

Sydney Desalination Plant 2017 Price Review

The desalination plant is part of Sydney's water security plan

The desalination plant 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, Sydney Desalination Plant Pty Ltd (SDP) is required to operate the plant with the objective of maximising production and supplying Sydney Water Corporation's (Sydney Water) area of operations when dam levels fall below a specified point (currently 60%) and continue to do so until dam levels rise to a certain point (currently 70%).

The Metropolitan Water Plan was updated on 19 March 2017.¹ Under the new Plan, the 'on' and 'off' dam level triggers for the plant have been lowered (from 70/80 to 60/70) to run the water supply system more cost effectively, taking account of changes in demand over the medium term.² For simplicity, we refer to the range of dam levels in which SDP must operate the plant as 'drought', consistent with SDP's drought response role. Our Determination is based on these operating rules.

The Metropolitan Water Plan also allows a discretionary 14-month minimum run time for the plant during drought, which includes allowance for a start-up period of up to 8 months. We have also accommodated this minimum run time in our Determination.

In 2017-18, the plant is expected to be shutdown, given current dam storage levels of 94%.³ 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 currently 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 affect prices. We understand from SDP that the plant will be reinstated and operable from 13 December 2018.

Bill decreases for customers

The cost of SDP goes down in 2017-18 in a typical Sydney Water customer's annual bill:⁴

- ▼ When the plant is shutdown, the yearly cost of SDP per customer falls 12% from \$96.78 in 2016-17 to \$85.51 in 2017-18.
- ▼ When the plant operates, the yearly cost of SDP per customer falls 3% from \$134.75 in 2016-17 to \$130.42 in 2017-18.

In operation mode, SDP's costs decrease on average by 1.4% each year over the determination period. This is because estimates of benchmark energy prices decrease over the period. If the plant remains shutdown it uses little energy. SDP's costs during shutdown

¹ 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.

² NSW Government, *2017 Metropolitan Water Plan*, March 2017, p 24.

³ WaterNSW, Sydney's dam level total at Thursday 8 June 2017, accessed from <http://www.watnsw.com.au/home>

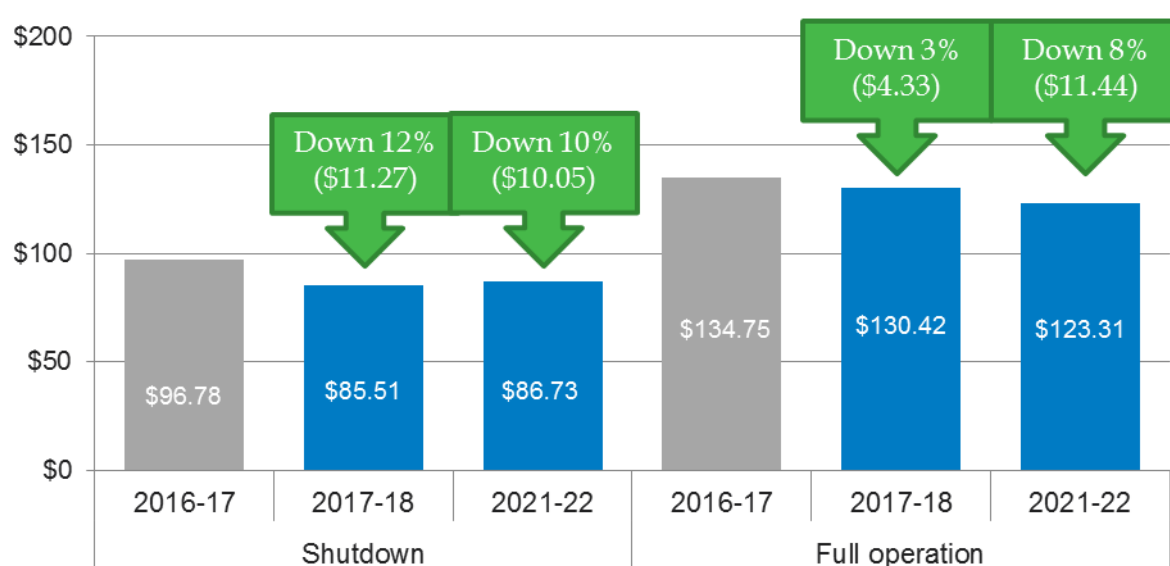
⁴ Customers would pay the 2017-18 costs of SDP in 2018-19, given the one year lag in the cost pass-through mechanism under the Sydney Water 2016 Determination. These costs are expressed in \$2017-18 for simplicity.

would 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.

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



Note: The full operation customer impacts assume that membranes are replaced on 1 July 2017.

Data source: IPART analysis.

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

- ▼ 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.

