uncertainty about how this will require us to operate in practice (i.e. frequency, volume and type of production requests). We have limited experience operating in the flexible manner envisaged under the new requirements and we will need time to develop the best operational response. For these reasons we have deferred the application of an O&M efficiency factor to 2024-25 (the second year in the 2023-27 regulatory period).

As outlined in the **Table 9.3**, in most cases we have not included any real price adjustments in our forecasts. The three exceptions are remuneration, land tax and council rates, and insurance costs. These are discussed further in the sections below. Additionally, our treatment costs are heavily influenced by chemical costs whose prices are determined in Australian and global markets. These costs can be volatile, and as SDP (and Veolia) are price takers in a global market, there is little to no opportunity to influence or hedge these cost movements. As it is challenging to forecast real price escalation for specific chemicals, SDP has proposed an end-of-period true-up for the benchmark chemical cost allowance. This true-up will avoid any windfall gains or losses while retaining an incentive for SDP to efficiently procure chemicals. As discussed in Appendix 7-4 the true-up would adjust the revenue requirement at the subsequent regulatory period by calculating and then passing through the movement in the benchmark chemical cost allowance due to changes in the benchmark chemical price component.

9.1.3.1. Continuing productivity improvements in the water sector

SDP supports incorporating ongoing efficiency into our expenditure forecasts where we have the ability to control these costs. While we consider that a water industry-specific estimate is preferred, we have based our continuing efficiency factor of 0.3% pa to align with IPART's approach.

A key difference between our continuing efficiency factor and IPART's current approach is the historical dataset that is used. By using 40+ years of historical data, it appears IPART's estimate are based on MFP estimates on a **value-added** basis. More recently, the Australian Burau of Statistics (ABS) has also published estimates of MFP on a **gross output** basis (since the mid-1990s). The reason that there is a longer data series for value-added-based estimates of productivity is because the data is directly available from the national accounts. The gross output-based approach imposes considerable demands on data availability.

Importantly, these two approaches measure output in different ways.

- Value-added measures output **excluding intermediate inputs** (materials and services used up in the process of production), whereas
- Gross output measures include those inputs.

A Productivity Commission research paper provides a thorough comparison of these two measures.[46] The paper concludes that the choice depends on the purpose of the productivity measure, however:

- the general conclusion of the literature is to favour the gross output approach to MFP measurement, and
- the overall advantage of a gross output-based MFP measure is that it minimises certain sources of productivity measurement bias.[47]

SDP considers that the way the productivity estimate is applied by IPART clearly indicates that conceptually, a gross output measure is preferred. This is because it applies to opex and capex that include intermediate inputs. The Productivity Commission paper also notes that the value-added measure will systematically exceed the measure based on gross output by a factor equal to the ratio of gross output to value added.

Our approach to determining the continuing efficiency factor is summarised in the box below.

Box 5: Ongoing productivity improvements in the water sector

- To estimate a continuing efficiency factor for the 2023-27 regulatory period we took the following steps:

1. We obtained ABS data on historical MFP
   - used ABS Cat. 5260.0.55.002 Estimates of Industry Multifactor Productivity, Australia (Table 15: Gross Output based Multifactor Productivity Indexes – Hours Worked basis).
2. We calculated:
   - the compound average annual multifactor productivity (MFP) for each industry in the market sector of the Australian economy from the data series using all available data (from 1994-95 to 2019-20), and
   - took the average across these industries, resulting in an estimate of 0.3% pa.
3. We applied the continuing efficiency factor of 0.3% pa to controllable opex as set out in **Table 9.3** and to all forecast capex.

46 Cobbold, T. 2003, A Comparison of Gross Output and Value-Added Methods of Productivity Estimation, Productivity Commission Research Memorandum, Canberra, available at: https://www.pc.gov.au/research/supporting/comparison-gross-output-value-added-methods/cgovam.pdf

47 Ibid, p 23.

9.2 Forecast operating and maintenance expenditure

This section provides more information on our forecast O&M which is a key element of the proposed opex for the Plant.

Our O&M contracts with Veolia Water Australia (Veolia) cover the operation and maintenance of our physical assets for the Plant and Pipeline. This includes operation and maintenance of assets such as the reverse osmosis membranes, pumps, electrical distribution, instrumentation and control systems for the Plant. Under the O&M contract Veolia provides water quality testing, chemicals and labour. Veolia also implements detailed policies and procedures to ensure tasks are completed safely, the site is secure, and data is collected and stored appropriately. The expert and diligent implementation of operations and maintenance activities ensures the Plant can prudently and efficiently provide the services required under SDP's Network Operator's Licence.

The Plant was originally procured through a competitive tender process using a design-build-operate-maintain (DBOM) procurement model. This procurement model provided a number of advantages including that:

- the design for the Plant was tailored to meet the long-term operational requirements of the project -primarily as a drought response asset providing production volume over the long term, and
- the Operator can establish an upfront long-term maintenance program that minimises whole of life cost, and which targets long-term reliability with informed decisions made with a whole of life lens.

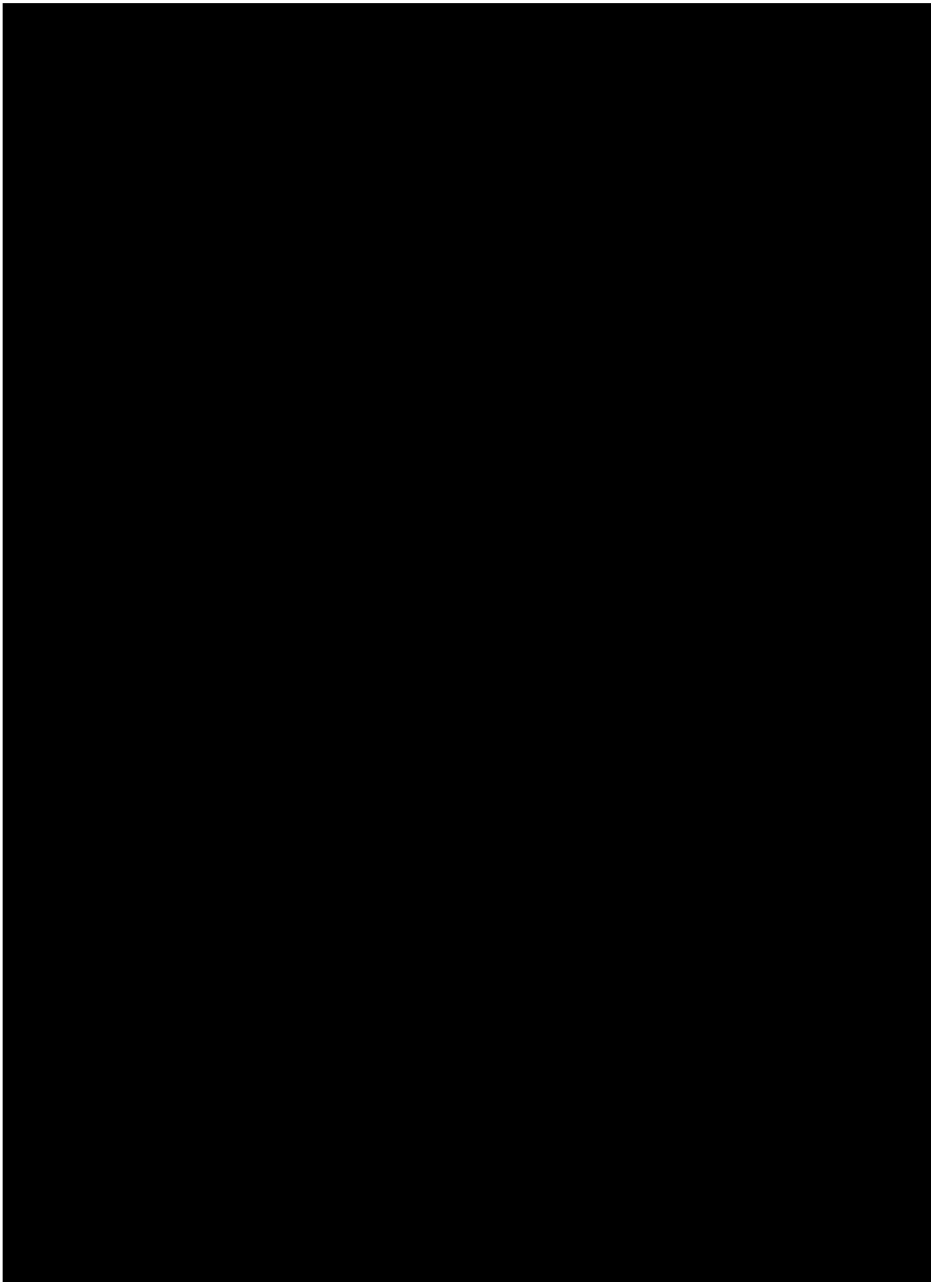
As a consequence of this procurement approach, long-term (20-year) O&M contracts are in place with Veolia. Long-term O&M contracts are prudent for complex and specialised assets like desalination plants and exist at other major desalination plants around Australia [redacted]. Long-term contracts ensure the appropriate expertise and intimate knowledge of the assets, promote long-term decision making rather than reactive management. Long term contracts also allow the Operator to manage uncertainty and operational risks (cost and reliability) over the long term.

Our recently renegotiated O&M contract with Veolia forms the basis of our O&M forecasts. We are confident that our forecasts remain competitive and in line with other market benchmarks. We commissioned expert advice on prudent and efficient O&M costs to support our renegotiation process with Veolia. Our O&M contract with Veolia also provides substantial long-term benefits for customers including:

- continued mitigation of operational risks of the Plant under the original procurement model - including previous asset management/ maintenance performance, and holding Veolia to account for any 'act or omission' that leads to increased cost or below minimum expected level of service.
- avoiding substantial costs involved in retendering including termination fees from the current O&M contracts and mobilisation, demobilisation, if a different operator was chosen and the costs associated with addressing latent risks outside the control of SDP and a new operator.
- avoiding retendering at a time where there was and continues to be uncertainty around market structure with major providers in Australia potentially merging, and when pandemic and geopolitical factors have led to tightening of the labour market.

Given the NSW Government's consideration of an expansion of the Plant and the introduction of the GSWS, it was not prudent for us to retender the O&M contract before the 2023-27 regulatory period. In SDP's view, and accounting for its understanding of efficient operating costs for equivalent desalination plants in the Australian market, these re-tendering costs outweigh the likely benefits and lost opportunities.

A breakdown of our Plant O&M forecasts by category is provided in the **Tables 9.5** and **9.6** below. This is followed by our forecast O&M for the Pipeline. Note SDP has proposed a four-year regulatory period covering FY24-27 and information for FY28 is included in the AIR & SIR.



We commissioned expert advice to inform our O&M forecasts. This advice supports the efficiency of our forecast O&M over the 2023-27 regulatory period (see **Box 6**).

Box 6: Expert reports on O&M costs

- As discussed in section 9 of our submission, we have undertaken a robust process with Veolia to form our forecast O&M costs in the 2022-27 regulatory period.
- To support this process, we also commissioned expert reports on forecast O&M for the Plant and Pipeline:
  - We commissioned Kellogg, Brown & Root (KBR) to provide expert advice on the prudent and efficient fixed operating and maintenance costs for the Plant and Pipeline. The scope of KBR's report included a bottom up estimate of fixed Labour, RAM and other O&M costs (see appendix 9.6). In Operational Mode, KBR's estimates were 17 to 33% higher (depending on year) than our forecasts over the 2023-27 regulatory period.
  - We commissioned Emerald Process Engineering (Emerald) to undertake a bottom-up assessment of the Plant's variable O&M costs, including chemical and other treatment costs. Emerald's estimated variable costs were around 6% higher than our forecast.
- We have not used KBR's and Emerald's reports as the basis for our fixed O&M forecasts over the 2023-27 regulatory period. Instead, we consider that our (lower) forecast O&M reflects efficiencies we have achieved with our Operator Veolia over several years and considers continued delivery of efficient services into the future. This further demonstrates the value for money that our existing O&M contract provides to Sydney Water and customers.

The following sections provide more information on our O&M categories.

9.2.1. Labour and other fixed costs

9.2.1.1. Background

Labour costs are the cost for Veolia to employ staff to operate and maintain the Plant safely, and in accordance with SDP's Network Operator's Licence. Other fixed costs are largely a function of our labour costs, and include but are not limited to:

- Preparatory treatment processes and process water (related to SDP's Network Operator's Licence)[48]
- Laboratory and analysis
- Carbon Dioxide (CO2) equipment rental (but not the cost of CO2 gas)
- Consumables
- Tools and equipment
- IT and telecommunications
- Environment Protection Licence fees
- Office costs
- Staff training and development
- Staff clothing and Personal Protective Equipment (PPE)
- Sundries
- Insurance
- Groundskeeping

48 Process water is defined as water produced by SDP to maintain availability and readiness, preserve assets or processes and/or meet environmental approvals that is not used to make drinking water.

- Flora and fauna management in line with the requirements of the Planning Approvals[49]
- Site security
- R&D.

9.2.1.2. Drivers for increased labour and other fixed costs

There are two key drivers for the increase in our forecast labour and other fixed costs:

1. Our new Network Operator's Licence which requires us to maintain the Plant to ensure it can respond to all production requests including emergency production requests requiring the plant to be constantly operational. This introduces additional costs related to Process water and associated treatment processes, and requires adequate resourcing to adapt to production requests that may change at any time to meet emerging customer needs
2. Additional staff to ensure SDP has the technical, financial and organisational capacity to carry out its authorised activities. This reflects our experience during the 2017-23 regulatory period, that additional staff are required to safely operate the Plant when it is required to operate flexibly, which will be even more important under our new Network Operator's Licence.

9.2.1.3. Forecasting methodology

Our forecasts of labour and other fixed costs over the 2023-27 regulatory period are based on our O&M contract with Veolia. We are proposing step changes relative to our Base Year expenditure as summarised in **Table 9.7** below. SDP and its Operator have absorbed some of these additional costs to date while operating under ERNs through 2020 to 2022. Now that a change to the operating licence has been confirmed from 1 July 2023, SDP and its Operator have committed to a subset of this expenditure in FY23 in order to prepare for new licence obligations and ensure the services continue to be delivered safely, reliably efficiently and to customer expectations in the lead up to the 2023-27 regulatory period. Our forecasts for the 2023-27 regulatory period then reflect the revenue required to meet the new operating regime reflected in our new Network Operator's Licence.

Source: Sydney Desalination Plant.

Additional costs of flexible full-time operation under our new Network Operator's Licence

Under our new Network Operator's Licence, the Plant will remain operational in a state in which it can respond to production requests from Sydney Water consistent with the defined level of service. As discussed in section 4 of our pricing submission, we will produce a minimum of around 23 GL/a in High Availability unless agreed otherwise with Sydney Water in the best interests of customers (noting that a lower level of production may affect our availability for an agreed period).

49 Planning Approvals for the Plant issued under the Environmental Planning and Assessment Act 1979 (NSW).

Keeping the Plant highly available involves additional costs relating to process water (i.e. the costs of producing water that is not sold to Sydney Water) including:

- The need to rotate assets/reverse osmosis modules (RO trains) to ensure we understand the condition of our assets and have up to date performance data to inform efficient maintenance and maintain the assets to be quickly available even when not actively and regularly producing drinking water. Additional costs include energy and treatment costs on ramp-up and ramp-down as water is diverted from 'sale' during these periods. Treatment costs are categorised in Labour and Other Fixed Costs while energy costs are included in our proposed fixed energy allowance.
- To meet availability and new Network Operator's Licence requirements, the ocean outfall diffuser caps cannot be changed quickly in lower production scenarios as per the original design intent since the period to swap back to 'high production' configuration could take weeks, and SDP would not be able to respond to production requests from Sydney Water such as emergencies. Our EPA licence conditions require a certain discharge volume through the 'high production' outfall configuration and the only way to do this is to operate our second pre-treatment module and bypass water out to sea when we are not operating in an increased production mode. Seawater must still be treated through the pre-treatment system as otherwise it would pose a risk to the safe treatment process and RO membrane assets once using the second module for supply.
- Non-production RO trains need to be regularly flushed with permeate to maintain membranes in a state of readiness and to maintain their performance. The permeate needs to be produced by an additional RO train, thus an additional RO train is operated. Energy and treatment chemicals must be used to make this water that is diverted from 'sale' (Process water). These treatment costs are categorised in Labour and Other Fixed Costs while energy costs are included in our proposed fixed energy allowance.

These additional costs are unavoidable in order for SDP to meet the defined service levels under SDP's Network Operator's Licence. The non-energy component of the additional costs of being highly available is estimated at [redacted] based on our treatment cost and the volume of Process water generated. Roughly half this uplift amount has been committed for FY23 as we prepare to transition to our new Network Operator's Licence requirements. Further information is available to IPART on request.

Additional labour costs based on our experience during the 2017-23 regulatory period

Over the 2017-23 regulatory period we experienced for the first-time drought response operations at full production and emergency response operations. Through this experience we have been identified that additional full-time equivalents (FTE) roles are required to run the Plant efficiently and reliability while ensuring service and safety standards are maintained. Our forecast increase in labour costs relates to:

- 2.5 additional FTE staff needed for the Plant in Operational Mode
- Increases to the superannuation guarantee.

A summary of the additional FTEs are provided in **Table 9.8** below.

Table 9.8: *Plant labour costs – proposed additional FTEs ($2022-23, $million)*

Position	Driver(s)	Justification	FTEs	Cost
Safety, Health, Environment and Quality (SHEQ) compliance manager	Compliance (including with Network Operators Licence), health and safety of staff	This role was established during the Reinstatement of the Plant following the Storm Event and subsequent restart of the Plant. Given the number of new staff entering the workforce, restarting of equipment and contractor involvement, additional SHEQ presence was funded by SDP for a 12-month period (ending June 2020). This role has proven a significant asset to the Plant operations particularly in a changing operating environment. The Operator has retained the SHEQ manager at its own cost to date, but this arrangement is not sustainable over the long-term. This role is essential to sustain current performance levels and provide ongoing compliance assurance, it represents a prudent and efficient cost under SDP's Network Operator's Licence.	1	[redacted]
Technicians	Meeting service standards for the Plant, staff safety/ fatigue, managing resourcing risk.	1 FTE Shift Work technician will enable the Plant to maintain operations (at variable production levels or full capacity) as flexibly as possible to respond to changing needs of our customers. Experienced technicians in desalination are not in high numbers throughout the local market, with the recent restart highlighting a period of 6months minimum as necessary to develop competency in the plant operation, and multiple years before a sound knowledge base is achieved. Currently, a resourcing risk remains with current allowances, any loss of operational team members will present a period of 4-8months (including hiring) whereby the existing technicians would not have adequate coverage. 0.5 FTE Day Work technician will be able to cover absences of other technicians due to annual leave, long service leave, sick leave (including leave resulting from COVID isolation requirements) in order to ensure staff are well rested and not required to perform overtime too frequently i.e. good industry practice fatigue management. The additional 1.5FTEs proposed also provides back-up coverage on the Pipeline O&M activities, with the scope of preventative maintenance on the Pipeline increasing. The additional FTEs are considered essential to sustain current performance levels, with Veolia currently funding these roles without any recourse to cost recovery which represents evidence that these resources are seen by Veolia as essential to sustainable and effective site operations.	1.5	[redacted]
Total			**2.5**	[redacted]

Source: Sydney Desalination Plant.

Further details on these positions can be provided to IPART on request.

Given the criticality of these positions, during the 2017-23 regulatory period these additional FTEs have been funded by SDP and Veolia (not passed on to customers) however this situation is not sustainable. The additional staff would ensure the following key priorities for the Plant:

- Safety, including a revised fatigue management plan for shift operators
- Asset preservation and reliability
- Production continuity in Operational Mode

We commissioned a report on our fixed O&M by consultants, KBR. KBR considers that our number of FTEs is reasonable compared to other desalination plants around Australia.

> Data was also obtained from various industry sources for the current FTEs of O&M Contractors of Reverse Osmosis Desalination Plants around Australia... A comparison of this data indicates that the Sydney Desalination Plant, at 38.5 FTE, has a ratio of 0.154 FTE to plant capacity (in ML/D). This compares favourably with other Australian desalination plants.[50]

KBR also observed that:

> Over time, an increase in FTEs as the plants age can be explained by the fact that even though it is expected that there are efficiencies in staff by experience, the effort required to keep on top of ageing assets and maintaining availability and reliability is greater.[51]

Consistent with government regulations for superannuation, labour cost forecasts also incorporate the change to the superannuation guarantee (from 10.5% in 2022-23 rising to 12% in 2026-27.)[52]

Changes in other fixed costs

The reduction in other fixed costs relates largely to efficiencies achieved in relation to corporate oversight of O&M activities and a reallocation of some of these costs to RAM.

We are also proposing an efficient, prudent and proportionate step change in the level of R&D expenditure over the 2023-27 regulatory period. This will ensure that we continue to innovate to benefit customers by reducing costs, lowering risks and providing better services. Further detail on our proposed R&D costs is set out below.

R&D is important for promoting the long-term interests of customers

IPART expects regulated water businesses to conduct appropriate research to understand their customers' needs and preferences and to innovate to deliver services that maximise value for customers, as would occur in a competitive market. It requires businesses to make savings through innovation and new technologies so that they can stay at the 'frontier', as reflected in the ongoing or continuing efficiency savings included in its expenditure allowances.

In its 2020 report to IPART, CEPA concluded that one of the emerging practices in regulation is for regulators to support innovation by providing funding and/or resourcing for companies to trial innovative approaches they would not otherwise undertake.[53] CEPA outlines the examples of Ofwat, Ofgem and the AER providing explicit allowances for R&D and innovation, and of the AER and Ontario Energy Board (OEB) establishing innovation 'sandboxes'. In addition, the Productivity Commission (PC) recently found that economic regulation should allow for R&D investment by water utilities. It considered that statements of obligations on businesses, or similar governing documents, should include an expectation that regulated utilities will invest in research and development activities relevant to their business. This would empower utilities and ensure that economic regulators include associated expenditure when making price determinations. [54]

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50 KBR, Sydney Desalination Plant – Operations and Maintenance estimate, July 2022, p XX.

51 KBR, Sydney Desalination Plant – Operations and Maintenance estimate, July 2022, p XX.

52 https://www.ato.gov.au/rates/key-superannuation-rates-and-thresholds/?anchor=Superguaranteepercentage#Superguaranteepercentage

53 CEPA, Economic regulation of water utilities –research, Final Report for IPART, 30 June 2020, p 10 & pp 47-49. https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-administrative-how-we-regulate-the-water-businesses/legislative-requirements/consultant-report-by-ceda-economic-regulation-of-water-utilities-research-june-2020.pdf

54 Productivity Commission, National Water Reform 2020 Draft Report, 2021, p 190, https://www.pc.gov.au/inquiries/completed/water-reform-2020/draft/water-reform-2020-draft.pdf

These practices of other economic regulators and the PC's recent findings recognise that R&D can deliver significant benefits to customers over time, through reduced costs, lower risks and/or enhanced services, but such R&D cannot always be directly linked to short-term cost savings or 'payback' within a regulatory period. Therefore, appropriate expenditure allowances are important for facilitating such activities.

Other urban water businesses are increasingly including R&D activities in their proposed expenditure allowances. For example, appropriate research and innovation is one of the objectives included in Sydney Water's Strategic Asset Management Plan and Hunter Water's 2019 pricing submission noted that it had increased resources to undertake research and strategic planning during the 2016-2020 period.[55] Such activity is necessary to enhance customer outcomes and provide innovative new services.

