

2005 Price Controls Review

First Consultation Paper

August 2004

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Foreword

This document marks the commencement of the review by the Regulation and Supervision Bureau (the “Bureau”) of the price controls that apply to:

1. Al Ain Distribution Company (AADC);
2. Abu Dhabi Distribution Company (ADDC);
3. Abu Dhabi Water and Electricity Company (ADWEC);
4. Abu Dhabi Company for Servicing Remote Areas (more commonly known the Remote Area Services Company, or “RASCO”); and
5. Abu Dhabi Transmission and Despatch Company (TRANSCO).

The present price controls for all five companies are due to expire on 31 December 2005. New price controls are therefore required to be set to take effect from 1 January 2006. These new controls will be termed the “third price controls”, or “PC3”.

This first consultation document sets out the issues which need to be considered in setting the PC3 controls and on which the views of respondents are sought. Important issues raised in this paper relate to the form, structure, scope, separation and duration of PC3 controls, to incentives within the new controls, and to the key inputs to the price control calculations. The paper also sets out the timetable for the remainder of the review.

Written responses to the issues raised in this paper should be sent by **13 October 2004** to:

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The Bureau proposes to make responses to the consultation exercise publicly available.

Nick Carter
Director General
Regulation and Supervision Bureau

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1 Introduction

1.1 Price Controls

AADC, ADDC, ADWEC, RASCO and TRANSCO each have substantial market power. These businesses are therefore subject to price controls set by the Bureau to protect customers and to promote efficiency.

AADC, ADDC, ADWEC and TRANSCO have charge restriction conditions in their licences granted by the Bureau through which the Bureau sets price controls for these companies. The first price controls (PC1) were set to run for three years starting from 1 January 1999 and were later extended for a further year up to 31 December 2002. The second price controls (PC2) for these companies were set in 2002 to apply for three years (2003-2005).

A set of price controls was also established for RASCO in 2003 to apply for two years (2004 and 2005). Previously, some activities of RASCO were subject to tariffs approved by the Bureau.

All of the present price controls are of the CPI-X type and act as annual revenue caps for the relevant businesses. With the exception of ADWEC, there are presently separate price controls for the water and electricity businesses of each company. The present price controls are accompanied by a Performance Incentive Scheme (PIS) to incentivise the companies' performance on a number of indicators of the quality of their performance.

The present price controls are due to be replaced by new or third price controls (PC3) with effect from 1 January 2006. This document marks the commencement of the review by the Bureau of the price controls for the above five companies.

A number of important areas of regulation will be addressed during this price controls review. These areas include the requirement to further strengthen the incentives for cost efficiency and improvements in the quality of service (performance), and the regulatory framework for the assessment and treatment of past and future efficient capital expenditure.

1.2 Structure of this Document

The remainder of this document is structured as follows:

- **Section 2** provides background information on the Abu Dhabi water and electricity sector and the regulatory framework established by the Bureau for different parts of the supply chain.
- **Section 3** assesses the possible forms of the revised price controls including the type, duration, and scope of the controls.
- **Section 4** discusses the structure of the new controls in detail, including revenue drivers, pass-through items and other terms which may be included in the price control formulae.

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- **Section 5** discusses approaches available to make projections of the efficient operating costs (opex) on which the new controls would be based.
- **Section 6** discusses approaches that the Bureau can apply to the treatment of the past and future capital expenditures (capex) and to project the Regulatory Asset Values (RAVs). This section also describes the ongoing review by the Bureau of past capex.
- **Section 7** discusses the estimation of the cost of capital (and profit margin for non-network businesses) for the new controls.
- **Section 8** assesses the design of a Performance Incentive Scheme (PIS) for the PC3 control period and discusses possible financial adjustments to the PC3 calculations for past performance of the companies under the scheme.
- **Section 9** discusses various other financial adjustments which will be required to the PC3 calculations.
- **Section 10** summarises the main issues raised in this document for consultation.

1.3 2005 Price Controls Review

As mentioned earlier, this consultation paper marks the start of the process that the Bureau intends to undertake to set the PC3 controls for the sector’s monopoly companies. As part of this review process, the Bureau intends to publish a number of consultation papers, to seek information submissions from the companies and to hold meetings with the concerned parties. **Table 1.1** below presents the Bureau’s proposed timetable for the review.

This timetable allows the companies six weeks to respond to the Consultation Papers and eight weeks to respond to the Information Requests.

The Bureau’s Information Requests will seek from the companies, *inter alia*, their actual outturn data on past performance and their forecast of future performance in relation to the following key inputs to the price control calculations:

- operating expenditures (opex);
- capital expenditures (capex);
- asset disposals / transfers;
- revenue drivers; and
- Category B performance indicators

In addition to the mainstream consultation papers, the Bureau may also publish additional discussion or research papers in the course of the review.

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Table 1.1: 2005 Price Controls Review Timetable (Approximate Dates)	
First Phase – Issues and Data	
30 August 2004	Bureau publishes this <i>First Consultation Paper</i>
15 September 2004	Bureau to make presentation to Companies
15 September 2004	Bureau to issue <i>First Information Request</i> to Companies
13 October 2004	Companies to respond to First Consultation Paper
10 November 2004	Companies to respond to First Information Request
Second Phase – Analysis and Assessment	
2 February 2005	Bureau to publish <i>Second Consultation Paper</i>
16 February 2005	Bureau to make presentation to Companies
16 February 2005	Bureau to issue <i>Second Information Request</i> to Companies
16 March 2005	Companies to respond to Second Consultation Paper
31 March 2005	Audited Price Control Returns (PCRs) for 2004 due from Companies
13 April 2005	Companies to respond to Second Information Request
Third Phase – Proposals and Implementation	
1 June 2005	Bureau to publish <i>Draft Proposals</i>
30 June 2005	Audited (Separate Business) Accounts for 2004 due from Companies
16 July 2005	Companies to respond to Draft Proposals
31 August 2005	Bureau to publish <i>Final Proposals</i>
1 January 2006	PC3 controls to take effect

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2 Background

2.1 Industry Structure

Following the passage of Law No (2) of 1998, the newly-created Abu Dhabi Water and Electricity Authority (ADWEA) was made responsible for administering government policy towards the water and electricity sector in the Emirate of Abu Dhabi. ADWEA restructured and unbundled the former Water and Electricity Department (WED) into a number of new sector companies:

- Four Generation and Desalination Companies (GDs)¹, one of which was subsequently privatised in 2003.
- One “single buyer” company, ADWEC, responsible for planning and contracting for new production capacity for the sector, for the purchase of fuel for the GDs and for the sale of bulk supplies of water and electricity to the distribution companies.
- TRANSCO for the despatch and transmission of both electricity and water.
- Two distribution companies, ADDC and AADC, for the distribution and supply of water and electricity to customers in the Municipality areas of Abu Dhabi and Al Ain, respectively.
- RASCO, to undertake electricity generation, water production and their distribution and supply to customers in remote areas of the Emirate of Abu Dhabi. RASCO’s distribution and supply assets have been transferred to the two distribution companies with effect from 1 January 2001. RASCO’s production activities remain the legal responsibility of RASCO but their operation has been contracted out to the distribution companies.

The Abu Dhabi Government through ADWEA currently wholly owns the above companies, although the GDs are being gradually privatized and there are plans for some form of privatization of the distribution companies. Further, four Independent Water and Power Producers (IWPPs)² have been awarded build, own and operate (BOO) contracts for four generation and desalination stations, including both ‘greenfield’ developments and the sale and refurbishment of some of the existing plant. ADWEC also purchases electricity from Abu Dhabi Oil Refining Company (TAKREER) in the locality of Ruwais. Negotiations are also underway between ADWEC and the Union Water and Electricity Company (UWEC) for the purchase of water and electricity by ADWEC from UWEC’s plant in Fujairah.

ADWEC has long-term PWPAs with the IWPPs for the purchase of their production capacities and outputs; the term of these PWPAs is generally about 20 years from the project commercial operation date of the respective IWPPs. Prior to 2004, the PWPAs between ADWEC and

¹ These GDs are: Al Mirfa Power Company (AMPC), Al Taweelah Power Company (ATPC), Bainounah Power Company (BPC) and Umm Al Nar Power Company (UANPC). UANPC was privatised in 2003.

² These IWPPs are: Arabian Power Company (APC) (formerly UANPC), Emirates CMS Power Company (ECPC), Gulf Total Tractebel Power Company (GTTPC) and Shuweihat CMS International Power Company (SCIPCO).

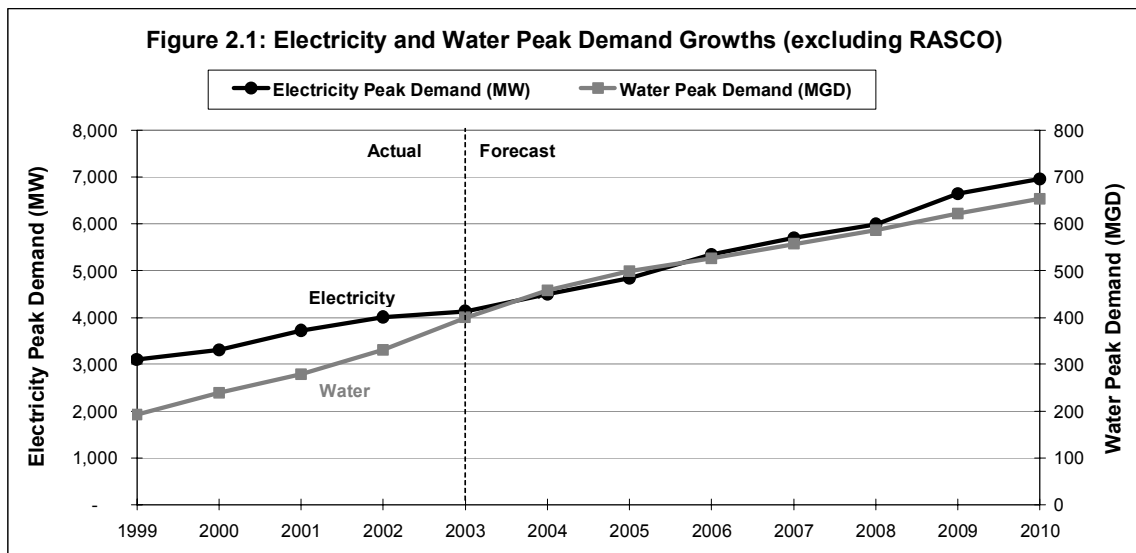
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ADWEA-owned GDs were reviewed on an annual basis. However, these annual PWPAs have now been replaced with five-year PWPAs with effect from 1 January 2004. The Power Purchase Agreement (PPA) between ADWEC and TAKREER is a five-year contract with effect from 1 June 2002.

The main interactions between the sector companies can be summarised as follows:

- ADWEC purchases capacity and output from GDs under the terms of PWPAs. ADWEC also purchases fuel for supply to GDs.
- ADWEC then sells bulk supplies of water and electricity to the two distribution companies at the Bulk Supply Tariffs (BSTs).
- In addition to purchases from ADWEC, distribution companies purchase some water and electricity from RASCO.
- The distribution companies also pay Transmission Use-of-System (TUoS) charges to TRANSCO.
- The distribution companies receive revenue from final customers and subsidy from the Government.

It is relevant to the design and calibration of price controls to note that the sector has seen significant growth in electricity and water demand in recent years. **Figure 2.1** shows the actual and forecast demand growths in the sector. The year 2003 recorded an electricity peak demand of 4,134 MW and a water peak demand of 400 MGD.³ This represents growth by 3.1% and 20.8% respectively over 2002. Peak demands for 2004 will be confirmed shortly.



Source: various ADWEC data

³ Source: ADWEC Seven Year Statement. ADWEC’s definition of demand includes internal or auxiliary consumption of production plant.

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ADWEC’s forecasts for 2004 peak demands are 4,500 MW for electricity and 458 MGD for water, expected to increase to 6,960 MW and 653 MGD respectively by 2010. Electricity peak demand has grown at an average rate of 7.4% from 1999 to 2003 and is expected by ADWEC to show an average annual growth of about 7.7% from 2003 to 2010. For water peak demand, the average annual growth rate has been about 20.0% during 1999-2003 and is expected by ADWEC to be 7.3% during 2003-2010.

2.2 The Role and Duties of the Regulator

Law No (2) of 1998 established the Bureau as the sector's independent regulatory body and defines its duties, functions and powers. Any entity wishing to undertake one of 12 defined “regulated activities” in the Emirate of Abu Dhabi requires authorization from the Bureau in the form of a licence (or a licence exemption). It is through the licence conditions that the Bureau is able to influence the conduct of companies.

The “primary duty” of the Bureau (Article 53 of the Law) is to “ensure, so far as it is practicable for it to do so, the continued availability of potable water for human consumption and electricity for use in hospitals and centres for the disabled, aged and sick”.

The Bureau also has a number of “general duties” (Article 54), the most relevant of which in relation to the price control review is to “protect the interest of consumers of water and electricity as to the terms and conditions and price of supply (whether consumers are domestic, commercial or industrial)”. Amongst the Bureau’s other general duties is a duty to promote competition in the sector.

The Bureau also has a number of “general functions” (Article 55) under the Law, including “the regulation of prices charged to consumers of water and electricity and the methods by which they are charged.”

In carrying out its functions under the Law, the Bureau is under an obligation (Article 96) to act consistently, to minimize the regulatory burden on licensees, to take account of the financial position of licensees and to give reasons for its decisions. Accountability is further reinforced by the fact that the Bureau’s decisions can be challenged by licensees and ultimately made the subject of arbitration.

2.3 Regulatory Framework for the Sector

2.3.1 The Overall Framework

Many companies in the sector have significant market power. At present, the only direct competition in the sector is the competition between bidders to build new generation and desalination plant (IWPPs). The Bureau has therefore established a regulatory framework to constrain the market power of the other companies.

As the PWPA payments for IWPPs have been subject to a competitive bidding process, the PWPA payments for ADWEA-owned GDs have been established using a benchmarking approach with reference to the PWPA payments for the IWPPs or to other efficient benchmark

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plant. All electricity and water purchasing costs are thus subject to regulation via an economic purchasing obligation under ADWEC's licence. The Bureau keeps ADWEC's performance on this obligation under constant review. ADWEC's purchase of fuel for the GDs is subject to a similar economic purchasing obligation.

The remaining businesses are subject to price controls set by the Bureau from time to time:

- The licences of ADWEC, TRANSCO, ADDC and AADC contain charge restriction conditions through which the Bureau sets price controls for these companies. The first price controls (PC1) were set in 1999 to run for three years starting from 1 January 1999 and were extended for a further year; that is, a control duration of four years (1999 – 2002). The second price controls (PC2) for these companies were set in 2002 to apply for three years (2003-2005).
- A set of price controls was also established for RASCO in 2003 to apply for two years (2004-2005). Previously, some activities of RASCO were subject to tariffs approved by the Bureau.