Sydney Water’s customers will pay lower prices 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 | 67.28 | 67.61 | 67.31 | 67.44 | 67.57 |
| - Pipeline service charge | 25.59 | 18.23 | 18.50 | 18.63 | 18.92 | 19.16 |
| Plant operation | | | | | | |
| - Incremental service charge | 6.74 | 3.85 | 3.99 | 4.02 | 4.03 | 4.33 |
| - Membrane service charge ^a | - | 2.37 | 2.40 | 2.43 | 2.46 | 2.49 |
| - Water usage charge | 31.23 | 38.69 | 33.29 | 30.90 | 29.87 | 29.76 |
| Transition charges | | | | | | |
| - Transition to restart | 3.02 | 7.02 | 6.46 | 6.21 | 6.14 | 6.17 |
| - Transition to shutdown | 0.79 | 0.85 | 0.86 | 0.87 | 0.88 | 0.89 |
| Cost in shutdown | 96.78 | 85.51 | 86.12 | 85.94 | 86.36 | 86.73 |
| Cost in plant operation | 134.75 | 130.42 | 125.79 | 123.29 | 122.72 | 123.31 |

^a The customer impact of membrane costs has been calculated by averaging the \$/day membrane service charges in Table 2, multiplying this by the number of days in the relevant year, and dividing the result by the number of Sydney Water customers.

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 ABS published March to March All Capitals CPI of 2.1% for moving from \$2016-17 to \$2017-18, and the mid-point of the RBA target band of 2.5% for all remaining years.

Data Source: IPART analysis.

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

We have assessed SDP's efficient costs through the lens of the plant's primary role of drought response. Accordingly, any need to maintain a higher level of service is ancillary and so we have removed higher cost short-term shutdown or standby modes.

We have reinforced this by not including significant plant testing costs proposed by SDP in the upcoming price path. We have also reduced expenditure in shutdown by:

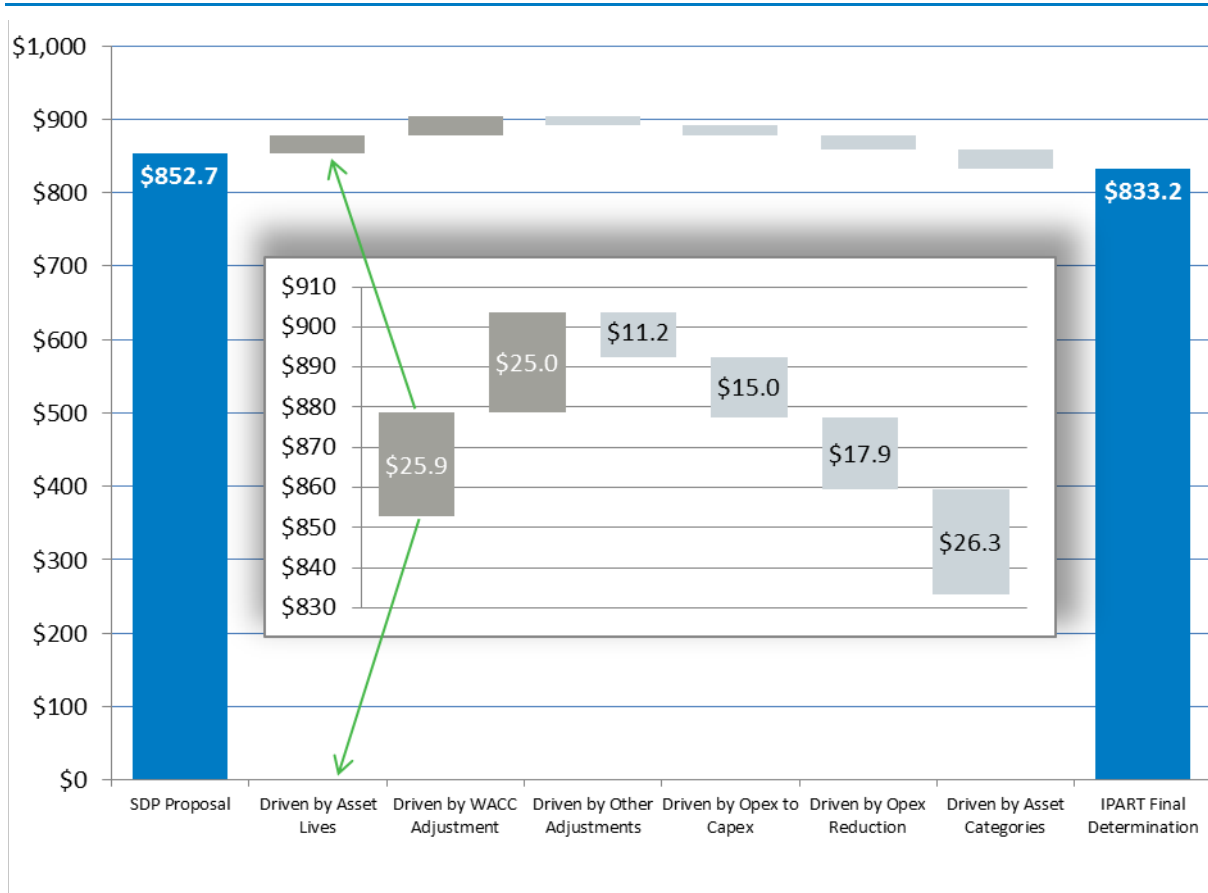
- ▼ deferring the cost of installing an additional pump until it is required
- ▼ applying efficiency targets to SDP's corporate costs, and
- ▼ ensuring the costs of replacing membranes are only paid for when needed.

