IPART

Independent Pricing and Regulatory Tribunal
New South Wales

Murray River to Broken Hill Pipeline

WaterNSW

Final Report
Water

May 2019

ISBN 978-1-76049-314-1

The Independent Pricing and Regulatory Tribunal (IPART)

IPART provides independent regulatory decisions and advice to protect and promote the ongoing interests of the consumers, taxpayers and citizens of NSW. IPART's independence is underpinned by an Act of Parliament. Further information on IPART can be obtained from IPART's website: https://www.ipart.nsw.gov.au/Home.

Tribunal Members

The Tribunal members for this review are:

Dr Paul Paterson, Chair

Mr Ed Willett

Ms Deborah Cope

Enquiries regarding this document should be directed to a staff member:

Matthew Mansell (02) 9113 7770

Chirine Dada (02) 9019 1929

Contents

1 Executive summary

The Independent Pricing and Regulatory Tribunal of NSW (IPART) has determined the maximum prices that WaterNSW can charge for the water transportation services provided by the Murray River to Broken Hill Pipeline (the Pipeline).[1]

This is IPART's first review of prices for the water transportation services supplied by the Pipeline. This Final Report:

- sets out our final decisions and explains how and why we reached these decisions
- compares our final prices to WaterNSW's proposed prices, and
- considers the impact of our final decisions on WaterNSW and Pipeline customers.

All dollar figures in this Final Report are in $2018-19, unless stated otherwise.[2]

1.1 The Murray River to Broken Hill Pipeline (the Pipeline)

The Pipeline consists of a 270km subterranean pipeline, pumping stations and bulk water storage facility for transporting, storing and delivering bulk water from the Murray River at Wentworth to Broken Hill and surrounding communities.

In 2016 and 2017, the NSW Government directed WaterNSW to make arrangements to construct, operate and maintain the Pipeline,[3] and to secure the long-term water supply for Broken Hill and surrounding communities.[4] In addition to transporting water to Broken Hill and surrounding communities, WaterNSW proposes to transport water to a small number of offtake customers located along the Pipeline. Further details on the Pipeline are provided in Appendix A and the Government directions are provided at Appendix C.

The scope of this review is limited to the prices that WaterNSW can charge for the water transportation services provided by the Pipeline. Maximum prices for bulk water (WaterNSW), water management services (WAMC) and water services to customers in Broken Hill (Essential Water) are determined by IPART under separate reviews. Our review of Essential Water's prices has taken account of the NSW Government's decision to subsidise the costs of the Pipeline.

1 This review is conducted under section 11 of the Independent Pricing and Regulatory Tribunal Act 1992 (the IPART Act).

2 The Final Determination accompanying this Final Report presents prices for the 2019 determination period in $2019-20 (which are the IPART determined prices presented in this Final Report in $2018-19, adjusted to $2019-20 using a CPI figure of 1.3%). This means that prices for the first year of the 2019 determination period (2019-20) apply as they are presented in the Final Determination. However, prices that apply from the second year of the 2019 determination period will need to be adjusted for future changes in CPI. The Final Determination specifies the method WaterNSW must follow when adjusting prices that apply from the second year of the 2019 determination period for future changes in CPI.

3 Available at: www.industry.nsw.gov.au/water/water-utilities/infrastructure-programs/broken-hill-pipeline

4 Available at: www.industry.nsw.gov.au/__data/assets/pdf_file/0016/143053/Pipeline-to-secure-Broken-Hills-water.pdf

1.2 We have set prices to recover the efficient cost of the Pipeline

In April 2018, the NSW Government directed IPART to set maximum prices that reflect the efficient cost of the Pipeline taking into account the Government's directions to WaterNSW.[5] Consistent with our legislative powers under the IPART Act and the Government direction to IPART, this Final Report presents our final decisions, which include setting:

- a three year determination period from 1 July 2019 to 30 June 2022 (ie, the 2019 determination period)
- the Notional Revenue Requirement based on our assessment of efficient costs
- price structures to reflect the efficient cost structure of the Pipeline, and
- price levels to allow WaterNSW to recover the efficient cost of the Pipeline from Essential Water and offtake customers.

1.2.1 Our decision to set a three year determination period

We decided to adopt a three-year determination period, to align future price reviews for the Pipeline's water transportation services with our decision to set a three year determination period for the review of Essential Water's prices. WaterNSW proposed a 4-year period on the basis that Essential Water had also proposed a 4-year period, and it considered the two determinations should be aligned.

1.2.2 Our decision on notional revenue

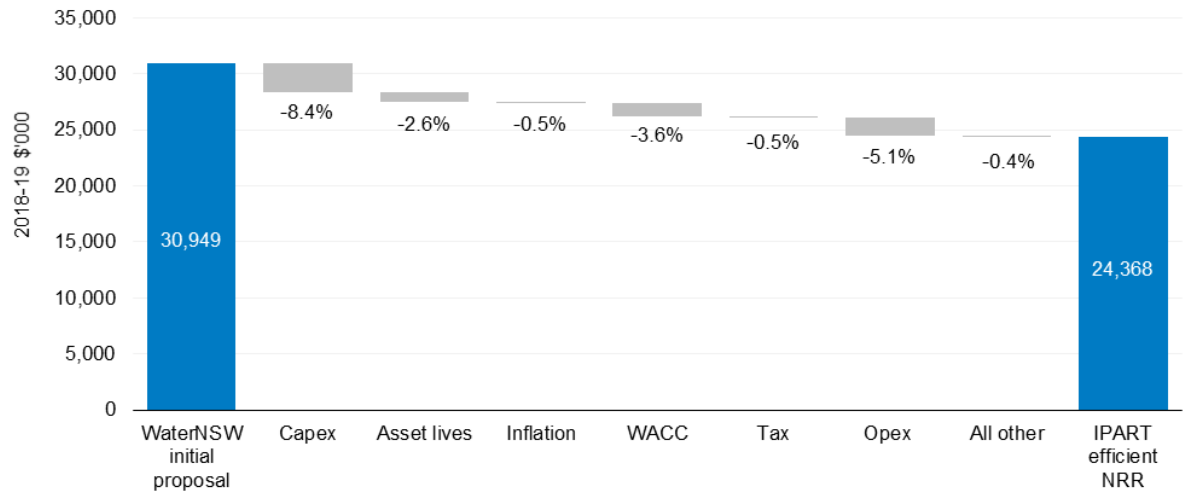
We have set a notional revenue requirement (NRR) of $24.4 million per year, on average, for the Pipeline's 2019 Determination.

On average, this is 21% lower than WaterNSW's proposal of $31.0 million per year (see Figure 1.1), comprising:

- 8% driven by WaterNSW's actual capital expenditure coming in below initial forecasts contained in WaterNSW's pricing proposal
- 8% driven by IPART's decisions on efficient operating expenditure, asset lives and the tax allowance, and
- 5% driven by updates to inflation, the weighted average cost of capital (WACC), and other parameters.

5 The Government directions to WaterNSW and IPART are included in Appendix C.

Figure 1.1 Changes to notional revenue requirement (annual average, $2018-19, $'000)



Note: this figure presents the notional revenue requirement for Pipeline services to Essential Water. Percentages are percentage reductions relative to WaterNSW's initial proposal.

Data source: WaterNSW Pricing Proposal, June 2018 and IPART analysis.

1.2.3 Our decision on price structures

In setting our prices, we adopted price structures that are cost reflective. This meant we set access charges to recover fixed costs[6] and usage charges to recover variable costs.[7]

Our decisions on price structures are summarised in Table 1.1 below.

Table 1.1 Decision on price structures

To recover:	Essential Water pays:	Offtake customers pay:
Fixed costs	Access charge ($/day) recovering: ▼ Pipeline capital costs ▼ Fixed operating costs ▼ Fixed electricity costs (daily charge and minimum load)	Access charge ($/day) recovering: ▼ Incremental fixed costs of offtake
Variable costs	Usage charge ($/ML)	Usage charge ($/kL)

Source: IPART analysis.

1.2.4 Our decision on price levels

We have set prices, comprising access and usage charges, for Essential Water and offtake customers. Access charges will remain constant in real terms over the three years for both Essential Water and offtake customers. Usage charges will change in line with our estimate of efficient energy costs over the three years.

6 Fixed costs are those that do not vary over the short-term and do not change with the amount of output produced. Access charges are paid by customers regardless of the amount they consume.

7 Variable costs are those that change with the amount of output. Usage charges are paid by customers based on the amount they consume.

Prices for Essential Water

Our prices for Essential Water are set out in Table 1.2. Both our access and usage charges are significantly lower than WaterNSW proposed. For access charges, this largely reflects WaterNSW's actual capital expenditure on the Pipeline. For usage charges, this reflects our decisions on the amount of energy required to move water through the Pipeline and the efficient cost of that energy.

Table 1.2 Prices for Essential Water from 1 July 2019 ($2018-19) – without inflation

	2019-20[a]	2020-21	2021-22
IPART decision			
Access charge ($/day)	64,120.12	64,295.79	64,295.79
Usage charge ($/ML)	206.74	209.06	203.09
WaterNSW proposal			
Access charge ($/day)	80,509.63	80,171.34	79,470.65
Usage charge ($/ML)[b]	327.80	304.07	256.04
Difference			
Access charge ($/day)	-16,389.51	-15,875.55	-15,174.86
Usage charge ($/ML)	-121.06	-95.00	-52.95
Difference (%)			
Access charge ($/day)	-20.4%	-19.8%	-19.1%
Usage charge ($/ML)	-36.9%	-31.2%	-20.7%

a Calendar year 2020 is a leap year (ie, 2019-20 has 366 days).

b Average usage charge per year for an average usage volume of 5,693 ML per year. Proposed charges vary depending on the weekly pumping profile.

Note: Totals may not sum due to rounding.

Source: IPART analysis.

Prices for offtake customers

Our prices for offtake customers are set out in Table 1.3. Both our access charges and our usage charges are significantly lower than WaterNSW proposed.

For usage charges, as this charge is based on the charge for Essential Water, this reflects our decisions on the amount of energy required to transport water through the Pipeline and the efficient cost of that energy. For access charges, it reflects our decision to allocate fixed costs between Essential Water and offtake customers on the basis of each party's contribution to the need to incur the cost of the Pipeline. The Pipeline was built (and designed) to supply Essential Water (and its customers in Broken Hill) – as reflected in Essential Water's guaranteed right to the Pipeline's transportation services, whereas offtake customers do not have such a guaranteed right. On this basis, under our prices, Essential Water would pay for the fixed costs of the Pipeline; whereas offtake customers would pay the incremental fixed costs associated with their supply.

We determine that WaterNSW and individual offtake customers can, however, enter into unregulated pricing agreements (ie, agree charges that differ from those in this determination).

Table 1.3 Prices for offtake customers from 1 July 2019 ($2018-19) – without inflation

	2019-20[a]	2020-21	2021-22
IPART decision			
Access charge ($/day)	19.81	19.86	19.86
Usage charge ($/kL)[c]	0.20674	0.20906	0.20309
WaterNSW proposal			
Access charge ($/day)[b]	27.21	27.02	27.46
Usage charge ($/ML)	321.27	298.73	251.38
Difference			
Access charge ($/day)	-7.40	-7.16	-7.60
Usage charge ($/kL)	-0.11	-0.09	-0.05
Difference (%)			
Access charge ($/day)	-27.2%	-26.5%	-27.7%
Usage charge ($/kL)	-35.6%	-30.0%	-19.2%

a Calendar year 2020 is a leap year (ie, 2019-20 has 366 days)

b Annuity payment plus contribution to the Pipeline.

c The usage charge per ML is the same as Essential Water and is $206.74/ML in 2019-20, $209.06/ML in 2020-21 and $203.09/ML in 2021-22.

Source: IPART analysis.

1.3 Our process for this review

Our review process has involved extensive investigation and public consultation. We have:

- Invited WaterNSW to make a pricing proposal in June 2018 detailing its proposed prices and expenditure levels for the 2019 determination period.
- Released an Issues Paper in September 2018 to respond to WaterNSW's pricing proposal and assist stakeholders in identifying and understanding the key issues for review.
- Invited stakeholders to make submissions on the Issues Paper and WaterNSW's proposal by October 2018.
- Held a public hearing in Broken Hill in November 2018 to discuss a wide range of issues raised by WaterNSW and other stakeholders.
- Engaged independent consultants to review:
  - WaterNSW's capital expenditure and operating expenditure proposals (excluding proposed energy costs) – Synergies Economic Consulting (Synergies), in association with Beca and
  - WaterNSW's proposed energy purchase costs – Frontier Economics (Frontier).
- Released a Draft Report in April 2019.
- Invited stakeholders to make submissions on the Draft Report April 2019.

- Considered WaterNSW's proposal, stakeholder submissions, the findings of Synergies' expenditure review and Frontier's energy review and our own analysis to make our final decisions, as set out in this Final Report. In making our decisions, we have considered all matters listed under section 15 of *Independent Pricing and Regulatory Tribunal Act 1992* (the IPART Act), which are set out in Appendix B.

Our reports, determinations, factsheets, stakeholder submissions, transcript from the public hearing and consultants' reports relating to this review are available on our website (www.ipart.nsw.gov.au).

1.4 Structure of this report

The following chapters provide more information on this review, and discuss in detail how we reached our decisions and how these compare to WaterNSW's pricing proposal:

- Chapter 2 outlines the key context for the review.
- Chapter 3 discusses our decisions on the length of the determination period and the method we used to calculate WaterNSW's revenue requirement over this period, and summarises our decisions on the revenue requirement.
- Chapters 4 and 5 explain our decisions on two of the key inputs for calculating the revenue requirement – forecast operating expenditure, and historical and forecast capital expenditure to be included in the RAB.
- Chapter 6 outlines our decisions on the remaining components of the revenue requirement – the allowances for return on assets, regulatory depreciation, tax and working capital.
- Chapter 7 discusses our decisions on forecast sales volumes and customer numbers over the determination period.
- Chapter 8 outlines our decisions on output measures and incentive schemes.
- Chapter 9 sets out our decisions on price structures and draft prices for water transportation services.
- Chapter 10 focuses on the implications of our decisions for Essential Water and offtake customers' bills, and for WaterNSW, the environment and general inflation.

Our final decisions are set out in these chapters. For convenience, they are also listed below.

1.5 List of decisions

2 Context for the review

The Pipeline has been constructed by WaterNSW in response to the NSW Government's direction to WaterNSW to secure the water supply of Broken Hill and to construct, operate and maintain a pipeline from the Murray River to deliver low salinity water to the Mica Street Water Treatment Plant in Broken Hill (see Appendix C).[8]

This chapter provides the context within which we set the Pipeline's prices, including the scope of our review.

2.1 This was the first price review for the Pipeline

On 16 June 2016, the NSW Government announced that it would build a 270km pipeline from the Murray River to Broken Hill.[9] The Minister for Regional Water directed WaterNSW, under section 20P of the *State-Owned Corporations Act,* to build a pipeline from the Murray River to the Mica Street Water Treatment Plant in Broken Hill. The pipeline will largely eliminate Essential Water's need to access water from the Menindee Lakes.

WaterNSW contracted a consortium led by John Holland to construct, maintain and operate the Pipeline. The Pipeline is designed to provide up to 37.4 ML/day of raw water to Broken Hill and surrounding communities. This is around 130% of Broken Hill's current peak daily demand, and 270% of its current average daily demand.[10] WaterNSW has also developed a bulk water storage facility, with capacity of 720ML outside of Broken Hill. This capacity is equal to around 25 days of water at Broken Hill's current peak daily demand.

This review is one of four IPART reviews that determine the price of water to customers in the Broken Hill region (see Figure 2.1). The current review set prices that WaterNSW can charge for the *transportation* of water through the Pipeline. Two other (separate) reviews determined prices for the *bulk water* that will be transported through the Pipeline.[11] These prices feed into a fourth review, which sets prices for the *water services* Essential Water provides to customers in the Broken Hill region.[12]

8 NSW Government, Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016, 21 November 2016. Available at: https://www.parliament.nsw.gov.au/la/papers/DBAssets/tabledpaper/webAttachments/70615/Direction%20under%20s%2020P%20of%20the%20State%20Owned%20Corporations%20Act.pdf

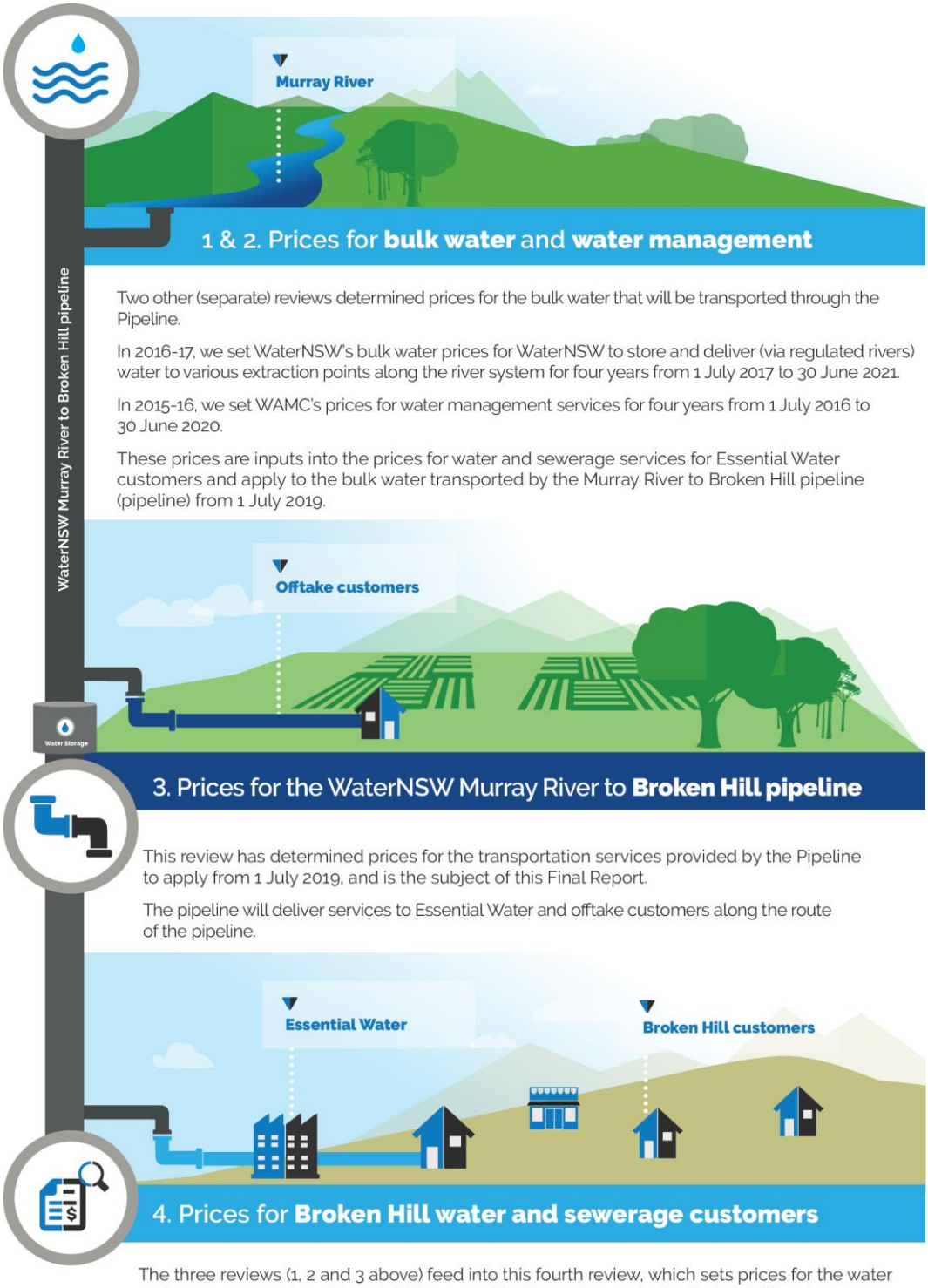
9 NSW Government, New Pipeline to secure Broken Hill water supply, press release, 16 June 2016. Available at: https://www.nsw.gov.au/your-government/the-premier/media-releases-from-the-premier/new-pipeline-to-secure-broken-hill-water-supply/

10 Essential Water annual information return, July 2018. Broken Hill's current peak day's demand for treated and untreated water is around 29 ML/day (highest within the period 2014-18) and average demand is around 14 ML/day (2014-18 period).

11 The 2017 WaterNSW Rural Bulk Water Determination (for the storage and delivery of water to the start of the Pipeline at the Murray River); and the 2016 Water Administration Ministerial Corporation Determination (for water management charges).

12 The 2019 Essential Water Determination. We set Essential Water's usage charge for water with reference to an estimate of the marginal cost of supplying water along the water supply network. This included the opportunity cost of the water allocation (ie, the opportunity cost of consuming water from the Murray River).

Figure 2.1 Setting Broken Hill water prices in 2019



2.2 The scope of our review

We have determined the maximum prices that WaterNSW can charge its customers (ie, Essential Water[13] and offtake customers) for water transportation services provided by the Pipeline. These prices have been set to reflect the prudent and efficient cost of designing, constructing, operating and maintaining the Pipeline to the specifications set out in the NSW Government's directions to WaterNSW.[14]

In determining the total efficient cost, we did not interrogate the decision to build the Pipeline, or to build it to the specifications set out in the NSW Government's directions to WaterNSW. This is because we received a direction under section 16A of the *Independent Pricing and Regulatory Tribunal Act 1992* (the IPART Act), which required us to set prices to reflect the prudent and efficient costs of WaterNSW complying with the Government direction to build the Pipeline (see Appendix C). However, we did assess the processes WaterNSW followed and the decisions it made in the delivery of the Pipeline, to ensure prices reflect the prudent and efficient costs of WaterNSW complying with the Government's direction.

2.2.1 NSW Government contribution for the Murray River to Broken Hill pipeline

Although this review determined the efficient cost of the Pipeline and set WaterNSW's prices to Essential Water and offtake customers, this does not mean that all of these costs have been passed through to Essential Water's customers.

In November 2018, the NSW Government advised us of its decision to subsidise the costs of construction and the efficient operation and maintenance costs of the Pipeline for the next four years, from 2019-20 to 2022-23, to ensure that prices for Essential Water's end use customers do not rise in real terms as a result of the Pipeline.[15] Further, the key issue of what Essential Water's customers in and around Broken Hill can afford to pay has been considered separately as part of our review of Essential Water's prices in Broken Hill.

13 Essential Energy, through its Essential Water business, provides water and other related services to customers in Broken Hill and the surrounding areas of Menindee, Sunset Strip and Silverton.

14 NSW Government directions to WaterNSW are summarised and presented in Appendix C.

15 NSW Government, Letter to the Chair – IPART, 21 November 2018, available at: https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/pricing-reviews-water-services-metro-water-legislative-requirements-prices-for-essential-energys-water-and-sewerage-services-in-broken-hill-from-1-july-2019/letter-from-the-minister-on-the-broken-hill-pipeline.pdf

3 Length of determination and revenue requirement

The first step in our approach for determining prices is to decide on the length of the determination period and the method we will use to calculate how much revenue should be recovered through prices over this period. We then apply this approach to establish the Pipeline's notional revenue requirement (NRR), which reflects our assessment of its efficient costs.

The sections below summarise our decisions, then discusses these decisions in more detail.

3.1 Summary of decisions

For this review, we decided to adopt a 3-year determination period, to align future price reviews for the Pipeline's water transportation services and Essential Water's water services. In addition, we decided to:

- Calculate the NRR by applying our standard building block method, in line with the approach we use in setting other prices for WaterNSW.
- Calculate separate NRRs for the services to Essential Water and to offtake customers, to ensure prices reflect the different rights to transportation services these customers have.

Our NRR and target revenue for Essential Water and for offtake customers are shown on Table 3.1 and Table 3.2, respectively. We set prices to recover target revenue. It is often slightly different to the NRR for a given year within a determination period, as target revenue is frequently set to smooth prices over a determination period. However, we generally set target revenue to equal the NRR in present value terms over the determination period.

Table 3.1 NRR and target revenue for services to Essential Water ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
Operating expenditure allowance	3,397.6	3,509.9	3,461.9	10,369.4
Return on assets	15,346.2	15,165.3	14,974.6	45,486.1
Regulatory depreciation	4,766.9	4,766.9	4,766.9	14,300.7
Return on working capital	161.1	169.2	167.3	497.6
Tax allowance	851.0	810.8	787.0	2,448.8
Total NRR	**24,522.7**	**24,422.1**	**24,157.7**	**73,102.6**
Target revenue	**24,377.8**	**24,385.2**	**24,355.4**	**73,118.4**

Note: Totals may not sum due to rounding

Source: IPART analysis.

Table 3.2 NRR and target revenue for services to offtake customers ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
Operating expenditure allowance	8.6	9.9	8.5	27.0
Return on assets	13.8	13.2	12.7	39.6
Regulatory depreciation	13.9	13.9	13.9	41.6
Return on working capital	0.2	0.2	0.2	0.7
Tax allowance	0.9	0.9	0.9	2.8
Total NRR	**37.4**	**38.1**	**36.2**	**111.7**
Target revenue	**37.3**	**37.4**	**37.1**	**111.7**

Note: We have calculated the allowance for operating expenditure, an element of the building block approach, as energy costs (calculated as the usage price multiplied by forecast volume) plus other non-energy operating costs. Total may not add due to rounding.

Source: IPART analysis.

3.2 Adopt a three-year determination period

We made a decision:

1 To adopt a 3-year determination period from 1 July 2019 to 30 June 2022.

We decided on a 3-year determination period rather than a 4-year period as WaterNSW proposed. WaterNSW proposed a 4-year period on the basis that Essential Water had also proposed a 4-year period,[16] and it considered that the two determination periods should align. It also noted that we have generally adopted a 4-year period for water utilities in recent years.[17]

Although we see benefits in adopting a 4-year determination period, we consider there is a stronger case for aligning the determination periods for the Pipeline and Essential Water. There are strong linkages between the prices set in the Essential Water price review and the prices set in the Pipeline price review. Aligning the reviews would provide end consumers with greater certainty over prices and bill impacts. There are also benefits in conducting joint public consultation for the two reviews. Therefore, because we have made a decision to adopt a 3-year determination period for Essential Water[18], we have also opted for a 3-year period for the Pipeline.

3.3 Calculating the notional revenue requirement

We made a decision:

2 To calculate WaterNSW's notional revenue requirements using our standard building block method.

16 WaterNSW pricing proposal to IPART, July 2018, p 45.
17 We have set 4-year determination periods for our most recent determinations for WaterNSW (rural and greater Sydney) and WAMC.
18 IPART, Review of Essential Energy's prices for water and sewerage services in Broken Hill, July 2019, p 40.

The NRR represents our view of the total efficient costs of providing the Pipeline's water transportation services. In general, we set prices to recover this amount of revenue. For this review, we decided to use our standard 'building block' method to calculate the NRR, in line with the approach we use in setting other prices for WaterNSW.[19]

The building block method involves estimating, for each year of the determination period:

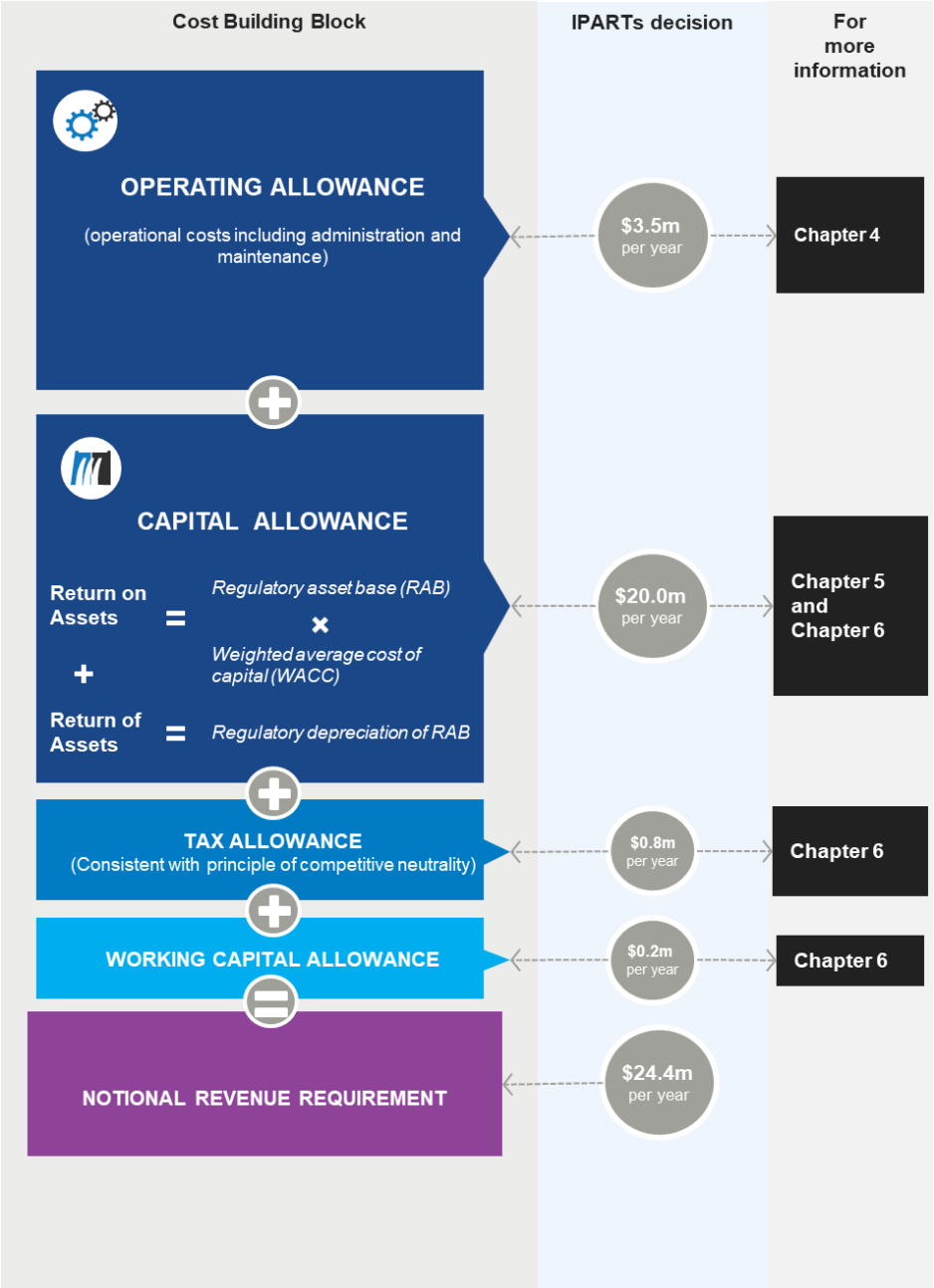
- **An operating expenditure allowance**, which represents our estimate of WaterNSW's forecast efficient operating, maintenance and administration costs.[20]
- **A capital allowance**, which comprises:
  - **A return *on* the assets** WaterNSW uses to provide the water transportation services, or its regulated assets. This is our assessment of the opportunity cost of the capital invested in the Pipeline by its owner, and ensures that WaterNSW can continue to make efficient investments.
  - **A return *of* the assets** WaterNSW uses to provide the water transportation services (or regulatory depreciation). This allowance recognises that capital infrastructure wears out over time. It allows WaterNSW to recover the investment in the regulated asset base (RAB) over the economic life of those assets.
- **A tax allowance**, which reflects the forecast tax liability for a comparable commercial business operating in a competitive market. This allowance ensures prices for regulated services are set in accordance with the principle of competitive neutrality.
- **A working capital allowance**, which represents the holding cost of net current assets and allows WaterNSW to meet its cash flow requirements

As Figure 3.1 illustrates, the sum of these allowances is equal to the NRR.

19 We used the 'building block' approach to set prices in the 2017 WaterNSW Rural price review and the 2016 WaterNSW Greater Sydney price review.

20 For offtake customers, we have calculated the allowance for operating expenditure, as energy costs (calculated as the usage price multiplied by forecast volume) plus other non-energy operating costs.

Figure 3.1 Building block approach to calculating efficient costs and the NRR



Note: The building block components of NRR in the figure above are not to scale and are for illustrative purposes only. Totals may not add due to rounding.

3.4 Calculate separate NRRs for services to Essential Water and to offtake customers

We made a decision:

3 To calculate separate NRRs for services to Essential Water and offtake customers.

We decided to calculate separate NRRs for setting prices for Essential Water and for offtake customers.[21] This is different to WaterNSW's proposal, which did not explicitly ring-fence the costs associated with serving offtake customers for pricing purposes. Instead, it calculated a total Pipeline NRR (Table 3.3) by:

- Calculating the total efficient cost of providing services to both Essential Water and offtake customers using our standard building block model, excluding the offtake assets (ie, those used to transport water from the Pipeline to offtake customers)
- Adding an annuity for the offtake assets, calculated to recover the incremental fixed costs (ie, capital expenditure per offtake customer) over 20 years.[22]

Table 3.3 WaterNSW proposed total NRR ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total	2022-23
Operating and maintenance	5,229.0	5,101.1	4,806.5	15,136.6	5,006.5
Return of capital (depreciation)	5,600.4	5,600.4	5,600.4	16,801.2	5,600.7
Return on capital	19,275.8	19,045.4	18,804.7	57,125.9	18,565.0
Working capital allowance	136.4	143.1	141.5	421.0	140.6
Tax allowance	1,087.1	1,115.8	1,140.8	3,343.7	1,165.0
Annuity for offtakes[a]	**14.6**	**14.6**	**14.6**	**43.8**	**14.6**
Total costs	**31,343.2**	**31,020.5**	**30,508.4**	**92,872.1**	**30,492.4**

a Refers to the forecast annuity payments for offtake assets. The annuity is used to compute the fixed charge to recover the capital costs associated with each offtake outlet. The annuity has been applied to two offtake outlets.

Note: Totals may not add due to rounding.

Source: WaterNSW's pricing proposal to IPART, July 2018, p 49.

