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Return on Working Capital in the Notional Revenue Requirement

Final report for the Independent Pricing and Regulatory Tribunal

5 July 2018

Contents

Executive summary

IPART provides an explicit return on working capital in the notional revenue requirement (NRR) for regulated entities. The need for working capital primarily arises due to a timing difference between the provision of a service, accounts receivable (payments received from customers from the sale of goods and services) and accounts payable (payments made to suppliers for the production and delivery of goods and services). This timing difference creates a financial liability for a business when the average collection days for accounts receivable are greater than the average payment days for accounts payable.

Deloitte Access Economics has been engaged to review IPART's approach to including working capital in the NRR. The aim of the engagement is to answer two key questions:

1. What items should be included in the working capital requirement, and how should IPART measure them?
2. Should IPART use a real or nominal WACC to calculate the return on working capital?

Based on this advice, this review also considers two worked example case studies, the first in which customers are billed quarterly and the second in which customers are billed at the end of the year.

Approach and evaluation criteria

In developing our recommendations on the return on working capital allowance we have had regard to the overarching principle that:

> *"Pricing should generate revenue that matches, as closely as possible, revenue achievable by a similar well-managed, privately owned business. The outcomes should reflect those similar to a competitive market, if such a market were feasible*."

The four evaluation criteria used to assess options and develop recommendations in this report are Accuracy; Robustness; Transparency; and Simplicity – defined in detail as part of this report.

Analysis and recommendations

Estimating working capital

The analysis and recommendations in response to the question outlined are organised into four parts. For each component part, a series of options are developed, each of which is analysed against our evaluation criteria. A summary of the recommended approaches is outlined in the below table.

Table i: Summary of recommendations for the estimation of working capital

	Recommendation	Rationale
Receivables	**Average receivable days**: Use a benchmark based on half of the meter reading cycle plus the historic average period between meter reading and customer payment. Where businesses bill customers for fixed charges in advance, this should be recognised.	While slightly more complex than an approach that assumes a benchmark based on general business contract terms, this is considered to be the most accurate and transparent approach, and is consistent with approaches adopted by other regulators. If businesses bill fixed charges in advance, this reduces the need for working capital and should be reflected in the allowance. However this should be applied on a case-by-case basis, based on actual practice, rather than a strict benchmark.
Payables	**Average payable days:** Use a benchmark based on standard supplier contract terms (e.g. 30 days) **Application of accounts payable:** Apply to both capital and operating expenditure	A benchmark based on standard supplier contract terms is considered to be most consistent with the practice of a benchmark efficient firm, and is therefore the most robust, simple and transparent approach. As a result of the timing assumptions applied by IPART for capital expenditure in the NRR, it is most accurate for capital expenditure to be included in the calculation of the working capital requirement.
Inventory	**Estimation of inventory:** Include inventory and adopt a fixed amount based on the business's estimation of average inventory levels over the most recent year.	Although inventory levels may fluctuate across a month or year, the average real value of inventory should not change materially year-on-year. Therefore, adopting a fixed amount is the most transparent, consistent and simple approach. If a business is growing in size and requires more inventory to be held this would be included in the additional operating expenditure allowance rather than adding to inventory for the purposes of the working capital allowance.
Prepayments	**Inclusion of prepayments:** Prepayments should not be included for suppliers (in payables) or for customers (in receivables) unless these businesses can reasonably demonstrate a requirement for prepayments to occur, and that these prepayments are consistent with the practices of a benchmark efficient firm.	For payables, it is understood that an efficient business would delay payments to suppliers as long as possible, such that there should not be an allowance for businesses paying expenses before the end of their contract terms. For receivables, there is insufficient evidence to suggest that, in general, regulated businesses systematically receive a prepayment from customers, relative to the benchmark average days for receivables outlined assumed in the receivables component of the working capital allowance.

Return on working capital

Using a real or nominal WACC

In the real post-tax revenue setting framework used by IPART, the return on working capital must be estimated as a real cost. There are two approaches that may be considered for the return on working capital

1. Applying a **real WACC** to the estimate of real working capital (current approach)
2. Applying a **nominal WACC** to the estimate of real working capital

The two approaches need to be considered with regards to the overall treatment of inflation in the regulatory framework, including the roll forward of the RAB.

When a real WACC is used, the inflationary gain on the value of assets is removed from the return on assets. However, it is capitalised in the RAB, meaning the regulated business earns a return on and of the inflationary gain over the life of assets in the RAB. This avoids double counting caused by compensating the regulated business for inflation through both the RAB and the revenue requirement.

The two approaches (a real or nominal WACC) provide differing estimates of the real return on working capital. The difference is driven by the treatment of inflation under each approach.

Using the real WACC, inflation on the working capital allowance is removed from the return on working capital. Using the nominal WACC it is not. The nominal WACC will always provide a higher return to the regulated business. The difference between the two approaches will be larger when inflation is higher.

Based on our assessment against the evaluation criteria, we recommend that IPART updates its approach and estimates the return on working capital using a nominal WACC. This is because while both approaches are equally simple and transparent, a nominal WACC is considered to be more accurate and robust to the extent it provides compensation for the 'cost' of inflation that entities do actually incur.

Using a WACC or return on debt

Broadly, there are two overarching approaches that can be used for determining the appropriate rate of return on the working capital.

1. Estimate the WACC at the entity level and **apply the same WACC parameters** to the return on the RAB and the return on working capital (excluding the real vs nominal issue discussed above) which is the current approach
2. Estimate and **apply separate WACCs** to the return on the RAB and the return on working capital.

In practice, the most pertinent question with regards to the return on working capital may be whether to apply a WACC or only the return on debt. However, this should be considered holistically with regards to the overall return on capital, rather than as a stand alone consideration.

Overall, we consider that both approaches could provide an accurate estimation of the efficient return on working capital (and overall return on capital) of the regulated business if applied properly. However, to accurately estimate separate WACCs for the return on assets and return on working capital would be significantly more complex, less transparent, and reflect a significant change to the regulatory framework. Therefore, we recommend that the return on working capital is estimated using the same WACC as the return on assets.

Impact on the notional revenue requirement

Applying the recommended approach developed here has the effect of increasing the return on working capital relative to the current approach, as summarised in the table below which considers two case study examples in which customers are billed quarterly and annually (using the *IPART cost building block model template, July 2016*).

Table ii: Return on working capital (year 0 real $000's) – Index for comparison

	Return on working capital relative to current IPART approach
Current IPART approach – customers are billed quarterly	**1.0**
Current IPART approach – customers are billed annually	**1.0**
Recommended approach - customers are billed quarterly	**2.7** (compared to current **quarterly** approach)
Recommended approach - customers are billed annually	**1.7** (compared to current **annual** approach)

Source: Deloitte Access Economics calculations

This result is largely driven by two factors:

- **Higher receivables**, due to estimating receivables against a higher number of days than the current IPART approach. This difference is larger for customers that are billed quarterly as the days between the end of the billing period and payment make up a larger proportion of receivables. We note that businesses that bill supply charges in advance would have significantly lower benchmark receivables

- **Higher rate of return**, due to the use of the nominal WACC (7.4%) rather than the real WACC (4.8%)

For customers that are billed quarterly the return on working capital is approximately 2.7 times the value under the current approach, with the working capital itself approximately 1.8 times larger. For customers that are billed annually the return on working capital is approximately 1.7 times higher, with the working capital itself 1.1 times higher.