Our proposed R&D activities are efficient, prudent and proportionate

In addition to the innovation implicit in our proposed ongoing efficiency factor of 0.3%, we consider that it is efficient and prudent for us to undertake R&D activities over the 2023-27 regulatory period that have a pay-off over the longer-term for customers. Our previous work has identified short-term cost minimisation strategies, or 'low hanging fruit', to achieve efficiency savings in operating the plant and pipeline. We are now also focused on identifying activities that reduce risks, enhance services and/or reduce costs to customers over the longer-term. However, identifying these activities imposes a cost on SDP in the short-term, with benefits ultimately flowing to customers through lower costs and/or enhanced services levels in the future. We therefore consider it is appropriate for these costs to be included in our forecast operating cost allowance for the 2023-27 regulatory period.

In the absence of an appropriate allowance for R&D, SDP would be constrained in pursuing such beneficial innovations. This is because SDP is a single asset business, subject to an abatement regime, with no control or certainty over when and how long it operates in certain modes. This means that relative to larger, more diverse business such as Sydney Water, we have limited flexibility and scope to pursue innovation in the absence of an appropriate allowance.

Our proposed R&D expenditure allowance is $200,000 per annum over the 2023-27 regulatory period. This makes up less than 0.1% of our notional revenue requirement in Operational (Drought) Mode.

The R&D activities that we will explore using our proposed expenditure allowance fall into two categories:

1. Investigating changes to processes and technologies to lower costs and risks over time.
2. Investigating alternative uses of the plant to maximise long-term benefits to customers.

Table 9.9 provides further details on our proposed activities.

55 For example see: Atkins, Sydney Water Corporation Expenditure and Demand Forecast Review Final Report, 2020, p 56; and Hunter Water, Pricing Proposal to IPART, 1 July 2019, p 29.

Table 9.9: *R&D projects 2023-27*

R&D area	Proposed projects
Changes to processes and technologies to potentially lower risks and costs over time	• Investigating reverse osmosis (RO) feed pump impeller trimming: We trimmed the impellers of 13 RO 1st pass pumps in 2011. This project will investigate the opex/capex trade off associated with this activity and understand any impacts on sea water feed quality (i.e. trimming impellers may add efficiencies at the average temperature and salinity of seawater but may reduce or cease production capability at colder temperatures or higher salinities). • Trialling variable speed drive (VSD) on RO 1st pass feed pumps: This project will trial the use of a VSDs to remove discharge valve throttling inefficiencies. The trial would explore the energy efficiency outcomes and opex vs capex trade-offs. • Investigating control system changes: Our control system has been designed to start-up the RO trains in a controlled manner that precludes any damage to the membranes (i.e. the control valve opens slowly so that pressure builds up slowly). There is potential to the add a control loop that ramps back the variable speed boost pumps and opens the control valve further to reduce pressure losses through the valve, decreasing our operating costs per ML of water produced. We will perform detailed analysis of control system changes to ensure there is no risk of membrane damage or other negative effects. • Investigating diffuser performance at low production levels: SDP currently needs to run an unused pre-treatment process module at minimum flow to have sufficient volumes through the outfall diffusers to meet our licence requirement. The requirement is based on an empirical equation. This project will investigate whether alternate more efficient methods can be used to be used to meet requirements. • Trialling alternate RO manufacturers and technologies for pre-treatment: This project will establish a pilot operational plant to trial alternate RO membrane manufacturers and different technologies. The aim is to reduce future membrane replacement costs. • Trialling alternate coating durability: The plant is approaching the end of life for most of its coating systems. This project will trial multiple coating systems on concrete, steel and other high exposure areas. • Assessing new online analysers: This project will investigate new technologies that are intended to improve detection of water quality risks such as algae, oil and other species. • Partnering with university or other government programs: This project involves forming strategic partnerships with universities to progress R&D in how the plant is managed, emerging technologies and other general water security benefits.
Investigating alternative uses of the plant to maximise long-term benefits to customers	• Identifying new customers: This project will investigate potential options for new customers. [redacted] This would benefit Sydney Water and its customers, by potentially allowing them to share SDP's fixed costs with other parties. • Investigating emerging markets: This project will investigate emerging markets for additional revenue that can be generated by the plant. Any additional revenue that is generated would benefit Sydney Water and its customers through the revenue sharing arrangements that IPART applies to unregulated revenue. • Partnering with universities: This project involves forming strategic alliances with universities to explore how the plant is managed and additional revenue sources from emerging technologies. Any additional revenue that is generated would benefit customers through the revenue sharing arrangements that IPART applies to unregulated revenue. Likewise, customers would ultimately benefit from any reductions in costs or risks arising from innovative new technologies or operating practices emerging from the alliances with universities.

9.2.1.4. Key assumptions

Key assumptions for our forecast labour costs include:

- the operation of the Plant over the 2023-27 regulatory period will be under SDP's new Network Operator's Licence.
- indexation is applied to rates under our O&M contract (generally CPI).

9.2.2. Routine asset maintenance (RAM)

9.2.2.1. Background

RAM costs include the costs of maintaining the Plant's mechanical, electrical and other assets. This includes preventative, corrective and breakdown maintenance activities. RAM can be distinguished from periodic maintenance which involves more significant expenditures to replace, renew and/or refurbish items.

Expenditure on RAM is an essential part of good asset management practice. It helps to ensure our assets provide reliable service and achieve their economic lives. Appropriately maintaining our assets also reduces the risk of any material issues occurring to the Plant.

9.2.2.2. Drivers for RAM investment

Our Network Operator's Licence and our operating requirements are key drivers for our forecast RAM costs. Under our Network Operator Licence, SDP is required to operate and maintain the Plant and Pipeline in accordance with Good Industry Practice, which means:

> The exercise of that degree of skill, diligence, prudence and foresight that reasonably would be expected from a prudent desalination plant operator acting in accordance with good industry practice and applicable Australian and international standards having regard to the Capacity of the Water Infrastructure, its duty, age and technological status.[56]

As discussed further below, the drivers of our forecast increase in RAM expenditure over the 2023-27 regulatory period include:

- The 'rebasing' of RAM costs taking into account recent operational performance of the Plant to date, including significant preventative maintenance scheduled over the 2017-23 regulatory period given the Plant's age
- A recent decision to remove ambiguity over how assets are accounted for to qualify as Capital Works and define the list of assets that are included and excluded from RAM as being below the 'de minimus' threshold of $30k renewal value.[57] This has led to increases in the cost allocation for asset renewals in the RAM category
- An increase in RAM on the DWPS than that forecast in the 2017 regulatory submission and determination. The DWPS was designed by a joint venture that did not include the Operator and revenue requirements were estimates only. These estimates have been found to be inadequate in practice, particularly given the criticality of the DWPS and its design availability of 85% only.
- Additional RAM to meet higher levels of availability and more complex utilisation of assets under our new Network Operators Licence.
- The overall shortage in resources in the subcontractor space as well as the price increase in equipment are additional factors contributing the to the higher RAM

For the 2017-23 regulatory period, our forecast RAM costs were best estimates given very limited operational experience of the Plant. During the 2017-23 regulatory period, we had significant interactions with our assets in different operating modes, and also during the reinstatement of the Plant following the Storm Event and Emergency Response periods. These interactions have provided SDP with a significant amount of data and knowledge on our assets, as well as informed lessons learned.

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56 SDP Network Operator's Licence, Schedule C, clause 2.2.

57 " The inclusion of a 'de-minimus' threshold also reinforces the fact that it relates only to significant non-routine maintenance work and therefore the appropriateness of classifying periodic maintenance as capital expenditure." Atkins, Sydney Desalination Plant - Expenditure Review Supplementary Report IPART 25 May 2017, p20.

Our RAM expenditure was lower than forecast in the 2017-23 regulatory period because the Plant was reinstated following the Storm Event, with many assets being replaced through the Reinstatement Project, ultimately providing a saving for customers as these replacements were funded by insurance proceeds. The current O&M contract costs for RAM are not sustainable, particularly as the Plant ages.

We consider that the increase in RAM expenditure represents an efficient solution to protect the life of the Plant and ensure operational reliability and avoid larger capital works in future, which is in the long-term interests of customers.[58]

9.2.2.3. Forecasting methodology

Our RAM forecasts for the 2023-27 regulatory period have been developed using Veolia's approach to estimating the cost of maintenance, which is based on the philosophies of Reliability Centred Maintenance (RCM). This approach emphasises the preservation of the function of a system rather than the preservation of individual assets that make up the system. Under this approach a greater focus of time is placed on assets which pose a higher risk to system function. In contrast, for assets which pose little or no risk to the system a leaner approach or in some cases run to fail strategy is adopted. While forecasting costs using this approach is more complex than a simple standard maintenance approach per asset, it results in reduced cost and reduced operational risk to the Plant.

The approach draws on Veolia's world leading international experience and database of maintenance costs as well as operational data for the Plant. For each type of asset, the approach involves a probabilistic assessment of the expected cost of each type of maintenance activity and the expected frequency to appropriately maintain assets in line with good industry practice, asset warranties and the service standards for the Plant. It then utilises actual operational data to validate the model and/or prompt adjustments.

RAM costs are modelled using a combination of three different models, being:

- preventative maintenance,
- corrective maintenance, and
- breakdown maintenance.

These models are combined to provide an estimate at the site level for operating expenditure. The three models are built bottom up, derived from first principles and then calibrated top down to ensure accuracy. The outcome from this modelling is a profile of forecast RAM expenditure. Our forecast step changes in RAM are summarised in **Table 9.10** below.

Table 9.10: *Forecasts of RAM costs for 2023-27 regulatory period ($2022-23, $million)*

Step change	2022-23	2023-24	2024-25	2025-26	2026-27	Total
RAM	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Percentage change		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Source: Sydney Desalination Plant.

Further information on this approach can be provided to IPART on request.

9.2.2.4. Key assumptions

Key assumptions for our forecast RAM costs include:

- operation of the Plant over the 2023-27 regulatory period under our new Network Operators Licence
- the Plant remains under existing long-term preventative maintenance plans
- indexation is applied to rates under our O&M contract (generally CPI)

58 We note that ESCOSA approved an increase in maintenance costs for SA Water in relation to the aging Adelaide Desalination Plant (ADP). ADP is a similar age to our Plant. See ESCOSA, SA Water Regulatory Determination 2020: Statement of Reasons, p 165.

- that SDP's proposed capex program will be undertaken, including ongoing RO membrane replacement.

9.2.3. Plant insurance costs

SDP relies on a range of insurance policies purchased by Veolia. We seek for Veolia to carry certain insurances to ensure that SDP is adequately protected, either directly because of damage to SDP assets and income streams, or indirectly to ensure that Veolia doesn't suffer undue financial loss that affects their ability to provide ongoing capability.

We developed our forecasts for Plant insurance by applying the same approach we used for our own insurance forecasts. There are two key steps in this approach:

- Deciding on the efficient level of coverage. This involves determining the types of insurance and appropriate limits Veolia needs. We do this by applying the holistic risk management framework set out in Chapter 5. As part of this, our insurance broker, Aon, undertook a review of the key risks originating with Veolia. A copy of Aon's report is contained in Appendix 9.15.

Ensuring that ensures forecasts reflect efficient costs. These forecasts reflect the likely market conditions that will apply in the 2023-27 regulatory period and the impacts of these conditions on Veolia's Plant insurance costs. The efficient costs for these policies are included in our O&M forecasts for the 2023-27 regulatory period and summarised in **Table 9.11**.

Table 9.11: *Forecasts of Plant insurance costs for 2023-27 regulatory period ($2022-23, $million)*

Step change	2022-23	2023-24	2024-25	2025-26	2026-27	Total
Plant insurance	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Percentage change		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Source: Sydney Desalination Plant.

9.2.4. Treatment costs

9.2.4.1. Background

The key components of treatment costs include:

- **Chemicals costs** – chemical dosing is required at various Plant treatment process areas in order to meet the required water quality at each treatment process area, to maintain RO membranes (via cleaning), to maintain public health and/or to protect plant or distribution system assets.
- **Waste disposal** – including ferric sludge and lime sludge disposal/ reuse
- **Cartridge filters** – used to polish filtered seawater and to protect RO membranes

Note: energy costs related to production of drinking water are covered in section 9.5.

9.2.4.2. Drivers of treatment costs

The volumes and therefore cost of treatment is highly correlated to the volume of water produced and so it is appropriate for treatment costs to be incorporated as a variable cost. As such, treatment costs will increase with the level of production in Operational Mode, noting that the level of production is not within SDP's control.

Operational factors that affect the volume of chemicals required for process efficacy include:

- Inlet seawater quality – the temperature and salinity of the inlet seawater have a material effect on the operation of the RO membranes and the permeate water quality produced from the process, as well as the dosage and mix of chemicals required to

filter out particulates from the seawater in the pre-treatment (e.g. when it rains heavily there is more runoff to the ocean and the seawater has a higher particulate load)

- Customer preference – our customer is able to request additional chlorine residual levels in the finished water to meet their own network targets and maintain customer safety. Customer preference has been for an increased (in comparison with the original contracted target value) chlorine residual at the delivery point as this has a positive effect on network water quality for end-use customers. This increases the cost of chemical dosing.
- Membrane age – as membranes age, additional chemical dosing is required to meet permeate water quality requirements, which has a further knock-on impact on the post-treatment dosing required to meet the final drinking water quality specifications. Older membranes also require a higher cleaning frequency to maintain membrane performance levels in relation to permeate water quality, permeate volume, energy consumption and maintain the overall performance warranties on the membranes themselves.

The increase in treatment costs forecast for the 2023-27 regulatory period is primarily driven by:

1. older RO membranes and the resulting need for increased chemical dosing in order to meet drinking water quality requirements (in the 2017 Determination the Plant was not expected to operate and if it did it would have new RO membranes, however under new Network Operators Licence the Plant will be always operating with on average older RO membrane life)
2. rising chemical prices, particularly in recent months in response to supply constraints related to the COVID-19 pandemic and exacerbated by the geo-political instability in Europe.

9.2.4.3. Forecasting methodology

Chemical costs

Pricing for chemical dosing is based on a bottom-up first principles approach as summarised in the Box below.

Box 7: Pricing model for chemical dosing

The model used for pricing calculates the Chemical Variable Cost (CVC):

CVC = ∑ (CUFi x CUPi) / 10^6

Where for each chemical (i):

- CUFi = Chemical Usage Factor (kg/GL) expressed per GL of Drinking Water produced
- CUPi = Chemical Usage Price ($/tonne)

The CUF depends on the selected dose rate and the flow of water where the chemical is dosed:

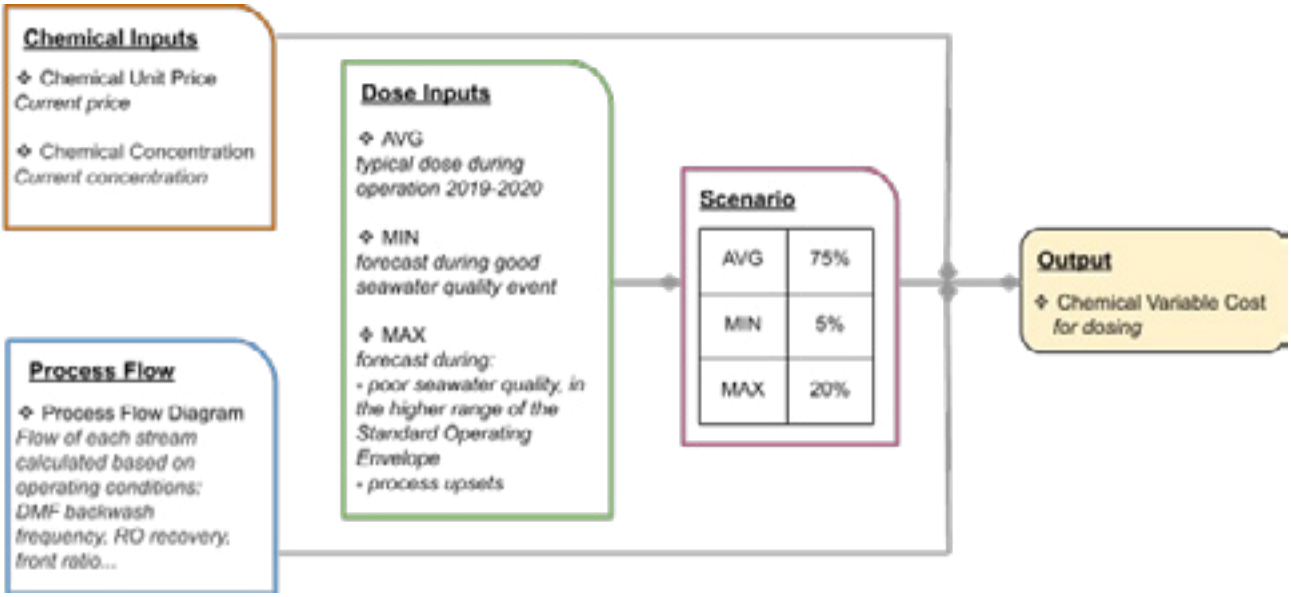
CUFi = Cdi x Fi / DW

Where:

- DW = Drinking Water Volume (ML/d) produced for each chemical (i):
- Cdi = Chemical Dose Applied (mg/L) expressed in pure product and per L of stream flow where the chemical is dosed
- Fi = Stream Flow (ML/d) where the chemical(i) is dosed

The pricing model calculates the Chemical Usage Factor based on a combination of three scenarios. The scenarios are named “AVG: Average”, “MIN: Minimum” and “MAX: Maximum” and a specific dose is assigned to each chemical, at each dosing point, for each of the scenarios based predominantly on operating experience in those scenarios. The weight assigned to each scenario is customised to reflect a reasonable likelihood of different source water quality, thus reflecting an equitable forecast of chemical volumes required for each unit of drinking water supplied to customers. The approach allows the calculation of an efficient weighted average Chemical Usage Factor to feed into our cost proposal in this Submission. **Figure 9.1** outlines the methodology for pricing of dosing chemicals.

Figure 9.1 *Methodology for pricing of chemical dosing*

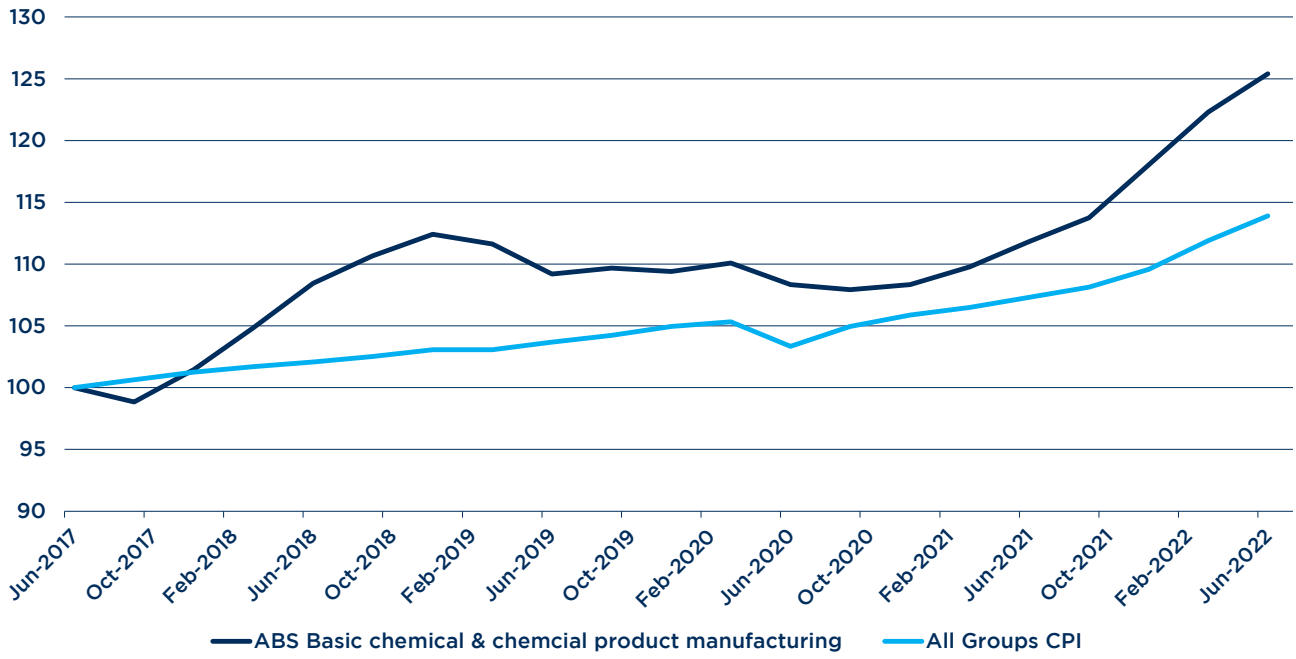


Source: Sydney Desalination Plant.

Chemical prices are based on current contract prices (May 2022), which are reviewed and adjusted for each year in line with different indices defined in the chemical supply contracts. These contracts are also subject to force majeure clauses which the supplier can activate in the event of unforeseen or unavoidable supply chain challenges. A comprehensive national tender process, for the current chemical suppliers was undertaken in 2019, taking advantage of Veolia's buying power across multiple jurisdictions to achieve lowest possible rates.

Chemical costs can be subject to significant volatility from movements in chemical prices in Australian and global markets. SDP's chemical costs have risen by over 30% since 2019/20, primarily as a result of cost increases on key chemicals (e.g. sulphuric acid, ferric chloride, citric acid, fluorosilicic acid and polymer flocculant). Veolia is a global leader in water treatment, and Australia's largest water company, with significant buying power and contractual agreements to maximise efficiencies. However SDP (and Veolia) are price takers in Australian and global markets and there is little to no opportunity to influence or hedge these cost movements that result from the inherent volatility in chemical prices, and the chemical supply chain. These same cost pressures are being experienced by other water utilities and manufacturers and these price pressures are evident from the movement in the ABS producer price index component "18 Basic chemical and chemical product manufacturing". As shown in **Figure 9.2**, there have been significant real increases in this index (above CPI) from June 2017, with the CPI increasing by 13.9% but the PPI increasing by 25.4%.

Figure 9.2 *Chemical price index vs CPI over the 2017-23 regulatory period (June 2017 = 100)*



Source: Australian Bureau of Statistics (Cat. 6427.0 Producer Price Indexes, Australia, Jun 2022; 6401.0 Consumer Price Index, Australia, June 2022)

SDP has proposed a step change in chemical costs in 2023-24 but given the challenges in forecasting real price escalation for specific chemicals beyond this period, SDP has proposed an end-of-period true-up for the benchmark chemical cost allowance. This is in line with the risk management framework set out in Section 5 of the submission.

As IPART have noted in the context of its Broken Hill Pipeline Draft Report, an end-of-period true-up has merit where there is uncertainty in forecast costs and that movements in these costs are driven by market forces outside of the utilities control.[59] SDP has limited ability to influence chemical prices and the true-up will avoid any windfall gains or losses by calculating and then passing through at the subsequent regulatory period the movement in the benchmark chemical cost allowance due to changes in the benchmark chemical price component.