The main features of the above regulatory framework are summarised in **Table 2.1** below:

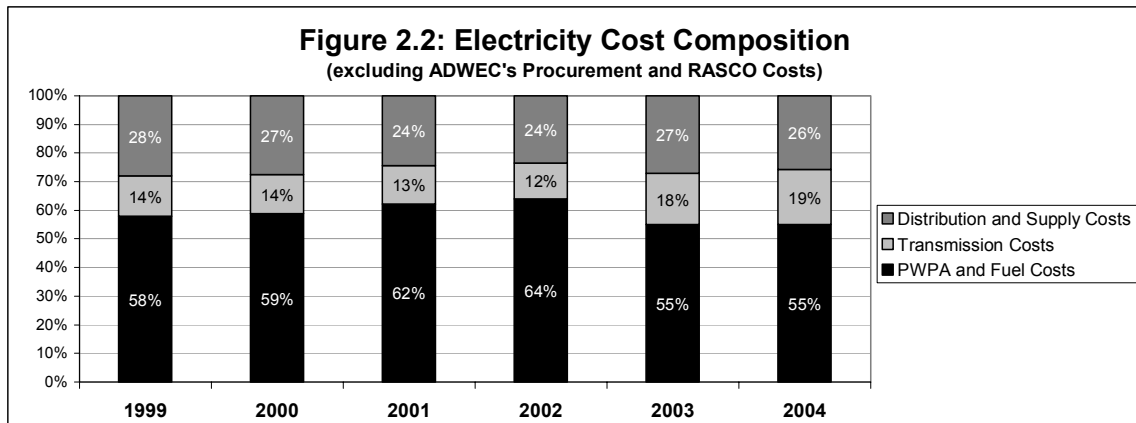
Activity or Cost	Framework
Production (by IWPPs)	ADWEC's economic purchasing obligation (via competition to build)
Production (by other GDs)	ADWEC's economic purchasing obligation (via benchmarking against IWPPs or other modern plant)
ADWEC's Procurement	CPI-X Price Control
TRANSCO's Transmission	CPI-X Price Control
ADDC / AADC's Distribution and Supply	CPI-X Price Control
RASCO's Production	CPI-X Price Control

2.3.2 Importance of Price Controls

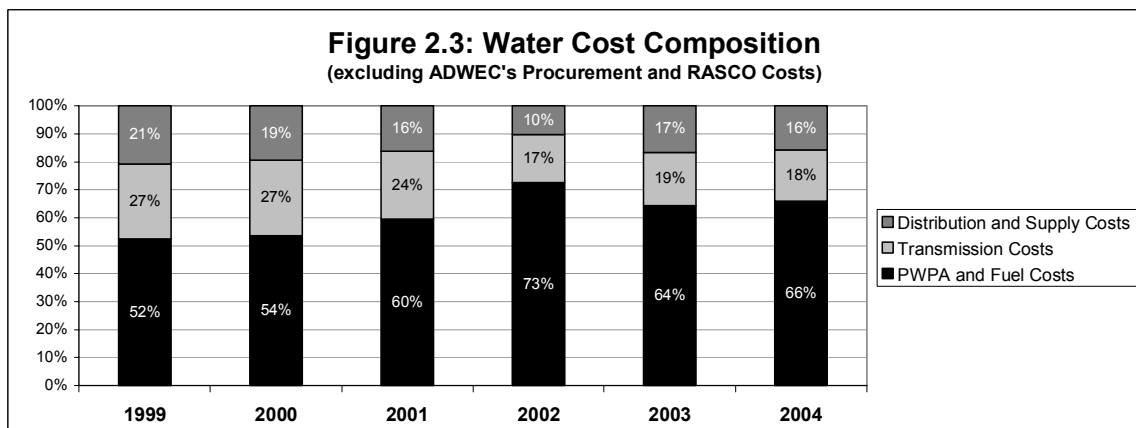
Figures 2.2 and **2.3** show the approximate composition of electricity and water costs, respectively, in 1999 through to 2004. For both water and electricity, production costs (which are subject to direct competition or benchmarking) account for more than half of the total sector costs. The balance between transmission and distribution/supply, however, varies significantly for water and electricity. In particular, transmission accounts for a higher proportion of water costs than of electricity costs (other components are correspondingly reduced).

It is estimated that the total sector costs in 2004 will be of the order of AED 7 billion. More than 40% of the total sector costs are regulated via price controls. This significant quantum of costs at stake highlights the importance of the price controls.

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Source: Bureau based on companies' data



Source: Bureau based on companies' data

2.3.3 Main Features of Current Price Controls

The main features of the current price controls are discussed below. A fuller discussion is included in the main body of the paper.

1. **CPI-X Regulation:** To date, the price controls have been of a "CPI-X" type which constrains changes in the companies' overall revenue to a measure of price inflation (CPI) less an amount "X" set to take into account factors such as expected efficiency improvements, demand growth and revenue profiling over the control period.
2. **Revenue Caps:** The CPI-X price control for each company or business acts as an annual revenue cap which defines the "Maximum Allowed Revenue" (MAR) that it recovers from its customers (or from government subsidy, in the case of distribution companies) in any year of the control period.
3. **Structure of Controls:** The MARs include a fixed term but are also partly determined by "revenue drivers" (such as peak demands, metered units transmitted or distributed, number of customers, etc.) set to reflect the cost structure of the companies and to provide desirable incentives.

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4. **Separation of Controls:** Presently, there are separate price controls for the water and electricity businesses of the companies, except for ADWEC which is subject to a single price control. For the distribution companies, the price controls (separate for water and electricity) presently cover both distribution and supply activities.
5. **Pass-Through Costs:** Price controls apply directly to companies' "own costs", which are considered to be within their control. Costs which are subject to competition, or to regulation elsewhere in the supply chain, are treated on a pass-through basis. For example, PWPA and fuel costs are considered on a pass-through basis for ADWEC (subject to the economic purchasing obligation) and the price control directly applies only to ADWEC's procurement cost (mainly staff costs). Similarly, purchases of water and electricity, and TUoS charges, are pass-through costs for distribution companies, with the price controls applying directly only to their own distribution and supply costs.
6. **Efficient Levels of Costs:** The price controls have been set to allow the companies to recover an efficient level of costs, comprising allowances for operating expenditure, depreciation and a return on capital.
7. **Incentives for Cost Efficiency:** By virtue of their medium-term revenue cap nature, the price controls provide strong incentives for companies to reduce costs since they are allowed to retain the benefit of any unforeseen efficiency gain (in the form of extra profits) at least until the next price control review.
8. **Treatment of Capex:** Calculation of depreciation and return on capital requires the determination of efficient capital expenditure allowances. The treatment of capital expenditure varied between PC1 and PC2, but was essentially based on an approach of 'ex-post' assessment – i.e., allowed capital expenditure is determined after the event (based on efficiency criteria established by the Bureau). The 2004-2005 price controls for RASCO were however set on the basis of an 'ex-ante' assessment of capital expenditure – i.e., the capital expenditure allowance is set in advance and is not subject to review.
9. **Cost of Capital:** A real post-tax cost of capital of 6% was used in setting the price controls for all the companies. This cost of capital was assessed against benchmarks from other countries and, to some extent, from Abu Dhabi for similar businesses. In the case of ADWEC, the return was expressed as a return on turnover (profit margin rather than return on capital) as ADWEC has few physical capital assets.
10. **Performance Incentive Scheme:** A Performance Incentive Scheme (PIS) was introduced as part of the present price controls (PC2) to incentivise the companies to improve their performance on various aspects of their operations.

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2.4 First Price Controls (PC1)

2.4.1 PC1 Structure

The structure of the PC1 controls that applied for four years (1999-2002) is summarized below:

ADWEC

$$\text{MAR} = \text{PWPA Costs} + \text{Fuel Costs} + A - K$$

TRANSCO (separate water and electricity price controls)

$$\text{MAR} = a + (b \times \text{Peak Demand}) + (c \times \text{Units Transmitted}) - K$$

ADDC & AADC (separate water and electricity price controls)

$$\text{MAR} = \text{Electricity or Water Purchase Costs} + \text{Transmission Charges} + \text{DSR} - K$$

$$\text{DSR} = a + (b \times \text{Number of Customers}) + (c \times \text{Metered Units Distributed})$$

Where:

- ‘A’ for ADWEC means its maximum allowed procurement cost;
- ‘a’ is the notified value for the fixed amount;
- ‘b’ is the notified value for the co-efficient of the first revenue driver;
- ‘c’ is the notified value for the co-efficient of the second revenue driver;
- ‘DSR’ is the allowed distribution and supply revenue for ADDC and AADC; and
- ‘K’ is the correction factor adjusting any over or under-recovery in the preceding year.

The structure of the price controls allowed MARs to vary with customer and demand growth via revenue drivers. In turn, the revenue drivers provided incentives for companies to meet the growing demand in the sector and to serve new areas and customers. The ‘metered units distributed’ revenue drivers provided incentives for the distribution companies to improve metering at exit points from their respective systems and to minimize losses from the distribution system.

2.4.2 PC1 Notified Values

The notified values of A, a, b and c were determined for the first year of the control period (1999), and were then automatically adjusted by CPI-X for each subsequent year of the period (to 2002), according to the following formula:

$$a_t = a_{t-1} \times (1 + (\text{CPI}_t - X) / 100)$$

(same formula for ‘b’ and ‘c’, and for ‘A’ for ADWEC)

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For TRANSCO, ADDC and AADC, “CPI” reflected the inflation in the previous year and was a weighted average of UAE CPI inflation and US CPI inflation (weighted in proportion of 80:20). For ADWEC, “CPI” was defined solely in terms of UAE CPI inflation.

Table 2.2 below shows the values that were notified by the Bureau for PC1 following its price control calculations and consultations with the companies:

	Notified Values			
	X	A or a	b	c
ADWEC Procurement	0.0	7.814 AED m		
TRANSCO Electricity	6.7	186.17 AED m	41.19 AED/kW	0.382 fils/kWh
TRANSCO Water	6.0	167.58 AED m	461.89 AED/TIG	0.65 AED/TIG
ADDC Electricity	8.0	141.61 AED m	1,501.79 AED/customer account	0.713 fils/kWh
ADDC Water	12.6	86.35 AED m	1,170.62 AED/customer account	0.76 AED/TIG
AADC Electricity	6.0	83.54 AED m	2,048.49 AED/customer account	0.922 fils/kWh
AADC Water	11.3	28.40 AED m	866.24 AED/customer account	6.99 AED/TIG

2.4.3 Treatment of Capex in PC1

As discussed later in this paper, PC1 did not include an allowance for capital expenditure, as the Bureau was concerned that accurate forecasts of capital expenditure were not available for the network operators. It was agreed that the Bureau would take account of actual capital expenditure during the PC1 period when setting the PC2 controls, provided that expenditure carried out was consistent with planning standards and was efficiently procured. This is discussed further in relation to the PC2 controls (below).

2.4.4 Derogation for ADWEC for PC1 Period

The correction factor (or K-factor) for ADWEC reflects the over- or under-recovery of revenue from the two distribution companies during the preceding year. It is used to adjust (either downwards or upwards) ADWEC’s BST revenue for the forthcoming year along with an appropriate interest rate. According to ADWEC’s licence, the K-factor for year t is calculated as follows:

$$K_t = (AR_{t-1} - MR_{t-1}) \times (1 + i_{t-1})$$

Where:

AR_{t-1} = actual revenue for year t-1

MR_{t-1} = maximum allowed revenue for year t-1

i_{t-1} = UAE Central Bank’s published average of monthly average interest rates on one-year interbank deposits for year t-1 (referred to in the licence as the “average specified rate”). An additional penalty interest rate (an additional 3% on top of

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the average specified rate) is applied to over-recoveries (only) exceeding 2% of the previous year's maximum allowed revenue.

During the discussions on the 2003 BST, ADWEC asked the Bureau to waive the interest payment on the over-recovery of revenue during the period 1999-2002 (PC1 period) which arose partly due to inadvertent over-charging of fuel costs by the fuel supplier during this period. The Bureau's paper⁴ of 11 March 2003 sets out ADWEC's proposal to waive the BST interest payment on over-recovery of fuel costs and the Bureau's assessment of the matter.

Subsequent discussions led the Bureau to issue a derogation⁵ to ADWEC on 8 April 2003 which waived the interest on the K-factor for all the years of the first price control period 1999-2002 (PC1 period). However, at the same time, in order to protect customers, the Bureau also reduced ADWEC's MAR by the income received by ADWEC from the GDs during the PC1 period (i.e. liquidated damages, claims, penalties, etc.) and any other income such as interest on bank deposits.

The formula for the K-factor for the PC1 period was thus modified by the derogation as follows:

$$K_t = AR_{t-1} - MR_{t-1} + L_{t-1}$$

Where L_{t-1} means any 'unregulated revenue' of ADWEC, i.e. liquidated damages, interest income and other such income of ADWEC from the GDs and banks during any year t-1 of the PC1 period.

The derogation applies only to 1999-2002. The price control formula has returned to its original form for 2003 onwards such that interest should be applied towards any under- or over-recovery of the BST.

2.5 Second Price Controls (PC2)

2.5.1 PC2 Structure

The PC2 controls are described in full in the Draft Proposals and Final Proposals published by the Bureau in September and November 2002, respectively. The structure of PC2 controls that presently apply to companies for 2003-2005 is summarized below:

⁴ "Calculation of the Correction Factor for the 2003 Bulk Supply Tariff", Bureau's Paper for ADWEC and ADWEA, 11 March 2003.

⁵ "Derogation (Specific) for the PC1 Period in respect of the Correction Factor formula – granted to Abu Dhabi Water and Electricity Company (ADWEC)", 8 April 2003, Ref: ED/L06/001 (Rev.0)

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ADWEC

$$\text{MAR} = \text{PWPA Costs} + \text{Fuel Costs} + A + Q - K$$

TRANSCO (separate water and electricity price controls)

$$\text{MAR} = a + (b \times \text{Peak Demand}) + (c \times \text{Metered Units Transmitted}) + A + Q - K$$

ADDC & AADC (separate water and electricity price controls)

$$\text{MAR} = \text{Electricity or Water Purchase Costs} + \text{Transmission Charges} + \text{DSR} + Q - K$$

$$\text{DSR} = a + (b \times \text{Number of Customers}) + (c \times \text{Metered Units Distributed})$$

Where:

- ‘A’ for ADWEC means its maximum allowed procurement cost;
- ‘A’ for TRANSCO means its allowed ancillary services costs;
- ‘a’ is the notified value for the fixed amount;
- ‘b’ is the notified value for the co-efficient of the first revenue driver;
- ‘c’ is the notified value for the co-efficient of the second revenue driver;
- ‘DSR’ is the allowed distribution and supply revenue for ADDC and AADC;
- ‘K’ is the correction factor adjusting any over or under-recovery in the preceding year; and
- ‘Q’ is the revenue adjustment for performance under the PIS in the previous year.

For the PC2 controls, the definitions of all revenue drivers were reviewed and where necessary amended to remove any ambiguity or inconsistency in the definitions used for the PC1 controls. In particular, TRANSCO’s “units transmitted” revenue drivers for electricity and water were redefined to refer only to units transmitted through exit meters compliant with the Metering and Data Exchange Code (MDEC), to provide incentives to improve metering and reduce losses similar to those already provided to the distribution companies.

2.5.2 PC2 Notified Values

The notified values of A (for ADWEC), a, b and c were determined for the first year of the control period (2003). They are then automatically adjusted by CPI-X for each subsequent year of the period (to 2005), according to the following formula:

$$a_t = a_{t-1} \times (1 + (\text{CPI}_t - X) / 100)$$

(same formula for ‘b’ and ‘c’, and ‘A’ for ADWEC)

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In contrast to the PC1 controls, CPI for the PC2 controls was defined solely in terms of UAE inflation in the previous year for all companies.