1 Background

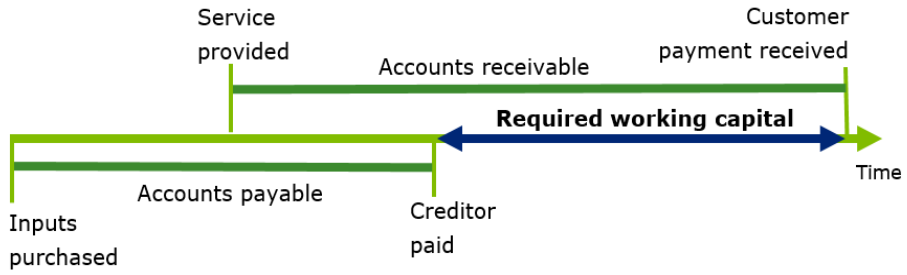
1.1 Working capital

Working capital is commonly defined as the difference between a business' current assets and current liabilities, and is a measure of operating liquidity. Current assets such as cash, accounts receivable and inventory can be quickly recovered as cash but receive no return while being held.

(1) $$Net\ working\ capital = Current\ assets - Current\ Liabilities$$

The need for working capital primarily arises due to a timing difference between the issue of service, accounts receivable (payments received from customers from the sale of goods and services) and accounts payable (payments made to suppliers for the production and delivery of goods and services). This timing difference creates a financial liability for a business when the average collection days for accounts receivable are greater than the average payment days for accounts payable. The diagram in figure 1 demonstrates this issue.

Figure 1 working capital required due to net receivables timing difference



(2) $$Net\ receivables = Accounts\ receivable - Accounts\ payable$$

A business is often required to maintain a minimum level of inventory to meet immediate service obligations. It incorporates the raw materials, work-in-process products and finished goods that are considered to be the portion of a business's assets that are ready or will be ready for sale. For the majority of service providers under IPART's regulation (in particular, for water businesses), inventory is primarily made up of spare parts and inputs (e.g. chemicals) rather than finished goods.

A business may also receive (or pay) advanced payments prior to the issue of a service, known as prepayments. A prepayment is a financial liability added into working capital if they are required to pay a supplier in advance. Conversely, a prepayment is a financial asset, subtracted from working capital, if a customer pays for the service prior to its delivery.

(3) $$Net\ working\ capital = Net\ receivables + Inventory + Net\ prepayments$$

While net working capital is made up of assets, it is more closely related to the day-to-day operations of a business. Net working capital is not part of the RAB and not subject to depreciation and thus its size is best indicated by annual revenue and operating expenditure.

A business receives a return on working capital by including it in the price charged to consumers, but to remain competitive an efficient business would aim to minimise the cost of working capital to the lowest level required to meet their obligations. For regulated utilities, regulators allow revenues based on economic cost, which includes a return on and return of capital. Working capital funding requirements are an economic cost of conducting business, and therefore should be included in regulatory revenue allowances in some form.

1.2 Overview of IPART's current approach

The need for a return on working capital allowance in the revenue requirement relies on the regulator's **assumption of timing of expenditure and receipts** in its building block methodology. Regulators generally rely on the assumption that revenue arises or expenditure occurs evenly throughout the regulatory year.

Due to the assumption that revenue is received evenly throughout the regulatory year, IPART calculates a mid-year value of return on and of assets (rather than a year-end value applied by some other regulators). IPART applies a real weighted average cost of capital (WACC) to the opening value of the RAB plus 50% of capital expenditure and disposals. It then discounts this value by a half year WACC to provide a mid-year value recognising the time value of cash flows at different times of the year. Because of these timing assumptions, IPART recognises a need for an explicit working capital allowance.

The method IPART currently employs to calculate the value of net working capital is shown below in equation 4. Note that the addition of prepayments implies that the regulated business would systematically make payments to suppliers in advance

IPART net working capital formula

$$(4)\quad Net\ working\ capital = \left(\frac{Average\ receivable\ days}{365}\right) * Annual\ allowed\ revenue - \left(\frac{Average\ payable\ days}{365}\right) * Anual\ forecast\ capex\ and\ opex + \left(\frac{Average\ inventory\ days}{365}\right) * Anual\ forecast\ capex\ and\ opex + \left(\frac{Average\ prepayment\ days}{365}\right) * Anual\ forecast\ capex\ and\ opex$$

A benchmark approach is used to estimate regulated business's average days' receivable (45) and average days payable (30). Inventory is estimated on a case-by case basis based on observed average days of operating and capital expenditure. IPART uses the following ratios to guide each of the component's average period. Note that not all regulated businesses apply for inventory or prepayments, and the number of inventory days varies across regulated businesses by applying equation 7 using the most recent year's values.

$$(5)\quad Average\ receivable\ days = \frac{averge\ accounts\ receivable * 365}{sales\ revenue}$$

$$(6)\quad Average\ payable\ days = \frac{average\ accounts\ payable * 365}{operating\ costs + capital\ expenditure}$$

$$(7)\quad Average\ inventory\ \ days = \frac{average\ inventory * 365}{operating\ costs + capital\ expenditure}$$

$$(8)\quad Average\ prepayment\ days = \frac{average\ prepayments * 365}{operating\ costs + capital\ expenditure}$$

Currently, IPART applies the same real post-tax WACC to both the return on assets and net working capital.

IPART return on working capital formula

$$(9)\quad Return\ on\ working\ capital = \ Net\ working\ capital * real\ post\ tax\ WACC$$

1.3 Approach used by other regulators

The regulatory approach to working capital varies across Australian jurisdictions. The Australian Energy Regulator (AER), Essential Services Commission of Victoria (ESCV), and Office of the

Tasmanian Economic Regulator (OTTER) do not include an allowance for the return on working capital for their regulated entities.

Other Australian regulators, the Essential Services Commission of South Australia (ESCOSA), Queensland Competition Authority (QCA), and Economic Regulation Authority Western Australia (ERA), all use different methods to calculate the return on working capital.

Notably, none of the other regulators currently make an allowance for prepayments. Table 1.1 below provides an overview on the approach each regulator takes to estimating the days required for each component and how it is applied to calculate the value of net working capital (whether to revenue, capital expenditure or operating expenditure). A bottom up approach refers to the regulator utilising business specific records to estimate the period of days for individual businesses, while a benchmark approach refers to a proxy number of days set for all regulated businesses. Although we have characterised these as different approaches here, more broadly they can both be viewed as applications of a benchmark approach, although differing in how the benchmarks are set and updated. ESCOSA applies accounts receivable and accounts payable only to operating expenditure, while QCA and ERA apply accounts receivable to total revenue. The QCA applies inventory to operating expenditure while the ERA applies inventory to capital expenditure.

Table 1.1 Overview of other regulator's approach to net working capital

	ESCOSA	QCA	ERA
Receivables	Bottom up approach applied to operating expenditure	Bottom up (water) and benchmark (gas) approach applied to revenue	Bottom up approach applied to revenue.
Payables	Benchmark approach applied to operating expenditure	Benchmark approach applied to operating expenditure	Bottom up approach applied to capital and operating expenditure.
Inventory	N/A	Bottom up approach applied to operating expenditure	Bottom up approach applied to capital expenditure

The approach taken by each of these regulators is detailed further in Appendix 1.

