UTILITIES COMMISSION
OF THE NORTHERN TERRITORY

2018 SYSTEM CONTROL CHARGES REVIEW

FINAL DECISION

30 April 2019

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Disclaimer

Purpose and structure of this paper

The purpose of this paper is to communicate the Commission's Final Decision on Power and Water Corporation's (PWC) revised submission under section 39(2) of the *Electricity Reform Act 2000* to increase the system control charge, and adopt a revenue cap formulae with a five per cent materiality threshold for an overs and unders account.

Further, this paper provides the Commission's associated considerations and reasons in relation to its Final Decision.

Inquiries

Any questions regarding this Final Decision should be directed to the Utilities Commission.

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Glossary

Term	Definition
Act	*Electricity Reform Act 2000*
AER	Australian Energy Regulator
AEMO	Australian Energy Market Operator
CAM	Cost Allocation Methodology
Commission	The Utilities Commission of the Northern Territory
CPI	Consumer Price Index
CSO	Community Service Obligation
FTE	Full time equivalent
NPV	Net present value
NTEM	Northern Territory Electricity Market
PWC	Power and Water Corporation
Regulations	Electricity Reform (Administration) Regulations
SCTC	System Control Technical Code
TGen	Territory Generation
UC Act	*Utilities Commission Act 2000*
WACC	Weighted average cost of capital

FINAL DECISION

In accordance with section 39(2) of the *Electricity Reform Act 2000*, the Commission's final decision is to **approve** the Power and Water Corporation's revised proposed system control charge to be applied by the power system controller from 1 July 2019 as summarised in Table 1 below, including a revenue cap formulae (as set out at Appendix A to this Final Decision) with a five per cent materiality threshold for an overs and unders account (as set out at Appendix B to this Final Decision).

Table 1: Approved system control charge (Real $2019)

Component	2019-20	2020-21[2]	2021-22[2]	2022-23[2]	2023-24[2]
System control ($/kWh)	0.0048	0.0048	0.0047	0.0047	0.0046
Market operator ($/kWh)[1]	0.00052	0.00051	0.00050	0.00049	0.00048

[1]Market operator component to only be paid by customers supplied by the Darwin-Katherine regulated system, with the charge determined based on the total energy consumption in that system only

[2]Indicative charges

POWER AND WATER CORPORATION'S PROPOSAL

Background

Power and Water Corporation (PWC) holds a System Control Licence to conduct system control and market operator functions. An independently operated business unit within PWC, known as System Control and Market Operator (System Control) provides these regulated services, as well as other services.

PWC, as the licensed system controller, carries out system control and market operator functions in accordance with section 38 of the *Electricity Reform Act 2000* (the Act) and the System Control Technical Code (SCTC).

Currently PWC charges retailers for System Control's services in accordance with the current system control charge, which was originally approved by the Commission in 2000. However, since 2000, there has been a significant change in the number and nature of System Control's functions and the cost of undertaking these functions.

PWC states that the current system control charge of $0.001 per kWh provides revenue of approximately $1.8 million per annum, and is not sufficient to meet its actual operating costs for providing system control and market operator functions, with the funding shortfall estimated by PWC at approximately $7 million in 2017-18.

PWC has made a submission to the Commission under section 39(2) of the Act in late 2018 proposing an increase to the system control charge, from the current $0.001 per kWh to $0.0057 per kWh, from 1 July 2019, and an annual review of the charge.

Following this, in March 2019, PWC submitted a revised system control charge proposal to the Commission with the intent to be in line with the Commission's Draft Decision recommendations.

Legislative framework

The Commission is an independent statutory body established by the *Utilities Commission Act 2000* (UC Act).

Section 6(1) of the UC Act provides the Commission with functions, including licensing under relevant industry regulation Acts and regulating prices charged by government and other businesses for providing certain monopoly services.

PWC, as the licensed system controller, carries out system control and market operator functions in accordance with section 38 of the Act and the SCTC.

Regulation 3F of the Electricity Reform (Administration) Regulations (the Regulations) provides that for the purposes of the Act, the System Control Licence is to be a licence authorising the system controller to operate a wholesale market in relation to the Darwin-Katherine power system.

