IPART

Independent Pricing and Regulatory Tribunal
New South Wales

Sydney Desalination Plant Pty Ltd

Review of prices from 1 July 2017 to June 2022

Draft Report
Water

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Invitation for submissions

IPART invites written comment on this document and encourages all interested parties to provide submissions addressing the matters discussed.

Submissions are due by 18 April 2017.

We would prefer to receive them electronically via our online submission form www.ipart.nsw.gov.au/Home/Consumer_Information/Lodge_a_submission.

You can also send comments by mail to:

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Independent Pricing and Regulatory Tribunal
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Late submissions may not be accepted at the discretion of the Tribunal. Our normal practice is to make submissions publicly available on our website www.ipart.nsw.gov.au as soon as possible after the closing date for submissions. If you wish to view copies of submissions but do not have access to the website, you can make alternative arrangements by telephoning one of the staff members listed on the previous page.

We may choose not to publish a submission—for example, if it contains confidential or commercially sensitive information. If your submission contains information that you do not wish to be publicly disclosed, please indicate this clearly at the time of making the submission. IPART will then make every effort to protect that information, but it could be disclosed under the *Government Information (Public Access) Act 2009* (NSW) or the *Independent Pricing and Regulatory Tribunal Act 1992* (NSW), or where otherwise required by law.

If you would like further information on making a submission, IPART's submission policy is available on our website.

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1 Executive Summary

The Independent Pricing and Regulatory Tribunal (IPART) is currently determining the maximum prices charged by the Sydney Desalination Plant Pty Ltd (SDP).[1]

This Draft Report sets out our draft decisions on SDP's maximum prices over the 5-year period from 1 July 2017 to 30 June 2022 (the 2017 determination period). It also:

- discusses the impact of our draft decisions on SDP's customers and other stakeholders, and
- explains how we reached these draft decisions, and how our draft prices compare to the 2012 Determination (which set maximum prices from 1 July 2012 to 30 June 2017) and SDP's proposed prices.

All dollar figures in this Draft Report are in $2016-17, unless stated otherwise.

1.1 Our draft prices for SDP result in bill decreases for customers

The desalination plant is a key element in Greater Sydney's water security plan. It was built to ensure a secure water supply for the Greater Sydney region, both in the long term and in response to drought events, as part of the NSW Government's Metropolitan Water Plan.[2]

Under the Metropolitan Water Plan and SDP's Network Operator's Licence, SDP is required to operate at full production and supply Sydney Water Corporation's (Sydney Water) area of operations when dam levels fall below a specified point and continue to do so until dam levels rise to a certain point. Throughout this Draft Report, for simplicity, we refer to this range of dam levels in which SDP must operate as **'drought',** consistent with SDP's drought response role.

Currently, Sydney Water is SDP's only customer and pays all of SDP's fixed costs, when the plant is either shutdown or operating. SDP's costs are passed on to end-use water customers through Sydney Water's residential and non-residential prices (which are subject

1 We determine SDP's prices in accordance with a standing Ministerial reference under section 52 of the *Water Industry Competition Act 2006* (WIC Act). We received the initial Terms of Reference on 6 May 2011. The initial Terms of Reference was replaced by the current Terms of Reference on 16 February 2012 (see Appendix A).

2 In July 2007, Sydney Water was directed by the then Minister for Water Utilities, under section 20P of the *State Owned Corporations Act 1989*, to construct and operate the desalination plant and associated infrastructure. In 2007, IPART was subsequently directed, under section 16A of the IPART Act, to include in its 2008 determination of maximum prices for Sydney Water an amount representing the efficient costs of the requirements imposed on Sydney Water. The Government's Metropolitan Water Plan was first developed in 2004 in response to indications a drought was taking hold. The Plan was updated in 2006 due to the deepening drought, where it identified a role for a desalination plant. See IPART, *Review of prices for Sydney Water Corporation's water, sewerage, stormwater and other services from 1 July 2008 – Determination and Final Report*, June 2008, Appendix B. NSW Government, Metropolitan Water Directorate, *Updating the Plan*, at https://www.metrowater.nsw.gov.au/planning-sydney/updating-plan, accessed on 11 March 2017.

to a separate IPART price determination). **Based on our draft prices, the cost of SDP would go down in 2017-18 in a typical Sydney Water customer's annual bill**:[3]

- When the plant is shutdown, the yearly cost of SDP per customer would fall 10% from $96.78 in 2016-17 to $86.87 in 2017-18.
- When the plant operates, the yearly cost of SDP per customer would fall 7% from $134.75 in 2016-17 to $124.76 in 2017-18.

Whether the plant operates or not, SDP's costs would then increase on average by 0.4% each year over the 5-year determination period, which is less than our 2.5% estimate of the rate of inflation.

In 2017-18, the plant is expected to be shutdown, given current dam storage levels of 89%.[4] SDP went into water security (shutdown) mode after its proving period in June 2012, as dam storage levels were 98%. It has remained in water security mode since.

The plant is also in a state of care and maintenance following significant damage from a storm event that occurred on 16 December 2015. **The damage to the desalination plant is fully covered by SDP's insurance and will not impact prices.** We understand the plant will be reinstated and operable from 1 July 2018.

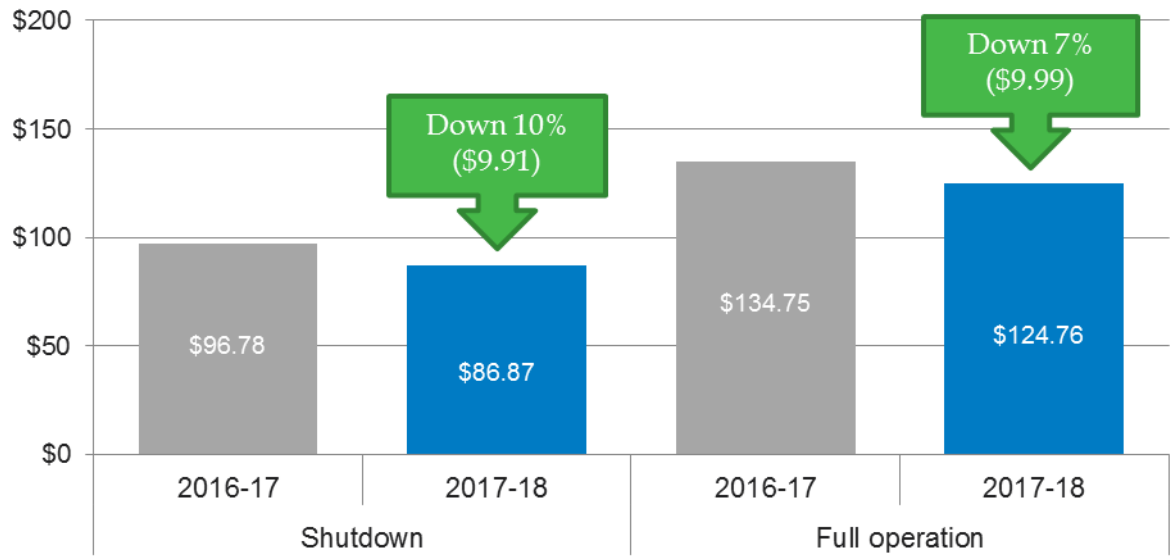
From 2018-19 onwards, if drought were to occur and the plant is called into operation, Sydney Water customers would pay, on average, an additional $37.94 in their annual bill. This recovers SDP's costs of producing and supplying water, as well as the additional fixed operating costs needed to run the plant.

Figure 1.1 shows how the costs of SDP for a typical Sydney Water customer are expected to fall as a result of our draft decisions.

3 Customers would pay the 2017-18 costs of SDP in 2018-19, given the one year lag in the cost pass-through mechanism under the Sydney Water 2016 Determination. These costs are expressed in $2017-18 for simplicity.

4 WaterNSW, Sydney's dam level total at Friday 17 March 2017, http://www.waternsw.com.au/home, accessed on 11 March 2017.

Figure 1.1 Annual cost of SDP for a typical Sydney Water customer ($/year, $ nominal) – with inflation



We have set draft prices to allow SDP to recover its prudent and efficient costs of delivering its services based on its operating environment. We engaged expert consultants to assist us in reviewing SDP's capital and operating expenditure proposals.

In developing our draft decisions, we have designed a regulatory framework and assessed SDP's efficient costs through the lens of SDP's primary role of drought response. Accordingly, **when the plant is shutdown, we have limited expenditure to essential maintenance activities only**. We have reinforced this by disallowing significant plant testing costs proposed by SDP in the upcoming price path. We have also reduced expenditure in shutdown by:

- deferring the cost of installing an additional pump until it is required
- applying efficiency targets to SDP's corporate costs, and
- ensuring the costs of replacing membranes are paid for only when needed.

Controlling for movements in market interest rates, **we have reduced SDP's proposed revenue requirement over the 5-year determination period by $48.4 million** (or 5.4%) – ie, from $896.1 million to $847.7 million.[5] Most of these savings are a result of our adjustments to SDP's proposed operating and maintenance costs.

Should the plant be called into operation, SDP's required revenue would be about $238.1 million per year. On average, it costs about $68.6 million more per year to operate the plant compared to when it is shutdown. This is due to the energy intensive nature of the desalination process, which explains about 69.0% of this increase (ie, $47.3 million). Our benchmark energy costs have increased significantly since the 2012 Determination because

5 SDP proposed a revenue requirement of $852.7 million over the 5-year determination period. This was based on a proposed Weighted Average Cost of Capital (WACC) of around 4.5%, in line with our biannual WACC update from August 2016. Since then several key WACC parameters have increased to reflect current market conditions, resulting in a WACC of 4.9%. Controlling for movements in the WACC, SDP's proposed revenue requirement would be about $896.1 million over the 5-year period (ie, based on our draft WACC of 4.9%).

of the increase in both 'black' and renewable energy components of the benchmark price. SDP is required to use 100% renewable energy as part of the planning approval for the plant.[6] Consistent with the Terms of Reference for our price determination, we have also included an allowance in prices over the 2017 determination period for the losses made on the sale of SDP's surplus energy while it was shutdown over the 2012 determination period.

We have included all necessary costs to ensure that the plant can respond effectively to drought, if required to do so over the next five years. In line with our expenditure consultant's recommendations, we have allowed for the costs of a full set of membranes on the first restart of the plant. This is because the plant has been in a prolonged period of shutdown (since July 2012) and the stock of membranes will be reaching the end of its asset life (8 years) early in the 2017 determination period. We have also decided to capitalise these costs so that they are recovered gradually over the life of the membrane stock, rather than upfront as a one-off payment. This approach ensures these costs (should they occur) would be subject to a review of prudence and efficiency by our expenditure consultant at the next price review.

We have also strengthened financial incentives[7] to ensure that SDP maximises its supply during drought. But we have been mindful of the difference between events that affect the plant's capacity to supply during drought that are within SDP's control and those that fall outside its control. We have balanced our objectives of providing value for SDP's customers while ensuring SDP is not unduly exposed to risk:

- Where SDP can insure against events that may impede its ability to maximise supply during drought, we have maintained provision to reduce SDP's fixed charges, as this provides the best value for water customers and allows SDP to recover its fixed costs through its insurance.
- Where events are uninsurable (eg, acts of war), we have decided not to reduce SDP's fixed charges.

This enhanced financial incentive would apply from 1 July 2018, when the plant is expected to be reinstated following the December 2015 storm event.

As mentioned above, SDP's drought response role is reflected in the Network Operator's Licence it holds under the WIC Act and in the Government's Metropolitan Water Plan. The Metropolitan Water Plan was recently updated, released on 19 March 2017.[8]

Under the new Plan, the 'on' and 'off' triggers for the desalination plant have been lowered to run the water supply system more cost effectively, taking account of changes in demand over the medium term.[9] SDP is to operate in drought response[10] when the total dam storage

6 The project approval for SDP was granted under the *Environmental Planning and Assessment Act 1979*. IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2012 - Final Report*, December 2011, p 17.

7 The 2012 Determination established an abatement mechanism that applies to SDP's fixed charges when it produces volumes of water less than the plant's full production capacity under the 70/80 rule – ie, when it is called into operation when dam storage levels fall to 70%, and until they rise to 80%. The objective of the abatement mechanism is to provide a financial incentive to SDP to respond fully to drought. But under the 2012 Determination, SDP's fixed charges are not abated when it is shutdown, or restarting, even during drought.

8 The Hon Don Harwin MLC, Minister for Resources, Minister for Energy and Utilities, *New Water Plan to save Greater Sydney*, Media release Sunday 19 March 2017.

9 NSW Government, *2017 Metropolitan Water Plan*, March 2017, pp 24.

level is below 60% (previously 70%) and continue to do so until the total dam storage level reaches 70% (previously 80%).[11]

While our Draft Determination is based on the previous 70/80 operating rules (which are referenced throughout this report), we consider it is equally applicable under the new operating rules. Our expenditure consultant noted that any changes in the rules causing the plant to operate less frequently are not likely to impact on the findings on operating modes and efficient costs.[12] Nonetheless, we are seeking stakeholder comments on the implications of SDP's new operating rules under the 2017 Metropolitan Water Plan in making our Final Determination.

Finally, we have decided to use a principles based approach to share SDP's costs in line with those who create a need for the plant to exist and the purpose for which the plant is called into operation. That is:

- in drought, **impactors** pay (bulk water users drawing from WaterNSW's dams and SDP's desalination plant), and
- outside of drought, **beneficiaries** pay (direct users of SDP).

Impactors that directly affect Greater Sydney's water storage levels would always pay the base costs of maintaining the plant as a form of drought insurance premium or water security payment.[13] Outside of drought, the additional fixed costs needed to operate the plant would be paid for by beneficiaries, given that the supply of desalinated water under these circumstances is a discretionary service.

Our cost sharing rules result in an efficient outcome when allocating costs to impactors and beneficiaries in and out of drought. As a result, desalinated water would not become cheaper to buy than dam water, nor would desalinated water be cross-subsidised by Sydney Water for third party customers.

Our draft prices are presented in Table 1.1 below.

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10 The Metropolitan Water Plan does not define 'drought' according to the desalination plant's trigger levels. However, the desalination plant, along with other water sources, is accessed as the water levels in dams reduce. Therefore, the plant is a drought response measure, aimed at securing supply of water. We refer to SDP's operating rules to distinguish between when the plant is operating in its drought response role and when it is not.

11 NSW Government, *2017 Metropolitan Water Plan*, March 2017, pp 28-29; and NSW Government, *2010 Metropolitan Water Plan*, August 2010, p 36.

12 Atkins Cardno, Expenditure Review – SDP, February 2017, p 7.

13 They would do so in proportion to their draw on the total water supply system. Total system draw is comprised of bulk water sourced from WaterNSW's dams supplying Greater Sydney and SDP's desalination plant (when in operation). This means SDP's fixed charges could be paid by bulk water users that do not necessarily receive direct supply from SDP.

Table 1.1 IPART's draft prices for the 2017 determination period ($2016-17)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	% change 2016-17 to 2021-22
Plant service charges ($/day)							
Base service charge	391,257	369,694	366,176	360,890	357,207	352,780	**-9.8%**
Incremental service charge	37,034	21,832	22,232	22,246	22,022	23,337	**-37.0%**
Pipeline service charge ($/day)	140,610	103,018	103,021	102,682	102,875	102,725	**-26.9%**
Membrane service charge ($/day)	-	14,301	13,798	13,258	12,791	12,288	**-**
Transition to restart ($'000 per event)	6,053	9,654	9,577	9,500	9,488	9,483	**56.7%**
Transition to shutdown ($'000 per event)	1,588	1,686	1,686	1,686	1,686	1,686	**6.2%**
Water usage charge ($/ML)	687	684	669	654	652	651	**-5.2%**

Note: Numbers may not add due to rounding.

Note: The first year of the determination is 2017-18. Results for 2016-17 are provided for comparative purposes.

Source: IPART analysis.

1.2 Our review process

In making our draft pricing decisions, we have complied with our Terms of Reference (see Appendix A). These Terms of Reference require us to determine prices for two services:

a) the supply of non-rainfall dependent drinking water to purchasers, and

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

We have also taken into account a broad range of issues consistent with the matters we must consider under the *Independent Pricing and Regulatory Tribunal Act 1992* (the IPART Act) (see Appendix B).

SDP submitted its pricing proposal to IPART on 27 October 2016. SDP redacted certain information from the public version of its pricing proposal on the grounds of commercial confidentiality.

At the Public Hearing, SDP disclosed some of the information that had been redacted from the public version of its pricing proposal. Accordingly, it has resubmitted its pricing proposal to include some information that was originally redacted. No other changes have been made to SDP's revised pricing proposal.

We have referred to SDP's revised pricing proposal throughout this Draft Report. We will make SDP's revised pricing proposal available on our website at the same time as we publish our Draft Report. To avoid any confusion, we will also mark SDP's original pricing proposal on our website as 'superseded'.

As part of our review process, we have undertaken an extensive investigation and public consultation, including:

- released an Issues Paper in August 2016 to assist stakeholders identify and understand the key issues for review
- invited SDP to make a pricing proposal in October 2016 detailing its prices, financial and performance data on the future capital and operating expenditure necessary to maintain service levels and respond to regulatory demands
- invited stakeholders to make submissions on the Issues Paper and SDP's pricing proposal by 11 November 2016[14]
- held a Public Hearing in December 2016 to discuss a wide range of issues raised by SDP and other stakeholders
- engaged independent consultants to review SDP's:
  - capital expenditure, asset planning and operating expenditure proposals - WS Atkins International (Australia) Limited, in association with Cardno (Queensland) Pty (Atkins Cardno)[15]
  - proposed allowances for energy costs and the energy adjustment mechanism – Marsden Jacob Associates Pty Limited (Marsden Jacob)[16]
  - insurance coverage for material damage and business interruption - Atkins Cardno in association with Deloitte Consulting Pty Ltd (Deloitte) (confidential report).[17]

Our Issues Paper, stakeholder submissions, the transcript from the Public Hearing, and consultants' reports are available on our website (www.ipart.nsw.gov.au).

1.3 How can stakeholders have their say?

We invite submissions from all interested parties, which we will consider before finalising our decisions and our report in June 2017. Stakeholders will be able to comment on our draft pricing decisions by 18 April 2017. The indicative timetable for this review is outlined in Table 1.2 below.

14 A total of 6 written submissions were received from other interested parties.

15 Atkins Cardno's final report was finalised in February 2017 and published on our website in March 2017. Atkins Cardno in association with Deloitte Consulting Pty Ltd final report was received in December 2015. Much of the supplementary information on costs used in its analysis was provided to us by Sydney Water on a commercial-in-confidence basis. Therefore, we have not published this report on our website.

16 Marsden Jacob's final report was received in January 2017 and published on our website in March 2017.

17 Atkins Cardno in association with Deloitte final report was received in January 2017. Much of the information on SDP's insurance policies used in its analysis was provided to us by SDP on a commercial-in-confidence basis. Therefore, we have not published this report on our website.

Table 1.2 Timetable for the review of SDP's prices

Milestone	Timeframe
Released Issues Paper on the price review and Methodology Paper	*29 August 2016*
Received SDP's pricing proposal	*24 October 2016*
Received public submissions on Issues Paper and SDP's pricing proposal	*11 November 2016*
Held Public Hearing	*8 December 2016*
Released Draft Report and Draft Determination	*21 March 2017*
Receive submissions to Draft Report and Draft Determination	18 April 2017
Release Determination and Final Report	June 2017

Concurrent to this determination of SDP's maximum prices, we are also reviewing the Methodology Paper[18] we published in 2012 setting out our approaches to provide SDP with an:

- energy adjustment mechanism (EnAM), and
- efficiency adjustment mechanism (EfAM).

Our Issues Paper summarised the key issues on how the existing energy and efficiency adjustment mechanisms are working and what changes, if any, should be made to these mechanisms.

We have released a **separate** Draft Methodology Paper and invite further comments from SDP and other stakeholders (also accessed from our website www.ipart.nsw.gov.au). We will consider all these comments before publishing a separate Methodology Paper in June 2017.

1.4 Structure of this Draft Report

The rest of this Draft Report provides more information about our draft decisions, and SDP's pricing proposal:

- Chapter 2 discusses the regulatory framework within which we set maximum prices. Our main objective is to set prices to allow SDP to recover the efficient cost of providing its monopoly services over the life of its assets, as required by the Terms of Reference.
- Chapter 3 outlines the improvements we are making to SDP's incentives to maximise its production and supply of water during drought.
- Chapters 4 to 8 discuss the issues related to the steps in our approach for setting SDP's maximum prices:
  - Chapter 4 covers SDP's notional revenue requirement, which represents our view of the total efficient costs of providing SDP's monopoly services in each year of the 2017 determination period.
  - Chapters 5 and 6 cover SDP's efficient operating, capital and energy related expenditure.

18 IPART, *Sydney Desalination Plant – Efficiency and Energy Adjustment Mechanisms - Methodology Paper*, April 2012.

- Chapter 7 looks at how we calculated allowances for a return on assets and regulatory depreciation.
- Chapter 8 discusses our decisions on price structures.

- Chapter 9 describes how the charges presented in Chapter 8 are to be shared in the event SDP serves multiple customers (ie, customers in addition to Sydney Water).
- Chapter 10 outlines how we have decided to capitalise the prudent and efficient cost of a full membrane replacement following the first restart of the plant.
- Chapter 11 presents price levels and assesses the implications of our pricing decisions on retail customers, SDP, general inflation, and the environment.

1.5 List of draft decisions

Our draft decisions are outlined in the chapters of this Draft Report. For convenience, they are also listed below.

We have made Draft Decisions to:

Length of determination [1]

1 Adopt a 5-year determination period from 1 July 2017 to 30 June 2022. 16

SDP's operating modes [2]

2 Simplify SDP's modes of operation modes for pricing purposes to the following - water security (shutdown), restart, and plant operation. In doing so, we have: 19

- removed the intermediate shutdown modes in the 2012 Determination – ie, short-term, medium-term and long-term shutdown 19
- retained the definitions of plant operation and restart periods in the 2012 Determination (subject to clarifying changes and consequential changes following amendments to the definition of "Shutdown Period"), and 19
- redefined the shutdown period to begin from the 11th consecutive day of no production. 19

Regulating SDP's prices [3-4]

3 Continue regulating SDP's prices outside drought for all customers. 23

4 Retain the nil price outside drought to Sydney Water except in the exceptional circumstances specified in the Water Supply Agreement, which are to: 24

- mitigate the effects of a public health incident, or 24
- ensure security of supply or network stability during periods of outages, unavailability or maintenance on any water industry infrastructure in Sydney Water's areas of operations. 24

Cost pass-through mechanism [5]

5 Not include a general cost pass-through mechanism in the 2017 Determination. 26

Abatement mechanism [6-13]

6 Broaden the abatement mechanism to apply uniformly during drought from 1 July 2018. This means: 29

- SDP's fixed charges would be abated for shutdown and restart days during drought resulting from: 30
  - o events within SDP's control, and 30
  - o insurable events outside SDP's control. 30
- the daily volumes produced on these shutdown or restart days (ie, 0 ML) would be included in the abatement factor, and 30
- the abatement factor would apply to SDP's fixed daily charges during these shutdown and restart days. 30

7 Provide SDP with an 8-month 'grace' period from abatement when the plant first responds to a drought period under the 70/80 rule: 34

- The daily volumes of production will not be included in the abatement factor for an 8-month period, commencing on the day when dam levels first fall below 70% since they were last above 80%. 34
- The abatement factor will, however, still apply to all daily fixed charges during a plant operation period including for any plant operation period that falls within the 8-month 'grace' period from abatement. 34

8 Align the abatement mechanism with the design parameters of the plant by: 35

- Removing the 250 ML cap on daily volumes for calculation of the abatement factor applied to daily fixed charges. 35
- Retaining the averaging period of 365 days for calculation of the abatement factor. 35
- Introducing a true-up of fixed charges to claw back any over-recovery of revenue over a single episode of drought, which: 35
  - o includes holding costs calculated using the relevant WACC, and 35
  - o is payable at the end of a drought response period. 35
- Resetting the abatement factor to one, if the plant exits drought with an abatement factor above one. 35
- Retaining and using the abatement factor, if the plant exits drought with an abatement factor less than one. 35

9 Exempt SDP from abatement on any day when it is required to reduce production below 250ML per day in order to comply with a law or a binding direction, order or similar made under a law. 40

10 Not exempt SDP from abatement when Sydney Water is unable to accept water on a day. 41

11 Exempt SDP from abatement when the plant is responding to Sydney Water in one of the exceptional circumstances specified in the Water Supply Agreement. 41

12 Continue to apply the abatement factor to all daily fixed charges, which includes base, incremental and membrane service charges under our draft price structures. 42

13 Deem the Daily Volume on 364 Availability Days preceding the first Availability Day equal to 250 ML per day for the 2017 determination period where no prior history exists. 42

Notional revenue requirement [14]

14 Set SDP's notional revenue requirement in each year of the 2017 determination period for: 43

– the plant in operation and water security (shutdown) modes, as shown in Table 4.1, and 43

– the pipeline across all modes of operation, as shown in Table 4.2. 43

Application of Energy and Efficiency Adjustment Mechanisms [15-16]

15 Include an allowance into prices over the 2017 determination period for the losses made on the sale of SDP's surplus energy while it was shutdown over the 2012 determination period of $28.9 million or $5.8 million per year (real $2016-17 and including financing costs). This is consistent with the Terms of Reference. 52

16 Include an efficiency carryover of $50,000 p.a. for the first three years of the 2017 determination period based on applying the 2012 EfAM methodology. 56

Prudent and efficient past capital expenditure [17]

17 Include in the RAB over the 2012 determination period prudent and efficient capital expenditure for the plant and pipeline as set out in Table 5.1 and Table 5.2. Our decision accepts SDP's proposed costs. 58

Expenditure on plant and pipeline over the 2017 determination period [18-23]

18 Set the efficient level of SDP's operating expenditure (plant and corporate) in water security (shutdown) mode as outlined in Table 5.3. Our draft decision is $38.7 million (or 32%) lower than SDP's proposed costs. 60

19 Set the efficient level of SDP's operating expenditure (plant and corporate) in plant operation mode as outlined in Table 5.4. Our decision is $55.3 million (or 12%) lower than SDP's proposed costs. 61

20 Set the efficient level of SDP's one-off operating expenditure (including energy) to transition to restart as outlined in Table 5.5. Our draft decision is on average $29.7 million (or 76%) lower than SDP's average proposed costs. 62

21 Set the efficient level of SDP's one-off operating expenditure (including energy) to transition to shutdown as outlined in Table 5.6. Our draft decision accepts SDP's proposed costs. 63

22 Include in the RAB the forecast capital expenditure for the plant as outlined in Table 5.7 over the 2017 determination period. Our draft allowance is $12 million (or 478%) higher than SDP's total proposed costs. 64

23 Set forecast capital and operating expenditure over the 2017 determination period for the pipeline as outlined in Table 5.8. Our draft decision accepts SDP's proposed costs. 65

Membrane replacement expenditure [24-25]

24 Set SDP's prudent and efficient capital expenditure at $30 million for a full membrane replacement on the first restart in the 2017 determination period. These costs would be payable at most once in the 2017 determination period. For clarity, this includes a restart: 67

– triggered by drought response, or 67

– discretionary use of the plant by third-party customers outside drought. 67

25 Not provide any further allowances for the ongoing replacement of membranes in the 2017 determination period. 67

Ex-post review of uncertain expenditure [26]

26 Not include in the RAB the prudent and efficient capital costs of an extra drinking water pump ($2.1 million) and a skid test unit ($1 million) given the uncertainty in timing of this expenditure. Rather, these costs would be re-assessed for efficiency and included (with holding costs at WACC) at the next review of SDP prices. 71

Energy costs [27-31]

27 Set energy cost allowances as outlined in Table 6.2. 75

28 Continue to set energy cost allowances based on market based estimates of efficient energy costs. 79

29 Set efficient benchmark energy unit prices as outlined in Table 6.3. 81

30 Set benchmark energy volumes as outlined in Table 6.6. 85

31 Maintain the cost pass-through mechanism used in the 2012 Determination for SDP's energy network costs. 86

Regulatory Asset Base [32-37]

32 Set the opening RAB at 1 July 2017 by rolling the historical RAB forward from 2011-12 to 2016-17 as outlined in Table 7.1. 87

33 Roll forward the RAB from 1 July 2011 to 30 June 2012 by taking account of actual CPI, but not updating for actual capital expenditure. 88

34 Correct asset category values used in the 2012 Determination to roll the RAB forward from 1 July 2012 to 30 June 2017. 89

35 Correct asset lives used in the 2012 Determination to roll the RAB forward from 1 July 2017. 90

36 Maintain our standard practice of using allowed depreciation to roll forward the historical RAB. 91

37 Adopt the value of the RAB in each year of the 2017 determination period as set out in Table 7.5. 92

Return on capital [38-39]

38 Apply a real post-tax WACC of 4.9% for the purposes of calculating an appropriate rate of return on SDP's assets. 93

39 Set an allowance for return on capital as outlined in Table 7.7. 93

Return of capital [40]

40 Accept SDP's infrastructure based asset categories, with minor adjustments, as set out in Table 7.8 and 96

– adjust SDP's proposed new and existing asset lives as set out in Table 7.9, and 96

– set an allowance for regulatory depreciation as set out in Table 7.10. 96

Regulatory tax [41-43]

41 Adopt the regulatory tax allowance as set out in Table 7.11. 100

42 Maintain the current statutory corporate tax rate of 30% to calculate SDP's taxation allowance for the purposes of setting prices over the 2017 determination period. 101

43 Adopt SDP's proposed approach to the treatment of tax loss carryovers for the distribution pipeline. 102

Price structures [44-48]

44 Split water service charges into: 104

– a base service charge ($/day), reflecting SDP's efficient fixed costs when in water security (shutdown) mode, and 104

– an incremental service charge ($/day), reflecting the difference in SDP's efficient fixed costs between water security (shutdown) and plant operation modes. 104

45 Retain a water usage charge ($/ML) for supplying non-rainfall dependent drinking water. 105

46 Continue transition charges, which reflect the efficient one-off operating costs of moving from shutdown into plant operation mode and vice versa. 106

47 Ensure transition charges (for restart and shutdown) are payable only once. Either: 106

– when triggered by dam storage levels when the plant is responding to drought; or 106

– upon notice by a customer to start or cease supply outside drought. 106

48 Continue to set a mode-independent pipeline charge. 107

Cost sharing rules [49-53]

49 Change the cost sharing rules in the event that SDP serves multiple customers to reflect the desalination plant's primary role as a drought response measure, such that: 109

– Base service charges (and pipeline service charges) are always paid for by impactors 109

– Water usage charges are always paid for by beneficiaries, and 109

– Incremental service charges and transition charges are paid by impactors when the plant operates as a drought measure and beneficiaries when it operates commercially outside of drought. 109

50 Define impactors as bulk water users who directly affect Greater Sydney's water storage levels and cause the need for SDP to exist. Specifically, impactors source water from dams supplying Greater Sydney (WaterNSW) and from the desalination plant (SDP) when it operates. 111

51 Share base service charges between impactors based on their proportion of total system draw that day. 112

52 Share incremental service charges 'on the day' between: 114

– impactors during drought based on their proportion of total system draw that day, and 114

– beneficiaries outside drought based on their proportion of desalinated water sold that day. 114

53 Share one-off transition charges (to restart and shutdown): 115

– between existing impactors based on their total system draw over the 12 months prior to a restart for drought and the entire drought episode prior to a shutdown on the completion of drought, and 115

– equally by the beneficiaries that request the restart or shutdown outside drought (ie, issue a notice for SDP to start or cease supply). 115

Treatment of membrane replacement costs [54-57]

54 Establish a separate membrane asset base (membrane RAB) as set out in Table 10.1: 118

- with an opening value of $30 million in the year of first restart 118
- adopting an asset life for membranes of 8 years 118
- not adding any further capital expenditure for the ongoing replacement of membranes, and 119
- rolling forward the membrane RAB until the membranes fully depreciate. 119

55 Set separate charges to recover the capitalised costs of a full membrane replacement over the 2017 determination period, which includes the: 120

- schedule of membrane service charges as outlined in Table 10.2, and 120
- one-off charges for residual membrane costs as outlined in Table 10.3. 120

56 Apply the following charging rules for membrane costs: 121

- membranes paid for in full by impactors when the plant is triggered by drought 121
- membranes paid for in full by beneficiaries when the plant operates outside drought, and 121
- membrane costs revert to impactors if drought occurs before they are paid in full by beneficiaries. 121

57 Review the prudent and efficient capital costs of membranes associated with supply for emergency response to Sydney Water (ie, exceptional circumstances specified in the Water Supply Agreement) ex-post at the next determination period. 123

- Where appropriate, these costs would be rolled into the historical RAB, including holding costs using the relevant WACC. 123
- These membranes costs would be paid for in full by impactors. 123

Draft prices [58]

58 Set draft prices for the 2017 determination period as outlined in Table 11.1. 125

2 Refining the regulatory framework

In this chapter, we discuss the regulatory framework within which we set prices. We set prices to allow SDP to recover the efficient costs of providing its monopoly services over the life of its assets, as required by the Terms of Reference.

SDP's primary role is to respond to drought. Our expenditure consultants have thus set SDP's efficient costs with reference to this purpose, rather than SDP's ancillary emergency response role. Further, our expenditure consultant has simplified the plant's shutdown modes by eliminating redundant and more costly intermediate shutdown modes.

Outside of drought, we consider there are economic arguments in favour of allowing unregulated pricing agreements. But we are of the view that such agreements would contravene the financial indifference principle in the Terms of Reference. Prices must therefore be regulated.

We have relaxed the nil price to Sydney Water only in circumstances where SDP is required to produce water as part of its emergency response role. This prevents Sydney Water from having to take water imprudently given the requirements of the Water Supply Agreement. We have also regulated the prices for water supplied in an emergency response. Further, our view is that SDP would likely have monopoly power in these circumstances, which could prevent 'win-win' agreements from occurring if prices were negotiated.

In this chapter, we also discuss our decisions to not include a general cost pass-through mechanism and to set the determination period for a 5-year period.

2.1 Length of determination

We have made a draft decision to:

1 Adopt a 5-year determination period from 1 July 2017 to 30 June 2022.

We consider a 5-year determination period provides the most appropriate balance between certainty and flexibility for SDP. In forming our view, we have considered the following issues:

- **The confidence we can place in the utility's forecasts.** We have sufficient confidence in our forecasts of capital and operating expenditure for the next five years. While five years is longer than the determination period for most utilities that we regulate, we consider this is still appropriate for SDP, which is a single asset business. Moreover, we consider that any uncertain areas of significant expenditure have been capitalised (eg, membrane replacement). This will enable us to review the prudence and efficiency of this expenditure at the next price review.

- **The risk of structural changes in the industry.** We consider that significant structural change is unlikely in the next five years. We consider the changes to the SDP's operating rules resulting from the 2017 Metropolitan Water Plan can be accommodated through SDP's Network Operator's Licence and references to this licence within the 2017 Determination.
- **The need for price flexibility and incentives to increase efficiency.** We consider that a 5-year determination provides sufficient incentives to achieve efficiencies, while allowing for a timely reset of prices.
- **The need for regulatory certainty and financial stability.** A 5-year determination generally provides sufficient regulatory certainty while balancing revenue stability.

Stakeholder views on the length of determination

In its pricing proposal, SDP supported a 5-year determination period.[19]

Sydney Water argued a shorter determination period is needed because there is considerable uncertainty around SDP's current operations. In particular, Sydney Water cited:

- the storm damage and repair to SDP's plant and equipment, and
- the review of the current Metropolitan Water Plan and SDP's operating rules.[20]

We consider these issues will not affect the drafting of the 2017 Determination, nor its length. SDP has indicated insurance will cover the repair and replacement of plant and equipment following the storm event.[21] Thus, the rebuild does not affect the Regulatory Asset Base (RAB) nor is there any insurance 'gap' arising from the storm event.

As noted above, the changes to the 2017 Metropolitan Water Plan would be reflected in SDP's Network Operating Licence. Where relevant, the 2017 Determination has referred to the licence and would therefore incorporate any changes. We are seeking stakeholder comments on the implications of SDP's new operating rules under the 2017 Metropolitan Water Plan in making our final determination.

Sydney Water also argued that a 2-year determination period is needed for SDP to determine the costs of membrane replacement.[22] But we consider the capitalisation of membrane replacement costs adequately deals with this issue (see Chapter 10 for more detail).

2.2 SDP's primary role is to respond to drought

The desalination plant is a key element in Greater Sydney's water security plan. It was constructed to ensure a secure water supply for the Greater Sydney region, both in the long-

19 SDP pricing proposal to IPART, October 2016, pp 25-26.
20 Sydney Water submission to IPART Issues Paper, November 2016, pp 39-40.
21 Deloitte, *Insurance Review – SDP*, February 2017.
22 Sydney Water submission to IPART Issues Paper, November 2016, p 20.

term and in response to drought events, as part of the NSW Government's Metropolitan Water Plan.[23]

The 2010 Metropolitan Water Plan states that SDP is to:

- operate the plant at full production and supply Sydney Water's area of operations when the total dam storage level is below 70%, and
- continue to do so until the total dam storage level reaches 80%.[24]

This '70/80 rule' is designed to ensure SDP reduces the likelihood of end-use customers (ie, retail customers) facing water restrictions and to increase Greater Sydney's water security during droughts.[25]

SDP's drought response role is reflected in the Network Operator's Licence it holds under the *Water Industry Competition Act 2006* (the WIC Act). The licence requires SDP to operate and maintain the plant "with the objective of maximising the production of drinking water for the exclusive supply into Sydney Water Corporation's area of operation".[26]

The desalination plant's primary purpose is to provide water supply during drought conditions as defined in its Network Operator's Licence.[27] The overall objective of our expenditure review, therefore, was to establish and recommend the most efficient way to deliver SDP's monopoly services, subject to SDP meeting its drought response role.[28]

Atkins Cardno, our expenditure consultant, concluded that the plant's operating rules are fundamental in setting the mode of operation or shutdown, rather than any need to maintain a higher level of shutdown to respond to any emergencies as defined in the Water Supply Agreement with Sydney Water. In other words, our expenditure consultants examined the most efficient operation for SDP to fulfil its primary drought response, rather than its secondary emergency response role. In this latter case, SDP's response is to use 'best endeavours', with arrangements for cost recovery to be agreed on an ex-post basis as the scope, duration and volume delivered are likely to be uncertain.[29]

Accordingly, in water security (shutdown) mode, Atkins Cardno considered that the cost driver is the licence requirement to maintain the plant in accordance with Good Industry

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23 Sydney Water was directed by the then Minister for Water Utilities, under section 20P of the *State Owned Corporations Act 1989*, to construct and operate the desalination plant and associated infrastructure. IPART was subsequently directed, under section 16A of the IPART Act, to include in its determination of maximum prices for Sydney Water an amount representing the efficient costs of the requirements imposed on Sydney Water. The Government's Metropolitan Water Plan was first developed in 2004 in response to indications a drought was taking hold. The Plan was updated in 2006 due to the deepening drought, where it identified a role for a desalination plant. See IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2012 - Final Report*, December 2011, p 60; NSW Government, *2010 Metropolitan Water Plan*, August 2010, p 11; IPART, *Review of prices for Sydney Water Corporation's water, sewerage, stormwater and other services from 1 July 2008 – Determination and Final Report*, June 2008, Appendix B. NSW Government, Metropolitan Water Directorate, *Updating the Plan*, at http://www.metrowater.nsw.gov.au/planning-sydney/updating-plan, accessed on 11 March 2017.

24 NSW Government, *2010 Metropolitan Water Plan*, August 2010, p 36.

25 We also note that Sydney Water is required to maintain and comply with an agreed roles and responsibility protocol regarding the development and implementation of the Metropolitan Water Plan under its Operating Licence. IPART, *Sydney Water Corporation Operating Licence – Report to the Minister*, May 2015, p 7.

26 See condition A2(b) of SDP's Network Operator's Licence.

27 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 23.

28 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 20.

29 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 7.

Practice.[30] Expenditure, therefore, should be limited to essential maintenance activities and any periodic expenditure, such as membrane replacement and periodic maintenance, should be clearly justified in terms of scope, risk and time. This criterion also applies to significant plant testing costs proposed by SDP in the future price path.[31]

In developing our draft decisions, we have designed a regulatory framework and assessed SDP's efficient costs through the lens of SDP's primary role of drought response. We agree with Atkins Cardno that any need to maintain a higher level of service is ancillary. In its submission to our Issues Paper, WaterNSW opposed SDP becoming a more broadly available supply source outside the operating rules, supporting the view of SDP's primary role as a drought security measure and not a water supply measure.[32]

Nonetheless, we also recognise that the licence does not require SDP to cease operating the plant when available storage reaches 80% (ie, outside drought). Nor does it restrict SDP supplying customers in addition to, or other than, Sydney Water (other than small retail customers).[33] While ancillary to SDP's primary role as a drought response measure, our draft determination accommodates these circumstances.

2.3 Strategic review of modes of operation

We have made a draft decision to:

2 Simplify SDP's modes of operation modes for pricing purposes to the following - water security (shutdown), restart, and plant operation. In doing so, we have:

- removed the intermediate shutdown modes in the 2012 Determination – ie, short-term, medium-term and long-term shutdown
- retained the definitions of plant operation and restart periods in the 2012 Determination (subject to clarifying changes and consequential changes following amendments to the definition of "Shutdown Period"), and
- redefined the shutdown period to begin from the 11th consecutive day of no production.

