

The desalination plant is a key element in Sydney's water security plan

The Sydney Desalination Plant (SDP) was built to ensure a secure water supply for greater Sydney, both in the long term and in response to drought events, as part of the NSW Government's Metropolitan Water Plan.

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 paper, for simplicity, we refer to this range of dam levels in which SDP must operate as 'drought', consistent with SDP's drought response role.

The Metropolitan Water Plan was recently updated, released on 19 March 2017. 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.¹ SDP is to operate in drought response² when the total dam storage level is below 60% (previously 70%) and continue to do so until the total dam storage level reaches 70% (previously 80%).³

While our Draft Determination is based on the previous 70/80 operating rules, we consider our pricing approach applies to the new operating rules. 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.

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.

Our draft decisions would result in bill decreases for customers

Based on our draft prices, the cost of SDP would go down in 2017-18 in a typical Sydney Water customer annual bill:⁵

¹ NSW Government, *2017 Metropolitan Water Plan*, March 2017, p 24.

² 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.

³ NSW Government, *2017 Metropolitan Water Plan*, March 2017, pp 28-29; and NSW Government, *2010 Metropolitan Water Plan*, August 2010, p 36.

⁴ WaterNSW, Sydney's dam level total at Friday 17 March 2017, accessed from <http://www.watarnsw.com.au/home>

⁵ 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.

- ▼ 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.

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 Sydney Water's end-use water customers through its residential and non-residential prices (which are subject to a separate IPART price determination).

Figure 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 1 Annual cost of SDP for a typical Sydney Water customer (\$/year, \$nominal) - with inflation

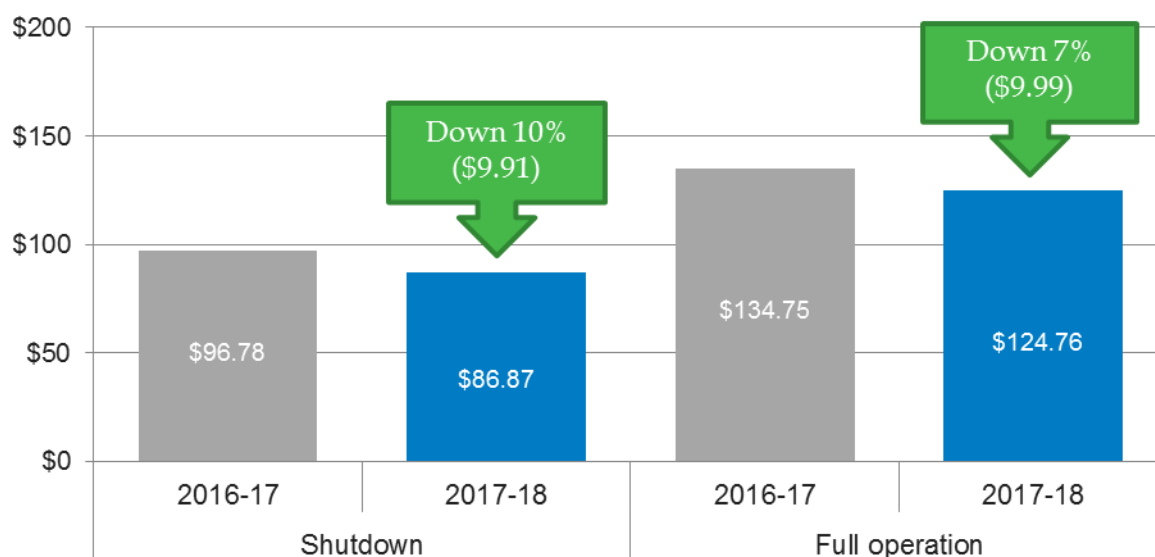


Table 1 shows how each component of SDP's charges are expected to flow through to a typical Sydney Water customer's bill. We have separated these impacts into:

- ▼ base charges, which are paid at all times (whether the plant is 'on' or 'off')
- ▼ plant operation charges, which are additional charges that apply when the plant is 'on' only, and
- ▼ transition charges, which are one-off payments that apply when the plant transitions to restart or shutdown.

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 (2017-18 to 2021-22) is lower than the amount we included over the 2012 determination period (2012-13 to 2016-17).

Table 1 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 2 below, 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.

When the plant is shutdown, we have limited SDP's expenditure to essential maintenance activities only

In developing our draft prices, we have assessed SDP's efficient costs through the lens of the plant's primary role of drought response.