The SCTC provides that the system controller must also perform the market operator role and fulfil the responsibilities of the market operator that are set out in the SCTC.

Regulation 5A(1) of the Regulations provides that the SCTC may make provision for operating protocols, system security and dispatch, disconnection and any matter relevant to the reliability, safety or security of the system or control of the operation of the system. Regulation 5A(2) provides that a code prepared by PWC for the Darwin-Katherine power system (the SCTC) may also make provision for the operation of a wholesale market in relation to that system.

Under section 39(1) of the Act, a system controller is entitled to impose and recover charges relating to the operations of system control. Section 39(2) of the Act states that the schedule of charges to be applied for the purpose of section 39(1) is to be approved by the Utilities Commission.

Scope and process of Commission's review

While Section 39 of the Act provides the Commission with broad discretion on the approval process for system control charges, the Commission is cognisant of, and accordingly had regard to, the objects of the Act. These include to promote efficiency and competition in the electricity supply industry, to facilitate the maintenance of a financially viable electricity supply industry and to protect the interest of consumers of electricity.

Similarly, pursuant to section 6(2) of the UC Act, in performing its functions, the Commission must have regard to the need to, among other things, prevent misuse of monopoly power, to promote economic efficiency, to ensure consumers benefit from competition and efficiency and to facilitate maintenance of the financial viability of regulated industries.

Accordingly, on 21 November 2018, the Commission published an associated Issues Paper which identified topics that that should be considered as part of the review of the system control charge and sought feedback from all stakeholders.

All interested parties were invited to make submissions on the Issues Paper by 11 January 2019. The consultation period was subsequently extended to 18 January 2019, with four submissions received, from EDL NGD (NT) Pty Ltd (EDL), Jacana Energy (Jacana), Rimfire Energy Pty Ltd and Territory Generation (TGen).

The Commission engaged ACIL Allen Consulting (ACIL Allen) to assist it in making its draft and final decisions, through assessing and making recommendations where appropriate in relation to the following matters:

- PWC's identification of System Control regulated functions, noting some regulated functions are limited to the Darwin-Katherine electricity system (ie. not a regulatory function in the Alice Springs and Tennant Creek electricity systems)
- PWC's recommendation that the system control charge be consistent across all three regulated systems despite some functions being limited to the Darwin-Katherine system
- PWC's cost allocation model, to verify that System Control's regulated and unregulated functions are correctly attributed, and that the model is well constructed (ie. logical, accurate, repeatable)
- PWC's corporate overhead allocation for System Control
- PWC's inclusion of costs associated with a proposed new Control and Administrative Centre
- the appropriateness of using the proposed energy consumption forecasts provided to PWC by the Australian Energy Market Operator (AEMO) for PWC's distribution determination, and if not appropriate, a better alternative

- whether a pricing or revenue control mechanism would be appropriate and if so, a proposed mechanism, setting out why this mechanism is appropriate.

In addition to its submission paper to the Commission, PWC provided detailed excel spreadsheets underpinning the associated tables and calculations in relation to System Control's allocation of costs to the Commission, and met with ACIL Allen to work through identified concerns with the original submission. ACIL Allen also met with Jacana and TGen to discuss their submissions.

The Commission published its Draft Decision together with ACIL Allen's associated report on 19 March 2019 and invited submissions. One submission was received in relation to the Draft Decision, from Jacana.

Further, the Commission met with the Treasurer (and Regulatory Minister), the Hon Nicole Manison MLA, on 5 April 2019 to discuss the Commission's System Control Charges Review and associated Draft Decision.

SYSTEM CONTROL'S COSTS

PWC System Control, as the licensed system controller, provides a combination of regulated and unregulated system control and market operator services.

The focus of the Commission's review is on the regulated services provided in accordance with PWC's System Control obligations under the Act, PWC's System Control Licence, the SCTC and other associated instruments.

Accordingly, this chapter considers the costs that are forecast by PWC to be incurred by PWC System Control to undertake these functions in its revised submission, including feedback from Jacana on the Draft Decision.

Cost forecasts

PWC's proposed revised costs to be recovered through the system control charge are summarised in Table 2 below and are consistent with that recommended by the Commission in its Draft Decision.