The chemical usage factor depends on the required dose rate, the flow of water where the chemical is dosed and is based on a combination of three scenarios relating to feed water quality: average, minimum and maximum. The average case has been sourced from 2019-20 actual data (based on typical doses from the plant's completed restart in August 2019 to the end of the full capacity mode in March 2020), whereas the maximum dose rates have been based on increased doses due to poor seawater quality – either actual or estimated, and minimum doses based on doses when the seawater is of exceptionally good quality. The selected weightings also have regard to the fact that in a rapidly changing water quality scenario, as has been the case during recent increased production requests that coincide with high rainfall events and poor inlet seawater quality, the pressing need is to err on side of higher dosage rates to maintain reliability of safe water supply, rather than be incentivised to underdose and risk water quality non-compliances or asset damage.

Table 9.12 provides the breakdown of chemical usage and unit prices in Operational Mode for the 2023-27 regulatory period.

59 IPART, Review of WaterNSW's prices for the Murray River to Broken Hill Pipeline: Draft Technical Report, p.33.

Table 9.12: *Breakdown of chemical volumes and prices ($/ML, $2022-23)*

Chemical	Usage factor (kg/GL)	Chemical unit price ($/tonne)
Sodium hypochlorite	[redacted]	[redacted]
Sulphuric acid	[redacted]	[redacted]
Polymer flocculant (polyDADMAC)	[redacted]	[redacted]
Coagulant (FeCl3)	[redacted]	[redacted]
Sodium Bisulphite	[redacted]	[redacted]
Antiscalant 1	[redacted]	[redacted]
Antiscalant 2	[redacted]	[redacted]
Sodium hydroxide	[redacted]	[redacted]
CO2	[redacted]	[redacted]
Lime	[redacted]	[redacted]
Polymer – lime clarification	[redacted]	[redacted]
Sodium silicate	[redacted]	[redacted]
Fluorosilic Acid (FSA)	[redacted]	[redacted]
Aqueous Ammonia	[redacted]	[redacted]
Citric Acid	[redacted]	[redacted]
NaDDS	[redacted]	[redacted]
Polymer Lameller settlers	[redacted]	[redacted]
Polymer Sludge centrifuges	[redacted]	[redacted]
Hydrochloric acid	[redacted]	[redacted]
Proposed chemical price - $ / ML		[redacted]

Source: Sydney Desalination Plant.

9.2.4.4. Key assumptions

Key assumptions for our forecast chemical costs include:

- Chemical dose rates are based on 75 per cent of average cases, 20 per cent maximum case and 5 per cent Minimum case.
- Average chemical doses:
  - are based on typical doses from the Plant's completed restart in August 2019 to the end of the full capacity mode in March 2020.
  - have been checked against 2010-2012 historical data.
  - include sodium hydroxide dosing for boron removal (required to meet the customer's water quality specification as RO membranes age) with subsequent increased doses for anti-scalant second Pass RO and carbon dioxide.
- Minimum chemical doses:
  - are based on doses applied on the pre-treatment when the seawater quality is exceptionally good.
  - consider reduced dose following a change of drinking water quality target for some downstream chemicals.
  - consider reduced doses which could be optimised after site trials i.e. antiscalant optimisation, polymer optimisation.
- Maximum chemical doses:
  - are based on doses applied on the pre-treatment when the seawater quality is of poor quality but still within the standard operating envelope;
  - consider increased doses following a change of drinking water quality target;
  - consider increased doses following a process upset.
- Proposed chemical costs also include a reasonable margin and overhead [redacted]

SDP has further supporting information for chemical costs available on request.

Other treatment costs

Other variable costs associated with the supply of drinking water consist of:

- Ferric sludge disposal
- Lime sludge disposal
- Cartridge filters

Ferric sludge is generated in the pre-treatment process. Ferric chloride coagulant, polymer flocculant and sulphuric acid for pH adjustment are dosed in the pre-treatment to aid in the seawater filtration process and remove particulate material. The ferric sludge is made up of a combination of the particulate matter filtered from the seawater enmeshed in the chemicals dosed to aid the process. The volume of sludge generated is therefore a function of the inlet water quality, the dosage rates assumed for the different inlet water quality envelopes as above (minimum, average and maximum) and the drinking water production volume required by customers. The ferric sludge is further treated through a wastewater treatment system to increase the solids content and remove water for efficient transport and disposal.

Lime sludge is generated in the post-treatment process. Hydrated lime is mixed with water and then treated to remove any contaminants before the resultant limewater is dosed into the RO permeate with other post-treatment chemicals to produce drinking water. The contaminants are settled out in the lime sludge which is further treated to increase the solids content for efficient transport and disposal. The lime sludge is beneficially reused by third party industry and this disposal saving is passed on to customers in our forecasts. The volume of sludge generated is therefore a function of the drinking water production volume required by customers and is also influenced by membrane age.

Cartridge filters are an important process step to ensure water quality feed to the RO membranes is at the required quality to ensure the RO membranes are not damaged. The cartridge filters are essentially a consumable item and their life and replacement rates are predominately a function of throughput and thus of the drinking water production volume required by customers.

We have undertaken a bottom-up assessment of each other variable cost component to develop 2023-27 regulatory period forecasts, based on experience from the 2017-23 regulatory period. Based on the detailed outlined above, our proposed treatment costs over the 2023-27 regulatory period are as summarised in the table below.

Further information on the calculation of other treatment costs can be provided on request.

Table 9.13: *Forecast treatment cost in the 2023-27 regulatory period ($/ML, $2022-23)*

Other Treatment Cost component	2022-23	2023-24	2024-25	2025-26	2026-27
Chemical costs	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Other treatment costs	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total variable treatment costs	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Our proposal is below the estimates from Emerald Process Engineering, who we commissioned to undertake a bottom-up assessment of prudent and efficient treatment costs for the Plant and full production.

A comparison is shown in **Figure 9.3** below. Note that Emerald process Engineering estimated treatment costs at different levels of production (50 ML/d and 266 Ml/d) which broadly align with minimum and maximum production from the Plant. The report from Emerald Process Engineering is provided in section 9.2.6 of this appendix.

Note: SDP proposed treatment costs is based on a single tariff rather than min or max estimates provided by Emerald Process Engineering

Source: Sydney Desalination Plant, Emerald Process Engineering

Table 9.14: *Forecast treatment costs for 2023-27 regulatory period ($2022-23, $million)*

Step change	2022-23	2023-24	2024-25	2025-26	2026-27	Total
Minimum production (23 GL)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Maximum production (91.25 GL)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Note: Includes 0.3% efficiency factor from 2024-25
Source: Sydney Desalination Plant.

9.2.5. Pipeline O&M

9.2.5.1. Background

Drinking water is transported from the Plant via our Pipeline to Sydney Water's system at Erskineville. Sydney Water then distributes the water, alongside water from other sources of supply, to homes and businesses across the Sydney region. Whilst the Pipeline was undamaged during the Storm Event, the restart of the Plant in 2019 and subsequent period of operations have provided SDP with experience bringing the Pipeline assets back into service following an extended Water Security Mode.

9.2.5.2. Drivers for Pipeline O&M

The key driver for the proposed increase in O&M for the Pipeline in the 2017-23 regulatory period is an increase in RAM. This is based on a revised preventative maintenance program identified, following a detailed condition assessment of the Pipeline which culminated in our 2020 Pipeline Asset Management Plan.

2016 – 2018 Condition Assessment

The Pipeline underwent a complete condition assessment during 2016-2018 including internal examination of the pipework's accessible areas (with exception of botany bay undersea sections). As a result of this assessment a number of recommendations were developed and have been implemented by SDP, these include:

- Periodic maintenance and renewals to Pipeline assets required prior to a Plant restart (implemented by SDP prior to 2019)
- Periodic maintenance and renewals to Pipeline assets not required prior to a Plant restart (completed as capital renewals delivered during the 2017-23 regulatory period).
- Undertake a full pipeline reinspection at the next available opportunity (ideally within five years) to check the extent of cracking and lining debonding in areas where repairs have been undertaken and assess for evidence of pipe corrosion or leakage.
- Further investigations on several valves including optioneering for keeping the air valve pits dry, or water level below the air valve isolation valves.
- Development and implementation of a specific Pipeline Asset Management Plan.

The immediate actions from the condition assessment were implemented by SDP and following the successful restart of the Plant, a strategic review of the Pipeline assets and their associated maintenance strategies was undertaken.

2020 Pipeline Asset Management Plan

SDP has developed its Pipeline Asset Management Plan in line with industry standards, technical expert opinion and benchmarked data on similar assets. Preventative maintenance activities, and their frequency are proposed to increase (in comparison to the 2017 Determination allowances) following our strategic review, key changes including:

- Development of a more rigorous monthly routine preventative maintenance activity (PM) schedule and annual routine PM schedule to inspect all above ground sections of Pipeline.

- Development of an annual inspection PM schedule for concrete and steel supporting elements of the Pipeline.
- Development of a quarterly valve pit dewatering and inspection schedule for both the structures and air valves.
- Targeted inspection of the Botany Bay undersea pipelines within the next five years, thence 10 to 20 yearly, subject to continued satisfactory cathodic protection (CP) performance through ongoing monitoring.

9.2.5.3. Forecasting methodology

We commissioned KBR to undertake a bottom-up assessment of the additional RAM to deliver the recommendations of the 2020 Pipeline Asset Management Plan, to inform this pricing submission and our negotiations with Veolia. We are satisfied that the increase in RAM for the Pipeline is both prudent and efficient. While it appears as a significant percentage uplift, it is coming off a very low base and is modest in comparison to the value and importance of the asset.

9.2.5.4. Proposal

Our forecast O&M for the Pipeline is summarised in the table below.

Table 9.15: *Forecasts of Pipeline O&M costs for the 2023-27 regulatory period ($2022-23, $million)*

Step change		2023-24	2024-25	2025-26	2026-27	Total
Pipeline O&M costs	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Percentage change		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Source: Sydney Desalination Plant.

9.3 Expert Report: Efficient variable O&M costs (Emerald Process Engineering)

This report is attached separately.

9.4 Expert Report: Efficient fixed O&M costs (KBR)

This report is attached separately.

9.5 Further detail on forecast energy volumes

9.5.1. Background

There are several drivers for the volume of energy used by the Plant when it is operating. These include factors that our Operator, Veolia, cannot control, such as seawater temperature and salinity, as well as those they can influence, including RO membrane performance optimisation and chemical usage.

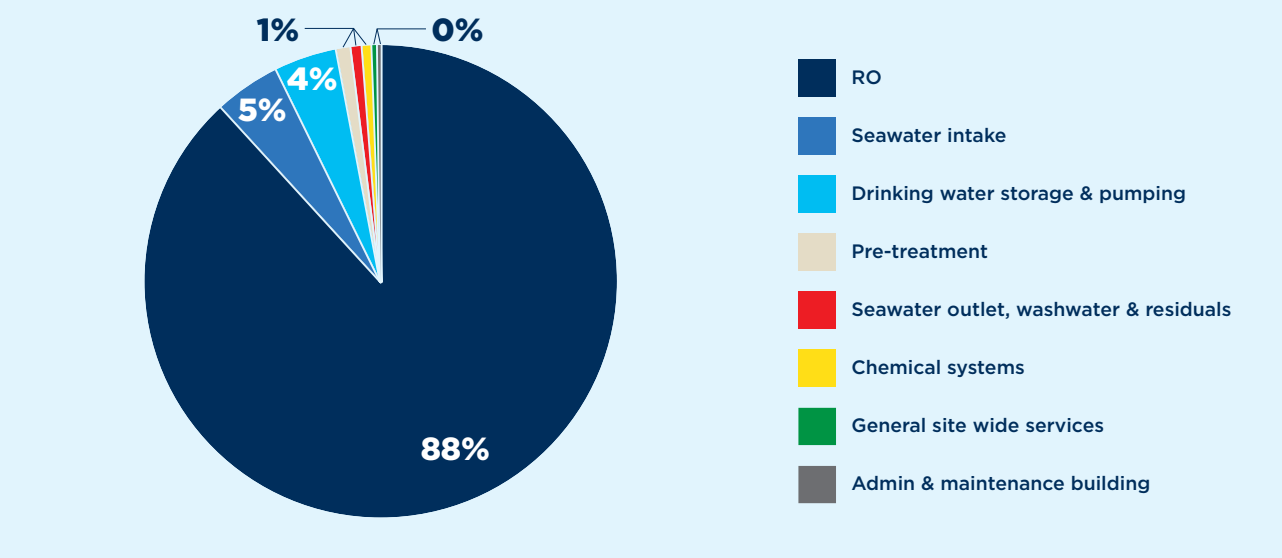
Energy consumption is most efficient when the Plant is operating at 100% production capacity and with optimal RO membrane replacement to maintain an optimal average RO membrane age. Our Operator manages the trade-off between membrane replacement, energy efficiency and membrane cleaning costs to ensure efficient production costs under appropriate incentives in the O&M Contract.

The age of our RO membranes is a key driver of electricity consumption when the Plant is operating. Electricity consumption increases as the average age of membranes increase. This is due to a number

of factors including irreversible fouling on the RO membranes which increases the pressure (and energy consumption) required to drive the process, and lower salt rejection requiring a higher proportion of water to be processed through a second RO membrane process thereby consuming additional energy. In addition, energy usage may be affected by process upsets, routine maintenance or rotation of operating trains that require RO membranes to be flushed with permeate. RO membrane flushing is an energy intensive activity (as it requires permeate), however any water used or produced through this process cannot be supplied as drinking water and must instead be returned to the ocean. Energy consumption is also materially affected by seawater temperature and salinity which can be highly variable day to day or season to season and is outside the control of SDP and our Operator.

A breakdown of energy usage by different areas of the Plant is provided in **Figure 9.4** below. This shows the RO membrane process consumes the greatest volume of energy, around 88% of the Plant's energy use.

Figure 9.4: *Approximate usage of energy by different areas of the Plant*



Note: SDP proposal is based on a single tariff rather than min or max estimates provided by Emerald Process Engineering

Source: Emerald Process Engineering

In the 2017 Determination, IPART set a variable energy volume benchmark of 3.516 MWh/ML in Plant Operation Mode. This was based on operating data available at the time – 2010 to 2012, with a brand-new Plant, recently commissioned, operating at full capacity and with new RO membranes. It does not take into account RO membrane aging, operation at 'low flow' or the impact of our new Network Operator Licence which may see production volumes varying appreciably over a year regardless of sub-optimal inlet seawater quality (particulate load, temperature or salinity).

Over the 2017-23 regulatory period when the Plant was operating, we averaged approximately 3.47 MWh/ML. The key factors that led to outperformance of IPART's energy volume benchmark include:

- The Plant operating on a full set of new RO membranes from the 2019 Restart – this meant that the average age of membranes while SDP was operating was considerably lower than the average RO membrane life in the RO membrane performance warranties to meet the Plant's design requirements for water quality and quantity
- exceptional seawater quality over the period (aside from brief periods where high rainfall had a deleterious effect on seawater particulate load) and minimal changes in temperature range, which led to best-case conditions for energy efficiency
- SDP exceeding its production volume requirements thereby gaining efficiencies
- SDP managing the treatment process to a high standard, and
- SDP maintaining its asset performance, assisted by the reinstatement and restart process where assets were renewed before operational commitments.

These factors combined to make ideal conditions for energy efficiency during the 2017-23 regulatory period and we consider that IPART's energy volume benchmark was broadly appropriate. However, with older

average RO membrane ages and other factors like seawater quality outside SDP's control means that this level of performance is not sustainable in the medium to long-term.

9.5.2. Assessment

9.5.2.1. Variable energy

As noted above, we consider that IPART's variable energy benchmark in the 2017 Determination was appropriate given a new set of RO membranes. However, this benchmark is not a realistic reflection of expected electricity consumption in the 2023-27 regulatory period. The key reasons are discussed below.

RO membrane ageing

The effects of RO membrane aging on the cost of water in desalination processes are well known and are often the primary consideration for RO membrane replacements. Good operating practice assesses the total cost of water by looking at the cost of membrane replacement versus the projected cost of energy as membranes age over time. Targeting and maintaining an optimal average membrane age also allows us to deliver to customer expectations which are difficult to value, but which are equally if not more important than cost – namely meeting health and aesthetic water quality requirements, output volumes and managing supply chain risk. This ensures that we can provide the plant availability and reliability of water supply that our customer needs over the long-term.

By doing this, an Average Membrane Life (AML) is established in the design process and a membrane replacement strategy is devised, feeding into the design of the Plant to ensure optimal cost of water over the life of the plant, and ensuring we can fulfill our primary service of reliably delivering drinking water to meet customer needs.

The AML is a significant figure with regard to process design and operation and maintenance costs. It is determined by performing membrane projections using the membrane supplier's proprietary software to predict RO membrane feed pressures under all conditions (namely min/max temperature, min/max salinity, new/old membranes).

This type of membrane replacement strategy aims to minimise the total operating cost by minimising energy consumption. At some point in time, the cost to replace RO membrane elements is offset by the energy savings. This practice also has secondary benefits such as:

- spreading membrane replacement costs over a period of multiple years
- maintaining a constant treated water quality
- maintaining a constant RO membrane feed pressure and hence energy consumption year to year, to provide consistent operation and operational costs
- manage volatility and supply constraints in the global RO membrane market as increased lead time and availability of RO membranes presents a risk to the long term availability of the Plant

To consistently achieve the treated water quality and capacity at the lowest cost, the design of the Sydney Desalination Plant was based on an AML of:

- 3.5 years for the 1st pass membranes
- 5 years for the 2nd pass membranes

In 2018, as part of Plant Restart, new membranes were installed. [redacted] and the corresponding projections were changed to be based on an AML of:

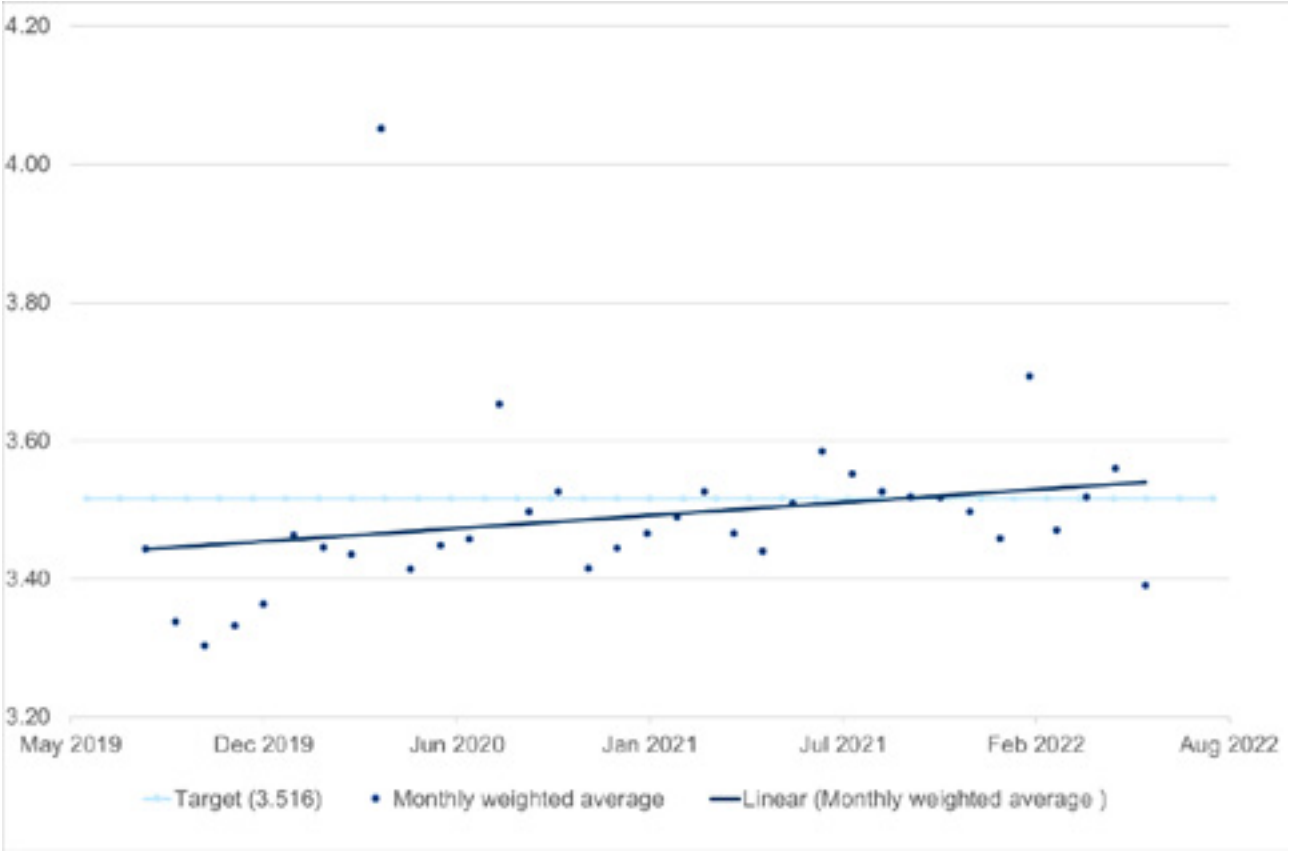
- 4 years for the 1st pass membranes
- 6 years for the 2nd pass membranes

This presents a significant saving to the customer, as the increase in AML means that fewer membrane replacements are required over the life of the plant, resulting in a substantial reduction in membrane procurement and installation costs.

Since the 2019 Restart, variable energy consumption has been trending upward as expected at approximately 1% per annum, but at a lower than manufacturer projected rate.. This is shown in **Figure 9.5** below, with variable energy consumption (monthly weighted-average) trending upward as shown by the linear trend line. As discussed further below and in our expert report by Emerald Process Engineering

attached at appendix 9.7, this trend relates to the Plant operating on an older set of RO membranes. Our energy performance is also affected by our level of production, with the Plant more energy efficient when operating at higher production.

Figure 9.5: *Variable energy consumption in the 2017-23 regulatory period (MWh/ML)*



Source: Sydney Desalination Plant

To allow for both the age of the membranes and the variability of feed conditions, the original O&M Contract included an algorithm to calculate variable energy based on membrane age. This algorithm was however limited to an AML of 3.5 years. As such, the membrane supplier's proprietary software has been used to extrapolate the expected rise in variable energy over a 5-year period. The predicted year-on-year rise increase is outlined below.

Table 9.16: *O&M contract variable energy increases by AML*

AML	0	1	2	3	4	5	>5
% increase in variable energy consumption	-	1.5%	1.5%	2.3%	0.35%	0.35%	0%

Source: Sydney Desalination Plant

For the 2023-27 regulatory period, it is assumed that:

- variable energy use will rise year-on-year, until the AML is reached, as demonstrated above
- membrane replacement will occur to maintain the production and water quality requirements of the Plant
- AML will need to be managed so that energy consumption is managed in a prudent and efficient manner to provide the most efficient cost of water to the customer

Membrane replacement will inevitably be required to maintain the production and treated water quality targets of the Plant, however the decision to replace membranes must be made such that it manages the financial **and** production and water quality risks to the Plant.

For the 2023-27 regulatory period, our forecast energy consumption is based on our proposed membrane replacement program. This program, standard for desalination plants in Australia, is designed to maintain the average age of membranes at 4 years for first pass membranes and 6 years for second pass membranes.

Our proposed variable energy benchmark energy was determined by:

- Forecasting unadjusted benchmark allowances for the 2023 –2027 Regulatory Period based on the 2017 Determination benchmark of 3.516 increased year on year in line with membrane projection data until steady state membrane age is assumed from the 2026 financial year.
- An adjustment to the benchmark to apply a delay in the onset and reduction in the rate of the benchmark projected increases to reflect actual historical data (i.e., observed efficiency in operation providing a discount of approximately 1.5% in the early years of RP3)

Year-on-year increases in this adjusted and reduced benchmark scenario

An increase to energy allowances from 2025/26 to align with long-term projections as membranes age and meet theoretical steady state AML. This provides an efficient outcome allowing SDP to manage the risk of AML uncertain effect on energy consumption with the aim of minimising capital cost for membrane replacements.