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:

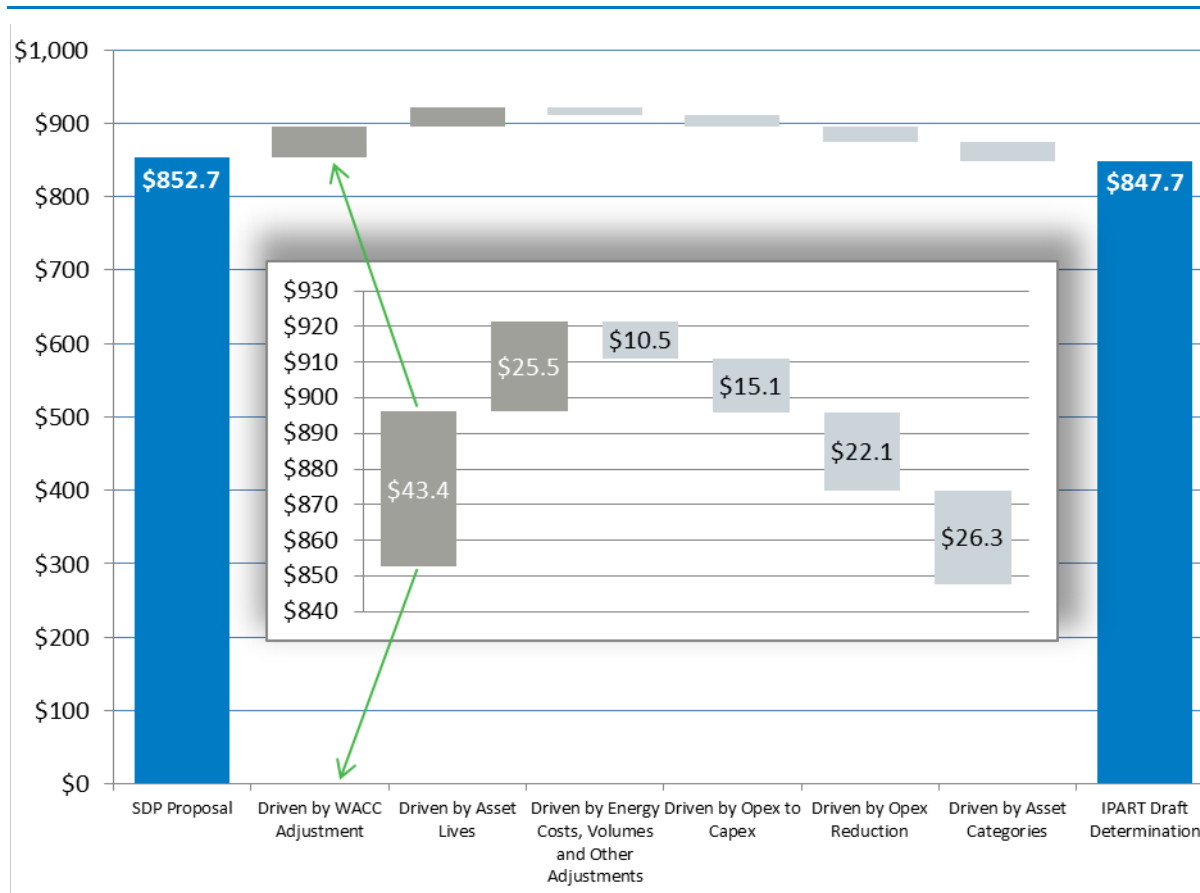
- ▼ deferring the cost of installing an additional pump until it is required
- ▼ applying efficiency targets to SDP's corporate costs, and
- ▼ ensuring the costs of replacing membranes are only paid for when needed.

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.⁶ Most of these savings are a result of our adjustments to SDP's proposed operating and maintenance costs.

Our notional revenue requirement (NRR), which is our assessment of SDP's efficient costs, is shown below in Figure 2, compared to SDP's proposed revenue requirement.

⁶ 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 five-year period (ie, based on our draft WACC of 4.9%).

Figure 2 Water security (shutdown) mode - our draft decisions on NRR (plant & pipeline) over the 5-year determination period (\$millions, \$2016-17)



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

When the plant is operating, we have included all necessary costs so the plant can respond effectively to drought

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).