1.4 Approach and evaluation criteria

In developing our recommendations on the return on working capital allowance we have had regard to the overarching principle that:

> *"Pricing should generate revenue that matches, as closely as possible, revenue achievable by a similar well-managed, privately owned business. The outcomes should reflect those similar to a competitive market, if such a market were feasible."*

The four evaluation criteria used to assess options and develop recommendations in this report are:

- **Accuracy.** The approach to calculating the return on working capital for a regulated entity should produce an accurate estimate of a benchmark efficient cost of working capital for the entity. The approach should not seek to replicate a business's actual working capital for accounting purposes, but rather should accurately reflect an efficient regulatory benchmark based on assumptions regarding the typical attributes and behaviour of a similar, well-managed business in that industry.
- **Robustness.** The approach should be robust to external influences, and provide a stable and predictable estimate of the working capital requirement, minimising regulatory risk. The

approach should also be consistent with the other regulatory benchmarks used to estimate the revenue requirement.

- **Transparency.** The approach should be transparent to, and replicable by, stakeholders such as regulated entities and customers. Transparency imparts confidence in the regulatory regime and also enables potential errors to be identified more easily.
- **Simplicity.** The approach should be generally easy to understand and implement. Simplicity minimises administrative costs to the regulator and burden on regulated entities.

2 Estimating the amount of working capital

The requirement for a working capital allowance depends on the timing assumptions used in the building block revenue calculations. Under certain timing assumptions, an explicit working capital allowance is not necessary, as the cost of working capital is implicitly included in other building blocks. This does not mean those businesses do not have any working capital requirements. In this way, the working capital allowance should not necessarily reflect an efficient level of working capital in isolation, but rather reflect working capital requirements outside of what is covered in the broader building block calculation. The following analysis and recommendations are based on the assumptions made by IPART in its application of the building block method as outlined in Section 1.2. To the extent that IPART changed its timing assumptions, these recommendations would need to be reviewed.

2.1 Receivables

There are a number of ways to estimate the average receivable days used to calculate the accounts receivable component of working capital. The following table presents three approaches to estimating average receivable days that IPART should consider.

Table 2.1 Options to estimate average receivable days

Options to estimate average receivable days
Option 1: Estimate a benchmark based on half of the meter reading cycle plus the historic average period between meter reading and customer payment.
$$\boldsymbol{Average\ receivable\ days} = \boldsymbol{Half\ of\ the\ meter\ reading\ cycle\ period} + \boldsymbol{Average\ days\ between\ meter\ reading\ and\ customer\ payment}$$
Option 2: Estimate a benchmark based on half of the meter reading cycle plus the period between meter reading and customer payment based on contract terms.
$$\boldsymbol{Average\ receivable\ days} = \boldsymbol{Half\ of\ the\ meter\ reading\ cycle\ period} + \boldsymbol{Days\ between\ meter\ reading\ and\ customer\ payment\ (based\ on\ contract\ terms)}$$
Option 3: Estimate based on days sales outstanding (DSO) ratio.
$$\boldsymbol{Average\ receivable\ days} = \frac{\boldsymbol{Average\ monthly\ accounts\ receivable}}{\boldsymbol{Annual\ revenue}} * \mathbf{365}$$

Options one and two both use the half of a meter reading cycle period as the base to estimate receivable days. However, option two uses a benchmark approach based on customer contract terms to add the additional days of payment after invoice. This is the most simple and consistent approach, but may also be less accurate, in favour of the regulated business, as many customers pay before the due date.

We note that if businesses reduce actual receivable days (by requiring earlier payment) this may not be in the interests of customers. As with regulated businesses, customers discount the future and would typically prefer to delay payments where possible. If regulated businesses reduce the delay between meter reading and payments, but this is not reflected in a lower working capital

allowance (and therefore lower prices), it makes customers worse off to the benefit of the regulated business.

In contrast, option one estimates the benchmark days between meter reading and payment based on actual historical information. This method is more accurate as it includes consideration of customers who pay in advance of their contract requirement. Given that the estimated average days is unlikely to fluctuate significantly it is likely to be a consistent measure over time while still reflecting individual business practices. If the benchmark is based on historic values, businesses will still have an incentive to minimise receivables to the extent possible, in line with the benchmark efficient entity. However, it minimises the chance of ongoing outperformance of the benchmark at the cost of the customer. There are a few options for how IPART could update this benchmark, for example it could be updated annually based on the previous year or using an average over a few years, at the start of each regulatory period in the same manner, or whenever payment terms on bills are changed by the regulated business.

As outlined above, customers also discount the future and would typically prefer to delay payments. This means it isn't obvious whether customers would prefer a greater delay between paying bills with an accompanying higher working capital allowance in their bill, or a smaller delay with lower working capital allowance. If customer discount rates are higher than the WACC, then all else held constant they would prefer to delay payment by one day and pay the additional cost of one day's WACC on receivables, and vice versa. If discount rates are similar to the WACC, then they are likely to be relatively indifferent as long as the allowance reflects actual practice.

Option three employs a DSO ratio to estimate the average receivable days for each business. The additional accuracy of this measure would be offset by the increased complexity, lack of transparency, and inconsistency across businesses.

We recommend that IPART employs option one to estimate the average receivable days. Purely as an example of what the average receivable days may be for a business, we can apply the estimates used by QCA in the price decision for Seqwater[1] (detailed in Appendix 1) to IPART's three month metering cycle. This would allow a total of 74 days for accounts receivable; accounting 45 days for half of the meter reading cycle, 8 days between meter reading and issue of invoice, and 21 days between invoice and receipt of payment.

The process of setting a benchmark based on actual days of receivables should not be overly onerous for IPART, and consideration must be given to the relative size of the working capital allowance in the context of other regulated allowances. It may be appropriate therefore to update the estimate of receivable days for a business only every second price review period, or only when there is significant new evidence provided that business practices have changed in a material way, requiring a different assumption to ensure the working capital allowance reflects the benchmark efficient firm practices.

Given that the delay in accounts receivable is a function of the sales made by a business, it is common practice to apply average receivable days to revenue. The formula to estimate annual accounts receivable is shown in equation 10 below.

$$(10) \quad Accounts\ receivable = \left(\frac{Average\ receivable\ days}{365}\right) * Annual\ allowed\ revenue$$

We note that some regulated businesses may bill fixed charges in advance (or mid period) and only usage charges in arrears. Where businesses bill in this way, we consider it should be reflected in the working capital allowance. However, this should be done on a case by case basis considering actual practice, rather than a strict benchmark applying to all businesses.

The most accurate way to estimate receivables in these cases would be to estimate the proportion of average bills in each component, and apply a separate number of days to each. For the usage component (in arrears), the number of days would be calculated in a similar manner to that

[1] Final Report SEQ Water Grid Service Charges 2011-12, QCA, July 2011

outlined above (half the days of meter reading period + average days between meter reading period and payment). For the fixed component paid in advance, the average days between meter reading period and payment would be the same. However, half the days in the meter reading cycle would be negative (as it is paid in advance).