SDP's proposed variable energy benchmark during Operational Mode is set out in **Table 9.17**. These benchmarks are consistent with and are fundamentally reliant on SDP's proposed membrane replacement program for the 2023-27 regulatory period, discussed in Chapter 11 and Appendix 11.

Table 9.17: *Forecast variable energy benchmark in operational mode (MWh/ML)*

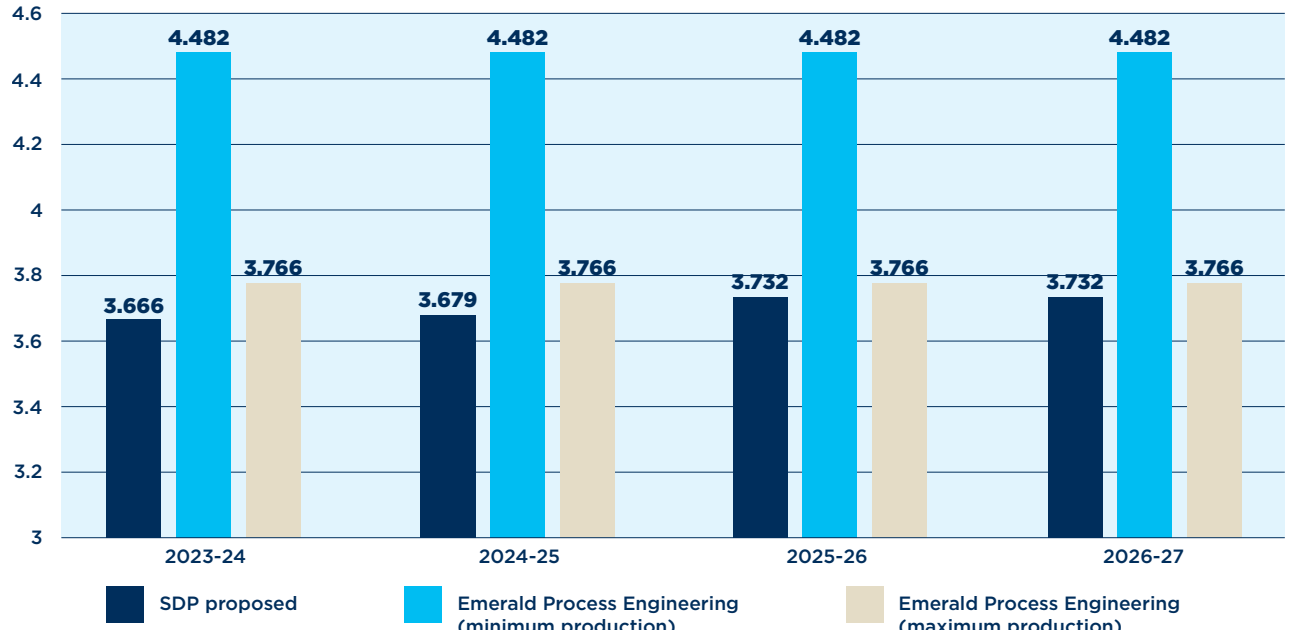
	2017 Determination allowance	2023-24	2024-25	2025-26	2026-27
Variable energy volume	3.516	3.666	3.679	3.732	3.732
% change		4.27%	0.35%	1.44%	0%

Source: Sydney Desalination Plant

We consider that our variable energy benchmarks are efficient given they:

- are based on our membrane replacement program which provides value for money on a whole of life basis and will be subject to ex-post review in light of the membrane replacement and energy cost trade-off and the need to meet our service standards
- are below the original design parameters for the Plant, and
- are below bottom-up minimum and maximum production estimates we commissioned from Emerald Process Engineering (see **Figure 9.6** below) Note the Emerald fixed energy is significantly higher than proposed by SDP, and overall the SDP proposal is more efficient.

Figure 9.6: *Proposed variable energy benchmarks vs Emerald Process Engineering estimates (MWh/ML)*



Note: SDP proposal is based on a single tariff rather than min or max estimates provided by Emerald Process Engineering

Source: Sydney Desalination Plant, Emerald Process Engineering

9.5.2.2. Fixed energy

The current fixed energy allowance during operation is 21 MWh/d (7,665 MWh/a). This energy is essentially the "base load" power when equipment associated with water production is not operational and can be observed during Plant shutdowns. Our forecast fixed energy requirements in the 2023-27 regulatory period comprise:

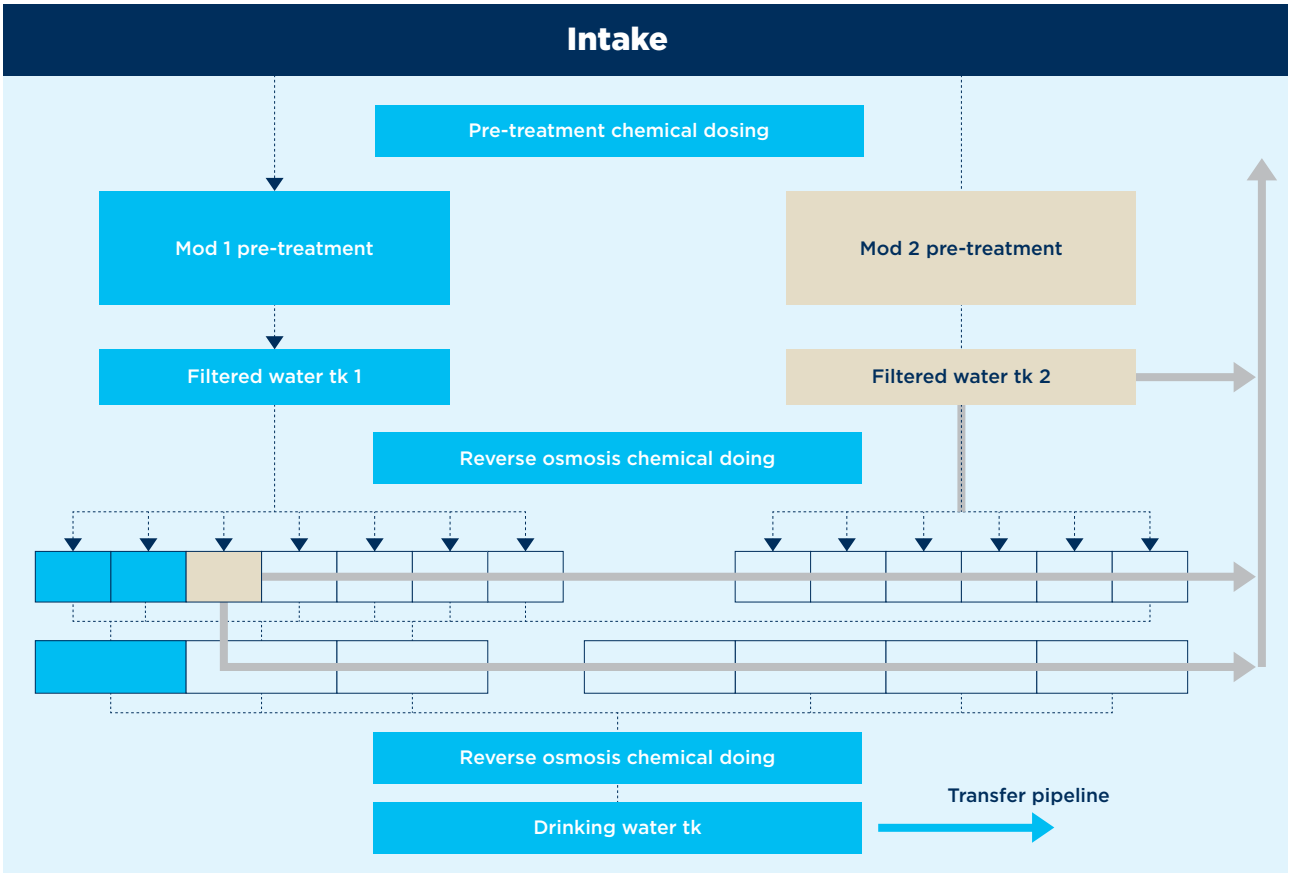
- Our baseline energy needs not associated with producing water from the 2017-23 regulatory period (includes heating, ventilation and air conditioning (HVAC), administration building, workshop and warehouse power, general site power and lighting, transformer and power supply equipment losses, equipment base load etc) – 7,665 MWh/a, plus
- An additional ~ 5,000 MWh/a (13.85 MWh/d) associated with keeping the Plant highly available to respond to water production requests from Sydney Water under SDP's Network Operator's Licence (i.e. energy not associated with water produced and sold to Sydney Water), including energy associated with:
  - RO flushing – as per membrane manufacturer manuals, the RO membranes must be flushed every 48 hours with low salinity water when not operational to prevent the build-up of foulants on the membrane surface. The alternative is to maintain the membranes in preservative solution however this is not conducive to timely ramp-up of production as required under our operating licence. In addition, good operating practice dictates that all stainless-steel components within an RO train (RO feed pumps, Energy Recovery Devices, pipework and instrumentation lines) should be flushed out of high salinity or stagnant sea water regularly to maintain the asset in optimal condition and reduce costly and unsafe high-pressure leaks and failures. When operating at full production, the RO system design redundancy is one 1st pass and one 2nd[60] of 11 1st pass RO trains and 6 2nd pass trains, which require flushing every 48 hours. This amounts to a substantial increase in the requirement of RO permeate required. As the energy associated with generating RO permeate is significant, this is the most significant contributor to the inefficiency of operation during High Availability. The concept of periodically running an additional first pass RO train is shown pictorially in **Figure 9.7**. Note that this also leads to an increase in chemical consumption
  - additional flows of sea water to the outfall to meet environmental protection licence (EPL) requirements – one critical aspect of this licence is ensuring that any concentrated sea water

60 Based on minimum operation of 50ML/d production

being discharged to the environment is disposed of in such a manner that it diffuses quickly and efficiently so as to pose minimal risk to the environment in the immediate vicinity of the discharge point. At low production the plant would normally physically install a different ocean outfall diffuser configuration (using divers), but this is not conducive to timely ramp-up of production as required under our operating licence. Instead, more water is bypassed to the outfall to meet the EPL through operating the second pre-treatment module. The concept of running this additional module is show pictorially in the Box below. Note that this also leads to an increase in chemical consumption.

- additional diversions to the outfall in the events of unexpected trips – this additional diversion is not accounted for and, although infrequent, at low flows can contribute to significant variable energy increases on a given day as it is a more significant portion of the daily production volume
- duty asset rotation, maintenance – during operation at low flow, equipment duty rotation contributes to an otherwise unaccounted for rise in variable energy. The key contributors to a rise as a result of duty rotation are the pre-treatment and RO systems, as well as rotation of the two modules.

Figure 9.7: *Basic plant process schematic – showing normal treatment processes (blue) and additional processes (green) required under new operating licence conditions*



9.5.3. Proposal

Our proposed total energy volumes are set out in **Table 9.18**. Our proposed energy volumes for the 2023-27 regulatory period are compared to the approved benchmarks in the 2017 Determination.

Table 9.18: *Proposed energy benchmark volumes for the 2023-27 regulatory period – Operational Mode (MWh)*

	2017 Determination	2023-24	2024-25	2025-26	2026-27

Fixed (baseline)	7,665	7,665	7,665	7,665	7,665
Fixed (additional fixed energy to enable SDP to respond to production requests as per Network Operator's License)		4,985	4,981	5,053	5,053
Fixed – Total	**7,665**	**12,650**	**12,646**	**12,718**	**12,718**
Variable (maximum production)	320,835	335,439	335,709	340,545	340,545
Total	**328,500**	**348,089**	**348,355**	**353,263**	**353,263**

Source: Sydney Desalination Plant

9.6 Expert Report: RO membrane age impacts (Emerald Process Engineering)

This report is attached separately.

9.7 Legal advice on SDP Greenhouse Gas Reduction Plan (JK Kirk SC)

This advice is attached separately.

9.8 Expert Report: Efficiency of long-term contracts (Frontier Economics)

This report is attached separately.

9.9 Expert Report: National Electricity Market analysis – In support of SDP's third regulatory period submission to IPART (ACIL Allen)

This report is attached separately.

9.10 Expert Report: Early termination (Energetics)

This report is attached separately.

9.11 Further detail on forecast corporate costs

A breakdown of our corporate costs forecasts is provided in the table below. The follow sections set out further details on the change in the efficient levels of these costs over the 2023-27 regulatory period.

Table 9.19: *Forecast corporate costs, ($2022-23, $million)*

	Base year	2023-24	2024-25	2025-26	2026-27	Total
Remuneration costs	4.13	4.62	4.93	5.00	4.99	19.53

Professional fees	2.81	3.55	2.38	4.28	3.83	14.04
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Sustainability	-	0.19	0.33	0.33	0.46	1.30
Land tax and council rates	1.25	1.57	1.71	1.84	1.98	7.10
Premises	0.02	0.26	0.25	0.25	0.25	1.02
Other	0.42	0.57	0.57	0.57	0.57	2.28
Total corporate	**8.63**	**11.53**	**10.79**	**13.08**	**12.68**	**48.09**
Percentage change		**33.6%**	**-6.4%**	**21.2%**	**-3.1%**	**46.9%**

*Note: *Base year costs for Professional fees and Other are based on an average of actual costs during 2017-18 to 2021-22.*

Source: Sydney Desalination Plant.

9.11.1. Remuneration costs

SDP's remuneration costs cover all payments made to SDP's Board of Directors, management team and other employees. Over the 2017-23 regulatory period, SDP employed an average of 9 FTEs (in addition to the Board) with a total of 11 FTEs at the end of 2021-22. The key changes in these costs that we expect over the 2023-27 regulatory period compared to the Base year are:

- Increased focus on operations, sustainability and risk. This is due to the increase in operational readiness of the Plant based on the requirements of our new Network Operator Licence's. We have identified two additional FTE roles that are needed to efficiently manage the operation of the Plant – an Operations and Sustainability Coordinator and Risk Management Manager. Further information on the roles and responsibilities for these roles is set out in **Table 9.20**. On average, increases in staffing levels between RP2 and RP3 comprise around half of our increase in remuneration costs.
- Increases to our labour costs in 2023-24 and 2025-26 will be needed to maintain the competitiveness of our remuneration. These increases account for the experience and expertise of our personnel and the specialist nature of the skills required. The pressures of maintaining a small, high performing team in a tight labour market means we must provide competitive, market-based remuneration to recruit and retain knowledge in our business. We engaged Aon to undertake an independent salary cost benchmarking exercise on the levels of remuneration needed to progress towards the 50th percentile of comparable roles and have reflected working towards these levels over the regulatory period in our forecasts.
- Increases in the superannuation guarantee of 0.5% per annum based on the statutory increase.

***Table 9.20:** Corporate costs – proposed additional FTEs*

New role	Driver(s)	Summary of duties
Risk Management manager	Improved risk management	• Designing and implementing an overall risk management process for the organisation, which includes an analysis of the financial impact on the company when risks occur • Performing periodic, ongoing corporate risk assessment: Analysing current risks and identifying potential risks that are affecting the company, maintaining the corporate risk register • Identifying specific projects within the business (e.g. regulatory submission, financing) that require bespoke risk assessments, and registers – facilitating risk assessment and ongoing management, • Performing a risk evaluation: Evaluating the company's previous handling of risks, and comparing potential risks with criteria set out by the company such as costs and legal requirements • Championing the mitigation actions identified through the risk assessment process and assisting the action owners in investigating, progressing or closing out the actions. • Establishing the level of risk the company are willing to take through Board approved Risk Appetite Statements • Preparing risk management and insurance budgets • Risk reporting tailored to the relevant audience. (Educating the Board of Directors about the most significant risks to the business; ensuring business heads understand the risks that might affect their departments; ensuring individuals understand their own accountability for individual risks)
Operations and Sustainability Coordinator	Improved operational management and environment, social and governance oversight	• Assist in the oversight and management of SDP's assets and lead the environmental, sustainability and governance (ESG) initiatives of SDP. • Assist in the oversight and management of SDP's assets and O&M contractor to ensure the delivery of the operations strategy in collaboration with the General Manager Operations. Managing short/ medium and long-term risks aligned with SDP's shareholder requirements, corporate values, contractual requirements and regulatory outcomes. • Lead the management of the existing ESG related activities as well as the identification, development and implementation of future opportunities and initiatives as required to meet SDP's company objectives.

9.11.2. Professional fees

SDP obtains additional professional expertise in a range of different areas. This allows us to minimise fixed costs of permanent staff while still obtaining necessary expertise for the management of the business. It allows for flexibility in project-based expertise, which can vary year-on-year in line with business needs. The types of professional fees that we incur, the activities that they cover, and the range of expenditure incurred during the 2017-18 to 2021-22 period include the following, as summarised in **Table 9.21** below.

Table 9.21: *Professional fees*

Type of professional fees	Activities	Range of annual expenditure 2017-18 to 2021-22 ($million, nominal)
Tax fees	Tax returns, distribution statements, shareholder loan agreements, review of tax governance framework, stapled guidelines review, Fringe Benefits Tax (FBT) return, review of board papers and attendance at board meetings as required.	0.22 – 0.3
Auditing fees	Internal and external auditing of financial statements and corporate activities.	0.1 – 0.28
Accounting support fees	Annual ongoing support to assist with financial analysis and other accounting activities.	0.09 – 0.10
Regulatory support fees	Ongoing regulatory support as well as additional support for preparing pricing submissions and submissions to other IPART reviews (such as WACC). SDP does not employee an ongoing regulation team and so incurs higher costs in years where it is required to prepare pricing proposals or respond to other regulatory reviews.	0.11 – 1.65
Plant-related and pipeline related fees	Technical, legal and other activities to efficiently manage the operation of the plant and pipeline. While Veolia is responsible for the operation of the plant, it is important that they are held to account and in more complex cases, that we do our own due diligence on proposed solutions to ensure they are prudent and efficient, safe and best for customer. This is particularly important as the plant ages and capital expenditure increases to a steady state.	0.08 – 0.66
Legal fees	Legal fees for covering Company Secretarial, Board matters, ad hoc advice and legal matters relating to SDP's financiers.	0.07 – 0.32
Other professional fees	Fees for a range of other professional services including recruitment, strategic communication, treasury management, financial modelling and agency fees.	0.56 – 1.16

Table 9.21 shows that there has been considerable fluctuation in professional fees in recent years. Given this fluctuation, no one year of expenditure provides a reasonable base year for forecasting ongoing costs. We have therefore used an average of costs over the period 2017-18 to 2021-22 as the base year for forecasting and for comparing costs in the 2023-27 regulatory period. We then applied a year-on-year method to

forecast costs. This method takes into accounting the expected cyclical fluctuation in these costs in future years.

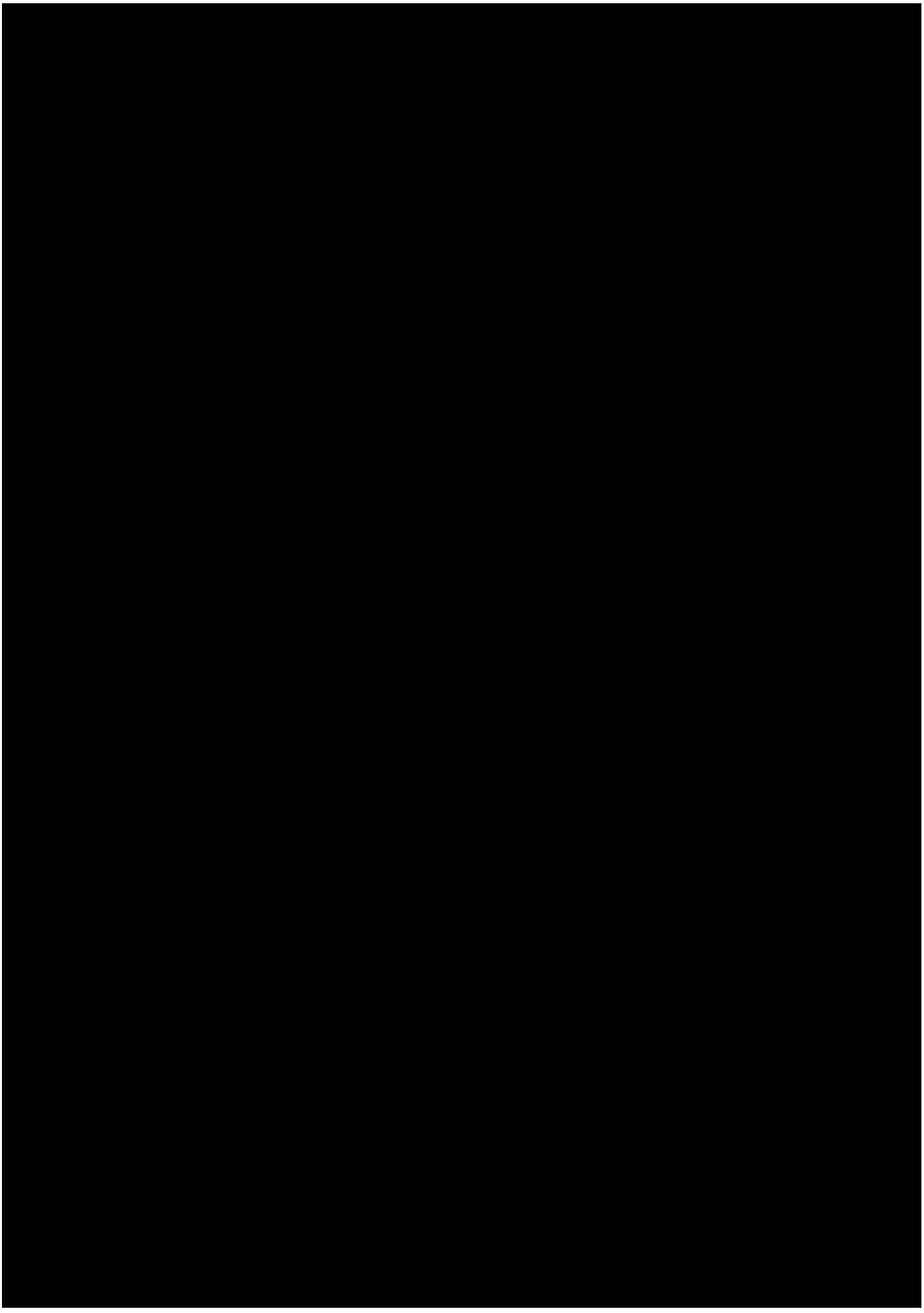
We consider that an increase in professional fees is efficient taking into account the following:

- IPART's previous allowance did not factor in the increase in scope and complexity associated with SDP's operations over RP2 including:
  - Switching on in response to drought
  - Responding to 15+ ERNs
  - Addressing changes following complexities of operating under the Network Operator's Licence

Increases in scope and complexity of our operations directly impact on our demand for professional services.

- IPART's previous allowance did not provide sufficient budget for regulatory submission preparation. Its most recent Draft Decision for the Broken Hill Pipeline, IPART's expenditure consultant (AECOM) suggested that 1% of annual revenue is reasonable. Our actuals costs to date to and forecasts cost are consistent with this benchmark.