Table 2: PWC's proposed revised System Control and Market Operator costs to be recovered, Real $2019

	2019-20	2020-21	2021-22	2022-23	2023-24
System Control					
Personnel costs	$6,246,938	$6,234,444	$6,253,147	$6,284,413	$6,322,120
Other direct costs	$621,059	$615,667	$465,367	$465,367	$465,367
Corporate overheads	$2,005,861	$1,882,657	$1,805,923	$1,726,639	$1,650,835
Total System Control	**$8,873,858**	**$8,732,767**	**$8,524,438**	**$8,476,419**	**$8,438,322**
Market Operator					
Personnel costs	$516,019	$514,987	$516,532	$519,115	$522,230
Other direct costs	$105,420	$104,759	$74,107	$74,107	$74,107
Corporate overheads	$211,001	$198,041	$189,969	$181,629	$173,655
Total Market Operator	**$832,440**	**817,787**	**$780,608**	**$774,851**	**$769,992**

The proposed regulated costs to be recovered are less than those originally submitted by PWC. The costs associated with the proposed new Control and Administrative Centre are not included in PWC's costs to be recovered, as originally proposed by PWC. The corporate overhead costs have decreased compared to PWC's original proposal, however this reduction is offset by an increase in the allocation of shared costs to the regulated functions.

Direct costs

While the Commission has not undertaken a comprehensive review of PWC System Control's efficiency, due to the lack of similar sized System Control operations in other Australian electricity markets to enable effective benchmarking, ACIL Allen did benchmark the efficiency of certain costs such as labour costs, and identified a number of issues in

PWC's original submission, including some anomalies in the salaries for personnel and double counting in direct costs. These issues have been addressed in PWC's revised submission.

Further, as recommended by the Commission, PWC has presented its labour costs and non-labour costs in real terms with salaries in line with Deloitte Access Economics' labour price growth forecast and escalated by CPI each year.

Corporate overheads

As recommended by the Commission, PWC's revised submission adjusts its corporate overheads to align with the Cost Allocation Methodology (CAM) approved by the AER in its draft and final 2019-24 electricity distribution revenue determination process. PWC has also made associated changes to the allocated corporate overheads to System Control and system control charges as recommended by the Commission.

New Control and Administrative Centre

Consistent with the Commission's recommendation, PWC has excluded the new facility from the system control charge, and proposes that the costs be passed through when there is more certainty.

Jacana's submission to the Draft Decision agrees that the proposed new Control and Administrative Centre be excluded from the system control charge at this stage given the lack of information such as a business case and uncertainty about project timing and costs.

The Commission agrees with PWC's proposed approach to pass through the costs for the new facility, subject to a robust review by the Commission of the associated business case and pass through proposal at the appropriate time.

Allocation of costs to activities

In its submission, PWC states that it undertakes 70 activities to meet its regulatory obligations and included a list of these in an appendix to its submission. Further information was provided by PWC to the Commission, and through discussions held with ACIL Allen, in relation to these activities.

ACIL Allen's review of PWC's list of activities, which did not change between the original and revised submission, found no evidence to suggest that the allocation of time to activities queried by TGen in response to the Issues Paper is materially incorrect.

The Commission notes ACIL Allen's feedback in relation to PWC's list of activities and associated information, including that there is not a one for one mapping of regulatory obligations to activities, the terminology in the activity description does not align to the SCTC, the distinction between some activities is only evident by referencing the SCTC and some references in the SCTC do not exist.

To provide clarity on the allocation of time to activities, PWC should address these issues for the next review of system control and market operator activities.

Market Operator activities

Sections 1.7.4(g) and 1.7.5 of the SCTC (and relevant definitions) provide that the market operator responsibilities must be performed by System Control in accordance with Attachment 6 of the SCTC. Regulation 3F of the Regulations similarly provides that the market operator responsibilities are to be performed by System Control pursuant to the System Control Licence. Performing the market operator responsibilities is therefore part of the System Controller's functions under the SCTC, Regulations and Act. Accordingly, the Commission is of the view that carrying out those functions is part of the 'operations of system control' and so can be charged under section 39(1) to recover the cost of carrying out those operations.