For example, assuming a quarterly billing cycle, and 15 days average delay between the end of the meter reading cycle and payment, the accounts receivable could be estimated in line with the equation below:

$$(11) \quad Accounts\ receivable = \left(\frac{45+15}{365}\right) * Usage\ revenue + \left(\frac{-45+15}{365}\right) * Fixed\ revenue$$

2.2 Payables

There are two options outlined in table 2.2 to estimate the average payable days. The first would be to use a benchmark based on general supplier contract terms. The second is to use a weighted average of each expenditure component and the respective contract terms. The latter approach better reflects the practical operations within each business. However, it is unlikely that the additional complexity and exposure to measurement error would be offset by the marginal improvement in accuracy. Given that an efficient business would delay creditor payments as far as possible, a benchmark approach may be the most reflective of a best-practice firm. Thus option one is the recommended approach to estimating average payable days.

Table 2.2 Options to estimate average payable days.

Options to estimate average payable days
Option 1: Benchmark based on standard contract terms
$\boldsymbol{Average\ payable\ days\ = 30\ days\ based\ on\ standard\ supplier\ contract\ terms}$
Option 2: Weighted average of different expenditure components.
$\boldsymbol{Average\ payable\ days}$ $= \boldsymbol{Labour\ cost\ proportion}\ \% * \boldsymbol{Benchmark\ labour\ contract\ terms}$ $+ \boldsymbol{Operating\ materials\ proportion}\ \% * \boldsymbol{Benchmark\ supplier\ terms}$ $+ \boldsymbol{Capital\ costs\ proportion}\ \% * \boldsymbol{Benchmark\ days\ for\ capital\ costs}$[2] $+ \boldsymbol{Other\ costs\ proportion}\ \% * \boldsymbol{Benchmark\ other\ cost\ supplier\ terms}$

Table 2.3 highlights that the delay in payable days can be applied in two ways, to operating expenditure solely or both capital and operating expenditure. While working capital is made up of assets, it is primarily held by businesses to fund day-to-day operations. Therefore, general business practice is to consider working capital purely in relation to operating expenses. However, due to the timing assumptions made by IPART, there may be a difference between when capital expenditure enters the RAB and starts earning a return on expenses incurred (e.g. contracts are signed) and when expenses are actually invoiced and paid by the business. Given that IPART spreads the revenue allowance on capital expenditure evenly over the year, regulated businesses are able to start receiving a return on incurred expenses as early January 1st, even though the actual payment for the same capital program may not be made until weeks or months later. It is unlikely that such a delay in payments exclusively occurs to operating expenses. Based on this, option two is a more accurate and robust approach that allows for a delay in the payment for capital expenses.

[2] Exclude capital cost component if not applying payable days to capital expenditure

Table 2.3 Options for the application of account payable in net working capital

Options for the application of accounts payable
Option 1: Apply to real operating expenditure forecast
$$\boldsymbol{Accounts\ payable} = \left(\frac{\boldsymbol{Average\ payable\ days}}{\boldsymbol{365}}\right) * \boldsymbol{Forecast\ operating\ expenditure}$$
Option 2: Apply to real capital and operating expenditure forecasts
$$\boldsymbol{Accounts\ payable} = \left(\frac{\boldsymbol{Average\ payable\ days}}{\boldsymbol{365}}\right) * \boldsymbol{Forecast\ capital\ and\ operating\ expenditure}$$

2.3 Inventory

Table 2.4 provides three options to calculate the value of inventory in working capital. Each option requires an estimated average level of inventory based on historical stock takes. The first two options differ from the third to the extent that they allow annual variations in yearly inventory based on the level of forecast operating expenditure for that year.

Given that inventory for IPART's regulated businesses will primarily be made up of spare parts and inputs (rather than capital stock ready for sale) it should not be applied to capital expenditure. Although inventory levels may fluctuate within the month or year, the real value of inventory should not change materially year-on-year. Therefore, option three – to adopt a fixed amount based on the business's estimation of average inventory levels over the most recent year – is the most transparent, consistent and simple of the three options. While options one and two do not add a material amount of accuracy. If a business is growing in size and requires more inventory to be held this would be included in the additional operating expenditure allowance.

Table 2.4 Options for the estimation of inventory days

Options for the estimation of inventory
Option 1: Benchmark days based on average historical stock held and applied to real forecast operating expenditure
$$\boldsymbol{Average\ inventory\ days} = \frac{\boldsymbol{Average\ monthly\ inventory\ level}}{\boldsymbol{Operating\ expenditure}} * \boldsymbol{365}$$ $$\boldsymbol{Inventory} = \left(\frac{\boldsymbol{Average\ inventory\ days}}{\boldsymbol{365}}\right) * \boldsymbol{Forecast\ operating\ expenditure}$$
Option 2: Percentage of operating expenditure
$$\boldsymbol{Inventory\ \%\ of\ operating\ expenditure} = \frac{\boldsymbol{Average\ inventory\ level}}{\boldsymbol{Operating\ expenditure}}$$ $$\boldsymbol{Inventory} = \boldsymbol{Inventory\ \%} * \boldsymbol{Forecast\ operating\ expenditure}$$
Option 3: Fixed amount based on business submission
Average level of inventory of the previous year, based on a number of observations throughout the year to avoid possible over or under estimation at one point in time.

2.4 Prepayments

Prepayments reflect the difference between supplier prepayments (expense paid prior to receipt of input) and customer prepayments (revenue received prior to provision of service).

Supplier prepayments
As discussed in payables (section 2.2) above, an efficient business would delay payments to suppliers as far long as possible, such that there should not be an allowance for businesses paying expenses before the end of their contract terms. We are not aware of any compelling evidence to suggest that regulated businesses are required by some suppliers to pay in advance of benchmark contract terms. In light of this, supplier prepayments should generally not be included in the calculation for working capital unless a business can reasonably demonstrate that there is a material impact of suppliers demanding prepayments.

Customer prepayments
There is insufficient evidence to suggest that, in general, regulated businesses systematically receive a prepayment from customers, relative to the benchmark average days for receivables outlined above. Therefore, customer prepayments should not be included into the calculation of working capital, unless it is clear that a material number of customers pay for a business's services in advance, and this is consistent with the practices of a benchmark efficient firm.

Based on this, the exclusion of prepayments from working capital is the most accurate, transparent and simple option.

3 Estimating the return on working capital

This chapter sets out our analysis and recommendations on the appropriate rate of return to apply to the working capital to estimate the efficient return on working capital.

It examines two questions:

1. Whether the return on working capital should be estimated using a real or nominal rate of weighted average cost of capital (WACC)
2. Whether the return on working capital should be estimated using the WACC or using the return on debt only.

3.1 Real or nominal WACC

In the real post-tax revenue setting framework used by IPART, the return on working capital must be estimated as a real cost. There are two approaches that may be considered for the return on working capital:

1. Applying a **real WACC** to the estimate of real working capital (current approach)
2. Applying a **nominal WACC** to the estimate of real working capital

The two approaches need to be considered with regards to the overall treatment of inflation in the regulatory framework, including the roll forward of the RAB.