After allowing for movements in market interest rates, we have reduced SDP's proposed revenue requirement over the 5-year determination period by \$44.5 million (or 5.1%) – ie, from \$877.7 million to \$833.2 million.⁵ These savings include our adjustments to SDP's proposed operating and maintenance costs. SDP, in its submission to our Draft Report, accepted many of these adjustments.

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 4.7%. Controlling for movements in the WACC, SDP's proposed revenue requirement would be about \$877.7 million over the 5-year period (ie, based on our WACC of 4.7%).

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

Figure 2 Water security (shutdown) mode - IPART decision on notional revenue requirement (plant & pipeline) versus SDP proposed over the 5-year determination period (\$millions, \$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 working capital parameters, 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 55.

Prices include 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 \$237.4 million per year. On average, it costs about \$70.8 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 70.5% of this increase (ie, \$49.9 million).

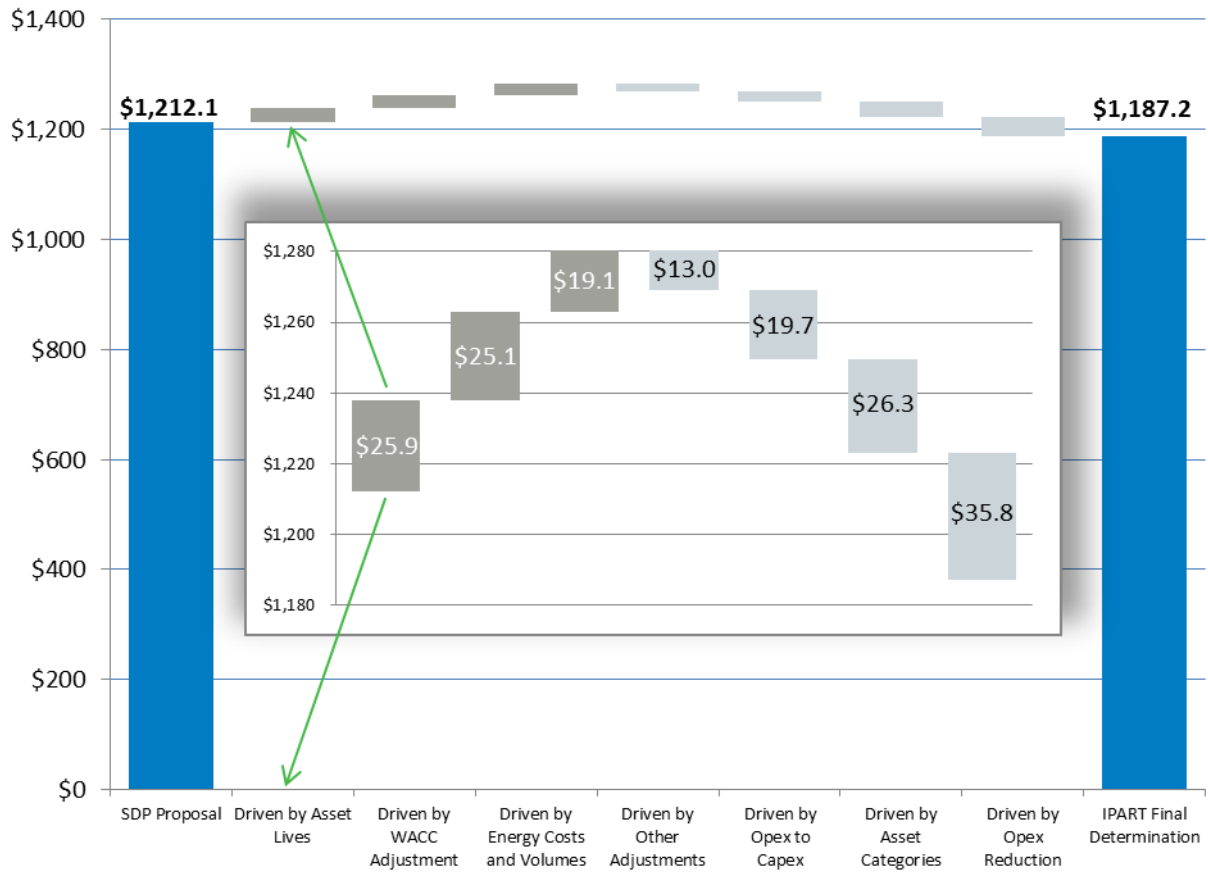
Benchmark energy costs have increased significantly since the 2012 Determination because of the increase in the 'black' energy component of the benchmark price.⁶ SDP is required to use 100% renewable energy as part of the planning approval for the plant.⁷ Consistent with the Terms of Reference for our 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 reaching the end of its asset life (8 years) during 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.