Our expenditure consultant, Atkins Cardno, conducted a strategic review of SDP's operating modes. It recommended that the defined modes of operation be simplified to:[34]

- Water security (shutdown) mode
- Plant operational mode, and
- Restart mode (distinguishing between first and subsequent restarts).

Atkins Cardno concluded that there are no clear circumstances where short, medium and long-term shutdown modes under the 2012 Determination would apply. Atkins Cardno

30 See condition A2(a)(i) of SDP's Network Operator's Licence.
31 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 7.
32 WaterNSW submission to IPART Issues Paper, November 2016, p 1.
33 SDP is authorised by the Retail Supplier's Licence granted to it under the WIC Act on 9 August 2010 to supply "any person other than a Small Retail Customer" within "Sydney Water Corporation's area of operations (as defined in the Sydney Water Operating Licence)". The term 'small retail customer' is defined under clause 5 of the WIC Regulation. SDP's Retail Supplier's Licence is also known as the WICA licence.
34 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 7.

recommended the prudent approach to minimise costs when the plant is not operating is for SDP to move to a water security (shutdown) mode.[35]

Atkins Cardno recommended water security (shutdown) mode as the base operating mode because it considers that SDP's Network Operator's Licence is clear in defining when the plant needs to be in operation or to be available – ie, in response to drought. Analysis of historical data shows that it is likely to take about one year for the dam levels to drop 10% in a drought; meaning that it would be a number of years following the break of a drought before the dam trigger level is likely to be reached again.[36] Atkins Cardno also noted that there are no clear protocols or definitions in place for determining any other mode of operation on an *ex-ante* basis - short, medium or long - and how any decision is made and agreed with all interested parties.

Although, SDP proposed to maintain all shutdown modes for pricing purposes —short, medium, long-term and water security shutdown modes – it also proposed water security shutdown as a default option following any period of operation, noting that:[37]

> In practice, it will generally make sense to always go into water security shutdown after a period of operation under the 70/80 rule. This is because the time it takes for the storages to drop below 70%, once they have reached 80%, is more likely to be greater than two years than less than two years (i.e. a long-term shutdown), given historical storage patterns….As a corollary, decisions about which modes to enter should be subject to an agreed protocol that the plant will always be placed into water security shutdown after a period of operation once the storages return to 80%, unless SWC (or another customer) requests otherwise.

We support Atkins Cardno's recommendation to simplify SDP's operating modes. In particular, we agree that water security (shutdown) mode should be SDP's default or base operating mode and have restructured SDP's prices and set efficient costs to reflect this (see Chapter 5-8). This is consistent with SDP's proposal to transition to water security shutdown as a default option following any period of operation over the 2017 determination period.[38]

We present definitions of our modes of operation in Box 2.1.

35 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 23.
36 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 23.
37 SDP pricing proposal to IPART, October 2016, pp 115-116.
38 SDP pricing proposal to IPART, October 2016, p 18.

Box 2.1 SDP's modes of operations for the 2017 determination period

We have simplified SDP's modes of operation to three periods:

1. Shutdown period
2. Restart period, and
3. Plant operation period.

We have made no changes to the definitions of plant operation and restart periods to those in the 2012 Determination (subject to clarifying changes and consequential changes following amendments to the definition of "Shutdown Period"). A restart period marks the recommencement of the production of desalinated water following a shutdown. SDP enters a plant operation period when the plant is producing and supplying desalinated water. Desalinated water is water suitable for purposes set out in SDP's Network Operator's Licence and Retail Supplier's Licence.

Given that we have eliminated the intermediate shutdown modes, we have defined a shutdown period to begin from the 11th consecutive day of no production. We refer to this as a 'water security (shutdown)' mode. During a plant operation period, SDP can therefore not produce for 10 days or fewer in duration.

Our definition of a shutdown period complements refinements to the abatement mechanism we have also made to allow SDP to manage short-term fluctuations in output and period maintenance consistent with the plant's design parameters (see Chapter 3).

We outline Atkins Cardno's rationale for removing the intermediate shutdown modes in further detail below. We also outline Atkins Cardno's assessment of the length of time needed to restart from a prolonged water security shutdown.

2.3.1 Removing the intermediate shutdown modes

The 2012 Determination covered a range of modes for shutdown, with varying levels of operating expenditure, including:

- Short-term shutdown for 2 to 10 days.
- Medium-term shutdown for 11 to 90 days.
- Long-term shutdown for 91 days to 2 years.
- Water security shutdown for more than 2 years.

Atkins Cardno noted that many of these modes are not relevant to the plant's primary objective to respond to drought or can be accommodated through appropriate changes to the regulatory framework.[39] Atkins Cardno's specific findings on each of the intermediate shutdown modes are:

39 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 25.

- ***Short-term shutdown (2 to 10 days)***. Atkins Cardno formed the view that routine plant maintenance should be undertaken as part of normal operations and does not require a short-term shutdown mode. It noted that the plant can produce up to 266 ML per day, so a short-term outage could be managed through a modified abatement mechanism[40] that accommodates the plant's capacity to produce up to 266 ML per day.[41]
- ***Medium-term shutdown (11 to 90 days).*** Atkins Cardno assessed that it would be highly unlikely that medium term shutdown would arise due to the dam levels falling below 70% within 3 months since last above 80%. Therefore, this mode of shutdown is not supported by SDP's primary drought response role.[42]
- ***Long-term shutdown (91 days to 2 years).*** While relevant to the plant's drought response role, Atkins Cardno considers this mode does not provide any significant cost advantages compared to water security mode (ie, shutdown of more than 2 years). In the absence of any protocol to explain why a long-term shutdown mode should apply, Atkins Cardno recommended it prudent to minimise costs and move to the water security (shutdown) mode.[43]

We have accepted Atkins Cardno's recommendation to remove short, medium and long-term shutdown modes for pricing purposes. In doing so, we have refined the abatement calculation to align with the plant's design parameters so that short-term outages can be managed by SDP without a net financial penalty through abatement. We also agree with Atkins Cardno[44] that longer outages should be covered by SDP's business interruption insurance for the loss of revenue through the abatement mechanism. Our changes to the abatement mechanism that complement the streamlining of SDP's modes of operation are outlined in Chapter 3.

2.3.2 Endorsing an 8-month restart

SDP proposed an 8–month duration of restart from water security shutdown.[45] Atkins Cardno reviewed SDP's proposal and found it reasonable, given the scope of activities that have to be undertaken on restart.[46]

In particular, Atkins Cardno noted that a long period of water security (shutdown) mode, which the plant is currently facing, places great importance on the restart with a need to procure membranes, carry out essential asset replacement, recruit and train additional operators and test the individual processes and the complete works.[47] Atkins Cardno also considered that effective price regulation should allow SDP to make efficient use of water produced during restart.

40 The 2012 Determination established an abatement mechanism that applies to SDP's fixed charges when it produces volumes of water less than the plant's full production capacity when required to fulfil its drought response role (ie, less than the annual average of 250 ML per day, when dam levels are between 70% and 80%).
41 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 22 and 25.
42 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 22, 24 and 25.
43 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 22 and 25.
44 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 25.
45 SDP pricing proposal to IPART, October 2016, p 10.
46 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 24.
47 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 24.

We have designed our regulatory framework in accordance with Atkins Cardno's findings on efficient modes of operation. Specifically, in restart we have:

- Introduced an 8–month grace from abatement when SDP responds to drought. This would allow SDP to enter a plant operation period and supply drinking quality water without penalty (abatement of its service charge) when ramping-up supply over the 8-month restart period.
- Removed from restart charges energy costs related to the production and supply of drinking water during a restart phase, to ensure no double recovery of these costs (ie, SDP can recover these variable costs through the water usage charge).
- Allowed SDP to procure a full set of membranes upon the first restart over the 2017 determination period. This removes the need to test the plant in shutdown and limits expenditure to essential maintenance activities.

We comment on the detailed restart activities and costs recommended by Atkins Cardno in Chapter 5.

2.4 Prices remain regulated outside drought

We have made a draft decision to:

3 Continue regulating SDP's prices outside drought for all customers.

As noted above, SDP is free to supply customers outside drought. In these instances, SDP might do so at volumes less than full production. This differs to SDP's primary role, which is to maximise production and operate at full capacity during drought.

Given the difficulty in determining bespoke or specific prices for all potential supply circumstances outside SDP's prescribed drought response role, in our Issues Paper we raised the possibility of introducing unregulated pricing agreements between SDP and its customers for supply outside drought. However, given the Terms of Reference under which we operate, we are unable to make this change to our regulatory framework.

2.4.1 Where SDP has limited monopoly power, economic arguments support unregulated pricing agreements

We consider that SDP and its customers should be able to make informed decisions in their own self-interest where SDP has limited monopoly power. Our preliminary view in the Issues Paper was that SDP has limited monopoly power when it operates outside the 70/80 rule because water is not scarce and there are other sources of water that are readily available.[48] In addition, SDP's customers are likely to be large sophisticated businesses with experience negotiating and assessing commercial agreements.[49]

48 IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2017 – Issues Paper*, August 2016, p 39.

49 SDP is restricted from supplying small retail customers under its WICA licence.

Given this, we considered that SDP, Sydney Water and third-party customers would only enter into unregulated pricing agreements when all parties benefit.[50]

2.4.2 But unregulated pricing agreements are inconsistent with the financial indifference principle in the Terms of Reference

SDP is seeking unregulated pricing agreements when dam levels are high (ie, outside the 70/80 rule) with Sydney Water or other customers.[51] SDP does not consider the financial indifference principle in the Terms of Reference prohibits unregulated pricing agreements. Rather, it considers that the financial indifference principle is directed at SDP's operation under the 70/80 rule.[52]

While, in principle, there is a strong economic argument for unregulated prices, we consider unregulated pricing agreements would be inconsistent with the financial indifference principle in the Terms of Reference. If SDP were to have the option to enter into unregulated pricing agreements, it would only be expected to do so at its benefit. Thus, it would no longer be financially indifferent as to whether or not it supplies water (see Appendix A).

To remain consistent with our Terms of Reference, therefore, we have decided that SDP's prices outside drought remain regulated to all customers.

2.5 Accommodating emergency response outside drought

We have made a draft decision to:

4 Retain the nil price outside drought to Sydney Water except in the exceptional circumstances specified in the Water Supply Agreement, which are to:

- mitigate the effects of a public health incident, or
- ensure security of supply or network stability during periods of outages, unavailability or maintenance on any water industry infrastructure in Sydney Water's areas of operations.

SDP is contractually obliged to supply water to Sydney Water if required for public health, network stability, unavailability or maintenance in Sydney Water's area of operations.[53] While this 'emergency response' role is ancillary to SDP's primary purpose of responding to drought, we have made changes to the regulatory framework to better accommodate this function.

50 We introduced this form of pricing flexibility in our recent determination of Sydney Water's retail prices. We allowed Sydney Water and its large non-residential customers to enter into unregulated pricing agreements for water and wastewater services. See IPART, *Review of prices for Sydney Water Corporation from 1 July 2016 to June 2020 – Final Report*, June 2016.

51 SDP pricing proposal to IPART, October 2016, p 31.

52 SDP pricing proposal to IPART, October 2016, p 31.

53 SDP pricing proposal to IPART, October 2016, p 117.

2.5.1 Sydney Water objects to removing the nil charge except for the exceptional circumstances outlined in the Water Supply Agreement

In the 2012 Determination, we set a nil price for any water supplied to Sydney Water outside the 70/80 rule, effectively creating no financial incentive for SDP to supply Sydney Water outside drought, even where this could benefit both parties. In our Issues Paper, we questioned whether this pricing constraint should be relaxed. However, we noted that relaxing this pricing constraint would need to be contingent on Sydney Water not having to take water imprudently from SDP.[54]

Sydney Water considers the nil charge should remain in place, unless it has called for water under the specific circumstances outlined in the Water Supply Agreement and then only at regulated prices.[55] It has argued that broader removal of the nil price outside drought conditions would require an amendment to the current Water Supply Agreement, because under that agreement Sydney Water must accept all water supplied from SDP, even if it is at a higher price than other water sources.[56] In our Issues Paper, we noted this take arrangement as a potential impediment to SDP and Sydney Water operating flexibly outside the 70/80 rule.[57]

Sydney Water does not support changing the Water Supply Agreement because it may trigger a re-assessment of the accounting treatment of the SDP lease.[58] This, in turn, could have significant implications for the financial position of Sydney Water, with negative impacts on its financeability.[59] Changes to the Water Supply Agreement would also incur significant transaction costs for all parties.

Removing the nil charge for exceptional circumstances only

We consider relaxing the nil price in line with Sydney Water's proposal better aligns our determination with the current Water Supply Agreement. It would also allow SDP to be renumerated when required under the Water Supply Agreement to operate the plant as an emergency response measure. As noted by SDP, the Water Supply Agreement requires Sydney Water to reimburse SDP the 'reasonable costs' for doing so, but the 2012 Determination prevents this.[60]

We acknowledge the view that there may be implications for the accounting treatment of the SDP lease if the Water Supply Agreement were changed to accommodate relaxing the nil price. At the Public Hearing, SDP also agreed with Sydney Water that not changing the Water Supply Agreement is an important matter.[61] Further, we note that removing the nil price to Sydney Water outside the 70/80 rule would also weaken SDP's incentives to seek third-party customers and increase SDP's dependence on Sydney Water.

54 IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2017 – Issues Paper*, August 2016, p 46.
55 Sydney Water submission to IPART Issues Paper, November 2016, pp 34-35.
56 Sydney Water submission to IPART Issues Paper, November 2016, p 33.
57 IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2017 – Issues Paper*, August 2016, p 46.
58 Sydney Water submission to IPART Issues Paper, November 2016, p 34.
59 Sydney Water submission to IPART Issues Paper, November 2016, pp 34-35.
60 SDP pricing proposal to IPART, October 2016, p 117.
61 IPART, SDP public hearing transcript, 8 December 2016, p 29.

Prices in an emergency response should be regulated

SDP proposed that the determination allow SDP and Sydney Water to agree an appropriate charge if Sydney Water requires SDP to operate for emergencies.[62] In seeking an unregulated pricing agreement, SDP stated that its intention was that the agreement would be consistent with the terms of the Water Supply Agreement.

Notwithstanding the limits of our Terms of Reference (discussed above), we agree with Sydney Water that the supply of desalinated water under the specific circumstances outlined in the Water Supply Agreement should be regulated. In these circumstances, it is reasonable to expect that SDP would have monopoly power, which could prevent 'win-win' agreements from occurring if prices were negotiated.

We also consider our charges to be cost reflective and are therefore in keeping with SDP using 'best endeavours' to supply any amount of desalinated water within the shortest period of time. Similarly, they are consistent with Sydney Water having to reimburse SDP the 'reasonable costs' of doing so, as stipulated under the Water Supply Agreement.[63] This is because the prices we have set in this draft determination reflect the efficient costs of service provision – ie:

- the incremental service charges and one-off transition charges we set recover fixed costs incurred by SDP from operating the plant (regardless of volumes of water supplied), and
- the water usage charge we set recover SDP's incremental costs (variable operating costs) of supplying each ML of water.

This means that, by applying our regulated prices, SDP would recover its efficient costs (no more or less) of supplying water to Sydney Water in an emergency response.

Our price structures and cost sharing rules are outlined in detail in Chapters 8 and 9.[64]

2.6 General cost-pass through mechanisms

We have made a draft decision to:

5 Not include a general cost pass-through mechanism in the 2017 Determination.

For the 2017 Determination, we have decided to continue to pass through SDP's network electricity costs, as these met our criteria for cost pass-through mechanisms. This pass-through is discussed in Chapter 6.

In our Issues Paper, we noted that cost pass-throughs should only be used in exceptional circumstances and asked if there was a case to manage other SDP costs through a cost

62 IPART, SDP public hearing transcript, 8 December 2016, p 29.
63 SDP pricing proposal to IPART, October 2016, p 119.
64 Our decision to review membrane costs ex-post if the plant operates in an emergency response ensures that only the membranes required to respond to the emergency are paid for. Membrane costs and charges are discussed in Chapter 10.

pass-through mechanism.[65] Our criteria for cost pass-through mechanisms are outlined in Box 2.2 below.

Box 2.2 Criteria for cost pass-through mechanisms

Cost pass-through mechanisms should only be applied in situations where:

- There is a trigger event (to activate the cost pass-through), which can be clearly defined and identified in the price determination.
- The resulting efficient cost associated with the trigger event can be fully assessed including whether there are other factors that fully or partially offset the direct cost of the event.
- The resulting cost is assessed to exceed a materiality threshold.
- The regulated business cannot influence the likelihood of the trigger event or the resulting cost.
- The mechanism is symmetric in that it applies equally to both cost increases and cost decreases (in cases where the risk can result in both cost increases and cost decreases).
- It is clear that the cost pass-through will result in prices that better reflect the efficient cost of service.

SDP responded to this question by proposing a general cost pass-through mechanism to manage the risk of unforeseen and uncontrollable costs associated with extraordinary events (eg, natural disasters), regulatory changes (eg, Metropolitan Water Plan), and tax changes.[66] It cited the following reasons in support of its proposal:

- **IPART's strict cost pass-through criteria can lead to inefficient expenditure**. By limiting the scope of risks that can be passed through to customers, SDP has an incentive to make inefficient investments throughout the regulatory period (that are allowed in prices and paid for by customers) to insure itself against these risks.
- **Lack of control**. SDP has little if any control over these events occurring.
- **More cost reflective**. Allowing a general cost pass-through will allow SDP to avoid including speculative cost estimates in its expenditure forecasts for events that may or may not occur.
- **More consistent with other regulatory frameworks**. Other regulators, including the Essential Services Commission of South Australia (ESCOSA) and the Australian Energy Regulator (AER), provide general cost pass throughs. IPART provided cost pass through mechanisms in its 2010 and 2013 Electricity Retail Determinations.

While we are open to allowing cost pass-throughs under the right circumstances, we do not consider SDP's proposal for a general cost pass-through mechanism meets our criteria. Specifically:

- **Extraordinary events** (eg, natural disasters). While SDP cannot control if and when these events occur, they can decide whether or not to insure against these events (assuming they are insurable) and they can influence the costs resulting from these events. Therefore, it is efficient for SDP to be at least partially exposed to these risks.

65 IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2017 – Issues Paper*, August 2016, p 61.

66 SDP pricing proposal to IPART, October 2016, p 41.

- **Regulatory changes** (eg, Metropolitan Water Plan). SDP has an ability to influence the Metropolitan Water Directorate and it has some influence over the costs resulting from a change in the Metropolitan Water Plan. Therefore, it is efficient for SDP to be at least partially exposed to these risks.
- **Tax changes**. Although tax changes are generally considered suitable candidates for cost pass-throughs, SDP's proposal is too general to meet our cost pass-through criteria. To meet our criteria, SDP would need to identify a potential tax change, identify the efficient cost, and show the efficient cost exceeds a materiality threshold. We consider the application of the cost pass-through mechanism to taxation events in more detail in Chapter 7.

We consider our current approach to setting efficient cost allowances is working effectively. This approach includes:

- **Expenditure reviews** to assess expenditure forecasts and attempt to identify any inefficient expenditure that a business may have included for the purpose of limiting its exposure to specific risks (as indicated in SDP's proposal).
- **Expenditure allowances** are assumed to be unbiased, so over the long-run unexpected cost increases are expected to offset unexpected cost decreases.
- Limited use of **cost pass-throughs** in circumstances that meet our criteria.
- The opportunity to **re-open the determination** if there is a significant change in costs.

Sydney Water expressed agreement with IPART that cost pass-throughs should only apply in exceptional circumstances.[67]

67 Sydney Water submission to IPART Issues Paper, November 2016, p 42.

3 Ensuring incentives are proportionate to SDP's drought response role

The 2012 Determination established an abatement mechanism that applies to SDP's fixed charges when it produces volumes of water less than the plant's full production capacity when required to fulfil its drought response role (ie, less than the annual average of 250 ML per day, for the period when dam levels are below 70% or until levels rise again above 80%). The intent of the abatement mechanism is to ensure that SDP responds fully to drought, reflecting the purpose for which the plant was built.

This chapter outlines our changes to the abatement mechanism to ensure that SDP's incentives reflect its drought response role. In particular, we have strengthened the abatement mechanism to apply to periods of inoperability during drought. But we have been mindful of the difference between events that are within SDP's control and those that fall outside its control. This is because SDP is less able to respond to the incentives created by abatement in events outside its control.

In these circumstances, we have taken a pragmatic approach. We have balanced providing value for SDP's customers while ensuring SDP is not unduly exposed to risk:

- For situations where SDP has insurance it may rely upon, we have continued to include provision for abatement of SDP's fixed charges if, on average, it supplies less than its full production capacity during drought. This provides the best value for customers and ensures SDP continues to recover its fixed costs through its insurance.
- Where events are uninsurable (eg, acts of war), we have decided not to include provision to abate SDP's fixed charges.

In broadening the abatement mechanism, we have also decided to align the abatement mechanism with the design parameters of the plant by removing the 250 ML cap on daily volumes for calculation of the abatement factor applied to daily fixed charges. This would allow SDP to manage temporary fluctuations in output and short-term outages while responding to drought without a net financial penalty through abatement.

Last, we identify exemptions to the abatement mechanism to remove perverse incentives from SDP's operations, including allowing a 'grace period' when moving from shutdown into plant operation mode in response to drought. We also consider circumstances in which SDP is directed to reduce supply under law, or Sydney Water is unable to receive the full production capacity of desalinated water during drought.

3.1 SDP must maximise output during drought

We have made a draft decision to:

6 Broaden the abatement mechanism to apply uniformly during drought from 1 July 2018. This means:

- SDP's fixed charges would be abated for shutdown and restart days during drought resulting from:
  - events within SDP's control, and
  - insurable events outside SDP's control.
- the daily volumes produced on these shutdown or restart days (ie, 0 ML) would be included in the abatement factor, and
- the abatement factor would apply to SDP's fixed daily charges during these shutdown and restart days.

3.1.1 Abating inoperability during drought from 1 July 2018

The objective of the abatement mechanism is to provide a financial incentive to SDP to maximise its production and supply of water during drought.

SDP supports the retention of an abatement mechanism which appropriately incentivises it to maintain and operate the plant and ensure that it can supply water at full production levels when required to do so.[68] So does Sydney Water.[69]

We note the abatement mechanism in the current 2012 Determination could mean that SDP's fixed charges are not abated during drought even if the plant is not supplying water. This is because, under the 2012 Determination, abatement only applies when the plant is operating – hence, SDP's fixed charges would not be abated when it is shutdown, or restarting, even during drought.

We support the continuation of the abatement mechanism. Where possible, we consider it should apply uniformly during drought. Thus, we have decided to broaden the abatement mechanism so that it applies **during drought** to:

1. Shutdown and restart days that result from events within SDP's control.
2. Shutdown and restart days that result from insurable events outside SDP's control.

This would apply from 1 July 2018. We understand the plant will be reinstated and operable from 1 July 2018 following the December 2015 storm event. This is discussed in more detail below.

3.1.2 Shutdown and restart days within SDP's control: an appropriate and manageable increase in SDP's risk

We have decided to extend the abatement mechanism to shutdown and restart days during drought for events that are within SDP's control.

It is efficient for SDP to be at least partially exposed to risks that it has the ability to control or influence. This provides it with an incentive to minimise the likelihood and cost of downside risk and maximise the likelihood and benefits of upside risk.

68 SDP pricing proposal to IPART, October 2016, p 35.
69 Sydney Water submission to IPART Issues Paper, November 2016, p 31.

This approach also strengthens the incentive properties of our regulatory framework relative to SDP's role in water security. Arguably, if SDP manages the plant prudently, as per the requirements of its Network Operator's Licence, then its exposure to income loss through abatement should be limited.

Routine maintenance can be managed through increased flexibility in the abatement mechanism

Under our decision, SDP's fixed charges would also be abated when it is shutdown for routine maintenance during drought. But we consider our decision to increase flexibility in the abatement mechanism (explained further below) means that SDP could manage these routine reductions in output, without a net financial penalty through abatement.

Specifically, we have removed the 250 ML daily cap on the abatement factor to allow SDP to manage temporary fluctuations in output while responding to drought. Given the plant's design parameters, this would provide SDP with up to 21 shutdown days a year and not be abated.[70] If the plant were to undertake more than 21 days maintenance, it would be operating below its design parameters.

Our refinement to the abatement mechanism to allow SDP to manage temporary fluctuations in output while responding to drought is discussed in more detail below.

3.1.3 Shutdown and restart days outside of SDP's control: relying on SDP's insurance provides better value for customers

We have also decided to broaden the abatement mechanism to shutdown and restart days during drought for events that are outside SDP's control but which are insurable. This includes force majeure events such as tsunamis, storms and fires that fall within the scope of insurance. This would reduce (abate) the service charge payable by SDP's customers (to the extent such events reduce SDP's supply during drought). It should also enhance the likelihood of the plant being able to fulfil its drought response role, while allowing SDP to recover its fixed costs (through insurance, rather than its service charges).

Industrial and Special Risks insurance provides cover for physical loss or damage to SDP's property as a result of, for example, fire, explosion, vandalism, weather perils, earthquake, or accidental damage. Typically, this policy covers the costs of replacement or reinstatement in the event of damage, and will also cover any resultant shortfall in revenue (ie, business interruption).

Where insurance is available on reasonable commercial terms, we consider it can be efficient for businesses to rely upon insurance to manage their risk. In the 2012 Determination, we included an allowance for SDP's Industrial and Special Risks insurance premiums, which was then incorporated into SDP's prices. Similarly, we have included an allowance in the 2017 determination period for SDP's insurance premiums to ensure that its coverage is

70 A 94% availability of the plant at 266 ML per day is equivalent to plant producing 0 ML per day on 6% of the days in a year (that is, 0.06 x 365 = 21.9 days rounded downwards to 21 full days), and 266 ML per day on the remaining 365 – 21 = 344 days of the year. The average production (available capacity) calculated over the period of 365 days in the schedule above is (0 x 21 + 266 x 344)/365 = 250.7 ML per day, which means that SDP's fixed charges are not abated.

sufficient given its operating environment (including our determination, and its abatement provisions).

Our draft decision should provide a financial incentive to SDP and its insurers to reinstate the plant as soon as possible following an insurable event that requires the plant to shutdown during drought. This is because SDP would be reliant upon its insurance payments during a period of inoperability to recover its fixed costs (rather than its service charges, which would be abated), and these payments would be limited in duration. Therefore, SDP would seek to have the plant in production as soon as possible. Similarly, the insurers would wish to minimise the business interruption payments under the policy and have the plant reinstated as quickly as possible.

Events that fall outside the scope of insurance will not be abated

We are not extending abatement to force majeure events for which insurance is not available on reasonable commercial terms (ie, that fall outside the scope of most insurance policies). We consider it would be unreasonable to penalise SDP for events outside its control where it cannot rely upon insurance.

We note that such events are so rare and of such magnitude that SDP may need to request to reopen the determination, for instance in light of a need to repair or rebuild the plant.

3.1.4 Implications for the December 2015 storm event

We have decided that the changes to abatement should apply from 1 July 2018. This is the date from which we understand the plant will be reinstated, following the December 2015 storm event. The plant is currently being repaired because of this storm event.

We have decided to apply the above-mentioned changes to abatement from 1 July 2018, to ensure that SDP's fixed charges are not abated when the plant is inoperable because of the December 2015 storm event. We do not think it appropriate to abate SDP's fixed charges for an event that occurred in the 2012 determination period under which different rules applied.

By applying abatement from 1 July 2018, we are also providing an incentive to SDP to ensure the plant is reinstated as soon as possible. From 1 July 2018, SDP would be penalised if the plant produced less than 250 ML per day if required to respond to drought (ie, under the 70/80 rule). This excludes the grace period from abatement when first moving from shutdown to plant operation in a drought episode, discussed in further detail below.

3.1.5 Stakeholder views on extending the abatement mechanism

SDP supports abatement to the extent it affects actions within its control

In general, SDP considers it "should be held accountable for its performance in fulfilling its water security role and that linking this to financial incentives is consistent with sound commercial practice".[71]

71 SDP pricing proposal to IPART, October 2016, p 35.

Specifically, SDP supports financial incentives in the abatement mechanism that relate directly to actions within its control that affect the plant's production.[72] We consider our changes strengthen the incentives in the abatement mechanism that apply to actions within SDP's control.

But SDP does not consider it should be penalised through the abatement mechanism because of factors outside of its control.[73] SDP objects to relying upon its insurance when inoperable, although it states it does have business interruption insurance.[74] It states this would increase its risk profile, resulting in higher cost of debt and equity, as well as higher insurance premiums.[75] It may also impact its rate of return.[76] Ultimately, SDP is concerned this would increase the costs for its customers.[77]

In broadening the abatement mechanism, we have balanced providing value for SDP's customers while ensuring SDP is not unduly exposed to risk. As in the 2012 Determination, customers will continue to pay the costs of SDP's efficient insurance. We consider SDP's coverage for business interruption insurance would be sufficient given the proposed changes to the abatement mechanism.[78] As this increased risk is firm-specific in nature, it should also not lead to an increase in the permitted rate of return to SDP. Only systematic risk is reflected in the Capital Asset Pricing Model that underpins our estimate of the WACC.

At our Public Hearing, SDP noted that there are other strong incentives for it to reinstate the plant following a period of inoperability, including:

- reputational requirements to manage its plant
- requirements under its licence (Good Industry Practice)
- the Government's step-in rights if SDP is not performing properly, and
- debt refinancing, which requires the plant to be operable.[79]

We agree with SDP that there are other measures in place to help ensure the plant is operable and ready to respond to drought. However, we consider our expansion of the abatement mechanism provides a very targeted incentive, which complements these broader measures. It also ensures that SDP's service charges to its customers reflect the level of drought response service being provided by SDP.

Sydney Water is supportive of broadening the abatement mechanism

At the Public Hearing, Sydney Water noted its support for SDP to take out business interruption insurance to cover itself for periods of inoperability.[80] As SDP's sole customer, Sydney Water indicated it would be prepared to pay for the costs of SDP's insurance.[81]

72 SDP pricing proposal to IPART, October 2016, p 35.
73 SDP pricing proposal to IPART, October 2016, p 35.
74 IPART, SDP public hearing transcript, 8 December 2016, p 41.
75 IPART, SDP public hearing transcript, 8 December 2016, pp 41-42.
76 IPART, SDP public hearing transcript, 8 December 2016, pp 41-42.
77 IPART, SDP public hearing transcript, 8 December 2016, pp 41-42.
78 Deloitte, *Insurance Review – SDP*, February 2017.
79 IPART, SDP public hearing transcript, 8 December 2016, p 45.
80 IPART, SDP public hearing transcript, 8 December 2016, p 45.
81 Sydney Water submission to IPART Issues Paper, November 2016, p 41.

In addition, Sydney Water noted it did not want its customers to pay for a service that is not being provided.[82] We consider our proposed changes address Sydney Water's key concerns, as SDP's service charge would be abated during drought when it is not producing water.

3.2 Allowing SDP sufficient time to respond to drought

We have made a draft decision to:

7 Provide SDP with an 8-month 'grace' period from abatement when the plant first responds to a drought period under the 70/80 rule:

- The daily volumes of production will not be included in the abatement factor for an 8-month period, commencing on the day when dam levels first fall below 70% since they were last above 80%.
- The abatement factor will, however, still apply to all daily fixed charges during a plant operation period including for any plant operation period that falls within the 8-month 'grace' period from abatement.

We have decided to introduce an 8-month 'grace' period from abatement to enable SDP to supply water at less than full production levels without being penalised when it is moving from shutdown to plant operation mode. This grace period would start on the first restart triggered by the 70/80 rule. The 8-month grace period aligns with the recommendations of our expenditure consultant on the time it takes the plant to reach maximum production following a restart (outlined in Chapter 2).[83]

When dam levels fall below 70%, SDP issues instructions to its O&M contractor to restart the plant. From restart it takes up to eight months for the plant to become fully operational. During this period, the plant will progressively commence producing potable water that meets the standard required by Sydney Water.

SDP proposed introducing an 8-month 'grace period' so that it is not subject to abatement during the period between switching on and producing water at 100% of capacity.[84] Under the definition of a restart period in the 2012 Determination, the period ends as soon as SDP produces and supplies water to a customer.[85] As SDP would not yet be producing 250 ML per day, supplying water to Sydney Water as the plant is restarting would result in SDP's fixed charges immediately being abated. This provides SDP a perverse incentive to withhold supply during the ramp-up period (eg, return it to the sea), in order to avoid being penalised through abatement.

We agree that the abatement mechanism should not penalise SDP when the plant is ramping up production to fulfil its drought response role. In our view, this penalty is unwarranted as

82 IPART, SDP public hearing transcript, 8 December 2016, p 45.

83 Ideally, abatement should commence as soon as the plant reaches full production. However, it is impractical to be precise as to the period of time this would take. An eight-month restart period is consistent with SDP's O&M contract and our expenditure consultant's views.

84 SDP pricing proposal to IPART, October 2016, p 36.

85 IPART, *Prices for Sydney Desalination Plant Pty Limited's Water Supply Services - Determination No. 2*, December 2011, p 60. This is apart from water that is supplied from storage.

the plant's production is limited by technical factors outside SDP's control. Sydney Water also agreed to relax abatement during a restart period in response to drought.[86]

3.2.1 How the 8-month grace period would apply

The grace period starts on the first restart triggered by the 70/80 rule (ie, date of dam levels first falling below 70% since they were last above 80%). It does not apply on subsequent 'restarts' during an unbroken drought episode.

For clarity, daily volumes of production during the eight-month grace period would not enter the abatement factor (ie, the averaging formula that is applied to fixed charges). But the abatement factor would still apply to daily fixed charges during this 8-month period. In other words, past performance during drought (rather than performance during the eight-month grace period) could nonetheless impact the fixed charges that SDP would receive in the eight month grace period through the abatement factor.

Following the 8-month grace period, the daily volumes of production would be included in the abatement factor. This means that SDP has eight months from the date of dam levels first falling below 70% since they were last above 80% to ensure its production levels reach 250 ML per day. Beyond that time period, it would be penalised for production levels below 250 ML per day.

3.3 Managing fluctuations in output during drought

We have made a draft decision to:

8 Align the abatement mechanism with the design parameters of the plant by:

- Removing the 250 ML cap on daily volumes for calculation of the abatement factor applied to daily fixed charges.
- Retaining the averaging period of 365 days for calculation of the abatement factor.
- Introducing a true-up of fixed charges to claw back any over-recovery of revenue over a single episode of drought, which:
  - includes holding costs calculated using the relevant WACC, and
  - is payable at the end of a drought response period.
- Resetting the abatement factor to one, if the plant exits drought with an abatement factor above one.
- Retaining and using the abatement factor, if the plant exits drought with an abatement factor less than one.

86 Sydney Water noted there may be network and water quality issues if it accepted desalinated water at very low volumes. We note that the terms and conditions of supply are contractually agreed between Sydney Water and SDP under the Water Supply Agreement. In addition, we note that SDP's WICA licences include a range of obligations under the Water Industry Competition (General) Regulation 2008, including an obligation to prepare and implement a water quality plan consistent with the 12 elements of the Australian Drinking Water Guidelines. See Sydney Water submission to IPART Issues Paper, November 2016, p 35 and IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2017 – Issues Paper*, August 2016, p 90.

The desalination plant has technical capacity to operate at 266 ML per day, with 94% availability. This is equivalent to an annual average of 250 ML per day (or 91.25 GL per year). To avoid abatement under the 2012 Determination, and operate within the design parameters of the plant SDP would either need to:

- run the plant to produce at least 250 ML per day during drought, or
- cease production and enter into a short-term shutdown mode (up to 10 days).

We agree with SDP that this contrary to the intent of the abatement mechanism. Therefore, we have removed the 250 ML daily cap on the abatement factor to allow SDP to manage temporary fluctuations in output while responding to drought. To avoid any over recovery of revenue, and remove the incentive for SDP to push production above the technically optimal limit, we have also introduced a true-up of fixed charges paid over the duration of a drought episode (ie, for the period of time when available dam storages are below 70% or until levels rise again above 80%).

3.3.1 Under the 2012 Determination, SDP cannot recover temporary losses by exceeding the 250 ML average daily capacity of the plant

The abatement mechanism reduces the daily water service charge[87] applicable on that day in plant operation mode if the average production of the preceding 365 days of production during drought[88] is less than the plant's optimal capacity (ie, 250 ML per day).

The abatement mechanism under the 2012 Determination, however, is not symmetrical. SDP is penalised for any days on which the plant's output falls below optimal capacity ('unders') but is not rewarded for any days on which production is above optimal capacity ('overs'). This is because the average daily volume for the past 365 production days is currently capped at the plant's optimal capacity.

SDP noted in its pricing proposal that this is contrary to the intent of the abatement mechanism.[89] To illustrate how a disproportionate penalty could arise under the current formulation of the abatement mechanism, we have constructed a simple example in Table 3.1 below that assumes a daily fixed charge of $100.

87 Network charges are included in the fixed daily charge. The pipeline charge is not abated.

88 The abatement mechanism measures performance over Availability Days, which are defined as production on all days except:
- any day on which dam levels are equal to or greater than 80%
- any day on which dam levels are equal to or greater than 70% where dam levels are falling from at or above 80%
- any day during which SDP is required to reduce production at the plant below 250 ML, or
- any day on which the plant is shutdown or in a restart period.

89 SDP pricing proposal to IPART, October 2016, p 35.

Table 3.1 Simplified example of loss of revenue under the 2012 Determination abatement mechanism

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Daily output, ML	250	250	250	250	240	265	250
Average output, ML	250	250	250	250	248	251	251
Abatement factor	100.0%	100.0%	100.0%	100.0%	99.2%	100.0%	100.0%
Loss/gain of revenue $	-	-	-	-	(0.80)	-	-

Note: This example uses 5-day rolling average. The production is 10 ML lower on Day 5, and 15 ML higher on Day 6. The abatement factor is applied on Day 5, leading to $0.8 loss of revenue. There is no offsetting gain in revenue on Day 6 as the abatement factor is capped at one.

Source: IPART analysis.

SDP also provided an example in its pricing proposal showing how it would be penalised for a two-week engineering fault that limited plant production to 150 ML per day, despite maintaining an aggregate volume of 250 ML per day delivered.[90] Specifically, SDP noted that the current abatement factor prevents it maximising production and results in a lost opportunity to build a production "bank" necessary to accommodate essential maintenance during prolonged periods of drought.[91]

We agree with SDP that the current abatement mechanism is not aligned with the design parameters of the plant. It can apply disproportionate financial penalties on SDP relative to SDP's performance during drought.[92]

3.3.2 Removing the cap on the abatement factor allows SDP to manage temporary fluctuations

Removing the cap on the abatement mechanism would allow SDP to over recover its fixed charges when production is above average output of 250 ML per day, so that it can offset times when production falls below 250 ML per day and fixed charges are abated.[93]

This is illustrated in Table 3.2 below, again assuming a $100 daily fixed charge.

90 SDP pricing proposal to IPART (Appendices), October 2016, pp 25-26.
91 SDP pricing proposal to IPART, October 2016, p 35.
92 Under the 2012 Determination, SDP could avoid abatement during drought by entering shutdown mode for a period of time. However, as outlined above, as part of the 2017 Draft Determination we have decided to extend the abatement mechanism to shutdown during drought.
93 To allow the plant to smooth out temporary fluctuations in output while responding to drought, we propose to remove the cap on the abatement factor (AC/TC) under the 2012 Determination, allowing the ratio to exceed one.

Table 3.2 Simplified example of removing the cap on the abatement factor for the 2017 Determination

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Daily output, ML	250	250	250	250	240	265	250
Average output, ML	250	250	250	250	248	251	251
Abatement factor	100.0%	100.0%	100.0%	100.0%	99.2%	100.4%	100.4%
Loss/gain of revenue $	-	-	-	-	(0.80)	0.40	0.40

Note: This example uses 5-day rolling average. The production is 10 ML lower on Day 5, and 15 ML higher on Day 6. The abatement factor is applied on Day 5, leading to $0.8 loss of revenue. There are offsetting gains in revenue on Days 6 as 7 as the abatement factor is not capped at one.

Source: IPART analysis.

Modifying the abatement mechanism to allow SDP to manage short-term fluctuations in output also removes the need for shorter duration shutdowns. Within the 94% availability parameter, SDP would be able to recoup up to 21 days of lost production per year, and thus would manage its maintenance requirements without needing to enter the shutdown mode (ie, it could operate for 344 days at 266 ML and 21 days at 0 ML and not have its fixed charges abated; or any other combination that results in average production of 250 ML per day over the year).

Our expenditure consultant, Atkins Cardno, recommended elimination of short duration shutdown modes based on the plant's technical capacity to produce 266 ML per day at 94% reliability – ie, an average of 250 ML day.[94] Modifying the abatement mechanism to allow greater operating flexibility is consistent with Atkins Cardno's recommendation.

The 365-day averaging period continues to be appropriate for calculation of the abatement ratio. This measure relates to the design specifications of the plant (ie, that the plant produces an annual average of 250 ML per day).

3.3.3 A true-up is needed to manage potential over-recovery of fixed charges

Relaxing the cap on the abatement factor may result in over-recovery of fixed charges if the plant operates beyond its design parameters. That is, a period of prolonged production above the average daily output of 250 ML per day.

At most, SDP could over-recover 6.4% of its fixed revenue requirement. That is, 365 days of production at 266 ML (ie, leading to an abatement factor of 266/250=1.064). Although, we note it is unlikely that the plant would be run this intensely.