The IPART approach to rolling forward the real value of the RAB may be expressed in simplified terms as follows:

$$(12) \quad RAB_{0,closing} = RAB_{0,opening} + NetCapex_0 - Dispoals_0 - Depreciation_0$$

Where all values are expressed in year 0 dollars.

Outside of capex, disposals and depreciation, the real value of the RAB is held constant as it is rolled forward. In other words, inflationary gain on the value of the assets is retained in the RAB.

To estimate the return on assets, IPART applies a real WACC to the RAB as follows:

$$(13) \quad Return\ on\ RAB_{0,real} = RAB_0 * r = RAB_0 * \left(\frac{1 + R_e\left(\frac{E}{E+D}\right) + R_d\left(\frac{D}{E+D}\right)}{1+i} - 1\right)$$

Where:

r: $Real\ WACC$
RAB_0: $Real\ RAB\ in\ year\ 0\ dollars$
E: $Value\ of\ equity\ component\ of\ RAB$
D: $Value\ of\ debt\ component\ of\ RAB$
R_e: $Nominal\ return\ on\ equity$
R_d: $Nominal\ return\ on\ debt$
i: $Inflation\ rate$

Which reduces to the following:

$$(14) \quad Return\ on\ RAB_{0\_real} = RAB_0 * \frac{R_e\left(\frac{E}{E+D}\right) + R_d\left(\frac{D}{E+D}\right) - i}{1+i}$$

Or, in line with the Fisher equation:

$$(15) \quad Return\ on\ RAB_0 = RAB_0 * \left(\frac{R-i}{1+i}\right) = RAB_0 * \left(\frac{R}{1+i} - \frac{i}{1+i}\right)$$

When a real WACC is used, the inflationary gain on the value of assets is removed from the return on assets. However, as outlined above, it is capitalised in the RAB, meaning the regulated business earns a return on and of the inflationary gain over the life of assets in the RAB. This avoids double counting caused by compensating the regulated business for inflation through both the RAB and the revenue requirement.

3.1.1 Overview of problem

The implications for the return on working capital under each approach is set out below.

1: Applying a real WACC (current approach)

Under this approach, the real return on working capital is estimated by multiplying the real working capital by the real WACC.

$$(16) \quad RoWC_{0,real} = WC_0 * r = WC_0 * (\frac{1 + R_e\left(\frac{E}{E+D}\right) + R_d\left(\frac{D}{E+D}\right)}{1+i} - 1)$$

Where:

$$(17) \quad WC_0 : Real\ working\ capital\ in\ year\ 0\ dollars$$

Which reduces to the following in line with the Fisher equation:

$$(18) \quad RoWC_0 = WC_0 * \frac{R-i}{1+i} = WC_0 * \left(\frac{R}{1+i} - \frac{i}{1+i}\right)$$

Using the real WACC, the treatment of inflation is equivalent to that applied to the return on assets. That is, inflationary gain on the value of the working capital is removed from the return on working capital.

2: Applying a nominal WACC

Under this approach, the real return on working capital is estimated by multiplying the real working capital by a nominal WACC.

This can be expressed as below:

$$(19) \quad RoWC_{0,nominal} = WC_0 * R$$

Using the nominal WACC, the inflationary gain on the value of the working capital is included in the return on working capital.

3.1.2 Analysis and recommendations

With regards to the return on working capital, IPART's internal policy paper[3] notes that:

"The selected rate should be consistent with the rate of return determined for the regulatory non-current asset base and calculated using the same principles underlying the determination of that rate."

We consider this reasonable as a basis for determining the return on working capital. However, the consideration of principles underlying the return on capital should include any relevant interaction with the broader revenue determination including the roll forward of assets and depreciation.

[3] Independent Pricing and Regulatory Tribunal, *Policy paper on Regulatory Working Capital*

We evaluated the two approaches against the evaluation criteria.

- **Accuracy** – In the real pricing framework employed by IPART, both the RAB and working capital are expressed in real terms. When the return on assets is estimated with the real WACC, the inflationary gain on assets is removed. However, by holding the real value of the RAB constant when rolling it forwards, the inflationary gain removed from the return on assets is retained in the RAB. For the regulated business these are equivalent in net present value terms (and can be conceptualised similarly to the treatment of capex).

  If the return on working capital is estimated with a real WACC, the inflationary gain on working capital is removed. However, as the working capital allowance is not rolled forwards, this inflationary gain is not reflected elsewhere in the revenue determination.

  If the return on capital is estimated with a nominal WACC, the allowance for working capital reflects the full cost of capital, including the 'cost' of inflation.

  Estimating the return on assets using a real WACC is appropriate because the interaction with the RAB roll forward ensures the overall treatment of inflationary gain is accurate. However, we consider that using a nominal WACC to estimate the return on working capital more accurately reflects the actual working capital costs of the benchmark entity. Because the inflationary gain on working capital is not considered outside of the return on working capital, we consider using a real WACC would undercompensate the regulated business.

- **Simplicity –** Both approaches are relatively simple to implement. The nominal WACC is estimated using the same parameters as the real WACC, and both are typically included in determinations.

- **Transparency –** Both approaches may be considered transparent, provided the treatment of inflation using the nominal WACC is clearly explained.

- **Robustness** – Taken in isolation, using the real WACC for the return on working capital is most in line with the WACC method and the overarching approach to estimating the return on capital. However, the use of the nominal WACC reflects the interaction between the return on assets and roll-forward of the RAB.

  The current WACC method does not anticipate the application of a nominal WACC to estimate the return on working capital, so this would need to be clearly explained to stakeholders to ensure the robustness of the regulatory framework.

Based on our assessment against the evaluation criteria, we recommend that IPART updates its approach and estimates the return on working capital using a nominal WACC.

3.2 WACC or return on debt

The return on working capital should reflect the efficient costs of financing the working capital requirements. The rate of return used to estimate this return should be determined in a way that reflects benchmark efficient financing practices, in line with the rate of return on the RAB.

Broadly, there are two overarching approaches that can be used for determining the appropriate rate of return on the working capital.

1. Estimate the WACC at the entity level and **apply the same WACC parameters** to the return on the RAB and the return on working capital (excluding the real vs nominal issue outlined above) which is the current approach
2. Estimate and **apply separate WACCs** to the return on the RAB and the return on working capital

In practice, the most common question that is often asked with regards to the return on working capital may be whether to apply a WACC or only the return on debt. However, in our view the

"first principles" question is whether the financing costs for capital expenditure and working capital should be considered holistically with regards to the overall return on capital, or whether they should be considered on a standalone basis.

3.2.1 Overview of problem

IPART estimates the rate of return for its regulatory decisions based on its WACC Method. The WACC Method was recently reviewed, with a Final Report released in February 2018. The updated WACC Method will apply from 1 July 2018.

The 2018 WACC Method retains most of the core elements of the previous WACC Methodology, released in December 2013. This includes the use of a post-tax real WACC, the definition of the benchmark firm, and the use of industry specific factors such as gearing and equity beta. However iterative adjustments were made to certain elements including the use of a trailing average for the historic and current cost of debt, and updated approach to estimating the market risk premium.

The 2018 WACC Review outlined four principles that IPART aimed to balance through the Review. The first principle is as follows:

"Our WACC method should produce estimates of the cost of capital that are as reasonably accurate as possible."