We have made a decision to set prices for offtake customers to recover the incremental costs of providing services to these customers. We have set usage charges to offtake customers to reflect the efficient cost of energy to transport water through the Pipeline.[23] We have allocated fixed costs between Essential Water and offtake customers on the basis of each party's contribution to the need to incur the cost of the Pipeline. The Pipeline was built (and designed) to supply Essential Water (and its customers in Broken Hill) – as reflected in Essential Water's guaranteed right to the Pipeline's transportation services, whereas offtake customers do not have such a guaranteed right. On this basis, under our prices, Essential Water would pay for the fixed costs of the Pipeline; whereas Offtake customers would pay the incremental fixed costs associated with their supply.

To enable this, we decided to calculate a separate NRR for services to offtake customers. This involves ring-fencing all costs (operating and capital costs) incurred by WaterNSW to service offtake customers from costs incurred to service Essential Water.

We consider that this approach appropriately captures the total efficient cost of providing water transportation services to offtake customers. It also facilitates transparency in our

21 WaterNSW's proposal includes prices charged to a small number of customers along the route of the pipeline who are local pastoralist (offtake customers). They will be able to receive raw water through offtakes in the pipeline installed close to their properties. This review sets the maximum prices to Essential Water and offtake customers.

22 20 years is the period over which WaterNSW considers the offtakes can be expected to be revenue generating assets.

23 We decided to apply the same usage price calculated for EW for offtake customers.

pricing methodology and mitigates the risk of any cross-subsidisation between the prices charged to Essential Water and offtake customers.

3.5 NRR and target revenue for services to Essential Water

We made a decision:

4 To set the NRR and target revenue for providing services to Essential Water as shown in Table 3.1.

Our NRR for services to Essential Water is $73.1 million over the total determination period. This is:

- $12.0 million (14.1%) lower than our Draft Report NRR of $85.1 million.
- $19.7 million (21.2%) lower than WaterNSW's proposed NRR of $92.8 million (excluding the operating expenditure it included for services to offtake customers).

Table 3.4 NRR compared to WaterNSW's proposed NRR for services to Essential Water, 2019-20 to 2021-22 ($2018-19, $'000)

	IPART decision	WaterNSW proposed	Difference	Difference (%)
Operating expenditure allowance	10,369.4	15,109.3	-4,739.9	-31.4%
Return of assets (regulatory depreciation)	14,300.7	16,801.1	-2,500.4	-14.9%
Return on assets	45,486.1	57,125.9	-11,639.8	-20.4%
Return on working capital	497.6	421.1	76.5	18.2%
Tax allowance	2,448.8	3,343.6	-894.8	-26.8%
Total NRR	**73,102.6**	92,800.9	-19,698.4	-21.2%

Note: For comparison purposes we have taken out costs associated with offtake customers, except for the asset replacement costs associated with the land swap offtake that is included in the Pipeline RAB. In WaterNSW's pricing proposal it included a single NRR equal to the sum of the costs associated with servicing Essential Water and offtake customers. Totals may not add due to rounding.

Source: WaterNSW pricing proposal to IPART, July 2018, p 49; IPART analysis.

3.5.1 Comparison with our Draft Report

Our NRR of $73.1 million is $12.0 million (14.1%) lower than our Draft Report over the 2019 determination period. This is due to a combination of:

- Higher operating expenditure (+0.2 million), due to higher energy costs
- Lower return on capital (-$9.4 million), due to a lower RAB, a lower WACC and lower inflation, and
- Lower regulatory depreciation (-$2.1 million), arising from the lower opening RAB.

These changes are discussed further in Chapters 4 to 6.

3.5.2 Comparison with WaterNSW's proposal

Our NRR of $73.1 million is $19.7 million (21.2%) lower than WaterNSW's proposal over the 2019 determination period. This is due to a combination of:

- Lower operating expenditure allowance, which is mainly due to lower energy costs
- Lower capital allowance, which is mainly due to our:
  - Lower WACC of 4.0% compared with WaterNSW's proposed WACC of 4.3%
  - Lower opening RAB value ($391 million). This is $67 million lower than the initial forecast of $458 million contained in WaterNSW's pricing proposal, largely due to WaterNSW's actual project costs coming in below initial forecasts contained in WaterNSW's pricing proposal.[24]
  - Longer pipeline asset life (100 years compared to 80 years), and
  - Lower tax allowance due to a lower tax rate and NRR.

Chapters 4, 5 and 6 discuss our estimates of the operating expenditure and capital allowances in more detail.

We have decided to set the target revenue so as to smooth the daily access charges to Essential Water over the 2019 determination period (Table 3.1).

We have set the target revenue so that, over the 2019 determination period, the present value of the target revenue equals the present value of the NRR. While the target revenue can be higher than the NRR in some years and lower in other years, Essential Water and WaterNSW are no better or worse off over the whole determination period (in present value terms).

3.6 NRR and target revenue for services to offtake customers

We made a decision:

5 To set the NRR and target revenue for services to offtake customers as shown in Table 3.2.

We have used our standard building block method to calculate a NRR for offtake customers. That is, we identified and separated the operating and capital costs associated with servicing these customers.

Our NRR for services to offtake customers is $0.1 million over the total determination period. This is:

- 1.5% lower than our Draft NRR.
- 10.5% lower than the NRR we have estimated based on the costs to service offtake customers identified in WaterNSW's proposal (shown in Table 3.5).

24 WaterNSW provided updated cost data in its submission to our Draft Report.

Table 3.5 NRR compared to WaterNSW's proposal for four offtakes, 2019-20 to 2021-22 ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
IPART decision	**37.4**	**38.1**	**36.2**	**111.7**
IPART draft decision	37.9	38.7	36.8	113.4
WaterNSW proposed [b,c]	42.5	42.7	39.7	124.8
Difference	-5.1	-4.6	-3.5	-13.2
Difference (%)	-12.0%	-10.7%	-8.8%	-10.5%

a In our published Draft Report we calculated the NRR based on 3 offtake assets. We increased this to four offtake assets for this Final Report (more detail in Chapter 6). To make a meaningful NRR comparison, we have compared our Draft and Final NRR's in this table based on four offtake assets.

b In its proposal, WaterNSW included an annuity payment for two of the three offtakes because it proposes to provide one offtake free of charge in exchange for land. We have included an annuity payment for all four offtakes for illustrative purposes.

c Annuity, variable electricity charges for offtakes and offtake-related asset replacement costs for four offtakes.

Note: Totals may not add due to rounding.

Source: WaterNSW pricing proposal to IPART, July 2018, pp 49 and 73; WaterNSW information return to IPART; IPART analysis

3.6.1 Comparison with our Draft Report

Our NRR of $0.1 million is 1.5% lower than our Draft Report over the 2019 determination period. Similar to the NRR for Essential Water, we have lowered the WACC and inflation, and increased the efficient energy cost from our Draft Report. These changes are discussed further in Chapters 4 to 6.

3.6.2 Comparison with WaterNSW's proposal

Our NRR of $0.1 million is 10.5% lower than our estimate of the efficient costs of servicing offtake customers in WaterNSW's proposal over the 2019 determination period.

For comparison purposes, we have identified the cost per offtake[25] from the information provided in WaterNSW's proposal. We then multiplied this by four, to be consistent with our decision to include four offtake assets to calculate our NRR to be recovered from offtake customer prices. We note that this does not reflect the prices proposed by WaterNSW for offtake customers, which includes a contribution to the fixed capital costs of the Pipeline itself. The difference between the two NRRs mainly reflects our decision to use a 25 year asset life for offtake assets instead of WaterNSW's proposed 20-year annuity approach to recover capital costs. Chapter 9 discusses our approach to setting prices for offtake customers in more detail.

We have decided to set the target revenue so that it smooths the daily access charges to offtake customers over the 2019 determination period (Table 3.2).

We have set the target revenue so that, over the 2019 determination period, the present value of the target revenue equals the present value of the NRR. While the target revenue can be higher than the NRR in some years and lower in other years, offtake customers and WaterNSW are no better or worse off over the determination period (in present value terms).

25 From the information provided in WaterNSW's pricing proposal, we have included the offtake-related asset replacement costs, electricity costs and the annuity cost of the offtake asset as the cost of servicing offtake assets.

4 Operating expenditure allowance

As Chapter 3 noted, the operating expenditure allowance in the NRR represents our estimate of the forecast efficient level of operating, maintenance and administration costs WaterNSW will incur in providing water transportation services to Essential Water and offtake customers over the 3-year determination period. These costs comprise:

- The fixed operating and maintaining costs it will incur under the Pipeline Operating and Maintenance (O&M) Contract
- Corporate overhead costs associated with the Pipeline
- Other operating costs associated with the Pipeline, and
- The energy costs of pumping water up the Pipeline.

In reaching our decisions, we considered WaterNSW's proposal for each of these cost components, its submission to our Draft Report and our review process, as well as comments on operating expenditure in other stakeholders' submissions. We also considered advice from our consultants – Synergies Economic Consulting (Synergies) who we engaged to review WaterNSW's submission on operating expenditure and recommend an efficient level of operating costs; and Frontier Economics (Frontier) who we engaged for advice on the energy cost component of the Pipeline's operating costs.

The sections below summarise our decisions on the operating expenditure allowance, then discuss each of these decisions in more detail.

4.1 Summary of decisions on the operating expenditure allowance

Table 4.1 sets out our operating expenditure allowances and compares them to WaterNSW's proposed allowance.

Table 4.1 Operating expenditure allowance for services to Essential Water and offtake customers ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
WaterNSW proposed – All services	5,232.4	5,104.9	4,809.2	15,146.4
IPART decision – services to Essential Water[a]	**3,397.6**	**3,509.9**	**3,461.9**	**10,369.4**
IPART decision – services to offtake customers	**8.6**	**9.9**	**8.5**	**27.0**

a The operating expenditure allowance for services to Essential Water includes asset replacement costs for the offtake that was built as part of the land-swap agreement. See Box 6.1 for further details regarding how we've accounted for this offtake.

Source: Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 11

The allowance for services to Essential Water reflects our decision to:

- **Accept the proposed O&M contract costs**, in line with Synergies' advice that these costs were efficient.
- **Not accept the proposed corporate overhead costs** and set these costs around 37% of that proposed, in line with Synergies' advice on the efficient level of these costs.
- **Accept the other proposed operating costs**, in line with Synergies' advice that these costs are efficient.
- **Not accept the proposed energy costs and cost past-through mechanism**, based on our view that they do not create appropriate incentives for WaterNSW to improve the efficiency of its energy costs. Instead, we set the energy cost allowance to reflect our estimates of the Pipeline's efficient energy costs over the determination period. These estimates are based on benchmark energy volumes and benchmark energy unit prices developed by our consultants.

Our energy cost allowance is around 50% lower than WaterNSW proposed over the three years to 2021-22.

The allowance for services to offtake customers reflects our decisions to:

- **Accept WaterNSW's proposed non-energy operating costs** for these services, in line with Synergies' advice that they are efficient.
- **Calculate the total efficient energy costs** using:
  - the same benchmark variable energy volume as for Essential Water (as the energy volume required to provide for services to offtake customers will be incidental to the volume required for Essential Water and is difficult to forecast), and
  - the same variable energy unit price as for Essential Water (for simplicity).

4.2 Accept proposed operation and maintenance (O&M) contract costs

We made a decision:

6 To include the fixed O&M Contract costs, shown in Table 4.2, in the operating expenditure allowance for services to Essential Water.

Table 4.2 O&M contract costs included in operating expenditure allowance to Essential Water ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
WaterNSW proposed	1,595.7	1,597.2	1,586.8	4,779.7
IPART decision	**1,595.7**	**1,597.2**	**1,586.8**	**4,779.7**

Source: Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 11.

We accepted WaterNSW's proposed O&M contract costs.

Synergies' review of WaterNSW's proposed operating expenditure allowance found the O&M contract requirements were prudent and resulted in efficient costs. It also found that the

procurement process used to select the contractor was prudent and generated sufficient competitive tension to result in efficient fixed O&M costs for the Pipeline.[26] On this basis, we decided to include these proposed costs in the operating expenditure allowance of the NRR.

4.3 Not accept proposed corporate overhead costs

We made a decision:

7 To include the corporate overhead costs shown in Table 4.3 in the operating expenditure allowance for services to Essential Water.

Table 4.3 Corporate overhead costs included in operating expenditure allowance for Essential Water ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
WaterNSW proposed	475.4	463.7	437.0	1,375.1
IPART decision	**104.0**	**204.0**	**204.0**	**512.0**

Source: IPART analysis. Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 12.

Our decision on corporate overhead costs is around 63% lower than WaterNSW's proposed costs.

Synergies' assessment of WaterNSW's proposed corporate overhead costs found that these costs were not efficient. Based on industry knowledge and external benchmarking, it recommended that an annual average of $104,000 is efficient. However, it also recommended an additional $100,000 be included in the final two years of the determination period, in recognition of the additional one-off costs WaterNSW will incur in preparing its Pipeline pricing proposal for the next determination period.[27] We accepted Synergies' advice.

4.4 Accept proposed other operating costs

We made a decision:

8 To include the Special Purpose Vehicle (SPV) audit, contract management and insurance and land tax costs, shown in Table 4.4, in the operating expenditure allowance for services to Essential Water in line with WaterNSW's proposal.

We accepted WaterNSW's proposed other operating costs.

WaterNSW has established a Special Purpose Vehicle (SPV)[28] to construct, operate and maintain the Pipeline, and to ring-fence costs and responsibility for the Pipeline. It proposed that the SPV operating cost, including audit, contract management and insurance and land

26 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 104.

27 Synergies' recommended on additional overhead cost for preparing the pricing submission for the next determination in 2012-22 and 2022-23, based on an assumed 4-year determination period. As we have made a decision to adopt a 3-year period, we have adjusted its recommendation accordingly.

28 The SPV is a wholly owned proprietary company limited by shares under the Corporations Act 2001 (Cth).

tax costs of $451,400, be included in the operating expenditure allowance.[29] Synergies found that these costs are efficient.[30]

We have decided to include WaterNSW's proposed SPV costs in the operating expenditure allowance for services to Essential Water.

Table 4.4 Other operating costs included in operating expenditure allowance for services to Essential Water ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
SPV audit				
WaterNSW proposed	100.0	100.0	100.0	300.0
IPART decision	**100.0**	**100.0**	**100.0**	**300.0**
SPV contract management				
WaterNSW proposed	220.0	220.0	220.0	660.0
IPART decision	**220.0**	**220.0**	**220.0**	**660.0**
SPV insurance and land tax				
WaterNSW proposed	131.4	131.4	131.4	394.2
IPART decision	**131.4**	**131.4**	**131.4**	**394.2**

Source: Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 11.

4.5 Not accept proposed cost pass-through of actual energy prices

We decided to not accept WaterNSW's proposed pass-through of actual energy prices. In our view, actual costs should only be passed through in exceptional circumstances. The criteria we use to define these circumstances are listed in Box 4.1.

Box 4.1 Criteria for cost pass-through mechanism

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

1. There is a trigger event (to activate the cost pass-through), which can be clearly defined and identified in the price determination.
2. 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[a]
3. The resulting cost is assessed to exceed a materiality threshold.
4. The regulated business cannot influence the likelihood of the trigger event or the resulting cost.
5. 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).
6. It is clear that the cost pass-through will result in prices that better reflect the efficient cost of service.

a The costs to be passed through must be specified in the price determination.

29 WaterNSW pricing proposal to IPART, June 2018, Table 27.
30 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 126.

We found that the Pipeline's energy costs do not meet these criteria. For example, they do not meet criterion 4 and 6, as the regulated business (or in this case, its O&M contractor) can influence the resulting cost through its tender process and the resultant prices from a pass-through may not necessarily better reflect the efficient cost of service.

In a submission to our Draft Report[31], WaterNSW submitted that:

> IPART's criterion 4 for cost pass through seeks to ensure that the regulated business cannot influence the likelihood of the trigger event or the resulting cost. In this case, energy is needed for the pipeline, it is not an optional expense. The cost has been determined through an efficient procurement process. WaterNSW has no influence over the resulting cost.
>
> IPART's criterion 6 for cost pass through requires clarity that the cost pass-through will result in prices that better reflect the efficient cost of service. Actual prices obtained through an efficient procurement process best reflect efficient costs. WaterNSW is of the view that contracted retail prices should be used rather than "modelled" prices.
>
> IPART's proposal would see WaterNSW bear cost increases triggered by a 'regulatory change' event. For example, energy prices could increase due to changes to emission targets or through the introducing of new mechanisms to price carbon. WaterNSW submits that IPART should allow actual energy costs to be passed through to customer bills to allow the cost or savings triggered by a regulatory change events to be passed through to customers.

While we are open to allowing cost pass-throughs under the right circumstances, we do not agree with WaterNSW's comments regarding our draft decision. Specifically:

- On WaterNSW's first point, whilst we acknowledge that the procurement process was found to be efficient by our expenditure review consultant, we do not agree that WaterNSW has no influence over the resulting cost of energy. WaterNSW has some ability to influence these processes. Therefore, a cost pass-through that shifts 100% of these risks onto customers may remove WaterNSW's incentive to actively engage in these processes and may lead to less efficient outcomes.
  - In addition, Essential Water submitted that setting placeholder prices for 2021-22 and then adjusting for actual prices via a pass-through mechanism would not be appropriate. In its view, the risk from price changes arising from a new power supply agreement (PSA) should be shared between it and WaterNSW.
- On WaterNSW's second point, we consider that by linking the energy cost allowance to the actual energy costs, a cost pass-through would reduce the incentives for WaterNSW and its O&M contractor to efficiently manage the Pipeline's actual energy costs now and in the future.

31 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 6.

- On WaterNSW's third point, the cost of unforeseen events (including an unforeseen regulatory change event) may be incurred by both the regulated business and its customers. Our 3-year determination period for the Pipeline means that WaterNSW is potentially exposed to up to 3-years of cost changes (positive or negative) resulting from an unforeseen event. At the next price review, cost changes are assessed and, if prudent to pass through to customers, these cost changes are factored into prices going forward.

Our final decision is to not provide a cost pass-through mechanism for actual energy prices in the Pipeline's 2019 determination. Our criteria for cost pass-through mechanisms reflect our views on the efficient allocation of risk between regulated businesses and customers.

4.6 Benchmarked energy volumes and energy costs

We made a decision:

9 To not accept WaterNSW's proposed energy cost allowance and to instead benchmark the efficient energy volumes and energy costs of the Pipeline. Our decision on energy costs included in the operating expenditure allowance for services to Essential Water is shown in Table 4.5. Our decision on energy costs included in the operating expenditure allowance for services to offtake customers is shown in Table 4.6.

Table 4.5 Energy costs included in operating expenditure allowance for Essential Water ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
WaterNSW proposed	2,696.6	2,578.7	2,323.5	7,598.7
IPART				
Total energy costs	**1,246.4**	**1,257.0**	**1,219.6**	**3,722.9**
Fixed energy costs	336.6	339.7	332.1	1,008.4
Variable energy costs	909.8	917.2	887.5	2,714.5

Source: IPART analysis. WaterNSW pricing proposal to IPART, June 2018, Table 27.

Table 4.6 Energy costs included in operating expenditure allowance for offtake customers ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
WaterNSW proposed	12.9	11.9	10.1	34.9
IPART	**8.3**	**8.4**	**8.1**	**24.8**

Source: IPART analysis. WaterNSW pricing proposal to IPART, June 2018, Table 27.

WaterNSW proposed energy costs of $7.6 million over the three years to 2021-22, or an average of $2.5 million per year. This represents around half of WaterNSW's proposed operating expenditure allowance for the Pipeline.[32]

32 WaterNSW pricing proposal to IPART, June 2018, Table 27.

WaterNSW's proposed costs were based on:

- The prices it would pay for electricity in 2019-20 and 2020-21 under its O&M contractor's negotiated PSA prices
- Placeholder prices for 2021-22 and 2022-23, until its actual prices for these years are known (after the tender process for a new PSA is completed, before the end of the current PSA)
- Its proposed variable energy volume per ML of water pumped, and a proposed maximum energy demand (constant throughout the 3-year determination period).[33]

We considered the merits of this proposal, our consultants' advice based on their reviews of the proposal, and stakeholders' comments.

We decided not to accept WaterNSW's proposed energy volumes and energy prices, based on our expert consultants recommended benchmark energy volumes and energy unit prices. We also prefer to split energy costs into fixed and variable cost components (where the variable cost depends on the amount of water the Pipeline is required to pump per day to meet Essential Water's water demand, and the fixed costs reflect the cost of operating the Pipeline irrespective of whether water is being pumped). This enables these costs to be recovered through cost-reflective fixed and variable charges (ie, access and usage charges).

We have estimated the efficient energy costs to be included in the operating expenditure allowance using the following approach:

- Calculating the fixed cost component and the variable cost components for three water demand scenarios (low, median and high demand), based on multiplying the:
  - benchmark energy volumes estimated by Synergies and adjusted by IPART, by[34]
  - benchmark energy unit prices estimated by Frontier.
- Setting the efficient energy costs as the fixed component plus the weighted average variable component under the median water demand scenario.

We consider this approach results in more cost-reflective prices, which provide appropriate incentives for WaterNSW to improve the efficiency of the Pipeline's energy costs.

This section of the chapter outlines:

- How we estimated the benchmark energy volumes, including fixed, variable and maximum energy volumes
- How the benchmark energy volumes were used to calculate total benchmark energy volumes for three water demand scenarios

33 WaterNSW revised its proposed energy volumes and maximum energy demand during the efficiency review process (see Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, *Final Report*, January 2019, footnote 51 on p 116). The proposed costs in its pricing submission to IPART are based on these numbers.

34 We accepted Synergies estimates of the benchmark total energy volume for each scenario but adjusted them to reflect changes we made to the water demand scenarios. These changes stemmed from our decision on Essential Water's forecast demand for water, made as part of our separate review of Essential Water's prices.

- How the total benchmark energy volumes were used to calculate benchmark energy unit prices and energy costs, and
- Our decision to use the weighted average variable energy unit cost under the median water demand scenario.

4.6.1 Estimating benchmark energy volumes

To derive the benchmark energy volumes, Synergies and its engineering partner Beca (Synergies/Beca) assessed the efficiency of WaterNSW's proposed energy volumes. Based on this assessment, they recommended the efficient:

1. Fixed energy volume required to operate the Pipeline. This is the 'base' amount of energy required each day, regardless of whether or how much water is being pumped to meet Essential Water's water demand.
2. Variable energy volume required to pump each ML of water transported via the Pipeline to meet Essential Water's demand.
3. Maximum energy volume required when the pumps are operating at full capacity.

Synergies then used these recommended volumes to calculate the total benchmark energy volumes required by the Pipeline over the determination period under the three water demand scenarios we provided.

The following sections outline:

- The steps taken to derive these volumes (fixed, variable and maximum energy volumes)
- How we applied these three energy volumes to high, median and low water demand scenarios, and
- How we estimated the benchmark energy unit price and total efficient energy costs.

Fixed energy volume

WaterNSW did not initially propose a specific fixed daily energy volume for the Pipeline[35], although we understand that fixed load costs were included in WaterNSW's proposed electricity costs[36]. Synergies/Beca recommended a benchmark efficient fixed energy volume on the following basis:

- WaterNSW later proposed a specific fixed energy requirement (see footnote 35).
- Synergies/Beca sought to verify WaterNSW's estimate by verifying load lists for the Pipeline's assets.
- Synergies/Beca estimated an efficient benchmark, allowing for intermittent operations of some of the loads. This led it to a significantly lower fixed energy demand estimate.[37]

35 WaterNSW provided an estimate of the fixed daily energy volume of for the Pipeline in a memo to IPART, 11 December 2018.

36 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, pp 23-24.

37 Synergies/Beca, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, January 2019, p 117.

Variable energy volume

We consider WaterNSW's revised proposal for variable energy volume is efficient. This is based on our assessment informed by recommendations from our consultants Synergies/Beca.

We, along with Synergies/Beca, assessed the efficiency of WaterNSW's proposal using:

- A bottom up approach to estimate the variable energy required to pump water
- The Pipeline specifications described in the tender document, and
- Adjusted for the risk factors WaterNSW included in its proposal.[38]

Our resulting estimate of variable energy volume was not materially different to WaterNSW's revised proposal. On this basis, Synergies/Beca recommended that WaterNSW's later proposed variable energy volume be accepted as efficient. We have accepted this recommendation.

Synergies/Beca noted that energy demand estimates for the Pipeline are modelled outputs and there is likely to be a large number of variables that are subject to some degree of uncertainty, whose true value will not be known until the Pipeline has been in operation for some time.[39]

Maximum energy volume

WaterNSW proposed a revised maximum energy volume over the determination period (revised from the O&M Contract).[40]

Synergies/Beca undertook a top-down assessment and assessed the process WaterNSW used to derive the revised proposal and found it to be reasonable. Given it had also assessed WaterNSW's revised proposed variable energy volume as efficient, it also recommended that the proposed maximum volume be accepted as efficient.[41]

4.6.2 Calculating total benchmark energy volumes for three water demand scenarios

To determine our total benchmark energy volumes, we applied the fixed, variable and maximum energy to three water demand scenarios, low, median and high demand, detailed in Box 4.2.

---

38 WaterNSW's revised proposed variable energy volume factored in allowances for risks including:
- A safety margin of 5% to allow for additional energy losses (other than friction) or changes in elevation that may become apparent as the actual build progresses.
- A contingency which comprises a risk margin for inefficiencies in pumping relative to theoretical values.

WaterNSW had previously allowed for evaporation in the form of a risk contingency to the variable energy demand. However, in its submission to our Draft Report, WaterNSW submitted that, based on updated technical analysis and final construction of the Bulk Water Storage (BWS), evaporative losses were higher than the previously allocated risk contingency and provided updated estimates of evaporative losses (ML pa).

39 Synergies/Beca, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, January 2019, p 116.

40 WaterNSW's pricing submission originally proposed a higher constant maximum energy volume. However, following discussions with Synergies/Beca it later submitted a revised maximum energy volume.

41 Synergies/Beca, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, January 2019, p 118.

In a submission to our Draft Report, WaterNSW submitted that under the Raw Water Supply Agreement between WaterNSW and Essential Energy, Essential Energy is required to take at least 8ML of water per day from the Pipeline, or 2,920ML in a 365 day year. WaterNSW also posited that it would be highly unlikely that Essential Energy would only take the minimum contracted volume for an entire year due to operational and climatic variability throughout the year and that a 10% premium would need to be added to the 2,920ML to account for these factors, producing a minimum scenario of 3,212ML.[42]

However, we were not provided with evidence substantiating the minimum water take of 8ML agreed between Essential Energy and WaterNSW and the additional 10% premium suggested by WaterNSW. We have decided there is not sufficient evidence for us to deviate from our draft decision on the three water demand scenarios.

WaterNSW also submitted that its treatment of the Pipeline's evaporative losses has been updated to take account of the final construction of the Bulk Water Storage (BWS). WaterNSW provided estimates of the evaporative losses in each year of the determination, which we have used to estimate the volume of water required to be pumped up the Pipeline to meet expected demand.

Our decision on the benchmark volumes for the three water demand scenarios is shown in Table 4.7.

Table 4.7 Benchmark energy volumes for three water demand scenarios[a]

	2019-20	2020-21	2021-22
Days in year	366	365	365
Low demand (high rainfall) scenario (ML)	**2,651**	**2,636**	**2,619**
Water demand (ML)	2,282	2,268	2,251
Evaporative losses (ML)	369	368	368
Median demand (median rainfall) scenario (ML)	**4,810**	**4,795**	**4,778**
Water demand (ML)	4,401	4,387	4,370
Evaporative losses (ML)	409	408	408
High demand (low rainfall) scenario (ML)	**6,741**	**6,726**	**6,709**
Water demand (ML)	6,249	6,236	6,219
Evaporative losses (ML)	491	490	490
Benchmark total energy volume for each scenario			
Low demand (high rainfall) (MWh)	6,675	6,653	6,624
Median demand (median rainfall) (MWh)	10,213	10,191	10,163
High demand (low rainfall) (MWh)	13,495	13,392	13,325

a We accepted Synergies estimates of benchmark energy volumes but adjusted them to reflect:

- changes we made to the water demand scenarios, which stemmed from our decision on Essential Water's forecast demand of water including real water losses, made as part of our separate review of Essential Water's prices, and
- our revised treatment of evaporative losses based on updated information from WaterNSW (see footnote 38).

Source: IPART calculations.

42 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 7.

Box 4.2 Water demand scenarios

To calculate the benchmark energy volumes and unit prices, we provided our consultants with three scenarios for Essential Water:

1. High demand (low rainfall): high demand for water from the Pipeline. In years of low rainfall, a higher portion of Broken Hill's water demand will be met by the Pipeline because Essential Water will collect less water within its own catchment.
2. Median demand (median rainfall): median demand for water from the Pipeline.
3. Low demand (high rainfall): low demand for water from the Pipeline. In years of high rainfall, a smaller portion of Broken Hill's water demand will be met by the Pipeline because Essential Water will collect water within its own catchment.

These scenarios account for our revised treatment of evaporative losses of the Pipeline (see footnote 38) and are consistent with our consideration of the impact of rainfall on Essential Water's own storages in our forecasts of water demand from the Pipeline, discussed further in Chapter 7.

In response to WaterNSW's comment in its submission to our Draft Report, our methodology calculates estimates based on the net amount of water pumped out of Essential Water's storages, and not historical rainfall.

We estimate Essential Water's demand from the Pipeline would be 72% of its total customer demand in a median rainfall year, 36% in a low demand year and 100% in a high demand year. This is in line with our analysis in our concurrent review of Essential Water.

Source: IPART analysis.

We have calculated the total energy volumes for services to Essential Water, in each year of the determination period, using the approach summarised by formula 7:[43]

(7) $TE_t = FE_t + VE_t$

Where:

$TE_t = Total\ energy\ volume\ to\ supply\ Essential\ Water$

$FE_t = efficient\ fixed\ energy\ per\ day\ (FE_{pd}) \times number\ of\ days\ in\ year\ t\ (days_t)$, or

$FE_t = FE_{pd} \times days_t$ c

$VE_t = efficient\ variable\ energy\ per\ ML\ (VE_{ML}) \times ML\ of\ water\ demanded\ in\ year\ t\ (D_t)$, or

$VE_t = VE_{ML} \times D_t$

IPART's calculation of a weekly load profile for the Pipeline

To enable Frontier to calculate the benchmark energy unit prices, we converted our benchmark total energy volumes[44] (shown in Table 4.7) into a weekly pumping profile for the Pipeline. This pumping pattern does not match water demand, which follows a highly

43 See Synergies/Beca, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, January 2019, pp 119-120.

44 The benchmark total energy volumes are the summation of the total fixed energy and total variable energy volumes, based on Synergies recommended fixed and variable benchmark energy volumes.

seasonal pattern. However, our analysis showed that by utilising the Bulk Water Storage (BWS), the Pipeline operator can handle the peak and troughs of water demand without pumping in a matching manner.

Figure 4.1 shows the volume of the BWS under the low, median and high demand scenarios, demonstrating that the Pipeline operator could operate effectively with a largely smoothed pumping profile without overfilling or emptying the BWS.[45] It is efficient for the operator to pump in a smoothed pattern, as this will enable them to optimise off-peak pumping by pumping water during low demand seasons to compensate for the higher demand of summer. The smoothed pumping profile reflects the maximum volume of water able to be pumped in off-peak in any given week of 104.63 ML.

In a submission to our Draft Report, WaterNSW submitted that the pumping profile should take into account contingency levels and incorporate contracted and practical operating requirements imposed on the operator[46] including:

- the operating requirements of the BWS includes a mandatory reserve that cannot be utilised by the Pipeline operator to supply water to Essential Water
- the Pipeline operator's decision to set aside a further contingency for unplanned maintenance and blackouts, and
- the implications of assuming 100% availability of the Pipeline for pumping during off-peak hours.

Given there has been significant redundancy built into the design and operation of the Pipeline,[47] we have only recognised the need to ensure that de-watering of the BWS ponds do not occur and decided to establish a minimum 'floor' in our final pumping profile which water levels do not drop below. We have not regarded the further contingency held by the operator to be mandatory as that is a commercial decision made by the operator and is not a requirement of the design of the Pipeline. We have also maintained our decision to assume 100% availability of the Pipeline during off-peak hours. We understand the Pipeline design specifications used in the procurement process indicated the Pipeline is to be largely operated during off-peak hours to minimise energy costs. Our expenditure review consultants assessed the procurement process for the O&M contract and found the fixed price emerging from the O&M contract in relation to the operation of the Pipeline to be prudent and largely efficient.[48]

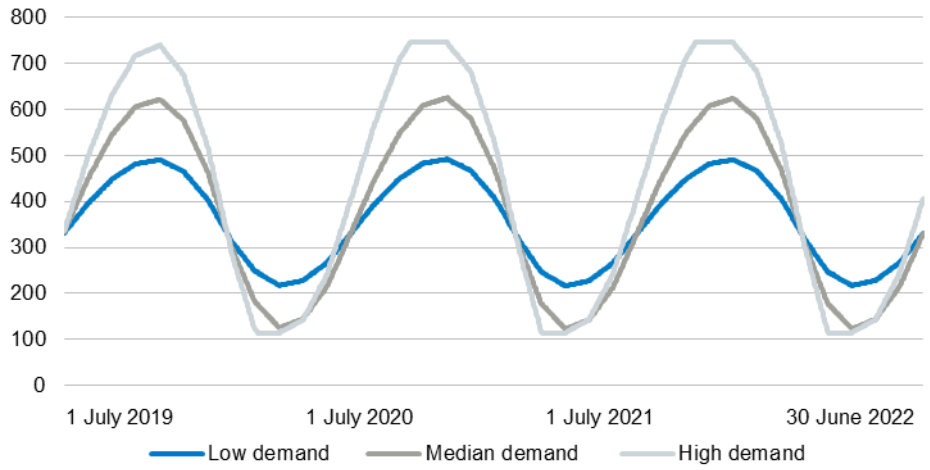
45 Under the high water demand scenario, there are times when more or less water is required to be pumped to prevent water levels from dropping too low (below a minimum floor) or overfilling the BWS, and this is reflected in our final pumping profile.

46 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, pp 8-10.

47 Our understanding, based on tender design documentation received from WaterNSW, is that the design of the pumping stations of the Pipeline ensures reliability of water from the Pipeline. There are four pumps in total at both high head pump stations, designed to be operated in a 3-1 duty standby mode. Each of the four pumps is capable of handling 50% of the Pipeline's overall capacity.