94 To ensure the ongoing reliability of supply including 94% availability, Atkins Cardno assessed that procuring an additional drinking water station pump would be prudent before the first restart in response to the drought. See Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 59. This expenditure is addressed in Chapter 5, where we present our decisions on efficient operating and capital expenditure over the 2017 determination period.

To avoid over-compensation, and remove the incentive for SDP to push production above the technically optimal limit, we have introduced a true-up mechanism. This mechanism would claw back any over-recovery of revenue over the duration of a drought episode resulting from production above the average level of 250 ML per day (ie, for the period of time when available dam storages are below 70% or until levels rise again above 80%). The true-up of fixed charges would also include holding costs, calculated using the relevant WACC and be payable at the same time as the transition to shutdown charge.

For clarity, the true-up mechanism is **asymmetric**. Any abatement penalties would not be refunded due to an abatement factor still below one by the end of drought. This would defeat the purpose and intent of the abatement mechanism.

Further, if the plant exits drought with an abatement factor less than one, it is retained and carries over into the next period of production, consistent with the mechanism's current design. This retains a strong financial incentive for SDP to operate as required during drought. If the plant exits drought with the abatement factor above one, it is reset to one so that SDP does not continue over-recovering revenue the next time the plant is called into operation.

Box 3.1 explains how the true-up mechanism would work.

Box 3.1 How the true-up mechanism would be implemented

We decided to implement the 'true-up' mechanism in the following way:

Step 1. *Determine if the refund is payable, and if so, its total amount*

- On the day when drought ends, SDP evaluates whether it has over-recovered fixed charges during the drought response period. The balance includes holding costs. If over-recovery is positive, this is the total amount of refund that is due to customers.

Step 2. *Determine which customers are eligible to receive the refund*

- On the day when drought ends, for each customer who is an impactor, SDP evaluates whether it over-recovered fixed charges during the drought period from each customer. The balance includes holding costs. If over-recovery from a customer has occurred, this customer becomes eligible to receive refund.

Step 3. *Distribute the total refund among eligible customers*

- Allocate the total refund amount determined in Step 1 to eligible customers determined in Step 2, in proportion to the customer's share of total impact on the days when over-recovery of charges occurred during the drought response period.

3.3.4 Other stakeholder views on this issue

Sydney Water also agreed that the abatement mechanism should allow SDP to manage short-term fluctuations in output. However, it proposed that abatement be calculated on a monthly basis (rather than daily), allowing SDP to achieve the 250 ML per day target over the month.[95] Sydney Water proposed that the abatement factor should be capped, so that

95 Sydney Water submission to IPART Issues Paper, November 2016, p 36.

SDP does not over-recover revenue if it exceeds the 250 ML per day average in any given month.

An attractive feature of Sydney Water's proposed mechanism is that SDP would never over-recover revenue, because abatement over the month is capped at one. It also aligns with SDP's billing period (ie, Sydney Water is invoiced on a monthly basis).

However, a monthly averaging period of abatement payments would not provide SDP with the flexibility it may require to manage the plant during prolonged drought. We estimate that within a month SDP could on average offset 1.8 days of zero production without abatement.[96] If the plant needed to address an engineering fault that required a longer period of shutdown, it would have to enter a short-term shutdown to avoid abatement. For this reason, Sydney Water's submission envisaged continuation of shorter shutdown modes.

We consider our decision to reconcile the abatement mechanism over the duration of a drought period aligns better with the plant's design parameters. The desalination plant is not designed to operate in short monthly bursts, but rather produce an average output of 250 ML per day over a year. Moreover, we note that recent periods of drought (that would trigger SDP's operations under the 70/80 rule) have lasted for at least four years, based on dam levels over the past 25 years.

We build on Sydney Water's proposal to allow for a wider 'reconciliation' window for abatement. Our proposed changes to the definition of a shutdown period (more than 10 days) and elimination of the short-term shutdown category require the extension of the reconciliation window to adjust the abatement penalty. A reasonable extension would be to the whole duration of the drought episode - ie, the entire duration of the period that SDP is required to maximise output in accordance with its operating rules and Network Operator's Licence.

No other stakeholders commented on the operation of the abatement factor.

3.4 Abatement does not apply when SDP reduces production in order to comply with a law, binding direction or an order

We have made a draft decision to:

9 Exempt SDP from abatement on any day when it is required to reduce production below 250ML per day in order to comply with a law or a binding direction, order or similar made under a law.

The 2012 Determination provides that SDP's prices are not subject to abatement when it is "required to reduce production" other than because it is in breach of a contract pursuant to which it operates the desalination plant. In the 2017 Determination, we have clarified that

96 A 94% availability of the plant at 266 ML per day is equivalent to plant producing 0 ML per day on 6% of the days in a year (that is, 0.06 x 365 = 21.9 days rounded downwards to a 21 full day), and 266 ML per day on the remaining 365 – 21 = 344 days of the year. The average production (available capacity) calculated over the period of 365 days in the schedule above is (0 x 21 + 266 x 344)/365 = 250.7 ML per day, which means that SDP's fixed charges are not abated. On a monthly basis, 21 days of zero production per year translate to 21/12 = 1.8 days per month. Therefore, within a month SDP could on average offset 1.8 days of zero production without abatement. Actual outcome will depend on the starting level of abatement factor.

this refers to a legal requirement to reduce production. As noted earlier, we consider it would be unreasonable to penalise SDP for events outside its control.

3.5 Abatement applies when Sydney Water is unable to accept desalinated water

We have made a draft decision to:

10 Not exempt SDP from abatement when Sydney Water is unable to accept water on a day.

SDP proposed widening the exemptions to the abatement mechanism in the determination to include instances where Sydney Water is unable to receive the full supply of water.[97] Specifically, SDP has asked that the determination deem production for those days to be the higher of:

- 250 ML; or
- the average of the preceding five 'Availability Days'[98] of unconstrained production.

In accordance with the Water Supply Agreement with Sydney Water, SDP has proposed that this adjustment would not apply with respect to up to five days in any financial year.[99]

In principle, we consider that SDP should not be financially penalised when Sydney Water is unable to receive the full supply of water. However, we have decided that **the determination** should not exempt SDP from abatement when Sydney Water is unable to accept water.

Rather, under these circumstances, we consider the onus should be on Sydney Water to reimburse SDP for any under-recovery of costs – including any loss of revenue under the determination caused by the application of the abatement mechanism – through payment **outside of the determination**. This should help ensure that, in such instances, the financial penalty rests with Sydney Water, rather than being passed through to its end-use customers in the form of an unabated service charge (and the SDP pass through mechanism in the Sydney Water determination). In turn, this would create an appropriate incentive for Sydney Water to ensure that it is ready to receive the full supply of water from SDP during drought.

3.6 Abatement does not apply to water produced in an emergency response role

We have made a draft decision to:

11 Exempt SDP from abatement when the plant is responding to Sydney Water in one of the exceptional circumstances specified in the Water Supply Agreement.

As noted in Chapter 2, SDP has an emergency response role under the current Water Supply Agreement. This requires SDP to make reasonable endeavours to supply Sydney Water with drinking water to mitigate the effect of a public health incident or to ensure security of

97 SDP pricing proposal to IPART, October 2016, p 36.
98 An 'Availability Day' under the 2012 Determination essentially means a day of production during drought.
99 SDP pricing proposal to IPART, October 2016, p 36.

supply or network stability in Sydney Water's area of operations. In these circumstances, the plant need not necessarily supply at full capacity.

Currently, daily volumes produced when the plant is operating outside drought are not included in the abatement factor. We have also decided that the abatement factor should not be applied to fixed charges when the plant is operating in the emergency response role envisaged by the Water Supply Agreement. Specifically, SDP's past performance in drought should not impact the fixed charges it receives when it is producing water in an emergency response role. This is because we do not consider the objectives of maximising production during drought apply to an emergency response role, where the plant may not need to supply desalinated water at full capacity.

3.7 Abatement continues to apply to all fixed charges

We have made a draft decision to:

12 Continue to apply the abatement factor to all daily fixed charges, which includes base, incremental and membrane service charges under our draft price structures.

13 Deem the Daily Volume on 364 Availability Days preceding the first Availability Day equal to 250 ML per day for the 2017 determination period where no prior history exists.

We have refined SDP's price structures (see Chapter 8), splitting its daily fixed charges for the plant into two components:

- **Base service charge** ($/day): reflecting the plant's base fixed costs when shutdown and operating.
- **Incremental service charge** ($/day): reflecting the additional fixed costs incurred by SDP when the plant operates.

We have also introduced a membrane service charge ($/day) to recover the capitalised costs of a full set of membranes if the plant is called into operation over the 2017 determination period (see Chapter 10).

The abatement mechanism will continue to abate all daily fixed charges related to the plant. Therefore, under our new price structures, it would apply to the base, incremental and membrane service charges when the plant is in operation mode. Our draft decision to abate SDP's fixed charges in a shutdown or restart period during drought, would apply to only base and membrane service charges (ie, SDP does not receive an incremental service charge when in a shutdown or restart mode).

The pipeline service charge would not be subject to abatement under our 2017 Determination, as is currently the case.

4 SDP's revenue requirement

The notional revenue requirement (NRR) represents our view of the total efficient costs of providing SDP's monopoly services in each year of the 2017 determination period. We set prices to recover this amount of revenue. In this chapter, we present an overview of SDP's revenue requirement over the 2017 determination period when the plant is in water security (shutdown) and plant operation modes.

The revenue requirement we have set for SDP over the 2017 determination period reflects our draft decisions on:

- efficient operating and capital expenditure
- the value of the Regulatory Asset Base (RAB)
- the Weighted Average Cost of Capital (WACC) and allowance for return on capital
- regulatory depreciation, including asset lives, and
- taxation allowance for the plant and pipeline.

Our decisions on these cost items are covered in detail in Chapters 5 to 7.

As required by our Terms of Reference, SDP's NRR includes additional allowances for an:

- energy adjustment mechanism (EnAM), and
- efficiency adjustment mechanism (EfAM).

The EnAM passes through to customers, outside a core band, the gains or losses SDP incurs on the sale of the surplus energy it has contracted. The EfAM is an efficiency carryover mechanism that allows SDP to retain efficiency savings for up to five years from when they are realised. In this chapter, we also outline our decisions on these allowances and their impact on SDP's NRR.

4.1 Overview of SDP's notional revenue requirement over the 2017 determination period

We have made a draft decision to:

14 Set SDP's notional revenue requirement in each year of the 2017 determination period for:

- the plant in operation and water security (shutdown) modes, as shown in Table 4.1, and
- the pipeline across all modes of operation, as shown in Table 4.2.

As for the 2012 Determination, we use a 'building block' method to calculate SDP's revenue requirement (see Appendix C). Unlike other water utilities, SDP's costs, and thus its prices, vary depending on what operating mode it is in.

We calculate SDP's revenue requirements for:

1. Water security (shutdown) mode
2. Plant operation mode.

The key difference in the NRR between water security (shutdown) and plant operation modes relates to additional operating expenditure required to produce desalinated water (primarily, energy and chemical costs). The return on capital (funding costs) and return on assets (depreciation) for SDP are identical under both water security (shutdown) mode and plant operation mode.

We also separately determine the building block costs for the distribution pipeline. The pipeline costs (and prices) do not vary by mode of operation. The annual building block components for the plant and pipeline in plant operation and water security modes are presented in Table 4.1 and Table 4.2, respectively.[100]

Table 4.1 Plant – Notional revenue requirement by building block ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22	Total
Water security (shutdown) mode						
Return on capital	60.5	58.5	56.5	54.5	52.6	282.6
Depreciation	42.8	42.8	42.8	42.9	43.1	214.4
Operating costs	16.9	16.9	16.8	16.4	16.2	83.2
Tax allowance	8.3	9.0	9.5	10.1	10.5	47.5
Return on working capital	0.6	0.6	0.6	0.6	0.6	3.1
EnAM	5.8	5.8	5.8	5.8	5.8	28.9
EfAM	0.1	0.1	0.1	0.0	0.0	0.2
Total NRR	**134.9**	**133.7**	**132.1**	**130.4**	**128.8**	**659.8**
Plant operation mode						
Return on capital	60.5	58.5	56.5	54.5	52.6	282.6
Depreciation	42.8	42.8	42.8	42.9	43.1	214.4
Operating costs	87.1	85.9	84.6	83.8	83.9	425.5
Tax allowance	8.3	9.0	9.5	10.1	10.5	47.5
Return on working capital	0.8	0.8	0.8	0.7	0.7	3.8
EnAM	5.8	5.8	5.8	5.8	5.8	28.9
EfAM	0.1	0.1	0.1	0.0	0.0	0.2
Total NRR	**205.3**	**202.8**	**200.1**	**197.9**	**196.7**	**1,002.9**

Note: Numbers may not add due to rounding.

Source: IPART analysis.

100 We have set transition charges, which will reflect the efficient fixed one-off operating costs incurred when the plant movies from shutdown into operation mode and vice versa. These costs are not included in the NRR set out in this chapter.

Table 4.2 Pipeline - Notional revenue requirement by building block ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22	Total
Plant operation and water security (shutdown) modes						
Return on capital	33.5	33.3	33.0	32.7	32.4	164.9
Depreciation	5.8	5.8	5.8	5.8	5.8	29.1
Operating costs	0.3	0.3	0.3	0.3	0.3	1.6
Tax allowance	-2.3	-2.0	-1.8	-1.5	-1.3	-8.9
Return on working capital	0.2	0.2	0.2	0.2	0.2	1.1
EnAM	0.0	0.0	0.0	0.0	0.0	0.0
EfAM	0.0	0.0	0.0	0.0	0.0	0.0
Total NRR	**37.6**	**37.6**	**37.6**	**37.5**	**37.5**	**187.8**

Note: Numbers may not add due to rounding.

Source: IPART analysis.

The NRR over the five years of the 2017 determination period for the **plant** is:

- Water security (shutdown) mode: $659.8 million, which is $10.3 million, or around 1.5%, lower than SDP's proposal.
- Plant operation mode: $1,002.9 million, which is $26.6 million, or around 2.6%, lower than SDP's proposal.

These values are partially offset by the NRR for the **pipeline**, which is $5.3 million (or 2.9%) higher than SDP's proposal in both plant operation and water security (shutdown) modes.

EnAM and EfAM add about 4.6% and 3.0% to NRR for the plant in water security (shutdown) mode and plant operation mode, respectively.

4.2 Notional revenue requirement (plant and pipeline) in water security (shutdown) mode

In water security (shutdown) mode, SDP proposed a total revenue requirement (for plant and pipeline) of $852.7 million over the 2017 determination period (on average, $170.5 million per year).[101]

Our total plant and pipeline NRR in water security (shutdown) mode is $847.7 million, which is marginally lower than SDP's proposal over the 5-year period ($5.1 million lower). This is due to a combination of factors offsetting each other including:

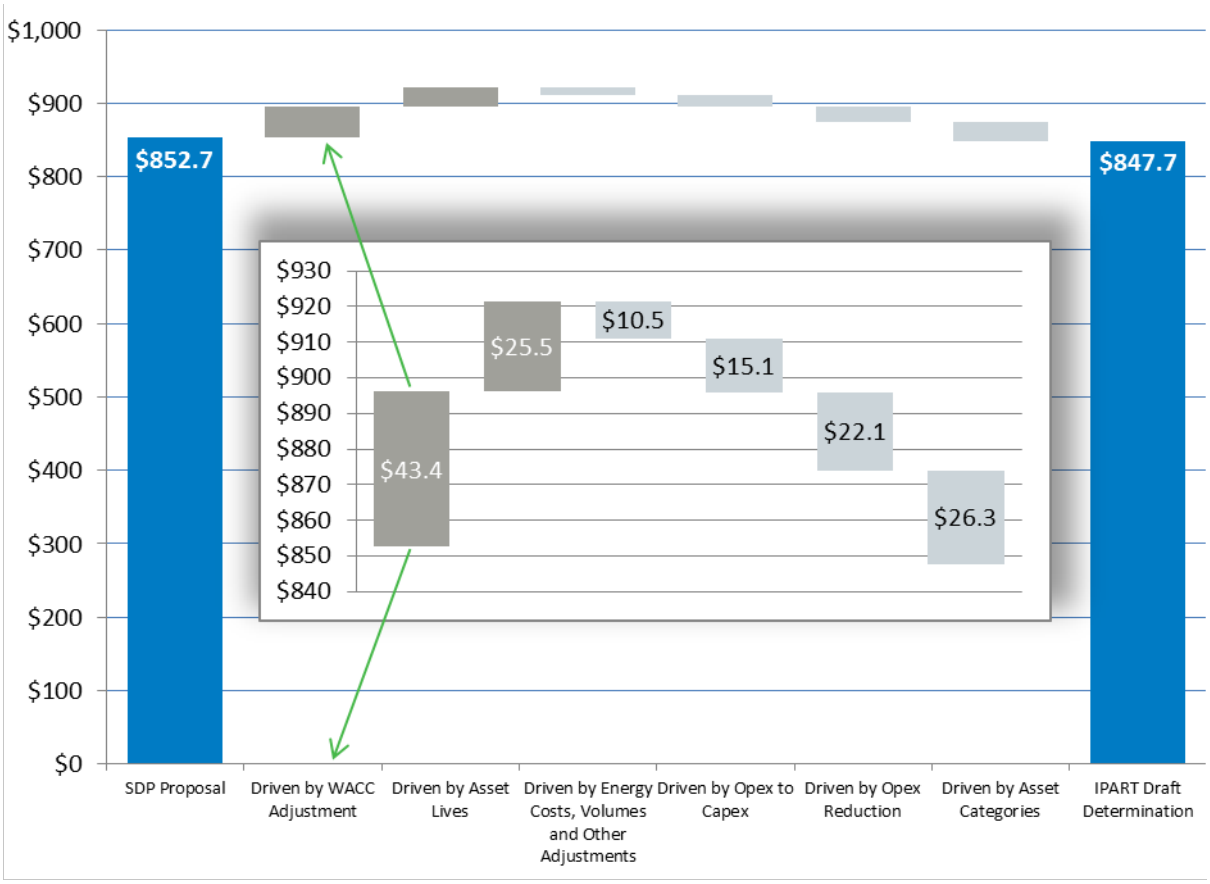
- a higher WACC of 4.9% compared to SDP's proposed WACC of 4.5%[102], due to updated market parameters
- transferring prudent and efficient periodic maintenance from operating costs to capital costs to allow a review of these costs at the next price review

101 SDP pricing proposal to IPART, October 2016, p 51.
102 SDP pricing proposal to IPART, October 2016, p 108.

- reduced operating costs mainly related to the disallowed partial plant test, and
- correcting existing asset lives and the classification of certain asset categories, which in net terms has had a relatively minor impact.

Overall, the higher WACC has offset many of our downward adjustments to SDP's proposed operating expenditure. SDP's proposed WACC of around 4.5% was based on IPART's biannual WACC update from August 2016.[103] Since then, several key WACC parameters have increased to reflect current market conditions.

Figure 4.1 Water security (shutdown) mode - our draft decision on notional revenue requirement (plant & pipeline) over the 5-year determination period ($million, $2016-17)



Note: The 'other adjustments' referred to in the figure relate to modelling related differences between SDP's proposal and IPART's analysis. The main components of this are: differences in the EnAM proposal and IPART's decision, updating historical inflation for 2011-12 from 2.5% to 2.3%, and modelling discrepancies of around $4 million over the 2017 determination period.

Data source: IPART analysis and SDP pricing proposal to IPART, October 2016, p 51.

Holding other variables constant, this higher WACC has increased SDP's NRR by about $43.3 million over the determination period. This corresponds with an increase of around 5.1% in water security (shutdown) mode (and 3.6% in plant operation mode). On an annual

103 SDP pricing proposal to IPART, October 2016, p 108.

basis, the impact declines from around $9.1 million in 2017-18 to around $8.2 million in 2021-22 in both modes.[104]

Our NRR is shown in Figure 4.1, compared to SDP's proposed NRR.

In annual terms, our NRR is above that proposed by SDP from 2017-18 to 2019-20, due mainly to the higher WACC. The NRR is lower in the final two years of the 2017 determination period than SDP's proposal, due mainly to the removal of operating costs for the partial plant test.

On an NPV basis, our NRR of $716.8 million is $2.6 million (or 0.4%) lower than SDP's proposal of $719.4 million (using a real pre-tax discount rate of 5.9% - see section 7.2.1 for further information).

Table 4.3 provides a yearly comparison of our NRR to SDP's.

Table 4.3 Water security (shutdown) mode – SDP proposed notional revenue requirement compared to IPART draft decision ($million, $2016-17)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Total
IPART Decision							
Plant	143.4	134.9	133.7	132.1	130.4	128.8	659.8
Pipeline	51.5	37.6	37.6	37.6	37.5	37.5	187.8
Total	**194.9**	**172.5**	**171.3**	**169.7**	**167.9**	**166.3**	**847.7**
SDP Proposed							
Plant		130.6	132.1	131.1	139.4	137.0	670.2
Pipeline		36.6	36.6	36.5	36.5	36.4	182.6
Total		**167.2**	**168.7**	**167.6**	**175.8**	**173.4**	**852.7**
Difference							
Plant		4.3	1.6	1.0	-9.0	-8.2	-10.3
Pipeline		1.0	1.0	1.0	1.1	1.1	5.3
Total		**5.3**	**2.6**	**2.1**	**-7.9**	**-7.1**	**-5.1**

Note: Numbers may not add due to rounding.

Source: SDP pricing proposal to IPART, October 2016, p 55 and IPART analysis.

4.2.1 A higher required revenue for the distribution pipeline asset

The NRR for the pipeline over the 2017 determination period is $5.3 million higher than proposed by SDP. This offsets the lower NRR of $10.3 million for the plant.

104 Note that changing the WACC also has affects the return on working capital, and the tax allowance. The impact on the return on working capital varies between the two modes due to the alternative operating cost profiles, and therefore the WACC impact varies marginally between the two modes of operation. The tax calculation is consistent between the two modes as operating costs are netted out of the tax calculation.

The NRR for the pipeline is comprised mainly of a return on and of assets (103% of total building blocks, given the tax allowance is negative[105]). Therefore, it has been impacted by the upward movement in market parameters in the WACC since SDP's proposal.

4.2.2 Compared to the 2012 determination period

When compared to the 2012 determination period, the NRR over the 2017 determination period is around 15.8% lower in water security (shutdown) mode. This is mainly due to a better estimate of SDP's tax liability by moving from a pre-tax to a post-tax framework and the lower WACC over the 2017 determination period.

In the 2012 Determination, we set a real pre-tax WACC of 6.7%. Moving to a post-tax WACC framework has reduced the return on assets, because a tax allowance is now separately calculated. In the 2012 Determination, the allocation for tax was effectively 1.5% of SDP's RAB (ie, 6.7% real pre-tax WACC coverts to a real post-tax WACC of about 5.2%). This has a particularly large impact on the pipeline NRR, for which the costs are predominantly capital in nature (ie, 1.5% of the pipeline RAB in 2016-17 was roughly $10 million).

Our draft decision on total operating costs (plant and pipeline including energy) over the 2017 determination period is $84.8 million, which is $6.5 million higher than $78.3 million allowed for in the 2012 determination period.[106] This is because lower operating costs for plant in the 2017 determination period are offset by an increase in corporate costs compared to our 2012 Determination.

Table 4.4 provides a comparison of NRR by each cost component over the two determination periods.

Table 4.4 Water security (shutdown) mode – IPART 2012 Determination and 2017 Draft Determination (plant & pipeline) ($million, $2016-17)

Building block	2012 Determination	2017 Determination	Difference	Difference (%)
Return on capital	686.4	447.4	-239.0	-34.8%
Depreciation	230.3	243.6	13.3	5.8%
Operating costs	78.3	84.8	6.5	8.3%
Tax allowance	0.0	38.6	38.6	
Return on working capital	11.3	4.2	-7.1	-62.6%
EnAM	0.0	28.9	28.9	
EfAM	0.0	0.2	0.2	
Total	1,006.3	847.7	-158.6	-15.8%

Note: Numbers may not add due to rounding.

Source: IPART analysis.

105 SDP proposed that the tax loss carryover for the pipeline be removed, allowing a negative tax allowance for the pipeline. The negative tax allowance for the pipeline only partially offsets the positive tax allowance for the plant and provides a better representation of SDP's tax liabilities given it is taxed as a single entity. See Chapter 7 for more information.

106 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 41.

4.3 Notional revenue requirement (plant and pipeline) in plant operation mode

In plant operation mode, SDP proposed a NRR of $1,212.1 million over the 2017 determination period (on average, $242.4 million per year).[107]

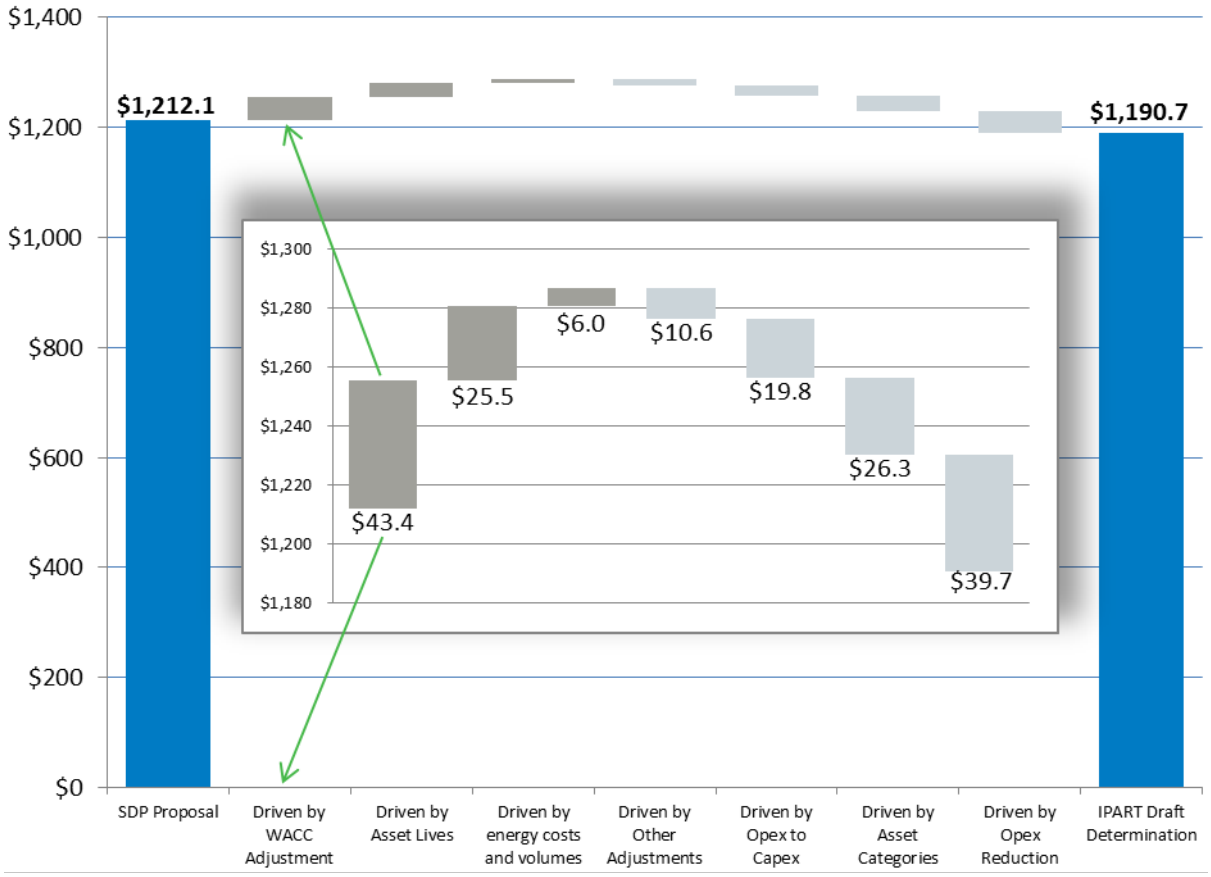
Our NRR in plant operation mode is $1,190.70 million, which is again marginally lower than SDP's proposal over the 5-year period ($21.4 million or 1.8% lower). This is due to the combination of factors offsetting each other, including:

- a higher WACC of 4.9% compared to SDP's proposed WACC of 4.5%, due to updated market parameters
- higher energy costs due to higher benchmark unit prices, offset by lower benchmark volumes
- lower operating costs related mainly to chemicals and labour, and the removal of ongoing membrane replacement costs
- transferring prudent and efficient periodic maintenance from operating costs to capital costs to allow a review of these costs at the next price review, and
- correcting existing asset lives and the classification of certain asset categories, which in net terms has had a relatively minor impact.

Our NRR is shown below in Figure 4.2, compared to SDP's proposed NRR.

107 SDP pricing proposal to IPART, October 2016, p 53.

Figure 4.2 Plant operation mode - our draft decisions on notional revenue requirement (plant & pipeline) over the 5-year determination period ($million, $2016-17)



Note: The 'other adjustments' referred to in the figure relate to modelling related differences between SDP's proposal and IPART's analysis. The main components of this are: differences in the EnAM proposal and IPART's decision, updating historical inflation for 2011-12 from 2.5% to 2.3%, and modelling discrepancies of around $4 million over the 2017 determination period.

Data source: IPART analysis and SDP pricing proposal to IPART, October 2016, p 53.

In annual terms, our NRR for the plant is less than proposed by SDP in each year of the 2017 determination period, with the difference increasing from around $2.8 million in 2017-18 to around $7.0 million in 2021-22. The difference increases over the period in line with adjustments we made to SDP's proposed operating costs.

Notably, we removed operating costs relating to membrane replacement, capitalised prudent and efficient periodic maintenance costs, and reduced some operating costs line items such as chemicals and labour. These changes have a larger impact on SDP's NRR in plant operation mode than water security (shutdown) mode.

The decisions we have made on energy costs (see Chapter 6) have also significantly impacted SDP's NRR in plant operation mode, compared to water security (shutdown) mode. This is due to the energy intensive nature of the desalination process when the plant is producing potable water. Our use of benchmark unit prices has increased SDP's NRR over the 5-year period. This is offset though by lower benchmark volumes. Overall, 20% of the NRR in plant operation mode relates to energy costs, compared to 0.4% in water security (shutdown) mode.

On an NPV basis, our NRR is $1,006.9 million compared to SDP's proposal of $1,024.5 million (discount rate: 5.9% real pre-tax), a difference of $17.5 million or 1.7%.

Table 4.5 provides a yearly comparison of our NRR to SDP's.

Table 4.5 Plant operation mode – SDP proposed notional revenue requirement compared to IPART draft decision ($million, $2016-17)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Total
IPART Decision							
Plant	218.9	205.3	202.8	200.1	197.9	196.7	1,002.9
Pipeline	51.5	37.6	37.6	37.6	37.5	37.5	187.8
Total	**270.4**	**242.9**	**240.4**	**237.7**	**235.5**	**234.2**	**1,190.7**
SDP Proposed							
Plant		208.1	207.0	205.8	204.9	203.7	1,029.5
Pipeline		36.6	36.6	36.5	36.4	36.4	182.6
Total		**244.7**	**243.6**	**242.3**	**241.4**	**240.1**	**1,212.1**
Difference							
Plant		-2.8	-4.1	-5.7	-7.0	-7.0	-26.6
Pipeline		1.0	1.0	1.1	1.1	1.1	5.3
Total		**-1.8**	**-3.1**	**-4.7**	**-5.9**	**-5.9**	**-21.4**

Note: Numbers may not add due to rounding.

Source: SDP pricing proposal to IPART, October 2016, p 55 and IPART analysis.

4.3.1 Compared to the 2012 determination period

When compared to the 2012 determination period, the NRR over the 2017 determination period is around 12.4% lower in plant operation mode. Again, this is mainly due to a better estimate of SDP's tax liability by moving to post-tax framework from a pre-tax framework, the lower WACC, and efficiency savings in operating costs identified during the 2017 review.

The energy cost allowance has increased by $16.7 million (or 7.5%) over the two determination periods, due to higher benchmark prices (note, this comparison assumed SDP would be in plant operation over the 2012 and 2017 determination periods). The increase in benchmark prices is mainly due to increases in the wholesale energy and renewable energy components of the benchmark price. This is discussed in further detail in Chapter 6.

Holding energy costs constant, operating costs have decreased significantly over the two determination periods. This is mainly due to our decision to capitalise prudent and efficient periodic maintenance and membrane replacement costs (outlined in Chapter 5).

Table 4.6 Plant operation mode – IPART 2012 determination and 2017 determination periods (plant & pipeline) ($million, $2016-17)

Building block	2012 Determination	2017 Draft Determination	Difference	Difference (%)
Return on capital	686.4	447.4	-239.0	-34.8%
Depreciation	230.3	243.6	13.3	5.8%
Operating costs	430.7	427.0	-3.7	-0.9%
Tax allowance	0.0	38.6	38.6	
Return on working capital	11.3	5.0	-6.3	-55.9%
EnAM	0.0	28.9	28.9	
EfAM	0.0	0.2	0.2	
Total	1,358.7	1,190.7	-168.1	-12.4%

Note: Numbers may not add due to rounding.

Source: IPART analysis.

4.4 Revenue adjustments required by the Terms of Reference

On 16 February 2012, the Government[108] amended the Terms of Reference to provide for the following in SDP's pricing determinations:

- an energy adjustment mechanism (EnAM), and
- an efficiency adjustment mechanism (EfAM).

The Terms of Reference requires us to treat demonstrated efficiency savings and energy gains or losses in accordance with our Methodology Paper for the EnAM and EfAM.[109]

In this section, we outline how we have calculated the adjustments for each mechanism and how these separate adjustments would be passed through into prices from 1 July 2017.

The Terms of Reference allows us to update the Methodology Paper from time to time. Concurrently with the SDP price review, we have released a Draft 2017 Methodology Paper. We invite consultation on the Methodology Paper to be applied in future SDP price determinations.

4.4.1 Allowances for the energy adjustment mechanism

We have made a draft decision to:

15 Include an allowance into prices over the 2017 determination period for the losses made on the sale of SDP's surplus energy while it was shutdown over the 2012 determination period of $28.9 million or $5.8 million per year (real $2016-17 and including financing costs). This is consistent with the Terms of Reference.

108 On 16 February 2012, the Minister administering the WIC Act amended the initial Terms of Reference issued to IPART on 6 May 2011.

109 In April 2012, we released the *Sydney Desalination Plant – Efficiency and Energy Adjustment Mechanisms - Methodology Paper*, April 2012, following consultation.

The purpose of the EnAM is to pass through to customers any gains and/or losses outside a core band from the sale of SDP's surplus energy while it was shutdown (four year period from 2012-13 to 2015-16). Surplus energy includes electricity and Renewable Energy Certificates (RECs).

The Methodology Paper sets a threshold for the core band at + or –5% of the total value of SDP's contracted energy. Gains (losses) on the sale of surplus energy when SDP is in shutdown or restart are shared on the following basis:

- SDP share: 100% within the threshold and 10% outside the threshold.
- Customer share: 90% outside the threshold.

Following our analysis, we have accepted SDP's proposed EnAM allowances

We have allowed a total EnAM allowance of $28.9 million or $5.8 million per year (including financing costs) over the 2017 determination period. This is based on our consultant, Marsden Jacob's, recommendation.[110]

This is equivalent to passing through $24.5 million (nominal and excluding financing costs) or 72% of SDP's losses from the sale of surplus energy from 2012-13 to 2015-16. Our EnAM allowances are consistent with SDP's proposed allocation of losses under the EnAM.[111]

The Methodology Paper states that we will include financing costs when calculating EnAM allowances to pass through into prices. Table 4.7 presents our EnAM allowances for the 2017 determination period, including financing costs. EnAM allowances represent about 3.0% (plant operation mode) of SDP's NRR over the 2017 determination period. This adds about $15,837 to the SDP's daily fixed service charge.

Table 4.7 EnAM allowances for 2017 determination period ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22	Total
Customer share of losses excl. 2017 financing costs	-	-	-	-	-	27.4
2017 financing costs (%real)[a]	1.8%	1.8%	1.8%	1.8%	1.8%	-
EnAM allowances incl. 2017 financing costs	**5.8**	**5.8**	**5.8**	**5.8**	**5.8**	**28.9**

[a] This is an average based on the last 12 months of available information (ie, January 2016 to December 2016) and the RBA's current inflation forecasts. This analysis will be updated as new information becomes available leading up to the final report.

Note: Numbers may not add due to rounding.

Source: RBA, Non-financial corporate BBB-rated bonds, Yield, 3 year target tenor. Series ID: FNFYBBB3M, and IPART analysis.

We have found no evidence of manifest imprudence in SDP's management of surplus energy

According to our 2012 Methodology Paper, SDP must act to minimise its exposure to losses on the resale of surplus electricity and RECs. In the case of any 'manifest imprudence' that

110 Marsden Jacob, *Energy Review – SDP*, February 2017, p 1 .
111 SDP pricing proposal to IPART, October 2016, p 47.

may arise on the part of SDP, we may exclude the affected transactions (in whole or in part) from the energy adjustment mechanism.[112]

Over the review period 2012-13 to 2015-16, SDP has:

- taken the spot market price for its surplus electricity, and
- gradually released its surplus RECs into the market at the prevailing market price.

With the assistance of our energy consultants, Marsden Jacob, we reviewed SDP's energy trading policy and activity and consider there is no evidence of manifest imprudence in SDP's management of its surplus energy over the review period. We have therefore included all of SDP's surplus energy transactions over the review period in the energy adjustment mechanism.

In response to our Issues Paper, Sydney Water suggested SDP could have more actively traded its surplus energy contracts, which would have reduced the losses passed on to Sydney Water's customers under the EnAM.[113] In our Draft 2017 Methodology Paper, we have decided to enhance SDP's incentives to prudently manage its surplus energy over the 2017 determination period. Specifically, we propose to:

- Increase SDP's share of gains and losses outside the core band to provide SDP with a larger share of any gains it is able to achieve on the resale of its surplus energy.[114]
- Modify the prudence test from a test of 'no manifest imprudence' to a general test of 'the prudence of SDP's energy trading policy and activity".[115]

Going forward, in applying this new test, IPART would need to assess whether SDP's approach to managing energy is prudent. Box 5.1 in Chapter 5 outlines our general approach to efficiency and prudence tests for expenditure. The approach that we would take in assessing the prudence of SDP's energy would be similar to that in assessing the prudence of capital expenditure. In this case, we would engage consultants to review the prudence of:

- SDP's energy policy, and
- how this policy was executed (ie, the sale of surplus energy), given information available at the time.

Subject to some modifications, we have followed our Methodology Paper to calculate EnAM allowances

The Methodology Paper states that we will account for financing costs through the EnAM. But the Reserve Bank of Australia (RBA) corporate bond series identified in the Methodology Paper to undertake this process is no longer available.[116]

112 IPART, *Sydney Desalination Plant – Efficiency and Energy Adjustment Mechanisms - Methodology Paper*, April 2012, p 26.
113 Sydney Water submission to IPART Issues Paper, November 2016, pp 44-46.
114 IPART, *SDP Energy Adjustment and Efficiency Carryover Mechanisms, Draft Methodology Paper*, March 2017, p 34.
115 IPART, *SDP Energy Adjustment and Efficiency Carryover Mechanisms, Draft Methodology Paper*, March 2017, pp 36-37.

To address this issue, we decided to use a substitute RBA 3-year corporate bond series to calculate a present value of losses incurred over 2012-13 to 2015-16 to be passed through by the EnAM. We then used the most recent 12 months of this substitute series (adjusted to remove forecast inflation) to calculate annual EnAM allowances for the 2017 determination period. Box 4.1 provides more detail on the approach we undertook.

Our energy consultant Marsden Jacob reviewed and endorsed the supporting information (ie, SDP's billing information, SDP's EnAM calculations, and our EnAM calculations).[117]

116 The Methodology Paper goes on to say that we will use the average of the corporate bond yield (with 1 to 5 years to maturity; BBB bond credit rating) at the end of each quarter of the year as published by the Reserve Bank of Australia." IPART, *Efficiency and Energy Adjustment Mechanisms, Methodology Paper*, April 2012, p 25.

117 Marsden Jacob, *Energy Review – SDP*, February 2017, p 7.

Box 4.1 Application of financing costs through the EnAM

To account for financing costs when calculating EnAM allowances, we identified two potential substitute series that are currently published by the RBA (ie, 3-year and 5-year BBB non-financial corporate bond yield series). We consulted on these two potential substitute series in our Issues Paper noting the 3-year series appeared to more closely match the discontinued series (when they were both available).[a]

In response to our issues paper, SDP stated its preference for the 3-year corporate bond series. We agree the 3-year series represents the best available substitute for the now discontinued series.

In calculating the EnAM allowances, we have applied financing costs in two separate steps:

Step 1 – application of financing costs over the 2012 determination period

This step involves calculating the present value at 2016-17 of annual EnAM losses that actually occurred over the first four years of the 2012 determination period. For this we used the historical annual average rates from the RBA 3-year corporate bond series (ie, nominal discount rate). The value for 2016-17 is an average of currently available monthly observations for that year.