Table 2.3 below shows the values that were notified by the Bureau for PC2 controls following its price control calculations and consultations with the companies:

	X	Notified Values		
		A or a	b	C
ADWEC Procurement	0.0	10.72 AED m		
TRANSCO Electricity	0.0	522.77 AED m	44.28 AED/kW	1.05 fils/kWh
TRANSCO Water	0.0	347.75 AED m	305.57 AED/TIG	0.44 AED/TIG
ADDC Electricity	0.0	442.01 AED m	761.40 AED/customer account	0.45 fils/kWh
ADDC Water	0.0	197.56 AED m	382.74 AED/customer account	0.69 AED/TIG
AADC Electricity	0.0	235.68 AED m	1,028.83 AED/customer account	0.57 fils/kWh
AADC Water	0.0	92.74 AED m	586.50 AED/customer account	1.75 AED/TIG

While X was set at zero (to ensure an appropriate profiling of revenue over the price control period), the underlying allowed revenue calculations included assumed opex efficiency improvements of 5% a year in real terms.

2.5.3 Treatment of Capex in PC2

A particularly important issue in setting the PC1 and PC2 controls was the treatment of capital expenditure (capex). As described above, the PC1 controls made no allowance for capex over 1999–2002. The Bureau agreed to remunerate companies for efficient PC1 capex at the 2002 price controls review. However, in the continuing absence at the 2002 price controls review of audited data on past capex, the Bureau made a *provisional* capex allowance for 1999–2002, as summarized in **Table 2.4** below:

Table 2.4: PC2 Provisional Capital Expenditure Assumptions for 1999–2002				
AED m, 1999 prices	1999	2000	2001	2002
TRANSCO Electricity	344.172	533.792	795.288	1,222.498
TRANSCO Water	118.735	123.456	92.110	289.037
ADDC Electricity	196.511	300.858	398.342	389.889
ADDC Water	69.105	44.923	130.471	380.707
AADC Electricity	188.675	188.675	188.675	188.675
AADC Water	66.350	66.350	66.350	66.350

Note: For TRANSCO and ADDC, allowances were set at 75% of the estimated capex submitted by the companies. For AADC, allowances for each year were set at the reported levels of capex in 1999, which appeared to be less unreliable than other data.

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A similar approach was adopted for future capex. While the Bureau wished to include full allowance for future efficient capex (2003-2005) at the 2002 price controls review, companies' capex projections for 2003-2005 made available to the Bureau at that time were subject to considerable uncertainty. The Bureau therefore also adopted *provisional* projections of companies' capex for 2003-2005, summarized in **Table 2.5**:

AED m 2003 prices	2003	2004	2005
TRANSCO Electricity	1,267.791	730.378	346.036
TRANSCO Water	1,261.103	1,280.087	243.243
ADDC Electricity	461.876	484.969	509.218
ADDC Water	151.420	158.991	166.941
AADC Electricity	205.796	205.796	205.796
AADC Water	72.370	72.370	72.370

Note: The provisional allowances for 2003-2005 were set in a similar manner as for 1999-2002.

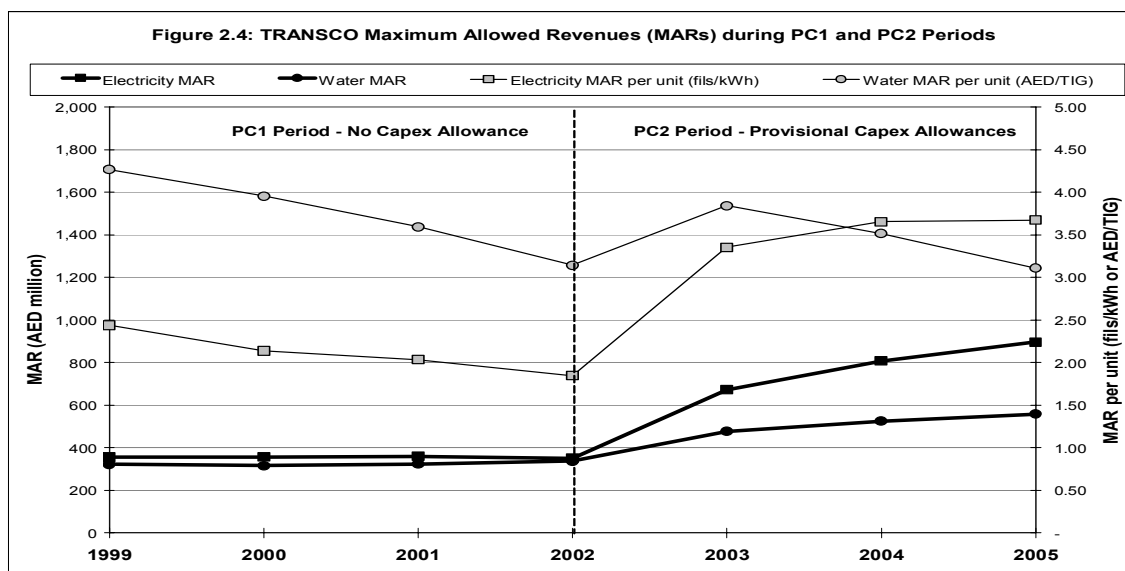
It was agreed at the 2002 price controls review that once audited data on actual capex over 1999-2002 and 2003-2005 is received by the Bureau, it will be reviewed against the efficiency criteria established by the Bureau. Any difference between efficient past capex and the provisional allowances will be reflected in a financial adjustment (to future revenues) at the 2005 price controls review - or at the subsequent review when the audited data becomes available.

For ADWEC, capex is very small and for the purposes of the PC2 control was treated in the same manner as opex (see Section 5 of this document for further details).

2.5.4 Effect of Provisional Capex Allowances in PC2

The effect of including in the PC2 controls provisional allowances for past and future capex was a significant increase in the MARs for the companies from the PC1 period (when there had been no capex allowance) to the PC2 period (when provisional amounts were financed for both PC1 and PC2 capex). For example, **Figure 2.4** shows the effect of including capex allowances in PC2 controls for TRANSCO based on the recent data made available to the Bureau. This figure shows that the actual and forecast MARs (plotted on the left vertical axis) for TRANSCO's electricity and water businesses have increased significantly from the end of PC1 period to the start of PC2 period. Similar effects are also evidenced in the MARs per unit (right vertical axis), although they are expected to follow a steadier trend in the latter part of the PC2 period due to growing demand.

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Source: TRANSCO's data

2.5.5 Other Main Changes from PC1

In addition to changes in relation to capex treatment and to the definitions of CPI and revenue drivers, there are three other important changes in the PC2 controls from the PC1 controls:

- A Performance Incentive Scheme (PIS) has been introduced in PC2 to provide a stronger incentive for companies to improve their performance. There are two "Category A" performance indicators for each separate business of the companies related to (i) the timeliness of audited accounts, and (ii) the timeliness of audited price control returns (PCRs). Good (poor) performance on these indicators leads to an automatic upward (downward) adjustment to MARs via a new term "Q" in the price control formulae. There are precise targets and incentive rates for these indicators stated in each company's licence and, to reduce risk for the companies, the adjustment to MAR via the term "Q" in any year has been capped at 2% of MAR in respect of companies' "own costs" in that year. A number of "Category B" performance indicators have also been introduced which are to be monitored over the PC2 period, with a possible financial adjustment made in respect of good or poor performance at the present review. These indicators are set out in Appendix F of the Bureau's PC2 Final Proposals of November 2002.
- A new term "A" has been introduced into TRANSCO's price controls to allow the pass-through of the costs of ancillary services subject to the economic purchasing obligation in TRANSCO's licence. (ADWEC's price control already included a corresponding provision within the term "PWPA".)
- For ADDC and AADC, the scope of price controls was extended to also include the distribution and supply businesses they inherited from RASCO with effect from 1 January 2001. However, as discussed later in this document, the Bureau needs to make financial adjustments at this price controls review for ADDC and AADC in relation to certain costs of these businesses over the period since 2001 which have yet to be financed in the price controls.

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2.6 Regulation of RASCO

2.6.1 Regulation of RASCO during 1999 - 2003

The Bureau's consultation papers published in 2003 on "*Review of Economic Regulation of RASCO from 2004*" describe in detail the economic regulation of various activities of RASCO to date, as summarised below:

- **"Dedicated" production activities⁶:** During 1999-2000, these activities were subject to tariffs (approved by the Bureau) for standby and continuous generation and for wellfields and associated desalination. The same tariffs are understood to be applied for 2001-2003. These activities are now within the overall RASCO's CPI-X price controls for 2004-2005.
- **"Non-dedicated" production activities⁷:** During 1999-2003, these activities were charged at the standard sector tariffs prescribed by ADWEA. These tariffs are below cost. A number of options to set retrospective revenue caps for these activities have been under discussion between the Bureau and ADWEA in order to calculate the subsidy requirements for RASCO for 2003 and earlier years. The Bureau has requested certain data in order to inform this discussion. On 10 March 2004, ADWEA provided the Bureau with RASCO data in relation to ADDC. However, as at 16 August 2004 the Bureau still awaits RASCO data in relation to AADC. Once complete information is made available to the Bureau, the Bureau will undertake the requisite analyses and suggest suitable methodologies to ADWEA for the calculation of the subsidy requirements of RASCO for 2003 and earlier years.⁸

These activities are now within the overall RASCO's CPI-X price controls for 2004-2005 and RASCO no longer requires subsidy (assuming it recovers its MARs from ADDC and AADC).

- **Distribution and supply activities:** During 1999-2000, these RASCO activities were not subject to any specific regulation by the Bureau. If necessary, the Bureau may set a retrospective revenue cap for this period to enable ADWEA to calculate the subsidy requirement.⁹ With effect from 1 January 2001, these activities have been transferred to ADDC and AADC in their respective authorized areas and hence are subject to the PC1

⁶ "Dedicated" production activities refers to standby and continuous electricity generation via units dedicated to certain customers (without using RASCO's former distribution networks), and to production of water from well fields and associated desalination units for supplies to ADDC, AADC and other RASCO customers such as remote villages, farms and palaces (now customers of ADDC and AADC), particularly in the Al Ain area.

⁷ "Non-dedicated" production activities refer to production of water by seawater desalination units and of electricity to supply customers via RASCO's former distribution networks.

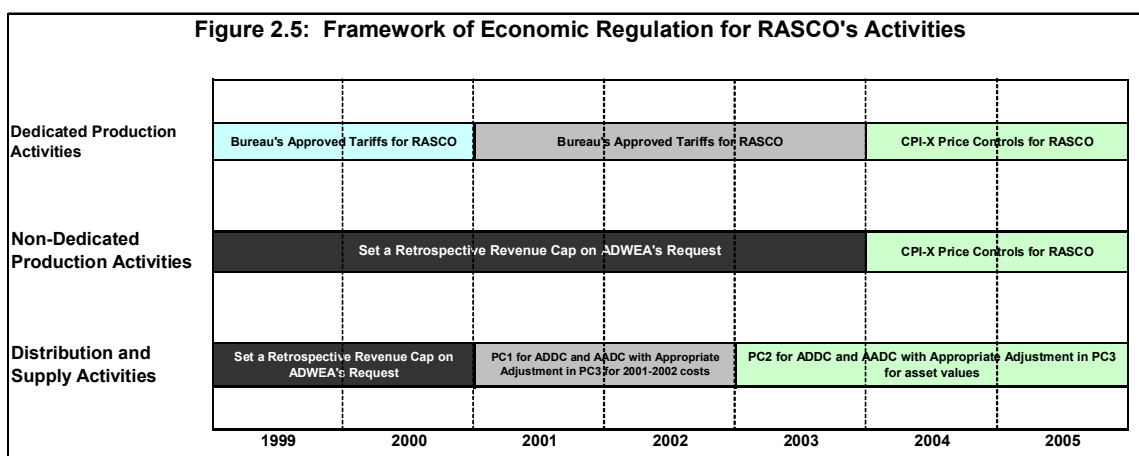
⁸ The Bureau is considering applying 2004-2005 RASCO price controls retrospectively to 2003 and earlier years for production activities of RASCO.

⁹ This may not be necessary, as it is understood that the RASCO subsidy for 1999 and 2000 has been calculated by the consultants (NERA) appointed by ADWEA to calculate sector subsidy requirements for 1999 and 2000.

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and PC2 controls for these companies for 2001 onwards. While operating expenditures relating to these activities for 2003 onwards have been taken into account while setting PC2 for ADDC and AADC, such expenses incurred during 2001-2002 may need to be remunerated through appropriate adjustment at the PC3 review. Further, if the distribution companies paid for the distribution and supply assets inherited from RASCO, the Bureau also intends to make an appropriate adjustment at the PC3 review for ADDC and AADC for capital costs (both return on capital and depreciation) they have incurred since 2001 associated with these assets.

The above discussion is summarised in **Figure 2.5** which graphically presents the regulatory arrangements for various activities of RASCO for different periods. It highlights two activities - non-dedicated production (2003 and earlier), and distribution and supply (1999 and 2000) - for which ADWEA may wish the Bureau to set retrospective revenue caps for the purposes of calculation of past subsidy requirements of RASCO.



Source: Bureau

2.6.2 2004-2005 Price Controls for RASCO

Following the restructuring of RASCO in 2001, RASCO's business is now solely that of electricity generation and water production. Although the operation of these activities is sub-contracted to ADDC and AADC, they remain RASCO's legal responsibility and the revenues which RASCO can earn from the sale of water and electricity to ADDC and AADC need to be regulated.

During 2003, the Bureau reviewed the framework for economic regulation that applies to RASCO's production activities and published four consultation papers on "*Review of Economic Regulation of RASCO from 2004*". This process resulted in the establishment of price controls for RASCO to apply for two years (2004-2005). The duration of the controls was chosen so that RASCO's price controls expire at the same time as the price controls for other sector companies, enabling all controls to be reviewed concurrently at the present review.

Broadly speaking, the form of the controls for RASCO is similar to that for other monopoly companies in the sector. There are two incentive-based CPI-X revenue caps for RASCO, separately for its electricity generation and water production businesses. These controls cap the

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Maximum Allowed Revenues (MARs) which RASCO can recover from its sales of electricity and water respectively, and, if reflected in RASCO's charges to the distribution companies, will remove the need for RASCO to receive subsidy (all sector subsidy will be paid directly to the distribution companies). The structure of these price controls can be summarised as follows:

$$\text{MAR} = a + (b \times \text{Revenue Driver}) + F + Q - K$$

Where:

- a** is the notified value for the fixed amount (expressed in AED million);
- b** is the co-efficient of the revenue driver (expressed in AED/kW for electricity or AED/TIG for water);
- F** is the allowed fuel cost, as defined below;
- K** is the correction factor adjusting any over or under-recovery of revenue in the preceding year. For the first year of control period (i.e. 2004), K has been set to zero¹⁰; and
- Q** is the revenue adjustment for performance under the PIS in the preceding year.

The notified values 'a' and 'b' were determined for the first year of the control period (2004) and are adjusted by CPI-X factor for the following year (2005) using the same formula as applied under PC2 for other companies (see Section 2.5.2 above). The notified values for RASCO are given in **Table 2.6**:

Table 2.6: Notified Values for RASCO Price Controls (2004-2005)			
	Values for 2004		
	X	a	b
Electricity Generation Business	0.0	32.57 AED m	62.76 AED/kW
Water Production Business	0.0	79.35 AED m	3.89 AED/TIG

To incentivise RASCO to improve its fuel consumption efficiency, the allowed fuel cost F for any year of the control period for each business is calculated as a weighted average of actual fuel costs and a benchmark level of fuel costs, as follows:

$$F = (0.95 \times AF) + (0.05 \times Z \times BUF)$$

Where:

- AF** = Actual fuel costs of RASCO for electricity or water in the relevant year (AED million)

¹⁰ An adjustment may be required in the future if subsidy received by RASCO over 1999-2003 differs from the level to be determined under the process described in Section 2.6.1 above.