48 Synergies/Beca, Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline, January 2019, p 4.

Figure 4.1 Bulk Water Storage volume assuming constant pumping profile under different rainfall scenarios



Data source: Frontier Economics, *Review of WaterNSW and Essential Energy's Water Forecasts*, December 2018; and IPART calculations.

4.6.3 Calculating benchmark energy unit prices and energy costs

We have calculated the benchmark energy unit price by estimating the efficient costs that an electricity retailer would face in supplying electricity to WaterNSW for the Pipeline and producing unit energy costs for each electricity cost component.

This is based on final recommendations by our consultant, Frontier.[49] We have accepted Frontier's methodology for calculating the benchmark energy unit price because it takes into account the impact of all the cost components of supplying energy, and how these components relate to the specific load profile of the Pipeline in a given period.

Two key drivers of our estimated efficient costs are the assumed electricity load of the Pipeline, and the assumed demand for water from the Pipeline. To estimate these costs, Frontier used:

- The three water demand scenarios that we provided (see Box 4.2).
- Our calculation of a weekly load profile, then derived an optimised half hourly load profile for each week from 1 July 2019 to 30 June 2022.

It then forecast the costs based on an optimised half-hourly load profile under each scenario, by separately estimating and summing the cost components that an electricity retailer would incur in supplying electricity.[50]

49 We asked Frontier to advise us on the efficient load profile for the Pipeline, and to provide recommendations on the efficient benchmark energy price over each year of the 2019 determination period based on our final pumping profile – see Frontier Economics, *WaterNSW's Energy Purchase Costs – Broken Hill Pipeline*, May 2019.

50 These include wholesale electricity prices in the NEM; other wholesale electricity purchasing costs; renewable energy and environmental policy costs; market fees and ancillary services; network costs; energy losses; and retail operating costs and margin.

Its estimates for each of these components are summarised in Table 10 to 12 of its final report[51], which is available on our website.[52] Appendix D includes more information on these cost components.

Frontier applied its cost estimates to the energy volumes under our three water demand scenarios (low, median and high) based on its optimised half-hourly load profile. This resulted in estimated total efficient energy costs over the determination period as summarised in Table 4.8. We compare this to WaterNSW's energy cost estimate.

Table 4.8 Frontier's estimated efficient electricity costs, compared to WaterNSW's estimate ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
WaterNSW estimate[a]	2,706.2	2,587.6	2331.0	**7,624.8**
Frontier Economics estimate – High demand	1,750.7	1,756.7	1,700.3	**5,207.7**
Frontier Economics estimate – Median demand	1,237.0	1,246.4	1,209.6	**3,693.0**
Frontier Economics estimate – Low demand	818.9	838.2	812.5	**2,469.6**

a WaterNSW's estimate is based on an assumed average demand of 5,746ML per annum.

Source: Frontier Economics, *WaterNSW's Energy Purchase Costs – Broken Hill Pipeline*, Final Report for IPART, May 2019, p 11.

As Table 4.8 shows, Frontier's estimate of the efficient electricity costs is much lower than the WaterNSW estimate under all water demand scenarios. This is because Frontier's estimate of the Pipeline's electricity volume, informed by Synergies' benchmarked unit energy volumes and our final pumping profile, is much lower than WaterNSW's proposed electricity volume. In particular, Frontier's estimate of the Pipeline's total electricity demand including peak demand indicates that there would be no need for pumping in shoulder periods, except under the high demand scenario, and no pumping in peak periods under all demand scenarios.

Frontier's final recommendations, based on our final pumping profile, are higher than its estimates detailed in our Draft Report as a result of[53]:

- an increase in the amount of water needing to be pumped through the Pipeline as a result of our revised treatment of evaporative losses (see footnote 38), and
- our recognition of a 'floor' (ie, minimum quantity of water to be stored) in the bulk water storage, which impacts the efficient pumping profile.

These drivers result in additional pumping in off-peak periods under all demand scenarios and additional pumping in shoulder periods in the high demand scenario.

In its submission to our Draft Report, WaterNSW questioned how Frontier has determined that there is no need for pumping in the higher-cost shoulder or peak periods except under the high demand scenario, resulting in a much lower maximum energy demand, given

51 Frontier Economics, WaterNSW's Energy Purchase Costs – Broken Hill Pipeline, Final Report for IPART, May 2019.

52 Table 10: Estimated electricity cost components – median demand ($2018-19)
Table 11: Estimated electricity cost components – low demand ($2018-19)
Table 12: Estimated electricity cost components – high demand ($2018-19

53 Frontier have also corrected a minor error in the way that their calculations defined peak and shoulder periods. They have corrected this error so that the number of peak and shoulder hours correctly matches the definition of these periods. They have advised that this error did not materially affect results.

Synergies (our expenditure review consultant) found WaterNSW's proposed maximum energy demand to be efficient in peak, off-peak and shoulder tariff periods.[54]

Frontier's estimation of efficient maximum demand is a bottom-up calculation of the Pipeline's load based on our pumping profile for all three water demand scenarios and the assumptions that underpin our approach to the pumping profile (discussed in section 4.6.2). Synergies' recommendation is based on a top-down review of the O&M contract, and was not informed by our decisions on the pumping profile, as discussed in section 4.6.1.

Table 4.9 show Frontier's estimated electricity demand in the peak, shoulder and off-peak periods in each year of the determination (based on our pumping profile, and benchmark energy volumes for each water demand scenario, shown in Table 4.7). For comparison, Table 4.10 shows Frontier's estimate of WaterNSW's proposed electricity demand for WaterNSW's forecast water demand.[55]

Table 4.9 Frontier's estimated electricity demand across peak, shoulder and off-peak periods in each year of the determination – benchmark energy volumes

	2019-20	2020-21	2021-22
Low demand			
Energy demand			
Peak (MWh)	343	343	343
Shoulder (MWh)	695	695	695
Off-peak (MWh)	5,637	5,615	5,586
Peak energy demand [max demand]			
Peak (MW)	0.27	0.27	0.27
Shoulder (MW)	0.27	0.27	0.27
Off-peak (MW)	1.23	1.19	1.19
Median demand			
Energy demand			
Peak (MWh)	343	343	343
Shoulder (MWh)	695	695	695
Off-peak (MWh)	9,175	9,153	9,125
Peak energy demand [max demand]			
Peak (MW)	0.27	0.27	0.27
Shoulder (MW)	0.27	0.27	0.27
Off-peak (MW)	2.02	1.96	1.95
High demand			
Energy demand			
Peak (MWh)	343	343	343
Shoulder (MWh)	2,384	2,283	2,219
Off-peak (MWh)	10,768	10,766	10,763

54 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 11.

55 Frontier was supplied a half hourly load profile based on WaterNSW's proposed energy volumes and water demand forecast, agreed with the O&M operator of the Pipeline.

	2019-20	2020-21	2021-22
Peak energy demand [max demand]			
Peak (MW)	0.27	0.27	0.27
Shoulder (MW)	1.46	1.45	1.44
Off-peak (MW)	2.22	2.22	2.22

Source: Frontier Economics, *WaterNSW's Energy Purchase Costs – Broken Hill Pipeline*, Final Report for IPART, May 2019, Tables 6 – 8.

Table 4.10 Frontier's estimated electricity demand – based on WaterNSW's proposed energy volumes and forecast water demand

	2019-20	2020-21	2021-22	2022-23
Energy demand				
Peak (MWh)	558	573	583	606
Shoulder (MWh)	2,668	2,754	2,830	2,885
Off-peak (MWh)	12,780	12,774	12,799	12,787
Peak energy demand [max demand]				
Peak (MW)	0.58	0.68	0.66	0.77
Shoulder (MW)	2.60	2.60	2.60	2.60
Off-peak (MW)	2.60	2.60	2.60	2.60

Source: Frontier Economics, *WaterNSW's energy purchase costs – Broken Hill Pipeline*, Final Report for IPART, 8 February 2019, p 34.

4.6.4 Our decision to use the weighted average variable energy unit cost under the median water demand scenario

To set the total efficient energy costs to be included in the operating expenditure allowance, we accepted the method outlined in Frontier's final report. However, as Box 4.2 discussed, Essential Water's demand for services from the Pipeline will vary, depending on the amount of rainfall the Broken Hill area receives. If we set a single usage price based on the median demand/median rainfall scenario only, WaterNSW would under recover efficient costs in very high demand years and very low demand years.

We foresee WaterNSW will face a downside revenue risk as a result of rainfall uncertainty. To address this, we set our total efficient energy costs by calculating a weighted average benchmark energy unit cost:

- First, we determined the 'variable' proportion of WaterNSW's electricity demand for each rainfall scenario (ie, the incremental demand required for pumping). This was separated from the 'fixed' demand for running control and maintenance systems. The variable proportion comprises both an energy charge and a charge for the additional monthly demand.
- Next, we used the pricing tables in Frontier's report to calculate the fixed[56] and variable costs under each pumping scenario (ie, we multiplied Frontier's recommended electricity cost component unit prices by the estimated variable and fixed electricity demand under each of the three scenarios). Then we:

56 Fixed costs include flat fees such as access charges.

- Divided the variable cost by the volume of water pumped under each scenario to determine a variable unit price ($/ML). The variable unit prices for the three are detailed in Table 4.11. The unit price for the high rainfall (low pumping) scenario was slightly higher than the median rainfall scenario due to the impact of a declining marginal cost (up to a point). The low rainfall (high pumping) scenario was slightly higher again due to the need to pump water during shoulder energy periods.
- Took the weighted[57] average of the variable unit prices under each scenario to calculate a weighted average variable unit price for each year of the determination period (Table 4.12).

- Finally, we multiplied these weighted average variable unit prices by the volume of water pumped in the median scenario to give an estimate of variable energy costs and then added Frontier's forecast fixed cost components to give a final electricity cost projection. This resulted in the total efficient energy costs shown in Table 4.13.

Table 4.11 Variable energy unit prices ($2018-19)

$/ML	2019-20	2020-21	2021-22
Low demand	183.9	189.2	183.7
Median demand	187.3	189.1	183.8
High demand	209.5	210.4	203.8

Source: IPART analysis.

Table 4.12 Weighted average variable energy unit price[a] ($2018-19)

$/ML	2019-20	2020-21	2021-22
Weighted average rainfall scenario	189.2	191.3	185.8

a This price is the unit cost to WaterNSW for the total volume of water pumped to supply Essential Water, under our median water demand scenario. The usage price charged to Essential Water is calculated as the total efficient energy costs divided by forecast water demand. It is higher than the unit price detailed in this table, as forecast water demand is lower than the volume required to be pumped, due to evaporative losses at the bulk water storage.

Source: IPART analysis.

Table 4.13 Total efficient energy costs ($2018-19, $'000)

	2019-20	2020-21	2021-22
Weighted average variable costs with median demand	909.8	917.2	887.5
Fixed costs[a]	336.6	339.7	332.1
Total electricity costs	**1,246.4**	**1,257.0**	**1,219.6**

a Fixed costs include access charges as well as usage and demand charges for energy not used for pumping, e.g. control systems and machinery. Energy costs include retail margin.

Source: IPART analysis

Overall, as a result of our approach to calculating the weighted average variable unit price, our total efficient energy costs are $30,000 (0.81%) higher over the determination period than

57 Our choice of weightings reflects the probabilities of the high and low demand scenarios respectively. The weights we selected were: 80% for median demand scenario, and 10% for low and high demand scenarios.

Frontier's estimate for the median rainfall scenario (Table 4.14). Our final decision is 4.5% higher than our draft decision.

Table 4.14 Frontier and IPART median rainfall energy costs ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
Frontier	1,237.0	1,246.4	1,209.6	**3,693.0**
IPART	**1,246.4**	**1,257.0**	**1,219.6**	**3,722.9**

Source: Frontier Economics, *WaterNSW's Energy Purchase Costs – Broken Hill Pipeline*, Final Report for IPART, May 2019, p 11. IPART analysis

For the purpose of calculating a usage price for Essential Water, we used the benchmark efficient variable energy volume for Essential Water (Table 4.7) and applied our weighted average variable energy unit price (Table 4.12) for each year in the determination period.[58]

This resulted in an energy unit price per MWh that takes into account the possibility of very high and very low demand years to ensure WaterNSW can recover its efficient cost, on average, over time. This approach also allows the efficient benchmark price to reflect the prioritisation of off-peak energy over shoulder energy (and shoulder energy over peak energy).

4.7 Accept proposed non-energy operating costs for services to offtake customers

We made a decision:

10 To include the proposed non-energy operating expenditure shown in Table 4.15 in the operating expenditure allowance for services to offtake customers.

Excluding energy costs, WaterNSW's proposed total operating costs for providing services to offtake customers of $1,700.[59] We accept our consultant's finding that these costs are efficient.[60] Our decision is $576 higher than WaterNSW's proposed costs, reflecting the cost of an additional offtake that has been constructed since WaterNSW's pricing proposal.

Table 4.15 Efficient operating expenditure for offtakes ($2018-19, $)

	2019-20	2020-21	2021-22	Total
WaterNSW proposed	300.0	1,100.0	300.0	1,700.0
IPART decision	**378.8**	**1,518.0**	**378.8**	**2,275.6**

Note: WaterNSW proposed expenditure is based on 3 offtakes and IPART's decision is based on 4 offtakes.

Source: Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 11.

58 This is discussed in further detail in Chapter 9.
59 WaterNSW pricing proposal to IPART, June 2018, Table 27.
60 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 125.

4.8 Set efficient energy costs for services to offtake customers using the same benchmark energy volumes and unit prices as Essential Water

We made a decision:

11 To set efficient energy costs for services to offtake customers using the same benchmark energy volumes and unit prices as Essential Water.

It is difficult to forecast the efficient energy costs WaterNSW will incur in providing services to offtake customers because there is no reliable information to assess the likely water demand from these customers:

- The number of offtake customers over the determination period is uncertain. There is no cap on the number of new offtakes that may be installed during the determination period.[61]
- The amount of water likely to be consumed by each offtake customer is uncertain, as they have not been previously supplied.

In addition, we consider that the supply of water to offtake customers will be incidental to the water supplied to Essential Water. WaterNSW has indicated that it will not alter its operations to supply offtake customers, and will not supply offtake customers at the expense of Essential Water.[62] For these reasons, we decided to calculate the efficient energy costs to be included in the operating expenditure allowance for services to offtake customers using the same benchmark variable energy volumes as for services to Essential Water.[63] For simplicity, we also decided to apply the same variable energy unit price to offtakes as we have to Essential Water.[64]

In our Draft Report, we sought stakeholder feedback on an alternate approach to estimating the energy costs for offtake customers, which would involve estimating the efficient energy per ML benchmark for supplying offtake customers and multiplying this by benchmark off-peak, peak and shoulder prices.[65] We received one submission in response, from WaterNSW, who agreed with our draft decision. WaterNSW submitted that it would be difficult to set specific peak and shoulder rates for the maximum demand charges as it is difficult to forecast total usage and to estimate an offtake customer's contribution to total usage.

61 We understand that since submission of its pricing proposal, the number of offtake customers has increased.
62 WaterNSW pricing proposal to IPART, June 2018, p 31.
63 This also recognises the revised treatment of evaporative losses (see footnote 38). As a result, the proposed approach we detailed in our Draft Report of considering the benchmark efficient variable energy volume, net of evaporative losses, as a reasonable simplification of the incremental cost of supplying offtake customers is no longer a consideration.
64 This is discussed in further detail in Chapter 9.
65 IPART, Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019 – Draft Report, April 2019, p 37.

5 Capital expenditure allowance

As Chapter 3 noted, under the building block method, there is no explicit allowance for capital expenditure in the notional revenue requirement (NRR). Instead, prudent historical capital expenditure and efficient forecast capital expenditure is added to the regulatory asset base (RAB) and recovered through the allowances for a return on assets and regulatory depreciation. This is discussed in further detail in Chapter 6.

This chapter sets out our assessment of the Pipeline's prudent level of capital expenditure over the pre-commissioning period of the Pipeline, to include into the opening RAB for the 2019 determination period, and our assessment of the Pipeline's efficient forecast capital expenditure over the 2019 determination period.

As with operating expenditure, we engaged Synergies Economic Consulting (Synergies) to review WaterNSW's historical and forecast capital expenditure and make recommendations on the amount of capital expenditure that should be included in the RAB.

5.1 Prudent capital expenditure over the pre-commissioning period of the Pipeline

We made a decision:

12 To set, for the purpose of establishing an opening RAB value, the prudent level of capital expenditure over the pre-commissioning period of the Pipeline as outlined in Table 5.1.

Our decision is $61.2 million lower than WaterNSW's proposed costs and $55.2 million lower than our draft decision, driven by WaterNSW's actual capital expenditure coming in below initial forecasts contained in WaterNSW's pricing proposal. WaterNSW proposed capital expenditure over the pre-commissioning period of the Pipeline of $445.4 million.[66]

Our decisions on capital expenditure reflect our assessment of the prudent expenditure on capital works that should be included in the Pipeline's opening RAB, and hence recovered through prices. To decide how much capital expenditure is added to the RAB, we applied a prudence test to WaterNSW's capital expenditure over the pre-commissioning period of the Pipeline and an efficiency test to forecast expenditure, against the criteria in Box 5.1.[67]

66 WaterNSW's construction of the Pipeline includes three separable portions, SP1, SP2 and SP3.
- SP1 comprises all expenditure on the Pipeline less SP2 and SP3.
- SP2 includes additional works from the bulk water storage to the Essential Water's Mica Street filtration plant.
- SP3 comprises permanent grid connections to be constructed close to the town centres of Broken Hill and Wentworth.

Our review of WaterNSW's proposed capital expenditure only includes expenditure on SP1. We understand that SP2 and SP3 will be gifted to Essential Water.

67 WaterNSW's proposed capital expenditure includes forecast capital expenditure in 2018-19. We understand that actual capital expenditure for 2018-19 will not be known until the Pipeline project is near completion.

Our decisions accept our consultant's, Synergies, recommendations and reflect actual cost data submitted by WaterNSW in its submission to our Draft Report.[68] Synergies reviewed WaterNSW's procurement process for the Pipeline (see Box 5.2), and supported this review with bottom-up and top-down analysis of individual components of the Pipeline (see Box 5.3).

Specifically, Synergies carried out:

- Top-down, high-level benchmarking analysis against comparator Australian water pipeline projects to assess the reasonableness of total project cost,
- Benchmarking analysis of the cost of individual major assets built under the design and construct (D&C) contract arising from WaterNSW's tender process for the Pipeline, and
- Benchmarking analysis of a sample of cost items taken from WaterNSW's Distributed Cost pool, which it proposes to capitalise into the initial RAB value.

Box 5.1 Prudence and efficiency tests

In reviewing expenditure, Synergies applied prudence and efficiency tests to historical and proposed expenditure, respectively.

Prudence test

This test assesses whether the decision to invest in an asset was one that WaterNSW, acting prudently, would have been expected to make in the circumstances existing at the time. Having regard to information available at the time, the test assesses both:

- How the decision to invest was made, and
- How the investment was executed (ie, whether the construction or delivery of the asset was cost effective).

In examining forecast expenditure, the prudence test examines the consistency of this expenditure with the utility's longer-term capital expenditure program.

Efficiency test

This test examines whether WaterNSW's 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.

We accepted our consultant's recommendations and the actual cost data submitted by WaterNSW, which was lower than our draft decision.

Our decision on the prudent capital expenditure over the pre-commissioning period of the Pipeline is presented in Table 5.1.

Our decision includes expenditure on Separable Portion 1 (SP1) only. The pro rata share to SP1 represents the share of the D&C contract costs attributed to SP1 as a proportion of the total D&C contract costs, less the cost of offtakes.

68 The actual cost data submitted by WaterNSW resulted in lower costs than our draft decisions.

Table 5.1 Total capital expenditure – pro rata share to Separable Portion 1 ($nominal, $'000)

Category	WaterNSW's proposal	IPART's decision
D&C Contract	330.1	328.5
Distributed costs	93.3	39.8
Funding costs	22.0	15.9
Total	**445.4**	**384.2**

Source: Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, pp 10-11; IPART calculations.

Our decision to set prudent capital expenditure of $384.2 million, for inclusion in the RAB, is $61.2 million lower than in WaterNSW's pricing proposal. This difference is the result of:

- The final actual cost of Pipeline construction submitted by WaterNSW in its submission to our Draft Report[69], which is $55 million lower than our draft decisions and the initial forecasts contained in WaterNSW's pricing proposal.
- Lower funding costs based on IPART calculations and a small error in WaterNSW's calculation (a reduction of $6.2 million), detailed further in Section 5.1.1.

We accepted WaterNSW's proposed construction costs in our Draft Report, and have in turn accepted WaterNSW's final actual costs for the Pipeline, consistent with Synergies finding of prudence, as detailed in Box 5.33.

Box 5.2 Synergies' review of WaterNSW's procurement process for the Pipeline

In assessing the prudence of WaterNSW's capital expenditure over the pre-commissioning period of the Pipeline, Synergies reviewed WaterNSW's procurement process for the Pipeline.

Synergies' found that WaterNSW conducted a detailed and robust tender process for the Pipeline within an overarching compressed timeframe for pipeline construction and commissioning.[70]

Synergies found that most of the costs associated with the Pipeline's design and construction, as well as future operations and maintenance, have been driven by the outcomes of competitive tender processes administered by WaterNSW; and that this process was well-designed and executed having regard to good procurement practice. As a result, Synergies concluded that WaterNSW's procurement process resulted in costs for the D&C and O&M contracts that reliably reflect a competitive market outcome.[71]

Source: Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019.

69 In its submission to our Draft Report, WaterNSW requested IPART set final decisions on prices using the latest actuals and final cost estimates for the project – see WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 17.

70 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, pp 39-40.

71 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, pp 39-40.

Box 5.3 Synergies' benchmarking of the Pipeline's capital expenditure

Synergies undertook top down benchmarking of the Pipeline and examined four functional forms as candidate benchmark cost curves to assess where the Pipeline lies on a $/km cost curve and used 13 comparable water pipeline projects in Australia for the benchmarking analysis. A log-log form was found to fit the comparator data best. Based on the high level benchmarking of pipeline construction costs for the 13 similar pipelines in Australia, the Pipeline is unlikely to be an outlier in terms of outturn capital costs relative to similar projects based on the information available to date.

The high level quantitative analysis corroborated Synergies' view that the contestable procurement process that WaterNSW pursued appears likely to ultimately result in an outturn capital cost that conforms to efficient cost expectations, so long as final contingency allowances are reasonable.[72]

Synergies also used industry benchmarks to benchmark components of the Pipeline's costs. It compared component costs of the D&C contract for each of the Pipeline's assets to four comparator Australian water pipelines and concluded that all the component costs are reasonable based on available benchmarks. Further, the benchmarking analysis substantiated the finding that the competitive tender process used for the D&C Contract has resulted in an efficient price for the Pipeline. [73]

Synergies also compared the larger cost items of the Pipeline's project construction and management costs against costs of similar projects and found all sub-component costs to be reasonable.

In addition, Synergies assessed a sample of items from the pool of Distributed Costs[74] to support its efficiency assessment. The selected sample represented a total value of $26.4M, or 58% of the total pool of Distributed Costs, by value. Synergies concluded that the pool of distributed costs were efficient and noted that as several of the distributed costs are forecasts only the Pipeline's actual capital expenditure should be added to the RAB.

Source: Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019.

5.1.1 Our assessment of funding costs to be included in the RAB

Our opening RAB includes funding costs of $15.9 million, which is $6.2 million, or 28%, lower than WaterNSW's initial forecast of $22.0 million contained in its pricing proposal. Funding costs are the costs associated with financing capital projects as expenditure is incurred up to the date of commissioning.

Our decision is lower than WaterNSW's proposed costs as a result of:

- WaterNSW's actual capital expenditure coming in below initial forecasts contained in WaterNSW's pricing proposal
- A small error in WaterNSW's calculations, and

72 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 66.

73 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 68.

74 Distributed costs are shared between the Pipeline project and two additional construction projects for infrastructure that will be transferred to Essential Energy upon completion and are not the subject of this pricing determination (called Separable Portions 2 and 3 or SP2 and SP3).

- WaterNSW calculating funding costs until 30 June 2019, which is about two months after the Pipeline became operational (ie, late April 2019).

5.2 Accept proposed capital expenditure per offtake

We made a decision:

13 That for the purpose of establishing an opening RAB value for offtakes, to set the efficient level of capital expenditure for offtakes as outlined in Table 5.2.

Our decision is $80,000 higher than WaterNSW's proposed costs. At the time of its proposal, WaterNSW advised that three offtakes were to be constructed as part of water supply agreements negotiated during the construction phase of the project and this was reflected in our draft decision. In its submission to our Draft Report, WaterNSW advised that five offtakes will be constructed, one of which will be provided to a land owner as part of a land-swap arrangement for the land on which the bulk water storage is located. WaterNSW further submitted that the cost of this offtake should be included in the Pipeline RAB. We agree with its submission, and our final decision is to include the cost of the land-swap offtake in the Pipeline RAB and the cost of the remaining four offtakes in the offtakes RAB.[75]

Once the pipeline is operational, the O&M contract allows for additional offtakes to be constructed.[76]

Synergies undertook two independent, bottom-up assessments of the cost of a farm offtake. Both costings were developed on the basis of a stand-alone contract, as opposed to being built as part of a larger contract for the entire pipeline project. The independent assessments produced cost estimates, before contingency, that lie in the range of $87,000 to $100,000 (see Box 5.4). Synergies advised that this lends support to WaterNSW's budgeted cost for the offtakes and indicated that the costs are within an efficient range.

We accepted Synergies recommendations, as outlined in Box 5.2.

Our decision is $80,000 higher than WaterNSW's proposed costs, reflecting the cost of an additional offtake that we have included in the offtakes RAB[77], and our assessment of lower financing costs, for the reasons outlined in Section 5.1.1.

Table 5.2 Offtakes – Capital Expenditure ($nominal, $'000)

Category	WaterNSW's proposal	IPART's decision
Farm offtakes	250	334
Financing costs	17	13
Total	**267**	**347**

Note: Totals may not sum due to rounding.

Source: Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019; IPART calculations

75 See Box 6.1 in Chapter 6 for more information.
76 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 12.
77 We note the cost of the additional offtake will be recovered by charges to an additional offtake customer(s).

Box 5.4 Synergies' review of the efficiency of WaterNSW's capital expenditure for offtakes

Synergies' undertook two independent, bottom-up assessments of the cost of a farm offtake, consistent with the design specifications detailed in WaterNSW's pricing proposal and information contained in the document for the D&C contract.

The bottom-up assessment prepared represents 'concept level'[78] estimates, reflecting the detail of the information provided, and Synergies advised that they should be interpreted as having an accuracy range of ± 30-50%.

As a result of the lack of definition around design, several assumptions were made by Synergies around the construction details including:

- that all valves are contained in a reinforced concrete chamber with a lid,
- chamber dimensions are 3m long x 1.5m wide x 1.0m deep, and
- overall length from stub flange off the main pipeline to the flange for the customer connection is nominally 5 metres (and the 3m long chamber is within this overall 5m length).

Both of the bottom-up cost assessments were developed on the basis of a 'stand-alone' contract, as opposed to being built into a larger contract for the entire Pipeline project.

The results of these assessments are presented in Table 5.3.

Table 5.3 Bottom-up assessments of farm offtake construction costs ($2018-19)

Assessment 1	Cost per offtake	Assessment 2	Cost per offtake
Materials	59,200	Supply and installation	65,000
Construction and installation	27,500	Overheads/indirect costs	22,750
Preliminaries/indirect costs	13,000	-	-
Total	**99,700**	**Total**	**87,750**
Contingency (35%)	34,900	Contingency (7.5%)	6,581
Total (incl. contingency)	**134,600**	**Total (incl. contingency)**	**94,331**

Source: Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, Table 20.

5.3 Accept proposed forecast capital expenditure

We made a decision:

14 To set the efficient level of forecast capital expenditure for the Pipeline over the 2019 determination period as outlined in Table 5.4.

Our decision accepts WaterNSW's proposed costs.

Our decision accepts WaterNSW's proposed costs. WaterNSW proposed forecast capital expenditure for the cost of land acquisition to access the pipeline for operational and maintenance purposes once operational.

78 This is due to the lack of definition of the design specifications in the tender documentation (see Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 86).

We accepted our consultant's finding that these costs are efficient.[79] Our decision on WaterNSW's forecast capital expenditure is presented in Table 5.4 below.

Table 5.4 Forecast capital expenditure ($2018-19, $000)

	2019-20	2020-21	2021-22	Total
WaterNSW proposed	500	0	0	500
IPART decision	**500**	**0**	**0**	**500**

Source: Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, Table ES2.

5.3.1 Synergies review of the efficiency of WaterNSW's forecast capital expenditure

Synergies reviewed WaterNSW's proposed land acquisition costs and considered this land acquisition to be a necessary and prudent action.

The underlying assumption for its forecast land acquisition cost is 5 lots at $100,000 per lot, reflecting assumptions about the number of impacted properties, type of acquisition (easement or acquisition), size of lot and location.

Based on Synergies' industry knowledge and understanding of land values along the Pipeline, it considered WaterNSW's forecast capital expenditure for the 2019 Determination period to be efficient.[80]

79 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 95.

80 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 96.

6 Allowances for return on assets, regulatory depreciation, tax and working capital

The building block model we use to determine the Notional Revenue Requirement (NRR)[81] includes a number of components. While Chapter 4 discusses the operating and maintenance expenditure allowance, this chapter discusses the remaining components or allowances in the building block model. This chapter sets out the:

- Capital allowance, consisting of the return on assets and regulatory depreciation
- Tax allowance, and
- Working capital allowance.

To determine the allowances we need to make the following decisions:

- The value of the regulatory asset base (RAB), which represents the economic value of the assets used to deliver the monopoly services. This includes any adjustments for asset disposals and capital cash contributions.
- The appropriate rate of return (eg, using the WACC) on the RAB.
- The appropriate asset lives and depreciation method for the RAB.
- The appropriate tax rate.

This chapter discusses these decisions and their impact on the relevant allowances.

We discuss the allowances for both Essential Water and offtake customers separately. That is, we have set separate allowances for return on assets, regulatory depreciation, tax and working capital to be recovered through prices to Essential Water and offtake customers.

6.1 Allowance for the return on assets

We made a decision:

15 To set an allowance for the return on assets for determining prices to Essential Water and offtake customers as shown in Table 6.1.

WaterNSW proposed a total return on Pipeline assets serving Essential Water of $57.1 million.[82] Our final decision is presented in Table 6.1 and is 20.4% less than WaterNSW's proposal. Our final decision is also 17.1% less than the allowance for the return on assets in our Draft Report for servicing Essential Water and 5.5% less than our draft decision for servicing offtake customers (per offtake).

81 NRR is discussed in further detail in Chapter 3.

82 WaterNSW pricing proposal to IPART, June 2018, p 49. Note that this is the total for first three years in WaterNSW's pricing proposal.

Table 6.1 IPART and WaterNSW's proposed return on Pipeline assets ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
Essential Water				
IPART decision	15,346	15,165	14,975	**45,486**
WaterNSW proposed	19,276	19,045	18,805	**57,126**
Offtake customers				
IPART decision	13.8	13.2	12.7	**39.6**
WaterNSW proposed	NA	NA	NA	**NA**

Source: WaterNSW pricing proposal to IPART, July 2018, p49; IPART analysis.

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 regulatory service. Our approach provides incentives for efficient investment decisions.

To calculate this allowance, we determine a value of the RAB and multiply that value by an appropriate rate of return in each year of the determination period.

This section discusses our decisions in comparison to WaterNSW's proposal and explains any differences in our decisions compared to our Draft Report. It includes:

1. The value of the RAB used to set allowances for Essential Water (section 6.1.1)
2. The value of the RAB used to set allowances for offtake customers (section 6.1.2)[83] and,
3. The rate of return (section 6.1.5).[84]

6.1.1 Value of the RAB used to set allowances for Essential Water

We made decisions:

16 To set the opening RAB at 1 July 2019 of $391.0 million, and

17 To adopt the value of the RAB in each year of the 2019 Determination period as shown in Table 6.2.

WaterNSW's proposed opening RAB as at 1 July 2019 was $457.6 million.[85] Our decision on the opening RAB used to set prices for Essential Water is presented in Table 6.2.

Our decision is 13.1% less than our draft opening RAB value of $449.8 million. This is mainly because we have updated our opening RAB to incorporate the latest actuals and final cost estimates as at 1 July 2019, provided to us by WaterNSW.[86] The final project cost data received from WaterNSW is approximately $53.8 million (12.7%) lower than the project cost data used in our Draft Report. We have also updated the inflation rate used to index the RAB. This rate

83 The RAB used to calculate the access charge for offtake customers is based on 4 offtake assets. This may not correspond to the number of customers that we set prices for, as there may be multiple customers connected to a single offtake or a single customer connected to multiple offtakes.

84 When setting the value of the RAB we also adjust for capital cash contributions and asset disposals. These decisions are also discussed in Section 6.1.

85 WaterNSW pricing proposal to IPART, June 2018, p 49.

86 WaterNSW, submission to IPART Draft Report, April 2019, p 17.

is lower than the value used in our Draft Report. However, we note that we have not changed our approach to estimating inflation or indexing the RAB.

Table 6.2 WaterNSW's proposed RAB in each year of the 2019 determination period ($2018-19, $'000)

	2018-19	2019-20	2020-21	2021-22
IPART final decision	391,002	386,641	381,779	376,918
WaterNSW's proposed	457,560	452,340	446,621	440,901

Source: WaterNSW pricing proposal to IPART, June 2018, p 60; IPART analysis.

The RAB represents the value of the assets on which we consider WaterNSW should earn a return on capital and an allowance for regulatory depreciation. In determining the value of the RAB over the 2019 determination period, we have calculated:

- The opening RAB at 1 July 2019, by starting at an initial RAB of $0 in 2016-17 and incorporating the prudent and efficient capital expenditure for 2017-18 and 2018-19.[87]
- The value of the RAB in each year of the 2019 determination period, incorporating forecast efficient capital expenditure.

We have also separately identified the value of the RAB for the offtake customers.