	2012 Determination Period ($million)					
	2012-13	2013-14	2014-15	2015-16	2016-17	**Total**
EnAM losses ($nominal)	5.5	7.6	10.7	0.7	-	**24.5**
RBA 3-year corporate bond rate (% nominal)	-	4.7%	4.0%	4.5%	3.8%	
PV of EnAM losses ($2016-17)						**27.4**

Step 2 – application of financing costs over the 2017 determination period

This step involves calculating an annuity to pass through EnAM losses from the 2012 determination period over the 2017 determination period. For this we used an average of the most recent 12 months of the RBA 3-year corporate bond series. Because we are setting allowances and prices in $2016-17, which will be subject to inflation indexation over the 2017 determination period, we removed the estimated inflation component from the RBA 3-year corporate bond series (ie, we converted it from a nominal to a real discount rate). Our estimate of inflation was based on the RBA's 1-year inflation forecast and the 2.5% target rate thereafter.

	2017 Determination Period ($million)					
	2017-18	2018-19	2019-20	2020-21	2021-22	**Total**
PV of EnAM losses ($2016-17)						**27.4**
RBA 3-year corporate bond rate (% real)	1.8%	1.8%	1.8%	1.8%	1.8%	
EnAM annuity 2017-18 to 2021-22 ($2016-17)	5.8	5.8	5.8	5.8	5.8	**28.9**

a IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2017 – Issues Paper*, August 2016, p 69.

4.4.2 Allowances for the efficiency adjustment mechanism

We have made a draft decision to:

16 Include an efficiency carryover of $50,000 p.a. for the first three years of the 2017 determination period based on applying the 2012 EfAM methodology.

SDP proposed to include $50,000 in its annual revenue requirement for the first three years of the 2017 determination period under the EfAM.[118] This efficiency gain reflects a reduction in insurance costs borne by SDP for its operator, Veolia.

We have decided to include this efficiency saving as part of the EfAM and apply it over the first three years of the 2017 determination period. The carryover period specified by the Terms of Reference for EfAM is five years. This efficiency saving was achieved in 2015-16, which is the penultimate year of the 2012 determination period.

While this efficiency saving relates to SDP uncovering a double counting of insurance costs, we consider this pass-through meets the objectives of the EfAM, by providing SDP with an incentive to identify and remove inefficiencies.

Unlike, the EnAM allowance, the EfAM allowance of $50,000 has a very minor impact on SDP's NRR and prices over the 2017 determination period.

118 SDP pricing proposal to IPART, October 2016, p 65 and information submitted to IPART.

5 Expenditure review

This chapter sets out our assessment of SDP's efficient level of expenditure over the 2017 determination period.

In making our decisions, we engaged Atkins Cardno to review the efficiency of SDP's proposed operating expenditure over the 2017 determination period. We asked Atkins Cardno to recommend any further efficiency savings that SDP should be able to achieve. In developing its recommendations, Atkins Cardno took into account international experience of desalination plants in shutdown modes and the effects of these long-term shutdowns on technical reliability of the plan and Good Industry Practice.[119]

We also assessed prudent and efficient capital expenditure over the 2012 determination period, to include into the opening RAB for the 2017 determination period.

As with operating expenditure, we engaged Atkins Cardno to review SDP's historical and forecast capital expenditure and make recommendations on the amount of capital expenditure that should be included in the RAB.

Under the building block method, there is no explicit allowance for capital expenditure in the notional revenue requirement. Instead, the prudent and efficient capital expenditure is added to the RAB and recovered through the allowances for a return on assets and regulatory depreciation.

All expenditures presented in this chapter include our decisions on efficient energy costs, which are presented separately in Chapter 6. Atkins Cardno reviewed SDP's efficient energy volumes in all operating modes. Efficient energy prices were reviewed by our energy consultant, Marsden Jacob. Therefore, all expenditure recommended by Atkins Cardno in this chapter includes Marsden Jacob's recommended benchmark energy prices.

5.1 Capital expenditure over the 2012 determination period

We have made a draft decision to:

17 Include in the RAB over the 2012 determination period prudent and efficient capital expenditure for the plant and pipeline as set out in Table 5.1 and Table 5.2. Our decision accepts SDP's proposed costs.

Our draft decisions on capital expenditure reflect our assessment of the efficient and prudent expenditure on capital works that should be included in the RAB, and hence recovered through prices. To decide how much capital expenditure is added to the RAB, we applied a prudence and efficiency test to SDP's actual capital expenditure over the 2012 determination period against the criteria in Box 5.1.

119 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 20.

Box 5.1 Efficiency test and prudence test

Efficiency test

In reviewing expenditure, the efficiency test is used to set how much of SDP's proposed expenditure (operating and capital) for the 2017 determination period will go into our determination of SDP's revenue requirement. The efficiency test should examine whether SDP's actual and proposed expenditure represents the best and most cost effective way of delivering the monopoly services.

The efficiency test examines whether the proposed capital expenditure represents the best way of meeting customers' needs (over the life of the asset), subject to the utility's regulatory requirements.

Prudence test

The prudence test assesses whether the decision to invest in an asset is one that SDP, acting prudently, would be expected to make in the circumstances existing at the time. The test assesses both:

- the prudence of how the decision was made to invest, and
- the prudence of how the investment was executed (ie, the construction or delivery of the asset), having regard to information available at the time.

In making our draft decisions, we relied upon the findings of our expenditure consultant, Atkins Cardno. Atkins Cardno found SDP's past capital expenditure over the 2012 determination period to be prudent and efficient. Most of the expenditure related to the replacement of the backup electricity supply, and was within the allowed capital expenditure of $1.7 million for the 2012 determination period.[120] Atkins Cardno recommended including $1.2 million of prudent and efficient capital expenditure between 2012-13 and 2016-17 in the plant's RAB.

Our draft decision on prudent and efficient capital expenditure over the 2012 determination period is presented in Table 5.1 and Table 5.2.

Table 5.1 Prudent and efficient past capital expenditure – plant and corporate ($million, $2016-17)

	2012-13	2013-14	2014-15	2015-16	2016-17	Total
SDP actual	0.44	0.03	0.30	0.39	0.02	1.17
IPART decision	**0.44**	**0.03**	**0.30**	**0.39**	**0.02**	**1.17**

Source: Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 57.

Table 5.2 Prudent and efficient past capital expenditure - pipeline ($million, $2016-17)

	2012-13	2013-14	2014-15	2015-16	2016-17	Total
SDP actual	0	0	0	0	0	0
IPART decision	**0**	**0**	**0**	**0**	**0**	**0**

Source: Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 57.

120 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 56.

5.2 Expenditure over the 2017 determination by mode of operation

Atkins Cardno assessed SDP's proposed operating and capital expenditure in all modes of operations, and recommended a significant reduction in operating expenditure.

Over the five years of the 2017 determination period, Atkins Cardno[121] recommended the following adjustments in plant operating costs:

- In *water security (shutdown) mode*, a reduction of $38.7 million or 32% (from SDP's proposed $121.9 million to Atkins Cardno recommended $83.2 million).
- In *plant operation mode*, a reduction of $55.3 million or 12% (from SDP's proposed $480.8 million to Atkins Cardno recommended $425.5 million).
- In *transition to restart*, a reduction of $29.7 million or 76% (from SDP's proposed average restart charge of $39.3 million to Atkins Cardno recommended average charge of $9.5 million).
- In *transition to shutdown*, no adjustment (Atkins Cardno accepted SDP's proposed $1.7 million one-off charge).

Many of the reductions in operating costs are due to Atkins Cardno reclassifying these costs as capital expenditure (ie, capitalising SDP's proposed periodic maintenance costs and ongoing membrane replacement costs subject to a prudence and efficiency review). This means that Atkins Cardno's recommended capital costs for the 2017 determination period are higher than those proposed by SDP.

We have accepted Atkins Cardno's recommendations in full. Below we present an overview of our draft decisions compared to SDP proposed expenditure by mode. In the latter half of the chapter, we explain in detail the key expenditure adjustments.

5.2.1 Water security (shutdown) mode – operating expenditure

We have made a draft decision to:

18 Set the efficient level of SDP's operating expenditure (plant and corporate) in water security (shutdown) mode as outlined in Table 5.3. Our draft decision is $38.7 million (or 32%) lower than SDP's proposed costs.

SDP proposed $121.9 million in total operating costs in shutdown over the 2017 determination period.[122] This includes energy costs.

SDP's proposal would increase total O&M costs by $33.5 million above the $44.8 million allowed over the 2012 determination period.[123] The drivers of SDP's proposed changes in O&M costs in water security (shutdown) mode are:

- a partial plant test, and
- an additional plant maintenance program.

121 All Atkin Cardno recommended expenditure in this chapter includes Marsden Jacob's recommended benchmark energy prices.
122 SDP pricing proposal to IPART, October 2016, p 57.
123 SDP pricing proposal to IPART, October 2016, p 70.

SDP proposed costs also include $42.0 million in corporate costs in water security (shutdown) mode over the 2017 determination period. [124]

We accepted our consultant's recommendations. Our draft decision on SDP's efficient operating costs in water security (shutdown) mode is presented in Table 5.3 below.

Table 5.3 Efficient fixed operating costs in water security (shutdown) mode - including energy ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22	Total
SDP proposed	18.49	21.11	21.3	30.92	30.09	121.91
IPART decision	**16.91**	**16.88**	**16.79**	**16.44**	**16.17**	**83.19**

Note: Total plant and corporate costs including fixed energy costs discussed in Chapter 6. Excluding pipeline costs.

Source: SDP pricing proposal to IPART, October 2016, p 57; Atkins Cardno, Expenditure Review – SDP, February 2017, pp 36, 41 and Chapter 6.

Atkins Cardno recommended $83.2 million in operating costs in water security shutdown (including energy costs). This is a reduction of $38.7 million (or 31.8%), from SDP's proposed $121.9 million. The recommended adjustments include:

- excluding plant testing
- efficiency adjustment to corporate costs
- capitalising periodic maintenance subject to a prudence and efficiency review
- efficiency adjustments for labour and other fixed costs, and
- efficiency adjustments to maintenance of the deferred new pump for the drinking water pumping station.[125]

These adjustments are discussed in more detail below. Atkins Cardno also provided its recommendation on the efficient energy requirement in water security shutdown (see Chapter 6 on energy costs).

5.2.2 Plant operation mode – operating expenditure

We have made a draft decision to:

19 Set the efficient level of SDP's operating expenditure (plant and corporate) in plant operation mode as outlined in Table 5.4. Our decision is $55.3 million (or 12%) lower than SDP's proposed costs.

Over the 2017 determination period, SDP proposed $480.8 million in operating costs in plant operation mode (including energy costs).[126] Compared to the 2012 Determination, this included an increase in plant O&M costs of $15.8 million, driven by:

- additional asset maintenance ($13.3 million), and
- change in key input costs (eg, chemicals) ($3.2 million).[127]

124 SDP pricing proposal to IPART, October 2016, p 68.
125 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 41 and Chapter 6.
126 SDP pricing proposal to IPART, October 2016, p 57.
127 SDP pricing proposal to IPART, October 2016, p 75.

SDP's proposed costs also include $46.2 million in corporate costs in plant operation mode over the 2017 determination period. [128]

We accepted our consultant's recommendations. Our draft decision on SDP's efficient operating costs in plant operation mode is presented in Table 5.4 below.

Table 5.4 Efficient operating costs in Plant operation mode - including energy ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22	Total
SDP proposed	95.92	95.90	95.94	96.38	96.63	480.77
IPART decision	**87.13**	**85.91**	**84.62**	**83.84**	**83.95**	**425.45**
fixed operating costs	*24.72*	*24.85*	*24.78*	*24.33*	*24.54*	*123.21*
variable operating costs	*62.41*	*61.07*	*59.84*	*59.51*	*59.41*	*302.25*

Note: Total plant and corporate costs including fixed and variable energy costs discussed in Chapter 6. Excluding pipeline costs.

Source: Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 45 and 50.

Atkins Cardno recommended $425.5 million in operating costs in plant operation mode over the 2017 determination period (including energy costs). This included reductions of $55.3 million (or 11.5%), from SDP's proposed $480.8 million.[129] The recommended adjustments include:

- capitalising periodic maintenance subject to a prudence and efficiency review
- removing ongoing membrane replacement costs
- a reduction in variable costs for chemicals
- an efficiency adjustment to corporate costs, and
- efficiency adjustments to maintenance of the deferred new pump for the drinking water pumping station.

These adjustments are discussed in more detail below. Atkins Cardno also provided its recommendation on the efficient energy requirement in plant operation mode (see Chapter 6 on energy costs).

5.2.3 Transition to restart one-off operating costs

We have made a draft decision to:

20 Set the efficient level of SDP's one-off operating expenditure (including energy) to transition to restart as outlined in Table 5.5. Our draft decision is on average $29.7 million (or 76%) lower than SDP's average proposed costs.

SDP proposed a six-fold increase in the one-off transition costs to restart the plant from water security (shutdown) mode, compared to the allowance of $6.1 million in the 2012 determination period. SDP's proposed increase is mainly due to costs it considered were not accounted for over the 2012 determination period, such as:

128 SDP pricing proposal to IPART, October 2016, p 69.
129 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 45 and Chapter 6.

- partial replacement of membranes (average $21.7 million)
- energy costs
- additional maintenance costs, and
- pipeline flushing costs ($0.6 million).[130]

These one-off costs range between $37.3 to $41.0 million per event, depending on the year of the restart during the 2017 determination period.[131]

We accepted our consultant's recommendations. Our draft decision on SDP's efficient one-off transition to restart costs is presented in Table 5.5 below.

Table 5.5 One-off operating costs of transition to restart - including energy ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22	Average
SDP proposed	37.27	38.4	39.37	40.23	40.98	39.25
IPART decision	**9.65**	**9.58**	**9.50**	**9.49**	**9.48**	**9.54**

Source: Total operating costs including energy costs discussed in Chapter 6. Atkins Cardno, Expenditure Review – SDP, February 2017, p 44.

Atkins Cardno's recommendations, including energy costs, result in a reduction of $29.7 million (or 75.7%), from SDP's proposed average transition to restart charge of $39.3 million. This is driven by:

- capitalising full membrane replacement costs, and
- efficiency adjustments to chemical costs.

5.2.4 Transition to shutdown one-off operating costs

We have made a draft decision to:

21 Set the efficient level of SDP's one-off operating expenditure (including energy) to transition to shutdown as outlined in Table 5.6. Our draft decision accepts SDP's proposed costs.

SDP proposed no increase to the current allowance for transitioning to shutdown of $1.69 million per event. [132]

Atkins Cardno reviewed activities associated with shutting the plant down from plant operation mode into water security (shutdown) mode. It found that most of the costs are associated with flushing and cleaning of the reverse osmosis trains, feed pumps, post-treatment plant and pre-treatment plant, and capping the sea intake and outfall outlets. Atkins Cardno reviewed the input costs related to these activities, and found SDP's proposed costs to be efficient making no adjustments.[133]

130 SDP pricing proposal to IPART, October 2016, p 70.
131 SDP pricing proposal to IPART, October 2016, p 70.
132 SDP pricing proposal to IPART - Appendices, October 2016, p 54.
133 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 51.

We accepted our consultant's recommendations. The summary of Atkins Cardno's recommendations and our draft decision on SDP's efficient one-off transition to shutdown costs are presented in Table 5.6 below.

Table 5.6 One-off operating costs of transition to shutdown ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22
SDP proposed	1.69	1.69	1.69	1.69	1.69
IPART decision	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**

Source: Atkins Cardno, Expenditure Review – SDP, February 2017, p 51.

5.2.5 Plant capital costs for all modes of operation

We have made a draft decision to:

22 Include in the RAB the forecast capital expenditure for the plant as outlined in Table 5.7 over the 2017 determination period. Our draft allowance is $12 million (or 478%) higher than SDP's total proposed costs.

SDP proposed total capital expenditure of $2.5 million over the 2017 determination period. This is $1.4 million higher than the capital expenditure we allowed in the 2012 Determination. SDP proposed a single profile of forecast capital expenditure in all modes.[134]

SDP's proposed expenditure mainly relates to the installation of an additional pump in the plant's Drinking Water Pumping Station (DWPS). SDP was seeking some redundancy in delivery pump capacity to ensure water security and the ability to sustain supply in line with the plant's design parameters 266ML per day at 94% availability.[135]

We accept our consultant's recommendations. The summary of Atkins Cardno's recommendations and our draft decision on SDP's prudent and efficient capital expenditure in shutdown and plant operation modes are presented in Table 5.7 below.

Table 5.7 Plant and corporate capital expenditure over the 2017 determination period – all modes ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22	Total
SDP proposed	0.32	0.02	2.12	0.02	0.02	2.48
IPART decision	**1.53**	**2.64**	**2.87**	**3.75**	**3.67**	**14.46**

Source: Atkins Cardno, Expenditure Review – SDP, February 2017, pp 60, 62.

Atkins Cardno recommended $14.46 million in capital costs over the 2017 determination period. This is $12 million (or 478%) higher than SDP's total proposed costs. The recommended adjustments include:

- deferring the cost of installing the additional pump and review it ex-post rather than build it into water security capital expenditure

134 SDP pricing proposal to IPART, October 2016, pp 104.
135 SDP pricing proposal to IPART, October 2016, pp 105.

- capitalising expenditure on periodic maintenance, excluding the costs associated with defective hoses that should be replaced by warranty. [136]

These adjustments are discussed in more detail below.

5.2.6 Pipeline operating and capital costs for all modes of operation

We have made a draft decision to:

23 Set forecast capital and operating expenditure over the 2017 determination period for the pipeline as outlined in Table 5.8. Our draft decision accepts SDP's proposed costs.

Atkins Cardno made no adjustment to SDP's proposed pipeline operating costs of $1.6 million over the 2017 determination period.[137] SDP proposed no capital expenditure on pipeline, which Atkins Cardno accepted.[138]

We accept our consultant's recommendations and accordingly SDP's proposed pipeline expenditure presented in Table 5.8 below.

Table 5.8 Pipeline expenditure over the 2017 determination period - all modes ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22	Total
SDP proposed						
Pipeline operating costs	0.31	0.32	0.32	0.32	0.32	1.59
Pipeline capital costs	0	0	0	0	0	0
IPART decision						
Pipeline operating costs	0.31	0.32	0.32	0.32	0.32	1.59
Pipeline capital costs	0	0	0	0	0	0

Source: Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 9,11-13.

5.3 Key expenditure adjustments over the 2017 determination period

5.3.1 Exclusion of partial plant test in water security (shutdown) mode

SDP proposed a partial plant test to manage the operational risks associated with an extended period of water security (shutdown) mode. According to SDP, such a test would only be required once during the 2017 determination period.[139]

A key purpose of the partial plant test proposed in SDP's submission is to assess the performance of the existing Reverse Osmosis (RO) membranes after many years under chemical preservation. If the restart occurs in the year 2019-20, SDP requested funding for the replacement of 62.8% of the existing membranes and replacement of the further 21.6% during the first two years of operation.[140]

136 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 60.
137 SDP pricing proposal to IPART, October 2016, p 58.
138 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 9, 11.
139 SDP pricing proposal to IPART, October 2016, pp 73.
140 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 40.

Atkins Cardno recommended removal of costs of SDP's proposed partial plant test ($17.5 million) from operating expenditure in water security mode.[141] Atkins Cardno considered that an alternative and efficient option is to replace **all** the RO membranes on full restart.[142]

Atkins Cardno viewed an ex-ante partial plant test to assess membrane condition as redundant because it would not remove the need to replace membranes at the next restart.[143] The testing of the membranes against performance specification to ascertain performance does not need a partial plant test because all the RO membranes can be funded to be replaced for the full restart.[144] According to Atkins Cardno, the replacement of the all the RO membranes with new RO membranes should ensure that plant meets its drinking water quality obligations.[145]

Atkins Cardno noted that an 8-month period to restart the plant provides SDP with sufficient time to procure new membranes and address any residual vulnerability in the plant and equipment. [146] An 8-month period to recommission the plant is similar to the time allowed for new plant commissioning and performance testing of newly constructed large desalination plants.[147]

Carrying out a partial plant test to provide SDP with confidence in the mechanical and electrical integrity of the plant is also not justified.[148] Atkins Cardno noted the following reasons:[149]

- The plant was fully commissioned and operated for a two year proving period which should have identified and remedied the typical new plant equipment supplier and constructor defects;
- The plant pumps, and actuated valves and major drives are regularly turned by hand except for the high pressure pumps; and
- All of the high pressure pumps have been fully refurbished by the supplier.

Further, Atkins Cardno noted that the operator ensures that the mechanical, electrical and civil, and safety assets all undergo regular inspection with routine and periodic maintenance which should enable the design lives to be achieved. Therefore, continuing to apply good asset management processes should reduce the risk of any major issues on restart.[150]

Atkins Cardno has provided sufficient allowances to ensure that all plant equipment can be well maintained and regularly serviced.

Sydney Water in its submission to our Issues Paper rejected customers paying for partial plant testing in the 2017 determination period. In principle, Sydney Water supported that

141 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 41.
142 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 9.
143 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 40.
144 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 39.
145 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 40.
146 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 42.
147 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 38.
148 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 40.
149 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 40.
150 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 39.

testing costs should be borne by all customers, but it considered testing in the 2017 determination period would form part of the insurance claim.[151]

5.3.2 Capitalising a full membrane replacement on first restart

We have made a draft decision to:

24 Set SDP's prudent and efficient capital expenditure at $30 million for a full membrane replacement on the first restart in the 2017 determination period. These costs would be payable at most once in the 2017 determination period. For clarity, this includes a restart:

- triggered by drought response, or
- discretionary use of the plant by third-party customers outside drought.

25 Not provide any further allowances for the ongoing replacement of membranes in the 2017 determination period.

SDP proposed to include an average of $21.7 million covering partial replacement of membranes on a restart during the 2017 determination period.[152] This amount was included in SDP's proposed one-off transition to restart costs (ie, as an operating cost). SDP also proposed additional expenditure for ongoing membrane replacement costs if the plant operates. Atkins Cardno estimates SDP's proposed membrane replacement program would provide for replacement of 62.8% of membranes on restart and a further 21.6 % over two years of operation. In total, SDP has proposed costs to replace about 84.4% of all membranes over the two years of operation following a restart in 2019-20.[153]

Atkins Cardno reviewed SDP's proposed membrane replacement program and found it inefficient. By the time of restart, the existing membranes would be past their guaranteed asset life and their performance would be uncertain. Atkins Cardno instead recommended providing for a full membrane replacement at first restart ($30 million).[154]

Atkins Cardno also recommended that these costs be capitalised.[155] It indicated that the Australian Accounting Standard AASB 116 definition of capital expenditure supports the capitalisation of periodic maintenance payments and membranes. This standard indicates that capital expenditure is that which is expected to generate benefits over more than a year. As membranes fall within this definition, Atkins Cardno recommended they be capitalised.

We recognise that membrane replacement costs are critical to the plant's production and supply of any desalinated water. This is why we have accepted Atkins Cardno's recommendation to include the prudent and efficient costs of **full** membrane replacement in the allowed capital expenditure on first restart in the 2017 determination period.[156] Moreover, we note that if SDP experiences operational issues due to faulty membranes over the 2017 determination period, it should be covered by the manufacturer's warranty.

151 Sydney Water submission to IPART Issues Paper, November 2016, p 35.
152 SDP pricing proposal to IPART, October 2016, p 70.
153 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 40.
154 Atkins Cardno *Expenditure Review – SDP*, February 2017, p 12.
155 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 52.
156 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 65.

We will review actual membrane replacement costs, if the plant is triggered to restart in the 2017 determination period, at the next price review. We accommodate for the contingent nature of this expenditure in Chapter 10. Below we outline Atkins Cardno's reasons for a full membrane replacement at first restart in further detail.

Atkins Cardno also recommended expenditure on portable skid test unit ($1 million) to carry out high pressure testing of the membrane conditions in situ. This would allow the operator to get a true assessment of the membrane condition while the plant is in Water security mode.[157] We discuss our treatment of this expenditure below, which was not proposed by SDP.

Provision of full membrane replacement, given their existing age

No provision was made in our 2012 Determination for any membrane replacement costs in shutdown. The plant has been in water security (shutdown) mode since 1 July 2012. The membranes were installed before commissioning of the plant in 2010.

Early in the 2017 determination period, the stock of membranes will be reaching the end of its asset life (eight years). The manufacturer extends warranty on membrane conditions if membranes are preserved in shutdown using the agreed protocol. SDP has been following the agreed protocol for membrane storage.[158] Atkins Cardno noted that even following the storage protocol, the condition of the membranes cannot be ascertained past the guaranteed eight years.[159]

Atkins Cardno envisaged SDP's first restart in its drought response role, triggered by dam levels falling below 70%. It considered that within a restart period SDP can procure membranes, carry out essential asset replacement, recruit and train additional operators and test the individual processes and the complete works. Atkins Cardno considered that the 8-month duration was sufficient to restart from a prolonged water security shutdown, including ordering membranes and full plant testing.[160]

To calculate the efficient costs of a full membrane replacement, Atkins Cardno established a 'supplied to SDP's site' benchmark unit cost for membranes, and applied a further allowance for installation, spares, and membrane disposal.[161]

Providing the plant with full membrane replacement on first restart eliminates the need of the partial plant test in water security shutdown mode, ensuring operating cost savings in water security shutdown mode.

No provision for ongoing replacement of membranes during the 2017 determination period

A full membrane replacement on first restart allows further removal of costs associated with ongoing membrane replacement from SDP's proposed operating costs in plant operation

157 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 61.
158 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 64.
159 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 64.
160 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 24.
161 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 66.

mode, without any additional capital expenditure provision during the 2017 determination period.[162]

Atkins Cardno's proposed approach to membrane replacement in restart and plant operation mode results in cost savings over the 2017 determination period in all modes, irrespective of the year in restart.[163]

Stakeholder views on membrane replacement costs

Sydney Water in its submission supported that membrane replacement costs should be capitalised. Further, due to uncertainty regarding the costs SDP will incur in replacing membranes, it argued that a cost pass-through of the capitalisation of the efficient costs would be more appropriate.[164]

We agree with Atkins Cardno[165] and consider that capitalisation of membrane replacement is preferable to a cost pass-through mechanism as this allows for ex-ante review of the expenditure and provides a strong efficiency incentive to SDP without requiring the detailed hands-on regulation associated with administering a significant cost pass-through item.

5.3.3 Capitalising periodic asset maintenance costs

SDP proposed continuing treating periodic asset maintenance costs as operating costs, as was the case under the 2012 Determination.[166] Atkins Cardno, however, has recommended the capitalisation of all periodic asset maintenance.

The recommended capital expenditure allowance for periodic maintenance over the 2017 determination period includes adjustments for defects under warranty. Much like membranes, Atkins Cardno considers these costs should be recognised as an asset consistent with Australian Accounting Standards Board because they generate benefits over more than one year. Prudent and efficient capital expenditure is the same in water security (shutdown) and plant operation modes.[167]

Atkins Cardno found that unlike routine asset maintenance, periodic maintenance expenditure relates to significant expenditures involving replacement, renewal and/or refurbishment of items which are proposed to take place on a cycle of multiple years. 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.[168]

162 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 50, 62.
163 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 67.
164 Sydney Water submission to IPART Issues Paper, November 2016, p 37.
165 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 52.
166 SDP pricing proposal to IPART, October 2016, pp 74, 77.
167 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 41, 52.
168 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 52.

5.3.4 Lower chemical costs in plant operation mode and restart

Atkins Cardno recommended reductions in chemical costs in plant operation mode and in transition to restart, compared to SDP's proposed.

Atkins Cardno used a bottom-up approach based on historical chemical usage data by the plant's operator, and best practices in procurement to establish the efficient quantities and efficient unit cost of chemicals. A 5% procurement efficiency was applied to the cost of chemicals in plant operation mode and restart.[169]

5.3.5 Adjustment to labour and other fixed costs

In water security (shutdown) mode, Atkins Cardno applied a 2.5% per year cumulative efficiency adjustment to labour and other fixed costs from year 2 to 5 of the 2017 determination period, through improved productivity and innovation.[170] This resulted in a reduction in SDP's proposed costs.[171]

No adjustment was recommended for labour and other fixed costs in plant operation and restart modes, because:

- restart costs being associated with one-off activities which are not frequently repeated, so efficiencies are unlikely to be achieved within the same regulatory period, and
- in plant operation mode, there will need to be considerable time for the large number of new plant staff to be fully trained and experienced to ensure plant safety after a long period in Water security mode.[172]

Atkins Cardno compared labour levels with desalination plants of similar design and output operating at full capacity. It concluded that SDP's proposed level of labour levels and expenditure is reasonable given the need to have three shifts and standby maintenance because of the risk of reduced output.[173]

5.3.6 Efficiency targets applied to corporate costs in all modes

Atkins Cardno applied a 0.75% per year cumulative efficiency adjustment to SDP's proposed corporate expenditure in all modes. Atkins Cardno assessed that SDP should achieve and out-perform these efficiency targets through improved procurement, methods of working and innovation.[174]

Atkins recommended a $2.4 million reduction in corporate costs in water security (shutdown) and plant operation modes.[175]

169 Atkins Cardno *Expenditure Review – SDP*, February 2017, p 49.
170 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 44, 50.
171 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 38.
172 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 43, 46.
173 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 43, 46.
174 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 36.
175 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 36.

SDP is concerned the approach taken by Atkins Cardno to this aspect of its expenditure is related to future procurement savings which SDP has already obtained and factored into its forecast spend.[176]

Atkins Cardno considers the efficiency adjustments of $60,000 cumulative over the period is modest, but gives SDP a focus to seek efficiencies as if it is operating in an open market.[177] We agree with Atkins Cardno that based on comparative analysis of our recent determinations, this target is modest and gives SDP the opportunity to out-perform.

5.3.7 Ex-post efficiency review of skid test unit and drinking water pump

We have made a draft decision to:

26 Not include in the RAB the prudent and efficient capital costs of an extra drinking water pump ($2.1 million) and a skid test unit ($1 million) given the uncertainty in timing of this expenditure. Rather, these costs would be re-assessed for efficiency and included (with holding costs at WACC) at the next review of SDP prices.

SDP proposed capital expenditure for an additional drinking water pump. Atkins Cardno recognised the lack of standby capacity in SDP's DWPS to deliver drinking water, presenting a risk to the reliability of supply. SDP proposed $2.1 million in capital expenditure to install an extra pump, to address this risk.[178]

However, Atkins Cardno considers it prudent and efficient to **defer** the cost of installing the additional pump and review it ex-post rather than build it into water security (shutdown) mode capital expenditure for the 2017 determination period. [179] It recommended removing $2.1 million capex from the prudent and efficient capital expenditure for the 2017 determination period. Due to the uncertainty of the need for and timing of any restart, it would be more appropriate to review the expenditure ex-post rather than to build it into water security capital costs for the 2017 determination period.

Atkins Cardno also recommended expenditure on portable skid test unit ($1 million) to carry out high pressure testing of the membrane conditions in situ. However, it considered it is only prudent to incur this cost in water security shutdown **following** the first restart for drought response in the 2017 determination period. A skid test unit is not required in the current shutdown period, as a full replacement of membranes is recommended on the plant's first restart in response to drought.[180]

We support our consultant's recommendation not to include the prudent costs of a skid test unit and an extra pump in the allowed capital expenditure for the 2017 determination period. We recognise the high degree of uncertainty associated with the timing of these costs if they eventuate, and the probability of these costs not eventuating at all during the 2017 determination period. Customers will save by not servicing the additional capital and operating costs until the benefits are likely to be realised.[181]

176 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 36.
177 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 36.
178 SDP pricing proposal to IPART, October 2016, p 104.
179 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 59.
180 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 12 and 61.
181 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 61.

We also note that these costs are not critical to the plant's operations in its drought response role for the 2017 determination period, because:

- There are two existing pumps with a guaranteed technical reliability parameter that were tested during plant technical proving period in 2010-2012, have been properly maintained during shutdown, and are highly unlikely to fail simultaneously.
- A skid unit will only be prudent to procure in the next water security shutdown, as full membrane replacement recommended on first restart eliminates the need to test the condition of the existing membranes in the current shutdown.

We recommend to include holding costs (based on our WACC decision) if any prudent capital expenditure on a skid test unit and an extra pump are incurred during the 2017 determination period, subject to the ex-post efficiency review, in the next price review.

5.3.8 Plant rebuild is fully insured

The damage to the desalination plant as a result of the December 2015 storm event is fully covered by SDP's insurance. Thus, there is no insurance 'gap'. At the Public Hearing, SDP stated it was not intending to pass-through these costs to its customers, which updated the position it took in its pricing proposal.[182]

Despite the claim still being finalised, our insurance consultants have confirmed the view expressed by SDP at the Public Hearing.[183] The only outstanding matters related to insurance are the scope of plant testing, which does not affect any 'gap' in insurance coverage.[184] The claim is expected to be largely settled by 1 July 2018, which is the date by which SDP has committed to having an operable plant.[185]

Because SDP's insurance is covering the cost of repairs to the plant, there will be no change to the RAB or to asset lives. Our expenditure consultants have indicated that the insurance funded works for the December 2015 storm event will have a neutral effect on SDP's RAB and asset lives.[186] Much of the insurance funded capital expenditure is likely to be repair work (rather than asset replacement) or relate largely to civil assets which have less of an impact on future renewal requirements than replacement of shorter asset life items would have. This therefore limits the impact on future prudent and efficient expenditure.

We consider our expenditure consultant's conclusion to be reasonable given that the purpose of the insurance cover (paid for through SDP's prices) is largely to protect SDP and its customers from the effects of events such as this. Since the December 2015 storm event will not change the RAB or asset lives, it will not impact SDP's prices (except to the extent that insurance premiums increase due to SDP having made a claim – see discussion below).

182 IPART, SDP public hearing transcript, 8 December 2016, p 43.
183 Deloitte, *Insurance Review – SDP*, February 2017.
184 Deloitte, *Insurance Review – SDP*, February 2017.
185 Deloitte, *Insurance Review – SDP*, February 2017.
186 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 69.

5.3.9 Efficient insurance costs

Our insurance consultants reviewed SDP's Industrial and Special Risks (ISR) policies and premiums for the 2017 determination period.[187] ISR insurance provides cover for physical loss or damage to SDP's property as a result of, for example, fire, explosion, vandalism, weather perils, earthquake, or accidental damage. Typically, this policy covers the costs of replacement or reinstatement in the event of damage, and will also cover any resultant shortfall in revenue (ie, business interruption).

Our consultants concluded that SDP's coverage for business interruption is adequate and would be sufficient given the proposed changes to the abatement mechanism.[188]

Our consultants stated that SDP's proposed premiums to the 2017 determination period are based on insuring the total asset value of the plant, rather than an estimate of maximum foreseeable loss (MFL).[189] The MFL is the largest financial loss that SDP could experience when its property is harmed or destroyed by an adverse event such as a fire or earthquake. Our consultants state it is more efficient for insurance premiums to be based upon MFL (which could reduce premiums by around 5%[190]), rather than the total asset value of the plant. In our 2012 Determination, we based SDP's ISR insurance premiums upon an estimate of MFL.

For the purposes of this Draft Report, we have included SDP's proposed ISR insurance premiums in our decisions on operating expenditure. These are based on insuring the total asset value of the plant and not the MFL value. However, we invite submissions on whether insurance premiums should be based on the MFL value for the plant and will consider this issue in making our final decision on SDP's prices.

187 Deloitte, *Insurance Review – SDP*, February 2017.

188 Deloitte modelled various abatement scenarios. Our proposed changes to the abatement mechanism in Chapter 3 fall within the range of scenarios modelled. Deloitte, *Insurance Review – SDP*, February 2017.

189 Deloitte, *Insurance Review – SDP*, February 2017.

190 Deloitte, *Insurance Review – SDP*, February 2017.

6 Energy costs

The cost of energy makes up a substantial proportion of SDP's operating costs when the plant operates.[191] This is because water desalination is an energy intensive process.

The four major elements of SDP's energy costs are:

1. The cost of energy required by the plant (ie, the wholesale market cost of energy).
2. The cost of renewable energy certificates arising from:
   - the planning approval for the plant that required 100% renewable energy use,[192] and
   - renewable energy schemes, which energy retailers in NSW are required to meet.
3. The cost of other energy components, including ancillary services and retail margins.
4. Network charges payable for the transmission of this energy over the network.

In this chapter, we outline our decisions on these cost allowances. We are setting energy cost allowances to cover the first three of these components. We are maintaining our approach to allow a cost pass-through mechanism for network charges.

6.1 Review of past energy use

Over the four years from 2012-13 to 2015-16, SDP used about 48% of the energy that had been forecast for shutdown mode in the 2012 Determination. As a result of this reduction in energy usage, SDP made a saving of approximately $2.4 million. This is shown in Table 6.1.

While this saving was retained by SDP over the 2012 determination period, it has allowed us to reduce the energy use forecast for shutdown mode over the 2017 determination period, resulting in downward pressure on prices for customers (efficient benchmark energy volumes are outlined below).

191 In plant operation mode, the plant requires around $50 million in energy per year (based on our benchmark energy prices and volumes – see Appendix D where $50 million is calculated by summing the fixed and variable energy cost per year in plant operation in 2017-18) to supply Sydney with about 15% of its water needs (http://www.sydneydesal.com.au/faqs/).

192 The project approval for SDP was granted under the *Environmental Planning and Assessment Act 1979*. IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2012 - Final Report*, December 2011, p 17.

Table 6.1 Savings from reduced demand during 2012 determination period ($2016-17)

	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Forecast volumes (MWh)	9,640	9,640	9,640	9,640	-	38,560
Forecast benchmark energy cost ($)	1,197,416	1,227,287	1,225,685	1,241,420	-	4,891,807
Actual volumes (MWh)	6,327	4,846	4,505	2,722	-	18,400
Actual benchmark energy cost ($)[a]	785,898	616,954	572,791	350,534	-	2,326,176
Savings (MWh)	3,313	4,794	5,135	6,918	-	20,160
Savings ($)	411,519	610,333	652,894	890,887	-	2,565,633

a Actual benchmark energy costs are calculated using actual energy volumes and 2012 benchmark energy prices.

Note: Numbers may not add due to rounding. Actuals for the full year 2016-17 are not yet available.

Source: IPART analysis. Marsden Jacob, *Energy Review – SDP*, February 2017, pp 9 and 29.

6.2 Energy cost allowances

We have made a draft decision to:

27 Set energy cost allowances as outlined in Table 6.2.

Our energy cost allowances that are reflected in SDP's draft prices for the 2017 determination period are presented in Table 6.2.

These allowances comprise decisions we have made on energy prices and volumes and therefore reflect our market based estimates of efficient energy costs over the 2017 determination period. Our benchmark unit energy prices have been developed by our energy consultant, Marsden Jacob. Our benchmark energy volumes are based on advice from our expenditure consultant, Atkins Cardno.[193]

The energy costs allowances have been set by mode of operation, because SDP's energy costs vary by mode (ie, whether the plant is operating or not). In addition, energy costs are also split into fixed and variable components so that they can be recovered through fixed or variable charges. For example, the variable energy cost in plant operation mode is recovered through SDP's water usage charge, whereas the fixed component is independent of volumes supplied and recovered through daily service charges.

193 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 42, 44 and 50.

Table 6.2 Energy cost allowances by mode of operation ($2016-17)

	2017-18	2018-19	2019-20 [a]	2020-21	2021-22
Shutdown					
- Fixed ($/day)	2,097.95	2,040.41	1,982.74	1,973.84	1,969.73
Transition to restart					
- Fixed ($ one-off payment)	2,783,554.40	2,707,045.00	2,629,987.80	2,618,118.80	2,612,640.80
Plant operation					
- Fixed ($/day)	3,201.03	3,112.83	3,024.42	3,010.77	3,004.47
- Variable ($/ML)	535.94	521.18	506.37	504.09	503.03

a 2019-20 will be a leap year with 366 days.

Note: There is no variable component in transition. As soon as SDP supplies drinking water it moves to plant operation mode. Numbers may not add due to rounding.

Source: IPART analysis.

Appendix D sets out how the energy cost allowances in Table 6.2 were calculated.

6.2.1 Compared to the 2012 Determination

Figure 6.1 and Figure 6.2 show our draft decisions on benchmark prices, volumes and allowed energy costs for the 2017 determination period compared to the 2012 determination period.