If the costs for performing the market operator functions under the SCTC could not be recovered as part of charges under section 39(1), then System Control would be required by the Act and SCTC to perform those without any ability to recover its efficient costs of doing so. The Commission does not consider that such an interpretation would be consistent with the objects of the Act or the UC Act.

Nonetheless, for transparency, it is important that these activities, and associated time and costs be separately identified. The Commission notes that PWC's revised submission implements this feedback.

The Commission is mindful that there may be a need to implement a pass through of costs (or savings) to provide for any increase or decrease to the system control charge if System Control's obligations under the SCTC in the future change as part of the transition from the Interim Northern Territory Electricity Market (NTEM) to a 'full' NTEM.

Allocation of time to activities

ACIL Allen's review of the process undertaken by PWC to allocate time to activities for the purpose of the original submission identified a number of issues.

Consistent with that recommended in the Draft Decision, PWC, in its revised submission, has changed the way in which it allocates time to activities, which has addressed most of the issues. Those remaining are unlikely to be material.

Allocation of costs to activities

PWC's allocation of direct costs to employees in its revised submission is similar to the original approach. The only changes are:

- direct costs are not allocated to the employees that are designated as Business Management
- travel costs are directly allocated to specific personnel (the portion of the General Manager not designated as Business Management and the Engineers) rather than activities.

ACIL Allen's review of PWC's revised approach noted that the total corporate overheads are allocated to the employees that are not designated as Business Management on the basis of FTE numbers. While this allocator does not align with the allocator that is used to allocate the costs to System Control for all costs, ACIL Allen considered it to be a reasonable approximation.

Consistent with that recommended, PWC's revised approach does not allocate the personnel costs associated with the Senior Real Time Operations Manager and the Control Room Coordinators, which have been allocated to Business Management, to personnel with market operator functions only.

PROPOSED SYSTEM CONTROL CHARGE

The system control charge is a function of the costs incurred in undertaking the regulated activities and the demand forecast.

PWC's revised submission proposes that the system control charge in 2019-20 for the three regulated systems should be $0.0048 per kWh and market operator charge for the Darwin-Katherine system only should be $0.00052 per kWh based on energy consumption forecasts prepared by AEMO, as set out below in Table 3.

Table 3: PWC's revised proposed system control and market operator charge (Real $2019)

	2019-20	2020-21	2021-22	2022-23	2023-24
System Control costs recovered ($)	$8,873,858	$8,732,767	$8,524,438	$8,476,419	$8,438,322
Energy consumption (3 systems MWh)	1,828,800	1,828,800	1,829,700	1,831,300	1,835,000
System control charge ($/kWh)	**0.0048**	**0.0048**	**0.0047**	**0.0047**	**0.0046**
Market Operator costs recovered ($)	$832,440	$817,787	$780,608	$774,851	$769,992
Energy consumption (D-K only MWh)	1,579,500	1,581,600	1,584,300	1,587,600	1,592,600
Market operator charge ($/kWh)	**0.00052**	**0.00051**	**0.00050**	**0.00049**	**0.00048**

This chapter discusses the energy consumption forecast that underpins PWC's proposed system control charge, the appropriate number of charges to be levied by System Control and the basis for charging customers for system control and market operator functions.

Energy consumption forecast

Consistent with its original submission, PWC has adopted the energy consumption forecasts prepared by AEMO for the purposes of PWC's distribution determination for the 2019-24 period as the basis for converting the Power System Controller's costs into a charge as set out in Table 4 below. The Commission agrees with this approach.

Table 4: AEMO's energy consumption forecast, 2019-20 to 2023-24

	2019-20 Forecast	2020-21 Forecast	2021-22 Forecast	2022-23 Forecast	2023-24 Forecast
	MWh	MWh	MWh	MWh	MWh
Darwin-Katherine	1,579,500	1,581,600	1,584,300	1,587,600	1,592,600
Alice Springs	211,900	209,700	207,800	206,000	204,600
Tennant Creek	37,400	37,500	37,600	37,700	37,800
Total	**1,828,800**	**1,828,800**	**1,829,700**	**1,831,300**	**1,835,000**