Calculating the opening RAB

Our decision for the opening RAB as at 1 July 2019 is $391.0 million, which is $66.6 million or 14.5% lower than WaterNSW's proposal. In this section we discuss how we have calculated the opening RAB and the main reason for the differences compared to WaterNSW's proposed RAB.

In calculating the opening RAB, we assumed a starting RAB of $0 on 1 July 2016 and from this starting point, we incorporated the prudent and efficient capital expenditure of building the Pipeline in each year of construction. The steps we took to determine the RAB at 1 July 2019 included:

- First, we calculated an opening RAB on 30 April 2019, the date that we have assumed that the Pipeline began operations.[88] We did this by adding the prudent and efficient capital expenditure for 2016-17, 2017-18 and 2018-19, adjusted for indexation and funding costs (see Table 6.3).
- Next, we allocated the 30 April 2019 RAB into asset classes recommended by our expenditure review consultant Synergies (see Table 6.4).[89]
- Then, we rolled forward the RAB from 30 April 2019 to 1 July 2019. This was done by adjusting for depreciation and including indexation. No capital expenditure is expected during that period (see Table 6.4).

87 The opening RAB also includes a small amount of operating expenditure for 2016-17 of $3.8 million which we have capitalised.
88 WaterNSW pricing proposal to IPART, June 2018, p 45; WaterNSW pricing proposal information return.
89 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, pp 94-95.

Table 6.3 shows the capital expenditure over the pre-commissioning period used to determine the opening RAB. Chapter 5 details our assessment of the prudent and efficient capital expenditure over the 2019 determination period.

Table 6.3 RAB by expenditure category during the pipeline's pre-commissioning ($nominal, $'000)

	2016-17	2017-18	Opening RAB 30 April 2019
D&C Contract	0	192,826	328,515
Distributed costs	3,791	19,994	39,817
Depreciation	0	0	0
Indexation	37	2,314	6,513
Funding costs	95	5,077	15,863
Closing RAB	**3,923**	**220,211**	**390,707**

Note: Expenditure for this Final Report reflects updated cost estimates and actuals provided to IPART by WaterNSW as at the start of FY2020 in their submission to our Draft Report. Totals may not sum due to rounding.

Source: WaterNSW's pricing proposal to IPART, July 2018, pp 54 and 60; IPART analysis.

Table 6.4 shows our decision on the RAB by asset class from 30 April 2019 and 1 July 2019.

Table 6.4 RAB by asset class ($nominal, $'000)

	%	30 April 2019	1 July 2019
Pipeline	86%	336,905	337,297
Bulk water storage facility	5%	19,493	19,508
Plant and Machinery	7%	28,409	28,296
Buildings	2%	5,900	5,900
Total RAB	**100%**	**390,707**	**391,002**

Note: Totals may not sum due to rounding.

Source: Synergies, Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline, February 2019, pp 94-95, IPART analysis.

Comparison to WaterNSW's pricing proposal

Our final decision on the opening RAB as at 1 July 2019 is $391.0 million, which is $66.6 million or 14.5% lower than WaterNSW's proposal. The main differences, as shown in Table 6.5, are due to:

- Using updated actual and forecast cost data of the Pipeline project compared to the forecast submitted as part of WaterNSW's original pricing proposal (-$53.8 million).
- Lower funding costs ($6.2 million) due to lower capex and our assumption that the Pipeline commenced operations on the 30 April 2019.
- Asset depreciation of $0.8 million between 30 April 2019 and 1 July 2019.
- Lower indexation ($4.6 million), due to a lower opening RAB and lower inflation rates of 2.1% in 2017-18 and 1.7% in 2018-19[90] compared to WaterNSW's inflation rate of 2.5% in both years.

90 2.1% is the actual inflation rate to June 2018 and 1.7% is the updated forecast for 2018-19.

Table 6.5 Opening RAB by expenditure category compared to WaterNSW's proposal ($nominal, $'000)

	RAB on 1 July 2019	WaterNSW proposed RAB on 1 July 2019	Difference
D&C Contract	328,515	330,052	-1,537
Distributed costs	39,817	93,261	-53,444
Depreciation	826	0	826
Indexation	7,633	12,215	-4,582
Funding costs	15,863	22,032	-6,169
Closing RAB	**391,002**	**457,560**	**-66,558**

Note: Totals may not sum due to rounding.

Source: WaterNSW's pricing proposal to IPART, July 2018, pp 54 and 60; IPART analysis.

Calculating the RAB over the 2019 determination period

To calculate the RAB in each year of the 2019 determination period, we rolled forward the opening RAB to 2021-22 by:

- Adding $0.5 million of forecast efficient capital expenditure in 2019-20 (discussed in Chapter 5), and
- Deducting $14.6 million for regulatory depreciation.

This gives the forecast RAB for each year of the 2019 determination period, which we have used to generate the allowances for the return on capital and regulatory depreciation in the NRR.

Table 6.6 shows the RAB roll-forward over the 2019 determination period.

Table 6.6 IPART's RAB for the 2019 determination period ($2018-19, $'000)

	30 April to 30 June 2019	2019-20	2020-21	2021-22
Opening RAB	390,707	391,002	386,641	381,779
Plus: Forecast prudent and efficient capex	0	500	0	0
Less: Allowed regulatory depreciation	826	4,861	4,861	4,861
Plus: Indexation	1,120	0	0	0
Closing RAB	**391,002**	**386,641**	**381,779**	**376,918**

Source: IPART analysis.

Comparison to WaterNSW's pricing proposal

Table 6.7 shows WaterNSW's proposed RAB over the 2019 period compared to IPART's decision. Our RAB is 14.5% lower for each year of the determination period compared to WaterNSW's proposal. This difference is mainly due to our decision to adopt a lower opening RAB on 1 July 2019 compared to WaterNSW's proposal, as we have detailed above.

Table 6.7 IPART's RAB and WaterNSW's proposed RAB in each year of the 2019 determination period ($2018-19, $'000)

	2018-19	2019-20	2020-21	2021-22
WaterNSW's proposed	457,560	452,340	446,621	440,901
IPART's decision	**391,002**	**386,641**	**381,779**	**376,918**
Difference	-66,558	-65,700	-64,841	-63,983
Difference (%)	-14.5%	-14.5%	-14.5%	-14.5%

Note: Columns may not sum due to rounding

Source: WaterNSW pricing proposal to IPART, June 2018, p 60; IPART analysis.

6.1.2 Value of the RAB used to set allowances for prices to offtake customers

We made decisions:

18 To set the opening RAB for offtake assets at 1 July 2019 of $350,800, based on 4 offtake assets, and

19 To adopt the value of the RAB for each year of the 2019 Determination as shown in Table 6.8.

WaterNSW's proposal did not include a RAB to recover the capital cost of offtake assets. Instead, it proposed to recover the capital costs using an annuity.[91] Chapter 9 discusses in detail the reasons why our final decision is to adopt a RAB approach instead of WaterNSW's annuity approach to recover capital expenditure.

We have made the decision to recover the incremental capital costs associated with serving offtake customers using our standard RAB approach. Our final decision on the RAB is presented in Table 6.8.

We have set the RAB and capital allowances (return on and return of assets) based on the number of offtake assets, not the number of customers, because it is the **number of offtake assets** that drives the efficient costs of service provision. As we are required to determine prices for customers, we then set prices to recover these allowances from the expected **number of offtake customers**.[92]

Our decision is 32% greater than our draft opening RAB value. The rationale for this change is explained in Box 6.1 below.

Table 6.8 IPART's RAB in each year of the 2019 determination period ($2018-19, $'000)

	2018-19	2019-20	2020-21	2021-22
IPART's decision	350.8	336.7	322.6	308.4

Source: IPART analysis.

91 WaterNSW pricing proposal to IPART, June 2018, p 63.

92 We set an access charge to recover the capital cost of the offtake. If there are multiple customers connected to an offtake then each customer would pay an equal share of the per-offtake access charge.

The RAB represents the value of the assets on which we consider WaterNSW should earn a return on capital and an allowance for regulatory depreciation. To determine the value of the RAB over the 2019 determination period, we have calculated:

- The opening RAB at 1 July 2019, and
- The value of the RAB in each year of the 2019 determination period.

Calculating the opening RAB

In calculating the opening RAB, we assumed a starting RAB of $0 in 2017-18 and from this starting point, incorporated the prudent and efficient capital expenditure of the offtake assets in each year of construction. The steps we took to determine the RAB at 1 July 2019 were to:

- First, calculate an opening RAB on 30 April 2019, the date we have assumed that the Pipeline became operational. We did this by adding the approved capital expenditure for 2017-18 and 2018-19 and funding costs (discussed in Chapter 5), then adjusted for indexation.
- Then, roll forward the RAB from 30 April 2019 to 1 July 2019. This was done by adjusting for depreciation and including indexation. No capital expenditure is expected during that period (see Table 6.9).

Table 6.9 shows our decision on the opening RAB. Chapter 5 provides more detail on capital expenditure for offtake assets.

Table 6.9 Offtakes opening RAB on 1 April and 1 July 2019 ($nominal, $'000)

	2017-18	1 July 2017 to 29 April 2019	30 April to 30 June 2019
Opening RAB	**0.0**	**208.3**	**352.2**
Plus: Forecast prudent and efficient capex	202.7	130.9	0.0
Less: Allowed regulatory depreciation	0.0	0.0	2.4
Plus: Indexation	1.8	3.9	1.0
Plus: Financing costs	3.9	9.2	0.0
Closing RAB	**208.3**	**352.2**	**350.8**

Note: Totals may not sum due to rounding.

Source: IPART analysis.

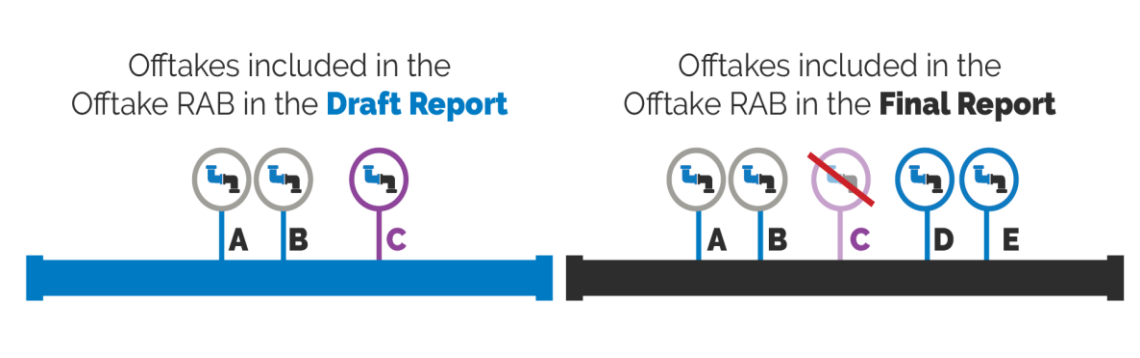
Box 6.1 The opening RAB for offtake customers is 32% greater than our draft decision

The $350,800 opening RAB is based on the number of offtake assets and is used to calculate the access charge for offtake customers. Our final decision on the opening RAB is about $85,000 greater than the opening RAB we used in our Draft Report.

The RAB for offtake customers in our Draft Report was based on three offtake assets (A, B and C in the diagram below). This included the capital costs of the offtake built under a land-swap agreement between WaterNSW and one customer (offtake C in the diagram below).

Our RAB for offtakes in this Final Report is based on the capital cost of four offtake assets, which **does not include** the offtake asset built under the land-swap agreement but includes two additional offtakes (offtakes D and E in the diagram below) that have been confirmed by WaterNSW since its pricing proposal.

Figure 6.1 Number of offtake assets in the RAB from Draft to Final Report



1. There has been an increase in the number of offtakes confirmed by WaterNSW since its pricing proposal

In our Draft Report, we included the capital costs of three offtakes in the opening RAB used to set the return on and return of asset allowances. As part of WaterNSW's submission to our Draft Report, it included information that confirmed that there are now five offtake assets.[a]

Therefore, for this Final Report, we have included the 2 additional offtake assets in the opening RAB.

2. We have taken out the capital cost of the offtake that was built as part of the land-swap agreement from the RAB for offtakes and have recognised the market value of that land in WaterNSW's opening RAB for Essential Water

WaterNSW entered into a land-swap agreement with one customer. WaterNSW agreed to construct an offtake for one customer in exchange for the customer's land, where it would build the bulk water storage facility.[b]

In our Draft Report, we included the capital cost of this offtake in the opening offtakes RAB used to calculate the return of and return on asset allowances. However, WaterNSW's submission to our Draft Report stated that because this offtake was installed as part of the land transfer at the bulk water storage it should be excluded from the offtake opening RAB. We agree with WaterNSW, and our final decision on the opening RAB for offtakes excludes the capital cost of this offtake.

Additionally, we have decided to include the implied value of the land (that is the cost of the offtake installed as part of the land-swap deal) in the opening RAB used to set WaterNSW's prices for Essential Water. This is to recognise that the land is used to provide a service for Essential Water

(as it is the location of the bulk water storage facility) and if it were not included in the RAB, WaterNSW would not be able to recover the efficient cost of providing the service to Essential Water.

As a result, our final decision on the value of the offtakes RAB for setting the return on and return of asset allowances is based on the capital costs of four offtakes. The value of the RAB used to set prices for Essential Water will include the market value of the land as discussed above.

a WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 24.

b The agreement included that the customer would not pay for the fixed charge of water delivery but only for the variable charge.

Calculating the RAB over the 2019 determination period

To calculate the RAB in each year of the 2019 determination period, we rolled forward the RAB to 2021-22 by deducting $0.01 million for regulatory depreciation. We do not anticipate any capital expenditure during the 2019 determination period on the four offtake assets that are included in the offtakes RAB.

This gives the forecast RAB for each year of the 2019 determination period, which we have used to generate the allowances for the return on capital and regulatory depreciation in the NRR.

Table 6.10 shows the RAB roll-forward over the 2019 determination period.

Table 6.10 Offtakes RAB for the 2019 determination ($2018-19, $'000)

	30 April to 30 June 2019	2019-20	2020-21	2021-22
Opening RAB	352.2	350.8	336.7	322.6
Plus: Forecast prudent and efficient capex	0.0	0.0	0.0	0.0
Less: Allowed regulatory depreciation	2.4	14.1	14.1	14.1
Plus: Indexation	1.0	0.0	0.0	0.0
Plus: Financing costs	0.0	0.0	0.0	0.0
Closing RAB	350.8	336.7	322.6	308.4

Note: There are no cash capital contributions or asset disposals. Totals may not sum due to rounding.

Source: IPART analysis.

Comparison to WaterNSW's pricing proposal

WaterNSW did not support a RAB approach to recover capital costs. Rather, it proposed an annuities approach to recover capital costs.

Our final decision to support a RAB approach over an annuities approach is discussed in more detail in Chapter 9.

Table 6.11 compares the differences between WaterNSW's proposal and IPART's final decision on how the incremental capital costs incurred by WaterNSW (to service offtake customers) are recovered over the regulatory determination period.

Table 6.11 How incremental capital costs are recovered over the determination period compared to WaterNSW's proposal ($2018-19, $'000 per offtake)

	2019-20	2020-21	2021-22
IPART's decision - RAB approach[a]			
Regulatory depreciation	3.5	3.5	3.5
Return on capital[c]	3.5	3.4	3.2
Tax allowances	0.2	0.2	0.2
Total	**7.2**	**7.1**	**6.9**
WaterNSW's proposed - annuities approach[b]			
Annuities contribution	7.3	7.3	7.3
Difference	-0.1	-0.2	-0.4
Difference (%)	-1.7%	-3.5%	-5.6%

a This is based on initial capital expenditure per offtake of $83,388, funding costs of $3,260, asset lives of 25 years and a WACC of 4.0%.

b This is based on initial capital expenditure per offtake of $83,388, funding costs of $5,591 an annuity payment period of 20 years and a WACC of 4.3%.

c Including return on fixed assets and working capital.

Source: IPART analysis.

6.1.3 Adjustments for asset disposals

We made a decision:

20 To accept WaterNSW's forecast of zero asset disposals over the regulatory period.

WaterNSW's proposal does not include any asset disposals over its upcoming determination period. Our decision is to accept WaterNSW's proposal. However, we will further examine this issue at its next price review (ie, 2022 Determination).

The value of any regulatory assets WaterNSW proposes to dispose of during a determination period are deducted from the RAB. This ensures customers are not charged a return on assets or regulatory depreciation for assets that are no longer used to provide regulated services.

6.1.4 Capital cash contributions

We made a decision:

21 To accept WaterNSW's forecast of zero cash capital contributions over the regulatory period.

WaterNSW's proposal does not include any capital cash contributions over its upcoming determination period. We have accepted this proposal. However, we will further examine this issue at its next price review (ie, 2022 Determination).

Cash capital contributions that a utility receives from third parties towards its capital expenditure, such as government grants, do not enter the RAB (ie, they are netted off capital expenditure). This ensures that customers do not pay a return on assets or regulatory depreciation for capital expenditure that the utility has not funded.

6.1.5 The rate of return or weighted average cost of capital

We made decisions:

22 To apply a real post-tax WACC of 4.0% for the purposes of calculating the appropriate rate of return on the Pipeline assets (including assets ring-fenced for offtake customers).

23 That we will account for annual changes in the cost of debt through a regulatory true-up at the 2022 Determination.

WaterNSW proposed a WACC of 4.3%, compared to our final decision to adopt a WACC of 4.0%.[93]

Our decision is 20 basis points less than our draft WACC of 4.2%. The difference between WaterNSW's proposed WACC, our draft WACC, and our final WACC is due to the timing of the collection of the input data used in the calculation. For the final WACC, we have used the latest market data available, that is, up to the end of March 2019. The methodology of calculating the WACC remains consistent between IPART's WACC methodology, WaterNSW's proposal and IPART's draft decision.

WaterNSW calculated its proposed WACC using IPART's updated methodology in our *Review of our WACC method – Final Report* published in February 2018[94] using WACC parameters from IPART's February 2018 WACC Biannual Market Update.[95] For our final decision we have updated these parameters as shown in Table 6.12 for data up to, and including, 31 March 2019.

We have developed our current approach to setting the WACC in consultation with stakeholders.[96] We have set the WACC at the midpoint of the range at 4.0%.

Box 6.2 How we reached our decision on the WACC

The WACC is our estimate of the efficient cost of capital of the Pipeline. It is a hypothetical benchmark of a business's efficient cost of debt and equity. It is a weighted average to take account of the relative shares of debt and equity that a firm might have.

We use the WACC to calculate the return on assets that we allow the business, by applying it to the value of the Pipeline's regulatory asset base (RAB). If we set a WACC that is too high, then customers would pay too much for the services and we risk encouraging too much investment in that business. If we set the WACC too low, then we risk the financial viability of the firm and encouraging too little investment. Neither of these outcomes is in the long-term interest of consumers.

The WACC is based on market data (risk free rate, debt margin and inflation) sampled to 31 March 2019. Our final decisions on parameters are shown in Table 6.12.[97]

93 WaterNSW pricing proposal to IPART, June 2018, p 65.
94 IPART, Review of our WACC method – Final Report, February 2018
95 WaterNSW pricing proposal to IPART, June 2018, p 65.
96 We completed a review of our WACC methodology in 2018 (IPART, Review of our WACC method – Final Report, February 2018).
97 The WACC for this review is lower than the WACC published in the IPART February 2019 bi-annual market update by 80 basis points. This is due to different debt sampling dates. The WACC for the final report uniformly samples debt costs to the end of March in all years including the current year. Whereas our default sampling dates for the IPART February bi-annual market update is end of January.

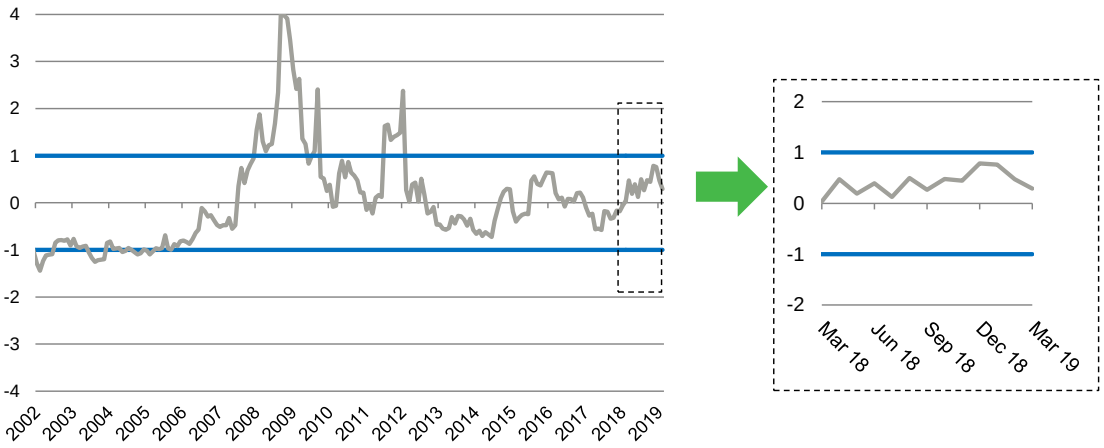
Table 6.12 IPART's WACC (sampled to 31 March 2019)

	Current market data	Long term averages	WACC range		
			Low	Mid	High
Nominal risk free rate	2.0%	3.6%			
Inflation	2.3%	2.3%			
Implied Debt margin	2.3%	2.6%			
Market risk premium	8.7%	6.0%			
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 (nominal post-tax)	8.1%	7.8%			
Cost of equity (real-post tax)	5.7%	5.4%			
Cost of debt (nominal pre-tax)	4.4%	6.2%			
Cost of debt (real pre-tax)	2.1%	3.8%			
Nominal Vanilla post-tax WACC	5.9%	6.8%	5.9%	6.4%	6.8%
Post-tax real WACC	3.5%	4.4%	3.5%	4.0%	4.4%

Source: Bloomberg, RBA and IPART's calculations.

As our measure of market uncertainty is currently within one standard deviation of the long term average (Figure 6.2), we have selected the midpoint WACC value. This is consistent with our decision rule for selecting a point within our range of WACC values.[98]

Figure 6.2 IPART financial market uncertainty index



Data source: Thomson Reuters, Bloomberg and IPART calculations.

98 IPART, Review of our WACC method – Final Report, February 2018, p 67.

Re-estimating the equity beta

In our 2018 WACC review, we made a number of decisions that would improve our method for estimating the equity beta. We also made decisions to publish more information for stakeholders on how we estimate the equity beta, and to give stakeholders the opportunity to propose additional industries for the equity beta calculation.

We are developing a new process for estimating the equity beta, which includes the improvements we decided to adopt in the 2018 WACC review, as well as automating the extraction of financial market data and calculation of the equity beta.

We have not applied our new method to estimate the equity beta in this review, as we are still developing this process and we have not yet consulted with stakeholders on the new method.[99] To that end, we have released a Fact Sheet on our website which explains and seeks feedback on our new method to estimate the equity beta.[100]

We would have regard to the equity beta estimated with this method along with other evidence on beta in our future WACC decisions.

Accounting for annual changes in the cost of debt through a regulatory true-up at the 2022 Determination

One of our decisions from the 2017-2018 WACC review was to transition to a trailing average cost of debt. In our view, a trailing average cost of debt allows regulated businesses to better manage their refinancing risk, while maintaining their incentives for efficient investment.

Implementing a trailing average involves updating the cost of debt at the start of each year within a regulatory period. To do this, we need to decide in each price review whether annual changes in the cost of debt will:

- Flow through to prices in the subsequent year, or
- Be cumulated and passed through via a regulatory true-up in the subsequent regulatory period.

WaterNSW requested that IPART apply annual updates to the cost of debt for the Pipeline determination. It argued that this is superior to a true-up to apply at the next determination period, for the following reasons:[101]

- **Customer's interests:** WaterNSW and Essential Water put forward that annual updates provide smaller incremental price changes to customers and reduce price shocks at regulatory reset dates.[102] WaterNSW is particularly concerned about this risk given that water bills can have a material and direct impact on the end user.

99 With that said, we note that our new process currently generates a similar equity beta estimate (0.74) to the value (0.7) we adopted as part of our WACC decision.
100 IPART, *Estimating Equity Beta, Fact Sheet*, March 2019.
101 WaterNSW pricing proposal to IPART, June 2018, pp 66-67.
102 Essential Energy, *submission to the Issues Paper – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019*, November 2018, p 9.

- **Cashflow timing impacts:** WaterNSW states that without annual updates, the cashflow impact of differences between the cost of debt allowance and the actual interest costs are borne by the firm and may impact on credit ratings. It claims that this may impact the financeability of the firm.
- **Incentive to incur efficient debt raising costs:** WaterNSW expresses that under annual updates the annual cost of debt allowance would reflect as much as possible the actual interest costs expected to be incurred by a prudent and efficient firm. WaterNSW proposes that this would incentivise the firm to adjust its debt raising practices on an annual basis so as to incur debt raising costs which align with the benchmark allowances.

Our decision is that annual changes in the cost of debt should be cumulated and passed through via a regulatory true-up in the subsequent regulatory period (ie, the 2022 Determination). While the two options are equivalent in present value terms to customers and WaterNSW, we favour the regulatory true-up because it provides greater certainty to customers about their prices over the determination period – changes in prices would be impacted by inflation only, rather than also being impacted by annual changes in the cost of debt.

Further, provided that the true-up is smoothed over the 2022 determination period, we do not expect that price shocks would be any more likely in the next determination period under our final decision, compared to an annual update.

Overall, our decisions have resulted in a lower return on assets compared with WaterNSW's proposal (Table 6.13). This is due to both our decision to adopt an updated WACC which is lower than the WACC at the time of WaterNSW's proposal, and a lower RAB as discussed above.

Table 6.13 IPART's decision and WaterNSW's proposed return on Pipeline assets ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
Essential Water				
IPART decision	15,346	15,165	14,975	45,486
WaterNSW's proposed	19,276	19,045	18,805	57,126
Difference	-3,930	-3,880	-3,830	-11,640
Difference (%)	-20.4%	-20.4%	-20.4%	-20.4%
Offtake customers				
IPART decision	13.8	13.2	12.7	39.6
Difference	NA	NA	NA	NA

Note: Totals may not sum due to rounding.

Source: WaterNSW pricing proposal to IPART, July 2018, p49; IPART analysis.

6.2 Allowance for the regulatory depreciation

We made a decision:

24 To set an allowance for regulatory depreciation for determining prices to Essential Water and offtake customers as shown in Table 6.14.

WaterNSW proposed a total allowance for regulatory depreciation (or return of assets) of $16.8 million.[103] Our decision on the regulatory depreciation over the determination period is presented in Table 6.14.

Our decision is 13.0% less than our draft allowance for regulatory depreciation. This is driven by the differences in the opening RAB values discussed above. We have not changed the method with which we have calculated regulatory depreciation from our draft decision.

Table 6.14 IPART's decision and WaterNSW's proposed return of Pipeline assets ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
Essential Water				
IPART decision	4,767	4,767	4,767	14,301
WaterNSW's proposed	5,600	5,600	5,600	16,801
Offtake customers				
IPART decision	13.9	13.9	13.9	41.6
WaterNSW's proposed	NA	NA	NA	NA

Note: Totals may not sum due to rounding.

Source: WaterNSW pricing proposal to IPART, July 2018, p49; IPART analysis.

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 lives associated with the assets that make up the RAB, and the appropriate depreciation method. The final decisions on asset lives and depreciation method to apply to assets used to serve Essential Water and offtake customers are discussed in the sections below.

6.2.1 Straight-line depreciation method

We made a decision:

25 That we will adopt a straight-line depreciation method for the 2019 determination period.

We have accepted WaterNSW's straight-line approach to depreciation for the pipeline assets.[104] We have also adopted a straight-line depreciation approach for offtake assets. WaterNSW proposed to depreciate its Pipeline assets using a straight-line methodology, consistent with our usual approach across the water utilities we regulate. This means that the

103 WaterNSW pricing proposal to IPART, June 2018, p 49.
104 WaterNSW pricing proposal to IPART, June 2018, p 52.

total value of an asset is recovered evenly over its assumed life. We consider this method is superior to alternatives in terms of simplicity, consistency and transparency.

WaterNSW proposed to recover its capital costs for offtake assets through an annuity approach, based on a fixed annuity payment over 20 years.[105] As discussed briefly in this section and in more detail in Chapter 9, we have not accepted WaterNSW's annuity approach for offtake assets and instead adopted a RAB approach. Accordingly, we have adopted the same straight-line depreciation method for offtake assets as pipeline assets.

6.2.2 Asset lives

We made a decision:

26 To adopt the asset lives as set out in Table 6.15.

WaterNSW proposed an asset life of 80 years for all existing and new depreciating assets.[106] Our final decision on asset lives is presented in Table 6.15. This decision is unchanged from our draft decision. We have applied these to asset values to calculate the depreciation allowances (as part of the NRRs) for the Pipeline's services to Essential Water and offtake customers.

Table 6.15 Asset lives for the Wentworth to Broken Hill Pipeline

Asset class	Asset life (years)
Pipeline[a]	100
Bulk water storage facility	80
Buildings	60
Plant and machinery (including pump stations and river intake)	25

a The tender design report for the Murray to Broken Hill Pipeline details an asset life of 100 years for pipes. The Synergies report details an asset life of 80 years for the pipeline. However, we have decided on an asset life of 100 years.

Source: Synergies, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline,* February 2019, p94; IPART analysis

WaterNSW proposed an asset life of 80 years for all existing and new depreciating assets (including the pipeline assets and renewal works on the pipeline).[107] However, our expenditure consultant, Synergies, did not consider WaterNSW's proposed single asset life appropriate on the basis that the Pipeline has several major asset classes, with different asset lives. To apply a single asset life of 80 years across all the major asset classes could result in certain assets with shorter lives continuing to be depreciated long after they have been replaced.

We therefore did not accept WaterNSW's proposal for asset lives and, instead, have generally accepted our expenditure consultant, Synergies', recommendations on asset lives for the bulk water storage facility, buildings and plant and machinery. However, for asset lives for the pipe, our final decision is based on the Pipeline's design life detailed in the tender design report, which assigned a 100 year asset life for the pipe.

105 WaterNSW pricing proposal to IPART, June 2018, p 52.
106 WaterNSW pricing proposal to IPART, June 2018, p 60.
107 WaterNSW pricing proposal to IPART, June 2018, p 62.

We view that, although Synergies recommended an 80 year asset life for pipe assets, this assessment was based on the appropriateness of WaterNSW's proposal and whether an 80 year life for the pipe itself is appropriate. Furthermore, Synergies recommendation is based on a report undertaken by Deloitte Access Economics in 2014 on the asset lives for State Water's 2014 pricing proposal, which recommended an 80 year asset life for the pipeline asset class.

However, we view that using the information provided in the Tender Design Report for the Murray River to Broken Hill Pipeline itself, is more up to date and specifically relevant to the asset in question. Based on this, using a 100 year asset life for pipes as per the Tender Design Report would lead to greater accuracy and therefore more cost reflective prices.

In its submission to our Draft Report, WaterNSW reiterated its support for an 80 year asset life for the pipe and asked IPART to reconsider Synergies recommendation. WaterNSW viewed that, although the design life of the pipeline is 100 years, the design life is not the correct criteria. This is because the design life does not take into account a number of factors, which could result in differences between the useful life and design life of an asset, including[108]:

- Reliance by the designer on manufacturer specifications
- Location and weather conditions can impact the pipeline useful life
- Adequacy of planned maintenance
- Future regulatory decisions on the prudency of operating expenditure and maintenance capital expenditure
- Seasonal maintenance windows, and
- Long term socio-economic and climatic factors affecting the customer base.

However, WaterNSW's submission does not include information on how these factors apply to, and impact on, the Pipeline itself. In the absence of specific information on how the factors would impact the Pipeline, we have maintained our decision to adopt a 100 year asset life for pipe assets based on the rationale discussed above.

Comparison to WaterNSW's proposal

Table 6.16 shows our final decision on the regulatory depreciation allowances to be recovered from prices to Essential Water. These allowances are lower than WaterNSW's proposal. The differences are due to:

- Our decision to adopt a lower opening RAB in 1 July 2019 than that proposed by WaterNSW, as detailed in section 6.1.1 above.

108 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 18.

- Our decision to set an asset life of 100 years for pipeline assets. This is in comparison to WaterNSW's proposal, which sets a single asset life of 80 years for all assets in the RAB. Pipeline assets make up 86% of the total RAB for services to Essential Water.[109] The impact of using a longer asset life for the pipe more than offsets the impact of using shorter lives for other assets.

Table 6.16 also shows the regulatory depreciation allowance to be recovered through prices for offtake customers. To calculate the regulatory depreciation allowance we categorised the four offtake assets as plant and machinery (Table 6.15) and applied the corresponding plant and machinery asset life of 25 years. WaterNSW's proposal included a 20-year annuity instead of a RAB approach for recovering the capital costs of offtake assets.

WaterNSW's decision to use a 20-year annuity to recover capital cost of offtake assets is consistent with the number of years it is expected to provide services to offtake customers as per the letter of intent signed between it and its customers.[110] WaterNSW's submission to our Draft Report considers that our decision to use a 25-year asset life for offtake assets instead of 20-years does not consider the commercial arrangements that WaterNSW has entered into with offtake customers. Because of this, it views that our pricing decisions do not mimic the outcomes of a competitive market environment.[111]

We have maintained our decision to apply the plant and machinery asset category (which has a 25 year asset life) for offtake assets. Although we recognise that WaterNSW may have entered into agreements with offtake customers, we base our determination independent of any commercial arrangements that the regulated business has entered into; particularly as those arrangements could be changed at any time. IPART's objective to set prices as they would occur in a competitive market environment refers to the price and quality of the regulated service. It does not mean the regulated prices should take account of any arrangements entered into by the (monopoly) regulated business.

109 See Table 6.4 within this report.

110 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 25.

111 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 25.

Table 6.16 IPART's decision and WaterNSW's proposed return of Pipeline assets ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
Essential Water				
IPART decision	4,767	4,767	4,767	14,301
WaterNSW's proposed	5,600	5,600	5,600	16,801
Difference	-833	-833	-833	-2,500
Difference (%)	-14.9%	-14.9%	-14.9%	-14.9%
Offtake customers				
IPART decision	13.9	13.9	13.9	41.6
WaterNSW's proposed	NA	NA	NA	NA

Note: WaterNSW's annuity approach in their pricing proposal is calculated to recover total capital costs. Therefore it includes the equivalent of the return on and return of assets in the RAB approach. Because of this difference we were not able to include a like for like comparison in the table between IPART's decision on the return of assets and WaterNSW's proposal. Totals may not sum due to rounding.