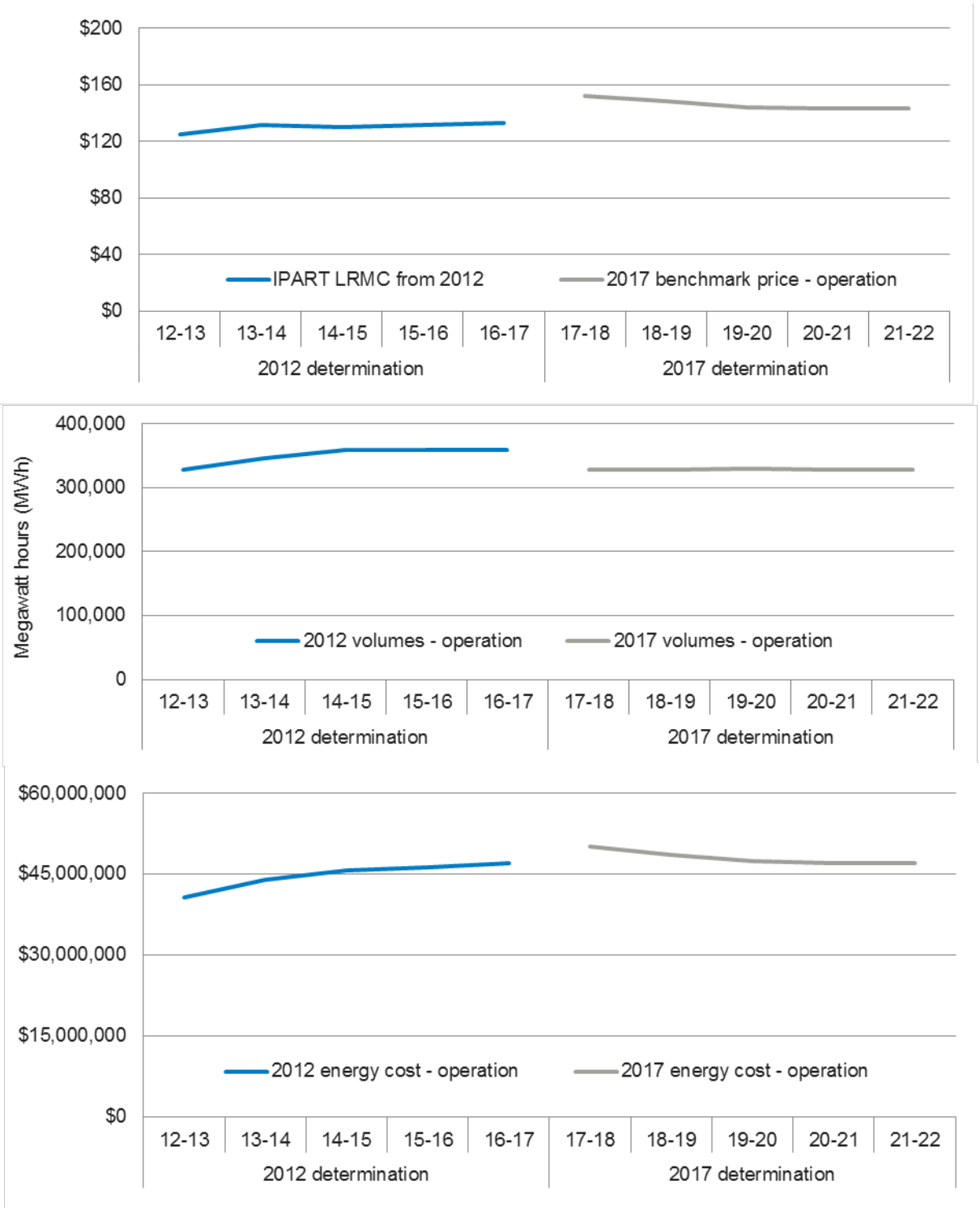
In plant operation mode, our energy cost allowances for the 2017 determination period have increased overall by $16.7 million or 7.5% compared to the 2012 determination period. This reflects:

- A 14.5% increase in benchmark prices compared to the 2012 determination period. This is driven by:
  - 5.8% increase in the energy component of the benchmark price, and
  - 15.2% increase in the LGC component of the benchmark price.
- A 6.1% decrease in benchmark energy volumes compared to the 2012 determination period. This is driven by efficiencies identified by our expenditure review consultant.

In shutdown mode, our energy cost allowances for the 2017 determination period have decreased overall by $2.1 million or 36.0% compared to the 2012 determination period. This reflects:

- A 15.1% increase in benchmark prices compared to the 2012 determination period, for the reasons outlined above.
- A 44.4% reduction in benchmark energy volumes compared to the 2012 determination period.

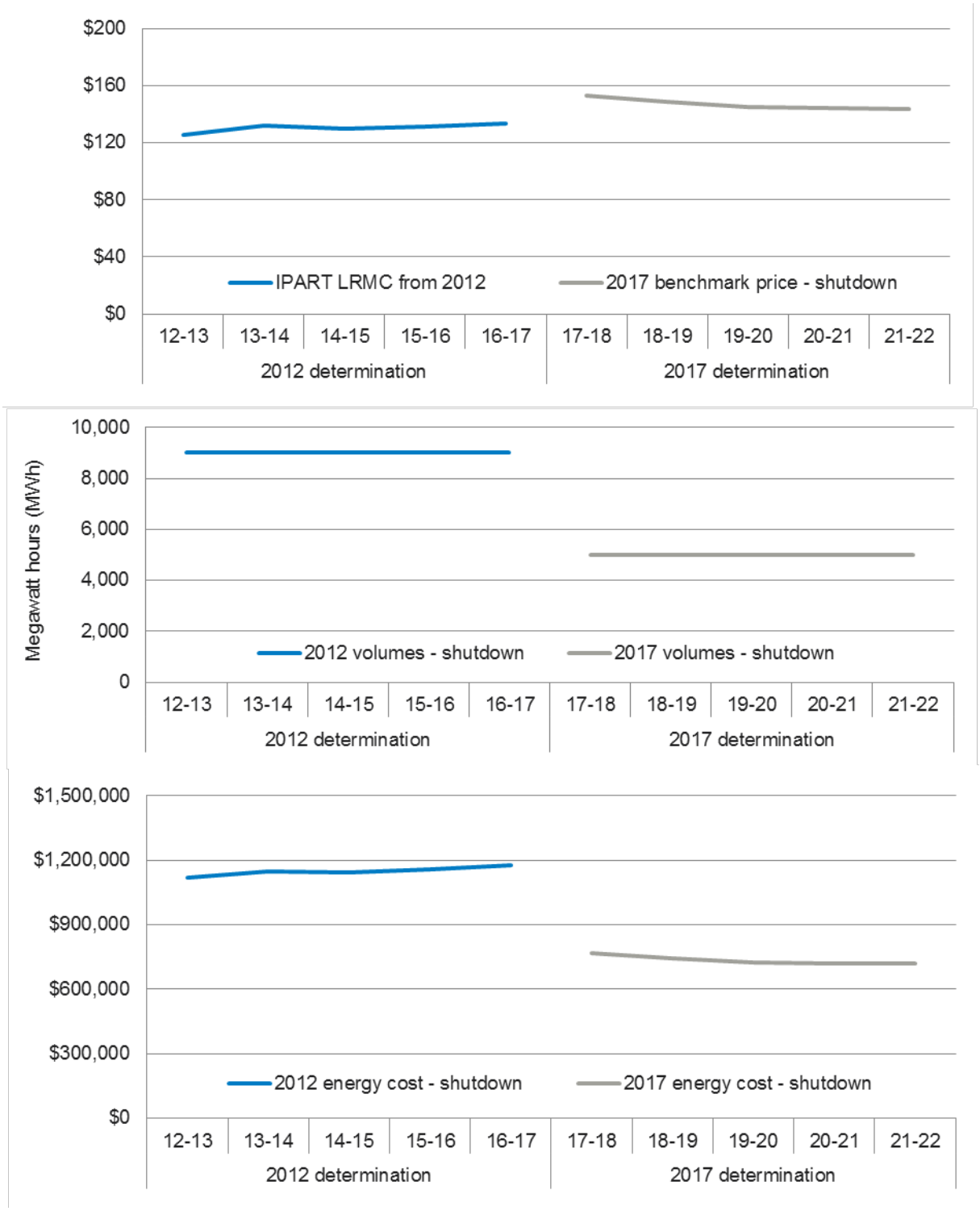
Figure 6.1 Benchmark prices, volumes and costs in plant operation ($2016-17)



Note: 2012 benchmark prices include the carbon price in 2012-13 and 2013-14 and exclude the carbon price in 2014-15 to 2016-17 since the carbon tax was repealed effective 1 July 2014 (http://www.environment.gov.au/climate-change/repealing-carbon-tax). This comparison involves converting all figures into $2016-17 and comparing totals over each determination period.

Data source: IPART analysis; IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2012 - Final Report*, December 2011, pp 58 and 136; Marsden Jacob, *Energy Review – SDP*, February 2017, pp 4 and 9; Atkins Cardno, *Expenditure Review – SDP,* February 2017, p 53.

Figure 6.2 Benchmark prices, volumes and costs in shutdown ($2016-17)



Note: 2012 benchmark prices include the carbon price in 2012-13 and 2013-14 and exclude the carbon price in 2014-15 to 2016-17 since the carbon tax was repealed effective 1 July 2014 (http://www.environment.gov.au/climate-change/repealing-carbon-tax). This comparison involves converting all figures into $2016-17 and comparing totals over each determination period.

Data source: IPART analysis; IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2012 - Final Report*, December 2011, pp 58 and 136; Marsden Jacob, *Energy Review – SDP*, February 2017, pp 4 and 9; Atkins Cardno, *Expenditure Review – SDP,* February 2017, p 53.

6.3 Approach to setting energy cost allowances

We have made a draft decision to:

28 Continue to set energy cost allowances based on market based estimates of efficient energy costs.

We have decided to maintain our approach of setting energy cost allowances based on an efficient benchmark, as this is best regulatory practice. By de-linking energy allowances from actual energy costs, this maintains appropriate incentives for SDP to prudently and efficiently manage its actual energy costs now and in the future. If we moved to passing through SDP's actual energy costs, SDP would have little incentive to procure energy on a prudent and efficient basis.

SDP proposed that we set energy cost allowances based on SDP's energy contract prices.[194] The reasons presented by SDP are outlined in Box 6.1.

Box 6.1 SDP's proposal to pass through actual energy costs

The following arguments were made by SDP in support of using its contracted energy costs for the purpose of setting prices over the 2017 determination period:

- SDP expressed its view that its contract price is both an efficient and prudent instrument through which to procure energy to provide the water supply and water security services as envisaged under the Metropolitan Water Plan, whilst complying with its planning conditions for 100% renewable energy.
- SDP argued that its use of long-term contracting is prudent and that the competitive tender process used to procure these contracts means that the prices in these contracts should be considered efficient.
- SDP noted that while IPART has a history of setting energy cost allowances based on an efficient benchmark (eg, LRMC modelling) rather than actual energy costs in its 2010 and 2013 regulated retail electricity price determinations, the different operating contexts and regulatory objectives suggest that these approaches are not well suited to setting the energy cost allowance for SDP.
- SDP argued that using a 'point in time' market based approach to set its energy cost allowance would negatively impact customers. SDP pointed to recent volatility in energy markets to support its argument that IPART's approach would provide SDP with a windfall gain and potentially shift risk onto customers.
- SDP also expressed the view that basing energy cost allowances on its contracts would ensure Sydney Water and customers are not required to manage year-on-year volatility in SDP's energy costs.

Source: SDP pricing proposal to IPART, October 2016, pp 84-88.

Sydney Water supported SDP's position that because SDP's energy contracts were secured following a competitive tender, and accordingly represent efficient energy costs, they should not be assessed at each price review.[195]

194 SDP pricing proposal to IPART, October 2016, pp 84-86. SDP redacted its energy contract prices (and the associated proposed energy cost allowances) from its public submission because this information is commercial in confidence. Therefore, we are not able to quote either SDP's contract prices or its proposed energy cost allowances directly.

195 Sydney Water submission to IPART Issues Paper, November 2016, p 41.

We have considered SDP's proposal and Sydney Water's submission. We do not agree that passing through SDP's actual energy costs would achieve an efficient allocation of risk between SDP and customers and, as a result, our view is that SDP's proposal is unlikely to be in the best long-term interests of SDP's customers.

We have decided to maintain our approach of setting energy cost allowances based on an efficient benchmark for the following reasons:

- Our prices will better reflect the market price of energy over time. With our approach, customers can expect to pay the efficient market price of energy required to efficiently run the plant over time rather than SDP's actual costs which may or may not be efficient. If SDP is able to beat our best estimate of the market price, it is free to keep any benefit it is able to generate through this. Therefore, under our approach, SDP has an incentive to prudently and efficiently manage its energy costs.
- As noted by our energy consultant, Marsden Jacob, it remains to be seen whether SDP's energy contracts will be considered prudent when assessed over the entire term of those contracts.[196]

An illustrative comparison can be made between benchmark electricity costs and benchmark financing costs (ie, electricity contracts are, in essence, financial contracts). A business will typically have a portfolio of debt at different prices and different maturities. When we consider the cost of debt for pricing purposes over the regulatory period, we do not pass through the actual costs of debt entered into by the regulated business in the past, regardless of the requirements in relation to procuring debt, as this might result in prices that do not reflect efficient costs, and would likely result in an inefficient allocation of risk between the regulated business and its customers.

6.4 Methodology used to estimate benchmark unit energy prices

Our benchmark unit energy prices have been developed by our energy consultant, Marsden Jacob. They include electricity, Large-scale Generation Certificates (LGCs), and all other components of energy costs (excluding network costs for which we are proposing to maintain the cost pass-through mechanism).

Marsden Jacob's benchmarks are based on current electricity and LGC forward market data (robust for the first three years of the 2017 determination period) and long-run marginal cost (LRMC) modelling to extrapolate these forecasts to the end of the 2017 determination period.

LRMC modelling was undertaken to establish the cost of providing energy, capacity and LGCs in each year of the 2017 determination period. This was in the context of pricing contracts that could be purchased for NSW over the 2017 determination period. Critical inputs in this modelling included demand, fuel costs, and capital cost assumptions.

Marsden Jacob employed two approaches to estimating the LRMC:

- An incremental approach (assuming existing supply capacity is able to meet SDP's load).
- A standalone approach (assuming new supply capacity is required to meet SDP's load).

196 Marsden Jacob, *Energy Review – SDP*, Final Report, p 1.

These approaches generated a LRMC range which Marsden Jacob then used to extend or extrapolate their market based estimates out to the end of the 2017 determination period.[197]

Marsden Jacob's approach to developing benchmark prices was based on meeting SDP's proposed load profiles under shutdown, transition, and operation modes.

We consider Marsden Jacob's estimates are the best available forecast of electricity and LGC spot market prices over the 2017 determination period.

6.5 Our benchmark energy unit prices

We have made a draft decision to:

29 Set efficient benchmark energy unit prices as outlined in Table 6.3.

Marsden Jacob established benchmark energy prices for three modes of operation:[198]

- Shutdown, which assumes a flat load of 0.57 MW.
- Transition, which assumes a linear increase from 0.57 MW to 37.5 MW.
- Plant operation, which assumes a flat load of 37.5 MW.

Marsden Jacob developed two cases of benchmark prices. One case that includes the cost of over-contracting and another that excludes the cost of over-contracting.[199] We have decided to base our benchmark prices on the case that excludes the cost of over-contracting. The case that excludes the cost of over-contracting is less prescriptive in that it does not assume SDP meets its load by entering forward contracts. This uses the forward market curve as the market's best estimate of spot market prices going forward. We therefore consider the case excluding the cost of over-contracting provides the best forecast of market prices over the forecast period.

Table 6.3 sets out our benchmark energy unit costs for the 2017 determination period.

Table 6.3 Benchmark energy unit prices ($/MWh, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22
Shutdown	153.15	148.95	144.74	144.09	143.79
Transition	152.44	148.25	144.03	143.38	143.08
Operation	152.43	148.23	144.02	143.37	143.07

Source: Marsden Jacob, *Energy Review – SDP*, February 2017, p 48.

197 Additional information on Marsden Jacob's LRMC modelling is contained in: Marsden Jacob, *Energy Review – SDP*, February 2017, Chapter 7 and Appendix 4.

198 Marsden Jacob, *Energy Review – SDP*, February 2017, p 35.

199 Forward contracts are traded in whole megawatt (MW) units. In order to meet a load of 0.5 MW, a market participant would need to purchase a forward contract for 1 MW (ie, 100% over-contracted). In order to meet a load of 49.5 MW, a market participant would need to purchase a forward contract for 50 MW (ie, 1% over-contracted). The degree (and potential cost) of over-contracting diminishes as the load increases.

6.5.1 Components of benchmark unit energy prices

Table 6.4 shows the components of Marsden Jacob's benchmark price for plant operation mode.

A full description of these cost components can be found in Marsden Jacob's report. In broad terms:

- Energy costs ($63.51/MWh) make up 42% of the total benchmark price in 2017-18. This represents a large increase from the (LRMC based) benchmark in 2016-17. Marsden Jacob cited the closure of Hazelwood Power Station as one issue that has affected market prices over the outlook period.
- Renewable energy costs ($82.38/MWh) consisting of LGCs, small scale generation certificates (STCs), and energy savings certificates (ESS), make up 54% of the total benchmark price in 2017-18. These are slightly higher than the (LRMC based) benchmarks in 2016-17.
- Other components ($6.54/MWh) consisting of retail margin, market fees, metering and data fees, ancillary services, and losses make up the remaining 4% of the total benchmark price in 2017-18. Together, these components are slightly lower than the benchmarks in 2016-17.

In developing these benchmark prices, Marsden Jacob assumed that the benchmark price included 100% renewable energy and that this was made up of 90% LGCs and 10% STCs.[200]

Table 6.4 Components of Marsden Jacob's benchmark price ($/MWh, $2016-17)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Energy (ex. losses)	48.90	63.51	60.96	58.56	59.69	61.12
REC / LGC	76.16	77.06	75.47	73.63	71.84	70.08
STC		3.38	3.24	3.24	3.24	3.24
ESS		1.94	2.06	2.13	2.13	2.13
Retail margin		5.00	5.00	5.00	5.00	5.00
Market fees	5.93	0.30	0.30	0.30	0.30	0.30
Metering / data		0.01	0.01	0.01	0.01	0.01
Ancillary services		0.25	0.25	0.25	0.25	0.25
Losses		0.98	0.94	0.90	0.92	0.94
Total [a]	**130.99**	**152.43**	**148.23**	**144.02**	**143.37**	**143.07**

[a] Refers to Marsden Jacob's benchmark unit energy price for plant operation mode. Numbers may not add due to rounding.

Source: IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2012 - Final Report*, December 2011, p 136 (note figures converted from $2011-12 to $2016-17). Marsden Jacob, *Energy Review – SDP*, February 2017, p 48.

6.5.2 Compared to the 2012 Determination

Table 6.5 compares our efficient benchmark energy unit prices to the components of various alternative unit energy price estimates. Specifically:

- **2012 Determination:** this is the IPART allowed unit energy cost from the 2012 Determination for 2016-17, moved into $2016-17 based on actual inflation.

200 Marsden Jacob, *Energy Review – SDP*, February 2017, p 21.

- **Frontier Economics' LRMC:** SDP engaged Frontier Economics to develop a LRMC based estimate of benchmark energy costs. Frontier Economics followed a similar LRMC methodology to the one Frontier Economics employed in 2011 to estimate efficient benchmark energy costs which we used to set SDP's prices for the 2012 determination period. Information on Frontier Economics' LRMC benchmark energy cost estimates for the 2017 determination period is provided in SDP's pricing proposal.[201]
- **SDP market prices:** SDP reported market based estimates for the first three years of the 2017 determination period as part of its pricing submission.
- **Marsden Jacob benchmark:** this is the estimate we have used to set energy allowances developed by our energy consultant, Marsden Jacob.

Marsden Jacob's benchmark is designed to reflect market prices and is close to the market prices reported by SDP in its pricing proposal. This is why it is also higher than the Frontier Economics benchmark estimates. Frontier Economics used an incremental LRMC approach. Marsden Jacob's benchmark is based primarily on market data and was developed at a later date, reflecting developments in the market's expectations of energy and LGC prices over the short to medium-term where market data is robust.

Marsden Jacob developed both incremental and standalone LRMC estimates to generate a LRMC range around its market based benchmark prices. Marsden Jacob employed this LRMC range to extend its market based benchmark prices out to the latter years of the 2017 determination period. We note the energy and LGC components of Marsden Jacob's incremental LRMC estimates for 2017-18 combined (about $120/MWh)[202] are similar to the energy and LGC components of Frontier Economics' incremental LRMC estimate for 2017-18 combined (about $116/MWh).[203]

Table 6.5 Comparing energy cost components ($/MWh, $2016-17)

	IPART 2012 benchmark price	SDP quoted LRMC (Frontier Economics)	SDP quoted market prices	Marsden Jacob benchmark[a]
	2016-17	2017-18	2017-18	2017-18
Energy	48.90	45.66	55.50	63.51
LGCs	76.16	70.14	82.63	77.06
Other	5.93	11.50	11.50	11.86
Total	**130.99**	**127.30**	**149.62**	**152.43**

[a] Refers to Marsden Jacob's benchmark unit energy price for plant operation mode.

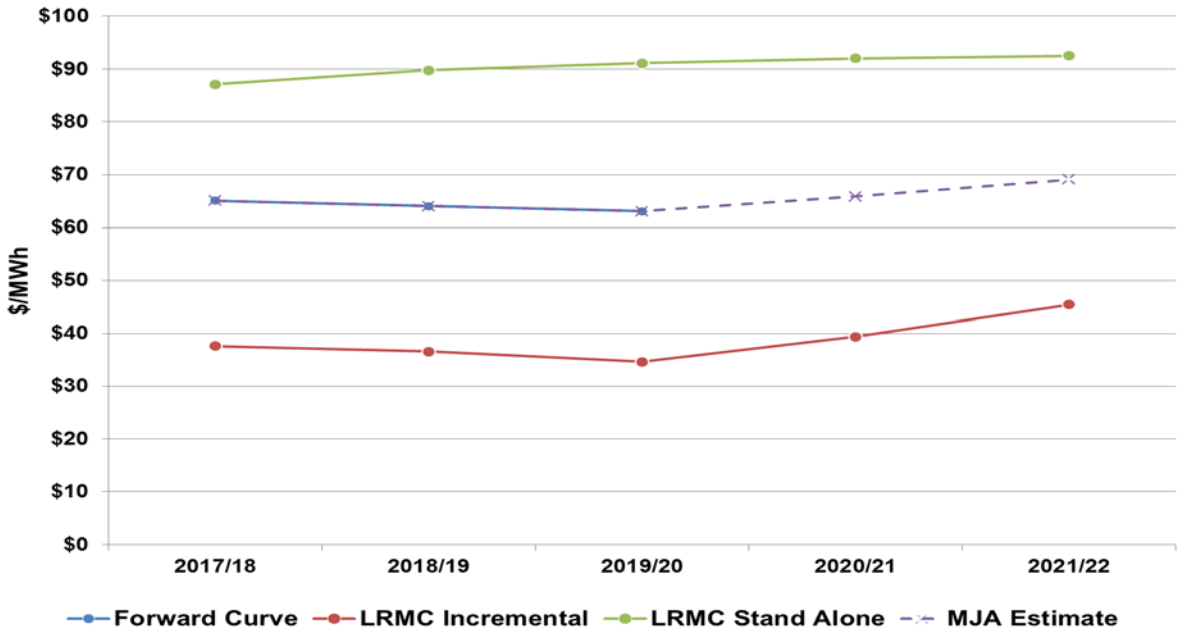
Note: Totals may not add due to rounding.

Source: IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2012 - Final Report*, December 2011, p 136 (note figures converted from $2011-12 to $2016-17). SDP pricing proposal to IPART, October 2016, pp 93-94. Marsden Jacob, *Energy Review – SDP*, February 2017, p 48.

Figure 6.3 illustrates Marsden Jacob's modelling of the energy component of the benchmark price, which is based on the forward market curve for the first three years of the 2017 determination period and then extrapolated over the remainder of the period based on incremental and stand-alone LRMC modelling.

201 SDP pricing proposal to IPART, October 2016, p 93.
202 Refer to the 'incremental LRMC' lines in Figure 6.3 and Figure 6.4.
203 Refer to Table 6.5.

Figure 6.3 Marsden Jacob's modelling of the energy component ($/MWh, $nominal)

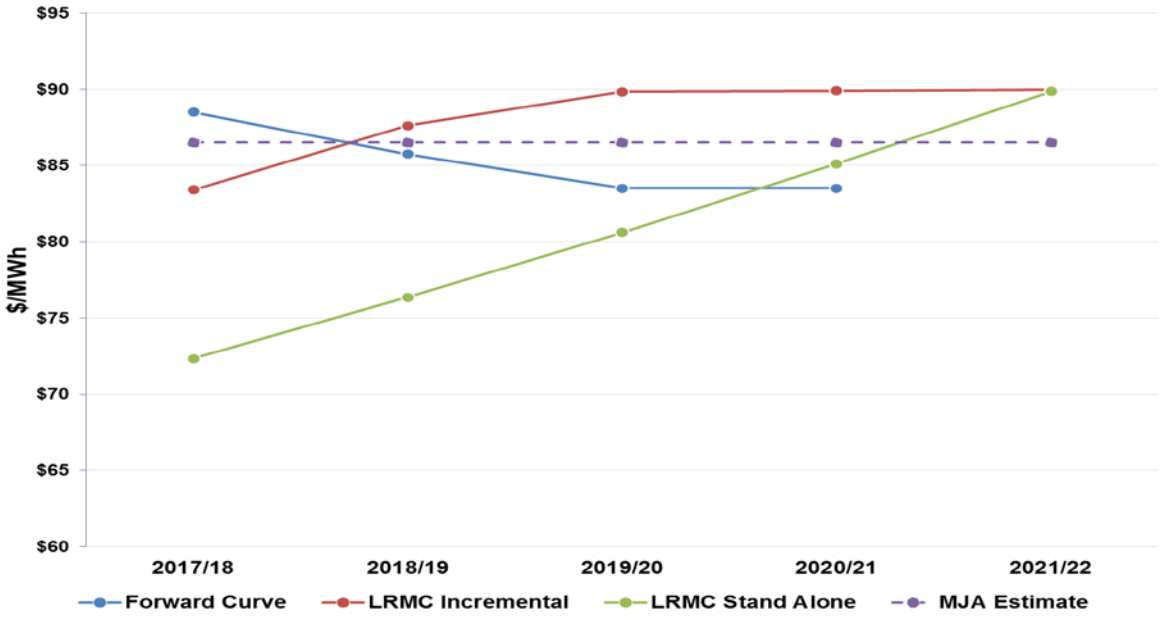


Note: The first three years of Marsden Jacob's estimate (2017-18 to 2019-20) is obscured by the forward curve.

Source: Marsden Jacob, *Energy Review – SDP*, February 2017, p 42.

Figure 6.4 illustrates Marsden Jacob's modelling of the LGC component of the benchmark price, which is based on a combination of forward market and LRMC modelling.

Figure 6.4 Marsden Jacob's modelling of the LGC component ($/MWh, $nominal)



Source: Marsden Jacob, *Energy Review – SDP*, February 2017, p 44.

6.6 Benchmark volumes

We have made a draft decision to:

30 Set benchmark energy volumes as outlined in Table 6.6.

Our benchmark energy volumes are based on our expenditure consultant, Atkins Cardno's, review and recommendations of SDP's energy requirements in each mode of operation.[204]

Atkins Cardno based its analysis of SDP's energy requirements in plant operation mode on the plant's proving period after construction.[205] The plant's proving period was the two years to June 2012. Atkins Cardno also made specific assumptions around technical aspects of plant operation and sea water quality.[206]

In shutdown, Atkins Cardno formed its estimate of SDP's energy requirements on the plant's actual energy use over the 2012 determination period.

We have accepted Atkins Cardno's benchmark energy volumes over the 2017 determination period, but for an adjustment to energy volumes in a restart period.

Atkins Cardno's estimate of efficient power consumption is 71,000 MWh for the complete transition to restart, which includes energy for the drinking water pumping station, assuming an 8-month restart period.[207] Atkins Cardno considered that this restart would include production and supply of 15,000 ML of drinking water.[208]

However, under our determination, once SDP supplies a litre of drinking water, it moves to Plant operation mode and begins receiving a water usage charge.[209] Therefore, it is important the transition to restart charge only include energy costs that are unrelated to the production and supply of drinking water to not double count these costs.

Of the total of 71,000 MWh included for restart, we have estimated that 52,740 MWh relate to the production and supply of 15,000 ML of desalinated water. The remaining 18,260 MWh are considered 'fixed' (ie, unrelated to production and supply of drinking water) and what we have decided as appropriate costs to recover through the transition charge.

Our benchmark energy volumes for the 2017 determination period are set out in Table 6.6.

204 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 41, 44 and 50.
205 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 41, 44 and 50.
206 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 49.
207 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 43.
208 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 42.
209 It also receives the incremental service charge.

Table 6.6 Benchmark energy volumes (MWh)

	2016-17	2017-18	2018-19	2019-20 [a]	2020-21	2021-22
Shutdown						
- Total (fixed)	**9,000**	**5,000**	**5,000**	**5,014**	**5,000**	**5,000**
Transition to restart						
- Total (fixed)	**-**	**18,260**	**18,260**	**18,260**	**18,260**	**18,260**
Plant operation						
- Fixed	-	7,665	7,665	7,686	7,665	7,665
- Variable	-	320,835	320,835	321,714	320,835	320,835
- Total	**360,000**	**328,500**	**328,500**	**329,400**	**328,500**	**328,500**

[a] 2019-20 will be a leap year with 366 days.

Note: Numbers may not add due to rounding.

Source: IPART analysis. Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 41, 44 and 50.

6.7 Pass through of energy network charges

We have made a draft decision to:

31 Maintain the cost pass-through mechanism used in the 2012 Determination for SDP's energy network costs.

Under the 2012 Determination we established a methodology to pass through fixed and variable network charges determined by the AER to SDP's prices. This was done because there was significant uncertainty about average changes in network prices within the 2012 determination period (as the AER's determination ended in 2013-14).

We have decided to continue to use this method to pass-through SDP's network charges into its prices. Similar to the 2012 determination period, SDP's network costs will become uncertain in the 2017 determination period. The AER sets network charges on a two-year basis, and its next determination will come into effect on 1 July 2017. Since network costs are subject to review by an independent price regulator, we can have confidence that SDP's efficient costs will be passed through.

The pass-through mechanism is identical to that in the 2012 Determination, except that we have updated energy volumes consistent with our decisions on SDP's efficient energy requirements by mode of operation over the 2017 determination period (outlined above).

SDP supported the use of a pass-through mechanism given the significant uncertainty with electricity network prices over the medium term. SDP also argued that retaining the pass-through mechanism would maintain regulatory consistency in addressing the same issue across determinations.[210]

Sydney Water also supported the use of a pass-through mechanism, arguing that any forecast of network charges during the previous price review for SDP would have been significantly higher than actual billed charges. The unpredictability of network charges means that no forecast would be more efficient than a pass-through of actual charges.[211]

210 SDP pricing proposal to IPART, October 2016, pp 37-38.
211 Sydney Water submission to IPART Issues Paper, November 2016, p 42.

7 Other building block components

To calculate the allowances for a return on assets and regulatory depreciation[212] in the revenue requirement, we need to determine three key inputs:

- the value of SDP's RAB, which represents the economic value of the assets used to deliver the monopoly services
- the appropriate asset lives and depreciation method for SDP's RAB, and
- the appropriate rate of return (ie, the WACC) on SDP's RAB.

In this chapter, we provide an overview of our decisions on these issues and their impact on SDP's NRR.

We also discuss our decisions on factors affecting the regulatory tax allowance and set out our findings on that tax allowance over the 2017 determination period.

7.1 The value of the Regulatory Asset Base

The RAB represents the value of SDP's assets on which we consider it should earn a return on capital and an allowance for regulatory depreciation. In determining the value of the RAB over the 2017 determination period, we have calculated:

- the opening RAB at 1 July 2017, by rolling the historical RAB forward from 2011-12 to 2016-17, and
- the value of the RAB from 1 July in each year of the 2017 determination period.

7.1.1 Calculating the opening RAB at 1 July 2017

We have made a draft decision to:

32 Set the opening RAB at 1 July 2017 by rolling the historical RAB forward from 2011-12 to 2016-17 as outlined in Table 7.1.

In calculating the opening RAB, we rolled forward the RAB over the 2012 determination period. This involved using the determined RAB at 1 July 2011[213] and making the following adjustments:

- adding prudent and efficient capital expenditure (see Chapter 5)
- deducting the regulatory depreciation we allowed in the 2012 Determination, and
- adding the annual indexation of the RAB.

212 Regulatory depreciation is also known as 'return of assets', as the regulatory depreciation allowance returns the value of assets over their lives.

213 When we set the RAB at our 2012 determination, the figures we used for 2011-12 were forecasts. Therefore, we need to adjust the 2011-12 figures for our actual figures including our decisions on capital expenditure for 2011-12.

We also made corrections to the asset lives and category values used to establish the RAB in the 2012 Determination (discussed further below).

The historical RAB roll forward is presented in Table 7.1. Our opening RAB of $1,963.9 million (plant and pipeline) for the 2017 determination period is around $10 million below SDP's proposed opening RAB of $1,973.6 million.[214]

Table 7.1 RAB roll forward – 1 July 2011 to 30 June 2017 ($million, $nominal)

	2011-12[a]	2012-13	2013-14	2014-15	2015-16	2016-17
Plant						
Opening RAB	1,344.7	1,337.7	1,330.2	1,328.7	1,307.0	1,278.0
plus Capex	0.9	0.4	0.0	0.3	0.4	0.0
less Depreciation	38.8	40.1	41.3	42.0	42.4	43.3
plus Indexation	30.9	32.1	39.9	19.9	13.1	28.1
Closing RAB	**1,337.7**	**1,330.2**	**1,328.7**	**1,307.0**	**1,278.0**	**1,262.8**
Pipeline						
Opening RAB	632.3	658.6	669.4	684.4	689.5	691.2
plus Capex	16.6	0.0	0.0	0.0	0.0	0.0
less Depreciation	5.1	4.9	5.1	5.2	5.2	5.3
plus Indexation	14.7	15.8	20.1	10.3	6.9	15.2
Closing RAB	**658.6**	**669.4**	**684.4**	**689.5**	**691.2**	**701.1**

a 2011-12 is the final year of the 2008 determination period for Sydney Water, the original owner of SDP. Forecasts were used to roll forward the RAB in this year during the 2012 Determination of SDP's prices.

Note: Numbers may not add due to rounding.

Source: IPART analysis.

RAB roll forward for 2011-12

We have made a draft decision to:

33 Roll forward the RAB from 1 July 2011 to 30 June 2012 by taking account of actual CPI, but not updating for actual capital expenditure.

Our standard regulatory practice is to roll forward the RAB from the beginning of the final year of the previous regulatory period to the end of the current regulatory period updating for actuals where they are available. In SDP's case, this requires rolling the RAB forward from 1 July 2011 to 30 June 2016, taking actuals into account.

However, the roll forward of the RAB from 1 July 2011 to 30 June 2012 is outside the current determination period and traverses the sale of the plant from Sydney Water to Government and then to the current owners.[215]

214 SDP pricing proposal to IPART, October 2016, p 61, Table 5.10.

Consequently, SDP has not updated the 2011-12 RAB for actuals. The prices in SDP's submission are based on a 1 July 2012 opening RAB of $2,000.2 million ($2012-13), consistent with the RAB we set in the 2012 Determination.

We have decided to update the 2011-12 RAB for CPI outcomes only and not actual capital expenditure. In making our decision, we were mindful that the 2012 Determination was used by potential purchasers of SDP to guide their bids.[216] We also note that the difference between forecast and actual capital expenditure for 2011-12 would have a minor impact on prices over the 2017 determination period.

When outcomes for both CPI and capital expenditure are accounted for, SDP's 30 June 2012 RAB (plant and pipeline) would be around $1,988.5 million ($2012-13). This is about $11.7 million lower than under SDP's proposed approach, comprised of:

- Lower actual capital expenditure ($7.7 million) – actual capital expenditure in 2011-12 was $9.8 million ($2011-12) compared to the forecast of $17.5 million ($2011-12) used to set prices under the 2012 Determination.
- Lower actual CPI ($4 million) – CPI for 2011-12 is 2.3% compared to the 2.5% forecast used to set prices under the 2012 Determination.

2012 Determination - correcting asset category values

We have made a draft decision to:

34 Correct asset category values used in the 2012 Determination to roll the RAB forward from 1 July 2012 to 30 June 2017.

In the 2012 Determination, the asset values for some plant asset categories were inadvertently swapped. This happened in two instances:

- Project development costs and Pre-operations payments.
- Seawater intake and Seawater outlet.

The net impact is that SDP's depreciation profile was overstated by around $3 million ($2011-12) each year in the 2012 determination period. As shown in Table 7.2 below, this is because the larger asset value for project development costs of $115.9 million was assigned the much shorter pre-operations payments asset life of 20 years, instead of 44 years.

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215 Sydney Water was the original owner of SDP. On 9 May 2012, Sydney Water created two trusts: SDP Assets Trust and SDP Pipeline Trust (the Trusts). The assets associated with SDP (desalination plant, site and pipeline) were transferred to the Trusts on 31 May 2012, with SDP owning the units in the Trusts. Later on the same day, Sydney Water entered into a sale and leaseback arrangement with the Ministerial Holding Corporation for $1.9 billion. The units in the Trusts were then transferred to the Ministerial Holding Corporation. On 1 June 2012, the units in the Trust were then sold for $2.3 billion to a consortium of Hastings Funds Management Ltd (now the Infrastructure Fund) and Ontario Teachers' Pension Plan Board, the successful bidder in the private sector, for a 50-year term. Sydney Water Corporation, *Annual Report*, 30 June 2012, pp 50, 151, 176.

216 We consider that sophisticated bidders (and investors) would reasonably expect the RAB to be rolled forward to reflect actual inflation.

Table 7.2 Asset categories, values and economic lives ($million, $2012-13)

Category	Value[a]	Economic Life (new assets)
As per SDP's (then owned by Sydney Water) 2011 submission		
Project development costs	$115.9	44
Pre-operations payments	$10.0	20
Seawater intake	$205.0	90
Seawater outlet	$62.3	100
As per IPART 2012 Determination		
Project development costs	$10.0	44
Pre-operations payments	$115.9	20
Seawater intake	$62.3	90
Seawater outlet	$205.0	100

a The values presented are opening asset values as at 1 July 2012, based on IPART's analysis and are consistent with the other decisions presented in this report.

Source: IPART analysis.

SDP did not raise this issue in its pricing proposal. However, we have decided to correct this error by:

- placing the relevant depreciated values (as at 1 July 2017) into the correct asset categories from 1 July 2017 (ie, there have been no retrospective adjustments in correcting for this issue).

This approach would ensure that all asset categories, values and remaining lives align at the commencement of the 2017 determination period, resulting in an appropriate depreciation profile being calculated going forward.

SDP is financially indifferent on a present value basis as a result of this issue, as it would still fully recover the cost of its investment, although over a different timeframe. The lower RAB as at 1 July 2017 due to the higher depreciation profile would be offset by the quicker recovery of the assets. That said, SDP would better off on a cash flow basis as it would receive a faster payback for a higher valued asset than it otherwise should - ie, 24 years earlier.

Nonetheless, correcting for this modelling error results in a more appropriate depreciation profile over the 2017 determination period. It ensures that cash flows more closely align with the appropriate level of depreciation of the assets, and importantly prices that are more cost reflective.

2012 Determination - correcting asset lives

We have made a draft decision to:

35 Correct asset lives used in the 2012 Determination to roll the RAB forward from 1 July 2017.

In the 2012 Determination, new asset lives were applied to existing assets for all depreciating plant asset categories. Overall, this understated depreciation by about $4 million in each year over the 2012 determination period. If uncorrected, customers would continue to be better off up to the point where the assets should have expired.[217]

Although SDP's depreciation profile (and therefore allowance) has been understated over the 2012 determination period, it would be financially indifferent on a present value basis over the life of the asset because it would still fully recover its initial investment (ie, via the higher relative RAB as at 1 July 2017 and onwards).

However, again, we have corrected for this error to ensure that cash flows more closely align with the appropriate level of depreciation of the assets, and that resulting prices are cost reflective. Our correction is prospective in nature and will only affect the RAB roll forward from 1 July 2017 onwards. But to make this correction we need to recast the RAB from 1 July 2012 to establish correct asset lives over the 2017 determination period. This involves:

- establishing what the remaining economic lives were for existing assets as at 1 July 2012, and
- rolling forward the RAB from 1 July 2012 with the correct remaining economic lives to establish the remaining lives for existing assets as at 1 July 2017.

Our draft decision on asset lives compared to SDP's proposal is presented in Table 7.3.

Table 7.3 Remaining asset lives to apply to affected asset categories from 1 July 2017 (years)

Category	SDP Proposed	IPART Decision
Plant	25.0	22.0
Seawater intake	85.0	82.0
Seawater outlet	95.0	92.0
Pumping station	20.0	17.1
Pre-operations payments	15.0	12.1
Project development costs	39.0	36.0

Note: Table 7.3 also reflects the asset category swap addressed in Table 7.2 above.

Source: SDP pricing proposal to IPART (Information Return), October 2016 and IPART analysis.

Maintaining our standard practice of using allowed depreciation

We have made a draft decision to:

36 Maintain our standard practice of using allowed depreciation to roll forward the historical RAB.

217 The magnitude of the impact depends on the economic life of the asset class. For example, at 1 July 2012, depreciation for the pumping station using the new life of 20 years instead of the remaining life of 17 years leads to around a 15% understatement in depreciation paid over the 2012 determination period. At the other end of the spectrum, the outlet infrastructure has a new life of 100 years, which equates to a 3% understatement.

SDP has proposed[218] to recalculate depreciation over the period 1 July 2012 to 30 June 2017 based on actual prudent and efficient capital expenditure when rolling forward the RAB over this period.

Actual prudent and efficient capital expenditure over this period was lower than forecast during the 2012 Determination, albeit marginally (see Table 7.4). Therefore, SDP's proposal would result in the RAB being marginally higher at 1 July 2017 than if allowed depreciation was used.

Table 7.4 Historical capital expenditure ($million, $nominal)

	2012-13	2013-14	2014-15	2015-16	2016-17	Total
2012 Determination	0.5	1.1	0.0	0.0	0.0	1.6
Actual	0.4	0.0	0.3	0.4	0.0	1.1

Note: Numbers may not add due to rounding.

Source: SDP pricing proposal to IPART (Information Return), October 2016 and IPART analysis.