[redacted]



[CONFIDENTIAL]

9.11.4. Land tax and council rates

SDP's land tax and council rates are set by the NSW Government and Sutherland Shire Council based on the underlying land value determined by the NSW Valuer General. Over the last five years, the underlying land valuation for SDP's plant has increased from $37.1 million in 2017-18 to $60.6 million in 2021-22. This change in land valuation has had a material impact on SDP's land tax and council rates. For example, SDP's land tax has increased from $0.68 million in 2017-18 to $0.97 million in 2021-22.

[redacted] there is considerable uncertainty over the valuation that would impact on SDP's land tax and council rates. Given this uncertainty, we are also proposing an end-of-period true-up of movements in land tax. See section 7 for further information.

9.11.5. Premises

Premises costs cover the lease charges for our corporate head office. Our forecasts costs are constant in real terms.

9.11.6. Other corporate costs

Other corporate costs cover a range of activities including office communication, IT, travel and accommodation and other minor expenses such as stakeholder engagement. Other costs are like professional fees in that no one year of expenditure provides a reasonable base year for forecasting ongoing costs. We have therefore used an average of costs over the period 2017-18 to 2021-22 as the base year for forecasting and for comparing costs in the 2023-27 regulatory period.

Prior to the COVID-19 pandemic, travel and accommodation costs accounted for up to half of our Other corporate costs (with the remainder predominantly training, development and professional accreditation). From 2022-23 we expect our travel and accommodation costs to return to pre-pandemic levels. We consider that this reflects an ongoing efficient level of expenditure.

9.12 [redacted]

This report is attached separately.

9.13 [redacted]

This report is attached separately.

9.14 [redacted]

This report is attached separately.

9.15 Forecast insurance costs - CONFIDENTIAL

A breakdown of our insurance costs forecasts and overview of the proposed policies for the 2023-27 regulatory period are provided in the tables below. The following sections set out further details on the change in the efficient levels of these costs for the 2023-27 regulatory period.

Table 9.22: *Forecast insurance costs, ($2022-23, $million)*

	Base year	2023-24	2024-25	2025-26	2026-27	Total
[redacted]						
[redacted]						
[redacted]						
[redacted]						
[redacted]						
Total	**4.97**	**4.86**	**5.48**	**5.90**	**6.12**	**22.35**
Percentage change		**-2.2%**	**12.7%**	**7.6%**	**3.7%**	**23.1%**

Table 9.23: *Overview of SDP's insurance policies (2022-23)*

Policy	Overview
Industrial Special Risks (ISR) including Business Interruption (BI)	ISR insurance provides coverage for damage to physical assets and a range of scenarios in which SDP suffers material losses. Insured assets largely include the desalination plant, the pipeline and any specific assets declared under the policy. It also includes BI coverage that relates to the financial impact that flows from material damage to an asset. This may include assets which are owned by or are the responsibility of SDP, or relied upon by SDP to achieve its financial objectives (e.g. supplier assets or facilities).
Combined (Products & Public) Liability	Combined Liability insurance provides SDP with coverage for third party personal injury, third party property damage and third-party financial loss.

Policy	Overview
Professional Indemnity	Professional Indemnity insurance provides coverage for loss for which SDP is legally liable as the result of an act, error, or omission in the provision of its professional services. An underlying principle of the need for this insurance, is that failure to perform professional services or duties may cause a third-party financial harm.
Environmental Liability	Environmental Liability insurance provides SDP with coverage designed to address the various financial losses that can occur from a pollution or contamination incident. These losses include: • Compensation to third parties for injury and property damage • Clean-up expenditure including third party claims and statutory clean-up notices • Civil fines and penalties • Legal defence expenditure • Natural resource damages • Emergency response expenditure
Workers Compensation	Worker Compensation insurance provides coverage for payments to employees if they are injured at work or become sick due to their work. Costs for Workers Compensation insurance are included in our Remuneration costs discussed in section 9.11.19.12.1.
Directors' and Officers' Liability	Directors' and Officers' Liability insurance provides coverage to SDP's directors and executives for personal liability and financial loss protection from wrongful acts committed or allegedly committed in their capacity as corporate officers.
Corporate Travel	Corporate Travel insurance provides coverage to SDP's employees when travelling.
[redacted]	[redacted]
[redacted]	[redacted]

SDP also relies on a range of insurance policies purchased by Veolia. The efficient costs for these policies are included in our O&M forecasts for the 2023-27 regulatory period outlined in section 9.2.

Our forecast insurance costs have been developed using an approach that ensures these costs are consistent with those that would be incurred by a prudent service provider acting efficiently in overseeing

and monitoring the operation and maintenance of the Plant and to meet our obligations under our Network Operators Licence.

9.15.1. Our approach ensures insurance costs are efficient and meet licence requirements

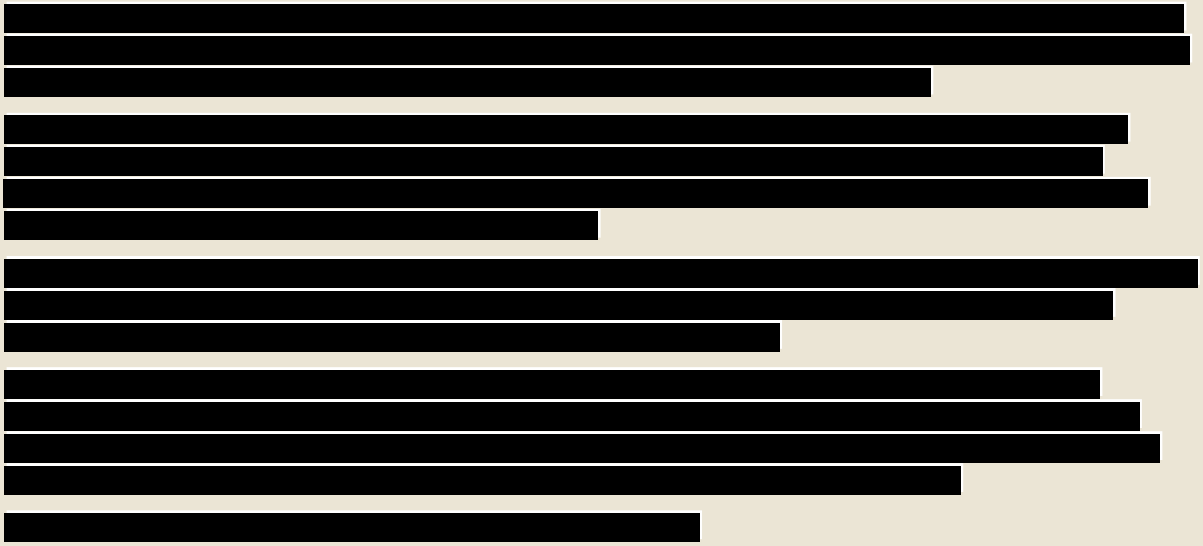
SDP obtains and maintains appropriate insurance arrangements using an approach that addresses all aspects of IPART's Insurance Guide for WICA Licence Applicants and Licensees (see **Box 10**) and ensures that our customer only pays for the efficient costs of these arrangements. There are two key steps in this approach:

- Deciding on the efficient level of coverage. This involves determining the types of insurance and appropriate limits needed. We do this by applying the holistic risk management framework set out in Chapter 5. As part of this, our insurance broker, Aon, undertakes periodic reviews of SDP's insurable risks and recommends the types of insurance and appropriate limits that can be used to manage those risks. In addition, we consider the size of the financial penalties and rewards under the current abatement mechanism set out in the 2017 Determination and our proposed Service Level Incentive Scheme (SLIS) and how these impact on the types and level of cover we need.
- Obtaining insurance coverage at an efficient cost. This involves our insurance broker Aon negotiating policies that reflect the efficient cost of the necessary coverage. Aon has extensive knowledge of insurance markets including the policies available, current market conditions and the capacity of Australian and overseas insurers. This allowed us to ensure that our insurance costs over the 2017-23 regulatory period were efficient. Aon also advised on the likely market conditions that will apply in the 2023-27 regulatory period and the impacts of these conditions on our forecast insurance costs.

Box 10: WICA Guidelines on appropriate insurance arrangements and [redacted] risk profiling and gap analysis

The Guidelines state that to make appropriate insurance arrangements, a licence applicant and Licencee should:

- Clearly identify the business activities proposed to be, or being, undertaken
- Identify and analyse the key risks arising from the business activities
- Consider what types of insurance policies will cover the business activities and associated risks, and what activities or risks are uninsurable or will remain uninsured
- Consider what insurance limits and terms are appropriate for the size and nature of the business activities and associated risks, and
- Obtain insurance from an appropriate insurer that is appropriate for the size and nature of the business activities and associated risks.



9.15.2. Our base year expenditure in 2022-23 is efficient

Insurance costs are known in advance at the beginning of each financial year. This means that 2022-23 is the most recent year over which we have confidence in the accuracy and efficiency of these costs and is an appropriate Base Year for forecasting efficient insurance costs.

Our actual insurance expenditure in each year of the 2017-23 regulatory period is provided below. It is compared to IPART's 2017 Determination allowance calculated on a pro-rata basis, based on the volume of water produced.

Table 9.24: *Comparison of actual and allowed insurance costs in the 2017-23 regulatory period ($nominal, $millions)*

	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Expenditure Allowance	2.29	2.53	2.77	2.79	2.96	3.09	16.44
Actual/Forecast	2.06	2.50	3.13	3.6	4.1	4.97	20.35

Variance $	-0.24	-0.03	0.37	0.79	1.16	1.87	3.92
Variance %	-10.4%	-1.3%	13.2%	28.5%	39.1%	60.6%	23.8%

Source: Sydney Desalination Plant

During this period, we had an overspend of $3.9m ($nominal) which is 23.8% higher than IPART's allowance. However, we consider that the insurance costs in our base year of 2022-23 are efficient. This is because we have used the approach outlined above to obtain and maintain appropriate and efficient insurance arrangements. There are four main reasons why efficient insurance costs have varied from IPART's allowances over the 2017-23 regulatory period:

- An increase in premiums has occurred across all global insurance markets which resulted in insurance costs rising substantially from 2020-21 onwards. As noted above, our insurance broker Aon has market tested our premium rates annually to ensure they continue to reflect efficient costs. However, our insurance costs have increased by an average of 17% pa between 2017-18 and 2022-23 as insurance markets have hardened. Further information on the impacts of hardening insurance markets is contained in Appendix 9.17.
- [redacted]
- Different levels of Business Interruption (BI) insurance coverage were needed to appropriately manage the risk of abatement. We considered that BI insurance is needed to provide coverage for 48 months of the Plant being unable to operate rather than 36 months provided for under IPART's allowance in the 2017-23 regulatory period. This decision was based on our experience following the December 2015 Storm Event. After the Storm Event, we required approximately 34 months to repair the damage and return the Plant to a pre-Storm Event condition. [redacted]. Any larger, catastrophic event would take longer than 36 months to repair the Plant. Our view is that it was prudent to obtain coverage for 48 months over the period 2017-18 to 2020-21 to manage this risk.
- A lower limit for our Professional Indemnity insurance is efficient. Aon also identified that a lower limit for our Professional Indemnity insurance is efficient. We subsequently reduced our limit from $50m to $10m, reducing base premiums by around $0.1m per year.

9.15.3. Step changes in insurance costs depend on the service level penalties that apply

IPART's abatement mechanism directly impacts the size of the insurance limits in our Industrial Special Risks (ISR) [redacted] BI component.[64] For example, during the 2017-23 regulatory period, abatement applied for the time we were in full operational mode January 2019 to March 2020. In other periods, we were in Water Security Mode, so no abatement applied. Also, during the

63 CONFIDENTIAL – TO BE REDACTED:

64 IPART's abatement mechanism also impacts on Veolia's Professional Indemnity insurance which is recovered through our O&M costs.

emergency response period no abatement applied as the duration of the ERN duration was less than 8 months at a time.

We considered two packages of insurance that have different levels of coverage for BI insurance [redacted]

Package 1

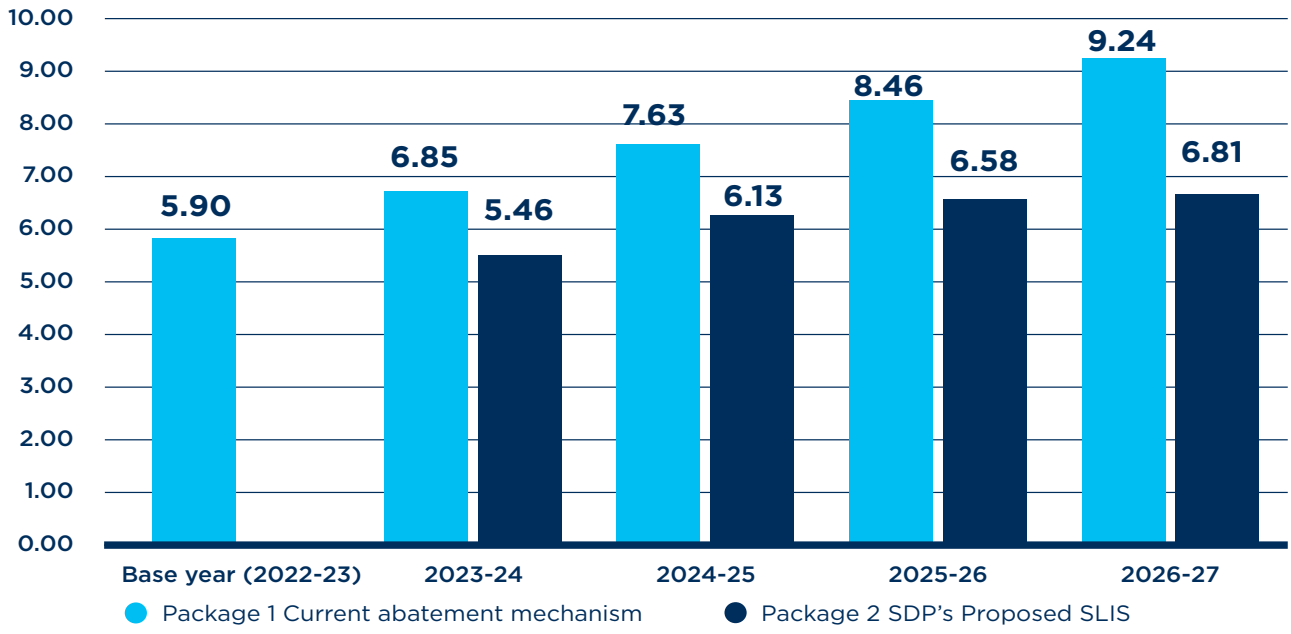
- Current abatement mechanism: This mechanism does not cap the financial penalties. This requires SDP and Veolia to maintain higher levels of BI insurance to manage the risk of financial penalties impacting SDP's revenue over the 2023-27 regulatory period. For example:
  - [redacted]
  - [redacted]
  - [redacted]

Package 2

- SDP's proposed SLIS: The proposed SLIS places a combined cap on financial rewards/penalties across the SLIS and Efficiency Carryover Mechanism (ECM). Financial penalties would apply to insured events (as well as uninsured events within SDP's reasonable control) up to a cap equivalent to +/-2.5% of annual fixed Plant service charges. The proposed SLIS also seeks to exclude uninsured events where SDP's ability to comply with the APR is prevented wholly or predominantly by an event outside its reasonable control (as per SDP's Network Operator's Licence). This would allow SDP and Veolia us to reduce the insurance limits associated with BI. For example:
  - [redacted]
  - [redacted]
  - [redacted]

The figure below compares our forecast efficient insurance costs under the two packages (including Veolia's PI insurance).

Figure 9.7: *Insurance costs under existing and proposed SLIS ($M, real 2022-23)*

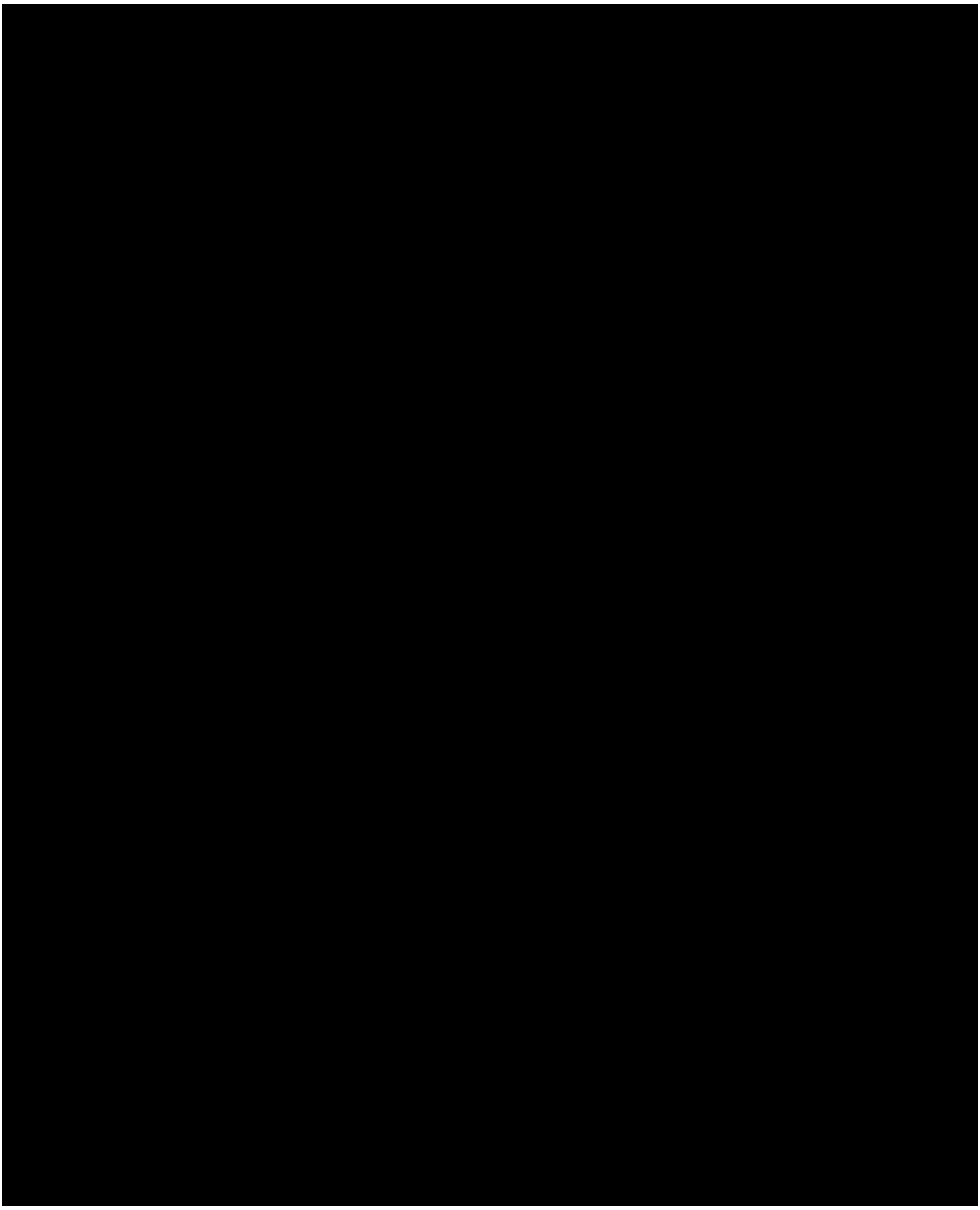


65 The cost of Veolia's PI insurance is included in our O&M costs.

Source: Sydney Desalination Plant and Aon.

We consider that insurance costs under Package 2 SDP's proposed SLIS reflect the efficient cost of SDP obtaining and maintaining insurance to appropriately manage risks under our proposed SLIS as required by SDP's Network Operator's Licence. Package 2 would allow us to reduce insurance costs (including Veolia's PI) by a total of $7.20m compared to Package 1 over the 2023-27 regulatory period. If IPART sets a higher or lower SLIS cap then prudent and efficient insurance cost estimates would need to be revised to align with this.

In addition, Package 2 SDP's proposed SLIS provides an appropriate financial incentive to SDP and its insurers to reinstate the Plant following an insurable event that requires the Plant to shut down. Our experience with the December 2015 Storm Event demonstrated that there were appropriate incentives for this to occur even when abatement did not apply to the Plant. Further information on this incentive and our experience with the December 2015 Storm Event is set out in **Box 11**.

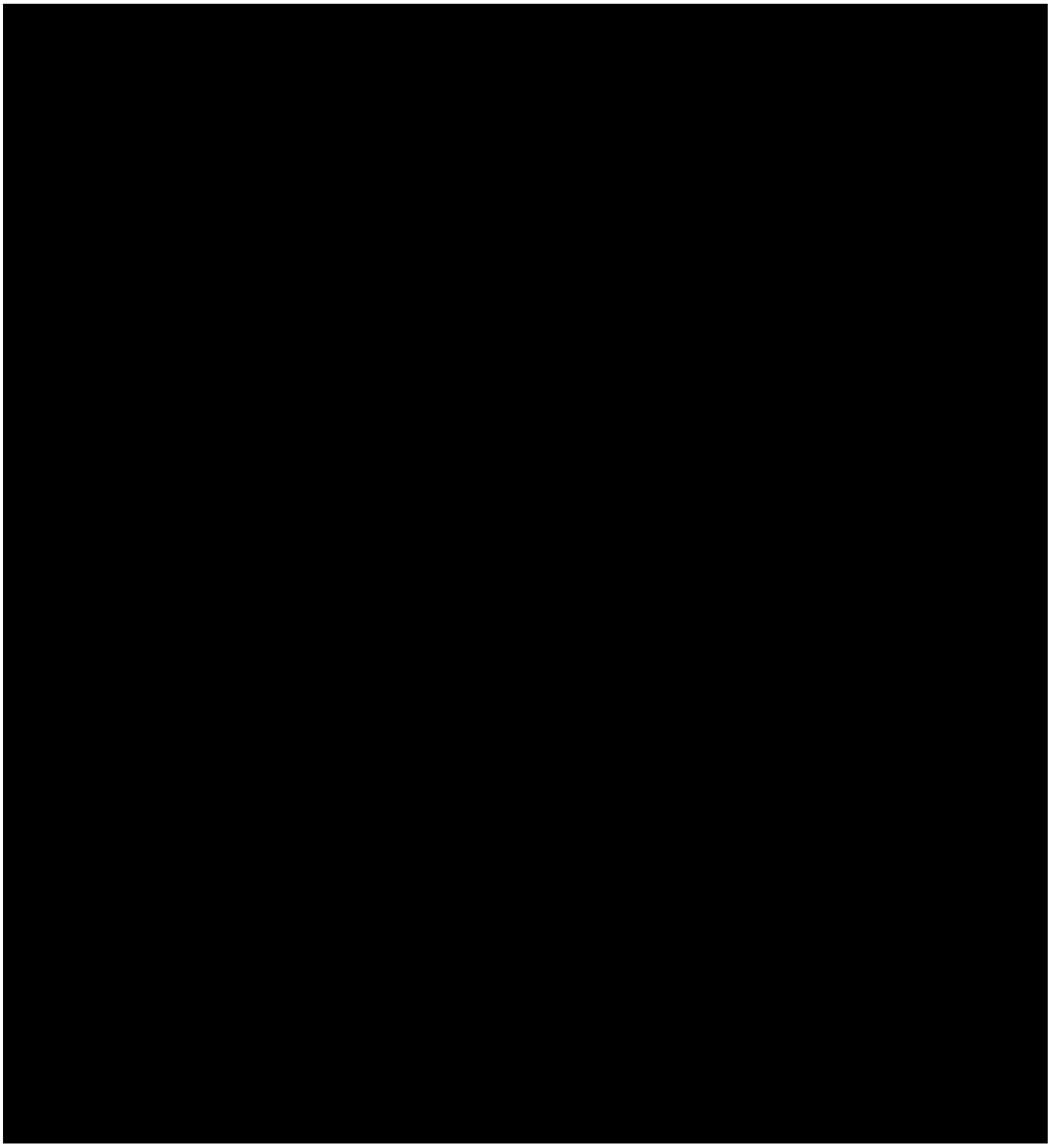


9.15.4. SDP is unable to insure or can only partially insure for a range of plausible events

Even with an efficient level of insurance coverage, SDP is exposed to financial risks from several single, large impact events and multiple small impact events. We have also considered the impacts of a range of plausible events resulting from the efficient level of insurance coverage and our proposed SLIS. Our analysis of these events is summarised in **Table 9.25**. These events do not cover an exhaustive list of possible scenarios but were used to explore where we are able to transfer risk using available insurance policies. In summary, we found that:

- SDP is unable to insure against several events that expose SDP to substantial financial risks, such as:
  - Pandemic or other event leads to closure of the site or very limited staff available to operate the plant (Scenarios 9 and 10). Insurers will not provide policies that cover financial risks associated with business interruption for these events.
  - An oil spill leading to hydrocarbons in intake water and SDP stopping production to avoid damage to reverse osmosis (RO) membranes (Scenario 2). Business interruption cover only applies where the Plant is damaged, not when the company ceases production and shuts off its seawater intake pipes to prevent damage.
  - Sydney Water is unable to receive production due to damage to Sydney Water assets (i.e. unrelated to SDP) (Scenario 11)
  - SDP is required to decrease production over the course of a year to undertake major asset refurbishment consistent with Good Industry Practice.
- SDP is partially insured for several events and exposed to some financial risks because of insurance limits and other policy terms, such as:
  - Catastrophic failure of an asset (e.g. due to a latent defect). SDP's Industrial Special risks (ISR) policy does not cover consequential losses for the first 7 days of an interruption in respect of machinery breakdown.
  - Ausgrid power shutdown from routine planned outage. SDP's ISR policy covers consequential losses from Public Utilities resulting from damage to the distribution network but does not cover outages from planned maintenance.