Source: WaterNSW pricing proposal to IPART, July 2018, p49; IPART analysis.

6.3 Allowance for tax

We made a decision:

27 To set the allowance for tax for the purpose of determining prices to Essential Water and offtake customers as shown in Table 6.17.

WaterNSW proposed a tax allowance of around $1.1 million per year over the 2019 determination period.[112] Our decision on the tax allowance is presented in Table 6.17.

Table 6.17 IPART's decision on the tax allowance ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
Essential Water				
IPART decision	851	811	787	2,449
WaterNSW's proposed	1,087	1,116	1,141	3,344
Difference	-236	-305	-354	-895
Difference (%)	-21.7%	-27.3%	-31.0%	-26.8%
Offtake customers				
IPART decision	0.9	0.9	0.9	2.8
WaterNSW's proposed	NA	NA	NA	NA

Source: WaterNSW pricing proposal to IPART, July 2018, p68; IPART analysis.

We calculate the tax allowance for each year by applying the relevant tax rate, adjusted for gamma, 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

112 WaterNSW pricing proposal to IPART, June 2018, p 49.

items such as interest expenses are based on the parameters used for the WACC,[113] 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 expenditure allowances and WACC parameters.

The next sections discuss our decision to treat the Pipeline as a separate business unit for calculating the tax allowance and the tax rates we use to calculate the allowances.

6.3.1 Treating the pipeline as a separate business unit

We made a decision:

28 To treat, for the purpose of calculating the tax allowance, the Pipeline business as a separate business unit, and not calculate the tax allowance based on WaterNSW as a consolidated business.

Our final decision is to calculate the tax allowance based on the Pipeline as a separate business unit. That is, we have not calculated this allowance based on WaterNSW as a consolidated business. This is different to WaterNSW's proposal.[114] This decision is unchanged from our Draft Report.

WaterNSW's pricing proposal has calculated its tax allowance using a statutory corporate tax rate of 30% based on its view that the Pipeline would not be treated as a separate business unit for tax purposes under tax law. It submits that under the Income Tax Assessment Act, 1997, WaterNSW would form a tax consolidated group with the Special Purpose Vehicle (SPV) where the pipeline assets are being transferred and held.[115] WaterNSW reiterated this point in its submission to our Draft Report. It views that even if the Pipeline is treated as a separate business, the tax law requires the determination of the aggregated turnover (a key factor in eligibility for the reduced corporate tax rate) to include the turnover of *connected* entities. As WaterNSW is a connected entity, the Pipeline would not qualify as a base rate entity entitled to the reduced corporate tax rate.

However, our decision to treat the Pipeline as a separate business unit is based on our broader view to define the Murray River to Broken Hill Pipeline as a regulated business and set prices accordingly. We have not set prices for the transportation services of the Pipeline assuming it is part of a broader business. Treating the Pipeline as a separate standalone business is also consistent with how we have assessed operating and capital costs along with other pricing decisions such as the WACC and how we have applied our financeability test.

WaterNSW's submission to our Draft Report requests that IPART clarify the relevance of the WACC as the reason for applying a lower tax rate (in the paragraph above). We clarify that the way we have determined the tax rate and the WACC is based on the Pipeline as a standalone business. We did not set the tax rate, WACC or the other cost allowances by

113 Eg, the nominal cost of debt is the sum of the nominal risk free rate and nominal debt margin.
114 WaterNSW, submission to the Issues Paper – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, October 2018, p 8.
115 WaterNSW, submission to the Issues Paper – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, October 2018, p 8.

assessing WaterNSW's broader business, but assessed it based on the Pipeline as a standalone regulated monopoly business.

We acknowledge that the WACC used by IPART to determine the return on asset allowance for this review is the same WACC that IPART has used in its other water pricing reviews such as the Essential Water Price Review[116] and the Central Coast Council Price Review[117], however our WACC methodology maintains some limited flexibility to tailor certain WACC parameters based on the standalone business which we are setting prices for, if there is a strong case to do so.[118]

As a result of this decision, the next section discusses our decision to take the variable tax rates into consideration when modelling the tax allowance for the Pipeline. If the Pipeline is considered as a separate business unit, we consider it appropriate to the use the lower rate applicable to a business under the $50 million threshold.

6.3.2 Using a variable tax rate

We made a decision:

29 To use the tax rate applicable to base rate entities in each year of the determination period, as shown in Table 6.18.

Table 6.18 Company tax rates applicable to base rate entities[a]

Income year	2018-19	2019-20	2020-21	2021-22
Tax rate for base rate entities under the threshold	27.5%	27.5%	26.0%	25.0%

a The lower company tax rate applies to base rate entities with an aggregated turnover less than $50 million from the 2018-19 income year.

Source: Australian Taxation Office, Changes to company tax rates: www.ato.gov.au/rates/changes-to-company-tax-rates/

As an outcome of our decision to calculate the tax allowance based on the Pipeline as a separate entity, we have also made the decision to use the variable tax rates when modelling the tax allowance (See Box 6.3 for more information). This means that we use the company tax rates for each year of the determination period shown in Table 6.18. We note that if variable tax rates were higher (than the 30% corporate rate rate) for base rate entities below the $50 million threshold, we would apply this higher rate to determine tax allowances.

Our decision results in a lower tax allowance than WaterNSW's proposal. WaterNSW proposed a tax allowance of around $1.1 million per year over the 2019 determination period based on a 30% corporate tax rate (Table 6.19). WaterNSW's submission to our Draft Report

116 IPART, Review of Essential Energy's prices for water and sewerage services in Broken Hill from 1 July 2019, June 2019.

117 IPART, Review of Central Coast Council's prices for water and sewerage services from 1 July 2019, June 2019.

118 In the 2014 Essential Energy water and sewerage services in Broken Hill price review, we decided to reduce the level of gearing for the final decision to a range of 50% to 60% (ie, a midpoint of 55%). The rationale for this was because we consider that a lower level of gearing recognises that Essential Energy's water business faces a higher level of risk that other metropolitan water utilities.

also reiterated that it would not be eligible for the lower tax rate and would incur a 30% corporate tax rate.[119]

WaterNSW's proposal did not include a tax allowance to be recovered through prices to offtake customers because of its preference to adopt an annuities approach over the RAB approach (see Chapter 9 for more detail).[120]

Table 6.19 IPART's decision and WaterNSW's proposed tax allowance ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
Essential Water				
IPART decision	851	811	787	2,449
WaterNSW's proposed	1,087	1,116	1,141	3,344
Difference	-236	-305	-354	-895
Difference (%)	-21.7%	-27.3%	-31.0%	-26.8%
Offtake customers				
IPART decision	0.9	0.9	0.9	2.8
WaterNSW's proposed	NA	NA	NA	NA

Note: Totals may not sum due to rounding.

Source: WaterNSW pricing proposal to IPART, July 2018, p49; IPART analysis.

Box 6.3 The Australian Government legislation on corporate income tax rates

In March 2017, the Australian Government enacted legislation that introduced different rates of corporate income tax for businesses of different sizes. Under the legislation, from 1 July 2018, businesses with an aggregated turnover of less than $50m (base rate entities) pay 27.5% tax, while those with a higher turnover pay 30% tax on all their taxable income.[121] The rate will then reduce to 25% by the 2021-22 income year, as detailed in the table below.

Table 6.20 Company tax rates applicable to base rate entities[a]

Income year	2018-19	2019-20	2020-21	2021-22
Tax rate for base rate entities under the threshold[b]	27.5%	27.5%	26.0%	25.0%

[a] The lower company tax rate applies to base rate entities with an aggregated turnover less than $50 million from the 2018-19 income year.

[b] Thresholds are not indexed for inflation

Source: Australian Taxation Office, Changes to company tax rates: www.ato.gov.au/rates/changes-to-company-tax-rates/

6.3.3 Non-cash capital contributions

We made a decision:

30 To accept WaterNSW's forecast of zero non-cash capital contributions over the regulatory period.

119 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 19.
120 WaterNSW pricing proposal to IPART, June 2018, p 63.
121 *Treasury Laws Amendment (Enterprise Tax Plan) Act 2017*.

WaterNSW did not propose any forecast any non-cash capital contributions. Our decision is to accept this forecast.

Non-cash capital contributions (also known as Assets Free of Charge, or 'AFOC') are assets that utilities receive for free. Non-cash capital contributions do not affect the RAB, and utilities do not earn a return on or of those assets. Utilities, however, are required to pay tax equivalents on the value of non-cash capital contributions. As such, we need to include forecast AFOC as revenue in the calculation of the regulatory tax allowance building block.

6.4 Allowance for working capital

We made a decision:

31 To set the allowance for working capital for determining prices to Essential Water and offtake customers as shown in Table 6.21.

Table 6.21 IPART's decision on the allowance for working capital ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
Essential Water				
IPART decision	161.1	169.2	167.3	497.6
WaterNSW's proposed	136.4	143.1	141.5	421.1
Offtake customers				
IPART decision	0.2	0.2	0.2	0.7
WaterNSW's proposed	NA	NA	NA	NA

Note: Totals may not sum due to rounding.

Source: IPART analysis.

Our decision on the allowance for working capital is based on our revised working capital allowance policy.[122] The parameters we used to calculate the working capital allowance, along with those proposed by WaterNSW, are shown in Table 6.22.

Table 6.22 Working capital parameters

Item	Recommended	WaterNSW's proposed	Comments
Days of receivables[a]	15+30 = 45	45	Recommended days assumes monthly billing and 30 days to pay. WaterNSW's proposal did not specify billing frequency or days to pay.
Inventory ($'000)	0	0	
Prepayments ($'000)	0	0	
Days of payables	30	30	Standard IPART assumption.

a Our Working Capital Allowance Policy defines the number of days receivable (for a water business that bills all charges in arrears) as 50% of the billing cycle number of days + days delay before payment.

122 IPART, Working Capital Allowance, Policy Paper, Final report Policies, November 2018. Available here on our website.

Our allowance for working capital is greater than WaterNSW's proposal (Table 6.23). This is largely due to our revised working capital policy,[123] which means that we used a nominal (post-tax) WACC of 6.4% rather than a real (post-tax) WACC of 4.3% proposed by WaterNSW.[124]

WaterNSW's proposal did not include a working capital allowance to be recovered through prices to offtake customers because of its preference to adopt an annuities approach over the RAB approach (see Chapter 9 for more detail).[125]

Table 6.23 IPART's decision on the allowance for working capital compared to WaterNSW's proposal ($2018-19, $'000)

	2019-20	2020-21	2021-22	Total
Essential Water				
IPART decision	161.1	169.2	167.3	497.6
WaterNSW's proposed	136.4	143.1	141.5	421.1
Difference	24.6	26.1	25.8	76.5
Difference (%)	18.1%	18.2%	18.2%	18.2%
Offtake customers				
IPART decision	0.2	0.2	0.2	0.7
WaterNSW's proposed	NA	NA	NA	NA

Note: Totals may not sum due to rounding.

Source: IPART analysis.

123 IPART, Working Capital Allowance, Policy Paper, Final report Policies, November 2018. Available here on our website.

124 As part of our review of our Working Capital Allowance Policy undertaken in 2018, we decided to apply a nominal (post-tax) WACC rather than the real WACC to determine the return on net working capital. We did this because, we calculate a working capital amount each year based on our estimate of the business' requirements for that year which does not include capitalising a cumulative inflationary gain (unlike our RAB approach).

125 WaterNSW pricing proposal to IPART, June 2018, p 63.

7 Forecast customer numbers and water sales

To convert the NRR into prices, we need to forecast the number of customers and offtakes, and the volume of water sales to those customers and offtakes in each year of the determination period. The number of customers and offtakes are used to determine access charges, and the water sales volume is used to estimate what proportion of the NRR will be recovered through usage charges.

For this review, WaterNSW has one major customer – Essential Water – and will also transport water to a number of offtakes along the Pipeline during the 2019 determination period. Its proposed forecast water sales volumes to Essential Water are based on estimates by its consultant, GHD, using 10 years of historical data of sales volumes to customers in Broken Hill.[126]

In this chapter we outline our approach to forecasting the volume of water sales and our consideration of factors that may impact demand for water from the Pipeline, including the demand for water from other supply sources.

The sections below summarise our decisions on these forecasts, and then discuss each decision in more detail, including our consideration of WaterNSW's proposal and stakeholders' submissions to our Draft Report.

7.1 Summary of decisions on customer numbers and water sales volumes

We decided to accept WaterNSW's forecast customer numbers and the number of offtakes, as we have no information to assess the forecast number of offtakes.

For offtakes, our decision is based on the latest information submitted by WaterNSW to our Draft Report, which confirmed the construction of five offtakes (see Chapters 5 and 6 for discussion on the capital expenditure allowance and RAB, respectively), that will supply water to four potential offtake customers.[127] In Chapter 9, we discuss our decision to set fixed access charges per offtake[128]. Therefore, the following sections will refer to the number of offtakes instead of offtake customers.

Our forecast customer numbers, including offtakes, are shown in Table 7.1. This includes the information in WaterNSW's submission to our Draft Report.

126 WaterNSW pricing proposal to IPART, June 2018, p 71.

127 As provided by WaterNSW in its submission to our Draft Report, there are potentially four offtake customers, including a customer who agreed with the land-swap arrangement with WaterNSW (discussed in Chapter 6).

128 As discussed in Chapter 9, our pricing assumed one offtake customer per offtake. In Chapter 10, we explain the charging arrangements where this is not the case, eg, where two customers are serviced by a single offtake, or one customer is serviced by two offtakes.

Table 7.1 Forecast customer and offtake numbers

	2019-20	2020-21	2021-22
IPART decision			
Essential Water	1	1	1
Offtakes[129]	5	5	5

Source: WaterNSW pricing proposal to IPART, June 2018, pp 71-72 and supporting modelling provided with the pricing proposal.

We decided not to accept WaterNSW's forecast water sales volumes to Essential Water and instead set these volumes as shown in Table 7.2. Our volumes are 23% per year lower than WaterNSW's forecast volumes, on average.

They reflect our decisions to:

- Adopt the forecast metered water sales to end use customers in Broken Hill used in our concurrent review of Essential Water's prices[130] as a baseline in estimating the water demand from the Pipeline.
- Make adjustments to this baseline to account for the potential impact of two factors on Essential Water's demand for water from the Pipeline:
  - water losses from Essential Water's existing network (which would need to be made up with more water from the Pipeline), and
  - a preference to source water from Essential Water's own storages, when it is cost effective and there is sufficient rainfall to make this possible, before transporting water from the Murray River using the Pipeline.

Table 7.2 Forecast water sales volumes to Essential Water (ML)

Forecast	2019-20	2020-21	2021-22
WaterNSW proposed			
Essential Water	5,650	5,700	5,750
IPART decision			
Essential Water	4,401	4,387	4,370

Source: WaterNSW pricing proposal to IPART, June 2018, pp 71, and IPART analysis.

In its pricing proposal, WaterNSW provided us with forecast water sales volumes of 10ML per offtake.[131] We have no information to assess these volumes or suggest that they are incorrect, therefore we have accepted WaterNSW's forecasts. In Table 7.3, the forecast water sales volumes to offtakes have been updated to 50ML per year to take into account the construction of five offtakes as confirmed in WaterNSW's submission to our Draft Report.[132]

129 This is the total number of offtakes confirmed by WaterNSW in its submission to our Draft Report. As discussed in Chapter 6, four offtakes are included in the offtake RAB, while the value of one offtake was included in the Pipeline RAB because of the land-swap arrangement.

130 IPART, *Review of prices for Essential Energy's water and sewerage services in Broken Hill from 1 July 2019 – Final Report*, April 2019, Chapter 7.

131 WaterNSW has used this assumption for illustrative purposes only. WaterNSW pricing proposal to IPART, June 2018, p 71.

132 WaterNSW, *submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019*, p 24.

Table 7.3 Forecast water sales volumes to all offtakes (ML)

Forecast	2019-20	2020-21	2021-22
WaterNSW proposed			
Offtakes[133]	50	50	50

Source: WaterNSW pricing proposal to IPART, June 2018, pp 71.

7.2 Forecast customer and offtake numbers

We made a decision:

32 To accept WaterNSW's proposed customer and offtake numbers over the 2019 determination period (as shown in Table 7.1).

The Pipeline's primary customer is Essential Water. Its primary purpose is to transport water in order to provide this utility with a source of bulk water, to improve the security of water supply for its customers (ie, end-users in the Broken Hill area).

WaterNSW will also use the Pipeline to transport water to a number of offtakes along its route, under separate agreements with the relevant customers. We have accepted WaterNSW's proposed forecast number of offtakes (five), as we cannot reasonably assess this number over the 3-year determination period.

7.3 Forecast water sales volumes to Essential Water

We made a decision:

33 To use forecast water sales volumes to Essential Water as shown in Table 7.2, which are 23% lower, on average, than WaterNSW's proposed forecasts.

WaterNSW's forecast water sales volumes to Essential Water are based on a linear regression using 10 years of historical data on sales volumes to end use customers in Broken Hill. This forecast predicts increases in water sales to Essential Water of an average of 50ML per year during the determination period.

We engaged a consultant, Frontier Economics (Frontier), to review WaterNSW's forecast water sales volumes to Essential Water for the 2019 determination period. We also asked Frontier to recommend the forecast metered water sales of Essential Water to its end use customers in Broken Hill (prepared for our concurrent review of Essential Water's prices) to use as a starting point in forecasting water demand from the Pipeline.

We largely accepted Frontier's recommended forecasts of Essential Water's sales to Broken Hill, but made adjustments based on our own analysis.[134] The following sections explain how we arrived at our forecast of WaterNSW's water sales to Essential Water using the Pipeline, and taking into account WaterNSW's submission to our Draft Report.

133 In our Draft Report, the forecast water sales volumes to offtake customers was 30ML per year, which considered the construction of three offtakes.

134 IPART, *Review of prices for Essential Energy's water and sewerage services in Broken Hill from 1 July 2019 – Final Report*, April 2019, Chapter 7

7.3.1 Frontier's findings on WaterNSW's forecast water sales to Essential Water

WaterNSW's forecast was prepared by GHD.[135] GHD estimated Essential Water's baseline forecast demand for water from the Pipeline by performing a linear regression of Essential Water's sales volumes to its customers in Broken Hill over the last 10 years (including restricted and high rainfall years), and then projecting out over the 2019 determination period.

Frontier identified several concerns with this approach, including that:[136]

- It did not take account of forecast changes in Essential Water's customer connections/population.
- It did not disaggregate overall demand into trends by major customer groups, including residential, business and mining customers.
- It did not adjust historical sales data that might be unrepresentative of 'normal' demand, ie, years with higher or lower than average rainfall.

7.3.2 Frontier's recommended forecast metered water sales of Essential Water to Broken Hill

As part of our concurrent review of Essential Water's prices, Frontier undertook bottom-up, detailed water demand modelling to forecast Essential Water's metered water sales to its end use customers in Broken Hill.[137]

We largely accepted Frontier's recommendations, but added a 'bounce-back' in demand to reflect estimated changes in customer behaviour once the new Pipeline becomes operational. The top row in Table 7.4 shows our decision on forecast water metered sales used in our review of Essential Water's prices.

7.3.3 IPART's considerations and analysis on forecast water sales volumes to Essential Water

In the Final Report on our concurrent review of Essential Water's prices,[138] we have made a decision on the forecast metered water sales of Essential Water to its end use customers in Broken Hill.

Table 7.4 shows this starting point and the adjustments we have made to this to arrive at our forecast of WaterNSW's water sales to Essential Water using the Pipeline. This includes:

- adding our estimate of Essential Water's real losses from its existing network[139], and

135 WaterNSW, *Pricing Proposal to the Independent Pricing and Regulatory Tribunal – Regulated prices for the Wentworth to Broken Hill Pipeline,* 16 July 2018, p 71.

136 Frontier Economics, *Review of WaterNSW and Essential Energy's Water Forecasts – Demand forecasts and customer connections forecasts,* 25 January 2019, pp7-9.

137 IPART, *Review of prices for Essential Energy's water and sewerage services in Broken Hill from 1 July 2019 – Final Report*, April 2019, Chapter 7

138 IPART, *Review of prices for Essential Energy's water and sewerage services in Broken Hill from 1 July 2019 – Final Report*, April 2019, Chapter 7

139 We made a minor adjustment (resulting in a small increase of 19 ML per year) from our Draft Report due to a change in methodology.

- subtracting our estimate of the amount of water that Essential Water will source from its water storages before transporting water using the Pipeline.

The second adjustment considers the ability of Essential Water to source water supply from its own storages, which reflects that the Pipeline is not its only source of water. These adjustments are discussed further in the following section.

Table 7.4 Forecast water sales to Essential Water (ML) using the Pipeline

Forecast	2019-20	2020-21	2021-22
Essential Water's forecast metered water sales	**5,968**	**5,955**	**5,939**
Add real water losses	343	342	341
Subtract supply from existing storages[a]	-1,910	-1,910	-1,910
Essential Water's purchases from WaterNSW using the Pipeline	**4,401**	**4,387**	**4,370**

[a] Our forecast water supply from existing reservoirs appears as a negative number, because it reduces water transported via the Pipeline.

Source: IPART analysis.

Real water losses from Essential Water's existing network

In any water supply system, there are system losses as a result of leaking pipes, main breaks, system flushing, etc. From Essential Water's perspective, these 'real' water losses are treated as non-revenue water for billing purposes. However, Essential Water will need to purchase water from WaterNSW to cover these losses.

We estimated the annual real losses to be a factor of 5.4%, which have been included in the Essential Water purchases as shown in Table 7.4. This is based on the 10-year average of the unbilled water volumes reported by Essential Water. We note that this estimate is quite low compared to similar utilities (ie, roughly half of the national average).[140]

Essential Water to source water from its own storages before transporting water using the Pipeline

Given the cost of transportation services via the Pipeline, we consider it probable that Essential Water would supply its customers with water from its own storages in preference to the Pipeline, when it is cost efficient and there is sufficient water to make this possible. This would have an impact on the volume of water it purchases from the Pipeline (at the very least, in the short term).

To account for this, we estimate that over the long term around 30% of Essential Water's customers' demand for water can be supplied from its storage reservoirs.

In its submission to our Draft Report, WaterNSW disagreed with this preferential consideration because:[141]

- It would be difficult to predict rainfall and subsequent demand from water harvesting in existing local water supply.

140 Bureau of Meteorology, *National Performance Report: Urban Utilities 2016-17*.

141 WaterNSW, *submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019*, pp 20-22.

- It would be more expensive to pump water from Umberumberka reservoir than pumping from the Darling River using existing pipelines or than the Murray River using the Pipeline.
- Essential Water would not solely rely on its own sources as this does not consider treatment cost and consumer preferences. According to WaterNSW, changes in water quality, including taste, would be a factor in Essential Water's preferences and would lead to a blending of supply rather than a sole supply. Based on this, WaterNSW has argued that this could lead to increased demand.
- Based on the Essential Water price review, WaterNSW noted that customers who currently purchase untreated water from the Menindee pipeline will receive water from Stephens Creek using the Pipeline. WaterNSW suggested that it is likely to result in higher demand for water using the Pipeline as more water needs to be stored and evaporated.

We decided to maintain our draft decisions after considering WaterNSW's submission as follows:

- Given the newness of the Pipeline, there is no empirical evidence to support WaterNSW's view that Essential Water will prefer sourcing water using the Pipeline. Our final decision takes into account the fact that Essential Water has multiple sources of water. We consider it reasonable that Essential Water would supply its customers with water from its own storages in preference to the Pipeline, when it is cost efficient and there is sufficient water to make this possible.
- While we do not disagree with WaterNSW's comment about the unpredictability of rainfall, historical data shows that Essential Water has been able to meet a portion of its water demand from its own storages during most years. Therefore, our final decision on water demand by Essential Water takes this into account. To estimate the impact of rainfall on supply sources, we have used the net amount of water being pumped out of its own storages as a proxy for this (see Box 7.1 and discussion below).
- Based on the available information provided by Essential Water as part of our concurrent review of prices in Broken Hill, Essential Water's treatment costs and transportation costs are not differentiated by source. In the absence of supporting evidence from WaterNSW, we have maintained our draft decision and will consider this matter at the next price review.[142]
- While we do not disagree with WaterNSW that water quality and consumer preference can have an impact on its supply operation, WaterNSW did not provide any supporting evidence to show how water transported using the Pipeline is of superior quality and would result in higher preference. In the absence of evidence from WaterNSW, we will continue to assume that around 30% of Essential Water's customers' demand for water will be supplied from its storage reservoirs, on average. We will review this assumption at the next price review.

142 This includes our consideration of the impact of the Pipeline replacing the Menindee pipeline in our forecasts for water purchases by Essential Water.

How we calculate Essential Water's net demand for water using the Pipeline

To estimate the net demand for water using the Pipeline, we considered the historical amount of water sourced from Essential Water's storages over the past 20 years, using the approach outlined in Box 7.1. We used this as a proxy in estimating the impact of rainfall yield on water supply and the ability of Essential Water to source water from its own storages.

The results of our analysis are summarised in Figure 7.1. This figure indicates that, historically, in particularly low rainfall years (eg, around 2003, 2005-6, 2018), 100% of Essential Water's customers' raw water demand (which is 5,000-6,000ML per year) has been supplied from the Darling River using the Menindee pipeline. However, in particularly high rainfall years (eg, around 2001 and 2012-13), most of this demand has been supplied from its existing storages, with rainfall affecting the amount of water in those storages.

For this review, we consider it appropriate to assume that 30% of Essential Water's customers' demand for water can be supplied from its storage reservoirs, on average. Although the volume of water supplied by these storages can be volatile because it's affected by rainfall, we consider it appropriate to subtract the median amount of water supplied from these storages from the overall amount of water that Essential Water will require.

Box 7.1 Estimating the rainfall yield, using historical water sourced from Essential Water's storages, and its impact on the demand for water for the Pipeline

Essential Water currently operates two water storages: Umberumberka reservoir and Stephen's Creek reservoir. Umberumberka receives water from rainfall only. Stephen's Creek receives water from rainfall and water pumped from Menindee Lakes via the Menindee pipeline.

To estimate the annual rainfall yield from these storages, we obtained 20 years of daily data on the volume of water pumped:

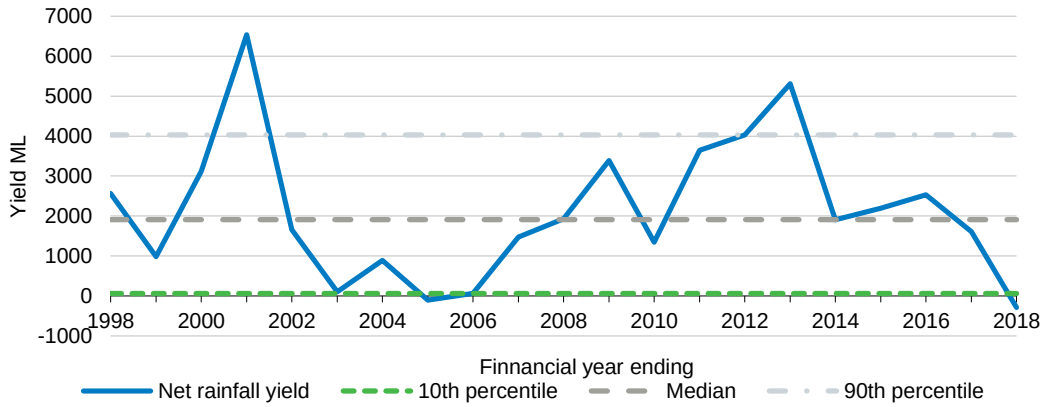
- from the Umberumberka pump station
- from the Stephen's Creek pump station, and
- from the Menindee Lakes pump station to the Stephen's Creek reservoir.

We then calculated the annual volume of water supplied using rainfall from the two reservoirs as:

- The annual volume from the Umberumberka pump station
- Plus the annual volume from the Stephen's Creek pump station
- Less the annual volume pumped into Stephen's Creek from the Menindee pump station.[143]

143 We also had to make a small adjustment for evaporation at Stephen's Creek dam, based on Essential Water's seasonal estimates of evaporation.

Figure 7.1 Net rainfall yield from Essential Water's storages



Data source: Essential Water and IPART analysis.

8 Output measures and incentive mechanisms

This chapter outlines our approach to two elements of the 2019 Determination:

- **Determining output measures** and our decision to have WaterNSW report on a number of performance indicators for the Pipeline as part of its Annual Information Return (AIR), and
- **The application of incentive mechanisms** and our decision to allow for an Efficiency Carryover Mechanism (ECM).

In reaching our decisions, we considered the information provided by WaterNSW in its proposal, our consultant's recommendations, and WaterNSW's submissions to our Draft Report.

8.1 Performance indicators for the Pipeline

We made a decision:

34 That WaterNSW will report on a number of performance indicators for the Pipeline as part of its Annual Information Return (AIR), as outlined in Table 8.1.

Accompanying price determinations, we often set output measures and/or performance indicators for the water utilities we regulate as a means of determining whether they are delivering on the expenditure plans or outcomes they outline in their pricing submissions. This is important because we set prices to enable them to recover the forecast costs of undertaking expenditure to deliver services to customers.

WaterNSW did not propose any output measures or performance indicators in its pricing submission to IPART.

Given the newness of the Pipeline, and the relatively small amount of forecast operating and capital expenditure over the 2019 determination period compared to the upfront capital costs, we decided there is limited benefit in setting output measures that focus on capital projects or expenditure for this upcoming determination period.

Rather, we consider it is more appropriate for WaterNSW to report on a number of performance indicators to inform future determinations, as outlined in Table 8.1. These performance indicators will form part of WaterNSW's AIR.

8.1.1 Review of performance indicators for the Pipeline

Our expenditure consultant, Synergies, reviewed the contract arrangements for the Pipeline. Under the operating and maintenance contract (O&M), the John Holland/Trility Joint Venture (the JV) is accountable to WaterNSW for a wide range of operational and service performance

obligations. Synergies considered that there is merit in WaterNSW reporting against a small number of performance indicators for the Pipeline as part of its AIR to IPART.[144]

Accordingly, Synergies proposed a set of performance indicators across four categories (see Table 8.1). Synergies considered that this will provide IPART with information that is important in its review of the 2019 Determination and future price reviews.[145] In particular, these indicators will enable IPART to monitor the revenue, expenditure, operational and service performance features of the Pipeline relative to the assumptions and forecasts underpinning the 2019 Determination. Further, Synergies considered that the reporting burden on WaterNSW is minimal, given that these indicators will be reported under the contractual arrangements between WaterNSW and the JV.

Table 8.1 Performance indicators for the Pipeline – to be reported by WaterNSW

Category	Performance indicators
Revenue	Actual revenues in relation to: ▼ The Pipeline's water transportation service ▼ Offtake revenues
Expenditure	▼ Annual reporting on each of the Pipeline's capital expenditure and operating expenditure items, including electricity costs
Water quantity	▼ Monthly volume of water delivered to the bulk water storage facility ▼ Monthly volume of water in the bulk water storage facility relative to total capacity of the facility ▼ Monthly volume of water delivered to Essential Water ▼ Monthly volume of water delivered to offtakes
Assets	▼ Energy usage by pump station at off-peak, shoulder and peak times each month (measured in kWh) ▼ Number, type and size (in dollar terms) of efficiency initiatives effected under the O&M Contract's efficiency benefit sharing scheme ▼ Electricity savings (defined as the John Holland Trility JV's actual electricity costs minus electricity payments made by WaterNSW to the JV) that are made under the O&M Contract's electricity saving sharing mechanism ▼ Total number of times in which the Pipeline is placed in shutdown and standby modes ▼ Frequency of times in which the Pipeline is placed in shutdown and standby modes by Essential Water

Source: Synergies Economic Consulting, *Expenditure Review – Broken Hill Pipeline Final Report*, January 2019, pp 129-132.

8.2 Efficiency carryover mechanism

Our decision to have a price cap form of regulation means that we set maximum prices that reflect our best estimate of the efficient costs WaterNSW will incur for the Pipeline.

Therefore, if WaterNSW is able to be more efficient during the determination period, our current approach would allow WaterNSW to keep these savings during the determination period. If these cost savings are permanent, they are then passed onto customers through

144 Synergies Economic Consulting, *Expenditure Review – Broken Hill Pipeline Final Report,* January 2019, p 129.

145 Synergies Economic Consulting, *Expenditure Review – Broken Hill Pipeline Final Report,* January 2019, p 133.

lower prices (reflecting lower costs) at the next price determination. This is referred to as 'incentive regulation', because the business has a financial incentive to achieve cost savings during the determination period.

We made a decision:

35 To allow for an Efficiency Carryover Mechanism (ECM) to apply to operating expenditure with a three year holding period.

A shortcoming of our current approach is that the financial reward for achieving savings reduces over the determination period, as we get closer to the next price determination (when costs are re-assessed and prices are set to reflect the latest estimate of efficient costs). This means WaterNSW has an incentive to delay savings from the latter years of one determination period to the beginning of the next.

To address this shortcoming, an ECM would allow permanent efficiency gains (ie, cost decreases) to be held by the utility for a specified period (eg, three years) before they are passed on to customers, regardless of when they are achieved within a determination period. This equalises the incentive to make permanent efficiency savings over a determination period. As a result, this reduces the incentive to defer identifying cost savings to the beginning of the following regulatory period, allowing customers to benefit from efficiencies sooner.

Further information on our ECM is discussed in Appendix F.

8.2.1 WaterNSW's contract with the Pipeline operator has an efficiency sharing mechanism

In its pricing proposal, WaterNSW indicated that it has a 50/50 efficiency sharing mechanism with its O&M operator for any energy underspends (ie, when the operator uses less energy than the volume specified in the contract).[146]

The mechanism operates on a year-to-year basis, which means that temporary underspends are shared between the operator and WaterNSW. If the operator overspends (ie, uses more energy than the volume in the contract) the resulting losses will be retained by the operator. In its pricing proposal, WaterNSW stated that it would pass on its share of any year-to-year savings to Essential Water. Further, in its submission to our Issues Paper, WaterNSW stated that it supports a 100% pass through of any efficiencies/losses from its share of energy efficiencies under its O&M contract to its customers.