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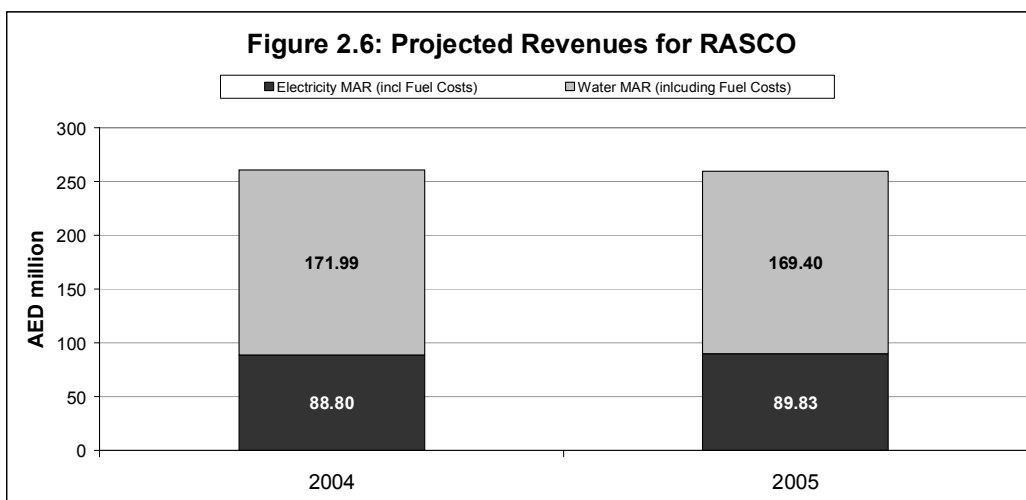
Z_t = For the electricity business, means the quantity of electricity produced from any source in the relevant year (expressed in kWh) and for the water business means the quantity of water produced from distillers only in the relevant year (TIG)

BUF = The benchmark unit fuel costs for electricity and water (20 fils/kWh and 8 AED/TIG, respectively), set by the Bureau based on realistically achievable levels of fuel consumption efficiency by RASCO.

Some important features of RASCO’s price controls are as follows:

- In contrast to the price controls for network companies, the price controls for RASCO were set with firm (not provisional) allowances for capital expenditure with no further review at a later stage. If actual capex is less than projected, RASCO will retain any benefit for the duration of the price control period, before the actual capex and depreciation are incorporated into the RAV at this review. See Section 6.4 for more details.
- A PIS similar to other companies has been introduced for RASCO with two ‘Category A’ indicators for the timelines of audited accounts and Price Control Returns (PCRs) for the water and electricity businesses. In addition there are a number of ‘Category B’ indicators as set out in Table 10.2 of the Bureau’s Final Proposals of November 2003 for RASCO. However, for RASCO, the adjustment to MAR via the term ‘Q’ in any year has been capped at 5% of MAR in that year (rather than 2% cap presently for the other companies). This followed experience with the other companies that suggested it was necessary to strengthen the incentive to improve the sector’s performance.

On average, the annual MARS for RASCO during 2004-2005 are estimated to be about AED 90 million (including fuel costs of AED 39 million) for the electricity business, and about AED 170 million (including AED 49 million of fuel costs) for the water business. The total in each year is about AED 260 million per annum as shown in **Figure 2.6** below:



Source: “Review of Economic Regulation for RASCO from 2004”, Bureau’s Final Proposals, November 2003

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3 Form of Controls

3.1 Introduction

Economic regulation can take a number of forms. However, there are two basic models: rate of return regulation and CPI-X (also known as price cap, or incentive, regulation). Since the sector restructuring in 1999, the monopoly companies in the sector (and RASCO more recently) have been subject to CPI-X price controls set by the Bureau.

The present price controls are due to be replaced by new or third price controls (PC3) with effect from 1 January 2006. This Section 3 therefore discusses whether the CPI-X type of regulation should continue to apply for the PC3 controls, and then addresses issues relating to the duration, scope, separation and structure of the new controls.

3.2 Type of Regulation

3.2.1 Sector Regulation to Date

The monopoly companies in the sector are presently subject to CPI-X type of regulation. This means that their allowed revenues are constrained to change each year by a measure of price inflation (represented by CPI) less a factor, X. The factor X is set to reflect a number of considerations, including efficiency improvements, the effect of demand growth and the profiling of future revenue.

3.2.2 Main Types of Regulation

CPI-X or price cap regulation is a popular form of price control in regulated sectors in a number of countries. This is because of the strong incentives it provides for regulated companies to improve their efficiency. However, rate of return regulation is also used in many countries and especially for government-owned utilities where incentive regulation may not be effective.

Under pure rate of return regulation, a company is guaranteed an agreed rate of return on capital and its prices are adjusted frequently, often on an annual basis, to ensure that this rate is earned. One of the main advantages of this regulatory regime is that, by guaranteeing a certain rate of return to the investor, it reduces perceived risk, resulting in a lower cost of capital. However, this regime is often criticized for the lack of adequate incentives it provides for companies to reduce costs (since any resulting increase in profits will be corrected by the regulator). Further, this type of regulation can provide a wrong incentive for a firm to over-invest in capital assets (“gold plating”) as a means of increasing the level of profits, if the allowed rate of return is higher than the company’s actual cost of capital (referred to in the academic literature as the “Averch-Johnson Effect”).

In contrast, price cap regulation involves the setting of prices or revenues over a medium term period (3 to 5 years) such that a well-run company can expect to earn a fair rate of return with the opportunity to earn and retain higher profits (at least up to the next price review) if the company reduces costs. This gives the company a greater incentive for efficiency.

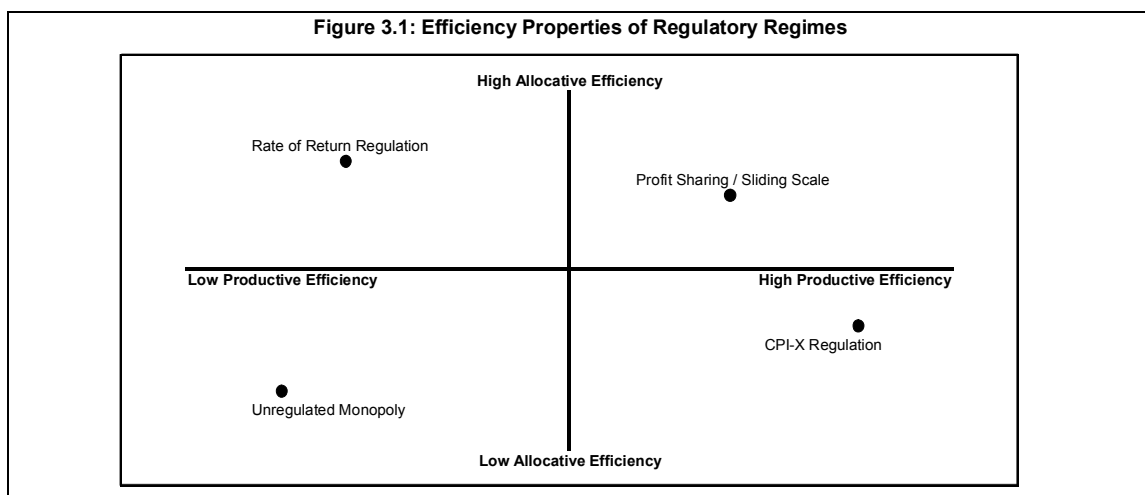
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In practice, price cap and rate of return regulation are less different than they might seem. In both the regimes, the regulator has to make an assessment of the costs and especially the rate of return that a firm should earn. Further, both models require the regulator to review the prices from time to time. The main difference between the two relates to the length of the “regulatory lag” – the period between the resetting of price controls.

The risk that CPI-X regulation may result in too low or too high profits for a regulated company has given rise to some variants of CPI-X regulation such as “profit sharing” and “sliding scale”. These approaches attempt to preserve the incentive properties of CPI-X while ensuring a closer link between prices and profits year-on-year. Under these mechanisms, the firm retains some fraction of its “excess” profits (i.e. profits over and above the allowed or assumed returns) and rebates the remaining fraction to customers. The main practical difficulty with such an approach is in defining “profits” (to be shared) in such a way that it is not open to manipulation. In addition, these approaches weaken the incentive to reduce costs.

One of the most important objectives of economic regulation is to promote economic efficiency. Economic efficiency requires both productive efficiency (i.e. reduction in costs) and allocative efficiency (i.e. prices follow marginal costs). Productive efficiency may be regarded as more important with regards to the type of control, as allocative efficiency can alternatively be addressed through the design of individual tariffs within the overall price cap. **Figure 3.1** summarises in stylised form the different approaches to economic regulation in terms of their efficiency properties.

CPI-X is regarded as having high productive efficiency properties but scores less well in terms of allocative efficiency (as prices are allowed to deviate from costs for a medium term period). On the other hand, rate of return is considered as scoring highly on allocative efficiency but less well in terms of productive efficiency. The profit sharing and sliding scale approaches lie between the two.

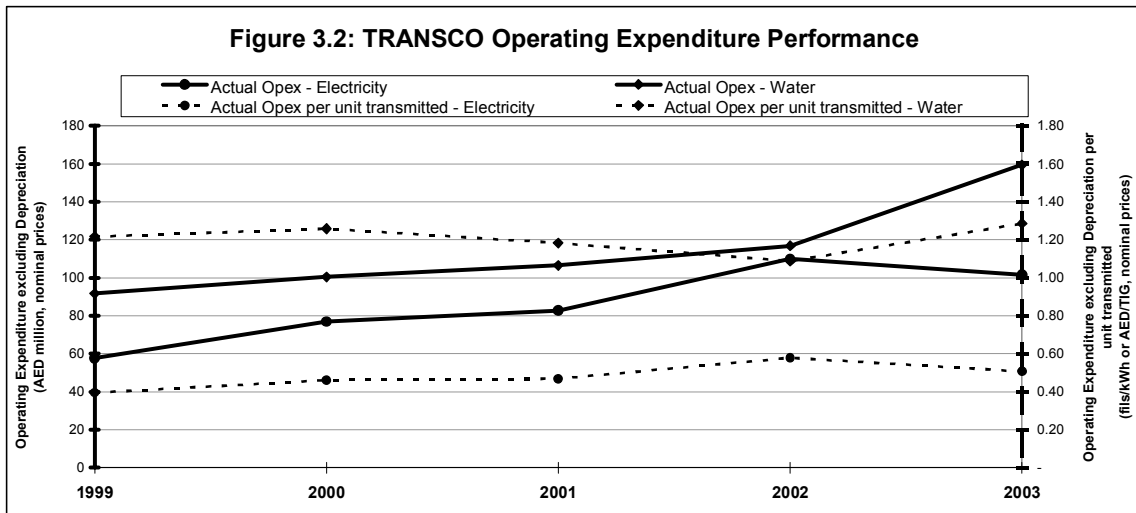


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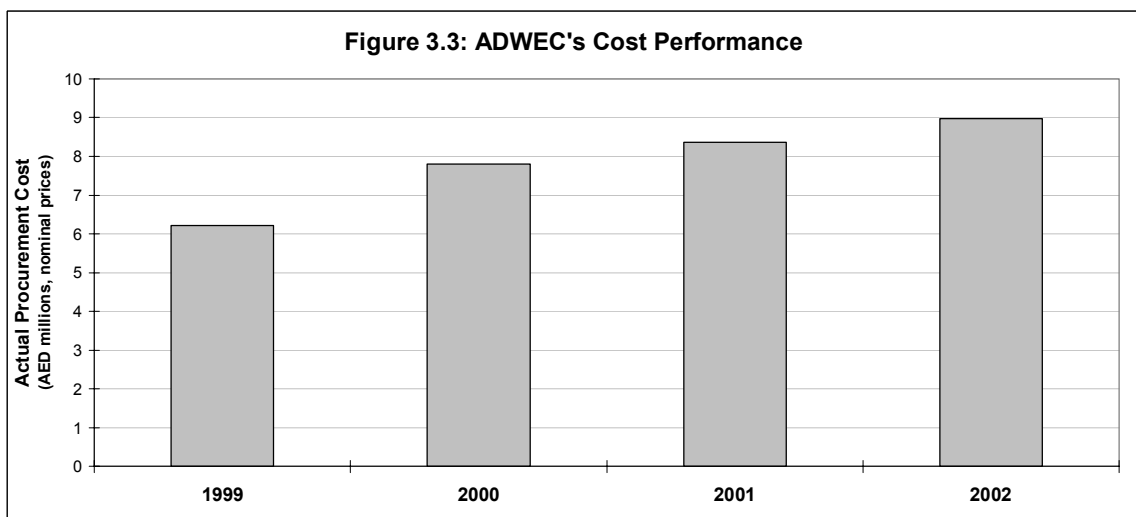
3.2.3 Assessment for the Sector

In assessing the suitability of price cap and rate of return regulation for the sector, the following factors need to be taken into consideration:

1. Although price cap regulation is characterized by its strong incentives for cost reductions, there are not yet indications that the Abu Dhabi companies have been able to reduce their costs. This can be observed in **Figures 3.2** and **3.3** below, for TRANSCO and ADWEC respectively.



Source: TRANSCO's audited and other data



Source: ADWEC's audited data

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2. While rate of return regulation has been in use in many countries¹¹, CPI-X regulation is increasingly applied around the world.¹² In the Middle East, CPI-X regulation has been used for telecommunications in Jordan and recently in Bahrain and Oman. Even in the US where rate of return regulation has been used historically, price cap regulation is being increasingly adopted.¹³ Indeed, the wide use of CPI-X regulation makes it international best practice and makes it easier to compare many aspects of companies' performance with others subject to a comparable regulatory environment.
3. Notwithstanding the increasing popularity of CPI-X regulation in the US, CPI-X regulation has been most readily adopted in countries (such as the UK and Australia) where there was no pre-existing rate of return regulation. Were the sector to shift to rate of return regulation, this may present an obstacle to reintroducing CPI-X regulation in the future when conditions may be more conducive to the companies responding to the incentives it provides.
4. Due to its efficiency incentives, it may be argued that CPI-X regulation is consistent with the Bureau's statutory duty towards an efficient and economic sector (Article 54 of the Law).
5. The continuing use of CPI-X regulation can be argued to help satisfy the statutory requirement for the Bureau to act consistently (Article 96 of the Law).

Overall the Bureau's initial thinking is that the price controls for all the companies should remain of the form CPI-X, in view of the above factors including the desirable efficiency incentive properties of CPI-X regulation and the possible privatization (in some form) of the distribution companies.

3.3 Form of Controls

3.3.1 Sector Regulation to Date

This document uses the term "form" of the controls to refer to the overall design of the price cap mechanism. As described in Section 2, the CPI-X regulation of the monopoly companies in the sector has to date taken the form of revenue caps for the businesses comprising a fixed component and (generally) two components linked to "revenue drivers". These revenue caps are constrained to change each year by CPI-based inflation rate less a factor X and by the changes in the values of the revenue drivers.

¹¹ Such as USA, Japan, Norway, Canada, Sweden, Pakistan and India.

¹² Such as the UK, Australia, New Zealand, Malaysia, Mexico, Peru, Argentina, Bolivia, Brazil, Chile, Colombia, El Salvador, Panama, Venezuela, Pakistan, Netherlands and Norway.