It is our standard practice to roll forward the historical RAB using allowed depreciation. This is an important feature of our regulatory framework as it provides regulated entities with the incentive to not overestimate their forecast capital expenditure at a price review. Therefore, irrespective of the size of the impact on the RAB, we have used allowed depreciation to roll forward SDP's historical RAB given the incentives this approach provides.

7.1.2 Calculating the RAB over the 2017 determination period

We have made a draft decision to:

37 Adopt the value of the RAB in each year of the 2017 determination period as set out in Table 7.5.

To calculate the RAB in each year of the 2017 determination period, we rolled forward the RAB to 2021-22 by:

- adding $14.5 million of prudent and efficient forecast capital expenditure over the period, which is all plant related (discussed in Chapter 5), and
- deducting $249.4 million for regulatory depreciation (of which $219.6 million is plant related, and the remaining $29.8 million is for the pipeline).

This gives the forecast RAB for each year of the 2017 determination period, which we use to set SDP's return on capital and allowance for depreciation.

The RAB roll forward over the 2017 determination period is shown in Table 7.5 below.

218 SDP pricing proposal to IPART (Information return), October 2016.

Table 7.5 RAB roll forward – 2017 determination period ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22
Plant					
Opening RAB	1,262.8	1,220.5	1,179.3	1,138.3	1,098.1
plus Capex	1.5	2.6	2.9	3.7	3.7
less Depreciation	43.8	43.9	43.9	44.0	44.1
Closing RAB	**1,220.5**	**1,179.3**	**1,138.3**	**1,098.1**	**1,057.7**
Pipeline					
Opening RAB	701.1	695.1	689.2	683.2	677.2
plus Capex	0.0	0.0	0.0	0.0	0.0
less Depreciation	6.0	6.0	6.0	6.0	6.0
Closing RAB	**695.1**	**689.2**	**683.2**	**677.2**	**671.3**

Note: Numbers may not add due to rounding.
Source: IPART analysis.

Our RAB is $2.1 million higher at the end of the 2017 determination period than that proposed by SDP.[219] The differences leading to a higher RAB than SDP proposed are:

- Our decisions to capitalise periodic maintenance (discussed in Chapter 5).
- The removal of the drinking water pump from the capital expenditure program (discussed in Chapter 5).
- The combination of the adjustments correcting for modelling errors in the 2012 Determination relating to asset categories and asset lives (outlined above).

7.2 Return on capital

We have made a draft decision to:

38 Apply a real post-tax WACC of 4.9% for the purposes of calculating an appropriate rate of return on SDP's assets.

39 Set an allowance for return on capital as outlined in Table 7.7.

We include an allowance for a return on assets in the revenue requirement. This represents our assessment of the opportunity cost of the capital invested to provide the regulated services. Our approach ensures that the business can continue to make efficient capital investments in the future.

To calculate this allowance, we multiply the value of the RAB in each year of the determination period by an appropriate rate of return. As for previous reviews, we have determined the return on capital using the WACC.

219 SDP pricing proposal to IPART, October 2016, p 108.

7.2.1 Rate of return

We have developed our current approach to setting the WACC in consultation with stakeholders in a number of reviews.[220] Our decision is to use our standard methodology for all parameters. We have selected the midpoint post-tax real WACC value of 4.9%.

The WACC is based on market data sampled to and including:

- 19 January 2017 for the risk free rate
- 31 December 2016 for the debt margin and market risk premium, and
- 3 November 2016 for inflation.

Our decisions on parameters and the post-tax real WACC are shown in Table 7.6.

Table 7.6 WACC parameters and WACC estimates

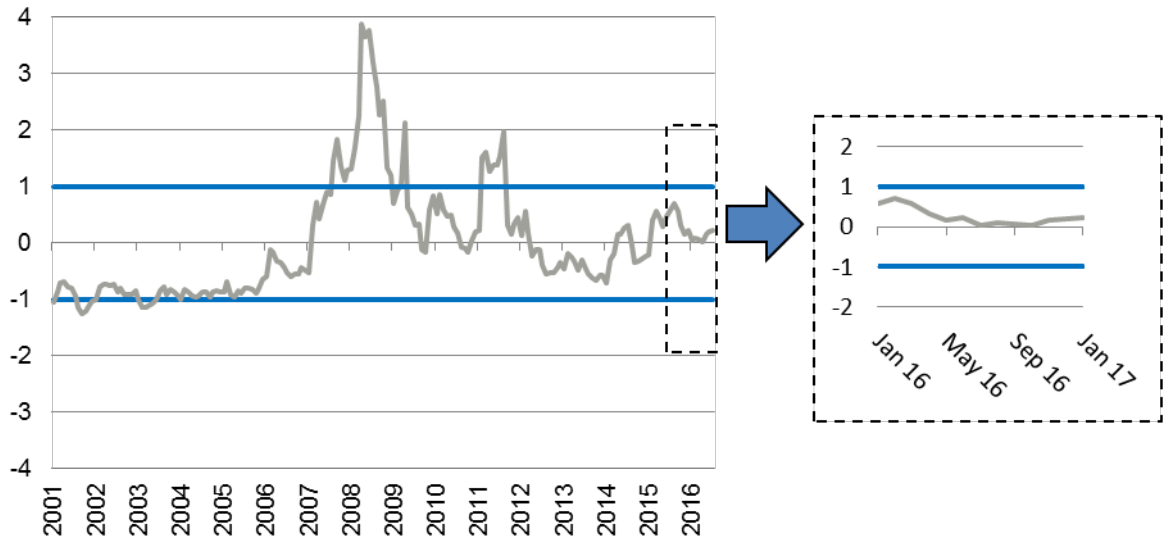
	Current Market Data	Long-term averages	Final WACC range		
			Lower	Midpoint	Upper
Market data					
Nominal risk free rate	2.8%	4.3%			
Inflation	2.4%	2.4%			
Debt margin	2.5%	3.2%			
Market risk premium	9.1%	6.0%			
WACC parameters					
Debt funding	60%	60%			
Equity funding	40%	40%			
Gamma	0.25	0.25			
Corporate tax rate	30%	30%			
Equity beta	0.70	0.70			
Cost of equity and debt					
Cost of equity (nominal post-tax)	9.2%	8.5%			
Cost of equity (real post-tax)	6.6%	6.0%			
Cost of debt (nominal pre-tax)	5.3%	7.5%			
Cost of debt (real pre-tax)	2.8%	5.0%			
WACC estimates					
Nominal Vanilla (post-tax nominal) WACC	6.8%	7.9%	6.8%	7.4%	7.9%
Post-tax real WACC	4.3%	5.4%	4.3%	**4.9%**	5.4%
Pre-tax nominal WACC	7.9%	8.9%	7.9%	8.4%	8.9%
Pre-tax real WACC	5.4%	6.3%	5.4%	5.9%	6.3%

Source: IPART analysis.

220 IPART completed a major review of the WACC in 2013 (IPART, *Review of WACC Methodology – Final Report*, December 2013). We also developed the method of estimating the debt margin and the inflation adjustment (IPART, *WACC - IPART's New Approach to Estimating the Cost of Debt – Fact Sheet*, April 2014; IPART, *New approach to forecasting the WACC inflation adjustment – Fact Sheet*, March 2015).

As market uncertainty is currently within one standard deviation of the long-term average, we have selected the midpoint WACC value (Figure 7.1). We measure market uncertainty using our financial market uncertainty index. This is consistent with our decision rule for selecting a point within our range of WACC values, which was established as part of our 2013 review of the WACC.[221]

Figure 7.1 IPART's uncertainty index to end of January 2017



Data source: Thomson Reuters, Bloomberg.

SDP proposed a WACC of around 4.5% based on our biannual WACC update from August 2016.[222] Since then, several key WACC parameters have increased to reflect current market conditions.

Compared to the 2012 Determination, the post-tax real WACC has decreased by 70 basis points, reflecting the greater weight given under our present WACC methodology to current market data. Current data is now given equal weight to long-term average data. Since 2012 there has been a significant reduction in the risk-free rate. This has driven a reduction in the current cost of debt, despite a slight upward movement in the debt margin. It has also driven a reduction in the current cost of equity, despite an increase in the current market risk premium.

7.2.2 Return on assets

Based on the RAB values set out in Table 7.5 and our decision to apply a WACC of 4.9%, the resulting return on capital is shown in Table 7.7 below. Our allowance for the return on capital is higher than proposed by SDP as a result of the higher WACC and higher capital expenditure (due to our decision to capitalise period maintenance costs – see Chapter 5).

221 IPART, *Review of WACC Methodology – Final Report*, December 2013, p 4.
222 SDP pricing proposal to IPART, October 2016, p 110.

Table 7.7 Allowance for return on capital - all modes ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22	Total
Plant						
IPART decision	60.5	58.5	56.5	54.5	52.6	282.6
SDP proposed	56.2	54.3	52.5	50.7	48.8	262.4
Difference	*4.3*	*4.1*	*4.0*	*3.9*	*3.9*	*20.2*
Difference %	*7.6%*	*7.6%*	*7.6%*	*7.7%*	*7.9%*	*7.7%*
Pipeline						
IPART decision	33.5	33.3	33.0	32.7	32.4	164.9
SDP proposed	31.1	30.8	30.4	30.1	29.8	152.1
Difference	*2.5*	*2.5*	*2.5*	*2.6*	*2.6*	*12.7*
Difference %	*7.9%*	*8.1%*	*8.4%*	*8.6%*	*8.8%*	*8.4%*

Note: Numbers may not add due to rounding.

Source: SDP pricing proposal to IPART, October 2016, pp 57 and 58, and IPART analysis.

7.3 Regulatory depreciation

We have made a draft decision to:

40 Accept SDP's infrastructure based asset categories, with minor adjustments, as set out in Table 7.8 and

- adjust SDP's proposed new and existing asset lives as set out in Table 7.9, and
- set an allowance for regulatory depreciation as set out in Table 7.10.

An allowance for regulatory depreciation is included in the revenue requirement (and used in calculating the value of the RAB, as discussed above). This is intended to ensure that the capital invested in the regulatory assets is returned over the useful life of each asset.

To calculate this allowance, we determine the appropriate asset categories and lives for SDP's RAB, and the appropriate depreciation method to use.

7.3.1 Asset categories on an infrastructure basis

We have accepted SDP's proposal to revert back to an infrastructure based asset classification, given that it aligns with SDP's accounting and reporting systems. A CEMLND[223] asset categorisation was adopted in the 2012 price review only because it was consistent with how Sydney Water reported capital expenditure for regulatory purposes (ie, the then owner of the plant and pipeline).

However, we consider the pipeline RAB should be allocated across two asset categories - pipeline and non-depreciating. The non-depreciating assets consist of land and easements, and make up around $13 million of the $660 million of total pipeline capital expenditure.

223 CEMLND asset categorisation divides assets into the following: civil, electrical, mechanical, electronic, non-depreciating assets.

Our 2012 modelling aggregated the pipeline and non-depreciating assets into one category, despite SDP's 2012 submission identifying these two asset categories. We consider including a non-depreciating asset category to be consistent with SDP's proposed asset classes for the plant infrastructure.

Reverting to asset categories on an infrastructure basis has a negligible impact on SDP's notional revenue requirement given that total capital expenditure over the 2012 determination period was $1.1 million in nominal terms.

Table 7.8 Asset categories for the RAB roll forward from 1 July 2012

Desalination Plant Infrastructure – Existing Assets (as at 1 July 2012)		
IPART 2012 Determination	**SDP 2017 proposal**	**IPART 2017 decision**
Plant	Plant	Plant
Intake infrastructure	Intake infrastructure	Intake infrastructure
Outlet infrastructure	Outlet infrastructure	Outlet infrastructure
Pumping station	Pumping station	Pumping station
Pre-operations payments	Pre-operations payments	Pre-operations payments
Project development	Project development	Project development
Non-depreciating	Non-depreciating	Non-depreciating
Desalination Plant Infrastructure – New Assets (post 1 July 2012)		
IPART 2012 Determination	**SDP 2017 proposal**	**IPART 2017 decision**
Civil	Plant	Plant
Electrical	Intake infrastructure	Intake infrastructure
Mechanical	Outlet infrastructure	Outlet infrastructure
Electronic	Pumping station	Pumping station
Non-depreciating	Pre-operations payments	Pre-operations payments
	Project development	Project development
	Non-depreciating	Non-depreciating
Pipeline Infrastructure – Existing & New Assets		
IPART 2012 Determination	**SDP 2017 proposal**	**IPART 2017 decision**
Civil	Pipeline	Pipeline
Electrical		Non-depreciating
Mechanical		
Electronic		
Non-depreciating		
Corporate – New Assets (post 1 July 2012)		
IPART 2012 Determination	**SDP 2017 proposal**	**IPART 2017 decision**
N/A	Short lived assets	Short lived assets

Source: IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2012 – Final Report*, December 2011, p 74. SDP pricing proposal to IPART (Information Return), October 2016. IPART analysis.

7.3.2 Asset lives

We have accepted SDP's proposed new asset lives for the plant infrastructure, following their review by our expenditure consultant, Atkins Cardno.[224]

However, we have not accepted SDP's proposal to adjust the asset life for the pipeline from 140 years (2012 Determination) to 100 years based on its design life.[225] Instead, we have adopted Atkins Cardno's recommendation to set the asset life for new pipeline infrastructure at 120 years.[226] This decision takes into account that half the length is land-based and the other half is in a more aggressive environment under Botany Bay. When this revised new asset life is applied from 1 July 2012, the remaining life of existing pipeline infrastructure assets becomes 115 years, compared with SDP's proposal of 95 years.

Also based on Atkins Cardno's recommendation, we have decided to set a 5-year asset life for new short lived corporate assets.[227] SDP proposed a shorter 3-year life for corporate assets.[228] This decision increased the existing life for short lived assets as at 1 July 2017 to 1.8 years from SDP's proposed 1.3 years.

We have made a number of adjustments to SDP's proposed existing asset lives. These are largely a result of the corrections made to modelling errors detected as part of the 2012 Determination (outlined earlier in this chapter).

Our draft decision on asset lives for existing and new assets is presented in Table 7.9.

224 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p. 68.
225 SDP pricing proposal to IPART, October 2016, p 62.
226 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p. 14.
227 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p. 14.
228 SDP pricing proposal to IPART (Information Return), October 2016.

Table 7.9 Asset lives for existing and new assets (years)

	Existing Assets		New Assets	
	SDP Proposed	IPART Decision	SDP Proposed	IPART Decision
Plant Infrastructure				
Plant	25.0	22.0	30.0	30.0
Intake infrastructure	95.0	82.0	90.0	90.0
Outlet infrastructure	85.0	92.0	100.0	100.0
Pumping station	20.0	17.1	25.0	25.0
Pre-operations payments[a]	15.0	12.1		
Project development costs[a]	39.0	36.0		
Membranes[b]				8.0
Pipeline Infrastructure				
Pipeline	95.0	115.0	100.0	120.0
Corporate Assets				
Short lived assets	1.3	1.8	3.0	5.0

a Pre-operations payments and Project development costs are pre-commissioning costs. No future capital expenditure will occur for these asset categories for the existing assets.

b The membranes asset category was not considered in the IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2017 –Issues Paper*, August 2016, and therefore SDP has not made a proposal in relation to the appropriate economic life.

Source: SDP pricing proposal to IPART (Information Return), October 2016. IPART analysis.

7.3.3 Return of assets

We have accepted SDP's straight-line approach to depreciation. This is consistent with our approach in previous reviews. We consider this method is superior to alternatives in terms of simplicity, consistency and transparency.

The difference between our allowances for regulatory depreciation and SDP's proposed values is due to a number of decisions we have made on asset lives and asset categories outlined above.

Table 7.10 presents our draft decision on SDP's allowance for regulatory depreciation over the 2017 determination period.

Table 7.10 Allowance for regulatory depreciation - all modes ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22	Total
Plant						
IPART decision	42.8	42.8	42.8	42.9	43.1	214.4
SDP proposed	41.5	41.5	41.6	41.6	41.5	207.6
Difference	*1.3*	*1.3*	*1.3*	*1.4*	*1.6*	*6.8*
Difference %	*3.1%*	*3.2%*	*3.0%*	*3.3%*	*3.7%*	*3.3%*
Pipeline						
IPART decision	5.8	5.8	5.8	5.8	5.8	29.1
SDP proposed	7.2	7.2	7.2	7.2	7.2	36.2
Difference	*-1.4*	*-1.4*	*-1.4*	*-1.4*	*-1.4*	*-7.0*
Difference %	*-19.5%*	*-19.5%*	*-19.5%*	*-19.5%*	*-19.5%*	*-19.5%*

Note: Numbers may not add due to rounding.

Note: The allowance for regulatory depreciation differs from that used to roll forward the RAB. The difference is the depreciation used to roll forward the RAB is discounted to the mid-year point using the pre-tax WACC. This ensures that the cash flows received by SDP via prices over a year align in principle with the dollar basis of the NRR.

Source: SDP pricing proposal to IPART, October 2016, pp 57 and 58, and IPART analysis.

7.4 Regulatory tax allowance

We have made a draft decision to:

41 Adopt the regulatory tax allowance as set out in Table 7.11.

We include an explicit allowance for tax, because we use a post-tax WACC to estimate the allowance for a return on assets in the revenue requirement. This tax allowance reflects the regulated business's forecast tax liabilities.

We calculate the tax allowance for each year by applying a 30% statutory corporate tax rate adjusted for franking credits to the business's (nominal) taxable income. For this purpose, taxable income is the notional revenue requirement (excluding tax allowance) less operating cost allowances, tax depreciation, and interest expenses. As part of calculating the appropriate tax allowance, the business is required to provide forecast tax depreciation for the determination period. Other items such as interest expenses are based on the parameters we use for the WACC, and the value of the RAB.

The tax allowance is one of the last building block items we calculate, due to its dependence on other items such as operating cost allowances and WACC parameters.

The difference between our tax allowance and that proposed by SDP is mainly due to our higher WACC, which results in more taxable income (for plant and pipeline). Table 7.11 presents our draft decision on SDP's tax allowance for the 2017 determination period.

Table 7.11 Allowance for tax - all modes ($million, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22	Total
Plant						
IPART decision	8.3	9.0	9.5	10.1	10.5	47.5
SDP proposed	7.1	7.8	8.3	8.9	9.3	41.4
Difference	*1.3*	*1.3*	*1.2*	*1.2*	*1.2*	*6.2*
Difference %	*18.1%*	*16.1%*	*14.5%*	*13.6%*	*13.3%*	*14.9%*
Pipeline						
IPART decision	-2.3	-2.0	-1.8	-1.5	-1.3	-8.9
SDP proposed	-2.2	-1.9	-1.7	-1.4	-1.2	-8.4
Difference	*-0.1*	*-0.1*	*-0.1*	*-0.1*	*-0.1*	*-0.5*
Difference %	*3.8%*	*4.7%*	*6.4%*	*8.1%*	*10.2%*	*6.1%*

Note: Numbers may not add due to rounding.

Source: SDP pricing proposal to IPART, October 2016, pp 57 and 58, and IPART analysis.

7.4.1 Maintaining the current statutory corporate tax rate of 30%

We have made a draft decision to:

42 Maintain the current statutory corporate tax rate of 30% to calculate SDP's taxation allowance for the purposes of setting prices over the 2017 determination period.

We have decided to calculate SDP's tax allowance over the 5-year determination period using the current legislated corporate tax rate of 30%. As part of the Commonwealth Government's 2016-17 Budget, a schedule for progressively decreasing the corporate tax rates from 30% to 25% by 2026-27 was announced.[229] If legislated, this could see SDP face a lower tax rate of 27.5% in the final two years of the 2017 determination period.[230]

To account for the potential of alternative tax rates, we would need to model separate price schedules for water security (shutdown) and plant operation modes, contingent on the legislation being passed. This would add further complexity to the determination.

Moreover, we consider the impact on revenue is minor, not meeting the materiality threshold for a cost pass through. Moving from a corporate tax rate of 30% to 27.5% in the last two years of the 2017 determination period would reduce the tax allowance annually by around $1 million ($2016-17) in each year in both plant operation and water security (shutdown) modes. This represents:

- 0.6% of required revenue in water security (shutdown) mode, and
- 0.4% of required revenue in plant operation mode.

Over the 5-year determination period, the revenue impact is around 0.22% in water security (shutdown) mode, and around 0.16% in plant operation mode.

229 Australian Government, Budget 2016-17, http://budget.gov.au/2016-17/content/glossies/tax_super/html/tax_super-04.htm, accessed 1 February 2017.

230 The proposed changes to the corporate tax rate and associated thresholds has yet to be legislated, and may be subject to adjustment through the parliamentary process on the way to being legislated

Our criteria for cost-pass through mechanisms are presented in Chapter 2.

7.4.2 Treatment of tax loss carryovers

We have made a draft decision to:

43 Adopt SDP's proposed approach to the treatment of tax loss carryovers for the distribution pipeline.

We have accepted SDP's proposal to remove the provision for the carryover of tax losses for the pipeline. That is, we have not set a zero tax allowance where a negative tax allowance is calculated.

We set separate notional revenue requirements (ie, building blocks) for SDP's plant and pipeline. Due to this separation, these assets are independently subject to carryover of tax losses in our model. SDP calculates its tax depreciation on an accelerated basis and provided its estimates for the purpose of calculating the tax allowance over the next regulatory period (ie, 2017 determination period). The tax depreciation estimates provided for the plant result in a positive tax allowance. However, the tax depreciation estimates provided for the pipeline result in a tax loss.

SDP has proposed that while separate tax allowances continue for the two broad asset classes, the treatment of accumulated tax losses be changed to recognise that 'SDP Pty Ltd' is taxed as a single entity. This allows tax losses for the pipeline to offset tax payable for the plant.

We agree with SDP's proposal as it will result in an aggregate tax allowance that is more reflective of SDP's tax position as a single entity. If we did adopt SDP's proposal, we would be overcompensating SDP for tax and the pipeline prices would be too high.

8 Refining price structures

The Terms of Reference require us to determine prices for SDP's two monopoly services:

a) the supply of non-rainfall dependent drinking water to purchasers, and

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

In the 2012 Determination, we met the Terms of Reference by setting the following separate maximum prices for SDP's declared monopoly services:

- a **water usage charge** ($/ML) for supplying non-rainfall dependent drinking water, which reflects SDP's variable operating costs and applies only when the plant supplies water, and
- **water service charges** ($/day) for making the desalination plant available, which reflect SDP's fixed operating and capital costs and apply whether or not the plant supplies water.

Separate water service charges were set for a range of defined operation modes. In addition to water service charges, we set separate one-off payments to reflect the costs of transitioning between some modes of operation.

In this chapter, we discuss what charges we have set over the 2017 determination period, when they apply and what costs are recovered by each charge.

8.1 Overview of our price structures

For the 2017 Determination, we have decided to maintain our broad pricing approach adopted in the 2012 Determination and, where possible, improve the transparency of charging arrangements. We continue to set mode-dependent prices, but have simplified the modes on the advice of our expenditure consultant by removing the intermittent shutdown periods.

We have also decided to split the water service charge into a 'base service charge' and an 'incremental service charge'. We have further refined transition charges, distinguishing between restarts within and outside drought and in some circumstances, first and subsequent restarts.

An overview of our price structure by mode of operation is presented in Table 8.1.

Table 8.1 Price structures for the 2017 determination period by mode of operation

Mode	Water usage charge	Base service charge	Incremental service charge	Pipeline charge	Transition charge
Shutdown	☑ Only applies to water in storage[a]	☑	☒	☑	☑ Transition to shutdown
Restart	☑ Only applies to water in storage	☑	☒	☑	☑ Transition to restart
Plant operation	☑ Applies to water produced and supplied to customers	☑	☑	☑	☒

a Although the plant will not produce water during shutdown, we have decided to continue to enable SDP to supply water out of storage (ie, out of its storage tanks) after production has stopped. The 2012 Determination also allowed this provision.

8.2 Pricing for making the plant available (fixed charges)

We have made a draft decision to:

44 Split water service charges into:

- a base service charge ($/day), reflecting SDP's efficient fixed costs when in water security (shutdown) mode, and
- an incremental service charge ($/day), reflecting the difference in SDP's efficient fixed costs between water security (shutdown) and plant operation modes.

We have decided to retain water service charges for making the desalination plant available in accordance with our Terms of Reference. These charges recover allowances for a full return on capital, depreciation and return on working capital, plus the efficient fixed operating costs of that mode.[231]

But we have decided to split water service charges into a **base service charge** and an **incremental service charge** to increase transparency in SDP's fixed costs. This is a departure from the 2012 Determination.

8.2.1 Base service charge – water security (shutdown) mode

The base service charge reflects the fixed costs SDP incurs when the plant is in water security (shutdown) mode. These are the minimum costs of maintaining the plant so that it can reliably produce drinking water in a timely manner when required under the 70/80 rule.

231 Water service charges also include allowances for the Energy Adjustment Mechanism (EnAM) and the Efficiency Adjustment Mechanism (EfAM), as required by the Terms of Reference.

The base service charge is a fixed daily charge calculated by adding the annual fixed operating costs, return on capital, depreciation and return on working capital, and dividing by the number of days in a financial year.[232]

8.2.2 Incremental service charge – plant operation mode

The incremental service charge reflects the difference in SDP's fixed costs between water security (shutdown) and plant operation modes. In plant operation mode, SDP would receive the base service charge plus the incremental service charge.

The incremental service charge includes the following fixed operating costs:

- Corporate fixed costs - additional staff to manage relations with customers due to increased business activity.
- Plant fixed costs – extra labour (shifts) to carry out additional routine and periodic maintenance of the plant when it operates.

There is also a slight amount of fixed energy costs in the incremental service charges related to periodic and routine maintenance during operations. Most energy costs, however, are variable and are recovered through the water usage charge which is discussed below. Appendix D provides a breakdown of our energy allowances into fixed and variable components for each mode of operation.

8.3 Pricing for the supply of drinking water (usage charges)

We have made a draft decision to:

45 Retain a water usage charge ($/ML) for supplying non-rainfall dependent drinking water.

This charge reflects SDP's efficient variable operating costs and applies only when the plant produces and supplies water (ie, plant operation period). It mainly includes the costs of energy required for the production of desalinated water.

Although the plant will not produce water during shutdown, we have decided to continue to enable SDP to charge for water supplied out of storage (ie, out of its storage tanks) after production has stopped. The 2012 Determination also allowed this provision.

Similarly, the 2012 Determination enabled SDP to supply water out of storage during restart. We have decided to continue this approach. However, the introduction of an 8-month grace period for the abatement mechanism may reduce the need for this (discussed in Chapter 3). Further, it may add additional complexity, given it may be unclear if water is being provided from storage or not. As a result, we are seeking stakeholder input on whether SDP would need to supply water out of storage during restart.

232 We note that a tax allowance would also be included as a component of the fixed charge to reflect our move to a post-tax WACC framework. More details on this are provided in Chapter 6.

8.4 One-off transition charges (for restart and shutdown)

We have made a draft decision to:

46 Continue transition charges, which reflect the efficient one-off operating costs of moving from shutdown into plant operation mode and vice versa.

In the 2012 Determination, we set one-off charges to reflect the fixed operating costs SDP incurs when the plant is moving between modes – ie, moving into shutdown from plant operation or conversely moving out of shutdown into restart (on the way to plant operation mode).

The one-off restart and shutdown costs are additional to the NRR presented in Chapter 4 and are passed through only when the plant is required to restart or shutdown. These one-off costs have been calculated based on the advice of our expenditure and energy consultants (Chapter 5 and 6).

The one-off costs for a restart are significant and include additional operational staff labour, marine intake and outfall opening, chemicals, waste disposal, as well as a fixed energy component. Shutdown charges recover costs associated with flushing and cleaning of the reverse osmosis trains, feed pumps, post-treatment plant and pre-treatment plant, and capping the sea intake and outfall outlets, which are about six times less than those incurred when restarting the plant.[233]

Specifically, these charges do not recover variable energy costs for the production and supply of drinking water and therefore do not substitute for water usage charges. This reflects our decision to allow SDP an 8-month grace period from abatement while ramping up production during a restart. That is, SDP can enter a plant operation mode and not be subject to financial penalty for up to 8-months if production is less than 250 ML per day. This allows it to recover its variable energy costs through the water usage charge as soon as the plant is ready to produce drinking water.

Membrane replacement costs are also excluded from these charges. Although triggered by a restart, we have made a decision to capitalise these costs and recover them through a separate daily service charge, discussed further in Chapter 10.

8.4.1 Transition charges are payable only once during drought or on notice by a customer outside drought

We have made a draft decision to:

47 Ensure transition charges (for restart and shutdown) are payable only once. Either:

- when triggered by dam storage levels when the plant is responding to drought; or
- upon notice by a customer to start or cease supply outside drought.

The transition charges are payable at most once upon request to restart or shutdown by a customer outside drought. We also distinguish between first and subsequent restarts within drought episodes.

233 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 43, and pp 50-51.

When the plant is required to operate **in response to drought**, SDP will receive a restart payment on first restart when dam storage levels fall below the 70% trigger. Restart charges are not payable on subsequent restarts during the same drought episode when dam levels have not yet reached the 80% trigger. Therefore, during an unbroken drought episode, SDP would receive only one restart payment.

Transition to shutdown charges are also only payable once, when a drought ends. That is, these charges are payable on first shutdown when the dam storage levels exceed the 80% trigger. They are not payable if the plant shuts down when dam storage levels are still below 80% since the first restart.

We have decided that SDP should not receive subsequent transition payments for restarting and shutting the plant down during a drought because this is inconsistent with the plant's primary role to maximise production during drought. This aligns with our decision to strengthen the abatement mechanism so that SDP's charges are abated when shutting down within drought. Under the 2012 Determination, transition to restart and shutdown charges were payable for each shutdown or restart irrespective of dam levels.

Outside drought, the use of the plant is discretionary and the transition charges are paid once on request by a customer to restart and shutdown.

If a customer requests the plant to restart outside drought, and the plant enters a shutdown for any reason during the term of the contract, no transition to restart (or shutdown) charges are payable in relation to this temporary shutdown.

8.5 Separate mode-independent pipeline charge

We have made a draft decision to:

48 Continue to set a mode-independent pipeline charge.

As in the 2012 Determination, we have decided to retain a separate charge for the pipeline, as this facilitates component pricing. The pipeline charge does not vary according to operating mode. The pipeline charge recovers allowances for a full return on capital, depreciation and return on working capital, plus the efficient fixed operating costs of the pipeline (ie, the NRR presented in Chapter 4).

8.6 Stakeholder views on price structures

Below we outline SDP's and Sydney Water's views to date on price structures.

8.6.1 SDP has accepted our draft price structures

SDP accepted a base service charge and incremental service charges, acknowledging this approach would improve transparency.[234] For transparency, SDP also agreed with the

234 SDP pricing proposal to IPART, October 2016, p 111.

maintenance of separate charges for the pipeline, which would not vary according to operating mode.[235]

However, SDP proposed that transition to restart charges include membrane replacement costs.[236] Our expenditure consultants considered membrane replacement costs should be capitalised and provided in a first restart following shutdown. This is discussed further in Chapter 10.

8.6.2 Sydney Water has accepted our draft price structures, subject to some minor comments which our expenditure consultants have addressed

Sydney Water also accepted our price structures.[237] But it did not consider the base service charges and incremental service charge have been apportioned correctly.[238]

It recommended the base service charge be reduced so that it does not include any fixed operating costs of SDP. It is not clear if Sydney Water intends that the base service charge be reduced only when SDP is operating, or at all times (ie, when the plant is shutdown).

If Sydney Water's approach is applied during shutdown, our view is that it would result in an inappropriate allocation of costs. It would result in cash flow issues for SDP when shutdown, as it would under-recover its costs. This would be inconsistent with the financial indifference principle in the Terms of Reference.

If Sydney Water's approach is applied only during operating periods, it would also shift costs onto potential third-party customers that could use the plant outside drought, by increasing the incremental service charge that only applies when the plant is operating.

Sydney Water opposed the proposed split between the base service charge and incremental service charge because it would pay most of the base service charge according to the impactor pays principle. Our view is these costs are appropriately paid by impactors (including Sydney Water) because these costs reflect the plant's drought response and water security role and, as such, its costs should be met when it is providing these services, even when shutdown. Cost sharing is discussed in more detail in Chapter 9.

Based on the recommendations of our expenditure consultants, we have set the base service charge to recover the efficient costs only during shutdown period and no more. This would include the minimum level of operating costs that are required for maintenance activities during water security shutdown.

235 SDP pricing proposal to IPART, October 2016, p 113.
236 SDP pricing proposal to IPART, October 2016, p 119.
237 Sydney Water submission to Issues Paper, November 2016, p 18.
238 Sydney Water submission to Issues Paper, November 2016, p 18.

9 Refining cost sharing rules

In the previous chapter, we discussed what charges we have set over the 2017 determination period, when they apply and what costs are recovered by each charge. In this chapter we outline the decisions we have made on how these charges are to be shared in the event SDP serves multiple customers (eg, customers in addition to Sydney Water).

The 2012 Determination shares all costs based on each customer's proportionate use of SDP – ie, how much desalinated water each customer purchases relative to the total volumes supplied. In practice, this is likely to deter third-party customers, as the costs of SDP supplying water are high.

For the 2017 Determination, we have decided to use a principles based approach to sharing SDP's costs. We employ the impactor and beneficiary pays principles in a hierarchy to create an efficient allocation of costs. This approach recognises the purpose for which the plant was built and is continued to be funded, namely the provision of an additional supply of water when dam storage levels are low. It also recognises that third parties may want to call the plant into operation commercially outside of drought.

We outline our decisions on rules for sharing membrane costs in Chapter 10. Our decisions on membrane sharing rules are consistent with our overarching principles and sharing rules in this chapter, but have regard to the complex timing of membrane replacement.

9.1 Cost sharing rules align with the plant's primary role to respond to drought

We have made a draft decision to:

49 Change the cost sharing rules in the event that SDP serves multiple customers to reflect the desalination plant's primary role as a drought response measure, such that:

- Base service charges (and pipeline service charges) are always paid for by impactors
- Water usage charges are always paid for by beneficiaries, and
- Incremental service charges and transition charges are paid by impactors when the plant operates as a drought measure and beneficiaries when it operates commercially outside of drought.

We have changed cost sharing rules to align with the plant's primary role, which is to respond to drought and therefore the purpose for which it was built.

Under our funding hierarchy[239], those who:

239 We have based our analysis of cost sharing on the Local Land Services framework which uses a hierarchy to determine who should pay. See IPART, *Review of funding framework for Local Land Services NSW – Draft Report*, September 2013.

- cause the need for the desalination plant to exist always pay the base service charge (**impactors**)
- directly benefit from the plant's operation always pay the variable charges (**beneficiaries**), and
- call the plant into operation (or require it to stop operating) pay the transition and incremental service charges. This will change according to whether the plant operates as a drought measure (**impactors**) or commercially outside of drought (**beneficiaries**).

Under the 2012 Determination, fixed charges (both plant and pipeline) were allocated under the 'beneficiary' (or user) pays principle in proportion to the share of the plant's output.

SDP was not in favour of changing the cost sharing rules to an impactor pays basis in its pricing proposal.[240] However, at our Public Hearing it revised its view and agreed that sharing costs on an impactor pays principle is logical and better aligns with the plant's primary role to respond to drought.[241] Sydney Water provided detailed views on cost sharing methods in response to our Issues Paper.[242] Our cost sharing rules are consistent with Sydney Water's, with the exception of recovering incremental fixed costs from impactors during drought.

Table 9.1 presents our recommended cost sharing arrangements for SDP charges.

Table 9.1 Our cost sharing rules – who should pay for what?

Charge/cost	Inside drought - allocate to	Outside drought - allocate to	Sharing rule - impactors	Sharing rule - beneficiaries
Base service charge (and pipeline charge)	Impactor pays	Impactor pays	Based on proportion of total system draw[a] "on the day"	N/A
Incremental service charge	Impactor pays	Beneficiary pays	Based on proportion of total system draw "on the day"	Based on proportion of draw from SDP "on the day"
Transition to restart charge	Impactor pays	Beneficiary pays	Once off charge – proportion of total system draw over the previous 12 months	Once off charge – the customer that calls SDP into operation (outside drought)
Transition to shutdown charge	Impactor pays	Beneficiary pays	Once off charge – proportion of total system draw over drought period	Once off charge – the customer that requires SDP to stop producing (outside drought)
Water usage charge	Beneficiary pays	Beneficiary pays	N/A	Charge per ML of water supplied by SDP

a Total system draw is any water sourced from WaterNSW Greater Sydney area dams and/or SDP.

9.2 Base service charges are always charged to impactors

In our Issues Paper, we proposed that SDP's base service charge (fixed capital and operating costs when shutdown) should be recovered from anyone who draws water from both or

240 SDP pricing proposal to IPART, October 2016, pp 124-126.
241 IPART, SDP public hearing transcript, 8 December 2016, p 18.
242 Sydney Water submission to Issues Paper, November 2016, p 27.

either WaterNSW and SDP (ie, in proportion to their draw on the total water supply system).[243]

This is consistent with the impactor pays principle, where those that create the need for a cost (ie, the desalination plant as a drought insurance/response measure) should pay for the cost.

The desalination plant exists as a non-rainfall dependant water source for Sydney during times when dams are low (the 70/80 rule). The plant's primary role is to act as insurance and augment Greater Sydney's water supply in the event of water scarcity. Therefore, SDP's base costs are a form of drought insurance premium or water security payment that should be paid by impactors who contribute to water scarcity in Greater Sydney.

9.2.1 What is an impactor?

We have made a draft decision to:

50 Define impactors as bulk water users who directly affect Greater Sydney's water storage levels and cause the need for SDP to exist. Specifically, impactors source water from dams supplying Greater Sydney (WaterNSW) and from the desalination plant (SDP) when it operates.

We define impactors as bulk water users who directly affect Greater Sydney's water storage levels. Total system draw is comprised of bulk water sourced from dams supplying Greater Sydney (WaterNSW) and from the desalination plant (SDP) when it operates.[244]

Our definition means that:

- Outside drought (outside the 70/80 rule) - when the desalination plant's default position is 'off' - total system draw would include only bulk water sourced from WaterNSW's dams supplying Greater Sydney.
- In drought (under the 70/80 rule) - when the desalination plant is 'on' - total water system draw would also include water sourced from SDP, given that the plant is contributing to Greater Sydney's water security needs. This also applies when the desalination plant is 'on' outside of drought.

Both in and out of drought, total water draw excludes water sourced from recycling schemes or any other source that adds to water security. These water users are not impactors because they are not drawing on dam storage levels and therefore do not create the need for the desalination plant.

We note that Sydney Water would not be disadvantaged under our definition of an impactor if a third-party customer decides to request supply from SDP outside drought. The third-party customer would automatically become an impactor as soon as it starts

243 IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2017 – Issues Paper*, August 2016, p 32.

244 Outside the 70/80 rule, the desalination plant's default position is 'off' and total water system demand would relate only to bulk water sourced from dams. When the desalination plant is 'on' under the 70/80 rule it is contributing to Greater Sydney's water security needs and therefore part of 'total water system supply'. For the purposes of apportioning SDP's costs, 'total water system demand' should exclude water supplied from recycling schemes and any other sources that add to Sydney's water security.

drawing water from SDP, and therefore contribute to base service charges. This also means that any utility with a WICA licence and supply agreement with WaterNSW would also be considered an impactor when they take water.

9.2.2 Compelling impactors to pay

Our sharing rules require SDP to be able to levy charges on impactors, which need not have water supply agreements with SDP. That is, an impactor could be a utility that draws only from WaterNSW's dams and therefore only has a supply arrangement with WaterNSW.

However, the Minister has an explicit power to add conditions to drinking water retailers' WICA licences, so as to compel them to pay SDP for the making available of the plant.[245] This is the case even where the WICA licensee is not a direct customer of SDP. This power was introduced in 2011, in contemplation of the privatisation of the plant.

Therefore, impactors can be compelled to contribute to drought security costs and pay SDP as an impactor through a licence condition. Moreover, that licence condition should also require that the licensee provide SDP with all information it would need to levy charges in accordance with IPART's determination (ie, its draw on total system supply).

9.2.3 Sydney Water would still pay most fixed costs in practice

Currently, Sydney Water is SDP's only customer and pays all of SDP's fixed costs. In practice, this is likely to continue for the foreseeable future, even with the proposed introduction of the impactor pays principle, because of Sydney Water's large share of the market.

This is the case even with the increased competition from WICA licensees for retail water. These water businesses are currently primarily 'wholesale' customers of Sydney Water, purchasing potable water from Sydney Water to on-sell to their end-use customers. Accordingly, they would continue to pay SDP's costs, including the drought insurance premium, indirectly through Sydney Water's wholesale prices.

9.2.4 'On the day' sharing rule

We have made a draft decision to:

51 Share base service charges between impactors based on their proportion of total system draw that day.

We consider our new sharing rules to be an improvement on those in the 2012 Determination. Under the 2012 Determination, the methodology for allocating fixed costs may have unintended consequences for third-party customers because:

- fixed charges during shutdown and restart are allocated to each customer as a proportion of total desalinated water purchased in the 12 months **preceding** that shutdown, and

245 *Water Industry Competition Act 2006*, section 13(2)(c)(ii).