IPART's considerations and analysis

In its submission to our Draft Report, WaterNSW queried how the ECM would be applied considering our draft decision to set an efficient energy cost allowance that was about 50% below the level proposed by WaterNSW in its pricing submission and given WaterNSW's arrangement with the O&M operator which includes an efficiency sharing mechanism. WaterNSW restated its view that the ECM can only apply to its actual operating costs – ie, excluding costs incurred and savings achieved by the O&M operator.

146 WaterNSW pricing proposal to IPART, June 2018, p 107.

We recognise the ECM may have a limited effect given that the benchmark energy price that we set is effectively outside the scope of the ECM[147] and that the O&M contract contains an efficiency sharing mechanism that allows the operator to retain a share of the efficiency saving (ie, the share retained by the operator is not available to WaterNSW and would not fall into the scope of the ECM). However, energy volumes, WaterNSW's share of efficiency savings through the O&M contract, and corporate overhead costs are potentially within the scope of the ECM. We have therefore maintained our draft decision for the ECM to be available to the Pipeline in the event that WaterNSW achieves a permanent efficiency saving (compared to our operating expenditure allowance) and wishes to retain this saving for a certain period of time before it is passed through to customers through lower prices.

Given the Pipeline and O&M contract are relatively new, we will consider at the next price review any reduction in costs achieved by WaterNSW and the Pipeline operator, and the sharing of any efficiencies between them.

ECM parameters

The ECM will apply to the Pipeline's operating expenditure only

In our previous applications of the ECM, we have restricted the mechanism to apply only to operating expenditure (ie, we have excluded capital expenditure). This is because the experience from other regulators (eg, ESC[148] and Ofwat[149]) has shown that applying the ECM to capital expenditure can incentivise inefficient deferrals from one determination period to the next.[150] [151] The ECM is more appropriate for operating expenditure because operating expenditure is more recurrent in nature (ie, difficult to shift between years). We recognise the downside of restricting the ECM to operating expenditure as this does not take into account efficient trade-offs between operating and capital expenditure.[152] However, we do not accept that applying the ECM to both operating and capital expenditure will necessarily achieve the intended outcome of balancing incentives to make efficient trade-offs between operating and capital expenditure.[153]

As a result, we have decided that the ECM will apply to the Pipeline's operating expenditure.

147 That is, we set the benchmark energy price completely independently from the actual energy price achieved by the business so if the business secures an energy price below the benchmark this will have no effect on the benchmark we set going forward.

148 Essential Services Commission (ESC) is the independent economic regulator in Victoria. It regulate Victoria's energy, water and transport sectors, and administer the rate-capping system for the local government sector.

149 Ofwat is a non-ministerial government department that was established in 1989. It is the economic regulator of the water sector in England and Wales.

150 IPART, *Review of prices for Sydney Water Corporation From 1 July 2016 to 30 June 2020 Water – Final Report,* June 2016, p268.

151 Ofwat, *Setting price controls for 2015-20 – Final methodology and expectations for companies' business plans,* July 2013, pp18-19.

152 That is, if an operating expenditure solution costs less than a capital expenditure solution, the business should have an incentive to choose the lowest cost option.

153 A key reason Ofwat moved away from operating and capital allowances (with separate ECMs in place) was that this approach was not resulting in efficient trade-offs between operating and capital expenditure. Ofwat, *Setting price controls for 2015-20 – Final methodology and expectations for companies' business plans,* July 2013, pp 18-19.

Length of holding period

With regard to the length of holding period, all else equal, a longer holding period will incentivise the business to make larger investments to find and deliver permanent efficiency savings. On the other hand, a longer holding period will delay when customers benefit from the saving. In addition, if there are savings available that require little if any investment, setting a longer holding period will have little impact other than providing the business a larger share of the overall benefit. While it is possible to have a holding period that differs from the length of determination period, we have decided to set the ECM holding period equal to the length of determination period (ie, 3 years in the case of the 2019 Pipeline determination). Further information on our ECM is discussed in Appendix E.

9 Price structures and prices

We use forecasts of the demand for water transportation services and offtake numbers to calculate maximum prices that are expected to recover the Pipeline's NRR (or target revenue). However, before we set maximum prices we need to decide on appropriate price structures. Price structures determine how the efficient costs of the Pipeline's transportation services are split between:

- different **types of customers** (ie, Essential Water and offtake customers[154]) and
- different **price components** (ie, access charges that are levied regardless of the amount of water transported, and usage charges that are levied per ML of water transported).

Once the structure of prices has been decided we can calculate the level of those prices - ie, how **much** customers will be charged.

This chapter explains our decisions on price structures and prices for the Pipeline and sets out:

- A summary of our decisions.
- Our pricing principles.
- Our decisions on price structures and prices for Essential Water in detail.
- Our decisions on price structures and prices for offtake customers in detail.

This chapter also explains our decision to allow for unregulated pricing agreements between WaterNSW and offtake customers under the 2019 Pipeline Determination. The impact of our pricing decisions on customer bills is discussed in Chapter 10.

9.1 Summary of decisions on price structures and prices

In setting prices, we adopted price structures that are cost reflective. This meant we set access charges to recover efficient fixed costs[155] and usage charges to recover efficient variable costs.[156] As a result, we did not accept all of WaterNSW's proposed price structures, as we considered they may create undesirable incentives affecting the demand for transportation services by Essential Water.

Our decisions on price structures and WaterNSW's proposed price structures are summarised in Table 9.1 and Table 9.2 below.

154 The number of offtakes WaterNSW has constructed is relevant to establishing the NRR and target revenue. However, our determination sets prices for customers. In this chapter we have assumed one offtake customer per offtake asset. In Chapter 10 we explain the charging arrangements where this is not the case, eg, where two customers are serviced by a single offtake, or one customer is serviced by two offtakes.

155 Fixed costs are those that do not vary over the short-term and do not change with the amount of output produced. Access charges are paid by customers regardless of the amount they consume.

156 Variable costs are those that change with the amount of output (in this case the amount of water transported through the Pipeline). Usage charges are paid by customers based on the amount they consume.

Table 9.1 Decisions on price structures

To recover:	Essential Water pays:	Offtake customers pay:
Fixed costs	Access charge ($/day) recovering: ▼ Pipeline capital costs ▼ Fixed operating costs ▼ Fixed electricity costs (daily charge and minimum load)	Access charge ($/day) recovering: ▼ Incremental fixed costs of offtake
Variable costs	Usage charge ($/ML)	Usage charge ($/kL)

Source: IPART analysis.

Table 9.2 WaterNSW's proposed price structures

To recover:	Essential Water pays:	Offtake customers pay:
Cost of building assets	Access charge ($/year) recovering Pipeline capital costs	Access charge ($/year) recovering: ▼ Incremental capital cost of offtake ▼ Contribution to Pipeline capital costs
Operating and maintenance (O&M) costs	Access charges recovering: ▼ Fixed O&M costs ($/year) ▼ Fixed electricity costs (daily charge, $/year) ▼ Electricity demand charge ($/month or year) (as applicable) ▼ Shut down and restart charges ($/event) and standby charges ($/day) (as applicable)	N/A
	Declining usage charge ($/ML/week)	Offtake customers charged at a single point on the usage charge schedule for Essential Water ($/kL/week) for water transportation.
Cost of early water	Early water usage charge[a] ($/ML)	N/A

a WaterNSW proposed that this charge would apply in the event that water was called on between the date of completion of the Pipeline (December 2018) and prior to commission (April 2019). We note that the prices we set under our determination will not apply until 1 July 2019.

Source: WaterNSW pricing proposal to IPART, June 2018, pp 86-88. IPART analysis.

Our prices for Essential Water are set out in Table 9.3. Both our access charges and our usage charges are lower than WaterNSW's pricing proposal.

For access charges, this reflects mainly:

- WaterNSW's actual capital expenditure coming in below initial forecasts contained in WaterNSW's pricing proposal,[157]

157 Compared to the forecast (or budgeted) capital expenditure that was used by WaterNSW in its pricing proposal (ie, before construction of the Pipeline was completed and including an allowance for "contingencies").

- Updates to inflation and market parameters for the cost of capital (WACC) between the time WaterNSW submitted its pricing proposal and this final decision,[158] and
- Our decision to use a 100-year asset life for the Pipeline rather than 80-year asset life proposed by WaterNSW.[159]

For usage charges, it reflects our decisions on the amount of energy required to transport water through the Pipeline and the efficient cost of that energy.

Table 9.3 Prices for Essential Water from 1 July 2019 ($2018-19) – without inflation

	2019-20[a]	2020-21	2021-22
IPART decision			
Access charge ($/day)	64,120.12	64,295.79	64,295.79
Usage charge ($/ML)	206.74	209.06	203.09
WaterNSW proposal			
Access charge ($/day)	80,509.63	80,171.34	79,470.65
Usage charge ($/ML)[b]	327.80	304.07	256.04
Difference			
Access charge ($/day)	-16,389.51	-15,875.55	-15,174.86
Usage charge ($/ML)	-121.06	-95.00	-52.95
Difference (%)			
Access charge ($/day)	-20.4%	-19.8%	-19.1%
Usage charge ($/ML)	-36.9%	-31.2%	-20.7%

a Calendar year 2020 is a leap year (ie, 2019-20 has 366 days)

b Average usage charge per year for an average usage volume of 5693 ML per year. Proposed charges vary depending on the weekly pumping profile. WaterNSW's proposed prices are set out in Appendix F.

Source: IPART analysis.

Our prices for offtake customers are set out in Table 9.4. Both our access charges and our usage charges are significantly lower than WaterNSW proposed. For access charges, this reflects our decision to allocate fixed costs between Essential Water and offtake customers on the basis of each party's right to pipeline transportation services (discussed below). For usage charges, it reflects our decisions on the amount of energy required to transport water through the Pipeline and the efficient cost of that energy.

158 As discussed in Chapter 6, the difference between WaterNSW's proposed WACC and our final WACC is due to the timing of the collection of the input data used in the calculation. For the final WACC, we have used the latest market data possible, ie, up to the end of March 2019. The methodology for calculating the WACC is consistent between WaterNSW's proposal and our final decision.

159 See Chapter 6 for more information.

These prices are based on the offtakes WaterNSW had constructed at the time of making this Determination.[160] If additional offtakes are constructed between now and the end of the 2019 Determination period, then these prices would also apply to those additional offtakes.

Table 9.4 Prices for offtake customers from 1 July 2019 ($2018-19) – without inflation

	2019-20[a]	2020-21	2021-22
IPART decision			
Access charge ($/day)	19.81	19.86	19.86
Usage charge ($/kL)[c]	0.20674	0.20906	0.20309
WaterNSW proposal			
Access charge ($/day)[b]	27.21	27.02	27.46
Usage charge ($/kL)	0.32127	0.29873	0.25138
Difference			
Access charge ($/day)	-7.40	-7.16	-7.60
Usage charge ($/kL)	-0.11	-0.09	-0.05
Difference (%)			
Access charge ($/day)	-27.2%	-26.5%	-27.7%
Usage charge ($/kL)	-35.6%	-30.0%	-19.2%

a Calendar year 2020 is a leap year (ie, 2019-20 has 366 days)

b Annuity payment plus contribution to Pipeline capital costs.

c The usage charge per ML is the same as for Essential Water and is $206.74/ML in 2019-20, $209.06/ML in 2020-21 and $203.09/ML in 2021-22.

Source: IPART analysis.

In its submission to the Draft Report, PIAC raised the issue of including the scarcity value of the water resource in prices. In particular, PIAC recommended that IPART consider how the limitations of water resources in the Murray-Darling system can be incorporated into the pricing structure, and addressed more appropriately in the next determination for the Pipeline.

As set out in Chapter 2, this review and determination sets the price for transporting water via the Pipeline, ie it addresses the costs of constructing the Pipeline and moving water through it from Wentworth to Broken Hill. In the concurrent review of prices for Essential Water's customers, the prices charged to end use customers in Broken Hill take account of the scarcity value of water. In estimating the marginal cost of water supply in that review (used to set the water usage charge) we have taken account of the opportunity cost of consuming water from the Murray River (ie, bulk water scarcity). We estimated a price per kL based on

160 There are currently five offtakes along the Pipeline. One of these offtakes was constructed by WaterNSW as part of a 'land swap' agreement, which involved WaterNSW providing an offtake in exchange for the land on which the Pipeline's bulk water storage facility was developed. We have included the capital value of this 'land swap' offtake in WaterNSW's Regulated Asset Base (RAB) for Essential Water (EW) because it represents the market value of land required to provide the regulated service to EW. We have included the other four offtakes in the offtake RAB and set an offtake access charge on a per offtake basis, which assumes this charge applies to the four offtakes included in the offtake RAB. If there is one customer connected to an offtake, they will pay 100% of this access charge and if there are two customers connected to an offtake, each will pay 50% of this access charge. All five offtakes will be subject to usage charges. We have forecast offtake demand by assuming each offtake supplies 10ML per year, for a total of 50ML of offtake demand per year.

the value of allocation trades in the NSW Murray River since 1 July 2014 (as this was the date the current Basin Plan water trading rules came into place).

Our determination of WaterNSW's prices for its other rural bulk water services sets the price for WaterNSW to store and deliver (via regulated rivers) water to various extraction points along the river system. Our next review of these prices will begin in 2020. The price of the water resource itself is determined through the water trading market (where water entitlements and allocations are traded). It would be inappropriate for us to apply a higher value for the water resource than the value determined by the market.

9.2 Pricing principles

In setting maximum prices for regulated water businesses, our overarching principle is that prices should be cost-reflective. This means that:

- Prices should only recover sufficient revenue to cover the prudent and efficient costs of delivering the monopoly services. Prices for individual services should reflect the efficient costs of delivering the specific service.
- Price structures should match cost structures, whereby:
  - usage charges reference an appropriate estimate of marginal cost (ie, the additional cost of transporting an additional unit of water), and
  - fixed service charges recover the remaining costs.
- Customers imposing similar costs on the system pay similar prices.

Prices that are cost-reflective promote the efficient allocation and use of resources – such as water and the capital invested to provide water transportation services – by sending accurate signals to customers about the cost of those services. For example, they discourage wasteful or unnecessary water usage.

Prices that are cost-reflective also promote efficient investment in water infrastructure and service provision – by ensuring that the regulated business cannot recover capital that is invested inefficiently or unwisely through the prices paid by customers.

In deciding on price structures, we also considered customers' preferences and whether the resulting prices are transparent, and easy for customers to understand and for the business to administer.

9.3 Price structures and prices for Essential Water

We made decisions:

36 To adopt a two-part tariff for Essential Water, with WaterNSW's fixed costs recovered through an access charge and WaterNSW's variable costs recovered through a usage charge, ie:

- Access charge ($/ day), reflecting the Pipeline's efficient fixed costs, being:
  - Capital costs;

- Fixed O&M costs;
- Fixed energy costs (both daily charge and minimum load); and

– Usage charge ($/ML), reflecting the Pipeline's efficient variable costs, being the energy cost associated with delivering a ML of water to Essential Water.

37 To set the prices to be charged to Essential Water in Table 9.5.

Table 9.5 Maximum prices for Essential Water ($2018-19)

	2019-20[a]	2020-21	2021-22
Access charge ($/day)	64,120.12	64,295.79	64,295.79
Usage charge ($/ML)	206.74	209.06	203.09

a Calendar year 2020 is a leap year (ie, 2019-20 has 366 days).

Source: IPART analysis.

38 To defer determining maximum prices for shutdown, standby and restart services initiated by Essential Water.

9.3.1 Access charge recovers efficient fixed costs

In its pricing proposal, WaterNSW proposed that most Pipeline charges should be levied on Essential Water, as WaterNSW has necessarily incurred capital and operating costs to build and maintain the Pipeline for Essential Water.[161] In particular, WaterNSW proposed that the majority of the Pipeline's (fixed) capital costs be recovered from Essential Water through a fixed charge, with a small contribution from offtake customers (which would otherwise be recovered from Essential Water).[162] WaterNSW also proposed that a number of fixed operating costs should be recovered from Essential Water.[163] WaterNSW considered that the installation of the offtakes would not have increased these costs above what would be reasonably required to serve Essential Water.[164]

WaterNSW's proposal raises the question of how the efficient fixed costs of the Pipeline should be allocated between Essential Water and other Pipeline customers.[165] In terms of the Pipeline's capacity, the requirement to meet peak daily demand of 37.4ML per day was a key prescribed design feature. In addition, we understand that Essential Water provided WaterNSW with a peak season demand forecast (December to March), which was to be

161 WaterNSW pricing proposal to IPART, June 2018, pp 92-93. WaterNSW considered that it is appropriate to apportion costs and charges to customer groups based on the contribution that each customer makes in creating the cost and their requirements for the Pipeline (such as service standards). Essential Water's primary role is to provide drinking water to the residents of Broken Hill. The Pipeline has been constructed for Essential Water to achieve this objective.

162 Ibid.

163 Ibid.

164 Ibid. In addition, in its response to the Issues Paper WaterNSW noted that the O&M contract specifies a payment schedule for operating and maintenance charges which is fixed over the 20-year term of the agreement, irrespective of the number of offtake assets installed. As such WaterNSW considered that all of the fixed operating and maintenance cost should be passed onto Essential Water. WaterNSW, submission to the Issues Paper – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, October 2018, p 11.

165 Theoretically, Essential Water and offtake customers could be charged anywhere between the incremental and stand-alone costs of service provision.

factored into Pipeline size and bulk water storage capacity.[166] Potential demand from offtake customers does not appear to have been a factor in establishing the Pipeline's capacity.[167]

Essential Water will be responsible for calling the Pipeline into operation, ie, it is Essential Water who will decide when the Pipeline will run and if (and when) it should be shut down and restarted. Offtake customers will only be serviced to the extent that fulfilling their demand for water transportation services is consistent with fulfilling Essential Water's demand.[168]

We have made a decision to allocate the efficient fixed costs between Essential Water and offtake customers on the basis of each party's contribution to the need to incur the cost of the Pipeline. The Pipeline was built (and designed) to supply Essential Water (and its customers in Broken Hill) – as reflected in Essential Water's guaranteed right to the Pipeline's transportation services, whereas offtake customers do not have such a guaranteed right. On this basis, under our prices, Essential Water would pay for the fixed costs of the Pipeline; whereas offtake customers would pay the incremental fixed costs associated with their supply.[169] In the event that a customer is connected to the Pipeline with a stronger right to service than is currently envisaged for offtake customers, or a right more akin to Essential Water's right, then IPART could consider making a new determination to take this into account.

We note that we have set access charges for Essential Water to recover all fixed energy costs, including the fixed requirement for electricity that occurs irrespective of the volume of water pumped (discussed in Chapter 4).

9.3.2 Usage charge recovers efficient variable costs

WaterNSW proposed a declining tariff for the usage charge to Essential Water. This means that the usage charge to Essential Water would decrease as the volume of water transported increased. In our Draft Report we did not adopt WaterNSW's proposed usage charge. Instead, we made a draft decision to set a single usage charge, reflecting our estimate of the cost of energy required to deliver a ML of water to Essential Water.[170]

In principle, the difference between the two price structures lies in how the electricity charges for fixed energy use[171] are recovered. WaterNSW proposed recovering this cost as part of the usage charge while our draft decision was to recover it as part of the access charge. We agree with WaterNSW that, from a cost recovery perspective, our tariff structure is generally consistent with WaterNSW's proposal.[172] However, as set out above, we set access charges to

166 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 6.

167 This is consistent with the way WaterNSW will operate the Pipeline, which will be to prioritise servicing the Broken Hill township. WaterNSW pricing proposal to IPART, June 2018, p 31.

168 To use an analogy with gas pipeline transportation services, Essential Water can be thought of as holding a 'firm' capacity right, while offtake customers can only access an 'as available' service.

169 Essential Water and offtake customers would each pay usages charges that recover the variable costs of supplying them.

170 IPART, Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019 – Draft Report, April 2019, pp 84-86.

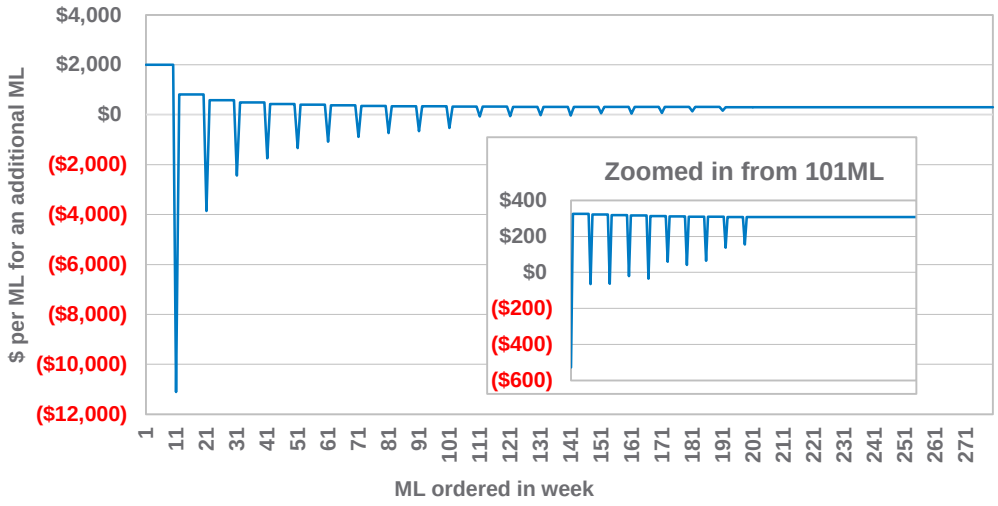
171 Ie, the fixed requirement for energy that the Pipeline has irrespective of the volume of water pumped.

172 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 23.

recover fixed costs and usage charges to recover variable costs, so this cost, being fixed, should be recovered through the access charge.

We also note that WaterNSW's proposed usage charges may create undesirable incentives affecting the demand for transportation services by Essential Water. As Essential Water's demand increases and moves between the usage charge bands proposed by WaterNSW (eg, from the 1 ML to the 10 ML band, to the 11 ML to the 20 ML band), the usage charge falls for each unit of water ordered for that week. As demonstrated in Figure 9.1 below, this produces negative marginal prices (ie, Essential Water would face a negative price if it ordered an additional ML of water) as demand increases from one band (eg 1 to 10 ML) to the next band (eg, 11 to 20 ML). This has the effect of reducing the amount paid by Essential Water if it demands more water transportation, ie Essential Water could lower its overall bill by using more water.

Figure 9.1 WaterNSW's proposed usage charge: negative marginal prices



Data source: WaterNSW pricing proposal to IPART, June 2018, p 87.

We consider that this could lead to perverse outcomes in terms of water consumption and investment. Instead, we have set a single usage charge, which we consider will encourage efficient consumption and investment decisions.

A single usage charge

As set out in Chapter 4, we have set the Pipeline usage charge ($/ML) as the total efficient energy costs ($) divided by forecast water demand (ML). For Essential Water's usage price:

- The total efficient energy costs ($) is set by calculating a weighted average benchmark energy unit cost based on three demand scenarios (corresponding to high, low and median demand for Pipeline transportation services). This approach results in total efficient energy costs that:
  - take into account the possibility of very high and very low demand years to ensure WaterNSW can recover its efficient cost on average over time (ie, if we based the usage price on the median demand scenario only, WaterNSW would under recover efficient costs in very high and very low demand years)

- takes into account evaporative losses (ML) occurring at the bulk water storage, and
- reflects the prioritisation of offpeak energy over shoulder energy (and shoulder energy over peak energy).

9.3.3 Defer determining shutdown, stand by and restart charges

As set out above, WaterNSW proposed price structures and levels that are designed to recover its expected costs under the O&M contract it has for the Pipeline with John Holland/Trility. This includes charges for shutdown, standby and restart services initiated by Essential Water. WaterNSW has proposed that IPART set a maximum price for these services as set out in Appendix F.

In relation to the costs of these shutdown, standby and re-start charges, we note the following:

- These costs are driven by Essential Water, and should be internalised by Essential Water. Essential Water should make water source decisions to achieve its water supply requirements at an efficient total cost. That is, Essential Water should choose to incur these costs if it lowered its overall total cost of supply.[173]
- We do not want to set up an expectation that these costs would be automatically passed through to and recovered from Essential Water's customers.
- Our expenditure review consultant (Synergies) could not confirm whether the proposed shutdown and restart charges were cost reflective (ie, Synergies considered the proposed charges could be 'punitive' rather than cost reflective).[174] With this degree of uncertainly around costs, any price we determine might not drive efficient outcomes (because of the risk it would be too high or too low).

Taking these issues into account, we have made a decision to defer determining prices for shutdown, standby and restart services in the 2019 Determination.[175] We will consider this issue for the next determination, when we may have more information on the likely costs of these services. WaterNSW could still levy these charges on Essential Water, as negotiated on a commercial basis between the two parties.[176] End use customers in Broken Hill would be indifferent to any such commercial arrangement, as it would not affect, or be reflected in, the prices they pay. We note that the access charge IPART determines would still apply under shutdown, standby and restart services.

---

173 Although we note that the likelihood of Essential Water requesting these services (ie not requiring water sourced via the Pipeline) is low.

174 Synergies Economic Consulting, *Expenditure review of WaterNSW's Wentworth to Broken Hill Pipeline*, Final Report, January 2019, p 110.

175 IPART has deferred determining individual prices previously, eg, prices under the Annual Water Quality Incentive Payment scheme between WaterNSW and Sydney Water. IPART, *Review of prices for WaterNSW from 1 July 2016 to 30 June 2020 – Final Report*, June 2016, pp 60-62.

176 Essential Water submitted that WaterNSW should be exposed to some of the costs of shutdown and standby, given WaterNSW may shut down the pipeline for failure mode and maintenance events. Essential Energy, *submission to the Issues Paper – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019*, November 2018, p 14. We would expect any agreement between the two parties would cover all shutdown, standby and re-start events, including shutdown initiated by WaterNSW.

9.3.4 Proposed early water charge

WaterNSW proposed an Early Water Charge that would be levied per ML of water delivered to Essential Water in the event that water is called on between the date of completion of the Pipeline (December 2018) and prior to commissioning (April 2019).[177]

Our determination will come into force on 1 July 2019. We consider that any pricing arrangements for the supply of services prior to this commencement date are a matter for agreement between WaterNSW and Essential Water. However, we note that Essential Water is bound by its current price determination (until this is replaced) and Essential Water is not able to charge higher than the maximum prices in the existing determination (ie, it would not be able to increase prices to recover any additional costs).

9.4 Price structures and prices for offtake customers

We made decisions:

39 To adopt a two-part tariff for offtake customers that reflects the incremental fixed and variable costs to WaterNSW of serving them, consisting of an:

- Access charge ($/day), reflecting the efficient fixed capital and operating costs of the offtakes, being the connection costs calculated using a RAB and the fixed operating costs.
- Usage charge ($/kL), reflecting the efficient variable costs of the offtake, being the energy costs associated with delivering a kL of water.

40 To set the prices to be charged to offtake customers in Table 9.6.

Table 9.6 Maximum prices for offtake customers ($2018-19)

	2019-20[a]	2020-21	2021-22
Access charge ($/day)	19.81	19.86	19.86
Usage charge ($/kL)[b]	0.20674	0.20906	0.20309

a Calendar year 2020 is a leap year (ie, 2019-20 has 366 days).

b The usage charge per ML is the same as for Essential Water and is $206.74/ML in 2019-20, $209.06/ML in 2020-21 and $203.09/ML in 2021-22.

Source: IPART analysis.

In our Draft Report we set a per ML usage charge for offtake customers. In its subsequent submission, WaterNSW considered that, given the low volumes that could be extracted (and transported) by offtake customers, we should also set a per kL usage charge.[178] For this Final Report and Determination, we have set a per kL usage charge for offtake customers.

177 WaterNSW Broken Hill Pipeline Pricing Proposal to IPART, 30 June 2018, p 88.

178 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 24.

9.4.1 Access charge recovers efficient fixed costs

WaterNSW proposed fixed charges to offtake customers of $9,958 ($2018-19) each year over the 2019 Determination. As shown in Table 9.7, the charges comprise:

- An annuity component (to recover the initial capital cost of the offtake).
- A contribution to the Pipeline's fixed capital costs (otherwise payable by Essential Water).

Table 9.7 Breakdown of WaterNSW's proposed fixed charge per offtake ($2018-19)

	Offtake installed 2018-19	Offtake installed 2019-20
Annuity	7,310	6,352
Contribution to fixed capital costs	2,648	3,606
Total fixed charge	**9,958**	**9,958**

Source: WaterNSW pricing proposal to IPART, June 2018, p 56.

The annuity is calculated to recover the proposed initial capital outlay for the offtake[179] over 20 years[180] based on a pre-tax WACC of 5.3%.[181] We have assumed that the proposed contribution to the fixed capital costs of the Pipeline was calculated to keep the total fixed charge constant over the determination period.

We have made a decision to set prices for offtake customers to recover the incremental costs of providing services to them. Accordingly, to set access charges for offtake customers we have:

- Established a RAB to determine the capital costs of the offtakes.
- Not included a contribution to the Pipeline's fixed capital costs.
- Included fixed operating costs.

We consider that our approach is preferable because it allocates efficient fixed costs between Essential Water and offtake customers on the basis of each party's right to pipeline transportation services recovers (and, in turn, each party's contribution to the need to incur the cost of the Pipeline).

Establishing a RAB to determine capital costs

WaterNSW considered a RAB approach to be ill-suited for calculating the capital cost of a small asset such as an individual offtake, which is used by one customer.[182] In the event that

179 That is, the proposed capital expenditure of $89,000 per offtake for offtakes installed in 2018-19 and the proposed capital expenditure of $77,000 per offtake for offtakes installed over 2019-23. See WaterNSW Broken Hill Pipeline Pricing Proposal to IPART, 30 June 2018, p 56.

180 20 years is the period over which WaterNSW considers the offtakes can be expected to be revenue generating assets.

181 This is the pre-tax equivalent of a post-tax WACC of 4.3%, which was WaterNSW's proposed WACC for the 2019 Determination.

182 WaterNSW Broken Hill Pipeline Pricing Proposal to IPART, June 2018, p 55.

a new offtake asset is required after prices are set, using a RAB approach would result in existing customers paying for some of the capital cost of the new offtake.[183]

In general, we consider that an annuities approach is suitable when certain factors exist, such as:

- There is a single up-front capital investment.
- There are no future capital investments required.

Should these factors be met, an annuities approach can facilitate price stability, as a single known price can be set over the life of the annuity. However, our view is that these factors have not been met in the case of offtake assets, because of the uncertainty around the asset replacement and renewal costs required over the life of the assets.

We understand from provisional forecasts that future asset replacement and renewal costs for offtakes (eg, meters and valves) could be significant beyond the 2019 Determination. An annuity would need to establish the total efficient capital costs over the asset's whole life. Establishing an annuity in this determination on the basis of no future capital needs for renewal or replacement could introduce price volatility in future determinations. In the event of future capital costs we would need to either recalculate the annuity, create a RAB for renewal and replacement assets, and/or allow WaterNSW to recover the costs over each determination period.

However, by estimating the efficient costs of serving offtake customers under our standard building block approach using a RAB, we would be able to control for any future price volatility from future capital needs by smoothing out the impact of future costs over the useful life of the assets.

In its submission to the Draft Report, WaterNSW argued that:

> … any future expenditure on the offtakes over the next 14 years will be attributable to an operating expenditure item, which will not have an impact on the capital account of the asset, (set using either a RAB or an annuity). For example, replacement of batteries, valves, and maintenance on solar panels and antennas. Note that all expenditure on offtakes over the next 14 years will be below the required $5,000 threshold for capital expenditure under WaterNSW's accounting rules.[184]

Under our approach, WaterNSW will recover offtake asset replacement costs from offtake customers. Treating these costs as operating expenditure could introduce considerable volatility into the amount paid per offtake per year (as, unlike capital expenditure, forecast operating expenditure is fully recovered in the year it is incurred). While individual expenditure items might be below $5,000 that does not mean total expenditure on offtakes for the year will be. Compared to our access charge of around $7,250 a year for offtake customers, even an additional operating expenditure of $5,000 across the offtakes currently installed

183 Ibid. Under the RAB approach, an offtake RAB would be established and the associated capital costs would be shared by all offtake customers. Though the value of the offtake RAB would decline gradually over the useful life of the asset, should new customers request an offtake at a later date, then the new offtake assets would enter the RAB, altering the value and depreciation profile of the RAB and causing existing customers to pay for the capital cost of the new offtakes.

184 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 26.

would lead to a significant increase in prices. We also note that we are not obliged to abide by WaterNSW's accounting rules when setting maximum regulated prices.

We adopted a capital annuity approach in our 2001 bulk water determination.[185] We were able to estimate future capital needs for renewal/refurbishment over a set time horizon, and calculated this as an annuity to be recovered from customers. Because we could estimate future expenditure the revenue collected from customers could be smoothed, even though the actual expenditure varied significantly from year to year.

However, in our 2006 bulk water determination we decided to adopt a RAB approach (rather than continue with a capital annuity approach), as we regarded it to be superior in terms of economic efficiency and regulatory effectiveness.[186] In particular, we considered that past experience indicated that a RAB approach was likely to be more sustainable and more robust over time.

No contribution to the Pipeline's fixed capital costs

As set out above, we consider that offtake customers should pay the incremental costs associated with their supply, to reflect the nature of their right to the Pipeline's transportation service (ie, not guaranteed) compared to Essential Water's (ie, guaranteed). In this case, there would be no contribution to the fixed capital costs of the Pipeline by offtake customers.

In its submission to the Issues Paper, Essential Water considered that the costs, including capital costs, of supplying offtake customers should not be subsidised by users in Broken Hill.[187] As explained in Chapter 3, we have calculated separate NRRs for setting prices for Essential Water and for offtake customers. This is different to WaterNSW's proposal, which did not explicitly ring-fence the total costs associated with serving offtake customers for pricing purposes, ie WaterNSW proposed recovering the annuity for offtakes and a small share of the remaining NRR through offtake prices. Calculating separate NRRs involves ring-fencing all costs (operating and capital costs) incurred by WaterNSW to service offtake customers from costs incurred to service Essential Water. We consider that this approach appropriately captures the total efficient cost of providing water transportation services to offtake customers. It also facilitates transparency in our pricing methodology and mitigates the risk of any cross-subsidisation between the prices charged to Essential Water and offtake customers.