Number of charges

PWC's revised submission separates the proposed system control charge into a system control component and a market operator component, with the market operator charge to only apply in the Darwin-Katherine area (calculated based on the energy consumption forecast in that area only). The Commission agrees with this approach, noting the benefits include:

- transparency – further development of the NTEM is envisaged. If there is a separately identified charge for the market operator functions of System Control, there is greater transparency as to the cost impacts of any market developments
- the system control functions are more mature than the market operator functions, and thus could be determined over a longer period of time (subject to some form of price control mechanism) than a market operator charge
- the system control functions are undertaken on behalf of all customers, while the market operator functions are only undertaken by System Control for Darwin-Katherine customers. Under an efficient cost recovery regime that minimises cross subsidies, the costs associated with the market operator functions should only be recovered from customers in the Darwin-Katherine area
- customers in Alice Springs and Tennant Creek are already paying TGen for market operator functions and therefore should not also be paying for market operator functions in the Darwin-Katherine area.

Jacana, in its submission on the Draft Decision, also supports the proposed separation of the system control charge from charges for market operator activities

Based on energy from the grid or total demand

The current system control charge is levied based on energy used from the grid, which is consistent with the way AEMO levies its system control and market operator fees and in line with PWC's proposal.

As part of providing expert advice to the Commission, ACIL Allen raised the point that charging based on energy results in customers with solar panels and batteries (who use less energy from the grid) contributing less to the costs associated with the system control and market operator functions, with customers without solar panels and batteries paying commensurately more.

ACIL Allen observed that while customers with solar panels and batteries will pay less, they will not reduce the costs that are incurred by System Control, and may in fact increase System Control's costs due to the increased complexity of managing the electricity system with increased solar.

ACIL Allen suggested that a system control charge levied on the basis of demand (the amount of energy consumed at a point in time) may be more appropriate in the future, noting this would require customers to have an interval or smart meter installed.

The Commission notes that all customers consuming more than 40 MWh per annum are anticipated by PWC to have interval or smart meters installed by 1 July 2019, and that more than half of all electricity customers are expected to have a smart meter installed by the end of June 2024 through PWC's new and replacement meter program and the requirement for customers installing rooftop solar to have a smart meter.

Accordingly, while there is merit in levying the system control charge based on demand, given the large number of customers without a smart meter, at least in the short term, and the complexities of levying a different system control charge for different customers based on whether they have an interval/smart meter or accumulation meter, the Commission agrees with ACIL Allen that this is better considered in the future.

Charges applied to retailers, generators or a combination

PWC's submission proposes that the system control charge should continue to be levied on retailers. However, on the basis that generators may be a more direct recipient of some services, the Commission considered whether the charge should be levied on retailers, generators or a combination of both.

Following consideration of feedback, the Commission's view is that the costs to deliver the system control and market operator functions will ultimately flow through to the total costs to supply electricity to customers, regardless of whether the charge is levied to retailers, generators, networks or a combination of these and given this, considers it more efficient that the charge be paid by retailers based on the consumption of their customers as proposed by PWC.

REGULATORY APPROACH

PWC’s revised submission proposes a revenue cap mechanism with a five per cent materiality threshold for an overs and unders account consistent with that recommended by the Commission in its Draft Decision.

This chapter discusses the proposed revenue cap mechanism, and the associated formulae.

Revenue cap mechanism

Under a revenue cap, if the revenue recovered from customers in one year is greater (or lessor) than the required revenue for that year, the charge in the subsequent year is adjusted so that, over time, the required revenues are recovered in full. This is administered through an overs and unders account.

A revenue cap approach will ensure the charge can be adjusted if there is a material variation between forecast and actual demand, noting the risk of this may be heightened as a result of the Territory Government’s commitment to 50 per cent renewables by 2030. The application of a materiality band will reduce the complexity of the revenue cap mechanism if there is not a material variation between forecast and actual demand.

Accordingly, the Commission considers it reasonable that the charge be set for a five-year period, with a revenue cap and an overs and unders account, as proposed by PWC and detailed at Appendices A and B, to be applied when the balance exceeds a materiality band of five per cent of required revenue.