¹³ 38 US states had price cap and only 8 states had rate of return regulation for telecommunications in 2002 compared to 1985 when 50 states had rate of return and none had price caps. There are presently 28 electric utilities in the US with some form of incentive regulation covering 16 states. 12 US jurisdictions have some form of incentive regulation in place for gas distribution companies. See "*Reflections on Incentive Regulation*", Stephen Littlechild, and *Incentive Regulation in Network Industries: Experience and Prospects in the US Telecommunications, Electricity, and Natural Gas Industries*", Ross C Hemphill et al, Review of Network Economics, Vol.2, Issue 4, December 2003; and "*Incentive Regulation: The US Experience*", The Utilities Journal, March 2004.

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3.3.2 Main Forms of Control

There are three main forms of control which could be considered:

- A **revenue yield control**, which caps the revenue per unit of output which a company can recover;
- A **pure revenue cap**, which caps the overall revenue which a company can recover in any year;
- A **hybrid approach**, which is combination of the above.

A **revenue yield control** is frequently used in utility sectors subject to demand growth. It provides an incentive for the company to reduce unit costs below the unit revenue allowed by the cap, but also ensures the company receives additional revenue to cover the additional costs arising from growth in demand. One potential downside to this is that it may provide an undesirable incentive for the regulated company to expand output in sectors subject to resource constraints or environmental limits on output. Further, this form of control may not be appropriate for capital-intensive industries having significant fixed costs which do not vary with demand.

The main alternative to revenue yield controls is the **pure revenue cap**. This cap places an overall lump sum limit on the total income of a company (such as in the case of ADWEC's procurement costs at present). This provides an incentive for the company to reduce overall costs below the overall revenue control but does not allow the regulated company additional revenue in the event of growth in demand. The downside to this approach is therefore that it may unfairly expose the company to demand risk if costs of companies vary with demand. It may also provide a disincentive for the company to meet demand growth.

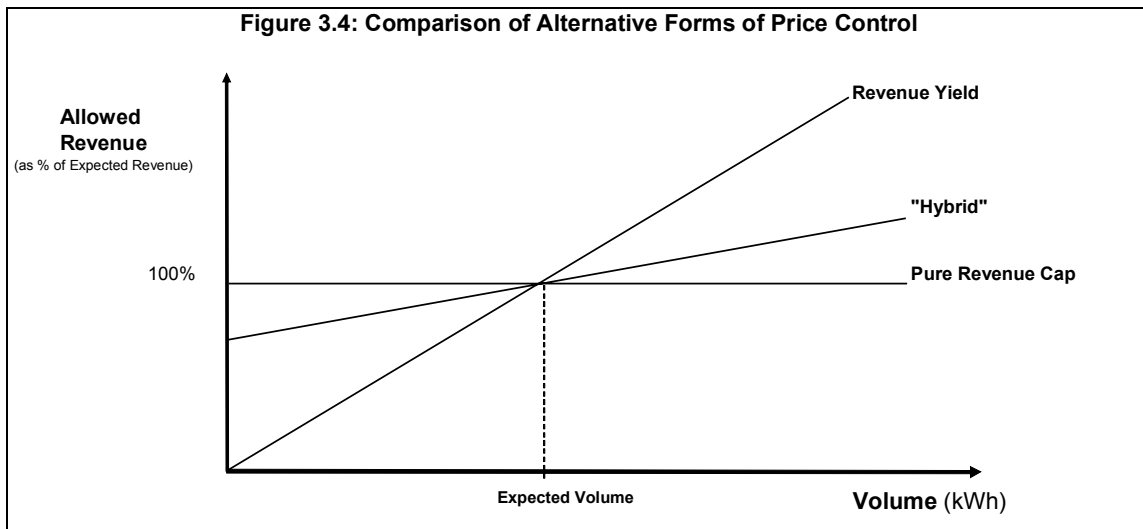
In view of the above, the Bureau presently adopts a **“hybrid” approach**, consisting both of a fixed component (similar to the pure revenue cap) plus one or more “revenue drivers” linking allowed revenue to defined output measures (similar to the revenue yield control). It is considered that this approach is suitable to the environment of Abu Dhabi as it provides an incentive for the companies to provide for the growing demands for water and electricity while at the same time limiting the risks of revenues deviating from costs by setting the fixed and variable revenue components, broadly speaking, to reflect the fixed and variable costs of the company.

While use of ‘revenue drivers’ may induce companies to encourage their customers to use water and electricity as much as possible (to increase companies’ allowed revenues), this effect can be offset by increasing the weight or the relative importance of the ‘fixed’ term within the structure of the controls.

In addition to reflecting each company’s cost structure, the revenue drivers also have other desirable objectives – for example, incentives to improve the extent of metering, to reduce losses, and to serve new demands, customers and areas.

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The revenue yield control, pure revenue cap and “hybrid” approach (with a single revenue driver for ease of representation) are compared in **Figure 3.4** below:



There are in addition other potential forms of controls. For example, **tariff caps** (specific caps applied to individual tariffs) are used to regulate gas and electricity supply companies in the United Kingdom. A **tariff basket control** (which caps the weighted average increase in a range of tariffs) is used for price regulation of water companies in England and Wales.¹⁴ In both cases, specific considerations guided the choice of control. Tariff caps were thought appropriate in the context of different tariffs for different payment methods (direct debit, standing order, prepayment etc) that exists in the UK energy supply market, where the regulator did not wish to see any change in the cost allocation between different tariffs. The specific design of the tariff basket control for water companies (specifically, the definition of the weights used to calculate the weighted average increase in charges) provided a very strong incentive for companies to increase the proportion of their customers who are metered.

3.3.3 Assessment

Designing a price control is generally a matter of reconciling a number of (sometimes conflicting) objectives. In the case of Abu Dhabi, the main objectives in designing the form of control include:

- Providing incentives to meet growing sector demands and customer numbers;
- Providing incentives for metering and loss/leakage reduction;
- Minimising unproductive demand risk;
- Ease of understanding for sector participants so that they can respond to incentives provided;

¹⁴ The tariff basket approach used for water companies in England and Wales also incorporates some revenue yield elements.

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- Facilitating calculation of subsidy requirements;
- Allowing flexibility in setting individual tariffs (in view of ADWEA's responsibilities in respect of subsidised tariffs).

The Bureau's initial assessment (on which the views of respondents will be welcomed) is that the continuation of the existing form of control – i.e., a hybrid of the pure revenue cap and the revenue yield approach - will continue to be the best way of meeting these objectives. The approach is now well understood by sector participants and has provided a clear and universally accepted methodology for calculating the subsidy requirement.¹⁵ By appropriate weighting of the fixed term and the revenue drivers, cost risks arising from demand growth can be limited while preserving the incentive to meet growing demands. It also provides strong incentives to increase metering and to reduce losses.

Other approaches seems less suitable: switching to a pure revenue cap would remove the incentive to meet the sector's growing demands, a revenue yield approach would increase the cost/demand risk, while the approaches focused on tariff regulation (tariff caps and tariff baskets) may not be suitable to the environment of subsidised tariffs set by ADWEA.

3.4 Duration of Controls

3.4.1 Sector Regulation to Date

Both the price controls PC1 and PC2 were set for three years, though PC1 was subsequently extended for another year. Present price controls for RASCO have a duration of two years. The main consideration in setting the duration of these controls was a general lack of reliable, and particularly audited, data on companies' performance on which to base projections of future costs. At that time, companies also generally expressed a preference for a control of shorter duration, on the grounds of the uncertainties within the sector. The Bureau considered that setting a control duration longer than three years would create a significant risk that the price control would become inappropriate, particularly in the latter years of the control, and would expose the sector to unnecessary risk.

3.4.2 Assessment

While rate of return regulation usually works on a short-term basis, the control period for CPI-X regulation is usually 4-5 years.

In principle, the duration of a price control must strike a balance between providing incentives for efficiency and reducing exposure to unanticipated outcomes. There is evidence that a longer duration provides stronger incentives for companies to implement efficiency savings. On the

¹⁵ As clarified in the licence amendments giving effect to the PC2 controls, subsidy is calculated by subtracting from (i) the Maximum Allowed Revenues (MARs) of the distribution companies derived from the price controls (ii) the income which the distribution companies should have collected from their customers according to the ADWEA-prescribed tariffs (regardless of whether they did actually collect that income or not).

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other hand, a longer duration also increases the possibility of performance being significantly at variance with expectations at the time that a control is set.

Another important factor to be taken into account is the efforts and costs involved both for the companies and the regulator in reviewing the price controls frequently. A longer control duration would reduce these costs.

The Bureau is highly encouraged by the recent initiative taken by ADWEA in appointing auditors for the separate business accounts and price control returns (PCRs) for the price-controlled companies for all the years since 1999. As a result of this work, a number of the companies have already submitted audited accounts and audited PCRs back to 1999. The statements from the remaining companies and for the remaining years are expected to be ready shortly.

The improvement in sector data combined with the longer ‘track record’ of company performance available at this review means that the companies and the Bureau should be able to develop more accurate projections of future costs to set PC3 controls. This in turn reduces the risks from setting PC3 controls for a longer duration. The companies’ performance to date in reducing costs, as discussed earlier, also indicates the need for stronger incentives to reduce costs.

In view of the above, the Bureau’s present thinking is that the duration of the PC3 controls may be extended, to, say, four years. A longer duration will provide stronger efficiency incentives for the companies and will be consistent with international practice.

3.5 Separation of Controls

3.5.1 Sector Regulation to Date

Presently, there are separate price controls for the water and electricity businesses of TRANSCO, ADDC, AADC and RASCO. There is no such separation of controls for the water and electricity procurement activities of ADWEC, nor for the distribution and supply businesses of the distribution companies.

3.5.2 Assessment

In principle, separation of controls enhances cost transparency between businesses and can help to facilitate the introduction of competition in certain activities. The following are the possible additional separation of controls we wish to consider for the PC3 controls:

(a) Separate Controls for ADWEC’s Water and Electricity Activities:

At present there is no separation of ADWEC’s accounts between water and electricity. Rather, ADWEC’s licence defines its activities as a single business. However, the Bureau can define separate businesses for the purposes of Condition 6 of the licence (“Separate accounts for separate businesses”). Furthermore, ADWEC is already required by the licence to provide certain PWPA and associated costing information to the Bureau separately for water and electricity (as part of the audited PCRs), and to produce separate Bulk Supply Tariffs (BSTs) for

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water and electricity. While the BSTs are reviewed thoroughly by the Bureau, the manner in which ADWEC allocates certain costs between water and electricity is presently not subject to independent audit.

ADWEC is unique among the price-controlled licensees in not having separate water and electricity businesses, even though it is responsible for more than half of the sector’s costs. This creates a problem in terms of calculating the sector’s economic costs separately for water and electricity, which is required in order to calculate the sector’s subsidy requirements separately for water and electricity, as requested by ADWEA and the Abu Dhabi Finance Department. It is therefore desirable that the separation of costs between water and electricity costs is audited, which requires the formal separation of ADWEC’s water and electricity businesses.

As part of the PC3 review, the Bureau therefore intends to explore the possibility of formally introducing separate businesses (and hence separate accounting requirements) for ADWEC’s water and electricity businesses. Associated with this, separate price controls for water and electricity would be developed as part of the present price control review process for ADWEC.

The Bureau does not anticipate any significant hurdle in introducing separate businesses and separate price controls for ADWEC’s water and electricity activities. This is because ADWEC already allocates all its costs between water and electricity for various purposes (as discussed above) although often based on some engineering assumptions or past experience and sometimes on a high-level basis. The Bureau would be willing to consider these or similar measures as the basis of cost allocation and separation of controls, as long as they are verifiable by the auditors.

(b) *Separate Controls for Distribution and Supply Businesses:*

The licences of ADDC and AADC each define four separate businesses for which both companies must produce separate accounts:

1. Electricity distribution
2. Electricity supply
3. Water distribution
4. Water supply

The Abu Dhabi water and electricity sector has been restructured so as to accommodate competition in the supply activity. Any person wishing to engage in the supply of electricity or water to premises can do so subject to the Bureau granting that person a licence. While the cost of water and electricity purchases from ADWEC and payment of Transmission Use of System (TUoS) charges and Distribution Use of System (DUoS) charges will be passed on to the customers by the supplier, the “supply” component of the final charge to customers would reflect competition between the new licensed supplier and supply businesses of ADDC and AADC. In the long-run, the competition in supply can also encourage the suppliers to adopt more innovative and efficient ways of procuring water and electricity for their customers. Competition is therefore likely to exert downward pressure on costs to the benefit of customers.

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During the 2002 price controls review, the Bureau provided the distribution companies an appropriate definition of the boundaries between distribution and supply:

- **Distribution Business:** The water and electricity distribution businesses are responsible for all matters relating to the development, maintenance, and operation of the distribution networks including metering equipment. They provide connections to the network and deal with all distribution related matters. These businesses do not sell or purchase water and electricity but receive connection charges from customers connecting to their distribution systems and DUoS charges from the supply businesses.
- **Supply Business:** The water and electricity supply businesses are responsible for meter reading, customer billing and account collection, and for maintaining customer records. The supply businesses purchase water and electricity from ADWEC (and RASCO) for sale to customers and arrange for the products to be transported and distributed to customers by the transmission and distribution businesses. The supply businesses pay TUoS and DUoS charges, to TRANSCO and the distribution businesses respectively, and collect income from customers and (as appropriate) from the Government in the form of subsidy.¹⁶

These transactions require separate charging mechanisms for supply and distribution. However, ADDC/AADC each presently has only two price controls: one for electricity (covering both electricity distribution and electricity supply), and one for water (covering both water distribution and water supply). In other words, for both water and electricity there is a single price control covering both distribution and supply activities.

The main reasons for this were as follows:

- At the time of the price control reviews prior to PC1 and PC2, audited information was not available separately for the four separate businesses. The Bureau therefore had to rely on unaudited information when setting price controls.
- In the case of the split between water and electricity, while there was concern about the quality of the separated cost information, this concern was over-ridden by the imperative to calculate sector costs separately for water and electricity (to facilitate the subsidy calculations).
- In the case of the potential split between distribution and supply, there were no strong arguments in favour of splitting the control in the absence at that time of prospective competition within the supply activities. Although the Bureau supported the principle of separate controls consistent with the definition of separate businesses, it was felt at that time to be prudent for the water and electricity controls to cover, in each case, both the distribution and supply activities.

¹⁶ See “Initial Consultation Paper on the Review of Price Controls for Al Ain and Abu Dhabi Distribution Companies, Transco and ADWEC”, Bureau, January 2001. The said document included meter reading in the responsibilities of the distribution businesses. However, in line with international best practice, the Bureau agreed with the distribution companies during the course of 2002 price controls review to include meter reading in the functions of the supply businesses instead.

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However, since that time, the sector has made significant progress in auditing accounting information dating back to 1999. In the course of the PC3 review period, the Bureau expects to receive audited accounts from both the distribution companies separately for each of their four businesses for the period 1999 – 2004. This would provide a much firmer foundation for having separate controls for distribution and supply.

Separating the distribution and supply controls would consolidate the recent initiative taken by ADWEA to introduce an internal charging mechanism (Distribution Use of System Charge, or “DUoS”) between the distribution business and supply business of each company. Such a mechanism is required to allocate income appropriately between distribution and supply businesses so as to enable the preparation of separate accounts for distribution and supply businesses. Associated to this, separate price controls for distribution and supply would also (by enabling different elements of cost to be more easily identified) ease the task of calculating large user tariffs in the case where the customer is connected directly to the transmission system of TRANSCO (rather than the distribution system of ADDC/AADC) but has a supply contract with ADDC/AADC.

There are therefore strong arguments in favour of introducing four separate controls for each of ADDC and AADC, corresponding to their separate businesses defined for the purposes of producing separate accounts, listed above.