We note that, at the public hearing in Broken Hill, one participant expressed the view that if offtake customers were required to pay fixed charges even when they demanded no water transportation, then there would be no incentive for water saving.[188] As set out above, we consider prices should be cost reflective, including by recovering fixed costs (ie, the costs that are incurred regardless of the level of consumption).

185 See IPART, *Department of Land and Water Conservation – Bulk Water Prices from 1 October 2001*, Draft Report, p 23.

186 See IPART, *Bulk Water Prices for State Water Corporation and Water Administration Ministerial Corporation from 1 August 2006 to 30 June 2010,* Draft Report, p 20.

187 Essential Energy, *submission to the Issues Paper – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019*, November 2018, p 14.

188 IPART, Review of Essential Energy's prices for water and sewerage services in Broken Hill and WaterNSW's prices for the Broken Hill Pipeline from 1 July 2019 – Public Hearing Transcript, p 54.

Including all fixed costs

Under our principle of cost reflective pricing, we set prices so that access charges recover fixed costs and usage charges recover variable costs. In calculating access charges we have included offtake-related fixed operating costs from WaterNSW's proposal.[189] These asset replacement costs are discussed in Chapter 4.

9.4.2 Usage charge recovers efficient variable costs

In line with the usage charge for Essential Water, the usage charge for offtake customers should recover the additional energy costs incurred in delivering water to them. As set out in Chapter 4, we cannot anticipate the quantity of water transportation services demanded by offtake customers or when it will be demanded. This means we do not have an estimate of the efficient energy volumes required to serve offtake customers, and cannot estimate the corresponding efficient energy costs.

In the Draft Report, for simplicity we set the usage charge to offtake customers in line with the usage charge for Essential Water. However, as discussed in Chapter 4, we sought stakeholder views on an alternative approach of a menu of usage charges for offtake customers, reflecting the efficient energy costs of delivering an additional unit of water at different times of the day (ie, peak, shoulder and off-peak) to offtake customers.[190]

Only WaterNSW submitted on this issue, supporting our draft decision.[191] WaterNSW considered that it would be difficult to set specific peak and shoulder rates for the maximum demand charges, as it is difficult to forecast total usage and to estimate an offtake customer's contribution to this total usage.[192] On this basis, we have maintained our draft decision to set efficient energy costs for services to offtake customers using the same benchmark energy volumes and unit prices as Essential Water.

9.4.3 Unregulated pricing agreements

We made a decision:

41 To allow unregulated pricing agreements between WaterNSW and offtake customers.

We have made a decision to allow unregulated pricing agreements between WaterNSW and offtake customers under the 2019 Pipeline determination. This is consistent with other recent water pricing determinations we have made and would facilitate a number of arrangements WaterNSW has entered into (or proposes entering into) with offtake customers.

Our standard form of regulation involves setting maximum prices for regulated services that apply to all customers for each year of the determination period. However, we support introducing pricing flexibility where it is likely to lead to more efficient prices and/or deliver

189 WaterNSW Broken Hill Pipeline Pricing Proposal to IPART, June 2018, Table 27.
190 We recognise that water may not be delivered to offtake customers at the exact time it is demanded, however this is likely to be the most practical point to measure.
191 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 16.
192 Ibid. p 17.

value to customers. In our 2016 reviews of Sydney Water's and Hunter Water's prices, we decided to allow those businesses to enter into unregulated pricing agreements with large non-residential customers.[193]

Unregulated pricing agreements are optional and only entered into if both parties agree. An unregulated pricing agreement is an agreement that allows the parties to charge/pay a price that is different to the price determined by IPART, over the determination period, and which is entered into after the 2019 Determination commences. If the parties do not enter into an unregulated agreement then the maximum price specified in the 2019 Determination will apply.

Allowing unregulated pricing agreements between WaterNSW and offtake customers could be used to accommodate arrangements WaterNSW proposes entering into. For example, WaterNSW proposed offering to install additional offtakes over the 2019-2023 period for an upfront capital charge (offtake customers would still pay the proposed variable charge for offtake customers).[194] This could be facilitated through an unregulated pricing agreement.

Implications for WaterNSW's revenue and costs

Pricing flexibility has the potential to benefit both offtake customers and WaterNSW. The potential for mutual gains provides incentives for WaterNSW and offtake customers to engage with each other, uncover value, and agree on unregulated prices that share this value between them. We consider these incentives should be maintained over time by allowing any gains generated through unregulated pricing agreements to be retained by the parties involved.

Gains (ie, net profits) made by WaterNSW should be retained regardless of whether they are the result of increases in revenue or decreases in costs. While this is relatively straightforward for changes in revenue (additional revenue is automatically retained by the business), it can present challenges for changes in costs (which may be difficult to go back and isolate from the business's wider cost base).

To ensure that the regulated cost base and regulated prices continue to reflect the efficient costs of providing regulated services in the future, WaterNSW would be required to 'ring-fence' any changes in costs resulting from unregulated price agreements.[195] This information would be assessed and factored into resetting expenditure allowances at the next price review.

In its submission to the Draft Report, WaterNSW supported our draft decision to allow unregulated pricing agreements, but requested that we provide a view as to whether any net revenue (ie revenue net of costs) derived from an unregulated agreement would be shared

193 Under this approach, we continue to set maximum prices for each of the business' monopoly services. However, if the business and a large non-residential customer enter into an unregulated pricing agreement, that customer would not be subject to our determined prices.

194 This mirrors the O&M contract, which allows for the installation of additional offtakes at a fixed cost of $70,290 plus an agreed margin for profit and overhead of 10%. WaterNSW notes that additional supply will be subject to the availability of capacity in the pipeline. Dollar figures in nominal terms. See WaterNSW Broken Hill Pipeline Pricing Proposal to IPART, 30 June 2018, pp 107-108.

195 For example, if a change in the level of service provided to an offtake customer resulted in a change in the cost of service provision.

with customers over the post 2023 Determination.[196] In response, we reiterate that gains (or losses) made by WaterNSW should be retained regardless of whether they are the result of increases in revenue or decreases in costs. If unregulated pricing agreements are made with offtake customers, then any associated incremental costs and/or revenue would be ring-fenced and any net profit or loss associated with the agreement would be fully retained by WaterNSW.

196 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 25.

10 Impacts of pricing decisions

This chapter outlines the impacts of our pricing decisions on Essential Water and offtake customers, the implications of our pricing decisions for WaterNSW and its shareholder, and other matters that we must consider under the IPART Act, being:

- The environment.
- General inflation.

We are satisfied that the 2019 Determination achieves an appropriate balance between these matters.

10.1 Impacts on Essential Water

As set out in Table 10.1, overall our decisions result in a 111% increase in Essential Water's total NRR over the upcoming regulatory period, compared to its NRR excluding the Pipeline.

Table 10.1 Essential Water's NRR including and excluding the Pipeline ($'000, $2018-19)

	2019-20	2020-21	2021-2022	Total
Essential Water's NRR excluding the Pipeline	21,327	21,983	22,737	66,047
Pipeline	24,378	24,385	24,355	73,118
Increase in working capital and tax allowances[a]	120	121	171	411
Essential Water's NRR including the Pipeline	45,824	46,489	47,263	139,577
% change	115%	111%	108%	111%

[a] Including the Pipeline increases the value of net working capital. This increase is then added to the NRR.

Note: Numbers may not add due to rounding

Source: IPART Analysis.

For comparison, Table 10.2 shows the increase in Essential Water's total NRR compared to its NRR excluding the Pipeline under WaterNSW pricing proposal.

Table 10.2 Essential Water's NRR including and excluding the Pipeline with WaterNSW's proposed costs ($'000, $2018-19)

	2019-20	2020-21	2021-2022	Total
Essential Water's NRR excluding the Pipeline	21,327	21,983	22,737	66,047
Pipeline	31,314	30,992	30,481	92,786
Increase in working capital and tax allowances[a]	154	154	215	522
Essential Water's NRR including the Pipeline	52,794	53,129	53,433	159,355
% change	148%	142%	135%	141%

[a] Including the Pipeline increases the value of net working capital. This increase is then added to the NRR.

Note: Numbers may not add due to rounding

Source: IPART Analysis.

In November 2018, the NSW Government wrote to IPART to say that it would subsidise the prudent and efficient costs of the Pipeline, so that Essential Water's prices for customers in Broken Hill would not increase in real terms (ie, above inflation) as a result of the Pipeline, for four years.[197] Accordingly, we have assessed the efficient costs of the Pipeline in this review, and recommended a Government subsidy in our review of Essential Water's prices. Our 2019 determination of WaterNSW's prices for water transportation services via the Pipeline would not result in price increases for Essential Water's customers.

10.2 Impacts on offtake customers

As discussed in Chapter 4, we cannot anticipate the quantity of transportation services that will be demanded by offtake customers. To illustrate the potential impacts of our prices, we have estimated annual bills for offtake customers as follows:

- Small customers using 10 ML of water (per year).
- Medium customers using 150 ML of water (per year).
- Large customers using 300 ML of water (per year).

Throughout this report figures have generally been presented in real dollars ($2018-19), including our decision on prices. However, over the 2019 determination period, our prices will be indexed in line with inflation and the bills actually paid by offtake customers will be based on nominal prices ie, including the effects of inflation.

Therefore, in this section we present the impact of our decisions on offtake customer bills in nominal dollars. This means that we have included the impact of our estimate of inflation on future prices.[198] This is to assist potential offtake customers in understanding the likely impact of our prices on their bills throughout the 2019 determination period, including the effects of inflation.

Our prices mean that, with a usage range of 10 ML to 300 ML, offtake customer bills could vary between $9,500 and $73,000 per year (as set out in Table 10.3), depending on how much water they use. Under WaterNSW's proposed charges (and with the same usage range) offtake customer bills could vary between $13,500 and $108,000 per year (Table 10.4).

197 NSW Government, Letter to the Chair – IPART, 21 November 2018. Available at: https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/pricing-reviews-water-services-metro-water-legislative-requirements-prices-for-essential-energys-water-and-sewerage-services-in-broken-hill-from-1-july-2019/letter-from-the-minister-on-the-broken-hill-pipeline.pdf.

198 Based on forecast inflation of 1.7% for 2019-20 and then 2.5% per year thereafter.

Table 10.3 Customer bills for offtake customers ($, with inflation)

	2019-20	2020-21	2021-22
Small customers (10ML)			
Access charge	7,342	7,526	7,716
Usage charge (or usage bill)	2,094	2,171	2,162
Total Bill	**9,436**	**9,697**	**9,878**
Medium customers (150ML)			
Access charge	7,342	7,526	7,716
Usage charge (or usage bill)	31,415	32,562	32,423
Total Bill	**38,756**	**40,088**	**40,139**
Large customers (300ML)			
Access charge	7,342	7,526	7,716
Usage charge (or usage bill)	62,829	65,124	64,845
Total Bill	**70,171**	**72,650**	**72,561**

Note: numbers may not add due to rounding.

Source: IPART analysis.

Table 10.4 Customer bills for offtake customers with WaterNSW's proposed costs ($, with inflation)

	2019-20	2020-21	2021-22
Small customers (10ML)			
Access charge	10,088	10,240	10,667
Usage charge (or usage bill)	3,254	3,102	2,675
Total Bill	**13,342**	**13,342**	**13,342**
Medium customers (150ML)			
Access charge	10,088	10,240	10,667
Usage charge (or usage bill)	48,816	46,526	40,131
Total Bill	**58,904**	**56,766**	**50,798**
Large customers (300ML)			
Access charge	10,088	10,240	10,667
Usage charge (or usage bill)	97,633	93,053	80,262
Total Bill	**107,720**	**103,293**	**90,929**

Note: numbers may not add due to rounding.

Source: WaterNSW pricing proposal to IPART, June 2018, pp 108-109, IPART analysis.

In its submission to the Draft Report, WaterNSW noted that its proposed prices for offtakes were on a per-offtake basis, not a per-customer basis, as two or more customers may use one offtake. In such a circumstance, the per-offtake prices would be split proportionately between the number of customers using the individual offtake. WaterNSW requested that IPART take care to ensure that its determination of prices provides for this outcome.[199]

As recognised in Chapter 6, it is the number of offtakes that WaterNSW has constructed which is relevant to establishing the NRR and target revenue. However, our determination sets

199 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 26.

prices for customers. As with Chapter 6, in this chapter we have assumed one offtake customer per offtake asset. The box below explains the charging arrangements where this is not the case, eg, where two customers are serviced by a single offtake, or one customer is serviced by two offtakes. This has been reflected in our Final Determination.

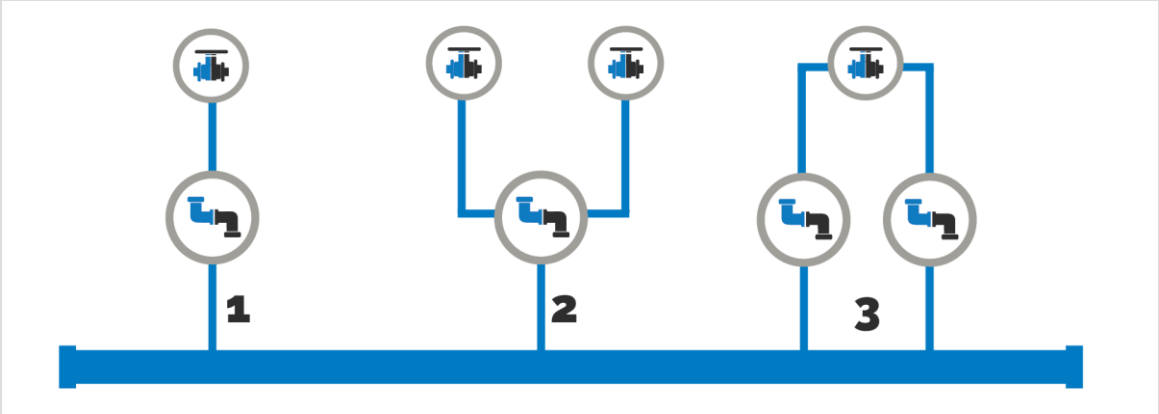
Box 10.1 Charging arrangements for offtake customers

The access charge for an offtake customer will apply on a "per-offtake" basis. This means that, as illustrated in the figure below:

1. If an offtake customer has exclusive access to a single offtake, they will pay the access charge for that offtake.
2. If a single offtake is shared between more than one offtake customer, the access charge for that offtake will be divided equally between the offtake customers.
3. If an offtake customer has exclusive access to more than one offtake, they will pay the access charge for each offtake.

The usage charge for an offtake customer will depend on the volume of water supplied to that customer by WaterNSW.

Figure 10.1 Offtakes and offtake customer scenarios



10.3 Impacts on WaterNSW

The following sections consider the implications of our pricing decisions for WaterNSW's service standards, financial viability and shareholders.

10.3.1 Service standards

Under our Determination, we expect WaterNSW to achieve operating efficiency savings compared to its pricing proposal. We are satisfied that WaterNSW can achieve these savings, and thus receive sufficient revenue to achieve service standards at or above those expected by customers and to meet the standards required by its regulators.

10.3.2 Financial viability

When setting prices, we consider the financial sustainability of the business resulting from our pricing decisions. To do this, we undertake a financeability test to assess how our price decisions are likely to affect the business's financial sustainability and ability to raise funds to manage its activities, over the upcoming regulatory period.

In 2018, we reviewed the financeability test we use as part of our price regulation process.[200] In this review, we decided to:

- Broaden the test by calculating financeability tests for both the benchmark and actual business
- Adjust the target ratios we use to assess financeability
- Clarify the process to identify any financeability concerns, and
- Tailor the remedy for a financeability concern based on its source.

The 2018 financeability test will apply to pricing decisions on or after 1 July 2019.

To assess WaterNSW's financeability over the 2019 Determination, we analysed its forecast financial performance, financial position and cash flows for both the benchmark and actual business. We then forecast financial ratios for both tests and assessed WaterNSW's financial ratios compared to our target ratios.

The three financial ratios we include in our financeability test, and the target ratios, are summarised in Table 10.5.

Table 10.5 Target ratios for the benchmark and actual test

Ratio	Benchmark test (real cost of debt)	Actual test (actual cost of debt)
Interest cover	>2.2x	>1.8x
Funds from operations (FFO) over debt	>7.0%	>6.0%
Gearing	<70%	<70%

Source: IPART, *Review of our financeability test*, November 2018, p 3.

The financeability test is conducted for the Pipeline only

In the 2018 financeability test review, we decided to conduct a financeability test if the prices we set determine the revenues of the business and if the business has, or is part of an entity with, a distinct capital structure. We have conducted the financeability tests on the Pipeline only (ie, the portion of the business for which we are setting prices, as opposed to WaterNSW's whole business). This is consistent with our how we have assessed the Pipeline's capital and operating and tax allowance and other pricing inputs such as the post-tax WACC parameters.

The benchmark test indicates no financial concern

Our prices would result in an efficient benchmark business exceeding our targets for the Real Interest Cover ratio (RICR) and the Real Gearing ratio over the regulatory period (see Table

200 IPART, *Review of our financeability test*, November 2018, p 1.

10.6). This is because the benchmark business is forecast to have sufficient operating cash flows to service its obligations.

However, the Pipeline is forecast to not meet the target for the Real FFO over Debt ratio during the regulatory period. Over the longer term, and including expected asset replacement, this ratio is forecast to improve.

Table 10.6 Financial ratios for the benchmark test

Ratio	Regulatory period								
	Target	2019-20	20-21	21-22	22-23	23-24	24-25	25-26	26-27
Real Interest Cover	>2.2x	2.9	2.9	3.0	3.0	3.0	3.0	3.0	3.0
Real FFO over Debt	>7.0%	5.6%	5.6%	5.8%	5.7%	5.7%	5.8%	5.8%	5.8%
Real Gearing	<70%	60%	60%	60%	60%	60%	60%	60%	60%

Source: IPART analysis

The results for the Real FFO over Debt ratio do not represent a financeability concern

The short-term under-performance is due to a relatively low return of assets (ie, depreciation allowance). The Pipeline is largely comprised of a single type of asset with a very long asset life (ie, the main asset class has an asset life of 100 years), and taken as a whole the Pipeline has a weighted average economic life of 93 years. This results in a smaller depreciation allowance compared to a business owning assets with shorter lives (all else being equal).

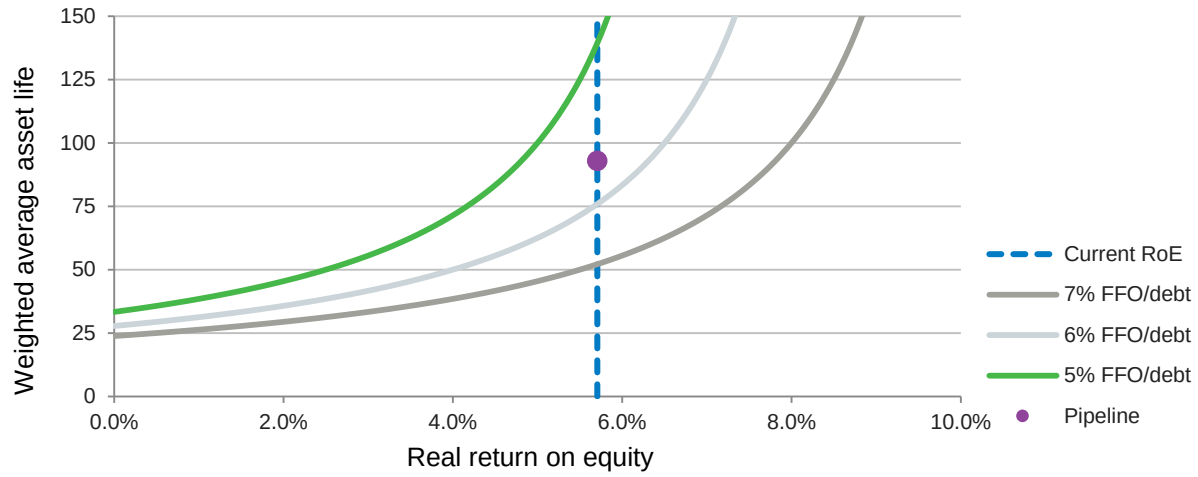
WaterNSW's submission to our Draft Report called for us to decrease the asset life of the pipes (from our decision of 100 years to 80 years) to help address the under-performance in the FFO over debt ratio. Our final decision is to maintain the asset lives as discussed in Chapter 6. We consider that the financeability concern is short-term in nature, and reflects this type of asset (as discussed above), and therefore does not warrant an accelerated depreciation over the determination period.

In the 2018 financeability review, we showed that the FFO over Debt ratio was largely a function of asset lives and the return on equity (see Figure 10.2). Figure 10.2 shows that the FFO over debt ratio – of about 5.6% to 5.8% - is consistent with the return on equity and asset lives we have adopted.

Overall, we do not think this result constitutes a financeability concern, given:

- The return on equity we have set reflects an efficient return for a BBB rated business.
- The ratio reflects the idiosyncratic nature of the pipeline – ie, a single asset with a long economic life – rather than our pricing approach.
- The business does not need to meet all ratios in all years to be financeable.
- Over time, the ratio improves as the asset's remaining life declines.

Figure 10.2 FFO over Debt expressed by return on equity and average asset life



Data source: IPART, Review of our financeability test, November 2018, p75; IPART analysis.

The actual test shows some concern in the short-term only

For the actual test, the Interest Coverage Ratio (ICR) is forecast to be slightly below the target during the regulatory period, but is forecast to meet our target ratio in the longer-term (see Table 10.7). Similarly, the FFO over Debt is forecast to be significantly below the target ratio during the regulatory period, but meet the target over the longer-term.

Table 10.7 Financial ratios for the actual test

Ratio	Regulatory period							
	Target	2019-20	20-21	21-22	22-23	23-24	24-25	25-26	26-27
Interest Cover	>1.8x	1.7	1.6	1.7	1.8	1.8	1.9	2.0	2.1
FFO over Debt	>6.0%	3.8%	3.7%	4.2%	4.5%	4.9%	5.4%	5.9%	6.5%
Gearing	<70%	56%	54%	52%	50%	47%	45%	43%	41%

Source: IPART analysis

Overall, our analysis shows that there is no financial concern for the Pipeline.

WaterNSW's submission to our Draft Report requested that IPART holds the gearing ratio constant at 58% for the actual test over the longer term. This is because:

- It argued that this is consistent with both NSW Treasury Policy to maintain its target standalone credit rating of Baa2 and reflects its forecasts in its 2018-19 Statement of Corporate Intent (SCI).
- It considers that by forecasting a decreasing gearing ratio (ie, net debt to RAB ratio) for our actuals test this masks the true cause of a financeability concern of the actual Pipeline business, which it views are a result of:
  - too low operating expenditure allowance of approximately $1 million per annum
  - inappropriate asset lives
  - too low tax allowance by assuming that the Pipeline could be eligible for the reduced corporate tax rate

For the actual test we have decided to maintain the assumptions in our Draft Report.

Under our Financeability Review 2018[201], our standard approach to the actual test is to set an initial gearing ratio, then calculate forecast gearing ratios based on forecast cash flows. It should be noted that, in order to set a constant 58% gearing ratio, we would need to assume a dividend payout ratio in the order of 300%. The reason for this is because the nominal value of the RAB is increasing due to indexation and, in order to maintain a constant gearing ratio, the business would need to borrow more each year and return shareholder capital.

More importantly, while we present both benchmark and actual tests, our primary focus is to address financeability issues revealed by the benchmark test, ie to test whether there are any financeability concerns arising from the level of revenue we have determined. If there is a financeability issue under the actual test, this is ultimately a matter for the business and its shareholder to address.[202]

10.3.3 Recognition of the Special Purpose Vehicle

In its submission to the Draft Report, WaterNSW reiterated that it has established a wholly-owned subsidiary to own and operate the Pipeline. WaterNSW anticipates finalising novation of the major Pipeline agreements (such as design and construct and operations and maintenance) to occur in May 2019. For ease of reference, WaterNSW's submission continues to refer to the Pipeline as "WaterNSW's Pipeline". However, WaterNSW requested that IPART makes clear the distinction in its Final Determination.[203]

We note that there is no need to distinguish between WaterNSW and its wholly-owned subsidiary in the Final Determination. For the purposes of the IPART Act (under which our Final Determination is made), the services for which our Final Determination sets maximum prices are taken to be provided by WaterNSW, even where the services are in fact supplied by a wholly-owned subsidiary.[204]

10.3.4 Section 16 of the IPART Act – Report on financial impact if maximum price not charged

Section 16 requires IPART to report on the financial impact if the maximum price determined by IPART was not charged. Specifically, section 16 states:

> If the Tribunal determines to increase the maximum price for a government monopoly service or determines a methodology that would or might increase the maximum price for a government monopoly service, the Tribunal is required to assess and report on the likely annual cost to the Consolidated Fund if the price were not increased to the maximum permitted and the government agency concerned were to be compensated for the revenue foregone by an appropriation from the Consolidated Fund.

201 IPART, Financeability Review 2018
202 IPART, Financeability Review 2018, November 2018, p 60.
203 WaterNSW, submission to the Draft Report – Review of prices for WaterNSW Murray River to Broken Hill Pipeline from 1 July 2019, May 2019, p 4.
204 IPART Act, section 4(7).

This is the first determination to set prices for the Pipeline. The maximum price allows WaterNSW to recover the full efficient costs of providing the Pipeline's water transportation service. If WaterNSW cannot recover its full costs through prices, some costs may ultimately need to be borne by the Consolidated Fund through foregone dividends to Treasury by WaterNSW. If WaterNSW sought the Treasurer's approval under section 18(2) of the IPART Act to charge below the maximum prices of the determination then, if requested, we could provide advice on the likely impact to the Consolidated Fund.

Our financial modelling is based on:

- A tax rate of 27.5% for pre-tax profit in 2019-20.
- A tax rate of 26.0% for pre-tax profit in 2020-21.
- A tax rate of 25.0% for pre-tax profit in 2021-22.
- Dividend payments of 70% of after-tax profit.

Under our calculations, a $1 decrease in pre-tax profit would result in a loss of revenue to the Consolidated Fund of:

- 51 cents in total in 2019-20, which is 70% of the decrease in after-tax profit of 73 cents.
- 52 cents in total in 2020-21, which is 70% of the decrease in after-tax profit of 74 cents.
- 53 cents in total in 2020-21, which is 70% of the decrease in after-tax profit of 75 cents.[205]

10.4 Implications for the environment

The NSW Government is responsible for determining the risk of negative impacts from WaterNSW's operations on the environment, and imposing standards or requirements to address these risks and minimise any impacts. For example, as set out in its pricing proposal, WaterNSW had to obtain a number of environmental approvals prior to the Pipeline's construction.[206] More generally, WaterNSW is required to meet the environmental obligations in its Operating Licence. In determining WaterNSW's revenue requirements, we have ensured WaterNSW can fully recover all efficient costs it incurs in meeting its environmental obligations through prices.

10.5 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. As the Australian Bureau of Statistics (ABS) does not collect data on WaterNSW's impact on the consumer price index, we have derived an estimate of the Pipeline's impact on general price inflation using the ABS estimate of Sydney Water's impact on the consumer price index (CPI).

Currently, water and sewerage prices in Sydney contribute about 0.23% towards the consumer price index (all groups, 8 capital cities).[207] Using Essential Water's customer

205 IPART analysis.
206 See •WaterNSW pricing proposal to IPART, June 2018, p 32-34.
207 Australian Bureau of Statistics, Consumer Price Index – 2018 Weighting Pattern, December 2018.

numbers (around 11,000 – these are the end users of water transported through the Pipeline) relative to Sydney Water's (around 1,900,000) we estimate the relative contribution of the Pipeline towards general inflation to be about 0.0013%.[208]

As set out in Chapter 1, the NSW Government has committed to subsidising the prudent and efficient costs of the Pipeline for four years. Therefore, the impact on general nation-wide price inflation of our prices for the Pipeline is zero.

208 Calculated as 0.23% x (11,000/1,900,000).

A Background on WaterNSW's Murray River to Broken Hill Pipeline

In 2016 and 2017 the NSW Government issued directions to WaterNSW to make arrangements to construct, operate and maintain the Murray River to Broken Hill Pipeline (the Pipeline) to certain specifications. These Government directions are presented in Appendix C.

The purpose of the Pipeline is to connect Broken Hill to the Murray River to replace the Menindee Lakes as Essential Water's primary bulk water supply and deliver long term water security to the Broken Hill community. The Pipeline will also provide bulk water transportation services to individual customers via offtakes constructed along the Pipeline.

The Pipeline has been designed to run along the Silver City Highway and transport bulk water from the Murray River in Wentworth to Essential Water's Mica Street Water Treatment Plant in Broken Hill. This represents a distance of 270km and an elevation of approximately 280m.

In October 2017, WaterNSW announced that it had appointed a consortium of John Holland, MPC Group and TRILITY to design, construct, operate and maintain the Pipeline: [209]

- The total cost of the design and construct contract was $467m (this contract includes some additional works that will be transferred to Essential Water and are not part of the Pipeline).
- The total cost of the operating and maintenance contract was $107.3m over 20 years.
- Construction began in early 2018. In April 2019 WaterNSW reported that the Pipeline was operational.

Table A.1 summarises WaterNSW's project progress report cards from June 2018, September 2018, December 2018 and March 2019.[210]

Table A.1 Pipeline project progress report

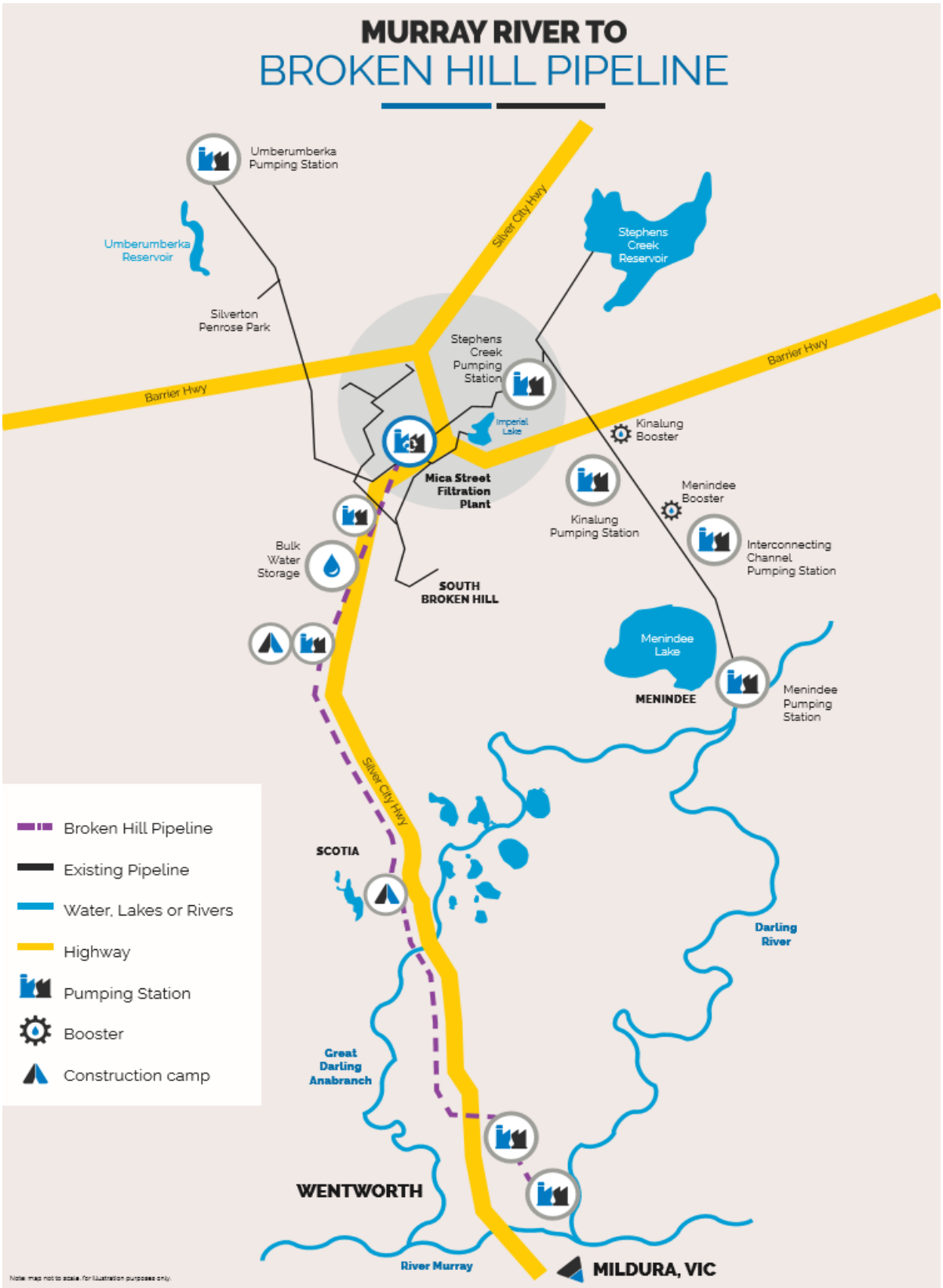
	Measure	Target	Jun 2018	Sep 2018	Dec 2018	Mar 2019
Local workforce	# of people	150	150	150	151	151
Aboriginal workforce	# of people	25	47	47	47	47
Trainees	# of people	-	42	48	48	48
Total hours worked	# of hours	-	423,355	768,560	1,071,031	1,118,974
Spend in local economies	$million	-	20.0	35.7	46.3	51.3
Pipe laid	km	270	173.5	269.85	270	270

Source: https://www.waternsw.com.au/projects/wentworth-to-broken-hill-pipeline

209 Available at: https://www.waternsw.com.au/about/newsroom/2017/htriver-murray-to-broken-hill-pipeline-contract-awarded

210 WaterNSW publishes monthly project report cards which are available report cards available on the WaterNSW website: https://www.waternsw.com.au/projects/regional-nsw/wentworth-to-broken-hill-pipeline

Figure A.1 Schematic representation of the Pipeline



Note: For information only.