Table 9.25: *Insurance and abatement scenario modelling*



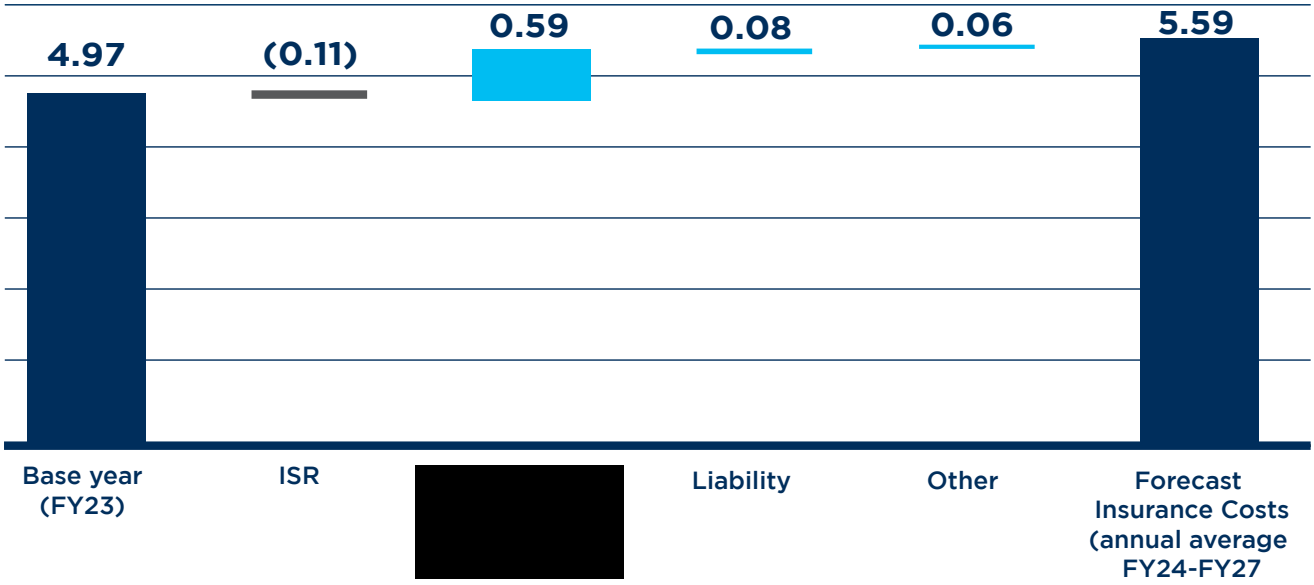
[redacted]

9.15.5. Premium increases are expected to moderate but are still well above CPI

Figure 9.9 summarises the changes for each policy between the base year and annual average for the 2023-27 regulatory period for Package 2 SDP's proposed SLIS. Aon expects the hardening market conditions seen over the last few years to moderate for some insurance policies. However, it is still forecasting increases in insurance premiums of 5-15% (nominal) across our policies.

[redacted]

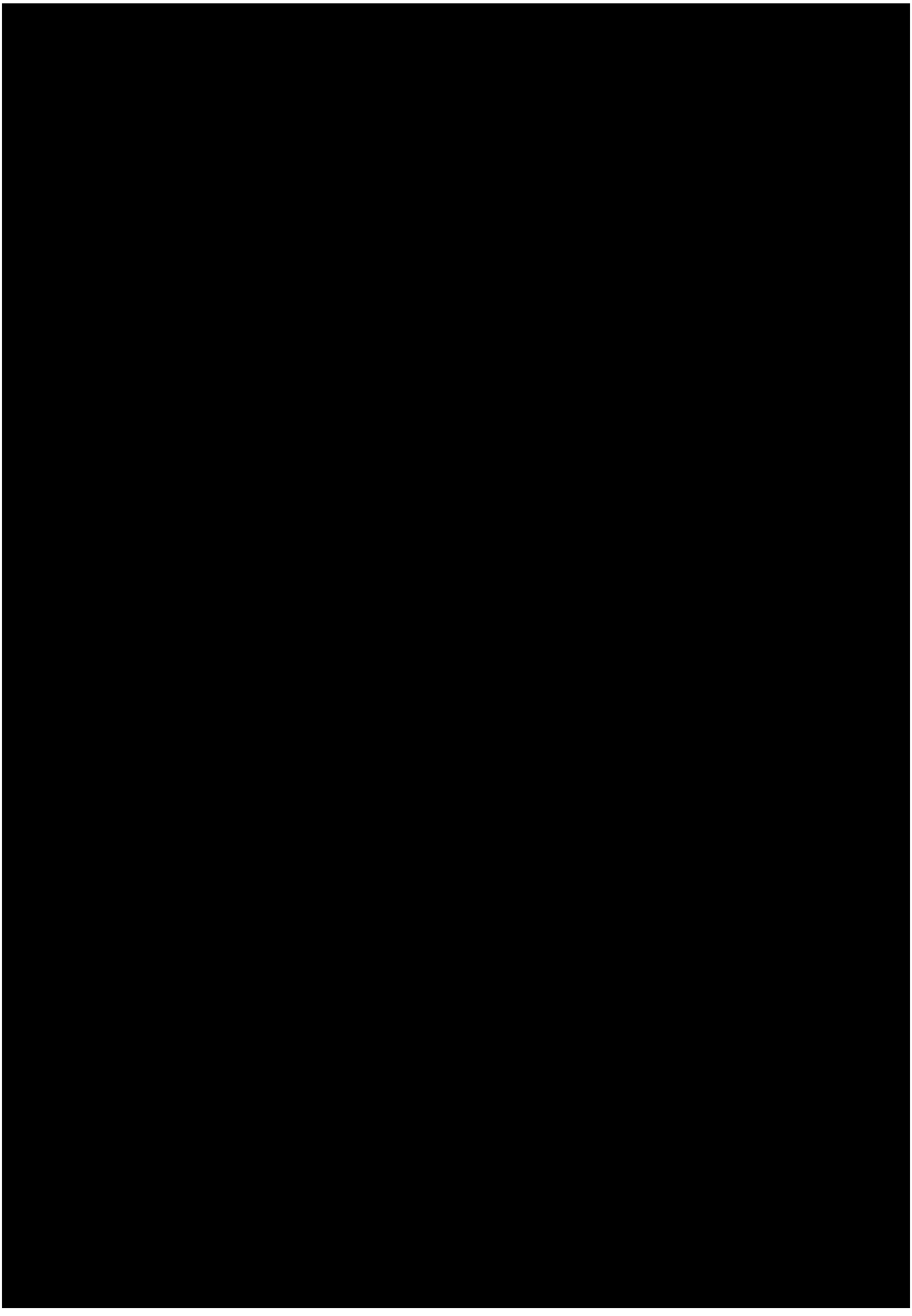
Figure 9.9: *Base Year relative to forecast insurance costs over the 2023-27 regulatory period ($2022-23, $millions) - Package 2*



Source: Sydney Desalination Plant

Aon forecast the change in premium for each of SDP's policies. Further information on the key factors for each policy is contained in **Table 9.26**. Further information on how Aon developed its forecasts for each policy is contained in its report in Appendix 9.17.

Table 9.26: *Summary of Aon premium forecasts*



9.16 Expert Report: [redacted] - CONFIDENTIAL

This report is attached separately.

9.17 Expert Report: [redacted] - CONFIDENTIAL

This report is attached separately.

9.18 Expert Report: [redacted] - CONFIDENTIAL

This report is attached separately.

10. Further detail on forecast capital expenditure

This appendix provides supporting information for our capex forecasts for the 2023-27 regulatory period as set out in chapter 10 of our submission.

10.1 SDP Report: Prudency of membrane replacement in 2019

This report is attached separately.

10.2 SDP Capital works procedure

This report is attached separately.

10.3 Long term investment plan

Our capital expenditure forecasts are derived from a predictive model that is tasked with estimating major maintenance that is carried out at predetermined intervals or according to a prescribed criteria, which is intended to reduce the probability of failure or degradation to the function of an asset with failure modes that have an age reliability relationship, in which the best course of corrective action is a time-based refurbishment or replacement.

As the O&M provider, Veolia maintains, repairs, and carries out renewal and refurbishment of our assets. In order to manage and forecast the expenditure on asset replacement and refurbishment and ensure that they are planned in such a way as to minimise operational risks, Veolia has developed and implemented its proprietary management system Sinapse. Sinapse is a decision support system (DSS) that combines a structured process with a simple intuitive web-based interface for developing and managing the asset renewal program. This system organises plant assets in a manageable, user-friendly platform. It combines a structured process with a simple user interface.

Sinapse programs renewals based on an “interval” and “refurbishments per cycle” value. The interval value refers to the time, in years, between a refurbishment or replacement while the refurbishments per cycle indicates the number of refurbishments planned before a full replacement. For example, a schedule with an interval value of three and two refurbishments per cycle will program a refurbishment at both three and six years after asset installation and a replacement three years following the second refurbishment. The user interface then displays these events for your reference.

The refurbishment and replacement strategies are based on original equipment manufacturer (OEM) recommendations in the first instance and often have common intervals (e.g. 5 years, 10 years etc.). This tends to result in individual years with a large quantity of interactions and produces a ‘spiky’ long term investment plan. This approach is also not very practical on an operating site as multiple redundant pumps that have the same strategies cannot physically be refurbished at the same time, nor can this occur while maintaining operational availability. It may make more sense to perform periodic maintenance on one pump a year early and one pump a year later.

The long-term investment plan is reviewed annually. The process consists of reviewing and refining the long-term theoretical intervals by establishing plans to control short-to-medium term exposure (1 to 5 years) associated with asset deterioration and performance issues. It is during this review that the intervals are ‘smoothed’ by shifting the strategies forward and backwards in time based on observations of condition, performance, actual run time of identical assets. The process involves the following steps:

1. Review asset criticalities
2. Conduct asset condition inspections/reviews
3. Calculate the asset exposure (condition multiplied by criticality)
4. Analyse the high and extreme exposure assets
5. Develop a plan for managing the high and extreme exposure assets.

The output of this process is our annual asset renewal plan, which informs the immediate priorities and long-term forecast. This plan then feeds into our Capital Works Procedure, where each project is assessed through business cases for prudency and efficiency.

10.4 SDP 5-year capex plan

This report is attached separately.

10.5 SDP Procurement Policy

This report is attached separately.

10.6 Ongoing RO membrane replacement business case - CONFIDENTIAL

This report is attached separately.

10.7 SDP project summary: Ongoing RO membrane replacement

This summary is attached separately.

10.8 SDP project summary: Dual 132kV Feeder

This summary is attached separately.

10.9 SDP project summary: Drinking Water Pumping Station – Additional Pump

This summary is attached separately.

10.10 SDP project summary: Drinking Water Pumping Station – Electrical cooling

This summary is attached separately.

10.11 SDP project summary: RO sampling panels

This summary is attached separately.

10.12 SDP project summary: Switchroom fire suppression

This summary is attached separately.

10.13 SDP project summary: Lime system efficiency improvements

This summary is attached separately.

10.14 SDP project summary: Protection of intermediate permeate tanks

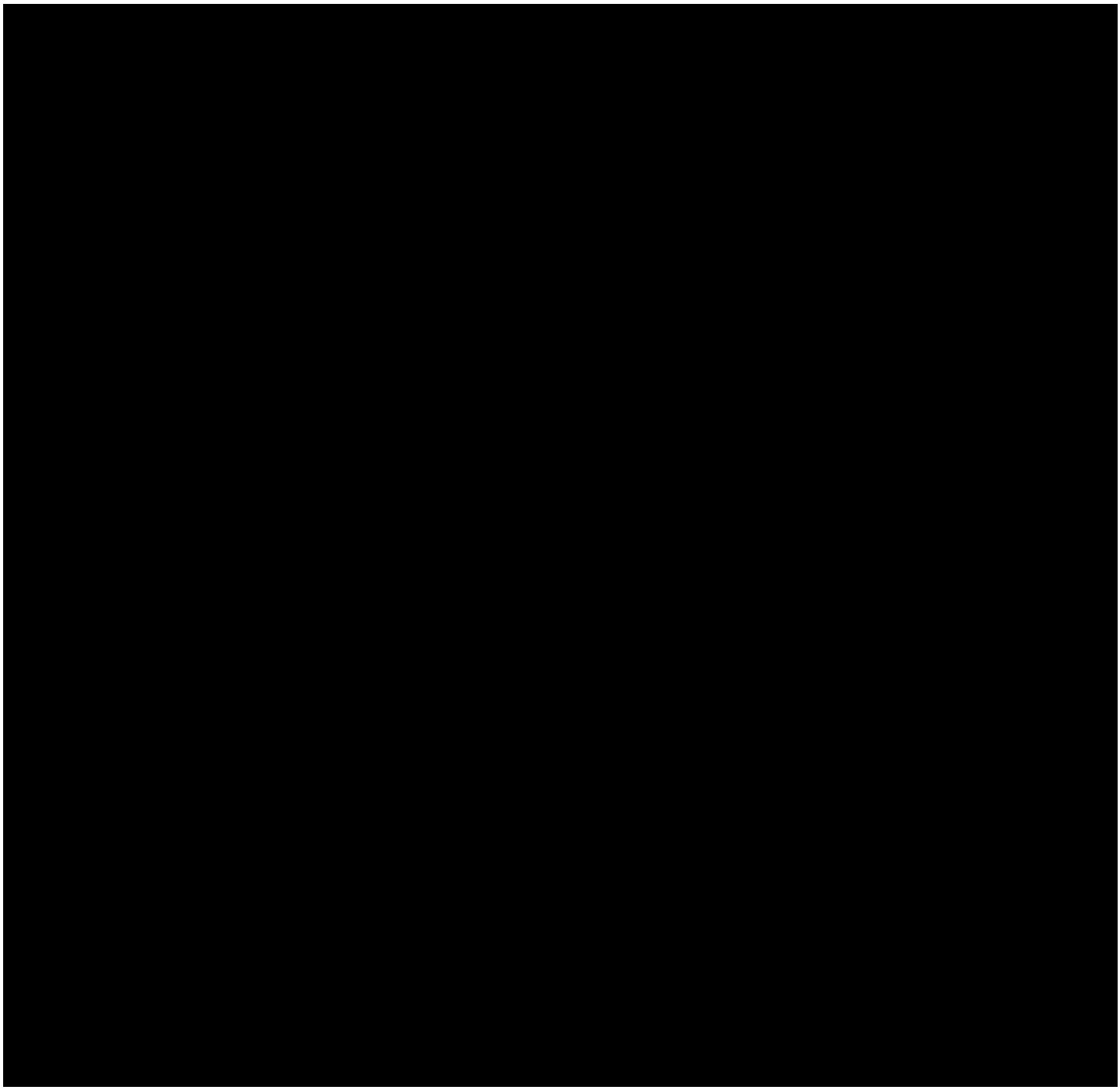
This summary is attached separately.

10.15 SDP project summary: Second Drinking Water Tank

This summary is attached separately.

11. Further detail on proposed allowance for return on assets, regulatory depreciation, tax obligations and other revenue

This appendix provides supporting information for our proposed allowance for a return on assets, regulatory depreciation, tax obligations and other revenue for the 2023-27 regulatory period as set out in chapter 12 of our submission.



66 IPART, Review of our WACC methodology, Final report, February 2018, p18.

Source: SDP

11.2 Expert report: The allowed rate of return for SDP (Frontier Economics)

This report is attached separately.

11.3 SDP's proposal on Pipeline asset lives

11.3.1. Background

The appropriate asset lives and depreciation method for SDP's assets are key assumptions in determining the return of assets allowance (or regulatory depreciation). SDP proposes to retain the straight-line method of depreciation.

For regulatory purposes, it is generally accepted that asset lives should reflect their economic lives rather than their technical/engineering lives. The Terms of Reference specify pricing principles that state explicitly that the "return of assets (depreciation) is to reflect the economic lives of the assets". In its 2017 Determination for SDP, IPART accepted this principle and stated that:

> We set asset lives on the principle of economic life (ie over what period should the asset provide a service), and not on its design life.[67]

11.3.2. Assessment

11.3.2.1. Economic life definition

The correct definition of economic life is the period over which assets can physically provide services and over which there is demand for these services. If an asset cannot physically provide a service because it has

67 IPART, Sydney Desalination Plant Pty Ltd Review of prices from 1 July 2017 to 30 June 2022, Final Report, June 2017, p128.

come to the end of its technical design life clearly it cannot generate economic benefits. Equally, if there is no demand for the services an asset provides, the asset will not be able to generate economic returns. This is discussed in greater detail in the Frontier Economics report on economic life (Appendix 11.4).[68]

As long as there is a clear expectation of demand for the services provided by an asset, and there are no other restrictions on that service provision (i.e., no regulatory or legislative constraints on service provision), the engineering design life can be assumed to be the economic life of the asset. However, the expected demand for the services provided by an asset can change over its design life.

For instance, suppose railway infrastructure has a technical life of 50 years but the mine that its exclusive purpose is to service will only be economically productive for 20 years. Although the technical life of the railway infrastructure is 50 years, its economic life will only be 20 years. The economic life of railway infrastructure can never exceed the technical life of railway infrastructure, but it might be less.

This reflects the common understanding of the term 'economic life'. For example, an Australian textbook on economic regulation explains that:

> … the amount included in the building block model for depreciation will depend on the value of the asset base and the economic life of the assets used in the provision of regulated services. The economic life of the assets in question will depend on how long they are expected to deliver services, which in some cases may be 50 years or more…[69]

As explained in in the accompanying expert report by Frontier Economics there is considerable regulatory precedent from NSW (including past IPART determinations) and other jurisdictions that the economic life of regulated assets should be determined by considering the period over which those assets can be reasonably expected to generate economic returns (given the likelihood of stranding due to bypass, loss of all customers or no demand from customers, or technical obsolescence) rather than the design life of the assets.[70]

The economic life may be equal to the technical life of the asset or may be shorter than this if there is a risk the asset may become redundant or stranded prior to the end of its technical life. It follows that the economic life of an asset can be no longer than its technical/engineering life but could be shorter if the asset is still capable of operating but market circumstances render the asset uneconomic.

11.3.2.2. The economic life of SDP's assets is uncertain

In SDP's case, economic regulation takes place within the context of the 50-year concession and associated WSA with Sydney Water. SDP has a 50-year lease on the Plant and related assets which is due to expire in 2062. The 50 year lease is backed by the WSA with Sydney Water, which expires in 2062.

SDP provides high quality drinking water to Sydney Water. This is SDP's sole source of revenue. This means that the existing WSA provides SDP with certainty of demand for its services only until 2062. Given how far into the future that date is, SDP faces considerable uncertainty over how much demand would continue to exist for its services beyond 2062. [redacted] These factors mean that there is also (potentially material) uncertainty over the economic life of SDP's assets.

In its 2017 Determination, IPART set regulatory asset lives for pumping station assets at 25 years and Plant assets at 30 years. This ensured that the cost of these assets could be recovered before the expiry of the existing WSA in 2062. However, for other assets—notably, SDP's Pipeline and intake and outlet assets—IPART adopted assumed asset lives well in excess of the term of SDP's lease. For instance, IPART determined a 90-year asset life for the intake infrastructure, a 100-year asset life for outlet infrastructure, and a 120-year life for Pipeline infrastructure.

SDP estimates that if its RAB continues to be depreciated according to IPART's existing asset life assumptions, then the total value of unrecovered for the Pipeline, intake and outlet assets ('Pipeline infrastructure') by 2062 would be approximately $695m ($2022-23). That represents nearly 37% of SDP's total expected opening RAB (excluding non-depreciating assets) in 2023-24. Since SDP's Plant assets

68 Frontier Economics, Economic life for the purposes of setting the regulatory depreciation allowance, 9 September 2022.

69 Peterson, G., Bull, M., Dermody, C. (2016), Access regulation in Australia, Thomson Reuters, para [5.110], p. 80.

70 Frontier Economics, Economic life for the purposes of setting the regulatory depreciation allowance, 9 September 2022.

have a much shorter design life than the Pipeline infrastructure, SDP would also need to make significant investments to renew its Plant assets to remain operational beyond 2062. Hence, the asset value that would need to be recovered beyond 2062 would be well in excess of $695m.

11.3.2.3. IPART should adopt an asset life assumption of 100 years for SDP's Pipeline infrastructure

As noted above, IPART explained in its 2017 decision that it determines asset lives on the basis of economic life rather than design life. However, as explained in the accompanying expert report by Frontier Economics, all of the expert advice (from Atkins Cardno) that IPART relied on to inform its assessment of asset lives related to the engineering design life of the assets, i.e., over what period of time would SDP's assets be physically capable of providing the regulated service? Atkins Cardno did not consider the period over which there is likely to be demand for SDP's services, and therefore, the period over which SDP's assets are expected to generate economic returns.[71] Rather, Atkins Cardno assumed there would be perpetual demand for SDP's services:

> There is an assumption that a desalination plant or a technical equivalent will be on the site in perpetuity to meet its obligations under the MWP.[72]

Atkins Cardno's assessment of the design life of SDP's Pipeline infrastructure also disregarded the actual design life of those assets. Instead, Atkins Cardno advised IPART that:[73]

- Sydney Water applies an asset life assumption of 140 years for water mains of similar diameter to SDP's Pipeline. On this basis, Atkins Cardno considered that an appropriate asset life assumption for a land-based Pipeline was 140 years;
- An asset life assumption of 100 years was appropriate for the undersea length of SDP's Pipeline, given that this section of the Pipeline was located in "more aggressive environmental conditions";
- Approximately half of SDP's Pipeline is land-based and half is undersea; therefore
- A weighted life of 120 years should be used to take account the relative lengths of Pipeline on land and under the sea.