The WACC Method states that the WACC is estimated with reference to an efficient benchmark entity, defined as:

"A firm operating in a competitive market and facing similar risks to the regulated business"

The WACC Method notes that the cost of capital for the benchmark entity may differ from the actual costs of any regulated business. As the benchmark entity is a hypothetical firm and cannot be directly observed, industry specific WACC parameters are based on observations of a sample of proxy firms.

The updated WACC method and 2013 method do not distinguish between the return on RAB and the return on working capital.

An overview of the implications of using the two approaches is outlined below.

1: Apply the same WACC to the return on RAB and return on working capital

Under this approach, the current approach, the efficient cost of capital is estimated at the entity level. This would reflect the overall financing requirements of the benchmark entity, including the requirements to finance both capital expenditure and working capital.

Comparator firms would be selected for their similarity and relevance to the regulated entities, and their capital costs would include a return on assets and on working capital. When observing comparator firms to determine industry-specific parameters such as gearing and equity beta, these should be considered with reference to efficient financing practices at the entity, rather than for the return on assets or return on working capital in isolation. The WACC determined from these parameters would then be applied to the overall capital requirements of the regulated business.

2: Apply separate WACCs to the return on RAB and return on working capital

Under the second approach, the efficient cost of capital is estimated separately for the return on the RAB and the return on the working capital.

To properly apply this approach, IPART would need to estimate the industry specific WACC parameters separately for these two components of capital. When observing comparator firms, it would need to decompose the financing practices into the return on assets and return on working capital components, and determine parameters for each. The WACCs estimated on the two sets of parameters would be applied to the RAB and working capital to estimate the return on assets and return on working capital respectively.

3.2.2 Analysis and recommendations

We recommend that the application of the WACC to the working capital should be considered holistically as part of the overall return on capital, in line with the WACC method. We evaluated the two approaches against the evaluation criteria.

- **Accuracy:** Our observation of funding practices of regulated utilities indicates that a range of approaches are used to fund working capital. In some cases, working capital is funded through operations, so it would reflect a mix of equity and debt funding in line with the overall gearing ratio. However, regulated businesses would typically have some working capital debt facilities and fund some part of working capital directly through debt, particularly during intervals with high working capital requirements.

  Therefore, taken in isolation, the working capital would be funded through both debt and equity, although perhaps with a somewhat higher proportion of debt funding. However, this would vary between regulated businesses, and throughout the year.
  However to properly apply a different cost of capital to the return on assets and return on working capital, all of the WACC parameters would need to be estimated specifically to that element of capital requirements. For example, the industry specific gearing is estimated with regard to overall financing of comparator firms that have working capital requirements. If the return on working capital assumes a gearing of 100%, this would mean the incorrect gearing is applied to the return on assets. To accurately estimate the return on assets, the gearing for the return on assets would need to be re-estimated based on observation of firms, excluding any capital used for working capital.

  In practice, if WACC parameters are estimated at the entity level, reflecting the cost of capital at the entity level including working capital, this will provide an accurate estimate of efficient cost of capital. Similarly, if the WACC parameters for return on assets and return on working capital are estimated separately, based on observations of comparator firms for each element in isolation, this will provide an accurate estimation. However if different WACCs are applied without going through this process, the result will be less accurate.

- **Simplicity –** As outlined above, accurately estimating different WACCs requires all parameters to be estimated separately for the return on assets and return on working capital. In general, it will be more complex to estimate two sets of parameters than one. In practice, it may be extremely complex to separate out the approach to financing working capital from assets, and would require more work from both the regulator and regulated business.

- **Transparency** – To separate the approach to financing working capital from assets would likely require significantly more judgement to be made by the regulator compared to estimating a single set of parameters. The application of this judgement is unlikely to be transparent and would be more difficult for stakeholders to understand and replicate.

- **Robustness** – Applying a separate WACC to the return on assets and return on working capital would reflect a significant change to IPART's approach to the WACC that was not reflected in the recent WACC Review. Given the additional complexity and judgement required to apply this approach, it would likely reduce stability and predictability of revenue setting.

Overall, we consider that both approaches could provide an accurate estimation of the efficient return on working capital (and overall return on capital) of the regulated business if applied properly. However, to accurately estimate separate WACCs for the return on assets and return on working capital would be significantly more complex, less transparent, and reflect a significant change to the regulatory framework. Therefore, we recommend that the return on working capital is estimated using the same WACC as the return on assets.

4 Impact on notional revenue requirement

This section sets outs some worked examples of our proposed approach to demonstrate the impact of our proposed approach on the notional revenue requirement. It sets out the return on working capital allowance under four scenarios:

1. Using the current IPART approach assuming customers are billed quarterly
2. Using the current IPART approach assuming customers are billed annually
3. Recommended approach assuming customers are billed quarterly
4. Recommended approach assuming customers are billed annually.

These worked examples are estimated using the model *IPART cost building block model template, July 2016* downloaded from the IPART website on April 19. All inputs and parameters are equal to those originally contained in the model, except where otherwise noted.

The following tables sets out the relative size of the building block models using the default values in the template, and IPART's current approach to the return on working capital assuming customers are billed quarterly.

Table 4.1: Current approach building blocks (year 0 real $000's)

	Year 1	Year 2	Year 3	Year 4	Year 5
Operating expenditure	65,000	65,150	65,300	65,450	65,000
Depreciation	19,961	20,564	21,300	22,198	19,961
Return on RAB	39,981	40,866	42,017	43,722	39,981
Return on working capital	264	401	254	353	264
Tax allowance	2,733	2,908	3,082	3,297	2,733
Total revenue requirement	**127,939**	**129,889**	**131,952**	**135,020**	**127,939**

Source: IPART model template

The return on working capital is the smallest building block in this example, making up approximately 0.2-0.3% of the total revenue requirement over the regulatory period

The following table sets out the approach to estimating the return on working capital under each of the scenarios.

Table 4.2: Working capital parameters and assumptions

	Receivables	Payables	Inventory	WACC
Current IPART approach (customers billed quarterly)	Based on revenue, using half days in average quarterly billing cycle (45 days total)	Based on opex and net capex, assuming 30 day payment terms	Based on observed days of opex and net capex (assumed 2 days for this example)	Real WACC (4.8%)

Current IPART approach (customers billed annually)	Based on revenue, using half days in average annual billing cycle (180 days total)	Based on opex and net capex, assuming 30 day payment terms	Based on observed days of opex and net capex (assumed 2 days for this example)	Real WACC (4.8%)
Recommended approach (customers billed quarterly)	Based on revenue, using half the days in quarterly billing cycle + average days between end of bill period and payment (60 days total)*	Based on opex and net capex, assuming 30 day payment terms	Based on observed value, held constant through period (assumed equal to IPART year 1 value)	Nominal WACC (7.4%)
Recommended approach (customers billed annually)	Based on revenue, using half days in annual billing cycle + average days between end of bill period and payment (195 days total)	Based on opex and net capex, assuming 30 day payment terms	Based on observed value, held constant through period (assumed equal to IPART year 1 value)	Nominal WACC (7.4%)

*Note: This case study assumes that usage and supply charges are billed in arrears

For each of the scenarios, the following table sets out the size of each of the working capital components as well as the overall return on working capital.