B Matters to be considered by IPART under section 15 of the IPART Act

In making determinations, IPART is required under section 15 of the IPART Act[211] to have regard to the following matters (in addition to any other matters IPART considers relevant):

1. the cost of providing the services concerned
2. the protection of consumers from abuses of monopoly power in terms of prices, pricing policies and standard of services
3. 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
4. the effect on general price inflation over the medium term
5. the need for greater efficiency in the supply of services so as to reduce costs for the benefit of consumers and taxpayers
6. 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
7. 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
8. 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
9. the need to promote competition in the supply of the services concerned
10. considerations of demand management (including levels of demand) and least cost planning
11. the social impact of the determinations and recommendations
12. standards of quality, reliability and safety of the services concerned (whether those standards are specified by legislation, agreement or otherwise).

Table B.1 outlines the sections of the report that address each matter.

211 The IPART Act 1992 is available at: https://www.legislation.nsw.gov.au/#/view/act/1992/39/whole

Table B.1 Consideration of section 15 matters by IPART - WaterNSW

Section 15(1)		Report reference
a)	the cost of providing the services	Chapter 3 sets out WaterNSW's total efficient costs to deliver its water transportation services. Further detail is provided in Chapters 4, 5 and 6 on prudent historical expenditure and efficient forecast expenditure.
b)	the protection of consumers from abuses of monopoly power	We consider our decisions would protect consumers from abuses of monopoly power, as they reflect the efficient costs WaterNSW requires to deliver its services. This is addressed throughout the report, particularly in Chapter 4 and 5 (where we establish the prudent historical costs and efficient forecast costs) and Chapter 9 and 10 (where we set out our pricing decisions).
c)	the appropriate rate of return and dividends	Chapter 6 outlines that we have allowed a market-based rate of return on debt and equity which would enable a benchmark business to return an efficient level of dividends.
d)	the effect on general price inflation	Chapter 10 outlines our estimate that the impact of our prices on general inflation is negligible.
e)	the need for greater efficiency in the supply of services	Chapters 4 and 5 set out our decisions on the Pipeline's prudent historical expenditure and efficient forecast expenditure. These decisions would promote greater efficiency in the supply of WaterNSW's water transportation services.
f)	ecologically sustainable development	Chapters 4 and 5 set out the Pipeline's prudent historical expenditure and efficient forecast expenditure that allows it to meet all of its regulatory requirements, including its environmental obligations.
g)	the impact on borrowing, capital and dividend requirements	Chapters 6 and 10 explain how we have provided WaterNSW with an allowance for a return on and of capital; and our assessment of its financeability.
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	Chapters 4 and 5 determine the prudent and efficient cost of the design and construct (D&C) and operation and maintenance (O&M) contracts which WaterNSW has entered into for the provision of the Pipeline's water transportation services.
i)	need to promote competition	In determining efficient costs, we have been mindful of relevant principles such as competitive neutrality (eg, we have included a tax allowance for WaterNSW as set out in Chapter 6).
j)	considerations of demand management and least cost planning	Chapters 4 and 5 outline how we have assessed the Pipeline's prudent historical and efficient forecast expenditure required to deliver its transportation service at least cost. Chapter 9 outlines how we have set prices to reflect efficient costs, including the usage price to reflect the approximate estimate of marginal cost of supply – such cost-reflective prices promote the efficient use and distribution of resources (all else being equal).
k)	the social impact	Chapter 10 considers the potential impact of our pricing decisions on WaterNSW, its customers and the NSW Government (on behalf of the broader community).
l)	standards of quality, reliability and safety	Chapters 4, 5, 8 and 10 detail our consideration of WaterNSW's prudent historical and efficient forecast costs so that it can meet the required standards of quality, reliability and safety in delivering its services.

C Government directions

This Appendix summarises the three NSW Government directions associated with this review and presents copies of these directions (in chronological order).

The following summarises the key elements of the directions:

1. Direction to the Board of WaterNSW to secure the water supply of Broken Hill – 21 November 2016. This direction requires WaterNSW to:
   a) Construct, operate and maintain a pipeline from the Murray River to deliver low salinity water to the Mica Street Water Treatment Plant in Broken Hill, including any infrastructure necessary for operation. The pipeline is to generally run along the Silver City Highway.
   b) Use best endeavours to ensure that supply from the pipeline, when used in conjunction with the current Broken Hill water supply infrastructure, can meet peak daily demand of 37.4 megalitres of water per day.
   c) Endeavour to have the pipeline operational by December 2018 and ensure that the pipeline is operational before all surface water and the Lake Menindee groundwater source is exhausted.
   d) Fund the capital costs of construction from within WaterNSW's existing resources or borrow the funds as required, recognising that IPART will be asked to allow WaterNSW to recover the total efficient cost associated with the ongoing operation of the pipeline, including the cost of capital.
   e) Consult with various stakeholders and report on the progress of the project.
2. Direction to the Board of WaterNSW in relation to the construction of the Broken Hill pipeline – 31 August 2017. This Direction instructs WaterNSW to ensure that:
   a) The minimum targets set in the NSW Infrastructure Skills Legacy Program are met for the construction of the pipeline to the extent possible (given the remote location and with relevant targets negotiated through the tender process).
   b) Australian rolled steel is substantially used in construction of the pipeline, regardless of where the pipe is manufactured.
3. Direction to IPART under section 16A of the IPART Act – 19 April 2018.
   a) The Government (ie, the portfolio Minister) can issue directions for WaterNSW to complete projects in the public interest, which may not be in the shareholders' interests.[212] To ensure this investment is not deemed imprudent, the Minister can direct IPART (with the Premier's approval) under section 16A of the IPART Act, to include in WaterNSW's maximum prices, the efficient costs of complying with the specified regulatory requirements.[213] This can take the form of either:

212 Typically through a direction given under section 20P of the *State Owned Corporations Act 1989* (NSW) (SOC Act).

213 Under Section 16A(3) of the IPART Act a specified requirement may only be a requirement imposed by or under a licence or authorisation, a requirement imposed by a ministerial direction under an Act, or some other requirement imposed by or under an Act or statutory instrument.

i) a 'standing direction' (which applies whenever IPART makes a determination in relation to a particular government monopoly service), or

ii) a 'one-off direction' (which applies when IPART makes a particular pricing determination).

4. For this review, one ministerial direction pursuant to section 16A of the IPART Act (section 16A direction) applies. We are directed, when making determinations of pricing for the government monopoly services relating to the Murray River to Broken Hill pipeline, to include an amount or factor in our methodology representing the efficient cost of complying with the two section 20P directions issued to WaterNSW.

Figure C.1 Direction to the Board of WaterNSW to secure the water supply of Broken Hill – 21 November 2016

New South Wales

Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016

under the

State Owned Corporations Act 1989

I, Niall Blair, MLC, Minister for Lands and Water, with approval of the Treasurer, in pursuance of section 20P of the *State Owned Corporations Act 1989*, make the following direction to the Board of WaterNSW, being satisfied that because of exceptional circumstances, it is necessary to give the direction in the public interest.

Dated this 21st day of November, 2016.

[redacted]

Minister for Lands and Water

Explanatory note

This direction is made under section 20P of the *State Owned Corporations Act 1989*. The object of this direction is to require WaterNSW to arrange for the construction, operation and maintenance of a pipeline from the Murray River to Broken Hill along the Silver City Highway. This direction will ensure that the people of Broken Hill have long term water security.

Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016

under the

State Owned Corporations Act 1989

1 Name of Direction

This direction is the *Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016*.

2 Commencement

This direction commences on the day on which it is signed and will remain in force until it is revoked, either in whole or in part.

3 Direction

The Board of WaterNSW is directed to:

a) Arrange for the construction, operation and maintenance of a pipeline from the Murray River to deliver low salinity raw water to the existing Mica Street Water Treatment Plant in Broken Hill, including any associated infrastructure necessary for operation such as new or upgraded distribution pipelines or pump stations. The pipeline is to generally run along the Silver City Highway road easement.

b) Use best endeavours to ensure that supply from the pipeline, when used in conjunction with the current Broken Hill water supply infrastructure, can meet peak daily demand of up to 37.4 mega-litres of water per day.

c) Use best endeavours to make the pipeline operational by December 2018, and notwithstanding this, ensure that the pipeline is fully operational before all surface water and the Lake Menindee groundwater source available to the Broken Hill community are depleted.

d) Fund the capital costs for constructing the pipeline from within WaterNSW's existing resources or otherwise borrow the required funds, recognising that the Independent Pricing and Regulatory Tribunal will be asked by Government to allow WaterNSW to recover the total efficient cost associated with the ongoing operation of the pipeline, including the cost of capital.

e) Chair and regularly consult with a Project Consultative Committee established for the project involving representation from the Department of Primary Industries, Department of Premier and Cabinet, NSW Treasury, NSW Planning and Environment, Infrastructure NSW, Essential Energy and NSW Public Works.

f) Report on progress of the project to Infrastructure NSW under the High Profile, High Risk reporting framework.

Figure C.2 Direction to the Board of WaterNSW in relation to the construction of the Broken Hill pipeline – 31 August 2017

New South Wales

Direction to the Board of WaterNSW in relation to the construction of the Broken Hill pipeline 2017

under the

State Owned Corporations Act 1989

I, Niall Blair, MLC, Minister for Regional Water, with approval of the Treasurer, in pursuance of section 20P of the *State Owned Corporations Act 1989*, make the following direction to the Board of WaterNSW, being satisfied that because of exceptional circumstances it is necessary to give the direction in the public interest.

Dated this 31st day of August, 2017.

[redacted]

Minister for Regional Water

Explanatory note

This direction is made under section 20P of the *State Owned Corporations Act 1989*. The object of this direction is to require WaterNSW to ensure that the pipeline, the subject of the previous Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016, is constructed substantially of Australian rolled steel (irrespective of place of manufacture of the pipe) and the project meets the minimum targets of the NSW Infrastructure Skills Legacy Program, to the extent that is possible given the remote location of the project.

Direction to the Board of WaterNSW in relation to the construction of the Broken Hill pipeline 2017

under the

State Owned Corporations Act 1989

1 Name of Direction

This direction is the *Direction to the Board of WaterNSW in relation to the construction of the Broken Hill pipeline 2017*.

2 Commencement

This direction commences on the day on which it is signed and will remain in force until it is revoked, either in whole or in part.

3 Direction

The Board of WaterNSW is directed to ensure that:

a) the minimum targets set in the NSW Infrastructure Skills Legacy Program are met for the construction of the pipeline, in consultation with the Department of Industry to the extent possible given the remote location of the project and with relevant targets negotiated through the tender process; and

b) Australian rolled steel is substantially used in the construction of the pipeline, regardless of where the pipe is manufactured.

Figure C.3 Government direction under section 16A of the IPART Act – 19 April 2018

New South Wales

Direction to the Independent Pricing and Regulatory Tribunal in relation to the construction and operation of the Broken Hill pipeline 2018

under the

Independent Pricing and Regulatory Tribunal Act 1992

I, Niall Blair, MLC, Minister for Regional Water, with approval of the Premier, in pursuance of section 16A of the *Independent Pricing and Regulatory Tribunal Act 1992*, make the following direction to the Independent Pricing and Regulatory Tribunal.

Dated this 19th day of April, 2018.

[redacted]

The Hon. Niall Blair MLC
Minister for Regional Water

Explanatory note

This direction is made under section 16A of the *Independent Pricing and Regulatory Tribunal Act 1992*. The object of this direction is to require the Independent Pricing and Regulatory Tribunal, when making determinations of pricing for the government monopoly services relating to the Murray River to Broken Hill pipeline to include an amount or factor in its methodology representing the efficient cost of complying with the following two section 20P directions issued to Water NSW under the *State Owned Corporations Act 1989:* the first issued on 21 November 2016 to construct, operate and maintain the Murray River to Broken Hill pipeline and the second issued on 31 August 2017 to ensure that in constructing the Murray River to Broken Hill pipeline, the minimum targets set in the Government's Infrastructure Skills Legacy Program are met and that the pipeline is constructed substantially using Australian rolled steel.

Direction to the Independent Pricing and Regulatory Tribunal in relation to the construction and operation of the Broken Hill pipeline 2018

under the

Independent Pricing and Regulatory Tribunal Act 1992

1 Name of Direction

This direction is the *Direction to the Independent Pricing and Regulatory Tribunal in relation to the construction and operation of the Broken Hill pipeline 2018*.

2 Commencement

This direction commences on the day on which it is signed and will remain in force until it is revoked, either in whole or in part.

3 Direction

The Independent Pricing and Regulatory Tribunal is directed, when making determinations of pricing for the Services, to include an amount or factor in its methodology representing the efficient cost of complying with the Section 20P Directions.

4 Definitions

In this direction:

Section 20P Directions means the following directions issued to WaterNSW under section 20P of the *State Owned Corporations Act 1989*:

(a) the *Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016* dated 21 November 2016; and

(b) the *Direction to the Board of WaterNSW in relation to the construction of the Broken Hill pipeline 2017* dated 31 August 2017.

Services means the services that are:

(a) supplied by WaterNSW by means of or in connection with the Murray River to Broken Hill pipeline; and

(b) declared to be government monopoly services for the purposes of the *Independent Pricing and Regulatory Tribunal Act 1992*.

D Frontier's review of WaterNSW's energy cost proposal and estimates of wholesale energy unit prices

In reviewing WaterNSW's energy cost proposal, Frontier assessed the procurement process used to secure the O&M's contractor's power supply agreement, and the approach used by WaterNSW's consultant (ACIL Allen) to estimate electricity prices for the determination period.[214] Frontier's review is detailed in Box D.1.

Box D.1 Frontier's review of WaterNSW's proposed energy costs

Frontier found that the procurement process supported the execution of an efficiently priced PSA. This process was clear and well structured. It solicited a number directly comparable offers that were also compared to a standard benchmark. The most competitive offer was identified, and further discounts on that offer were sought and received before finalising the procurement.[215]

Frontier also found that ACIL Allen's approach to estimating electricity prices to be reasonable, noting that the methodology used is broadly similar to its own approach. However, Frontier made the following observations about ACIL Allen's estimates:

- The input assumptions used were developed at the start of the year (when they commenced modelling) and therefore aren't based on the most recent data available
- Many of the input assumptions used were in-house assumptions and little information was provided on how they were developed
- The approach potentially overlooked preferable combinations of hedging contracts.
- The estimate of contract prices were based on two-year rolling averages of ASX energy prices, whereas Frontier considers that market to market value estimates provide a better measure of contract value.

Source: Frontier Economics, *WaterNSW's energy purchase costs – Broken Hill Pipeline*, Final Report for IPART, 8 February 2019.

As discussed earlier in the chapter, Frontier's estimate of benchmark energy unit prices took account of each of the cost components an electricity retailer would incur in supplying electricity – wholesale electricity prices in the NEM; other wholesale electricity purchasing costs; renewable energy and environmental policy costs; market fees and ancillary services; network costs; energy losses; and retail operating costs and margin. These sections below outline its approach for estimating each of these component costs. For more detailed information, see Frontier's final report, which is available on our website.[216]

214 Electricity prices have been sourced by the pipeline contractor from a competitive tender process required under the O&M contract for the financial years 2019-20 and 2020-21. Electricity prices for the remaining year of the determination period (2021-2022) will be sourced under a subsequent tender process, expected to be held within the determination period.

215 Frontier Economics, *WaterNSW's energy purchase costs – Broken Hill Pipeline, Final Report for IPART*, 8 February 2019, p10.

216 Available at: Prices for WaterNSW's Murray River to Broken Hill Pipeline services from 1 July 2019.

D.1 Wholesale electricity prices in the NEM

To forecast wholesale market prices, Frontier used a modelling approach that aims to have regard to bidding behaviour of market participants and actual market supply and demand conditions. This approach involved:

- Modelling the long-term investment outcomes in the NEM using its long-term optimisation model, WHIRLYGIG.[217]
- Using the long-term investment to forecast prices at the half-hourly level using its SYNC model.[218]
- Feeding these half-hourly prices into its STRIKE model[219] to forecast wholesale market prices. (Box D.2 provides an overview of Frontier's modelling approach.)

D.2 Other wholesale electricity purchasing costs

To estimate the other costs of purchasing wholesale energy, Frontier calculated an efficient hedging position and the cost of the hedging position. This hedging position is determined using Frontier's portfolio optimisation model STRIKE.[220]

D.3 Renewable energy and environmental policy costs

These are the costs of complying with current Australian and NSW Government green schemes, including:

- Large-scale Renewable Energy Target (LRET)
- Small-scale Renewable Energy Scheme (SRES)
- NSW Energy Savings Scheme (ESS), and
- Climate Change Fund (CCF)

To estimate these costs, Frontier modelled the costs of compliance and forecast their impacts on the costs of supplying electricity throughout the determination period. Frontier assumed no change in the regulatory regime behind these schemes over the determination period.[221]

217 This model relies on a detailed representation of the electricity system, from which it optimises the total generation cost in the electricity market. Further detail on WHIRLYGIG can be found in Frontier Economics, *WaterNSW's energy purchase costs – Broken Hill Pipeline, Final Report for IPART*, 8 February 2019, pp 14-15.

218 SYNC is an electricity market dispatch model that focuses on detailed short-term fluctuations in demand, supply and system constraints.

219 Further detail on STRIKE can be found in Frontier Economics, *WaterNSW's energy purchase costs – Broken Hill Pipeline, Final Report for IPART*, 8 February 2019, pp19-20.

220 Frontier Economics, *WaterNSW's energy purchase costs – Broken Hill Pipeline, Final Report for IPART*, 8 February 2019, pp 19-20.

221 Frontier Economics, *WaterNSW's energy purchase costs – Broken Hill Pipeline, Final Report for IPART*, 8 February 2019, pp 22-26.

Box D.2 Frontier modelling approach

Source: Frontier, *WaterNSW's energy purchase costs – Broken Hill Pipeline, Final Report for IPART*, February 2019, pp 16-17.

D.4 Market fees and ancillary services costs

Frontier used market fees set by AEMO for 2018-19 to estimate the cost of fees in each year of the determination period, based on AEMO's comment that it expects the fees to remain relatively constant in real terms over the coming years. It estimated ancillary services costs by taking an average of historical costs over the past five years.[222]

D.5 Network costs

Frontier estimated these costs based on Essential Energy's proposed network tariffs, which are currently being considered by the AER. It assumed the AER would accept the proposed tariffs, and that these tariffs would increase in-line with inflation (assumed to be 2.5%) throughout the determination period.[223]

D.6 Energy losses

Frontier estimated energy losses using publicly available distribution and transmission loss factors available from AEMO.[224]

D.7 Retail operating costs and margin

Frontier found that there is limited publicly available information to determine appropriate retail operating costs (ROC) and retail margin allowances for large customers because regulators in most jurisdictions only determine prices for small customers. It assessed previous decisions and research published by the Queensland Competition Authority (QCA), Economic Regulation Authority (ERA) and IPART. Based on its findings, Frontier based its estimates on the fixed ROC and retail margin the QCA adopted in its most recent decision.[225]

222 Frontier Economics, *WaterNSW's energy purchase costs – Broken Hill Pipeline, Final Report for IPART*, 8 February 2019, pp 27-28.
223 Frontier Economics, *WaterNSW's energy purchase costs – Broken Hill Pipeline, Final Report for IPART,* 8 February 2019, pp 28-30.
224 Frontier Economics, *WaterNSW's energy purchase costs – Broken Hill Pipeline, Final Report for IPART*, 8 February 2019, p 30.
225 Frontier Economics, *WaterNSW's energy purchase costs – Broken Hill Pipeline, Final Report for IPART*, 8 February 2019, pp 31-32.

E The Efficiency Carryover Mechanism

In this Appendix, we explain why an Efficiency Carryover Mechanism (ECM) would remove an incentive for the utility to delay efficiency savings it identifies during a regulatory period until the beginning of the following period. It provides worked examples of how the ECM removes this incentive by identifying efficiency savings that are permanent, and allowing the utility to retain permanent efficiencies savings for the same amount of time, regardless of when they are implemented by the utility. For example, for a 3-year determination, any permanent efficiency savings would be retained for three years.

Sections F.1 and F.2 below compare the 'profits' that a utility would enjoy if it implemented a permanent efficiency saving under the current regulatory framework, with those available under the ECM. Section F.3 explains how the ECM is applied. Section F.4 explains why we implement the ECM with a 1-year lag.

E.1 Current regulatory framework

The three tables in Figure E.1 show the profits that a regulated utility retains after making an efficiency improvement decrease the further into a regulatory period that the efficiency is made. The efficiency is then incorporated into the regulatory allowance – in the form of lower prices to customers – in the next determination period and the utility gains no more profit from that efficiency. This creates the incentive for the utility to delay efficiencies to the first year of a new regulatory period.

Figure E.1 assumes that an efficiency saving implemented by a utility in the final year of a determination would be identified by IPART in the expenditure review process.

Figure E.1 How the current framework incentivises delaying efficiencies

Permanent saving made in year 1

	Regulatory Period 1			Regulatory Period 2		
Year	1	2	3	4	5	6
	$	$	$	$	$	$
Allowance	100	100	100	80	80	80
Actual	80	80	80	80	80	80
Annual profit	20	20	20	-	-	-
Total profit in period		**60**				

Permanent saving made in year 2

	Regulatory Period 1			Regulatory Period 2		
Year	1	2	3	4	5	6
	$	$	$	$	$	$
Allowance	100	100	100	80	80	80
Actual	100	80	80	80	80	80
Annual profit	-	20	20	-	-	-
Total profit in period		**40**				

Permanent saving made in year 3

	Regulatory Period 1			Regulatory Period 2		
Year	1	2	3	4	5	6
	$	$	$	$	$	$
Allowance	100	100	100	80	80	80
Actual	100	100	80	80	80	80
Annual profit	-	-	20	-	-	-
Total profit in period		**20**				

Note: Regulatory period 2 does not necessarily have to be the same length as previous regulatory period. We have not made a decision on the length of the subsequent regulatory period. The tables in this figure are illustrative only.

E.2 How the ECM removes the incentive to delay savings

The ECM removes the incentive to delay savings by allowing the utility to retain profits for each permanent saving as though the saving were made in year 1 of the determination period in the scenario above. That is, the total profit for the utility is the same regardless of which year the efficiency was made.

The three tables in Figure E.2 demonstrate the ECM for a 3-year determination. Using the same example as in Figure E.1, the utility retains a $60 profit regardless of which determination year it makes the saving in. This is because we calculate a "carryover" into the next determination period.

After three years, the saving is passed onto customers.

Figure E.2 How the ECM removes incentives to delay efficiencies

	Regulatory Period 1			Regulatory Period 2		
Permanent saving made in year 1						
Year	1	2	3	4	5	6
	$	$	$	$	$	$
Base allowance	100	100	100	80	80	80
Actual	80	80	80	80	80	80
Permanent saving	20	20	20	-	-	-
Incremental saving	20	20	20	-	-	-
Carryover calc	N/A	N/A	N/A			
Net allowance	100	100	100	80	80	80
Annual profit	20	20	20	-	-	-
Total profit in period		60				
Permanent saving made in year 2						
Year	1	2	3	4	5	6
	$	$	$	$	$	$
Base allowance	100	100	100	80	80	80
Actual	100	80	80	80	80	80
Permanent saving	-	20	20	-	-	-
Incremental saving	-	20	20	-	-	-
Carryover calc			20	20		
Net allowance	100	100	100	100	80	80
Annual profit	-	20	20	20	-	-
Total profit in period		40			20	
Permanent saving made in year 3						
Year	1	2	3	4	5	6
	$	$	$	$	$	$
Base allowance	100	100	100	80	80	80
Actual	100	100	80	80	80	80
Permanent saving			20			
Incremental saving			20			
Carryover calc				20	20	
Net allowance	100	100	100	100	100	80
Annual profit	-	-	20	20	20	-
Total profit in period		20			40	

Note: Regulatory period 2 does not necessarily have to be the same length as previous regulatory period. We have not made a decision on the length of the subsequent regulatory period. The tables in this figure are illustrative only.

E.3 Applying the ECM

If the utility decides to apply the ECM, the utility would need to calculate the following values:

- **Under (over)**: first the utility identifies the difference between the base allowance set by IPART to its actual expenditure.
- **Outperformance**: second, the utility only reports where it underspends against our allowances (overspends are omitted).
- **Permanent gain**: working backwards from year 3 to year 1, the utility then determines how much of the outperformance in year 3 also occurred in year 2, how much of the outperformance that occurred in both year 3 and 2 occurred in year 1.

- **Incremental gain**: working forwards from year 1 to 3, it then determines the first year that a permanent saving occurred. It is this 'incremental gain' in each year that would be carried forward for three years through the ECM calculation that follows.
- **ECM calculations**: ensures that any incremental gain is carried forward and held for three years.

At the next determination period, we would consider these calculations, and decide whether the savings identified by the utility are permanent.

E.4 Why there is a 1-year lag in implementation

In practice, at the time we undertake our review, we only have a forecast of expenditure in the final year of the determination period.

To address this limitation, we make three adjustments.

First, we lag the implementation of the ECM by one year. For example, with a 4 year determination period, we apply the ECM calculation to the first three years of the current determination period (years 1, 2, and 3), and to the final year of the previous regulatory period (ie, year 0). Efficiency savings in the final year of the current period (year 4) would be included in the ECM calculation for the following determination period.

Second, we assume an efficiency saving made in year 3 is permanent. Therefore, the benefit is held in year 3 and year 4, and the ECM allows the benefit to be carried forward in years 5 and 6.

Figure E.3 shows the first two adjustments. In this example, the two regulatory periods are years 1 to 4 (regulatory period 1), and year 5 to 8 (regulatory period 2). The ECM is then applied to operating expenditure in years 0 to 3 in the first regulatory period, and years 4 to 7 in the second.

Figure E.3 ECM is lagged one year so that it is based on actuals

		Regulatory Period 1				Regulatory Period 2			
	ECM1				ECM2				
Year	-	1	2	3	4	5	6	7	8
	$	$	$	$	$	$	$	$	$
Base allowance	100	100	100	100	100	80	80	80	80
Actual	100	100	100	80	80	80	80	80	80
Under (over)	-	-	-	20	20	-	-	-	-
Outperformance	-	-	-	20	20	-	-	-	-
Performance gain	-	-	-	20					
Incremental gain	-	-	-	20					
ECM1 calc									
- year 0	-	-	-	-	-				
- year 1		-	-	-	-	-			
- year 2			-	-	-	-	-		
- year 3				20	20	20	20	-	
ECM benefit						20	20		
Total allowance		100	100	100	100	100	100	80	80
Total gain (loss)		-	-	20	20	20	20	-	-

Source: IPART analysis.

The third adjustment made is to ensure that any efficiency made in the final year of a determination period is only retained for one regulatory period, in present value terms. This is because we review efficiency savings made in the final year of a determination in the following period. For example, with a 4-year determination period, it is five years before we review this expenditure. Therefore, the utility would have retained these cost savings for five years.

Figure E.4 shows that we would calculate a 'year 0 adjustment' to ensure permanent savings made in the last year of a determination are only held for the length of the determination period, in this example for four (and not five) years.

In this example, a permanent efficiency saving of $20 is made in Year 0. Without an adjustment factor, the business would retain this saving for five years. The 'Year 0 adjustment' offsets the fifth year of benefit (received in year 4) with a corresponding negative adjustment to the allowance in the first year of the next regulatory period (ie, year 5). Note that we are inflating this adjustment term by the WACC[226] in order to ensure incentives are fully equalised in present value terms (because the WACC represents our view of the appropriate discount rate).

Figure E.4 ECM adjustment to ensure savings are held for no longer than determination

		Regulatory Period 1				Regulatory Period 2			
	ECM1				ECM2				
Year	-	1	2	3	4	5	6	7	8
	$	$	$	$	$	$	$	$	$
Base allowance	100	100	100	100	100	80	80	80	80
Actual	80	80	80	80	80	80	80	80	80
Under (over)	20	20	20	20	-	-	-	-	-
Outperformance	20	20	20	20	-	-	-	-	-
Performance gain	20	20	20	20					
Incremental gain	20	-	-	-					
ECM1 calc									
- year 0	20	20	20	20	20				
- year 1		-	-	-	-	-			
- year 2			-	-	-	-	-		
- year 3				-	-	-	-		
- year 0 adjustment						-21			
ECM benefit						-21	-	-	-
Total allowance		100	100	100	100	59	80	80	80
Total gain (loss)	20	20	20	20	20	-21	-	-	-

Source: IPART analysis.

Retaining the saving for five years would be inconsistent with the purpose of the ECM of equalising incentives over time. The business may have an incentive to delay savings until the last year of a determination period in order to maximise returns.[227]

The adjustment term only applies to a permanent efficiency saving that is made in the final year of a regulatory period. Because the business receives this benefit for five years initially (years 0, 1, 2, 3, and 4), the adjustment term inflates the fifth year of this benefit (received in year 4) by the WACC and returns it to customers in year 5.

226 If cash flows are assumed to occur at the end of each year, this should be the WACC used for regulatory period 2.

227 This incentive already exists under the current form of regulation.

F WaterNSW's proposed prices

Table F.1 WaterNSW's proposed prices ($2018-19)

	2019-20	2020-21	2021-22	2022-23	% change 2019-20 to 2022-23
Prices for Essential Water	**$'000**	**$'000**	**$'000**	**$'000**	**%**
WaterNSW fixed charge $/year	27,021.11	26,814.78	26,570.24	26,373.56	-2.4
Fixed O&M charge $/year	1,595.96	1,598.33	1,587.10	1,585.28	-0.7
Fixed electricity charge $/year	28.66	28.65	28.66	28.65	0.0
Electricity demand charge $/year (if levied for full year)	820.80	820.78	820.79	820.83	0.0
Electricity demand charge $/month (if levied by month active)	68.40	68.40	68.40	68.40	0.0
Variable charges $/ML by weekly demand	**$**	**$**	**$**	**$**	
1 ML to 10 ML	2,000.13	1,863.48	1,580.86	1,831.71	
11 ML to 20 ML	808.58	752.79	636.70	726.52	
21 ML to 30 ML	586.25	545.55	460.54	520.33	
31 ML to 40 ML	488.88	454.78	383.38	430.00	
41 ML to 50 ML	434.42	404.01	340.23	379.48	
51 ML to 60 ML	399.76	371.71	312.77	347.36	
61 ML to 70 ML	375.47	349.07	293.52	324.83	
71 ML to 80 ML	357.75	332.55	279.48	308.39	
81 ML to 90 ML	344.26	319.97	268.79	295.88	
91 ML to 100 ML	333.29	309.75	260.10	285.70	
101 ML to 110 ML	324.78	301.84	253.43	278.24	
111 ML to 120 ML	321.27	298.73	251.38	279.48	
121 ML to 130 ML	318.09	295.91	249.49	280.33	
131 ML to 140 ML	315.51	293.62	247.97	281.14	
141 ML to 150 ML	313.03	291.42	246.47	281.63	
151 ML to 160 ML	311.35	289.94	245.54	282.51	
161 ML to 170 ML	309.68	288.48	244.59	283.10	
171 ML to 180 ML	308.25	287.23	243.82	283.67	
181 ML to 190 ML	307.31	286.43	243.39	284.42	
191 ML to 280 ML	306.51	285.71	242.87	284.29	
Prices to offtake customers	**$**	**$**	**$**	**$**	**%**
Offtakes fixed charge $/year	9,958.07	9,862.23	10,022.27	9,435.50	-5.2
Variable charge $/ML	321.27	298.73	251.38	279.48	-13.0
Variable charge $/Kilolitre (kL)	0.32	0.30	0.25	0.28	-13.0

Source: WaterNSW Broken Hill Pipeline Pricing Proposal to IPART, 30 June 2018, pp 86-88.

Table F.2 Proposed shutdown, standby and restart charges to Essential Water ($2018 19)

($)	Temporary (Less than 30 days)	Short Term (30 to 90 days)	Long Term (More than 90 days)
Shutdown payment (per shutdown event)	1,142.66	2,302.03	11,962.43
Restart payment (per restart event)	571.33	1,151.02	10,222.32
Standby payment (per day)	4,241.63	4,149.72	4,056.76

Note: The shutdown charge would be levied per shutdown event. Restart charge would be levied per restart event. Standby charges would be levied for each day the Pipeline is in shutdown/standby mode, the period between Shutdown and Restart. To ensure the fixed operational maintenance charge is not levied while the Pipeline is in shutdown/standby, a 'rebate' on the annual fixed operational maintenance charges (minus the asset replacement costs) would be paid to Essential Water, which would prorated based on the number of days in which the Pipeline is in shutdown/standby mode

Source: WaterNSW Broken Hill Pipeline Pricing Proposal to IPART, 30 June 2018, p 88.

Table F.3 Proposed Early Water Service charge to Essential Water ($nominal)

	$/ML
Early Water Service	411.68

Note: WaterNSW has proposed that this charge would only apply in the event that water was called on between the date of completion of the Pipeline (December 2018) and prior to commission (April 2019). We note that the prices under our determination would not apply until 1July 2019.

Source: WaterNSW Broken Hill Pipeline Pricing Proposal to IPART, 30 June 2018, p 88.

Glossary

2019 Determination period	The period from 1 July 2019 to 1 July 2022
Annual revenue requirement	The notional revenue requirement in each year of the determination period
Broken Hill Pipeline (the Pipeline)	The WaterNSW Murray River to Broken Hill pipeline
CPI	Consumer price index
Essential Water	Essential Energy's water business
GL	Gigalitre (one billion litres)
IPART	*Independent Pricing and Regulatory Tribunal of NSW*
IPART Act	Independent Pricing and Regulatory Tribunal Act 1992 (NSW)
kL	Kilolitre (one thousand litres)
kVA	Kilovolt-amps
ML	Megalitre (one million litres)
MW	Megawatt
MWh	Megawatt hour
NRR	Notional revenue requirement.
NPV	Net present value
RAB	Regulatory asset base
Section 16A direction	Ministerial direction pursuant to section 16A of the IPART Act
Section 20P directions	Ministerial directions pursuant to section 20P of the SOC Act
SOC Act	State Owned Corporations Act 1989 (NSW)
Target revenue	*The revenue WaterNSW generates from maximum prices set by IPART*
WACC	Weighted average cost of capital