⁶ The benchmark energy price comprises mainly the wholesale market cost of energy (ie, 'black' component) and the cost of renewable energy certificates arising from the planning approval for the plant that required 100% renewable energy use (ie, 'green' component).

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.

Figure 3 Plant operation mode – IPART decision on notional revenue requirement (plant & pipeline) versus SDP proposed over the 5-year determination period (\$millions, \$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 working capital parameters, 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 55.

Improved incentives for SDP to operate the plant efficiently

Strengthening incentives to ensure SDP supplies water when required to do so

The Determination has strengthened financial incentives to ensure that SDP maximises its supply during drought. We have also introduced similar financial incentives to incentivise SDP to respond to an emergency, if required to do so. Specifically, SDP's fixed charges are influenced by its performance at these times through an abatement factor.

We have been mindful of the difference between events that affect the plant's capacity to supply - during both drought and an emergency response - that are **within** SDP's control and those that fall **outside** its control. In these circumstances, we have balanced providing value for SDP's customers with SDP's exposure to risk. For situations where SDP could rely on insurance on commercially reasonable terms, we have continued to include provision for abatement of SDP's fixed charges. Where events are *uninsurable* (eg, acts of war), rather than *uninsured*, we have decided not to include provision to abate SDP's fixed charges.

These enhanced financial incentives will apply from 13 December 2018, when the plant is expected to be reinstated following the December 2015 storm event.

Improving the cost-sharing principles

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, 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.

Impactors that directly affect Greater Sydney's water storage levels will now pay a proportionate share of the base costs of maintaining the plant as a form of drought insurance premium or water security payment.⁸ Impactors are bulk water users drawing from WaterNSW's dams serving Greater Sydney and SDP's plant.

If SDP responds to drought, the additional fixed costs needed to operate the plant would also be paid for by impactors. However, outside of drought, these additional fixed costs would be paid for by direct users of SDP (or 'beneficiaries'). This is because the supply of desalinated water under these circumstances is a discretionary service. The cost sharing rules result in an efficient outcome when allocating costs to impactors and beneficiaries in and out of drought.

Prices from 2017-18 will be mostly lower than prices in 2016-17

We have set 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.

The 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.

In addition, we have set **transition charges** (\$/event), 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 restarting

⁸ They would pay 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.

the plant 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** (\$/day) 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 \$12,865 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.

SDP's prices are presented in Table 2 below. They are presented in 'real' \$2016-17 – ie, they exclude the effects of inflation over 2017-18 to 2021-22. We note that prices in our Determination are in \$2017-18 – ie, the prices outlined below adjusted for one year of inflation.⁹

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

| | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2016-17 to 2021-22 |
|---|---------|---------|---------|---------|---------|---------|--------------------|
| | | | | | | | % change |
| Plant service charges (\$/day) | | | | | | | |
| Base service charge | 391,257 | 365,748 | 362,064 | 357,033 | 352,906 | 348,783 | -10.9% |
| Incremental service charge | 37,034 | 20,948 | 21,383 | 21,345 | 21,081 | 22,377 | -39.6% |
| Pipeline service charge (\$/day) | 140,610 | 99,071 | 99,086 | 98,793 | 99,011 | 98,899 | -29.7% |
| Membrane service charge (\$/day) ^a | - | 13,816 | 13,344 | 12,837 | 12,400 | 11,928 | - |
| Transition to restart (\$'000 per event) | 6,053 | 13,933 | 12,652 | 12,031 | 11,735 | 11,622 | 92.0% |
| 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 | 841 | 715 | 654 | 625 | 614 | -10.5% |

^a No membrane service charge applies if there is no restart in the 2017 determination period. The membrane service charge in this table assumes a first restart in 2017-18. Table 12.2 in our Final Report presents the complete schedule of membrane service charges by year of restart.

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

⁹ The Determination then allows prices in \$2017-18 to be updated for inflation from 2018-19 onwards. We have applied 2.1% inflation to \$2016-17 prices to determine prices in \$2017-18 (in the Determination).