- if a third-party customer buys any amount of water from SDP on a day when dam levels are high (ie, outside the 70/80 rule), and there are no other customers, it becomes liable for the full daily fixed charge on this day.[246]

In practice, these sharing rules may not create financial incentives to seek supply from SDP, particularly when dam levels are high. For example, the 'historical' sharing rule effectively requires customers to pay a proportion or all of SDP's fixed costs for years to come after their actual use of the plant.[247]

Under our draft 2017 sharing rule, an impactor's share of the **daily** base service charge is proportionate to their **daily** share of total system draw. This 'on the day' sharing rule avoids some of the complications and unintended perverse outcomes created by the cost sharing rules under the 2012 Determination.

9.3 Water usage charges always paid for by beneficiaries

Under our sharing rules, those who take water directly from the desalination plant always pay the water usage charges associated with the plant's operation.

In principle, there is a case to extend the 'impactor pays' principle to SDP's variable charges when the plant is operating in drought. This is because the plant is called into operation under drought conditions to augment Sydney's water supply. However, doing this would create a perverse incentive for third-parties to source water from SDP during drought. This is why our sharing rules allocate water usage charges to beneficiaries (direct users of SDP) at all times.

If impactors were targeted to pay water usage charges, Sydney Water could contribute to the variable costs of desalinated water supplied that it does not receive. In addition, Sydney Water could pay higher prices for dam water from WaterNSW because SDP's operation offsets (decreases) demand for WaterNSW water.[248] This would raise the per unit cost of dam water paid by Sydney Water to WaterNSW (ie, total cost/ML) and lower the per unit cost of desalinated water paid by a third-party to SDP, creating a perverse incentive for the third-party to source water from SDP.

Sydney Water was concerned that it would cross-subsidise water taken by third-parties, and ultimately make desalinated water sourced from SDP cheaper than dam water from WaterNSW.[249] A worked example of how this perverse incentive would arise if SDP's usage charge was levied on an impactor pays basis is shown in Appendix E.

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246 See clause 6 of Schedule 2 under the 2012 Determination as an example. IPART, *Prices for Sydney Desalination Plant Pty Limited's Water Supply Services - Determination No. 2*, December 2011, pp 24-25.

247 For example, assume SDP supplied water in 2012 to a third-party customer whilst operating in its drought response role. In 2013, dam storage levels returned to 80% and SDP ceased to operate. SDP remained shutdown for five years, until dam levels once again reached 70% in 2018, calling the plant into operation. The third-party customer in this example would pay a proportionate share of SDP's fixed costs for the entire duration that SDP is shutdown (ie, from 2013 to 2018) based on their consumption back in 2012.

248 WaterNSW's current determination contains an equation that adjusts (proportionately increases) WaterNSW's variable price to large customers (currently only Sydney Water) for every ML taken from SDP. This equation assumes that forecast demand for that year remains constant and any water taken from SDP must reduce water taken from WaterNSW by an equivalent amount. This ensures that WaterNSW's revenue requirement is unaffected by SDP operation.

249 Sydney Water submission to Issues Paper, November 2016, p 26.

9.4 Ongoing and one-off fixed operating costs paid by impactors during drought and beneficiaries outside drought

Transition and incremental service charges are allocated to those who call the plant into operation. That is, in drought impactors pay and outside of drought beneficiaries pay.

While impactors do not directly request the plant to operate in a drought, operation is triggered under the 70/80 rule to augment Greater Sydney's water supply. This is part of the plant's purpose for existing, as previously discussed. Therefore, the 70/80 operating rule calls the plant into operation on behalf of the impactors, requiring them to pay the transition and incremental service charges (ie, additional one-off and ongoing fixed operating costs when the plant is called into production).

Outside of drought, the plant is a discretionary service requested by third-parties.[250] The plant is not responding to water scarcity and operating to augment Sydney's water supply. Therefore, beneficiaries pay SDP's transition and incremental service charges.

Our decision on who should pay incremental service charges is different from our preliminary position presented in our Issues Paper. We initially proposed levying charges to recover incremental service costs on a user (beneficiary) pays basis during drought. Sydney Water agreed with our preliminary position to allocate incremental service charges to beneficiaries.[251]

However, we did not address the sharing of transition charges in our Issues Paper. Sydney Water raised the issue of transition charges and made a case that these charges should be allocated to beneficiaries outside drought (outside the 70/80 rule) and allocated to impactors inside drought (inside the 70/80 rule).[252] Sydney Water argued that allocating transition charges to beneficiaries outside drought was to prevent its customers from subsidising the discretionary use of the plant by third-party customers.[253]

We agree with Sydney Water that transition charges should be allocated to impactors when the plant is responding to drought and to beneficiaries outside of drought (as outlined above). Based on Sydney Water's logic and consistent with our principles, it follows that incremental service charges should be allocated to impactors in drought, given that both transition and incremental service charges relate to calling the plant into operation.

9.4.1 Sharing ongoing incremental service charges – calculated on the day

We have made a draft decision to:

52 Share incremental service charges 'on the day' between:

- impactors during drought based on their proportion of total system draw that day, and
- beneficiaries outside drought based on their proportion of desalinated water sold that day.

250 As an example, if the plant supplies Sydney Water in an emergency response role outside drought then the incremental service charges and one-off transition to and from shutdown charges would be shared on an impactor pays principle.
251 Sydney Water submission to IPART Issues Paper, November 2016. p 27
252 Sydney Water submission to IPART Issues Paper, November 2016, pp 27- 28.
253 Sydney Water submission to IPART Issues Paper, November 2016. p 27.

Like base service charges, incremental service charges are levied daily recovering the ongoing fixed costs to operate the plant.

During drought, these charges would be shared between impactors based on their share of total system draw 'on the day'. That is, each impactor will be charged an amount equal to the proportion of water it draws from **WaterNSW and SDP** (compared to total water supplied by WaterNSW and SDP) for each day SDP operates.

Outside drought, these charges will be shared between beneficiaries based on their total proportion of draw from **SDP** 'on the day'. That is, each beneficiary will be charged an amount equal to the proportion of water it draws from SDP (only) compared to total water supplied by SDP (only) for each day SDP operates.

9.4.2 Sharing one-off transition charges

We have made a draft decision to:

53 Share one-off transition charges (to restart and shutdown):

- between existing impactors based on their total system draw over the 12 months prior to a restart for drought and the entire drought episode prior to a shutdown on the completion of drought, and
- equally by the beneficiaries that request the restart or shutdown outside drought (ie, issue a notice for SDP to start or cease supply).

Transition charges are one-off payments made to SDP to recover fixed operating costs of either recommencing or terminating supply (ie, for the plant transitioning to and from shutdown). Because they are not on-going payments, like incremental service charges, an 'on the day' sharing rule is inappropriate. Allocating a significant one-off payment (transition charge) according to draw on a particular day could lead to a perverse outcome. This would occur when an impactor's/beneficiary's draw on the water supply network on that day is significantly different from its average/typical draw. This means that its contribution to these costs would not represent that customer's impact on the system.

How we apportion transition charges between impactors in drought and beneficiaries outside of drought is summarised below:

- Transition to restart charges:
  - Commencement of drought response, allocate on impactor pays principle using the total customer impact over the preceding 12 months.
  - Outside drought, allocate on beneficiary pays principle in equal shares to customer(s) who request the restart.
- Transition to shutdown charges:
  - Completion of drought response, allocate on impactor pays principle using the total customer impact over the period of drought.
  - Outside drought, allocate on beneficiary pays principle in equal shares to customer(s) who request the shutdown.

We have moved away from only using historical use of the plant to allocate these one-off charges (ie, as per the 2012 Determination) because it creates some uncertainty for SDP's cost

recovery. Charging based on historical use of the plant would be based on previous users, not necessarily those that call plant into operation, which is inconsistent with efficient allocation of costs under the impactor and beneficiary pays framework.

Inside drought, SDP's transition to restart charges are shared between existing impactors based on their total system draw (from WaterNSW and SDP) over the 12 months preceding SDP commencing its transition to operation. This is a reasonable reflection of the impact each water user has had on the total system. Transition to shutdown charges are shared between existing impactors based to their draw over the entire drought episode. This is to reflect that total system draw can be greatly impacted by drought conditions, especially if restrictions are in place.

Outside of drought, transition charges are shared equally between the beneficiaries (direct users of SDP) that request the restart or shutdown (ie, issue a notice for SDP to start or cease supply). This is appropriate because transition charges recover costs that are independent of volumes supplied to individual customers. As noted in Chapter 8, transition charges can be charged at most once to a requesting customer outside drought.

9.5 Stakeholder views on cost sharing rules

At our Public Hearing, SDP commented that it had no objection to reclassifying costs under impactor pays arrangements. However, it noted that implementing an impactor or user (beneficiary) pays methodology will have little consequence while Sydney Water remains SDP's only customer. [254] This view was different from SDP's original proposal to continue to share its charges on a user pays basis.[255]

Sydney Water also supported the proposal to move away from recovering SDP's water security charge on a user pays basis toward an impactor pays basis.[256] Further, Sydney Water agreed more broadly with the possibility of third-party customers sharing the burden of SDP's costs.

However, Sydney Water and WaterNSW emphasised that SDP's sharing rules should not result in desalinated water becoming cheaper to buy than dam water, nor the cross subsidisation of desalinated water by Sydney Water for third party customers.[257] We show in Appendix E that our cost sharing rules result in an efficient outcome when allocating costs to impactors and beneficiaries under different scenarios in and out of drought. Our worked examples include:

1. SDP in shutdown outside of drought
2. SDP in operation in drought, and
3. SDP in operation outside of drought.

These three examples show that there is no perverse incentive created by our cost sharing rules. We also provide a fourth example in Appendix E showing that a perverse incentive

254 IPART, SDP public hearing transcript, 8 December 2016, p 18.
255 SDP pricing proposal to IPART, October 2016, pp 124-126.
256 Sydney Water submission to IPART Issues Paper, November 2016. p 27.
257 Sydney Water submission to IPART Issues Paper, November 2016. p 26. WaterNSW submission to IPART Issues Paper, November 2016, p 2.

would arise if impactors, and not beneficiaries, were charged SDP's usage charges (variable costs) in drought. This is the basis for our decision to always charge beneficiaries (direct users) for SDP's variable costs.

10 Treatment of membrane replacement costs

In Chapter 5, we decided to allow for the prudent and efficient cost of a full membrane replacement only **once** at the time of a **first restart** in the 2017 determination period. This is the cornerstone of our consultant's (Atkins Cardno) recommendations, reflecting that:

- the plant has been in a prolonged period of shutdown (since July 2012), and the membrane stock is near the end of its guaranteed life, and
- providing a full membrane replacement on first restart eliminates the need for a partial plant test in water security (shutdown) mode.[258]

We also decided not to provide any further allowances for the ongoing replacement of membranes in the 2017 determination period (ie, in the event of subsequent restarts).

In this chapter, we outline our treatment of these costs over the 2017 determination period, should the plant restart and be called into operation. In particular, we have decided to capitalise the costs of a full membrane replacement on first restart in accordance with Atkins Cardno's recommendation,[259] and to introduce a separate daily membrane service charge to recover the capital costs of membranes over their asset life.

We consider a separate charge recovering membrane costs increases transparency of the membrane replacement program. Specifically, the charge is designed to accommodate the uncertainty of their timing, and ensure customers only pay for membranes when they are needed.

We apply different cost sharing rules for membrane service charges depending on whether the plant is called into operation for drought or commercially, outside drought. These cost sharing rules are consistent with those applied to SDP's other charges in Chapter 9.

Finally, we have decided not to make a provision for membranes needed in the event that the first restart over the 2017 determination period is in response to an emergency (ie, exceptional circumstances specified in the Water Supply Agreement). Rather, we would review these prudent and efficient costs ex-post at the next price review. We consider this to be in keeping with SDP using 'best endeavours' in an emergency response.

10.1 Capitalising the costs of membrane replacement

We have made a draft decision to:

54 Establish a separate membrane asset base (membrane RAB) as set out in Table 10.1:

- with an opening value of $30 million in the year of first restart
- adopting an asset life for membranes of 8 years

258 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 10 and 12.
259 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 12.

- not adding any further capital expenditure for the ongoing replacement of membranes, and
- rolling forward the membrane RAB until the membranes fully depreciate.

We have decided to capitalise the costs of a full membrane replacement on first restart in accordance with Atkins Cardno's recommendation,[260] and to introduce a separate daily membrane service charge to recover the capital costs of membranes over their asset life.

To capitalise membrane costs, we establish a separate asset base, a 'membrane RAB'. The membrane RAB has an opening value of $30 million in accordance with our decision on the prudent and efficient costs of a full set of membranes (see Chapter 5). Opening and closing values of the membrane RAB are calculated over an 8-year asset life, until the membranes are fully depreciated.

The RAB represents the value of SDP's stock of membrane assets on which we consider it should earn a return on capital and an allowance for regulatory depreciation. It assumes that a full membrane replacement occurs in 2017-18 and is calculated beyond the 2017 determination period, over the full life of the membranes (from 2017-18 to 2024-25).

SDP's annual required revenue for membrane costs is then calculated in each year as the sum of the:

- return on membrane assets, using our draft WACC of 4.9%, and
- return of membrane assets, using straight line depreciation over the 8-year asset life.

Finally, the annual required revenue is converted to a daily service charge. Our draft decision on membrane RAB is presented in Table 10.1.

Table 10.1 Membrane RAB, revenue requirement and daily charges assuming a restart in 2017-18 ($'000, $2016-17)

	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Opening RAB	30,000	26,250	22,500	18,750	15,000	11,250	7,500	3,750
Depreciation	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750
Closing RAB	26,250	22,500	18,750	15,000	11,250	7,500	3,750	0
Return on capital	1,470	1,286	1,103	919	735	551	368	184
Depreciation	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750
Total capital costs or required revenue	5,220	5,036	4,853	4,669	4,485	4,301	4,118	3,934
Daily charge ($/day)	14,301	13,798	13,258	12,791	12,288	11,784	11,250	10,777

Note: Numbers may not add due to rounding.

Source: IPART analysis.

260 Atkins Cardno, *Expenditure Review – SDP*, February 2017, pp 12 and 52.

10.2 Establishing membrane service charges

We have made a draft decision to:

55 Set separate charges to recover the capitalised costs of a full membrane replacement over the 2017 determination period, which includes the:

- schedule of membrane service charges as outlined in Table 10.2, and
- one-off charges for residual membrane costs as outlined in Table 10.3.

We have set a schedule of daily charges for membranes given that a restart could in principle occur in any year of the determination period. In practice, the restart is unlikely to occur during the first year of the 2017 determination period (2017-18) while the plant is inoperable following the December 2015 storm event.

Atkins Cardno assessed it unlikely that a dam level driven restart would happen before 2019-20.[261] However, we have developed a schedule of charges that allows for a restart in any given year of the 2017 determination period (assuming the restart on 1 July of the financial year.)

The schedule of daily **membrane service charges** over the 5-year 2017 determination period is presented in Table 10.2. These service charges are derived from Table 10.1. We note that the one-off **transition to restart charge** (average $9.5 million including energy costs, see Chapter 5) is payable on each restart in response to drought and excludes membrane costs. Therefore there is no double counting of membrane costs to customers.

Table 10.2 Membrane service charges over the 2017 determination period contingent on restart year ($/day, $2016-17)

Year of first restart	2017-18	2018-19	2019-20	2020-21	2021-22
2017-18	14,301	13,798	13,258	12,791	12,288
2018-19	n/a	14,301	13,798	13,258	12,791
2019-20	n/a	n/a	14,301	13,798	13,258
2020-21	n/a	n/a	n/a	14,301	13,798
2021-22	n/a	n/a	n/a	n/a	14,301

Source: IPART analysis.

To allow SDP to recoup the full cost of the membrane replacement required at a restart, we have also decided to set a separate charge for any residual capital costs of membranes. This would be a one-off charge payable by the user (or users) on transition to shutdown following a period of operation outside drought (we explain the charging and cost sharing rules for membrane service charges below).

The residual costs payable vary depending on which year the restart occurs during the 2017 determination period. Our draft decision on **residual membrane charge** is presented in Table 10.3. These costs are also derived from Table 10.1.

261 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 65.

Table 10.3 One-off residual membrane charge over the 2017 determination period contingent on restart year ($'000, $2016-17)

Year of first restart	2017-18	2018-19	2019-20	2020-21	2021-22
2017-18	26,250	22,500	18,750	15,000	11,250
2018-19	n/a	26,250	22,500	18,750	15,000
2019-20	n/a	n/a	26,250	22,500	18,750
2020-21	n/a	n/a	n/a	26,250	22,500
2021-22	n/a	n/a	n/a	n/a	26,250

Source: IPART analysis.

10.3 Sharing rules for membrane replacement costs

We have made a draft decision to:

56 Apply the following charging rules for membrane costs:

- membranes paid for in full by impactors when the plant is triggered by drought
- membranes paid for in full by beneficiaries when the plant operates outside drought, and
- membrane costs revert to impactors if drought occurs before they are paid in full by beneficiaries.

Similar to SDP's other charges (Chapter 9), we employ the impactor and beneficiary pays principles in a hierarchy to create an efficient allocation of membrane costs. This approach recognises the purpose for which the plant is used (ie, in response to drought or for discretionary use outside drought).

Accordingly, we have decided that membrane service charges are paid in full on an impactor pays basis during drought and beneficiary pays basis outside drought. This is consistent with our decision on cost sharing rules for other charges.

10.3.1 Membranes for drought response are funded in full by impactors

A full replacement of membranes on first restart in response to drought is intrinsic to SDP's primary drought response role. Therefore, when the costs are triggered by a restart, we consider that they should be treated in the same way as the base service charge. That is, the daily membrane service charges are:

- shared on the impactor pays principle, and
- continue into plant operation period and a subsequent shutdown until the membranes are fully paid (ie, over the 8-year asset life).

Effectively, the membrane service charge becomes an add-on to the base service charge.

Should the plant restart during the 2017 determination period in response to drought, any actual membrane costs incurred by SDP would be treated like any other capital cost in the

base service charge and subject to a prudence and efficiency test at the next determination period when rolling forward the historical RAB and its membrane component.

10.3.2 Membranes paid for in full by beneficiaries outside drought

Much like incremental service charges, membrane service charges should be paid on a user or beneficiary pays principle for discretionary use of the plant outside drought. Moreover, because a restart outside drought is not intrinsic to SDP's water security role, we consider that **all** associated membrane costs should be borne by the beneficiary. That is, regardless of how long the plant is requested to operate, the full set of membranes should be paid for over their economic life.

This means that a third-party customer would pay a one-off charge on transition to shutdown (ie, by issuing a notice to cease supply) to recover the residual costs of membranes, as set out in Table 10.3.

The proposal to recoup all membrane costs from third-party customers for use of the plant outside drought is similar to SDP's proposal. SDP proposed that membrane costs be paid in full by third-party customers, however as a one-off payment at restart.[262] However, by capitalising membrane costs and paying for them over their useful life, our treatment of membranes allows the potential sharing of these costs in the event there are multiple customers using the plant simultaneously (although not sequentially) outside drought.

Our treatment of membranes would see a third-party customer pay out the residual membrane costs regardless of the terms of the supply (ie, duration and capacity). SDP proposed unregulated pricing agreements with customers outside drought to accommodate supply at varying levels of output. As discussed in Chapter 2, we are unable to implement such agreements given our Terms of Reference. The prices we set reflect the full efficient cost of provision of SDP's services, both in and outside drought. We note that alternative sources of water are available outside drought, and the customer's decision to source water from SDP is a commercial decision.

10.3.3 No additional membrane costs payable at a subsequent restart

Membrane replacement costs are allowed only once in the 2017 determination period, on first restart of the plant in or outside of drought.

Membranes funded by a third-party customer on first restart outside drought could have a significant useful life left in them. Sydney Water customers (and other impactors) would therefore receive a windfall gain for the residual life of the membranes over the 2017 determination period. This is because the membranes could be used by SDP during drought but would have been paid outside of drought (ie, by a third-party customer, not by Sydney Water).

Equally, third-party customers would receive a windfall gain if they were to use the plant subsequent to a drought period of less than eight years (the life of the membranes). This is because membranes for drought response are funded in full by impactors.

262 SDP pricing proposal to IPART, October 2016, p 70.

Avoiding membrane costs under these circumstances does not reduce the unit cost of desalinated water below dam water and therefore incentivise inefficient use of the plant. As noted above, it is appropriate for impactors to pay for a full set of membranes on first restart in response to drought because it is difficult for SDP to predict the duration of a drought. SDP is required by its Network Operator's Licence to maximise production in response to drought.

At any subsequent restart of the plant, SDP would not be over-compensated for the fully funded membranes.

10.3.4 Membrane costs revert to impactors if drought occurs before they are paid in full

If drought occurs before membranes are paid in full by a third-party customer, the cost sharing rule would switch from beneficiary to impactor pays. The remaining costs of the membranes therefore would be paid in full by all impactors, as per Table 10.2.

Effectively, the stock of membranes paid by the third-party customer on a beneficiary pays basis outside drought 'changes hands' when the drought starts, now becoming intrinsic to drought response and thus shared using the impactor pays principle. The daily membrane service charges in this instance would be paid by impactors[263] and continue throughout the drought period and beyond into a subsequent shutdown until the membranes are fully paid (ie, over the 8-year asset life).

10.4 Ex-post review of membrane costs for emergency response

We have made a draft decision to:

57 Review the prudent and efficient capital costs of membranes associated with supply for emergency response to Sydney Water (ie, exceptional circumstances specified in the Water Supply Agreement) ex-post at the next determination period.

- Where appropriate, these costs would be rolled into the historical RAB, including holding costs using the relevant WACC.
- These membranes costs would be paid for in full by impactors.

If Sydney Water requests SDP to restart in emergency, SDP must use its best endeavours to supply any amount of desalinated water within the shortest period of time.

Notwithstanding their age, the existing membranes might still be fit to produce some quantity of desalinated water that can be treated to drinking water quality standard. This is particularly so if the emergency period is short. However, if the emergency is prolonged, it would be reasonable to expect some replacement of membranes on restart.

263 We note that in this circumstance if the third-party customer continues to draw supply from SDP, they are no longer classed as a beneficiary. They would therefore no longer pay for membrane costs based on their total proportion of draw from SDP 'on the day'. Instead, they would be classed as an impactor and be charged an amount for membranes equal to the proportion of water they draw from WaterNSW and SDP. Therefore, they do not avoid membrane costs.

Due to uncertainties associated with the timing and nature of any emergency response, we recommend reviewing membrane replacement costs in this instance ex-post. At the next price review, we would assess the prudent and efficient capital costs of membranes associated with emergency response. This is consistent with our treatment of other capital cost items with uncertain timing (eg, skid test unit and an extra pump for the drinking water pumping station, see Chapter 5).

To ensure SDP is not underfunded for the membranes it might need for an emergency response, we would also reimburse any holding costs using the relevant WACC. The resulting membrane costs would be subsequently paid for by all impactors (ie, treated like a base service charge).

11 Prices and impacts

This chapter outlines our draft prices and the impact of our pricing decisions on Sydney Water's customers. It also discusses the implication of our pricing decision on other matters we must consider under section 15 of the IPART Act (see Appendix A). These include:

- SDP's financial viability and shareholders
- general inflation
- the environment, and
- SDP's service standards.

We are satisfied that our 2017 Determination achieves an appropriate balance between these matters.

11.1 Draft prices over the 2017 determination period

We have made a draft decision to:

58 Set draft prices for the 2017 determination period as outlined in Table 11.1.

Our draft prices comprise the following charges:

- **Base service charge** ($/day) reflecting SDP's fixed costs for the plant when in shutdown mode. This is equivalent to the NRR in water security (shutdown) mode.
- **Incremental service charge** ($/day) reflecting SDP's additional fixed costs when in plant operation mode. This is equivalent to the NRR in plant operation mode (with all variable costs removed) less the NRR in water security (shutdown) mode.
- **Water usage charge** ($/ML) for supplying non-rainfall dependent drinking water. This charge reflects SDP's efficient variable operating costs when the plant is operating.
- **Pipeline service charge** ($/day) reflecting the NRR for the pipeline.
- **Membrane service charge** ($/day) reflecting the costs of a full membrane replacement at restart and capitalisation of these costs.

In addition, we have set **transition charges**, which will reflect the efficient fixed one-off operating costs incurred when the plant moves from water security (shutdown) into plant operation mode and vice versa. These costs are not included in the NRR set out in Chapter 4. Transition charges have been calculated by drawing on information from both the Atkins Cardno and Marsden Jacob efficiency reviews. They pass through separate operating costs that are paid in full when the plant is required to restart or shutdown.

Our draft prices are presented in Table 11.1 below. Our draft prices recover costs in the year they occur. As a result, there is no smoothing of the NRR or prices.

Table 11.1 Draft prices for the 2017 determination period ($2016-17)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	% change 2016-17 to 2021-22
Plant service charges ($/day)							
Base service charge	391,257	369,694	366,176	360,890	357,207	352,780	**-9.8%**
Incremental service charge	37,034	21,832	22,232	22,246	22,022	23,337	**-37.0%**
Pipeline service charge ($/day)	140,610	103,018	103,021	102,682	102,875	102,725	**-26.9%**
Membrane service charge ($/day)	-	14,301	13,798	13,258	12,791	12,288	**-**
Transition to restart ($'000 per event)	6,053	9,654	9,577	9,500	9,488	9,483	**56.7%**
Transition to shutdown ($'000 per event)	1,588	1,686	1,686	1,686	1,686	1,686	**6.2%**
Water usage charge ($/ML)	687	684	669	654	652	651	**-5.2%**

Note: The first year of the 2017 Determination is 2017-18. Results for 2016-17 are provided for comparative purposes.

Source: IPART analysis.

11.1.1 Compared to the 2012 Determination

Plant service charges would decrease because of a lower WACC, better estimate of tax allowance and capitalisation of periodic maintenance

Under our draft decisions, SDP's daily service charges (base service charge and incremental service charge) would decrease in 2017-18 compared to 2016-17. The base service charge decreases by 5.5% from 2016-17 to 2017-18, while the incremental service charge decreases by 41.0%.

Both the base service charge and the incremental service charge decrease because of the better estimate of SDP's tax liability under a post-tax framework, the lower WACC and efficiency savings in operating costs identified by our expenditure consultants. In addition, the capitalisation of periodic maintenance results in a large decrease in the incremental service charge.

Over the 2017 determination period, the base service charge continues to decrease whereas the incremental service charge increases slightly. The decrease in the base service charge reflects its capital intensive nature and the fact that the return on capital is decreasing over this period.

Pipeline service charges would decrease because of changes to the tax allowance and a lower WACC

In 2017-18, the pipeline service charge would decrease by 26.7% compared to 2016-17 under our draft decisions. Again, this reflects the lower WACC and a better estimate of SDP's tax liability under a post-tax framework. It also reflects our decision to allow tax losses for the

pipeline to offset tax payable on the plant. The impact of this latter change is a reduction in the overall required revenue via a negative tax allowance for the distribution pipeline.

Membrane service charges would be introduced for the first time in the 2017 determination period

Membrane replacement costs were also excluded in the 2012 Determination, given the age of these assets at the time. If SDP restarts during the 2017 determination period, it is likely to need a full set of membranes which would add around $14,000 to SDP's daily service charges. The membrane replacement costs start at the time of the first transition to restart and then continue until they are paid in full. No membrane replacement costs are payable if SDP remains in shutdown for the duration of the 2017 determination period.

Water usage charges would decrease over time

Under our draft decisions, SDP's water usage charge would remain relatively constant in 2017-18 compared to 2016-17. This reflects the increase in benchmark energy costs, which is slightly offset by the reduction in energy volumes recommended by our consultants. Our analysis indicates energy costs are approximately $536 per ML, or about 78% of the water usage charge.

Over the 2017 determination period, the benchmark energy cost declines, which results in a reduction in the water usage charge by 5.2% in 2021-22 from prices in 2016-17.

Additional costs have been included in transition to restart charges

In 2017-18, the transition to restart charge would increase by 59.5% compared to 2016-17 under our draft decisions. This reflects costs related to energy, pipeline flushing and changes in key input costs (eg, chemicals) that were excluded in the 2012 Determination. The energy costs in the transition to restart charges reflect the fixed energy costs associated with general plant operation and not the variable energy costs that depend directly on the volume of water produced. These latter energy costs are captured by the water usage charge.

11.1.2 Compared to SDP's proposed prices

SDP's proposed prices are presented in Table 11.2. Differences between SDP's prices and our draft prices derive from our decisions on SDP's efficient costs, which are identified in the NRR analysis in Chapter 4. This includes:

- Capitalising prudent and efficient periodic maintenance costs so that customers do not need to pay for these capital-related costs upfront.
- Disallowing a partial plant test in water security (shutdown) mode.
- Deciding to review ex-post capital expenditure contingent on uncertain future restart of the plant so that customers only pay for this if needed.

Factors that have increased our draft prices include a higher WACC than proposed by SDP and higher benchmark energy costs.

Our transition to restart charges are lower than SDP's because we have excluded energy costs for the production and supply of drinking water (these costs are recovered via the usage charge) and we have capitalised membrane costs and introduced a membrane service charge (see Chapter 10).

Table 11.2 SDP's proposed prices for the 2017 determination period ($2016-17)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	% change 2016-17 to 2021-22
Plant Service Charges ($/day)							
Base service charge	391,257	357,809	361,921	358,074	381,872	375,375	**-4.1%**
Incremental service charge	37,034	40,424	33,195	32,197	7,576	10,666	**-71.2%**
Pipeline service charge ($/day)	140,610	100,332	100,237	99,811	99,900	99,659	**-29.1%**
Transition to restart ($'000 per event)	6,053	37,272	38,402	39,372	40,232	40,982	**577.0%**
Transition to shutdown ($'000 per event)	1,588	1,686	1,686	1,686	1,686	1,686	**6.2%**
Water usage charge ($/ML)	687	688	688	688	688	688	**0.2%**

Note: The prices in this table are based on SDP's proposal with the following modifications: the base charge is equivalent to SDP's proposed water security charge, and incremental charge is equivalent to SDP's proposed plant operation charge less SDP's proposed water security charge.

Source: SDP pricing proposal to IPART, October 2016, pp 127-130.

11.1.3 The draft prices for the 2017 determination period meet the requirements of the Terms of Reference

In determining SDP's prices, we must comply with a range of pricing principles set out in the Terms of Reference. These principles require us to adopt a price structure that includes at least two components:

- a **variable charge** for the drinking water supplied to SDP's customers, and
- a **fixed charge** for making the plant available that applies whether or not drinking water is supplied to customers.

The pricing principles also set out very specific requirements on the type of costs to be recovered through these price components. Notably, fixed costs are recovered through service charges and variable costs recovered through usage charges.

Our draft prices in Table 11.1 meet these requirements.

11.2 Implications for retail customers

Sydney Water is SDP's only customer at present. As a result, we are considering the impact of our draft prices on Sydney Water's customers.

Our draft decisions would result in reductions to the prices paid by Sydney Water's customers. This is because the amount that Sydney Water is expected to pay SDP over the 2017 determination period is lower than the amount we included over the 2012 determination period.

Table 11.3 shows how each component of SDP's charges are expected to flow through to a typical Sydney Water customer's bill. We have separated these impacts into:

- base charges which apply in all modes of operation
- incremental charges which apply in plant production mode only, and
- transition charges which apply when the plant transitions to restart or shutdown.

Table 11.3 Annual cost of SDP for a typical Sydney Water customer ($/year, $nominal) – with inflation

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Base charges						
- Base service charge	71.19	67.94	68.31	67.97	68.20	68.27
- Pipeline service charge	25.59	18.93	19.22	19.34	19.64	19.88
Plant operation						
- Incremental service charge	6.74	4.01	4.15	4.19	4.20	4.52
- Membrane service charge[a]	-	2.44	2.47	2.50	2.54	2.57
- Water usage charge	31.23	31.43	31.13	30.88	31.13	31.50
Transition charges						
- Transition to restart	3.02	4.86	4.88	4.90	4.96	5.03
- Transition to shutdown	0.79	0.85	0.86	0.87	0.88	0.89
Cost in shutdown	**96.78**	**86.87**	**87.53**	**87.31**	**87.84**	**88.16**
Cost in plant operation	**134.75**	**124.76**	**125.28**	**124.88**	**125.71**	**126.75**

a The customer impact of membrane costs has been calculated by averaging the $/day membrane service charges in Table 11.1, and multiplying this by the number of days in the relevant year.

Note: Numbers may not add due to rounding.

Note: The forecast number of 20mm equivalent meters used to calculate the customer impacts in this table are consistent with Sydney Water's 2016 Determination. The CPI forecasts used to convert $2016-17 prices and customer impacts into $nominal are: the Bloomberg Mean Forecast for 2016-17 (as at 9 February 2017) of 2% for moving from $2016-17 to $2017-18, and the mid-point of the RBA target band of 2.5% for all remaining years.

Source: IPART analysis.

Based on our draft prices, the cost of SDP would go down from 2017-18 in a typical Sydney Water customer's annual bill:[264]

- When the plant is shutdown, the yearly cost of SDP per customer would fall 10% from $96.78 in 2016-17 to $86.87 in 2017-18.
- When the plant operates, the yearly cost of SDP per customer would fall 7% from $134.75 in 2016-17 to $124.76 in 2017-18.

This contribution of SDP to a typical Sydney Water bill increases by about 0.4% each year in nominal terms over the 2017 determination period in all modes. This is less than our 2.5%

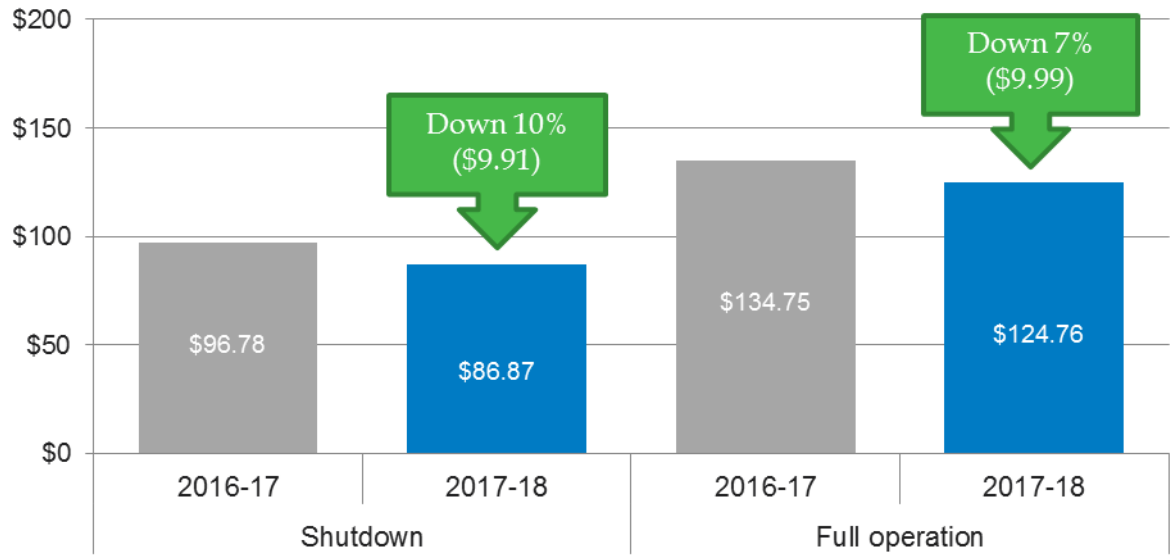
264 Customers would pay the 2017-18 costs at a one year lag, given the cost pass-through mechanism under the Sydney Water 2016 Determination. These costs are expressed in $2017-18 for simplicity.

forecast rate of inflation over the period (ie, the cost of SDP decreases in real terms over the determination period).

In 2017-18, the plant is expected to be shutdown. From 2018-19 onwards, if drought occurs and the plant is called into operation customers would pay on average an additional $37.94 in their annual water bill. This recovers SDP's costs of producing and supplying water, as well as the additional fixed operating and membrane costs needed to run the plant.

Figure 11.1 shows how the costs of SDP for a typical Sydney Water customer are expected to fall as a result of our draft decisions.

Figure 11.1 Annual cost of SDP for a typical Sydney Water customer ($/year, $nominal) – with inflation



If the plant is called into operation at some point over the 2017 determination period, then customers would also pay the one-off transition costs of doing so. The timing of transitions to restart and shutdown is uncertain and will depend on when future droughts occur and how long those droughts last:

- When SDP transitions to restart, a typical customer would pay on average an additional $4.94 in their annual water bill.[265]
- When SDP transitions to shutdown, a typical customer would pay on average an additional $0.88 their annual water bill.[266]

11.3 Implications for SDP's financial viability and shareholders

We are satisfied our determination will not adversely affect the ability of SDP to operate, and maintain the assets required to deliver its regulated services over the

265 This represents the average bill impact from 2018-19 to 2021-22. 2017-18 is excluded from the average because the plant is expected to be shutdown.

266 Again, this represents the average bill impact from 2018-19 to 2021-22. 2017-18 is excluded from the average because the plant is expected to be shutdown

2017 determination period. Further, we are satisfied that this determination will enable SDP to earn a reasonable rate of return on its assets.

11.3.1 SDP is priced to be financially indifferent

Consistent with the Terms of Reference, our draft prices encourage SDP to be financially indifferent as to whether or not SDP supplies water to customers, including Sydney Water.

Notably, our water usage charge for the supply of non-rainfall dependent drinking water reflects all efficient costs that vary with output, including variable labour, energy and maintenance costs. The fixed charges for making the plant available to supply non-rainfall dependent drinking water are periodic payments. These reflect fixed costs, including the fixed component of operating costs, a return of assets and a return on assets.

Our base service charge applies to all modes of operation, which means SDP is entitled to charge for making the plant available to supply non-rainfall dependent drinking water irrespective of the levels of water in dam storages servicing Sydney or the availability of water from other sources.

11.3.2 Rate of return

Our pricing decisions mean that SDP is able to achieve the total NRR we have set for the 2017 determination period. Therefore, we expect that SDP will earn a real post-tax rate of return on its RAB of at least the benchmark rate of 4.9% over the 2017 determination period (see Chapter 7). This calculation is based on the assumptions we used in our modelling of the financial impacts of our pricing decisions, and depends on SDP achieving the efficiency targets we have set.

11.3.3 Financeability

Since the 2012 Determination, we have established a financeability test that we use to consider the effect of our regulated prices on the utility's financial sustainability.[267] We assess whether our decisions would enable the utility to raise finance consistent with an investment grade rated firm, over the regulatory period.

In our financeability assessment, we check whether a utility would achieve at least a Baa2 rating, based on our own financeability test. We have reviewed our approach to calculating the credit ratios we use in our financeability test, including Funds From Operations (FFO) Interest Cover, Debt Gearing, and FFO over debt.[268]

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267 The objective of our financeability test is to assess the short-term financial sustainability of the utility. Our financeability test requires us to construct financial statements for the regulated utility, use the utility's actual cost of debt and gearing levels to compute the financial ratios, compare the financial ratios against our Baa2 benchmark levels, make an overall assessment taking into account the financial ratios, financial statements and other relevant information which could affect financial sustainability. IPART, *Financeability tests in price regulation – Final Decision*, December 2013.

268 IPART, *Financeability ratios – Final Decision*, April 2015.

Table 11.4 shows SDP's financial ratios based on our prices. Our financeability test has been done on the basis of a revenue forecast that assumes no abatement events occur during the regulatory period. Table 11.5 shows our benchmark financial ratios.

Table 11.4 SDP's financial ratios (based on RAB values)

Financial year ending 30 June	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
1. FFO Interest Cover	1.9	2.0	2.1	2.2	2.3	2.3
2. Debt / RAB	90%	85%	82%	79%	76%	73%
3. FFO / Debt	4.9%	4.6%	5.0%	5.3%	5.7%	6.3%

Note: The first year of the determination is 2017-18. Results for 2016-17 are provided for comparative purposes.

Source: IPART analysis.

Table 11.5 Financial Ratio Benchmarks (for water utilities)

	Investment Grade				
Credit Ratio	**A3**	**Baa1**	**Baa2**	**Baa3**	**Ba1**
1. FFO Interest Cover	>2.9	2.3 - 2.9	1.7 - 2.5	1.4/1.5 - 1.7	<1.4 / 1.5
2. Debt / RAB	<60%	80-85%	60-91%	90-100%	>100%
3. FFO / Debt	>10%	>10%	6-10%	5-8%	<4%

Source: Kanangra Ratings Advisory Services advice to IPART, see IPART, *Financeability tests in price regulation Research — Final Decision December 2013*, p10.

Based on our analysis of SDP's credit metrics, and the improvement of these credit metrics over the 2017 determination period, we consider SDP to be financially sustainable.

- The first two metrics, FFO interest cover and Debt/RAB, are consistent with Baa2 (investment) grade in all years of the determination.
- The third metric, FFO/Debt, is below investment grade for the first four years of the determination, but consistent with investment grade in the final year. This increasing trend arises because debt is forecast to be paid off during the period.

We do not expect a regulated entity will meet every benchmark in every year of a determination period.[269] SDP's own financeability assessment produces ratios that are very similar to those in Table 11.4 above.[270] SDP indicates that the FFO/Interest and Debt/RAB ratios meet the Baa2 benchmark for all years of the determination, but that FFO/Debt does not meet it for any of the years.

Based on its proposed revenue requirements, SDP expects its financial position to remain sustainable over the 2017 determination period. Our NRR is marginally lower than proposed by SDP in both water security (shutdown) and plant operation modes (see Chapter 4).

269 IPART, *Financeability tests in price regulation – Final Decision*, December 2013, pp 11-12.
270 SDP pricing proposal to IPART, October 2016, pp 133-135.