Table 4.3: Working capital components and return on working capital (year 0 real $000's)

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
	Receivables	15,010	15,385	15,767	16,287	16,824	79,274
Current IPART approach (customers billed quarterly)	Inventory	670	488	739	625	655	3,178
	Payables	10,051	7,315	11,090	9,382	9,830	47,669
	Net working capital	5,629	8,558	5,416	7,530	7,650	34,783
	Return on working capital	**264**	**401**	**254**	**353**	**359**	**1,631**
Current IPART approach (customers billed annually)	Receivables	60,041	61,539	63,070	65,147	67,298	317,095
	Inventory	670	488	739	625	655	3,178
	Payables	10,051	7,315	11,090	9,382	9,830	47,669
	Net working capital	50,660	54,712	52,719	56,390	58,123	272,605
	Return on working capital	**2,375**	**2,565**	**2,472**	**2,644**	**2,725**	**12,782**
Recommended approach (customers billed quarterly)	Receivables	20,014	20,513	21,023	21,716	22,433	105,698
	Inventory	670	670	670	670	670	3,350
	Payables	10,051	7,315	11,090	9,382	9,830	47,669
	Net working capital	10,633	13,869	10,603	13,003	13,273	61,380

	Return on working capital	**763**	**995**	**761**	**933**	**953**	**4,406**
	Receivables	65,045	66,668	68,326	70,576	72,906	343,520
Recommended approach (customers billed annually)	Inventory	670	670	670	670	670	3,350
	Payables	10,051	7,315	11,090	9,382	9,830	47,669
	Net working capital	55,664	60,023	57,905	61,864	63,746	299,202
	Return on working capital	**3,995**	**4,308**	**4,156**	**4,440**	**4,576**	**21,476**

Source: Deloitte Access Economics calculations

Applying our recommended approach has the effect of increasing the estimating return on working capital. In the scenarios above, this is largely driven by two factors:

- **Higher receivables**, due to estimating receivables against a higher number of days than the current IPART approach. This difference is larger for customers that are billed quarterly as the days between the end of the billing period and payment make up a larger proportion of receivables. We note that businesses that bill supply charges in advance would have significantly lower benchmark receivables

- **Higher rate of return**, due to the use of the nominal WACC (7.4%) rather than the real WACC (4.8%)

For customers that are billed quarterly the return on working capital is approximately 2.7 times the value under the current approach, with the working capital itself approximately 1.8 times larger. For customers that billed annually the return on working capital is approximately 1.7 times higher, with the working capital itself 1.1 times higher.

Appendix A

Comparison to other regulators

The following is a discussion of the formulae and methodology employed by other regulators to calculate working capital. The Australian Energy Regulator (AER), Essential Services Commission of Victoria (ESCV), and Office of the Tasmanian Economic Regulator (OTTER) are not included as they do not provide a working capital allowance.

ESCOSA

ESCOSA uses an "as-incurred" approach to calculating forecast capital expenditure, rather than an "as commissioned" approach. Under an "as-incurred" approach, capital expenditure is added to the regulatory asset base (RAB) at the time it is incurred and thus returns are reflected instantly rather than adding the new asset into the RAB at the beginning of the following year after completion. Therefore, the return on capital provided in the revenue is earned immediately, even though the asset may be commissioned months, or years after. ESCOSA believes this method adopts assumptions about the timing of capital-related revenue and expenses that are beneficial to the service provider compared to the actual timing of these cash flows. [4] Based on this, ESCOSA does not include working capital related to capital expenditure.[5]

With respect to operating expenditure, ESCOSA notes that if the forecast of operating expenses is simply inserted into the revenue requirement, this is equivalent to the implicit assumption that operating expenses are incurred, and the associated share of revenue is received, evenly over the regulatory period. Therefore, due to the actual mismatch in revenue received and expenses incurred over the period, an allowance for working capital applied only to operating expenditure would provide an estimate of those financing costs incurred. The formula employed to calculate annual working capital for SA Water is shown in the equation 3 below.

SA Water working capital formula

$$(A1) \quad Working\ Capital = \left(\frac{Days\ receivable\ day - Days\ payable}{365}\right) * Forecast\ operating\ expenditure$$

The annual return on working capital is the product of post-tax real WACC (same as the rate for return on capital) and annual working capital.

QCA

The method employed by QCA to calculate working capital varies between regulated ports and the water sector. Shown in equation 2 below, QCA uses a basic formula applied to total revenue to calculate the working capital for regulated coal port operator, DBCT Management. Whereas the working capital calculated for bulk water service provider, Seqwater, incorporates an accounts receivable component, accounts payable component, and inventory component (equation 3). To compensate the lack of a payables component in DBCT Management's working capital, the number of days for accounts receivable allowed by QCA is notably smaller than that of Seqwater.

DBCT Management working capital formula

$$(A2) \quad Working\ Capital = \left(\frac{Days\ receivable}{365}\right) * Annual\ allowed\ revenue$$

[4] The Allen Consulting Group, Working Capital: The Relevance for the Assessment of Reference Tariffs, Report to the ACCC, March 2002, Appendix A

[5] SA Water and Sewerage Revenues Final Regulatory Determination 2013/14 – 2015/16, ESCOSA, May 2013

Seqwater working capital formula

$$(A3) \quad Working\ Capital = \left(\frac{Days\ receivable}{365}\right) * Annual\ allowed\ revenue - \left(\frac{Days\ payable}{365}\right) * Forecast\ operating\ expenditure + \left(\frac{Days\ inventory}{365}\right) * Forecast\ operating\ expenditure$$

The inclusion of inventory in Seqwater's current arrangement was based on the QCA's earlier regulatory decisions, dating back to a 2001 determination of electricity networks (which was in turn based on IPART's 1999 determination of electricity networks).

"The Authority [QCA] acknowledges that inventories are an essential requirement for the on-going business of electricity DNSPs. Inventories are used for ongoing maintenance of system and non-system assets and for operational requirements. The cost of handling and storage and the interest cost of the funds necessary to maintain essential inventories can be substantial. Thus the Authority supports the inclusion of the cost of inventories as working capital that directly results in a cost to electricity DNSPs."[6]

This suggests that QCA included the cost of inventory for operating and maintenance costs. How the QCA determined inventory levels for electricity distributors in earlier years (2001) is not disclosed. A 'critical spares and inventory' component was allowed in 2011 and 2012 determinations for Seqwater, according to the amount submitted in their initial proposal.

ERA

Equation 4 below demonstrates the methodology used by ERA in recent access arrangements for ACTO Gas and Western Power. Accounts receivable and payable are calculated on a daily average basis. Note that the inclusion of capital expenditure in the accounts payable component implies that service providers may delay payment in capital expenses.