The design life assumption for the Pipeline is best informed by the design life specified by the designers and constructors of the assets. There is no reason to think that the designers of SDP's Pipeline infrastructure would have specified an imprudent or inefficiently low design life. Moreover, the design life specified by the designers of SDP's assets reflect the technical characteristics of the Pipeline infrastructure, taking account of construction materials and the actual environment in which the assets are located. Therefore, the design life specified by the designers of SDP's assets represents the best possible indication of the actual design life of the Pipeline infrastructure.

As the expert report by KBR (Appendix 11.5) explains, the Pipeline infrastructure was designed and constructed by Sydney Water's Water Delivery Alliance in 2010.[74] The Basis of Design Report produced by the Water Delivery Alliance set out the design criteria of the Pipeline infrastructure and established that its design life was 100 years.[75]

KBR was a member of the Water Delivery Alliance and the designer of SDP's Pipeline and pumping station. This makes KBR uniquely qualified to express an expert opinion on the design life of SDP's Pipeline infrastructure. KBR concludes in its expert report that:[76]

- The original design life of the entire Pipeline infrastructure—including the land-based and undersea sections—was 100 years;
- The sub-elements of the Pipeline that sustain it—including cathodic protection, pipe wall thickness, protective coating and lining, joint design—were designed to achieve a 100-

71 Frontier Economics, Economic life for the purposes of setting the regulatory depreciation allowance, 9 September 2022, section 3.

72 Atkins Cardno, Sydney Desalination Plant - Expenditure Review, Supplementary Report, 25 May 2017, p26.

73 Atkins Cardno, Sydney Desalination Plant - Expenditure Review, Final Report, 21 February 2017, p68.

74 KBR, Sydney Desalination Plant Pipeline Design Life – Technical Memorandum, 16 August 2022.

75 Water Delivery Alliance. Basis of Design Report Work as Constructed (Document Number: WDA-BoD-REP-001), 2009, pp38-39.

76 KBR, Sydney Desalination Plant Pipeline Design Life – Technical Memorandum, 16 August 2022.

year design life for the whole Pipeline and not more. If a greater design life were intended, then the designs of these sub-elements would have been developed accordingly;

- The Pipeline is located in an aggressive marine environment and a 100-year asset life is an appropriate design life for that environment; and
- The Pipeline is a singular asset, and the concept of averaging design life between land-based sections of the Pipeline and the undersea section of the Pipeline is not appropriate.

Expanding on the last point above, KBR states the following:

> We have reviewed the assessment conducted by Atkins Cardno and the reasons for their recommendations of having different asset life assumptions of 140 years for the land-based section of the pipeline and 100 years for the under-sea section of the pipeline. We have also reviewed Atkins Cardno's conclusion that a weighted average life of 120 years should be adopted. While there is consensus that the under-sea section of the pipeline should have a 100 year asset life, it is our opinion that it is not appropriate to assume the land based section of the pipeline has an asset life of 140 years. Nor is it appropriate that a weighted value (i.e., the average) is then applied to the pipeline as a whole. Unlike Sydney Water's assets, the SDP pipeline is a single whole entity and if any part of the pipeline is damaged or removed from operation, be it land based or under-sea, then the whole pipeline would be out of service. If any part of the under-sea sections are lost, then the whole of pipeline would be out of service for an extensive unknown period and the plant cannot supply water.[77]

KBR also explains that Atkins Cardno's comparison of SDP's Pipeline to Sydney Water's Pipeline, to arrive at an asset life assumption of 140 years for the land-based section of SDP's Pipeline, is invalid because the characteristics and operating environments of the two Pipelines are fundamentally different:

> Comparing SDP's pipeline to Sydney Water's pipelines is not appropriate. The Sydney Water network of trunk watermains has inherent flexibility with many of its delivery systems being interconnected. This means Sydney Water can divert water between systems to meet demand in different areas or shut down for maintenance or repair. Also, Sydney Water's major transfer systems are constructed generally above ground in dedicated corridors. By comparison SDP's pipeline assets have no redundancy or flexibility, 59 % of the pipeline is under sea (not 50% as assumed by Atkins Cardno) and 86% of the pipeline is inaccessible for routine condition assessment or maintenance.[78]

SDP submits that the asset life assumption for its Pipeline infrastructure should be set to 100 years, reflecting the actual design life specified by the assets' designers, as documented in the Basis of Design Report.

If evidence becomes available in future periods that the economic life of SDP's assets is likely to be lower than their design life, then IPART should (in future periods) consider revising its asset life assumptions in line with the expected economic life.

11.3.3. Proposal

SDP proposes the standard asset life assumption for Pipeline infrastructure should be set to 100 years, consistent with its design life.

11.4 Expert report: Technical memorandum on SDP's pipeline design life (KBR)

This report is attached separately.

11.5 Expert report: Economic asset lives and regulatory precedents (Frontier Economics)

This report is attached separately.

77 KBR, Sydney Desalination Plant Pipeline Design Life – Technical Memorandum, 16 August 2022, p15.
78 KBR, Sydney Desalination Plant Pipeline Design Life – Technical Memorandum, 16 August 2022, p15.

11.6 Expert Report: Surplus LGC and Electricity Sales Compliance Review (Seed Advisory) - CONFIDENTIAL

This report is attached separately.

11.7 Process for the calculation of any ex post revenue adjustments for FY23

11.7.1. Background

SDP's prices for the forthcoming regulatory period were originally scheduled to be determined by 30 June 2022 and apply from 1 July 2022. However, to allow time for the GSWS to be finalised, including changes to SDP's Network Operator's Licence, the Minister for Water asked IPART defer its review of SDP's prices by up to 12 months, with the 2023 Determination now due by 30 June 2023 for new prices to apply from 1 July 2023. Under IPART's 2017 Determination, this means that SDP's 2021-22 prices will be held constant in nominal terms over 2022-23.

IPART has suggested it would consider whether SDP's prices in the 2023 Determination should be adjusted to account for any over-recovery accrued over 2022-23 due to the 12-month deferral, and that in doing so it would take into account all relevant factors, including the long-term interests of customers.

11.7.2. Assessment

11.7.2.1. SDP does not support a revenue adjustment as it would not be consistent with best practice regulation nor the long-term interests of customers

We do not support a revenue adjustment for the impact of the deferral of the determination of SDP's 2022-23 prices. As outlined in the body of our submission, such an adjustment would not be consistent with best practice regulation nor the long-term interests of customers, as it would add unnecessary complexity and uncertainty to the regulatory framework, with no efficiency benefits. Such an adjustment would:

- provide no benefits in terms of promoting efficient consumption decisions by consumers and expenditure decisions by SDP, as the regulated revenue for a year would be determined after that year;
- mean that prices deviate from cost-reflective levels over the upcoming regulatory period and potentially contribute to price instability over time;
- conflict with the provisions of IPART's 2017 determination of SDP's prices (which specifically allows for 2021-22 prices to roll forward in nominal terms until the determination is replaced) and IPART's longstanding practice of making no such adjustments following the deferral of price determinations for other water utilities;
- undermine investment certainty by determining the 'rules of the game' after the event.

There are circumstances where an ex-post review by IPART leads to future adjustments to prices, such as the EAM. However, the practice of IPART and other economic regulators has been to consult on, explain and establish such mechanisms ahead of time to ensure sufficient investment and operational certainty for the regulated utility.

Further, IPART's longstanding practice has been to not make such an adjustment following the deferral of price determinations for other water utilities. Instead, prices have been held constant in nominal terms based on the last year of determined prices until a new Determination is made. The new Determination has then been made on a forward-looking basis, with no ex-post adjustments to revenue to account for the impact of the deferral. Some examples include:

- **Water Administration Ministerial Corporation** (1-year deferral) – In May 2019, IPART agreed to defer WAMC's price review for 12 months, from 2019-20 to 2020-21, for new prices to apply from 1 July 2021.[79]

79 https://www.ipart.nsw.gov.au/sites/default/files/documents/media-release-review-of-water-management-charges-deferred-30-may-2019_0.pdf

- **Essential Water Broken Hill** (1 year deferral) – In November 2016, IPART announced that it would defer Essential Water's price determination by 12 months, from 2017-18 to 2018-19.[80]
- **Central Coast** (1-year deferral) – In April 2016, IPART announced that it would defer the next price determinations for Gosford and Wyong Councils for 12 months, from 2016-17 to 2017-18.[81] Then, in January 2017, it announced that it would defer the determination of the Central Coast Council's prices for a further 12 months, to 2018-19, for new prices to apply from 1 July 2019.[82]
- **State Water, now Water NSW Rural** (3 year deferral) – In 2012, IPART wrote to State Water advising that it would defer its 2013-14 review of its 'Coastal prices' to 2014-15 (State Water's inland prices had moved from IPART to ACCC regulation).[83] Then in 2014, IPART issued a media release announcing that the next determination of State Water's Coastal prices would be delayed for a further two years to 2016-17 (for new prices to apply from 1 July 2017).[84]
- **Water Administration Ministerial Corporation,** WAMC (2-year deferral) – In April 2013, IPART announced that it would defer the NSW Office of Water's (WAMC's) price review by 12 months, from 2013-14 to 2014-15.[85] Then, in 2014, IPART issued a media release announcing the next determination of prices for the NSW Office of Water (WAMC) would be delayed by a further 12 months to 2015-16, to apply from 1 July 2016.[86]
- **Hunter Water** – In 2013, IPART set Hunter Water's prices for four years, from 1 July 2013 to 30 June 2017, using a WACC of 4.6%. In 2014, Hunter Water asked IPART to bring forward its next price determination by one year (which can have a similar effect to a deferral) so its price review could be aligned with Sydney Water's (at the time, the WACC was also increasing relative to 2013 levels). IPART agreed and set Hunter Water's new prices to apply from 1 July 2016, which would have otherwise been the final year of the 2013 determination, notably using a higher WACC of 4.9%.[87]

IPART's past practice recognises that there will be circumstances where it makes sense to delay or bring forward a price determination, but this needs to be done in a way that maintains investment and decision-making certainty and price stability, which are in the long-term interests of customers. It is therefore important that prices be set on a forward-looking basis.

A retrospective adjustment to prices for events beyond a utility's control would create significant decision-making uncertainty and price uncertainty/instability and create unnecessary complexity (including, for example, in interacting with the ECM), which would be counter to the long-term interests of customers. Having a predictable and certain regulatory regime which delivers on published pricing determinations is an important feature of SDP's risk profile, which has pricing implications in private debt markets where SDP procures its debt finance.

11.7.2.2. If IPART is to apply a revenue adjustment, it should be applied symmetrically to all of SDP's building block costs, and seek to minimise adverse financeability impacts on customers

If IPART is to apply an adjustment to SDP's revenue to account for the impact of the deferral of the determination, it should account for all of SDP's building block costs and inflation and be symmetric (i.e., account for cost increases as well as cost decreases relative to the allowance provided by the nominal roll forward of 2021-22 prices to 2022-23). There is no justification for merely adjusting one building block cost item (e.g., the WACC or the return on assets).

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80 https://www.ipart.nsw.gov.au/sites/default/files/documents/media-release-broken-hill-water-and-sewerage-services-price-review-deferred-14-november-2016.pdf

81 https://www.ipart.nsw.gov.au/sites/default/files/documents/media_release_-_gosford_city_council_and_wyong_shire_council_water_and_sewerage_price_reviews_deferred_-_11_april_2016.pdf

82 https://www.ipart.nsw.gov.au/sites/default/files/documents/media-release-central-coast-council-water-and-sewerage-price-review-deferred-1-january-2017.pdf

83 https://www.ipart.nsw.gov.au/sites/default/files/documents/letter_-_to_brett_tucker_state_water_regarding_deferral_of_2014_state_water_price_review_-_2_october_2012.pdf

84 https://www.ipart.nsw.gov.au/sites/default/files/documents/media_release_-_water_management_and_bulk_water_prices_to_remain_at_current_levels_-_14_july_2014.pdf

85 https://www.ipart.nsw.gov.au/sites/default/files/documents/stakeholder_letter_-_deferral_of_the_review_of_prices_for_the_water_administration_ministerial_corporation_from_1_july_2014_for_12_months.pdf

86 https://www.ipart.nsw.gov.au/sites/default/files/documents/media_release_-_water_management_and_bulk_water_prices_to_remain_at_current_levels_-_14_july_2014.pdf

87 https://www.ipart.nsw.gov.au/sites/default/files/documents/media_release_-_timing_of_iparts_price_review_for_hunter_water_corporation_-_14_july_2014.pdf

Table 11.2 compares the allowance SDP has received for 2022-23 under the 2017 Determination to estimates of its actual costs for 2022-23 using an estimate of 23 GL of water supplied under the ERNs from Sydney Water. The drivers of SDP's costs in 2022-23 are explained in Sections 9 - 11 of the Submission.

Table 11.2 shows that, once all building block cost items are considered, the difference between the revenue SDP is expected to receive in 2022-23 from rolling forward the RP2 determination in nominal terms and its actual efficient costs is $15.0 million.

Table 11.2: *Differences between the estimated revenue from the 2022-23 allowance and estimates of SDP's actual efficient expenditure ($2022-23)*

Cost item	2022-23 allowance	2022-23 actual efficient expenditure	Variation
Fixed operating expenditure	27.8	38.1	(10.3)
Variable operating expenditure	15.4	16.2	(0.8)
Depreciation	57.5	60.3*	(2.8)
Return on Assets	90.1	70.2	19.9
Return on Working Capital	0.1	1.6	(1.5)
EAM*	6.3	-	6.3
Tax Allowance (net of imputation)	10.1	5.8	4.3
Total	**207.2**	**192.2**	**15.0**

*Note: *This excludes the impact of SDP's proposed changes to asset lives, which would have increased its depreciation allowance in 2022-23 if the determination had not been deferred.*

**The EAM component relates to the 2021-22 EAM 'payment' from customers being notionally rolled forward to 2022-23. IPART should exercise care in ensuring there is no double-counting in adjusting for this amount across its roll forward of the EAM and any ex-post revenue adjustment to 2022-23 as a result of the deferral of the price determination.*

If IPART is to deduct this $15.0 million from SDP's notional revenue requirement for the upcoming determination period, then this should be done in a way that minimises adverse financeability impacts on SDP. This is because customers will be indifferent as to when this adjustment is 'paid out' in prices (on the basis that it will be NPV neutral), and it is in customers' long-term interests that SDP remains financeable.

Specifically, we propose that any revenue adjustment be applied as a 4-year annuity (even) adjustment to SDP's fixed charges over the upcoming determination period, using the BBB corporate bond rate as the discount rate (as per the EAM) – subject to the profile minimising adverse financeability impacts on SDP.

SDP notes that the benchmark energy price in the 2017 Determination of $151.85/MWh ($2022-23) for 2022-23 is significantly below current market prices of $328.52/MWh (see **Figure 9.5** in Section 9 of the Submission). This results in a material difference between current estimates of a market-based energy purchase cost allowance for 2022-23[88] and IPART's 2022-23 allowance - ranging from between $16.6m and $61.9m ($2022-23) depending on whether the Plant is in minimum or maximum production for the year. That is, if IPART reset SDP's prices for 2022-23 using a methodology for determining SDP's energy cost allowance that is consistent with IPART's 2017 methodology then SDP's revenue from prices would need to be between $16.6m and $61.9m ($2022-23) higher than actual levels in 2022-23, all else being equal.

88 IPART's preferred methodology for setting the energy purchase cost allowance in the 2017 Determination was to use a market-based methodology that used a combination of public available market prices and modelled outcomes.

However, SDP is not proposing that IPART compare the 2023-23 energy cost allowance to an updated benchmark allowance as part of any IPART revenue adjustment. This is because we consider that SDP's efficient costs of energy reflect its costs incurred under the GGRP Contracts – consistent with our proposal that the energy cost allowance for the 2023-27 regulatory period reflect GGRP costs in line with the requirement in the amended Terms of Reference to consider SDP's ability to recover all costs it incurs in complying with the GGRP and the GGRP Contracts. If IPART were to not accept this aspect of our proposal and instead it continues to set the energy cost allowance in line with a marked-based benchmark energy price, to be consistent, it would have to include any difference between its energy cost allowance under the 2017 determination and market prices in its 2022-23 revenue adjustment. This could result in a net payment to SDP (rather than a deduction) from any adjustment to SDP's prices for the 2023-27 period to account for the 12-month deferral of the determination.

12. Proposed method for adjusting prices

12.1 Methodology for adjusting our prices in Operational Mode during the 2023-27 regulatory period

This section provides an example of how maximum prices for Operational Mode could be adjusted mechanically using a methodology set out in the 2023 Determination. These 'price formulae' are based on the 2017 Determination (see Schedule 2), with several key refinements to ensure prices reflect the efficient cost of providing services over the 2023-27 regulatory period, by enabling the:

- Continued pass through of electricity network charges (as per 2017 Determination), as well as pass through of Uncontrollable Costs that SDP is not able to forecast and for which it has not included a forecast of costs in regulated revenues (see submission section 7.5)
- Annual price adjustments to reflect annual changes in the cost of debt allowance (See submission section 11.1)
- Incorporation of forecast energy consumption over the 2023-27 regulatory period (See submission section 9.6)

As highlighted in submission section 12.1, SDP has not proposed changes to the current cost sharing arrangements. However, IPART could consider simplifying these arrangements given SDP has only one customer (Sydney Water), and it is highly unlikely SDP will supply a third-party customer in the foreseeable future given SDP's Network Operator's Licence and the need to flexibly respond to meet Sydney Water's needs in or outside of drought. This relates to the terms ('AS', 'CI' and 'TI') below.

Figure 12.1 *Water Usage Charge in Operational Mode for each day of the 2023-27 regulatory period*

Applicable Period Variable Cost = (WUC + ([VNC + CPT] x VEV)) x AS

Note: New terms in red
Source: Sydney Desalination Plant.

Where:

- WUC = the water usage charge for the applicable period, as approved by IPART in its 2023 Determination. SDP proposed prices for the applicable period are set out in **Table 12.2** of submission.
- VNC = the Variable Network Charge for the applicable period, meaning the variable charge, fee or tariff per megawatt hour payable by SDP in respect of Use of System Services provided by a Distribution Network Service Provider in respect of electricity supplied to the NMI (or NMIs) at which SDP's electricity usage at the Plant is measured for the applicable period
- CPT = the cost pass through amount for the applicable period, meaning the charge, fee or tariff per megawatt hour payable by SDP in respect of Uncontrollable Costs that SDP is not able to forecast and for which it has not included a forecast of costs in regulated revenues, including Unaccounted for Energy Charges, charges imposed by AEMO on market participants as a result of compensation claims for directed generators under clause 3.15.7B of the NER, and charges imposed by AEMO as a result of use of its Reliability and Emergency Reserve Trader (RERT) function.
- VEV = the variable energy volume for the applicable period, meaning the volume of electricity consumed (in megawatt hours) per megalitre of water produced, as set out in **Table 9.9** of the submission
- AS = the number of ML of desalinated water supplied by SDP from the Plant to that customer on the day

Figure 12.2 *Plant Service Charge in in Operational Mode for each day of the 2023-27 regulatory period*

Daily Plant Service Cost = (PSC + FNC + COD_{Plant} + ([VNC + CPT] X FEV)) x (CI/TI)

Note: New terms in red
Source: Sydney Desalination Plant.

Where:

- PSC = the daily Plant service charge for the applicable period, as approved by IPART in its 2023 Determination. SDP proposed prices for the applicable period are set out in **Table 12.2** of submission;
- FNC = the Fixed Network Charge for the applicable period, meaning the fixed charges, fees and tariffs payable by SDP in respect of Use of System Services provided on the relevant day by a Distribution Network Service Provider (including access charges and capacity charges) which are applied to the NMI (or NMIs) at which SDP's electricity usage at the Plant is measured;
- CODPlant = the difference between the Notional Revenue Requirement for the Plant approved by IPART for each year in its 2023 Determination and the Notional Revenue Requirement for the Plant for each year arising from annual updating of the trailing average cost of debt allowance, where the difference is expressed as $/day;
- FEV = the fixed energy volume for the applicable period, meaning the volume of electricity consumed (in megawatt hours) per day to maintain assets in an operational state to meet service levels under SDP's Network Operator's Licence, including the volume of electricity required to flush membranes with desalinated water, run a second pre-treatment to meet EPL and availability requirements, comply with ramp-ups requested by Sydney Water, and carryout routine asset rotation and maintenance, and is calculated using the annual fixed energy volumes in **Table 9.17** of the submission divided by the number of days in each year;
- CI = the customer's Customer Impact for the day; and
- TI = the Total Impact for the day.

Figure 12.3 *Pipeline Service Charge in Operational Mode for each day of the 2023-27 regulatory period*

(PC + COD_{Pipe}) x (CI/TI)

Note: New terms in red
Source: Sydney Desalination Plant.

Where:

- PC = the daily pipeline service charge for the applicable period, as approved by IPART in its 2023 Determination; and
- CODPipe = the difference between the Notional Revenue Requirement for the Pipeline approved by IPART for each year in its 2023 Determination and the Notional Revenue Requirement for the Pipeline for each year arising from annual updating of the trailing average cost of debt allowance, where the difference is expressed as $/day.

13. Financeability - CONFIDENTIAL

13.1 [redacted]

This report is attached separately.

13.2 Financeability Analysis - CONFIDENTIAL

13.2.1. Proposed improvements to IPART's benchmark financeability test

SDP engaged debt advisory experts [redacted] to:

- provide on opinion whether IPART's benchmark test is suitable for the purpose of assessing properly the financeability of a benchmark business in SDP's circumstances;
- advise on any improvements that should be made to IPART's benchmark test to make it more fit-for-purpose; and
- assess the financeability of a benchmark business in SDP's circumstances if:
  - all of SDP's regulatory proposal were adopted; and
  - if some or none of SDP's key proposals were not accepted by IPART.

[redacted]

[redacted]

[redacted]

13.2.1.1. [redacted] the efficient cost of debt is nominal

IPART uses a real cost of debt when computing the financial ratios used in its benchmark test. This implicitly assumes that the benchmark business only faces real interest cost obligations in each regulatory period.[91] In SDP's view, this is unreasonable since:

- A stand-alone benchmark efficient Australian infrastructure business would only be able to efficiently raise nominal debt finance.
- The vast majority of the debt raised by all the water businesses regulated by IPART is nominal debt.
- [redacted]
- Whilst it may be feasible for SOCs to issue some inflation-linked debt, such a debt management approach is infeasible (and therefore could not be efficient) for a privately-owned, unrated issuer such as SDP. SDP notes that IPART's WACC methodology defines the efficient benchmark entity for which WACC allowances are to be set as "'a firm operating in a competitive market and facing similar risks to the regulated business."[93] The WACC methodology does not specify the efficient benchmark entity as a SOC. Rather, the WACC methodology explicitly defines the efficient benchmark entity as a firm "facing similar risks to the regulated business." This requires IPART to take into account the fact that SDP is a small, privately-owned infrastructure firm with circumstances that require a different debt management strategy to the debt management strategies followed by the SOCs.
- There is no practical or efficient way for a business in SDP's circumstances to convert its nominal debt obligations into real debt obligations.
- [redacted]

IPART's regulatory framework only provides businesses with a real cash return on debt in each regulatory period. Compensation for inflation is provided very slowly (over decades) via regulatory depreciation of an inflation-indexed RAB. This raises the potential for cash flow mismatches within a regulatory period that may give rise to a financeability problem.