A further option is to introduce separate controls for water distribution and electricity distribution, but have a single supply control covering both water supply and electricity supply. The argument for this is that the distribution companies are organisationally structured in such a way that, in each case, their ‘Sales’ division covers both electricity and water, while they have separate ‘Network’ divisions, one each for electricity and water. This option of having three price controls was discussed extensively with ADDC at the time of the 2002 Price Controls Review. The Bureau does not support this option as a single control covering both water and electricity supply businesses would reduce the transparency required to produce calculations of sector costs separately for water and electricity. Further, the distribution companies already allocate supply costs between water and electricity for the purposes of producing separate accounts.

3.6 Scope of Controls

3.6.1 Sector Regulation to Date

Another issue to be addressed is the scope of the controls – that is, which activities are covered by the controls and which are excluded. Broadly speaking, with the exception of ADWEC, each company’s existing price controls cover all revenue received in respect of licensed activities. Effectively, the revenue caps work as a “single till” – the overall level of revenue required by the company is determined via the price control review process (based on a forecast of total cost), and any revenue that is recovered from one group of customers of the licensed business is automatically deducted from the revenue which can be recovered from other customers of the licensed business. This approach was developed on the grounds that:

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- There was no evidence of effective competition in any area which would justify the narrowing of the scope of the control.
- Cost data provided by the companies was not sufficiently reliable to enable the control to focus on a narrower subset of any company's cost.

This means that, from the point of view of companies' income:

- For TRANSCO, the MAR caps both its TUoS charge and any connection charge incomes.
- For ADDC and AADC, the MAR (broadly speaking) caps the sum of income received from customers and from the Government in the form of subsidy. More specifically, “regulated revenue” for the PC2 controls is defined in the licences as “the revenue (measured on an accrual basis) derived from the distribution and supply of water [or electricity] in the relevant year including any revenue which should be billed to and collected from the customers according to tariffs and charges referred to in Conditions 27 and 28 of the Licence, fines, penalties, damages and claims received from customers, insurance claims received from insurers, and any subsidy from the government [or ADWEA], after deduction of any taxes based directly on the amounts so derived.”
- For RASCO, the MAR caps its revenue which should be billed to and collected from distribution companies, fines, penalties, damages and claims received from the distribution companies, insurance claims received from insurers and subsidy from the Government (if any).
- For ADWEC, the MAR caps its BST revenue from the distribution companies but explicitly excludes the items below.

The following items are specifically considered outside the scope of the price controls:

- For ADWEC, any income received from production companies in the form of damages, claims, late payments or events of default is presently excluded from the calculation of its MAR.¹⁷
- For all companies, the MAR does not cover the revenues in respect of activities which are other than licensed activities and for which the concerned company has received the consent of the Bureau (as is required according to the licences in order for the companies to undertake such activities). Such activities undertaken at present are listed below:
 1. For ADDC and AADC, “Management of RASCO’s Production Assets” on behalf of RASCO;¹⁸

¹⁷ For the PC1 period only, such income was included in ADWEC’s MAR via a derogation issued by the Bureau on ADWEC’s request (see section 2.4.4 of this document). This derogation expired on 31 December 2002.

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2. For ADDC, “Central Laboratory Services” for third parties; and
3. For TRANSCO, provision of certain ”Manpower Services” to third parties.

Consents have been issued for the above activities, to apply retrospectively as appropriate, but are subject to periodic renewal.

3.6.2 Assessment

The recent work on the audit of the companies’ price control returns (PCRs) for 1999 onwards has raised a number of important issues which are relevant to the scope of the PC3 controls. In the discussion below, the activities (and hence associated costs and revenues) of the companies are categorized into the following four classes:

- (a) Licensed activities not subject to competition
- (b) Licensed activities subject to competition
- (c) Unlicensed activities
- (d) Other activities indirectly related to licensed activities

Each of these is discussed below in turn to assess whether it should be covered by the scope of the PC3 controls:

(a) Licensed activities not subject to competition

Licensed activities not subject to competition are treated as follows:

- For ADWEC, the procurement of water, electricity, ancillary services and fuel are within the scope of the price controls, but most of the costs (except for its own ‘procurement costs’) are treated on a pass-through basis subject to economic purchasing obligation. That is, all PWPA payments (including those for ancillary services) and fuel payments subject to ADWEC’s economic purchasing obligation are covered by its MAR or price-controlled BST revenue. However, any income received from production companies in the form of damages, claims, late payments or events of default is explicitly excluded in the licence definition from the calculation of its MAR. Similarly, ADWEC’s costs arising from penalties, damages, claims, late payments or event of defaults under the PWPAs are excluded from the term ‘PWPA’ in its MAR to be recovered from the distribution companies.
- For TRANSCO, provision of connection and use of system services, and procurement of ancillary services, are within the scope of price controls. Accordingly, income from both TUoS charges (and connection charges, if any) is covered by the price controls.

¹⁸ These activities and associated costs (and hence incomes) are excluded from the scope of price controls for the distribution companies. However, the efficient levels of the costs paid by RASCO to the distribution companies for these services are financed within the price controls for RASCO.

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- For ADDC and AADC, all activities relating to distribution and supply of water and electricity fall within the scope of price controls. That is, income from standard and non-standard consumption tariffs, connection and disconnection charges, or any other charge or penalty from its water and electricity customers, and any subsidy from the Government is covered by the price controls.
- For RASCO, the scope of controls covers all generation and water production activities, and accordingly all income from the sale of water and electricity to the distribution companies is considered as regulated revenue.

The Bureau considers the above approach remains appropriate.

(b) Licensed activities subject to competition

In principle, if competition is effective in providing a constraint on the companies’ pricing and service for any activities, then it may be thought appropriate to exclude such activities from the scope of the price control.

At present, competition only exists in relation to ADWEC’s procurement of water and electricity from IWPPs. This is not directly subject to price controls but treated on a pass-through basis under its overall MAR formula (subject to economic purchasing obligation). Otherwise, the Bureau is presently not aware of any licensed activities or parts thereof (such as provision of new connections, meter reading, supply) which are yet subject to competition.

Even if competitive licensed activities could be identified, it is not obvious that the most sensible regulatory treatment at present would be to exclude them from the scope of the price controls. There would be a need to protect both customers of the remaining monopoly activities, and competitors of the competitive activities, from any cross-subsidy of the competitive activities from the monopoly activities. This would necessitate the robust allocation of costs between activities within and outside the price controls, and the implementation of transparent transfer pricing principles for transactions between the different activities – effectively, separate accounts for each of the competitive activities.

Unless competition for a licensed activity can be demonstrated to be effective, and its costs can be robustly ring-fenced from the company’s other costs to the satisfaction of the Bureau, the Bureau’s present view is to continue with the existing wide scope of the control for the next price control period. The controls will therefore cover all licensed activities undertaken by the companies, as at present, and charges within this will be required to be cost-reflective, consistent with the non-discrimination provision in the companies’ licences.

(c) Unlicensed activities

The Bureau is aware of a number of activities that the companies presently undertake or have plans to undertake which do not fall within the definitions of “regulated activities” according to the Law and require the Bureau’s consent under the respective licences. These activities are as follows:

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- Management of RASCO’s production assets by ADDC and AADC on behalf of RASCO;
- ADDC’s central laboratory services for third parties;
- TRANSCO’s manpower services for third parties;
- Procurement by ADWEC of water and electricity from UWEC for sale to third parties outside the Emirate of Abu Dhabi; and
- Transmission by TRANSCO of water and electricity produced by UWEC for third parties outside the Emirate of Abu Dhabi.
- Other possible arrangements to which licensees may be party to in future in connection with the Emirates National Grid and/or GCC Interconnection.

The Bureau’s present thinking is that the above activities should not be within the scope of the PC3 controls. That is, the revenue from these activities should not be considered part of “regulated revenue” and not be capped by the relevant MARs. Accordingly, the assets and costs associated with these activities should not be financed by the PC3 controls. This would require the relevant companies to establish sound and transparent principles and mechanisms for allocation of assets and costs between the regulated businesses and the above activities and to exclude them from the past and future projections of data to be submitted in response to the Bureau’s information requests for this review. Consents for the first three activities have been issued recently. Consents for the other activities are under consideration. As a matter of principle, all these consents contain conditions designed to ensure appropriate accounting data is made available to the Bureau.

(d) Other activities indirectly related to licensed activities

Finally, there are incomes (or losses) that the price-controlled companies receive from parties other than their customers. These incomes include:

- Insurance claims from insurers in relation to the licensed businesses;
- Penalties from the general public for affecting or damaging the assets of licensed businesses;
- Penalties, liquidated damages, claims or late payment interest from contractors working for a licensed business;
- Interest income on bank deposits or return on investments made out of the cash flows or incomes from the licensed businesses; and
- Foreign exchange gains or losses on amounts held by the companies in foreign currency for payments to third parties in relation to the licensed businesses.

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A key issue that arises is whether the above income streams should be recognized as part of “regulated revenue” when assessing compliance with the price control (and hence in calculating any over- or under-recovery of revenue requiring to be corrected in the following year’s MAR).

Although the above incomes do not come from the customers of the companies, they arise only because the companies are undertaking regulated businesses. Further, the receipt of most of these incomes requires the time and efforts of the companies’ staff, for example, in gathering evidence, negotiating and enforcing contracts, exploring and managing investments or policies. The companies’ regulated businesses therefore incur costs in managing these activities.

Furthermore, the past cost data for the regulated businesses, which forms an important part of the assessment to make future costs projections while setting the price controls, includes the costs of the above activities. Similarly, the companies’ own cost projections for the future submitted in response to the Bureau’s information requests are also usually based on past cost data including the costs of these activities. In other words, the costs of the above activities which may not be directly related to the regulated businesses are financed via the price controls. For insurance, for example, the regulated businesses pay insurance premia which are included in the cost base.

In view of the above, the Bureau considers that it is not appropriate to exclude the incomes from the above activities from the scope of price controls, and that an further amendment is required to the definition of “regulated revenue” to remove any remaining ambiguity on this point. However, the Bureau would welcome the views of respondents on these matters.

Efforts were made at the 2002 price controls review to improve the definition of “regulated revenue” in the licences for the distribution companies to clarify what income streams are covered by regulated revenue. However, the recent experience on the audit work for PCRs has highlighted the need for further improvement. During the course of this review, the Bureau will therefore consult with the interested parties on the appropriate licence definition of “regulated revenue” for each price-controlled business.

3.7 Issues for Consultation

The above discussion raises the following main issues for consultation in relation to the PC3 controls:

1. The Bureau’s current thinking is to continue with CPI-X type of regulation for the new price controls.
2. The Bureau’s current thinking is to continue with a hybrid of a pure revenue cap and revenue driver approach for the form of the price controls.
3. Should the duration of the PC3 controls be three years as at present, or be extended to, say, four years?
4. Should separate water and electricity businesses be defined for ADWEC’s activities, allowing separate controls for the two businesses?

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5. Should there be separate price controls for the supply and distribution businesses of ADDC and AADC? (That is, four controls in total for each company: (i) electricity distribution, (ii) electricity supply, (iii) water distribution, and (iv) water supply.)

6. Do you agree that income associated with licensed activities but collected from parties other than customers should count towards “regulated revenue” in determining compliance with the price controls?

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4 Structure of Price Controls

4.1 Introduction

Section 3 discussed the fundamental issues in relation to the design of the PC3 controls such as the type, form, duration, separation and scope of the controls. This Section 4 discusses the possible structure of the PC3 controls in more detail (see Section 2.5 for description of the structure of present price controls). In particular, assuming continuation of revenue driver based price controls, this section discusses whether there is a need to review the present definitions of revenue drivers, and what should be the revenue drivers if the price controls of distribution companies are to be split between the separate controls for their distribution and supply businesses.

This section also identifies some high level issues in relation to other terms in the price control formulae relating to allowed ancillary services costs (A) for TRANSCO, correction factor (K), and the 'Q' term related to the Performance Incentive Scheme (PIS).

4.2 Bureau's Approach to Price Control Calculations

In order to understand the context for revenue driver projections, this section briefly describes the overall approach to the price control calculations used by the Bureau for setting the price controls. The discussion is based on the existing (revenue driver) form of control – the approach would be amended appropriately in the event of any changes to the form of control.

Setting the price controls means, for each business, determining the values of the co-efficients on the fixed term and the variable terms in the MAR formulae (i.e. presently A for ADWEC, and a, b and c for other companies); the 'X' factor; and (for RASCO only) the benchmark unit fuel costs ('BUFs') and the weights of actual and benchmark fuel costs.

The Bureau proposes to continue with the existing approach whereby, in essence, the values of 'A', 'a', 'b' and 'c' are determined by setting the MAR equal to the required revenue (sufficient to finance an efficient business) over the control period. (PWPA and fuel costs for ADWEC, fuel costs for RASCO, pass-through costs for the distribution companies, and Q terms for all businesses are excluded from this calculation and the correction factor is assumed to be zero for the purposes of the calculations.)

The above calculations will be carried out in post-tax¹⁹ present value (PV) terms over the control period (2006 onwards), and in real 2006 price terms (i.e., excluding the effect of inflation) for each business separately. That is:

$$\text{NPV of projected annual MARs} = \text{NPV of Required Revenues}$$

(in real terms, over the control period)

¹⁹ Presently, there is no corporate income tax in the Emirate of Abu Dhabi.

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For a given value of X, and an assumed distribution of revenue between the fixed and variable elements in the MAR formula, solving the above equation will give the values of ‘A’, ‘a’, ‘b’ and ‘c’ for the first year of the control period (i.e. 2006).

At the 2002 review, the X factor was used by the Bureau to reflect a number of factors other than just efficiency improvements. In essence, the X factor has been used as a revenue profiling or smoothing factor and does not necessarily accurately represent the underlying efficiency improvement assumption. For example, X was set to zero at the last review in view of the following considerations:

- To avoid any confusion between the efficiency improvement (which was incorporated into opex projections separately) and the X factor; and
- To allow lower revenue in the early part of the control period and higher in the later (than would have been the case with a higher X factor), consistent with the companies’ submissions for generally increasing costs and demands (implying increasing requirement for revenue) over the control period.

Estimating annual MARs

The estimation of annual allowed revenue thus requires:

- setting an appropriate value of ‘X’ factor (discussed above);
- making reasonable projections of the revenue drivers for each year of the control period (see Section 4.8 below); and
- deciding the appropriate proportions of the allowed revenue which should be recovered from the fixed term ‘a’ and the variable terms involving the revenue drivers with coefficients ‘b’ and ‘c’ (see Section 4.9 below for more details).

Estimating annual required revenues

The required revenue can be calculated in two ways, which can be shown to be arithmetically equivalent:

For each year (Building Block Approach) to be summed over control period in NPV terms:

$$\text{Required Revenue} = \text{Operating Expenditure} + \text{Depreciation} + \text{Return on Assets}$$

Or

Over the entire control period (Cash Flow Approach):

$$\begin{aligned} \text{PV of Required Revenues} &= \text{PV of Operating Expenditure} + \text{PV of Capital Expenditures} \\ &+ \text{PV of Opening Asset Value} - \text{PV of Closing Asset Value} \end{aligned}$$

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The two approaches may sound different, but on a given set of assumptions they give the same answer in PV terms over the control period. The first approach calculates the required revenue separately for each year of the control period using a “building block” methodology. Annual required revenues are then discounted to determine their present values at the beginning of the control period and then summed up to calculate the present value of the total required revenue for the period. The second approach directly calculates the present value of the total required revenue for the period. The Bureau used the second approach to set both the PC1 and PC2 controls and cross-checked the result against the building block approach.