11.4 Implications for general inflation

Under section 15 of the IPART Act, we are required to consider the effect of our determinations on general price inflation. SDP costs contribute to general water costs in Greater Sydney as they are included in Sydney Water prices as a cost pass-through.

In our 2016 Determination of Sydney Water's prices, we included SDP's fixed costs based on the 2016-17 prices set in our 2012 Determination of SDPs' prices. The resulting Sydney Water prices contributed to the annual impact on general price inflation of -0.006% points (above the change in the CPI).[271]

Our draft decisions result in a $71.2 million reduction in SDP's fixed costs already included in Sydney Water prices.[272] This would reduce Sydney Water's target NRR and prices; however, the additional impact on general inflation would be very small.[273]

11.5 Implications for ecologically sustainable development

The NSW Government is responsible for determining any negative environmental impacts associated with SDP's activities, and for imposing standards or requirements on SDP to address these impacts.

In setting our draft prices, we have provided SDP with sufficient funding to meet its environmental and other obligations and to conduct its operations in accordance with Good Industry Practice.

The project approval for SDP was premised on ecologically sustainable development

SDP was constructed by Sydney Water from 2007-2010 as part of the NSW Government's *Metropolitan Water Plan*. It was constructed in response to the worst drought in 100 years, when Sydney's dam levels fell to 34%.[274] The desalination plant was intended to reduce the likelihood of end-use customers (ie, retail customers) facing water restrictions and to increase Sydney's water security during droughts.[275]

The project approval for SDP[276] included a requirement that the plant use 100% renewable energy.[277] SDP has entered into long-term 20-year contracts with Infigen to acquire fixed

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271 See IPART, *Review of prices for Sydney Water Corporation from 1 July 2016 to June 2020 – Final Report*, June 2016, p 237.

272 From $194.9 million in 2016-17 to $172.5 million in 2017-18, $171.3 million in 2018-19 and $169.7 million in 2019-20, a cumulative reduction of $22.4m+$23.6m+$25.2 = $71.2 million over 2017-18 to 2019-20, see Chapter 4. Sydney Water prices already included passing through $194.9 million per year x 4 years = $779.6 million of SDP's fixed charges over 2016-17 to 2019-20. Our draft decision results in removing $71.2 million from Sydney Water prices.

273 The impact on general price inflation of -0.006% points above resulted from $418 million (in $2016-17) reduction in Sydney Water's NRR over its 2016 determination period. The $71.2 million reduction due to SDP's lower fixed costs would contribute to an additional 71.2/418 = 17% impact, or -0.001% point reduction in general inflation (above the change in CPI).

274 SDP, *Our History*, at http://www.sydneydesal.com.au/who-we-are/our-history/, accessed on 4 July 2016.

275 We also note that Sydney Water is required to maintain and comply with an agreed roles and responsibility protocol regarding the development and implementation of the Metropolitan Water Plan under its Operating Licence. IPART, *Sydney Water Corporation Operating Licence – Report to the Minister*, May 2015, p 6.

276 The project approval for SDP was granted under the *Environmental Planning and Assessment Act 1979*.

277 IPART, *Review of water prices for Sydney Desalination Plant Pty Limited from 1 July 2012 - Final Report*, December 2011, p 17.

volumes of electricity and RECs at fixed real prices. SDP has contracted annual volumes of electricity sufficient to run the plant at full capacity. It has the ability to sell load back to the market if the plant's electricity demand is less than full capacity.[278]

SDP holds an environment protection licence

The NSW Environment Protection Authority (EPA) is the environmental regulator of SDP. It has issued an environment protection licence that requires Veolia, in its management of SDP, to meet certain requirements such as water quality criteria for the outfall.[279] This licence is scheduled to be reviewed in October 2018.

SDP has undertaken a marine monitoring program

SDP conducted a six year Marine and Estuarine Monitoring Program to determine the impacts upon seawater quality and aquatic ecology as a result of its operation.[280] The program's methodology was independently reviewed by experts from the CSIRO, UNSW and UTS and endorsed as robust. The program was designed to detect a change of 10% in the marine environment with 80% confidence.

The Marine and Estuarine Monitoring Program concluded in 2014. The research has shown that, once discharged to the ocean, the seawater concentrate returns to normal temperature and salinity within 50 - 75 metres from the outlet.[281] This is called the near field mixing zone. It has been found that there are no significant impacts on seawater quality or aquatic ecology from the seawater concentrate beyond the near field mixing zone and minimal impact within near field mixing zone during operation.

11.6 Implications for SDP's service standards

Under our draft determination, we expect SDP to achieve operating efficiency savings. We are satisfied that SDP can achieve these efficiency savings and thus can generate sufficient revenue to achieve service standards at or above those expected by customers and required under its licences.

SDP holds a Network Operator's Licence and Retail Supplier's Licence under the WIC Act. IPART administers and reviews these licences.

Our expenditure consultants Atkins Cardno concluded the main licence obligation is for the plant to be maintained consistent with Good Industry Practice.[282] Accordingly, in water security (shutdown) mode, Atkins Cardno considered this to be the main cost driver and undertook its expenditure review on this basis.[283] Our consultants confirmed that SDP has

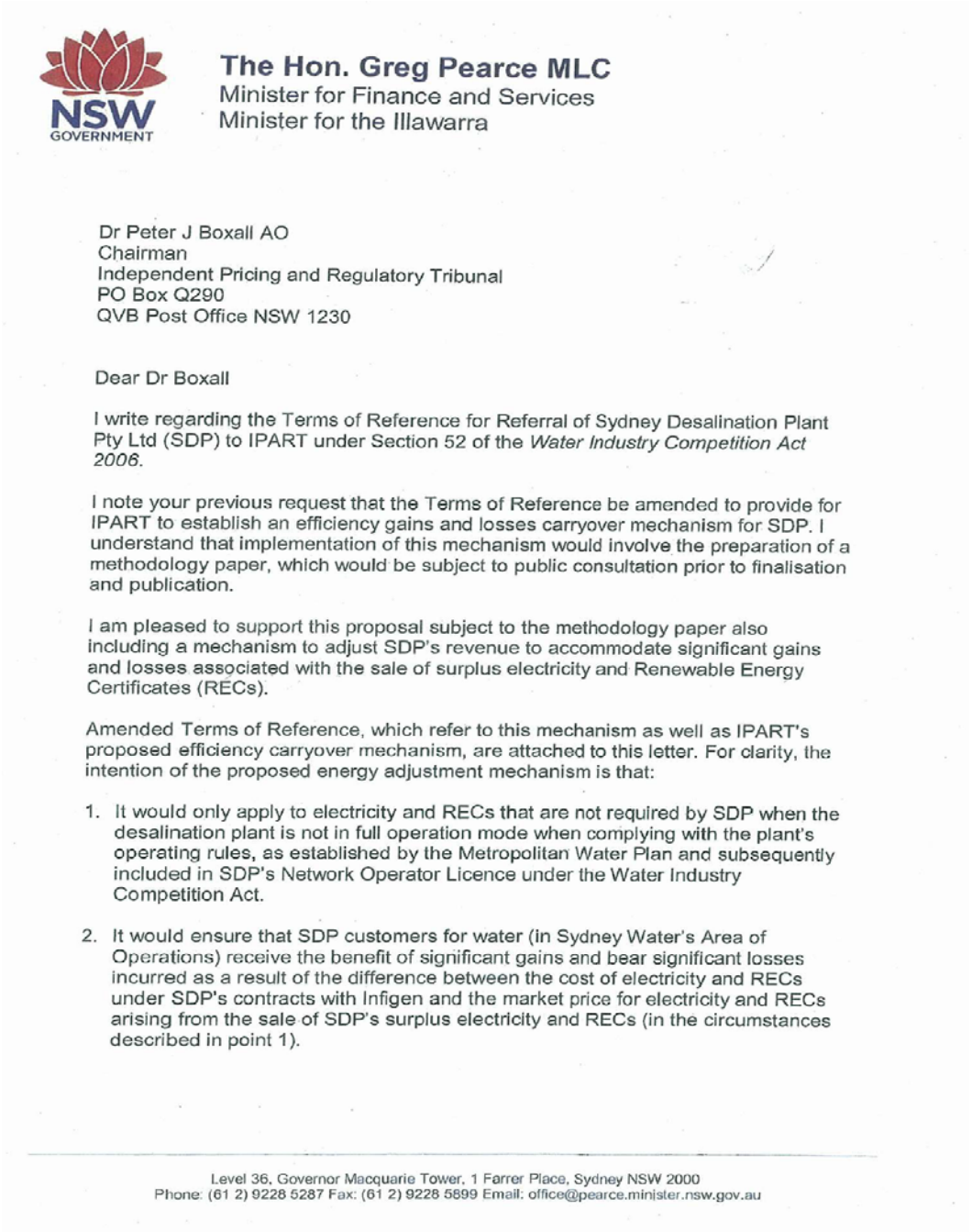
278 SDP submission to IPART: Review of prices for SDP, 8 July, 2011, p 3.
279 EPA, *Licence summary*, at http://www.epa.nsw.gov.au/prpoeoapp/Detail.aspx?instid=12904&id=12904&option=licence&searchrange=licence&range=POEO%20licence&prp=no&status=Issued, accessed on 6 July 2016.
280 SDP, Marine Environment, at http://www.sydneydesal.com.au/caring-for-the-environment/marine-environment/, accessed on 2 March 2017.
281 SDP, Marine Environment, at http://www.sydneydesal.com.au/caring-for-the-environment/marine-environment/, accessed on 2 March 2017.
282 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 33.
283 See condition A2(a)(i) of SDP's Network Operator's Licence.

and is continuing to maintain the plant.[284] This is consistent with the findings of the WIC Act audit.[285]

284 Atkins Cardno, *Expenditure Review – SDP*, February 2017, p 33.
285 Risk Edge, *WICA Licence audit report*, July 2015.

Appendices

A Terms of Reference



The Hon. Greg Pearce MLC
Minister for Finance and Services
Minister for the Illawarra

Dr Peter J Boxall AO
Chairman
Independent Pricing and Regulatory Tribunal
PO Box Q290
QVB Post Office NSW 1230

Dear Dr Boxall

I write regarding the Terms of Reference for Referral of Sydney Desalination Plant Pty Ltd (SDP) to IPART under Section 52 of the *Water Industry Competition Act 2006*.

I note your previous request that the Terms of Reference be amended to provide for IPART to establish an efficiency gains and losses carryover mechanism for SDP. I understand that implementation of this mechanism would involve the preparation of a methodology paper, which would be subject to public consultation prior to finalisation and publication.

I am pleased to support this proposal subject to the methodology paper also including a mechanism to adjust SDP's revenue to accommodate significant gains and losses associated with the sale of surplus electricity and Renewable Energy Certificates (RECs).

Amended Terms of Reference, which refer to this mechanism as well as IPART's proposed efficiency carryover mechanism, are attached to this letter. For clarity, the intention of the proposed energy adjustment mechanism is that:

1. It would only apply to electricity and RECs that are not required by SDP when the desalination plant is not in full operation mode when complying with the plant's operating rules, as established by the Metropolitan Water Plan and subsequently included in SDP's Network Operator Licence under the Water Industry Competition Act.

2. It would ensure that SDP customers for water (in Sydney Water's Area of Operations) receive the benefit of significant gains and bear significant losses incurred as a result of the difference between the cost of electricity and RECs under SDP's contracts with Infigen and the market price for electricity and RECs arising from the sale of SDP's surplus electricity and RECs (in the circumstances described in point 1).

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3. For electricity, the mechanism would mirror the 'Calculation of Shortfall Adjustment' in SDP's Electricity Supply Agreement with Infigen, with the 'market price' defined as the half-hourly spot price and/or the price of a contracted 'available block'.

4. For RECs, the 'market price' would be the price shown in the Nextgen Greenroom Report, or another equivalent report.

I understand that IPART's intention is to publish its draft methodology paper in the near future, with the final paper due to be published by May 2012.

Yours sincerely

Greg Pearce MLC
Minister for Finance and Services
Minister for the Illawarra

16 Febry 2012

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 Desalination Plant Pty Limited (SDP) was granted a network operator licence in relation to the *desalination plant*. The Minister for Finance and Services has, under section 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 operator licence.

SDP is the only supplier of non-rainfall dependant 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, the Sydney Catchment Authority and, since its commissioning, the *desalination plant*.

The *desalination plant* is a key element in Sydney's water security plan. Under its network operator licence, the *desalination plant* is required to maximise water production when dam storage levels in Sydney are below a prescribed threshold. Prices set by the Independent Pricing and Regulatory Tribunal (IPART) should therefore reflect the water supply services provided by SDP set out below:

(a) the supply of non-rainfall dependant drinking water to purchasers; 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 principles:

1. Maximum prices should be set so that expected revenue generated will recover the efficient costs of providing the services described 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 assets:

   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 structure 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.

8. For each *price determination* other than the first price determination:

   i. SDP should be allowed to carryover demonstrated efficiency savings, net of 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 notional revenue requirement, IPART should determine the demonstrated efficiency savings and treatment of energy gains or losses in accordance with the Methodology Paper; and

   iii. A mechanism(s) is required to allocate the costs or benefits to SDP customers (in Sydney Waters area of operation) of 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 Infigen and revenues from the sale of surplus electricity and RECs. The mechanism would only operate at times when:

   - the desalination is in Shutdown or in a Restart Period; and
   - SDP complied with its requirements to maintain and operate the desalination plant under clause A2 of its network operator licence.

9. Any other matters that 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 is to cover the period to 30 June 2017.

For each successive price determination period, IPART is to make the price determination before the expiry of the current determination period.

B Section 15 of the IPART Act

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

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

Section 15 of the IPART Act applies to IPART's determination of SDP's prices in the same way as it applies to prices for government monopoly services referred for determination under section 12 of the IPART Act (see WIC Act, section 52(3)). Table B.1 outlines the sections of the report that address each matter.

IPART has also had regard to certain matters listed in section 14A(2) of the IPART Act. Where IPART has had regard to those matters, they are also matters covered by section 15(1) of the IPART Act, and the relevant sections of the report are listed below.

Table B.1 Consideration of section 15 matters by IPART

Section 15(1)	Draft report reference
a) the cost of providing the services	Chapters 4, 5 and 6
b) the protection of consumers from abuses of monopoly power	Sections 2.5 and 3.1
c) the appropriate rate of return and dividends	Sections 3.1.5, 7.2 and 11.3
d) the effect on general price inflation	Section 11.4
e) the need for greater efficiency in the supply of services	Chapters 4, 5 and section 2.2
f) ecologically sustainable development	Section 2.2 and 11.5
g) the impact on borrowing, capital and dividend requirements	Sections 3.1.5, 7.2 and 11.3
h) impact on pricing policies of any arrangements that the government agency concerned has entered into for the exercise of its functions by some other person or body	Not applicable
i) need to promote competition	Chapter 2
j) considerations of demand management and least cost planning	Section 2.2
k) the social impact	Sections 2.2 and 11.2
l) standards of quality, reliability and safety	Section 2.2, Chapter 5 and 6, and Section 11.6

C Our 'building block' approach to setting the revenue requirement

In this appendix, we provide information about our 'building block' methodology for setting SDP's revenue requirement. This is our standard approach, which we used in the 2012 Determination and continue to use in the 2017 Determination.

C.1 Components of the building block

The notional revenue requirement represents our view of the total efficient costs of SDP providing its regulated services in each year of the determination period. In general, we set prices to recover this amount of revenue.

This method to calculate SDP's revenue requirement involves determining, for each year of the 2017 determination period, an allowance for:

- **Operating expenditure,** which represents our estimate of the efficient level of SDP's forecast operating, maintenance and administration costs.
- A **return on the assets** SDP uses to provide its services. This amount represents our assessment of the opportunity cost of the capital invested in SDP, and ensures that it can continue to make efficient capital investments in the future. To calculate this amount, we need to decide on the efficient and prudent levels of SDP's past and forecast capital expenditure, the value of SDP's regulatory asset base (RAB), and the appropriate weighted average cost of capital (WACC).
- A **return of those assets (regulatory depreciation).** This allowance recognises that through the provision of services to customers, SDP's capital infrastructure will wear out over time, and therefore revenue must recover the cost of maintaining the RAB. To calculate this allowance, we need to decide on the appropriate asset lives and depreciation method.
- An **allowance for meeting tax obligations**. In the 2017 Determination, we use a real post-tax WACC to calculate the allowances of a return on assets and regulatory depreciation, and calculate the allowance for tax as a separate cost block. We consider this method accurately estimates the tax liability for a comparable commercial business. This represents a departure from the 2012 Determination, where we used a pre-tax WACC.
- An **allowance for working capital**, which represents the holding cost of net current assets.

D Calculation of energy cost allowances

Table D.1 shows how the energy cost allowances set out in Chapter 6 were calculated.

Table D.1 Calculation of energy cost allowances ($2016-17)

	2017-18	2018-19	2019-20 [a]	2020-21	2021-22
Shutdown					
- Benchmark price ($/MWh)	153.15	148.95	144.74	144.09	143.79
- Benchmark volume (MWh)	5,000	5,000	5,014	5,000	5,000
- Cost per year ($)	765,750	744,750	725,683	720,450	718,950
- Frequency (days)	365	365	366	365	365
- Allowance ($/day)	2,097.95	2,040.41	1,982.74	1,973.84	1,969.73
Transition to restart					
- Benchmark price ($/MWh)	152.44	148.25	144.03	143.38	143.08
- Benchmark volume (MWh)	18,260	18,260	18,260	18,260	18,260
- Cost per transition	2,783,554	2,707,045	2,629,988	2,618,119	2,612,641
- Allowance ($/transition)	2,783,554	2,707,045	2,629,988	2,618,119	2,612,641
Plant operation - fixed					
- Benchmark price ($/MWh)	152.43	148.23	144.02	143.37	143.07
- Benchmark volume (MWh)	7,665	7,665	7,686	7,665	7,665
- Cost per year ($)	1,168,376	1,136,183	1,106,938	1,098,931	1,096,632
- Frequency (days)	365	365	366	365	365
- Fixed allowance ($/day)	3,201.03	3,112.83	3,024.42	3,010.77	3,004.47
Plant operation - variable					
- Benchmark price ($/MWh)	152.43	148.23	144.02	143.37	143.07
- Benchmark volume (MWh)	320,835.0	320,835.0	321,714	320,835.0	320,835.0
- Cost per year ($)	48,904,879	47,557,372	46,333,250	45,998,114	45,901,863
- Frequency (ML)	91,250	91,250	91,500	91,250	91,250
- Variable allowance ($/ML)	535.94	521.18	506.37	504.09	503.03

a 2019-20 will be a leap year with 366 days.

Note: There is no variable component in transition because as soon as SDP supplies a ML of drinking water it is deemed to be in operation mode. Of Atkins Cardno's estimate of efficient energy required to restart of 71,000 MWh, we have subtracted 52,740 MWh related to the production of 15,000 ML (ie, assuming 3.516 MWh per ML consistent with full production mode). The remaining 18,260 MWh is assumed fixed and is recovered through the transition to restart charge.

Source: IPART analysis.

E Examples of cost sharing rules

In this section we provide four examples, the first three showing how our cost sharing rules work when SDP is in different modes in and outside of drought. These examples show how SDP costs would be shared under three broad scenarios that SDP is could encounter.

The fourth example shows how sharing SDP's variable costs between impactors (instead of beneficiaries in our rules) during a drought would create a perverse incentive for third parties to source water from SDP. This provides the justification for why variable costs are always paid by beneficiaries under our cost sharing rules. Our examples are summarised below.

1. SDP not operating (shutdown) outside of drought
2. SDP operating inside of drought
3. SDP operating outside of drought
4. SDP operating inside of drought, where impactors share all SDP costs.

All four examples also show how WaterNSW's charges to Sydney Water are affected by the operation of SDP under WaterNSW's current determination.[286]

Our four hypothetical examples include two large water retailers in Sydney: the incumbent, Sydney Water; and a new entrant called Customer A. All numbers are sourced from this report, and the current determinations for Sydney Water and WaterNSW.

All examples are for the year 2017-18, the first year of SDP's new determination period. However, all values are in 2016-17 dollars to be consistent with the numbers in the rest of this report. Inflation has not been applied to WaterNSW's costs as all values in its determination are in 2016-17 dollars.

E.1 Example 1 – Cost sharing, SDP not operating outside drought

The purpose of this example is to show how our cost sharing rules work when SDP is not operating (in shutdown) outside of drought as discussed in Chapter 9.

In this example, SDP's base water security and pipeline costs are shared between Sydney Water and Customer A in proportion to each organisation's relative share of total system demand. Total system demand is demand for dam water from WaterNSW only because SDP is in shutdown. Example 1 is summarised in Table E.1.

286 IPART, *Water NSW Maximum prices for water supply services from 1 July 2016 in relation to Sydney Catchment Functions — Determination No. 3*, pp 5-8.

Table E.1 Example 1 – SDP not operating (shutdown) outside drought ($million, $2016-17)

2017-18	Sydney Water	Customer A	Total
Demand (ML)	448,183	91,250	**539,433**
Demand share (%)	83%	17%	**100%**
Transition to restart costs	-	-	**-**
Incremental service costs	-	-	**-**
Pipeline service costs	31.2	6.4	**37.6**
Membrane service costs	-	-	**-**
Variable costs	-	-	**-**
Base water security costs	112.1	22.8	**134.9**
Total SDP costs (A)	**143.4**	**29.2**	**172.5**
WaterNSW fixed costs	133.4	27.2	**160.5**
WaterNSW variable costs	33.3	6.8	**40.1**
Total WaterNSW costs (B)	**166.7**	**33.9**	**200.6**
Total costs (A)+(B)	**310.1**	**63.1**	**373.2**
Share of total costs	83%	17%	**100%**
$/ML	691.8	691.8	

Note: Numbers may not add due to rounding.

Total water demand for 2017-18 is 539,433 ML, comprised of:

- Sydney Water total demand: 448,183 ML (83%) from WaterNSW
- Customer A total demand: 91,250 ML (17%) from WaterNSW.

Under our cost sharing rules, SDP's water security (shutdown) costs (both base service charges and pipeline charges) would be recovered from impactors. There are no other costs to be recovered. This would be apportioned to each based on their relative share of draw on the water supply in the Greater Sydney area on the day the costs are accrued.

SDP's base water service and pipeline costs in 2017-18 are $172.5 million. We would apportion costs to the impactors as follows:

- Sydney Water: $172.5 million × 83% = $143.4 million
- Customer A: $172.5 million × 17% = $29.2 million.

Both Sydney Water and Customer A source all water from WaterNSW. Under WaterNSW's determination, Sydney Water and Customer A share WaterNSW's fixed charges for large customers based on the relative proportion of water supplied to each customer for 2017-18 ($160.5 million).

WaterNSW's variable price to large customers in 2017-18, when SDP is shutdown, is $74.39/ML.[287] Sydney Water pays $33.3 million through the variable price for 448,183 ML of water from WaterNSW. Customer A pays $6.8 million through the variable price for 91,250 ML of water from Water NSW.

[287] IPART, *Water NSW Maximum prices for water supply services from 1 July 2016 in relation to Sydney Catchment Functions — Determination No. 3*, pp 5-8.

Our sharing rules outside of drought when SDP is shutdown result in a per ML cost to each party of:

- Sydney Water: $691.8/ML
- Customer A: $691.8/ML

E.2 Example 2 – Cost sharing, SDP operating inside drought

The purpose of this example is to show how our cost sharing rules work when SDP is operating inside drought.

In this example, we assume that SDP is operating in drought for the entire year. We also assume that Customer A has entered into an access agreement with SDP to purchase 100% of its water produced.

SDP's base water security, transition and incremental service costs are shared between impactors Sydney Water and Customer A in proportion to the relative share of total system demand. SDP's variable costs are paid by Customer A. Example 2 is summarised in Table E.2.

Table E.2 Example 2 – Cost sharing, SDP operating in drought ($million, $2016-17)

2017-18	Sydney Water	Customer A	Total
Demand (ML)	448,183	91,250	**539,433**
Demand share (%)	83%	17%	**100%**
Transition to restart costs	8.0	1.6	**9.7**
Incremental service costs	6.6	1.3	**8.0**
Pipeline service costs	31.2	6.4	**37.6**
Membrane service costs	4.3	0.9	**5.2**
Variable costs	-	62.4	**62.4**
Base water security costs	112.1	22.8	**134.9**
Total SDP costs (A)	**162.3**	**95.5**	**257.8**
WaterNSW fixed costs	160.5	-	**160.5**
WaterNSW variable costs	40.0	-	**40.0**
Total WaterNSW costs (B)	**200.5**	**-**	**200.5**
Total costs (A)+(B)	**362.9**	**95.5**	**458.3**
Share of total costs	79%	21%	**100%**
$/ML	809.6	1,046.2	

Note: Numbers may not add due to rounding.

Total water demand for 2017-18 is 539,433 ML, comprised of:

- Sydney Water total demand: 448,183 ML (83%) from WaterNSW
- Customer A total demand: 91,250 ML (17%) from WaterNSW.

Under our cost sharing rules, SDP's base water security, pipeline, membrane, incremental service, and transition to restart charges would be recovered from impactors. This would be apportioned to each based on their relative share of draw on the water supply in the Greater

Sydney area (ie, defined as bulk water sourced from dams supplying Greater Sydney (WaterNSW) and from the desalination plant (SDP) when it operates).[288]

In total these charges represent $195.4 million in 2017-18 and would apportion to impactors as follows:[289]

- Sydney Water: $195.4 million × 83% = $162.3 million
- Customer A: $195.4 million × 17% = $33.1 million.

Customer A sources 100% of its water from SDP and pays an additional $62.4 million for the 91,250 ML of desalinated water from SDP.

Sydney Water sources 100% of its water from WaterNSW. Under WaterNSW's determination, Sydney Water would therefore pay all of WaterNSW's fixed charges for large customers for 2017-18 ($160.5 million). It would also pay WaterNSW's $89.29 per ML variable price to large customers, when SDP is in full production. This amounts to $40 million in total for the 448,183 ML water sourced from WaterNSW (which is $6.7 million more than when SDP is off).

Our sharing rules result in a per ML cost to each party of:

- Sydney Water: $809.6/ML
- Customer A: $1,046.2/ML

E.3 Example 3 – Third party cost sharing operating outside drought

The purpose of this example is to show how our cost sharing rules work when a third party calls SDP into operation outside of drought.

In this example, we assume that SDP is operating outside of drought for the entire year. We also assume that Customer A has entered into an access agreement with SDP to purchase 100% of the water it produces.

Only SDP's base water security and pipeline costs are shared between Sydney Water and Customer A, in proportion to the relative share of total system demand. All incremental service charges, membrane charges, transition to restart and variable costs are paid by Customer A. Example 3 is summarised in Table E.3.

288 However, in this example, SDP is not operating and therefore total system demand comprises water sourced only from dams).

289 These numbers do not include transition charges, however these will be apportioned on an 83/17 split under the impactor pays sharing rule. This will not impact the price per ML differential between Sydney Water and Customer A.

Table E.3 Example 3 – SDP operating outside drought ($million, $2016-17)

2017-18	Sydney Water	Customer A	Total
Demand (ML)	448,183	91,250	**539,433**
Demand share (%)	83%	17%	**100%**
Transition to restart costs	-	9.7	**9.7**
Incremental fixed costs	-	8.0	**8.0**
Pipeline service costs	31.2	6.4	**37.6**
Membrane service costs	-	5.2	**5.2**
Variable costs	-	62.4	**62.4**
Base water security costs	112.1	22.8	**134.9**
Total SDP costs	**143.4**	**114.4**	**257.8**
WaterNSW fixed costs	160.5	-	**160.5**
WaterNSW variable costs	40.0	-	**40.0**
Total WaterNSW costs	**200.5**	**-**	**200.5**
Total costs	**343.9**	**114.4**	**458.3**
Share of total costs	75%	25%	**100%**
$/ML	767.3	1,254.2	

Note: Numbers may not add due to rounding.

As previously, Sydney Water sources 100% of its water from WaterNSW and Customer A sources 100% of its water from SDP.

Total water demand for 2017-18 is 539,433 ML, comprised of:

- Sydney Water total demand: 448,183 ML (83%) from WaterNSW
- Customer A total demand: 91,250 ML (17%) from WaterNSW.

Under our cost sharing rules, SDP's base service and pipeline costs are recovered from impactors. This would be apportioned to each based on their relative share of draw on the water supply in the Greater Sydney area (ie, defined as bulk water sourced from dams supplying Greater Sydney (WaterNSW) and from the desalination plant (SDP) when it operates).[290]

When operating outside drought, all other costs are recovered from beneficiaries, including transition to restart, incremental service charges, membrane charges, and variable costs. Transition costs would be apportioned to each beneficiary on an equal share basis. Incremental service costs would be apportioned on each beneficiary based on proportional of draw from SDP on the day. Given that Customer A is the only beneficiary it will pay 100% of transition to restart, incremental service and variable charges. Customer A will also pay all variable costs per ML of water supplied by SDP.

SDP's base water security and pipeline costs for 2017-18 are $172.5 million. Therefore, we would share costs between the impactors as follows:[291]

290 However, in this example, SDP is not operating and therefore total system demand comprises water sourced only from dams).

291 These numbers do not include transition charges, however these will be apportioned on an 83/17 split under the impactor pays sharing rule. This will not impact the price per ML differential between Sydney Water and Customer A.

- Sydney Water: $172.5 million × 83% = $143.4 million
- Customer A: $172.5 million × 17% = $29.2 million.

In addition, Customer A pays $9.7 million in transition to restart costs, $8 million in incremental service costs, $5.2 million in membrane service costs and $62.4 million variable costs for 91,250 ML of water from SDP ($85.3 million).

Sydney Water sources 100% of its water from WaterNSW. Like example 2, it would pay all of WaterNSW's fixed charges for large customers in 2017-18 ($160.5 million). And it would pay $40 million in variable costs for the 448,183 ML water sourced from WaterNSW, based on the 89.29 per ML variable price to large customers, when SDP is in full production.

Our sharing rules result in a per ML cost to each party of:

- Sydney Water: $767.3/ML
- Customer A: $1,254.2/ML

E.4 Example 4 – Perverse incentive cost sharing in drought

The purpose of this example is to show what would happen if we were to recover SDP's variable costs on an impactor pays basis while SDP is in full production in a period of drought.

In this example, we assume that SDP is operating in drought for the entire year. We also assume that Customer A has entered into an access agreement with SDP to purchase 100% of its water production. All SDP costs are shared between Sydney Water and Customer A in proportion to the relative share of total system demand. Example 4 is summarised in Table E.4.

Table E.4 Example 4–SDP operating in drought, impactor pays variable costs ($million, $2016-17)

2017-18	Sydney Water costs 2017-18	Customer A costs 2017-18	Total
Demand (ML)	448,183	91,250	**539,433**
Demand share (%)	83%	17%	**100%**
Transition to restart costs	8.0	1.6	**9.7**
Incremental fixed costs	6.6	1.3	**8.0**
Pipeline service costs	31.2	6.4	**37.6**
Membrane service costs	4.3	0.9	**5.2**
Variable costs	51.9	10.6	**62.4**
SDP base water security costs	112.1	22.8	**134.9**
Total SDP costs	**214.2**	**43.6**	**257.8**
WaterNSW fixed costs	160.5	-	**160.5**
WaterNSW variable costs	40.0	-	**40.0**
Total WaterNSW costs	**200.5**	**-**	**200.5**
Total costs	**314.7**	**43.6**	**458.3**
Share of total costs	90%	10%	**100%**
$/ML	925.3	477.9	

Note: Numbers may not add due to rounding.

As previously, Sydney Water sources 100% of its water from WaterNSW and Customer A sources 100% of its water from SDP.

If SDP's variable costs were shared on an impactor pays principle, then Sydney Water would contribute to these costs, in proportion to its system draw. Therefore, Customer A pays $10.6 million for 91,250 ML of water from SDP. Sydney Water pays $51.9 million for water produced by SDP that is supplied to Customer A.

Under WaterNSW's determination, Sydney Water would continue to pay all of WaterNSW's fixed charges for large customers for 2017-18 ($160.5 million). Sydney Water also continues paying the additional $40 million for the 448,183 ML of water it sources from WaterNSW.

Sharing SDP's costs during drought on an impactor pays basis alone results in a per ML cost to each party of:

- Sydney Water: $925.3/ML
- Customer A: $477.9/ML

This represents a significant cross subsidy from Sydney Water to Customer A. Customer A's total costs are now 48% less than Sydney Water's on a per ML basis, compared to Example 2, where they were 29% more than Sydney Water's. This could allow Customer A to on-sell desalinated water to its retail or end-use customers at the prevailing market price and realise super normal profits.

This creates a powerful perverse incentive for Customer A to source water from SDP during drought under this scenario.

Glossary

2012 Determination	IPART, *Prices for Sydney Desalination Plant Pty Limited's Water Supply Services - Determination No. 2*, December 2011.
2012 Methodology Paper	IPART, *Sydney Desalination Plant – Efficiency and Energy Adjustment Mechanisms*, Methodology Paper, April 2012.
2017 Determination	Draft Determination of SDP's maximum prices from 1 July 2017, to be made in this review.
2017 Draft Methodology Paper	IPART, *Sydney Desalination Plant Pty Ltd - Energy Adjustment and Efficiency Carryover Mechanisms*, Draft Methodology Paper, March 2017.
Sydney Water 2016 Determination	IPART, *Sydney Water Corporation, Maximum prices for water, sewerage, stormwater drainage and other services from 1 July 2016 – Determination*, June 2016.
2012 determination period	The period from 1 July 2012 to 30 June 2017.
2017 determination period	The period from 1 July 2017 to 30 June 2022.
The 70/80 rule	Condition A2(b) of SDP's network operator's licence requires SDP to operate and maintain the desalination plant with the objective of maximising the production of drinking water for the exclusive supply into the Sydney Water Corporation area of operation beginning when the available storage in Sydney's water supply reservoirs falls below 70%, until the available storage rises to 80%. **'Under the 70/80 rule'** refers to when SDP is operating in its drought response role. In this role, SDP must operate to maximise its production and supply of drinking water in Sydney Water's area of operations. **'Outside the 70/80 rule'** refers to when SDP is **not** operating in its drought response role.

Abatement mechanism	A pricing mechanism intended to create a financial incentive for SDP to maximise its production of drinking water when required under its operating rules.
AER	Australian Energy Regulator.
Australian Drinking Water Guidelines	HMRC, NRMMC, *Australian Drinking Water Guidelines Paper 6 National Water Quality Management Strategy*, National Health and Medical Research Council, National Resource Management Ministerial Council, Commonwealth of Australia, Canberra, 2011, updated February 2016.
Base service charge (water security)	Proposed daily fixed charge to reflect the costs of making plant available in water security (shutdown) mode.
Building block approach	IPART's standard methodology to establish notional revenue requirement.
Dam storage levels	Available storage in Sydney's water supply reservoirs as published on a weekly basis on the website of the WaterNSW (former Sydney Catchment Authority). If for any reason WaterNSW is unable to calculate or publish the available storage, the available storage is the amount of water as calculated and notified from time to time by such other authority as is nominated by the Minister.
DPI Water	Department of Primary Industries Water responsible for the management of NSW's surface water and groundwater resources.
EfAM	Efficiency Adjustment Mechanism in the 2012 Determination.
Efficiency Adjustment Mechanism	As per the Terms of Reference, SDP should be allowed to carryover demonstrated efficiency savings, net of efficiency losses, in operating expenditure in providing its water supply services for a period of four years following the year in which the efficiency saving was achieved. EfAM should be applied in accordance with the 2012 Methodology Paper.
EAM	Energy adjustment mechanism in the 2017 Draft Methodology Paper.

ECM	Efficiency carryover mechanism in the 2017 Draft Methodology Paper.
EnAM	Energy Adjustment Mechanism in the 2012 Determination.
Energy Adjustment Mechanism	As per Terms of Reference, energy adjustment mechanism is to provide for the carryover and pass-through to SDP's customers of gains or losses, outside a core band, associated with the sale of surplus electricity and RECs when the plant is in shutdown and restart modes only. EnAM should be applied in accordance with the 2012 Methodology Paper.
EPA	NSW Environment Protection Authority.
ESCOSA	Essential Services Commission of South Australia.
Financial indifference principle	Pricing principle under Terms of Reference, requiring that "the structure 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" (see SDP's Referred Services).
FNC	Fixed Network Charge (under the 2012 Determination).
Force majeure event	As defined in the 2017 Draft Determination.
GWh	Gigawatt-hour.
Good Industry Practice	As per SDP's Network Operator's Licence granted on 9 August 2010, as varied on 10 May 2013, 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 internationally recognised standards having regard to the Capacity of the Water Infrastructure, its duty, age and technological status.
IPART	Independent Pricing and Regulatory Tribunal of NSW.
IPART Act	*Independent Pricing and Regulatory Tribunal Act 1992* (NSW).

Impactor pays principle	The impactor pays principle allocates costs according to which of the parties created the cost, or the need to incur the cost.
Incremental service charges	For the 2017 Determination, daily fixed charges in plant operating mode over and above the base service charge in water security shutdown.
Infigen	Infigen Energy Limited.
Infigen Contracts	Electricity Supply Agreement and RECs Supply Agreement between Infigen and SDP.
LGCs	Large-scale generation certificates.
Long-term shutdown mode (2012 Determination)	Term for the operational mode where the plant is not producing water for between 91 days and two years.
LRET	Large-scale Renewable Energy Target.
LRMC	Long-run marginal cost.
Medium-term shutdown mode (2012 Determination)	Term for the operational mode where the plant is not producing water for between 11 and 90 days.
Membrane service charge	For the 2017 Determination, daily fixed charges to recover capital costs of membrane replacement.
Metropolitan Water Plan	NSW Government, *2010 Metropolitan Water Plan*, August 2010. Was updated on 19 March 2017 with the release of the *2017 Metropolitan Water Plan*.
ML	Megalitre.
MWh	Megawatt-hour.
Nil water usage charge	Under the 2012 Determination, applies when SDP supplies drinking water to Sydney Water outside the 70/80 rule.
Notional revenue requirement	Revenue requirement set by IPART that represents the efficient costs of providing SDP's declared monopoly services.
O&M contract	Operating and maintenance contracts between SDP and Veolia (the plant operator).

Operator's licence	SDP's Network Operator's Licence granted under the WIC Act on 9 August 2010, as varied on 10 May 2013.
Outside the 70/80 rule	See 'the 70/80 rule' above.
Pipeline charge	Under the 2012 Determination, separate daily fixed charge for SDP's pipeline.
Plant operation mode	Mode of operation when SDP supplies desalinated water to customers.
RAB	Regulatory Asset Base.
RBA	Reserve Bank of Australia.
RECs	Renewable Energy Certificates.
Restart mode(s)	In the 2012 Determination, the modes to transition from a corresponding shutdown mode into plant operation mode. For the 2017 Determination, the mode to transition from water security (shutdown) mode to plant operation mode.
RET	Renewable Energy Target.
SCA	Former Sydney Catchment Authority, now WaterNSW (Greater Sydney).
SDP	Sydney Desalination Plant Pty Ltd.
SDP's water supply services	Services declared by the Minister under section 51 of the WIC Act, 2 May 2011.
SDP's monopoly services	SDP's declared services referred to IPART under Terms of Reference are: (a) the supply of non-rainfall dependent water to purchasers, and (b) the making available of the desalination plant to supply non-rainfall dependent drinking water.
Short-term shutdown mode (2012 Determination)	Term for the operational mode where the plant is not producing water for between 2 and 10 days.

Shutdown modes	In the 2012 Determination, shutdown includes short-term, medium-term, mong-term and water security shutdowns. No water is supplied to customers (except for water from storage) under the 2012 Determination. For the 2017 Determination, we propose only one shutdown mode or period. In this Draft Report, we refer to this mode or period as 'shutdown, 'Shutdown period,' 'Water security (shutdown) mode' or 'Water security mode.'
Storm event	On 16 December 2015, SDP sustained significant damage from a storm event that occurred in areas across Sydney.
Sydney Water	Sydney Water Corporation.
Sydney Water's Area of Operation	Sydney Water Corporation's area of operation as defined in Sydney Water's Operating Licence, *Sydney Water Corporation Operating Licence, 2015-2020.*
Terms of reference	Terms of reference for Referral of Sydney Desalination Plant Pty Limited to IPART under section 52 of the *Water Industry Competition Act 2006*, 16 February 2012.
Third-party customer	SDP's customers other than Sydney Water.
Transition charges	One-off charges for SDP to transition from Plant operation mode to a shutdown mode, or from a shutdown mode to a corresponding restart mode.
Under the 70/80 rule	See 'the 70/80 rule' above.
Veolia	Veolia Water Australia Pty Ltd.
WACC	Weighted average cost of capital.
WaterNSW	WaterNSW is the organisation responsible for managing raw water supply across NSW by bringing together the Sydney Catchment Authority (SCA) and State Water Corporation (State Water) (at 1 January 2015).
Water security (shutdown) mode	Term for the operational mode where the plant is not producing water for longer than 11 days (under the 2017 Draft Determination).

Water Service Charge	Fixed daily charge for making the desalination plant available (under the 2012 Determination).
Water Supply Agreement	Agreement between Sydney Water and SDP, June 2012.
Water Usage Charge	Variable water charge per ML of water supplied to SDP's customers.
WIC Act	*Water Industry Competition Act 2006* (NSW).
WIC Regulation	*Water Industry Competition (General) Regulation 2008* (NSW).