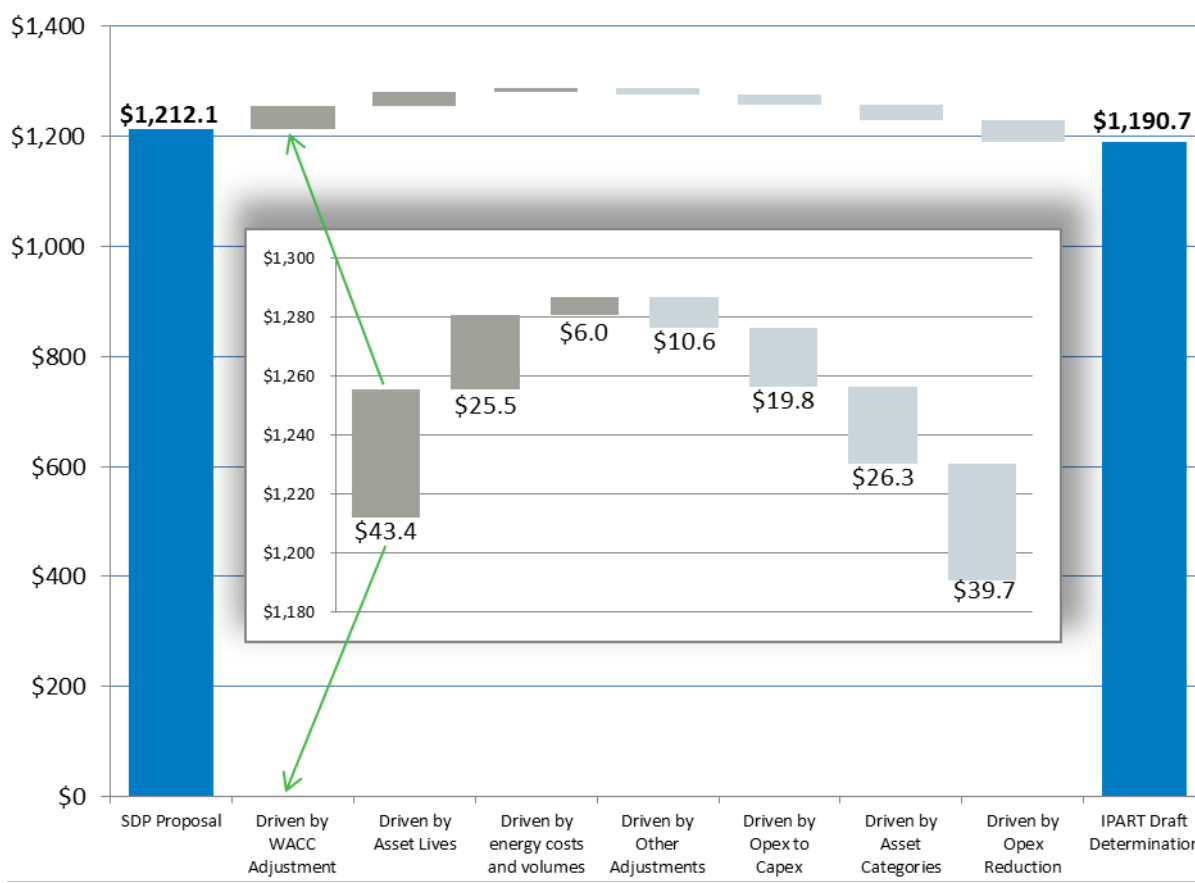
Our benchmark energy costs have increased significantly since the 2012 Determination because of the increase in both ‘black’ and renewable energy components of the benchmark price. SDP is required to use 100% renewable energy as part of the planning approval for the plant.⁷ Consistent with the Terms 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.

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

⁷ 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.

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.

Figure 3 Plant operation mode - our draft decisions on total NRR (plant & pipeline) over the 5-year determination period (\$millions, \$2016-17)



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

Our draft determination means better value for customers

Strengthening the incentives for SDP to maximise its supply during drought

We have strengthened financial incentives 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 reduce⁸ 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.

Improving the cost-sharing principles if SDP has multiple customers

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.

Nonetheless, in the event SDP has multiple customers, 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 (ie, bulk water users drawing from WaterNSW's dams and SDP's desalination plant), and
- ▼ outside of drought, **beneficiaries** pay (ie, direct users of SDP's desalination plant).

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.⁹ Outside of drought, the additional fixed costs needed to operate the plant would be paid for by beneficiaries (ie, direct users of SDP's desalination plant), 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 does not become cheaper to buy than dam water, nor is desalinated water cross-subsidised by Sydney Water for third party customers.

Our draft prices are mostly lower than SDP's prices in 2016-17

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.

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.

⁸ 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 it is called into operation when dam storage levels fall to 70%, and until they rise to 80% (under the 70/80 rule). 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.

⁹ 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.

- ▼ **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.

In addition, we have set **transition charges**, which will reflect the efficient fixed one-off operating costs incurred when the plant moves from shutdown into operation mode and vice versa. The increase in the transition to restart charge reflects costs related to energy, pipeline flushing and changes in key input costs (eg, chemicals). 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.

We have also introduced **membrane service charges** for the first time in the 2017 determination period. If SDP restarts during the 2017 determination period, it is likely to need a full set of membranes, which would add around \$14,000 a day to SDP's 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.

Our draft prices are presented in Table 2 below.

Table 2 IPART's draft prices for the 2017 determination period (\$2016-17) – without inflation

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	% change 2017 to 2022
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 determination is 2017-18. Results for 2016-17 are provided for comparative purposes. Membrane service charges assume a restart in 2017-18.

Source: IPART analysis.