However, the building block approach, being made up of three obvious components (operating expenditure, depreciation and return on capital), is more intuitive and is being increasingly used by regulators around the world. The Bureau therefore adopted this approach for calculating the required revenue for setting 2004-2005 price controls for RASCO. At that time, the objective was to increase the familiarity of the sector companies with the building block approach before it could be used at this 2005 price controls review for all companies.

Both the approaches require projections of efficient operating expenditures (opex), capital expenditures (capex), depreciation and regulatory asset values (RAVs) to be made over the control period; and a decision on the cost of capital which can be used as the rate of return on RAVs and as the discount rate to calculate present values (PVs).

4.3 Revenue Drivers for PC3

As described in Section 2, each revenue cap (except for ADWEC) changes each year by a number of “revenue drivers”, set to broadly reflect each company’s cost drivers. For example, TRANSCO’s price control is made up of a fixed element and elements reflecting peak demand and metered units transmitted. However, the choice and calibration of revenue drivers can have objectives other than cost-reflectiveness, such as:

- incentives to improve metering on the systems;
- incentives to reduce system losses;
- incentives to meet growing demands; and
- incentives to serve new customers and new areas.

Table 4.1 sets out the present definitions of the revenue drivers for various companies.

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Table 4.1: Present Definitions of Revenue Drivers

Company	Revenue Driver	Present Definition
TRANSCO	Peak Electricity Demand	The maximum average electricity demand in an hour (expressed in kilowatts) as metered or otherwise measured at exit points on leaving the Licensee's electricity transmission system in relevant year t.
	Metered Electricity Units Transmitted	The aggregate quantity of electricity units transmitted (expressed in kilowatt-hours) through the Licensee's electricity transmission system in relevant year t metered (in compliance with the Metering and Data Exchange Code) at exit points on leaving the Licensee's transmission system.
	Peak Water Demand	The maximum average water demand in a day (expressed in imperial gallons per day) as metered or otherwise measured at exit points on leaving the Licensee's water transmission system in relevant year t.
	Metered Water Units Transmitted	The aggregate quantity of water units transmitted (expressed in imperial gallons) through the Licensee's water transmission system in relevant year t metered (in compliance with the Metering and Data Exchange Code) at exit points on leaving the Licensee's transmission system.
ADDC/AADC	Electricity Customer Accounts	The number of electricity customer accounts registered with the Licensee as of 31 December of relevant year t for the supply of electricity by the Licensee in that relevant year.
	Metered Electricity Units Distributed	The aggregate quantity of electricity units distributed (expressed in kilowatt-hours) through the Licensee's electricity distribution system in relevant year t metered at exit points on leaving the Licensee's distribution system.
	Water Customer Accounts	The number of water customer accounts registered with the Licensee as of 31 December of relevant year t for the supply of water by the Licensee in that relevant year.
	Metered Water Units Distributed	The aggregate quantity of water units distributed (expressed in imperial gallons) through the Licensee's water distribution system in relevant year t metered at exit points on leaving the Licensee's distribution system.
RASCO	Electricity Generation Capacity	The aggregate electricity generation capacity (expressed in kilowatts) owned by the Licensee as of 31 December of a relevant year t (a) as measured or reasonably estimated net of auxiliary or internal consumption of the generation facility, (b) whether used on standby, emergency or continuous basis, (c) whether connected to the electricity distribution or transmission systems of a licensed distribution or transmission operator or connected directly to one or more customers of such operator, and (d) which is required to meet the demand or security of supply requirements.
	Water Annual Production	The aggregate amount of water (expressed in thousand imperial gallons per year) produced by the Licensee in relevant year t (a) as measured or reasonably estimated net of auxiliary or internal consumption of the production facility, (b) whether produced from desalination units or ground water wells (in each case, owned by the Licensee), and (c) whether the production facility is connected to the water distribution or transmission systems of a licensed distribution or transmission operator or connected directly to one or more customers of such operator.

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At the 2002 price controls review, the definitions of the revenue drivers were reviewed on the basis of experience with the previous definitions and of considerations to strengthen incentives to improve performance. However, a number of issues need to be considered at this review in relation to the revenue drivers:

- Both the peak demand revenue drivers for TRANSCO and both the revenue drivers for RASCO presently do not have strict requirements of metering and allow estimation if meters do not exist. This is in contrast to other demand-related revenue drivers, all of which require demand or units transmitted or distributed to be measured by a meter compliant with Metering and Data Exchange Code (MDEC). The Bureau considers that the sector is now sufficiently mature that all revenue drivers should now be defined in terms of metered units (both on a peak and annual basis).
- If the price controls for distribution companies are to be split between separate controls for distribution and supply businesses at this review, such separate controls need to contain appropriate revenue drivers. Possibilities include:
 - o same revenue drivers for both distribution and supply businesses as presently apply to single control (i.e. customer accounts and metered units distributed);
 - o one revenue driver (say metered units distributed) for distribution business controls and one revenue driver (say customer accounts) for supply business controls; and
 - o some combination of the above, or additional revenue drivers.
- The ongoing audit of the price control returns (PCRs) has highlighted the need for review of the customer account-related revenue drivers for the distribution companies. The definitions of these drivers need to be improved to precisely define which customer categories are to be included or excluded. For example, in the case of water customer numbers:
 - o it may be appropriate to specify that such a revenue driver will include only those customers which are connected to the networks of the distribution companies and will exclude those which are supplied by tankers or by other means. This will also incentivise the distribution companies to minimise the usage of tankers as an alternative to distribution via their pipeline network (in addition, “water supply method” is a PIS Category B indicator for the distribution companies) ; and
 - o although the definition covers all water customers connected to the network, this may need to be made more explicit (ie, to explicitly state that it includes customers who are charged a fixed monthly amount).
- ADWEC’s control presently consists solely of a constant term for its own procurement cost which is subject to the CPI-X formula. During the last review, it was proposed that ADWEC’s control should also include a measure of its “activity” or workload to reduce

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ADWEC's exposure to risks associated with potential increases to its own costs arising from unexpected increases in its workload. A number of measures such as installed electricity and/or water capacity, and the number of IWPPs were considered as the possible activity-based revenue drivers, but rejected by ADWEC.

- If separate price controls need to apply to electricity and water businesses of ADWEC for the PC3 period, separate constant terms and/or revenue drivers for the procurement costs of these businesses would have to be determined at this review.

4.4 Pass-Through Terms

For Abu Dhabi companies, certain costs are pass-through in the price control formulae:

- For ADWEC, PWPA and fuel costs;
- For ADWEC and TRANSCO, allowed ancillary services costs; and
- For ADDC and AADC, power and water purchases and transmission charges.²⁰

In the case of PWPA, fuel and ancillary service costs, these costs are pass-through as they are difficult to predict and are subject to an economic purchasing obligation. (Ancillary services costs are further discussed in Section 4.5 below.)

In the case of power and water purchases and transmission charges, these costs are pass-through for the distribution companies as they are costs recharged from ADWEC / RASCO and TRANSCO which have already been subject to regulation (via the economic purchasing obligation or price controls in the case of power and water purchases from ADWEC / RASCO and via the price controls on TRANSCO's transmission businesses).

Pass-through of ADWEC's PWPA and fuel costs has been considered appropriate to date since indexing these costs to movements in demand or general price inflation or other measures (as has been used in some circumstances in other countries) would increase the business risk for ADWEC. However, while the Bureau endeavours to keep ADWEC's economic purchasing obligation in relation to PWPA and fuel costs under review, there have been difficulties for the Bureau in monitoring such costs due to the unavailability or delay in availability of the requisite data from ADWEC.

Furthermore, since 1999, the unit cost of electricity and water procured by ADWEC has increased substantially. This is at a time when cost reductions should have been expected, due to efficiency improvements and economies of scale.

²⁰ Note that prices of power and water purchases and transmission charges for the distribution companies are regulated at the levels of ADWEC / RASCO and TRANSCO, respectively. The terms 'electricity transmission system charges (ETC)' and 'water transmission system charges (WTC)' used in the MAR formulae for distribution companies are not specifically defined in the respective licences, but are generally understood to include both TUoS charges and connection charges payable by the distribution companies to TRANSCO.

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The Bureau would therefore welcome suggestions as to other forms of price control which may be considered for ADWEC. It may be that an approach similar to that adopted for fuel costs for RASCO, involving pass-through of only a proportion of actual costs with the remainder linked to an index set by the Bureau, may provide a better incentive for ADWEC to minimise purchase costs and provide better protection for its customers from price increases if it fails to do so.

In relation to the potential separation of controls for ADWEC and ADDC/AADC, it may be necessary to address the following with respect to the pass-through items:

- If separate price controls need to apply to the electricity and water businesses of ADWEC for the PC3 period, separate PWPA and fuel cost terms for these businesses would have to be defined for separate MAR formulae at this review. That is, the structure of ADWEC’s price controls would be as follows:

ADWEC’s electricity business:

$$MAR_E = PWPA\ Costs_E + Fuel\ Costs_E + A_E + Q_E - K_E$$

ADWEC’s water business:

$$MAR_w = PWPA\ Costs_w + Fuel\ Costs_w + A_w + Q_w - K_w$$

Where, subscripts “E” and “W” mean that the concerned revenue or cost relates to electricity business and water business, respectively. Allocation of fuel costs in particular may give rise to some issues but ADWEC already does this for the purposes of the BST.

- If separate controls are to be introduced for distribution and supply businesses of the distribution companies, pass-through terms for water and power purchases and transmission charges will need to be moved to the price controls for supply businesses. The latter controls will also need to include distribution charges levied by the distribution businesses of the distribution companies to the supply businesses. That is, the structure of price controls for distribution companies would be as follows:

ADDC & AADC distribution businesses (separately for water and electricity)

$$MAR_D = a + (b \times Revenue\ Driver_{D1}) + (c \times Revenue\ Driver_{D2}) + Q_D - K_D$$

ADDC & AADC supply businesses (separately for water and electricity)

$$MAR_S = Electricity\ or\ Water\ Purchase\ Costs + Transmission\ Charges + Distribution\ Charges + SR + Q_S - K_S$$

$$SR = a + (b \times Revenue\ Driver_{S1}) + (c \times Revenue\ Driver_{S2})$$

Where, subscripts “D” and “S” mean that the concerned term relates to the distribution business and supply business, respectively.

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4.5 Ancillary Services Costs

The present price controls allow both TRANSCO's electricity business (through the term 'A') and ADWEC (within the term 'PWPA') to recover their costs of ancillary services.²¹ While the mechanism to recover such costs existed since 1999 for ADWEC, the term 'A' was introduced in the price controls for TRANSCO at the 2002 price controls review.

It was agreed at the 2002 price controls review that the Bureau will monitor TRANSCO's licence obligation for economic purchase of electricity ancillary services through an annual statement by TRANSCO to demonstrate compliance with its obligation as part of the audited price control returns (PCRs). This statement should also demonstrate that procurement of ancillary services was necessary for system security and stability and/or resulted in a reduction in overall transmission costs. The introduction of this new term 'A' in TRANSCO's price control does not and should not prevent ADWEC from procuring ancillary services as necessary in accordance with its licence. However, TRANSCO and ADWEC must coordinate with each other on the procurement of ancillary services, as required by their licences.

During 2003, there had been some discussions among the Bureau, ADWEC and TRANSCO on matters relating to the procurement of ancillary services. TRANSCO requested ADWEC to provide a clear explanation of the ancillary services covered by the PWPAs. The retention of the term 'A' in the price controls for TRANSCO's electricity business will allow TRANSCO to procure in future necessary ancillary services (to the extent not covered by the PWPAs or other agreements of the GDs with ADWEC) in coordination with ADWEC.

4.6 Performance Incentive Scheme Term 'Q'

The present price control formulae for all the companies contain a term 'Q' to provide an incentive to improve their performance against "Category A" performance indicators. This term was introduced at the last price controls reviews as part of the Performance Incentive Scheme (PIS).

For each separate business of the companies, there are two "Category A" performance indicators related to (i) the timeliness of audited accounts, and (ii) the timeliness of audited price control returns (PCRs). Good (poor) performance on these indicators leads to an upward (downward) adjustment to MARs via the term "Q" based on precise targets and incentive rates for these indicators. In order to reduce risk for the companies, the adjustment to MAR via the term "Q" in any year has been capped at 2% (5% in the case of RASCO) of MAR in respect of companies' "own costs" in that year. "Own costs" refer to the term "A" for ADWEC, MARs (less K factors) for TRANSCO and RASCO, and to the term "DSR" for ADDC and AADC (see Section 2.5.1 of this document).

A number of "Category B" performance indicators have also been introduced which are to be monitored over the PC2 period, with a possible financial adjustment made in respect of particularly good or poor performance at the present review. Furthermore, certain Category B

²¹ Ancillary Services are defined in the licences for ADWEC and TRANSCO as the services which may be required from time to time for reasons of system security and stability as identified in the Electricity Transmission Code.

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indicators may be moved to Category A indicators with precise definitions, targets and incentive rates at this 2005 price controls review. These matters are discussed in detail in Section 8 of this document.

To increase the number of Category A indicators and/or to provide stronger incentives for improved performance, the present annual caps on the term ‘Q’ may need to be increased to say 5% or 10% of MAR in respect of companies’ own costs. It may be worth noting that the Bureau initially suggested a cap of 5% - 10% for the Q term at the 2002 review. However, some companies argued for a lower cap due to the fact that the PIS was being applied for the first time. In view of the companies’ responses and consideration of the companies’ financial positions, the Bureau reduced the cap to 2%. The Bureau considered that a lower cap was also justified in view of the fewer Category A performance indicators at that time. This will now be reviewed.

Further, as mentioned in Section 4.4 above, if there are changes in respect of the separation of controls, separate Q terms may need to be defined for the two possible separate businesses of ADWEC (i.e., electricity procurement business and water procurement business) and for the four possible separate businesses of each distribution company (i.e. electricity distribution business, electricity supply business, water distribution business, and water supply business).

4.7 Correction Factor

The correction factor “K” in all the price control formulae is intended to adjust the MAR for one year for any over or under-recovery of MAR in the preceding year. Such an over or under-recovery arises mainly due to actual or out-turn demands or revenue driver values being different from those forecast at the beginning of a year while estimating MAR. This under- or over-recovery (in year ‘t-1’) needs to be recovered from, or paid back to, the customers of the company in the following year (‘t’) with interest via a correction factor calculated as follows:

$$K_t = (\text{Actual Revenue}_{t-1} - \text{MAR}_{t-1}) \times (1 + i_t / 100)$$

Where “i_t” means that interest rate which is equal to:

- the “average specified rate” when there is over-recovery by 2% or less of MAR or when there is any under-recovery; and
- the average specified rate plus a 3% ‘penalty’ rate if there is over-recovery by more than 2% of MAR.

The average specified rate is defined by the licences as “the average of the monthly average one year inter-bank deposit rates published by the Central Bank of U.A.E. (or such other bank as the Bureau shall specify from time to time) during the period in respect of which the calculation falls to be made”. That is, such a rate is published in respect of the same year to which the actual revenue and MAR in the above formula relate. In other words, the K-factor for the under or over-recovery of revenue during a year ‘t-1’ will be calculated by using the average specified rate published for the year ‘t-1’ (and this K-factor will then be used in the calculation of the MAR for the year ‘t’).

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The main objective of the above mechanism is to allow the return in the following year of any under-recovery (or over-recovery) in the preceding year *with interest* so as to keep the company (or customers) indifferent in terms of the time value of money. Further, the additional 3% ‘penalty’ over and above the average specified rate in case of over-recovery by more than 2% is intended to provide the companies with incentives to improve their forecasting; in particular, to ensure that they do not over-recover significantly in any year.