This is because a business that issues nominal debt is contractually obligated to make nominal interest payments over the regulatory period. However, to service the interest expense related to this debt in each regulatory period, the business will receive:

- A real cash return on debt; plus
- Some additional cash flows that allow recovery of inflationary gain capitalised into the RAB in past regulatory periods.

These cash flows will typically be inadequate to service the nominal cost of debt that IPART has deemed to be efficient over the regulatory period in question. The business could face a financeability problem if:

90 SDP, Review of financeability tests – Response to Draft Report, 14 September 2018.

91 SDP notes that its response to IPART's draft decision on its financeability tests addressed each of the reasons IPART provided for using real, rather than nominal, interest costs when applying its benchmark test. However, IPART's final decision did not address SDP's responses. Instead, IPART's decision simply restated its original reasons for preferring the use of a real cost of debt.

[redacted]

93 IPART, Review of our WACC method, Final Report, February 2018, p19.

[redacted]

- IPART has underestimated the required real return on debt allowance (e.g., by over-estimating expected inflation); and/or
- If the regulatory depreciation allowance over the period is too low (e.g., if recovery of the RAB is too slow, or if the inflationary gains to the RAB in previous regulatory periods are insufficient to service the nominal debt obligations that the benchmark business is expected to face in the forthcoming period).

Such financeability problems would not be identified if the benchmark test assumes that the benchmark business faces real debt obligations, when in fact the benchmark business faces nominal debt obligations.

[redacted]

IPART's benchmark test assumes implicitly that the costs that the benchmark business will incur over the regulatory period match the cost allowances provided by IPART in its pricing decision. This assumes away any potential financeability concerns that could arise from errors in the determination of important inputs to IPART's pricing decisions—including, for example, the allowance for operating expenditure.

[redacted]

13.2.1.3. [redacted] a financial ratio that assesses the ability of the benchmark business to make interest and principal repayments

IPART's benchmark test uses three financial metrics:

- Interest coverage ratio (real);
- Funds From Operations (FFO) over debt (real); and
- Debt to RAB (i.e., gearing), which is assumed to be fixed at the benchmark level of gearing.

During IPART's 2018 review of its financeability tests, SDP submitted that businesses in SDP's circumstances differ from other water businesses that IPART regulates. Specifically, SDP is subject to a limited term concession. Under the terms of that concession, SDP is obligated to repay its debt in full (i.e., principal and all interest owed) within the concession period. This is standard industry practice for companies with limited term concessions, and represents an immutable characteristic of SDP that would be shared by a benchmark efficient entity in the circumstances of, and with a similar degree of risk as is faced by SDP.

Given this characteristic, the Debt Service Coverage Ratio (DSCR), which measures SDP's ability to repay principal as well as interest, is an important financial metric [redacted] monitor. [redacted] Therefore, the DSCR is an appropriate financial metric to consider when assessing the financeability of any business in SDP's circumstances. [95]

NSW Treasury supported SDP's position that IPART should consider the DSCR, noting that:[96]

> DSCR is a measure of available cash flow to pay all current obligations, both interest and principal. Used in conjunction with an interest coverage test, the DSCR would highlight when an entity's funding is concentrated on current debt. DSCRs are included in many syndicated loan packages

95 Given that other water businesses regulated by IPART operate in circumstances where they do not face similar limited term concession obligations, it would be unnecessary for IPART to assess the DSCR when conducting financeability tests for those businesses.

96 NSW Treasury response to Financeability Review Issues Paper, 1 June 2018, p. 3.

and are almost always seen in project finance debt.

SDP reiterates the following observations, which SDP put to IPART during the 2018 review of its financeability tests:

- SDP does not have a choice over whether it uses the cash flows generated by IPART's pricing decisions to repay its debt—this is a binding condition of SDP's limited term concession, and is a matter that is beyond SDP's control. As SDP has noted, this requirement is not peculiar to SDP. Any business in SDP's circumstances (i.e., operating under a limited term concession) would similarly face this constraint. [redacted]

- SDP notes that rating agencies—including Moody's, Standard & Poor's and Fitch—use the DSCR as the primary financial indicator when rating Public-Private Partnership (PPP) and Project Finance Initiative (PFI) projects. Whilst SDP does not operate under a PPP or a PFI arrangement, SDP does share an important feature with these structures. Specifically, SDP operates under a fixed term concession, and nearly all PPP and PFI agreements operate under a fixed term. [redacted] This is known as an amortising debt profile. As SDP shares this characteristic with PPP/PFI projects, it is reasonable that any financeability tests undertaken by IPART in relation to SDP also include the DSCR, alongside other metrics appropriate for regulated water utilities. [redacted]

- There should be no presumption by IPART that the depreciation allowance in the building block approach would necessarily provide an allowance that meets principal repayments. The depreciation allowance provides a return of capital (i.e., the RAB), a portion of which relates to the debt capital of the business. The cash flows associated with the depreciation allowance should be sufficient to repay the efficient benchmark entity's debt. However, that would not occur if the depreciation allowance is inadvertently set too low. The question the financeability test must test is whether this stream of cash flow is sufficient to repay the business's debt principal as well as interest costs. The speed of cash flow, via the depreciation allowance, depends on choices that IPART will make about the lives of regulated assets. If assumed asset lives are too long, then the regulatory depreciation allowance may be inadequate to repay principal and interest. Simply assuming that the depreciation allowance is sufficient assumes away the possibility that those allowances may be inadequate. The DSCR provides a way to test this, without the need to make assumptions about the sufficiency of cash flows.

[redacted]

[redacted]

A key reason that IPART provided for not including the DSCR in its benchmark test was that:[98]

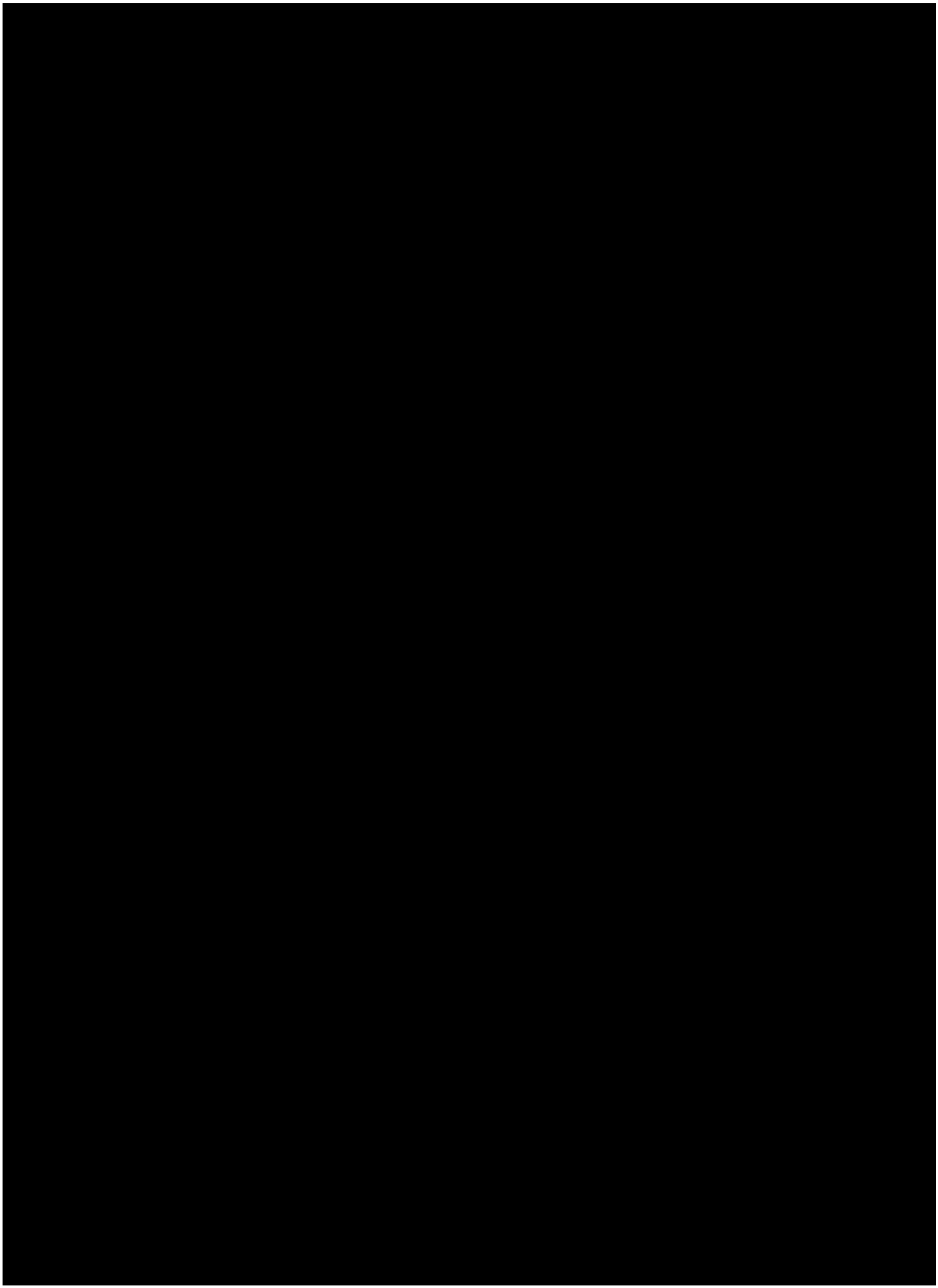
> It is not clear how to establish a target ratio for a benchmark efficient business in the regulated water industry.

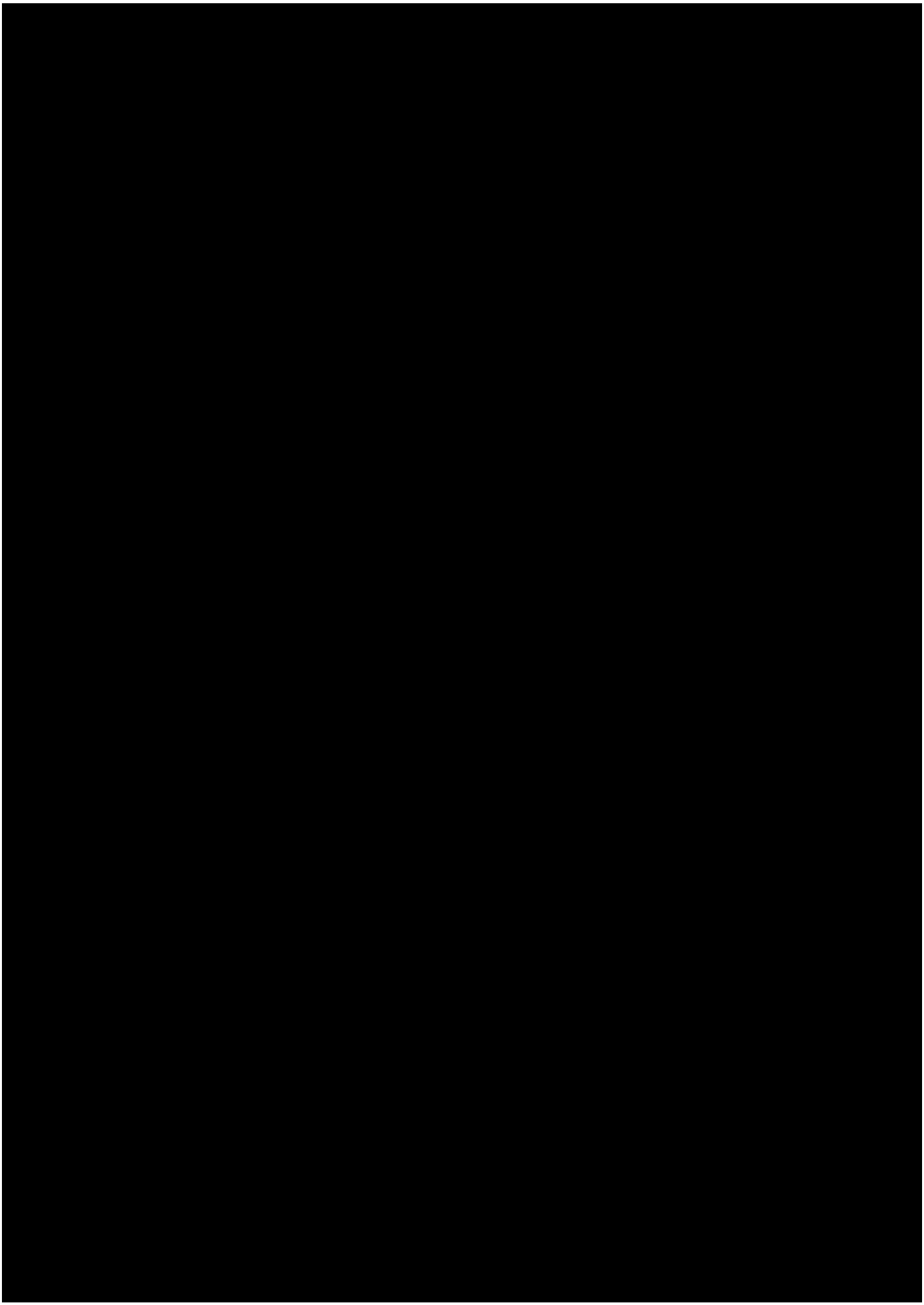
To address this concern, SDP has engaged [redacted] expert advice on an appropriate DSCR target against which the DSCR ratio for SDP may be compared. [redacted]

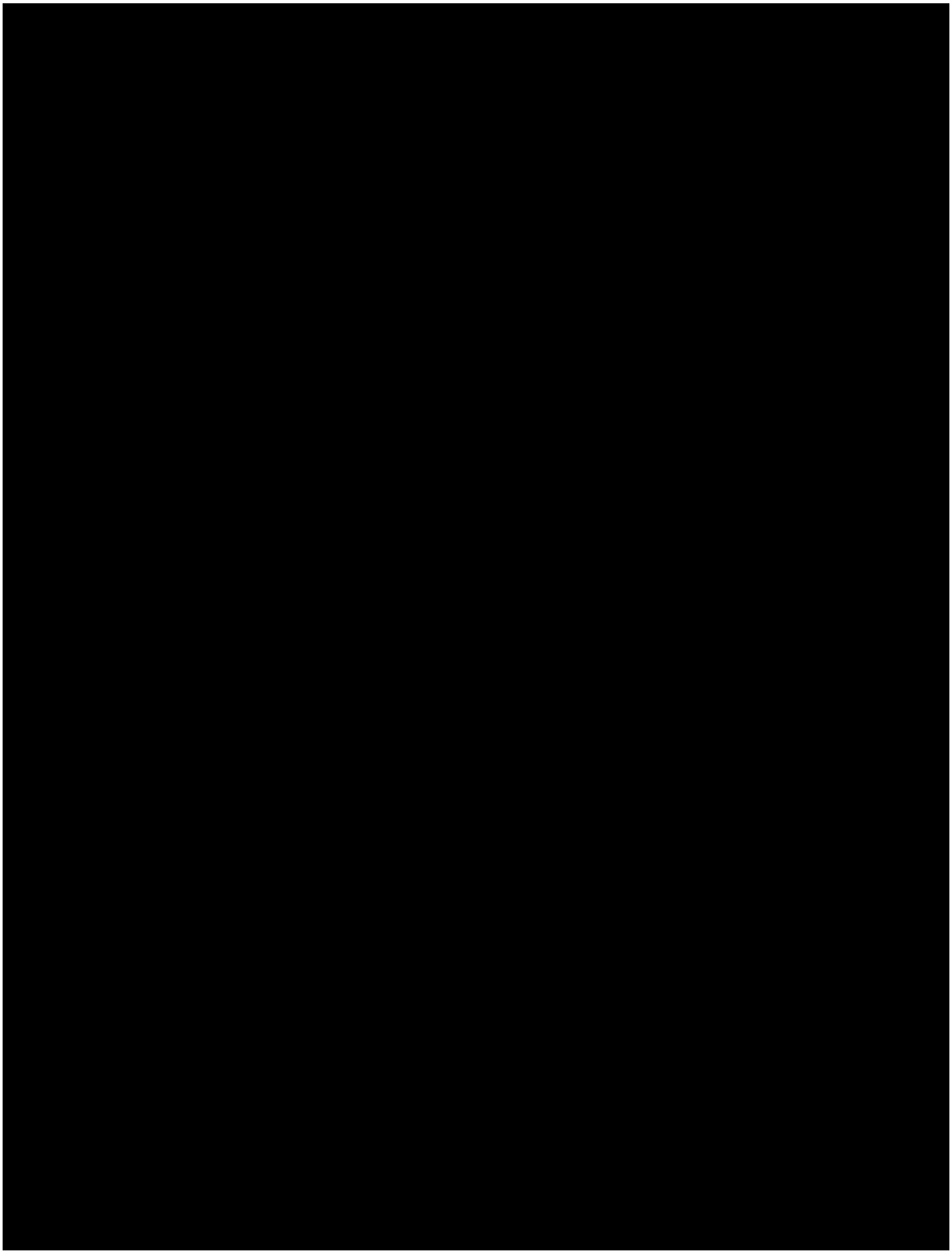
13.2.2. Benchmark financeability assessment

[redacted]

98 IPART, Review of our financeability test, Final Report, November 2018, Table 5.2, p. 48.







14. Miscellaneous Financial Information

This appendix section contains pertinent information required by IPART's Guidelines for Water Agency Pricing Submissions[101] (guidelines) relating to key financial indicators of the Sydney Desalination Plant's performance over the 'historical' and 'forecast' periods.

As per Section 1.3 of the IPART guidelines, the historical period is defined as the "the current determination period plus the last year of the previous determination period"[102] and the forecast period is defined as "five years from the start of the new determination period"[103].

For the purposes of this Appendix, the historical period is defined as 2016/17-2022/23 and the forecast period is 2023/24-2027/28.

14.1 Historical period

14.1.1. Historical operating expenditure

As per Section 2.3 of IPART's guidelines, the information required with respect to historical operating expenditure includes "any totals or comparisons over the determination period (e.g., between years) in real dollars, using inflation figures provided in the SIP letter"[104]. **Table 14.1** presents the necessary information to address this requirement. All other requirements relating to historical operating expenditure are met in Chapter 9 of the main submission or Appendix 9.

Table 14.1: *Operational Expenditure Actual versus Allowed 2016-17 to 2022-23 (real $22/23, $million)*

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
IPART Determination	18.28	21.78	32.20	86.22	44.66	46.64	47.14
Actual/Forecast	26.76	21.04	31.96	80.46	47.13	47.74	54.34

Note: IPART Determination Allowance 2016-17 to 2021-22 calculated on a pro-rata basis using the volume of water produced and escalated to $nominal using June on June CPI. 2022-23 notional allowance calculated by escalating 2021-22 allowance by forecast 2022-23 CPI.

Source: Sydney Desalination Plant

14.1.2. Historical capital expenditure

As per Section 2.3 of IPART's guidelines, the information required with respect to historical capital expenditure includes "any totals or comparisons over the determination period (e.g., between years) in real dollars, using inflation figures provided in the SIP letter"[105]. **Table 14.2** and **Table 14.3** present the necessary information to address this requirement. All other requirements relating to historical capital expenditure are met in Chapter 10 of the main submission or Appendix 10 and 11.

101 IPART (2020), Guidelines for Water Agency Pricing Submission, November 2020.
102 IPART (2020), Guidelines for Water Agency Pricing Submission, November 2020, p.6.
103 IPART (2020), Guidelines for Water Agency Pricing Submission, November 2020, p.6.
104 IPART (2020), Guidelines for Water Agency Pricing Submission, November 2020, p.13.
105 IPART (2020), Guidelines for Water Agency Pricing Submission, November 2020, p.13.

Table 14.2: *Capital Expenditure Actual versus Allowed 2016-17 to 2022-23 (real $22/23, $million)*

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
IPART Determination	0.02	1.82	38.82	3.42	4.46	4.36	n/a
Actual Costs	0.02	0.32	36.68	0.34	0.79	5.13	12.77

Source: Sydney Desalination Plant

Table 14.3: *Historical capital expenditure (real $22/23, $million)*

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Plant – membranes	-	-	33.36	-	-	-	2.28
Plant – other	-	0.01	2.52	0.21	0.47	4.52	10.24
Pipeline	-	0.04	0.76	0.12	0.30	0.61	0.11
Corporate	0.02	0.27	0.04	0.01	0.02	0.01	0.14
Total Capex	**0.02**	**0.32**	**36.68**	**0.34**	**0.79**	**5.13**	**12.77**

Source: Sydney Desalination Plant

14.1.3. Historical revenue

As per Section 2.3 of IPART's guidelines, the information required with respect to historical revenue includes "the totals or comparisons in real dollars, using inflation figures provided in the SIP letter"[106]. **Table 14.4** presents the necessary information to address this requirement. All other requirements relating to historical revenue are met in Chapter 3 of the Appendix.

Table 14.4: *Historical regulated revenue (real $22/23. $million)*

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23*
Total Regulated Revenue	231.0	202.0	228.1	275.3	227.5	217.1	207.2

Source: Sydney Desalination Plant

*Note: * Target production for 2022-23 remains highly uncertain and subject to Sydney Water ERNs. ERN#15 issued in August 2022 was for 250 ML/day. Expected revenue based on assumed production of 23 GL.*

106 IPART (2020), Guidelines for Water Agency Pricing Submission, November 2020, p.12.

14.2 Forecast period

14.2.1. Forecast operating expenditure

As per Section 3.1 of IPART's guidelines, the information required with respect to forecast operating expenditure includes "forecast operating expenditure by service/service area or mode of operation, for each year of the next five years. These costs should be presented in real dollars of the year stated in your SIP letter from IPART (e.g., $2021-22)"[107]. **Table 14.5** presents the necessary information to address this requirement. All other requirements relating to forecast operating expenditure are met in Chapter 9 and Chapter 12 of the main submission and Chapter 9 of the Appendix.

Table 14.5: *Forecast Operating Expenditure (real $22/23, $million)*

	2023-24	2024-25	2025-26	2026-27	2027-28
Total operating expenditure	57.91	58.36	62.55	59.95	61.85

Source: Sydney Desalination Plant

14.2.2. Forecast capital expenditure

As per Section 3.2 of IPART's guidelines, the information required with respect to forecast operating expenditure includes "forecast efficient capital expenditure for each year over the next five years. These costs should be presented in real dollars of the year stated in your SIP letter from IPART (e.g., $2021-22)"[108]. **Table 14.6** presents the necessary information to address this requirement. All other requirements relating to forecast operating expenditure are met in Chapter 9 and Chapter 12 of the main submission and Chapter 9 of the Appendix.

Table 14.6: *Forecast Capital Expenditure (real $22/23, $million)*

	2023-24	2024-25	2025-26	2026-27	2027-28
Total capital expenditure	24.02	22.39	18.31	16.28	15.72

Source: Sydney Desalination Plant

107 IPART (2020), Guidelines for Water Agency Pricing Submission, November 2020, p.16.
108 IPART (2020), Guidelines for Water Agency Pricing Submission, November 2020, p.19.

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