APPROVED CHARGES AND COMMENCEMENT

This chapter provides detail and discussion on PWC's proposed charges as approved by the Commission, including in relation to the commencement of the associated charges.

Approved charges

The requested regulated costs to be recovered (summarised at Table 2 in this Final Decision) represent the unsmoothed revenue to be converted into a charge based on energy consumption.

The unsmoothed revenue is smoothed by assuming that:

- the revenue in the final year of the period (2023-24) aligns with the forecast costs in that year
- the Net Present Value (NPV) of the smoothed revenue over the five-year period is the same as the NPV of the unsmoothed revenue over that period
- the NPV of the revenue is calculated by discounting using the nominal Weighted Average Cost of Capital (WACC) as determined by the AER for the Power Networks business (5.22 per cent)
- the X-factor is the same each year from 2020-21.

The smoothed revenues and X-factors, as calculated by ACIL Allen and proposed by PWC, are set out in Table 5 below. The Commission notes the recommended X-factors are positive indicating a real decrease in the costs associated with the system control and market operator functions over the five-year period.

Table 5: Requested smoothed and unsmoothed revenue, Real $2019, and X-factor

	System control		Market operator	
	Unsmoothed revenue	Smoothed revenue	Unsmoothed revenue	Smoothed revenue
2019-20	$8,873,858	$8,787,141	$832,440	$821,515
2020-21	$8,732,767	$8,698,607	$817,787	$808,320
2021-22	$8,524,438	$8,610,965	$780,608	$795,336
2022-23	$8,476,419	$8,524,207	$774,851	$782,561
2023-24	$8,438,322	$8,438,322	$769,992	$769,992
NPV	$37,099,156	$37,099,156	$3,429,255	$3,429,255
X-factor		1.02%		1.63%

To calculate the associated charge, the system control revenue is converted to a charge based on the energy consumption across all three regulated systems, and the market operator revenue is converted to a charge based on the energy consumption in the Darwin-Katherine area only.

Accordingly, the approved 2019-20, and indicative 2020-21 to 2023-24 charges, based on the revenue amounts in Table 5 adjusted by the recommended revenue cap formulae (Appendix A), with a five per cent materiality threshold for the unders and overs account (Appendix B) are set out in Table 6 below. These approved charges are based on the energy consumption by retailers' customers.

Table 6: Approved system control charge (Real $2019)

Component	2019-20	2020-21[2]	2021-22[2]	2022-23[2]	2023-24[2]
System control ($/kWh)	0.0048	0.0048	0.0047	0.0047	0.0046
Market operator ($/kWh)[1]	0.00052	0.00051	0.00050	0.00049	0.00048

[1]Market operator component to only be paid by customers supplied by the Darwin-Katherine regulated system, with the charge determined based on the total energy consumption in that system only

[2]Indicative charges

Commencement

While all submissions received as a result of the Issues Paper were supportive of PWC's ability to appropriately recover the operating costs associated with performing System Control's regulated functions, and there are no practical barriers to implementing the revised system control charges from 1 July 2019, only TGen supported the immediate commencement of the revised system control charge.

Jacana, in its submission on the Draft Decision, states that the proposed increased system control charge will represent a significant step increase, and in the interests of providing price stability for customers, such a substantial increase should be price pathed so as to avoid price shock.

The Commission acknowledges that there will be customer impacts associated with increasing the system control charge from 1 July 2019. For example, the increase would be approximately $28.50 per annum for a couple consuming 6613 kWh per annum and approximately $3240 for a large commercial business consuming 750,000 kWh per annum, assuming the Territory Government allows the increase to flow through to Pricing Order customers. Any increase for larger commercial customers would be on the basis of the individual agreement the customer negotiated with its retailer.

Further, the Commission is cognisant of the need to, among other things, protect the interest of consumers. However, this must be balanced with facilitating the maintenance of a financially viable electricity supply industry and providing System Control with a reasonable opportunity to recover its efficient costs of providing the functions it is required to provide under the Act and SCTC.

The level of the system control charge has not been reviewed since 2000, PWC System Control is operating at a significant loss to deliver its regulated services and the Territory Government already significantly subsidises the cost of electricity for households and small and medium-sized businesses ($72 million in 2018-19). On this basis, the Commission considers it reasonable that the revised charge commence on 1 July 2019 as requested by PWC.