ACTO Gas and Western Power working capital formula

$$(A4) \quad Working\ Capital = (Days\ receivable * Average\ daily\ revenue) * 365 - (Days\ payable * Average\ daily\ capital\ and\ operating\ expenditure) * 365 + Inventory\ component\ \% * Forecast\ capital\ expenditure$$

The decision for the ERA to include working capital for Western Power was based on their allowance for AlintaGas to include working capital in their 2005 access arrangement. In this access arrangement the regulator noted that a service provider may require working capital to fund periodic shortfalls in accounts receivable and accounts payable, and that working capital may also be required to fund working stock (such as line pack, parts and inventories). As such the cost of funds employed as working capital is no different to the cost of funds used to invest in the regulated tangible assets. In this regard, the ERA suggested that the "*working capital may be calculated using a generally accepted industry practice*".[7]

A 2004 report by Allen Consulting Group (ACG) commissioned by the ERA noted that if working capital is included in the AlintaGas access arrangement, it should only be applied to the operating and maintenance component. This recommendation was based on an empirical evaluation that applying working capital to capital expenditure would provide a significant bias in favour of AlintaGas's revenue

[6] Final Determination – Regulation of Electricity Distribution, QCA, May 2001
[7] Final Decision on the Access Arrangement for the South-West and Mid-West Gas Distribution Systems, ERA Western Australia, July 2005

allowance, whereas working capital applied only to operating expenditure would not produce such a bias, based on the cash timing assumptions proposed by Alinta Gas in their initial submission.[8]

Despite this, the ERA accepted the inclusion of working capital in principle, with the proviso that:

- it would not be subject to depreciation,
- be applied to both capital and operating expenditure,
- the number of days for receivables be reduced (from 35 to 20) in light of the terms payment after invoice be reduced from 15 business days to 10 business days.

Equation 5 below shows that the methodology employed by the ERA for AlintaGas 2005 access arrangement (provided in ACG's review of working capital) also included a prepayment component. Prepayments were applied to capital and operating expenditure, implying that some expenses may have been paid in advance. The ERA did not approve a working capital allowance for WA Gas Networks in the 2010 access arrangement; a prepayment component was not included in subsequent arrangements.

AlintaGas working capital formula

$$(A5) \quad Working\ Capital = \left(\frac{Days\ receivable\ (20)}{365}\right) * Annual\ allowed\ revenue - \left(\frac{Days\ payable\ (15)}{365}\right) * Forecast\ capital\ and\ operating\ expenditure + \left(\frac{Days\ inventory\ (7)}{365}\right) * Forecast\ capital\ and\ operating\ expenditure + \left(\frac{Days\ prepayment\ (15)}{365}\right) * Forecast\ capital\ and\ operating\ expenditure$$

[8] AlintaGas Networks Proposed Access Arrangements Revisions – Working Capital Requirement, The Allen Consulting Group, June 2004

Estimating net receivables

Overview of other regulators treatment of receivables and payables

	Net receivables (appropriate number of days)	
	Receivables	**Payables**
ESCOSA (Water)[9]	70 days, incorporating 45 days (half of a 3 month meter reading cycle) + 21 days average time between meter reading and issue of bill (noting this adds to 66)	30 days based on SA Water's Annual Report 2011/12
	Net receivables = 40 days Applied to operating expenditure	
QCA		
DBCTM (Gas)[10]	30 days net receivables. Used as a benchmark consistent with 30-day payment terms (DBCTM customers are invoiced monthly and have 30 days to pay). QCA notes that this doesn't allow the 15-day difference between mid-month and end of month issuance, however this creates incentive to reduce net debtor days and is consistent with a benchmark approach. Further, payables are not deducted. Applied to revenue	
Seqwater (Water)[11]	45 days = 15 days from service delivery (assumed mid-month) to month end + 30 days for issuance and payment (8 days on average to issue invoice after end of month + 21 days on average to pay afterwards). Applied to revenue	30 days based on a benchmark consistent with the general terms of contract to suppliers. Applied to operating expenditure
ERA		
Alinta Gas[12] **(2005)**	20 days, includes 10 business days for invoice payment terms. Applied to revenue	20 days. Applied to capital and operating expenditure
ATCO Gas[13][14] **(2014)**	18 days based on Days Sales Outstanding (DSO) ratio. Calculated by an average monthly receivable balance (taken from general ledger for a 12-month period) and divided by the total haulage revenue over the same period. Reflects bi-monthly billing cycle and payment contract terms of 10 days. Applied to revenue	15 days based on DSO ratio. Calculated by an average monthly creditor balance (taken from general ledger for a 12 month period) and divided by the average of capital expenditure and operating expenditure (excluding UAFG[15]) over the same period. Reflects labour paid monthly (two weeks in arrear and two weeks in advance) and payment for materials made 30 days (as stipulated in contracts). Applied to capital and operating expenditure
Western Power (Energy)[16]	45 days = 15 from service delivery (assumed mid-month) to month end + 14 days to send invoice + 10 days for payment. Based on limits in contract terms. Applied to revenue	24.2 days = weighted average of proportion of costs 29% labour cost * 10 days 66% material cost * 30 days 5% other costs * 30 days Applied to capital and operating expenditure

[9] SA Water and Sewerage Revenues Final Regulatory Determination 2013/14 – 2015/16, ESCOSA, May 2013
[10] DBCT Management Draft Decision 2015 Draft Access Undertaking, QCA, April 2016
[11] Final Report SEQ Water Grid Service Charges 2011-12, QCA, July 2011
[12] AlintaGas Networks Proposed Access Arrangements Revisions – Working Capital Requirement, The Allen Consulting Group, June 2004
[13] Final Decision to the Access Arrangement for Mid-West and South-West Gas Distribution Systems, ERA Western Australia, September 2015
[14] ATCO Gas Access Arrangement Information 2014 – 2019, ATCO Gas, March 2014
[15] Unaccounted for Gas
[16] Final Decision to the Access Arrangement for the Western Power Network, ERA Western Australia, September 2012

Estimating inventory and pre-payments

Overview of other regulators treatment of inventory and pre-payments

	Inventory	Pre-payments
ESCOSA (Water)[17]	Not included	Not included
QCA		
DBCTM (Gas)[18]	Not included	Not included
Seqwater (Water)[19]	3 days based on the average days in inventory proposed by Seqwater. Applied to operating expenditure	Not included
ERA		
AlintaGas (2005)	7 days between cost and sale (proposed by AlintaGas) Applied to capital and operating expenditure	15 days on average (as proposed by AlintaGas). Applied to capital and operating expenditure
ATCO Gas[20] [21]	0.89% of forecast capital expenditure. Submitted by ATCO – calculated by taking the average of monthly inventory levels from its general ledger (2011, 2012, 2013), then divided by the actual capital expenditure in each year to determine inventory as a percentage of capital expenditure. (Does not include work in progress or completed assets not yet added to the RAB) Applied to capital expenditure.	Not included
Western Power (Energy)[22]	4 % of capital expenditure, based on a benchmark of the average level of inventory value to works program size (to undertake planned work on the network) for other Australian service providers. Applied to capital expenditure.	Not included

[17] SA Water and Sewerage Revenues Final Regulatory Determination 2013/14 – 2015/16, ESCOSA, May 2013
[18] DBCT Management Draft Decision 2015 Draft Access Undertaking, QCA, April 2016
[19] Final Report Seqwater Bulk Water Price Review 2018-21, QCA, March 2018
[20] Final Decision to the Access Arrangement for Mid-West and South-West Gas Distribution Systems, ERA Western Australia, September 2015
[21] ATCO Gas Access Arrangement Information 2014 – 2019, ATCO Gas, March 2014
[22] Final Decision to the Access Arrangement for the Western Power Network, ERA Western Australia, September 2012

Limitation of our work

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