The Commission notes that while this period of notice is shorter than would ideally be provided, it is similar to the period of notice that retailers receive of changes in PWC's network charges prior to the start of a regulatory control period, with network charges representing a much larger cost to retailers.

APPENDICES

Appendix A: Revenue cap formulae

The formulae to implement a revenue cap form of price control mechanism for the system control (or market operator) charge is set out below.

The adjusted annual revenue requirement in the first year of the period in which the charge is to be determined is the forecast total costs for the system control and market operator functions for that year, subject to any smoothing of the revenue.

$$AAR_t = AR_t$$

where:

AAR_t	is the adjusted annual smoothed revenue requirement for year t
AR_t	is the annual smoothed revenue requirement for year t, including any overs and unders carried over from the previous period

The adjusted annual smoothed revenue requirement in the subsequent years of the period is the adjusted annual revenue requirement in the previous period year escalated by Consumer Price Index (CPI) and an "X-factor".

$$AAR_t = AAR_{t-1} \times \left(1 + \Delta CPI_t\right) \times (1 - X_t)$$

where:

ΔCPI_t is the annual percentage change in the ABS CPI All Groups, Weighted Average of Eight Capital Cities from the December quarter in years t-2 to the December quarter in year t-1, calculated as follows:

$$\Delta CPI_t = \frac{CPI_{t-1}}{CPI_{t-2}} - 1$$

X_t is the X factor so that the Net Present Value (NPV) of the smoothed revenue requirement over the period is equal to the NPV of the unsmoothed revenue requirement over the period

The total allowable revenue in each year is the adjusted annual smoothed revenue requirement and, when the materiality threshold of the overs and unders account has been exceeded, the balance of the overs and unders account. It also includes the costs associated with the proposed new Control and Administrative Centre, any costs associated with additional market operator functions, and any consequent change in the direct costs and corporate overheads.

$$TAR_t = AAR_t + B_t + C_t$$

where:

TAR_t	is the total allowable revenue in year t
B_t	is the true-up in year t for any under or over recovery of actual revenue collected through the system control or market operator charge
C_t	is:

a. the costs in year t associated with the proposed new Control and Administrative Centre, when approved by the Commission

b. the change in costs in year t associated with a change in the market operator functions

c. a change in the allocation of direct costs and corporate overheads in year t arising from these events.

The total allowable revenue is converted to a system control (or market operator) charge which is calculated in accordance with the following equation:

$$TAR_t \geq \sum_{i=1}^{n} p_t^i \, q_t^i$$

where:

p_t^i	is the system control (or market operator) charge *i* in year t
q_t^i	is the forecast quantity of system control (or market operator) charge i in year t

Appendix B: Overs and unders account

The overs and unders account balance for each of the system control charge and the market operator charge is determined using the following approach:

1. The under/over recovery of revenue in the first year is the revenue recovered through the system control (or market operator) charge less the total allowable revenue for that year.
2. The under/over recovery in item 1 is adjusted by 18 months of interest, with the interest rate to be the nominal weighted average cost of capital (WACC) for each year approved by the Australian Energy Regulator for the purposes of the regulated Power and Water Corporation Power Networks business. The under/over recovery item will be adjusted by the WACC in year t-2 for half a year and the WACC for year t-1 for a year.
3. The sum of items 1 and 2 is the closing balance for the first year of the period (year t-2).
4. If the closing balance exceeds the materiality band of five per cent of the total allowable revenue for that year, it is applied in year t.
5. If the closing balance is less than the materiality band of five per cent of the total allowable revenue for that year, it is the opening balance for the next year.
6. The under/over recovery of revenue in the next year (which is now year t-2) is the revenue recovered through the system control (or market operator) charge less the total allowable revenue for that year.
7. The under/over recovery in item 6 is adjusted by 18 months of interest (WACC in year t-2 for half a year and WACC in year t-1 for a year) and the opening balance is adjusted by 12 months of interest (WACC in year t-1).
8. The sum of items 5 to 7 is the closing balance for the next year of the period.
9. Items 4 to 8 are repeated each year.