If there is a further separation of controls for certain companies as proposed in section 3.5, separate K factors would need to be defined for the new separate businesses. Furthermore, any K-factor in respect of 2005 carried forward to the PC3 control period would need to be appropriately allocated between the affected businesses.

In the case of ADWEC, which is exposed to the risk of very large financial flows compared to its own costs, the Bureau agreed that ADWEC could amend the 2003 BST to bring BST income for that year more in line with ADWEC’s actual costs in that year. This ensured that the 2003 BST charges are truly cost-reflective. With such an approach, it is for consideration whether the incentive for ADWEC to forecast accurately should be enhanced via the PIS.

4.8 Revenue Driver Projections

As explained in Section 4.2 above, calculation of the notified values, a, b, c and X requires assumptions to be made at the time of setting the price controls of revenue driver data such as peak demands, customer numbers and metered units transmitted or distributed over the control period.

These assumptions have important implications for the accuracy of the price controls and therefore require careful consideration. If, at the price control review, a revenue driver is assumed at a level higher than the expected level, the relevant notified value (being expressed in a payment per unit of the revenue driver) would be unreasonably understated, which would have the effect of lowering the future allowed revenue to below its correct value, to the disadvantage of the company. Similarly, if the revenue driver data for the future is assumed at a level lower than its expected level, the notified value would be overstated and therefore allow more revenue in future than it should, to the disadvantage of the customers.

Equal care is required to ensure that revenue driver projections are made on the same basis as the actual revenue driver would be measured in future. For instance, if the units used in the price control calculations are assumed to be metered in future, the units assumed when calibrating the revenue drivers must also be metered units. Any inconsistency between the basis of revenue driver data used at the price control review and that of actual revenue driver data to be used in Price Control Returns during implementation of price controls would result in lower or higher revenue than what should be allowed.

The accuracy of the revenue driver projection, and hence whether the companies concerned earned higher or lower revenue and profits than assumed when setting the price controls, also depends on how the companies responded to the incentives provided by the revenue drivers – if the companies have responded positively to an incentive provided by the design of revenue drivers (such as to improve metering) then it is reasonable for them to make additional profits.

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Similarly, if companies have not met reasonable expectations as to improvements that could be made to the revenue drivers, then profits will justifiably be lower than assumed.

As at the previous price control reviews, the Bureau will take into account the revenue driver projections made by the companies in their responses to the Bureau's information requests during the course of this review. However, these projections would need to be assessed against the cost projections and past data of the company and the revenue driver or demand projections of other companies in the sector. Further adjustments to these projections may be necessary to reflect stronger incentives for performance and/or to reflect realistic achievable targets for performance, for example, in relation to the extent of metering and reductions in system losses.

4.9 Weights of Revenue Drivers in Price Control Calculations

As mentioned in Section 4.2 above, a decision on the appropriate proportions of the allowed revenue which should be recovered from the fixed term 'a' and the variable terms involving the revenue drivers with co-efficient 'b' and 'c' is required as part of the price control calculations. This decision has important implications. While the weights are generally intended to reflect the cost structure of a company, these weights (along with the revenue driver projections) can also be used to incentivise the company to perform well on the objectives of the revenue drivers (for example, to improve metering or to meet new demand). A higher weight for a variable term means a greater incentive for performance against the objective of the relevant revenue driver. On the other hand, a higher weight for the fixed term means greater surety for companies to earn revenue irrespective of the outturn demand or revenue driver performance.

At the last price control reviews for all the businesses, an overall break-up of 65:35 was used for the split of allowed revenue between fixed and variable components (except for ADWEC, which had full 100% weight for the fixed term). The following table summarises the revenue driver weights used at the last price control reviews:

Business	Revenue Term or Revenue Driver	Weight in Revenue
ADWEC	Fixed Amount	100%
TRANSCO Electricity	Fixed Amount	65%
	Peak Electricity Demand	25%
	Metered Electricity Units Transmitted	10%
TRANSCO Water	Fixed Amount	65%
	Peak Water Demand	25%
	Metered Water Units Transmitted	10%
ADDC / AADC Electricity	Fixed Amount	65%
	Electricity Customer Accounts	25%
	Metered Electricity Units Distributed	10%
ADDC / AADC Water	Fixed Amount	65%
	Water Customer Accounts	25%
	Metered Water Units Distributed	10%
RASCO Electricity	Fixed Amount	65%
	Electricity Generation Capacity	35%
RASCO Water	Fixed Amount	65%
	Water Annual Production	35%

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These weights relate to the present value of total revenue over the control period. The weights thus vary slightly from year to year, depending on the relative movement in revenue drivers in each year.

These assumptions may need to be reviewed at this review, for example to strengthen the incentives for improved performance via revenue drivers (by increasing weights for variable terms), or, alternatively, to increase the weight of fixed terms to better reflect the cost structure of the companies, and/or to alter the revenue profile over the control period as desired.

4.10 Issues for Consultation

This Section 4 raises the following issues for consultation in relation to the PC3 controls:

1. Should the revenue drivers (and/or the present definitions of existing revenue drivers) be reviewed? If so, which alternative revenue drivers or what changes to the definitions of existing revenue drivers should be considered?
2. The Bureau’s current thinking is that the TRANSCO peak demand revenue drivers, and the RASCO revenue drivers, should be amended so that they are based solely on metered units.
3. If there are to be separate price controls for distribution and supply businesses, what should be the revenue drivers for each business?
4. Should one or more revenue driver(s) be introduced into ADWEC’s price control (whether or not there is a separation of control into water and electricity businesses)?
5. Should the treatment of PWPA and fuel costs on a pass-through basis for ADWEC be reviewed? If so, what alternative approaches may be considered?
6. Do you agree that the cap on the PIS-related MAR adjustment via the term “Q” for Category A performance indicators should be increased to, say, 5% or 10%?
7. How should the weights for the fixed term and variable terms (involving revenue drivers) in the price controls be set?

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5 Assessment of Operating Expenditures

5.1 Introduction

As discussed in Section 4.2, projections of operating expenditures (opex) are one of the important inputs to the price control calculations. In this document, the term “operating expenditure”, or “opex”, generally refers to operating costs excluding depreciation. Exceptions to this are ADWEC, for which opex includes capex and depreciation; and RASCO, for which opex excludes fuel costs.

This section discusses possible approaches to the assessment of future opex for PC3. In order to ensure that the companies are able to finance their businesses, the revenues allowed to be recovered under the price controls are set at a level sufficient to cover projected operating and capital costs, including a return on capital. However, under Law No.2 of 1998, the Bureau has a duty (among other things) to ensure the operation and development of an *efficient* and *economic* water and electricity sector. This means that, in common with other regulators charged with administering an incentive-based regulatory regime, the Bureau must be satisfied that the cost projections underpinning the price controls reflect the costs which could be expected of a reasonably efficient operator. Thus while the companies’ historical level of costs, and their future projections of costs, are taken into account by the Bureau, adjustments are made where necessary to ensure that future projections of “efficient costs” are not over-stated.

5.2 Assessment of Operating Expenditures

5.2.1 Bureau’s Approach at Previous Reviews

The Bureau’s approach to assessing future opex at the previous price control reviews has been as follows:

1. **Base Level:** To determine a “base” level of opex, assess the actual level of opex immediately prior to the forthcoming price control period, based on the most reliable recent actual data submitted by the companies. This is then projected forward in real terms (to allow for general price inflation).
2. **Adjustment for Demand Increases:** To forecast future opex from this base level, make necessary adjustments to reflect increased costs associated with meeting increases in demand.
3. **Adjustment for Opex Efficiency Improvement:** Make a further adjustment to this demand-adjusted level of opex to take account of the assumed opex efficiency improvement over the price control period.
4. **Further Adjustments:** Make any further adjustments to opex projections which may be appropriate – for example, for one-off costs (or cost reductions) which are known about in advance, or for anticipated changes in the real price of inputs used in the production process.

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This approach pays regard to the current levels of cost of the companies while at the same time providing strong incentives for efficiency improvement.

At the 2002 review, in view of the absence at that time of audited financial data for 2001, the Bureau used the average of 2000 and 2001 opex (adjusted to 2003 prices) as the base level for future opex projections. Further, the Bureau assumed that any increases in opex over the next price control period that would be expected to result from demand growth can be offset by efficiency improvements of 5% a year.²² No further adjustments were made.

As a result of the above approach, the methodology at the 2002 review was to assume that opex for 2003, 2004 and 2005 can remain constant in real terms at the base level.

In the case of RASCO, the Bureau at the 2003 review used 2003 opex (adjusted for 2004 prices) as the base level of opex for 2004-2005 and employed the same assumption of 5% a year efficient assumption as for other companies.²³

5.2.2 Possible Approaches to the Assessment of Opex

A number of approaches may be taken to assessing future opex requirements at this review:

1. **Bottom-Up Approach:** Some regulators have adopted the approach of assessing or benchmarking each main item of expenditure against that of similar companies in the sector or elsewhere. The main difficulty with such an approach is finding comparators which are sufficiently similar to the business being analysed. Even then, there may be a limited amount of publicly available data on which to base comparisons.
2. **Top-Down Approach:** An alternative (or complementary) approach is to assess the total opex of the business / company as a whole. This can take a number of forms:
 - a. **Use of Benchmarking Tools:** Regulators can use benchmarking tools to assess the efficient levels of total opex for a company. The advantage of such an approach over bottom-up benchmarking is that cost data for the overall business or company is more likely to be in the public domain than more disaggregated cost data. The benchmarking tools vary from simple ratios of total opex to outputs (such as average total cost per customer) to more ‘formal’ techniques (e.g., regression analysis, data envelopment analysis) linking total opex (and capex or asset values) to multiple outputs and other factors. The Bureau made use of simple comparative assessments such as cost per unit of output when setting the PC1 controls in 1999 and in the past has investigated the scope for more sophisticated analysis.
 - b. **Actual Outturn Costs with Efficiency Assumptions:** The regulator can use the present cost of the company as the base level for the next control period, and

²² See “2002 Price Controls Review – Final Proposals for PC2”, Bureau, November 2002 for more details.

²³ See “Review of Economic Regulation of RASCO from 2004 – Final Proposals”, Bureau, November 2003 for more details.

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then make various adjustments to ensure it provides reasonable projections of efficient opex for the next control period. As described in 5.2.1 above, the Bureau used this approach in setting the current price controls. The regulator needs to be aware of the possibility (and make adjustments where necessary) that such an approach may provide poor incentives towards the end of the price control period for licensees to reduce costs (if they think higher costs at the end of one control period will result in higher allowed opex in the next control period).

- c. **Extending Previous Projections with Efficiency Assumptions:** This approach is similar to (b) above, but uses the opex projected at the last review (instead of actual out-turn opex) as the base level for the next control period. This approach may be considered suitable if using actual out-turn costs would result, in the regulator’s view, in an inefficient level of costs (for example, if the company has not achieved the assumed efficiency improvements in the previous price control period).

In practice, regulators will tend to use a combination of approaches and assess a wide range of information before forming a judgment about the efficiency improvement that can be reasonably expected from the company over the next control period.

5.2.3 *Assessment of Opex Approaches*

One of the purposes of the restructuring of the Abu Dhabi water and electricity sector and the introduction of incentive regulation was to provide the regulated companies with improved incentives to improve their efficiency. Further, the Bureau has a duty to ensure the economy and efficiency of the sector. Improvements in efficiency over time will have important benefits in terms of reducing charges to customers, reducing the subsidy requirements of the sector, and increasing the value of the companies.

While any of the approaches discussed in Section 5.2.2 for the assessment of opex can help achieve the above objectives, a number of factors need to be considered in selecting the approach for this price controls review.

The bottom-up approach requires the identification of suitable comparators from elsewhere in the country or overseas and is highly data intensive. Further, this approach may involve the regulator in the “second-guessing” of detailed operational decisions which are often best left to the management of the company.

Nevertheless, the Bureau will wish during the course of the review to undertake investigation of certain cost components which are particularly significant or which give cause for concern. Such components may include fault repairs, vehicle costs, staff costs, and general overhead expenses.

The difficulty of identifying suitable comparators also applies to the top-down benchmarking approaches. For example, the most suitable comparators would be similar companies elsewhere in the region, but there is virtually no publicly available data about such companies.

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Notwithstanding the above, the Bureau presently favours placing most emphasis on a top-down approach to projecting future opex which uses appropriate costs levels as the base level and provides strong incentives for efficiency improvement from this starting point. It is to be determined whether the base level can be the actual outturn cost levels for the latest year prior to the next control period (2b above) or the cost levels projected at the last price control review for the last year of the present control period (2c above), or perhaps some combination of the two. This will be assessed once the Bureau is in receipt of and has assessed the required data from the companies. Where companies have not responded adequately to efficiency incentives included in the PC2 controls, the Bureau will be reluctant to fully reflect this in higher opex allowances in the PC3 period than those the Bureau considers should have been achievable.

The Bureau would also welcome the results of any benchmarking analysis undertaken by the companies, either at the level of the business/company as a whole or for individual components of cost. For example, TRANSCO is a member of a group of electricity transmission companies which undergoes a regular benchmarking exercise, which the Bureau understands has also now been extended to its water business. The company would need to make a case on how the results of its benchmarking analysis can be used at this review. The Bureau would also expect to receive the results of benchmarking analysis that the Bureau understands has been commissioned by the distribution companies.

Furthermore, the Bureau will keep under review the possibility of undertaking more detailed analysis of individual components of opex to inform its overall assessment.

5.2.4 *Application of Top-Down Approach*

Assuming a top-down approach is used to inform the efficiency assessment, a number of issues would need consideration:

- **Base Level of Opex:** In the case of approach 2(b) (“top-down approach – actual outturn costs with efficiency assumptions”), audited accounts for 2004 are due to be received from the companies by 30 June 2005, prior to the scheduled issue of Final Proposals in August 2004. The Bureau’s preferred methodology would therefore be to use the audited level of opex in 2004 as the base level of opex. However, if audited 2004 data is not available before the Final Proposals are due to be published, the Bureau would use other suitable data (e.g., the latest year for which audited data is available) to determine the base level of opex for the next price controls.

In the case of approach 2(c) (“top-down approach – extending previous projections with efficiency assumptions”), the Bureau could use the opex projected for 2005 at the last reviews, converted to 2006 prices, as the base level of opex for the PC3 controls.²⁴ **Table 5.1** below shows the projections for opex for 2005 (in 2003 prices) made at the last price control reviews:

²⁴ These projections may need to be allocated to separate businesses if the PC3 controls are to be split for ADWEC and distribution companies.

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Table 5.1: Operating Expenditure Allowances at Previous Price Control Reviews

AED m, 2003 prices	2003	2004	2005
ADWEC (1)	9.798	9.798	9.798
TRANSCO Electricity	96.809	96.809	96.809
TRANSCO Water	93.255	93.255	93.255
ADDC Electricity	196.367	196.367	196.367
ADDC Water	122.575	122.575	122.575
AADC Electricity	100.117	100.117	100.117
AADC Water	93.097	93.097	93.097
RASCO Electricity (2)	-	33.950	32.860
RASCO Water (2)	-	87.880	82.340

Note (1): ADWEC's opex includes capital expenditure and depreciation

Note (2): RASCO costs are in 2004 prices and exclude fuel costs

- **Adjustment for Demand Increases:** In Abu Dhabi, water and electricity demands have been typically growing by 5 – 10 % a year. It is therefore necessary to make adjustments to the base level of opex to reflect increased opex associated with meeting increases in demand.²⁵ However, since a proportion of opex is fixed in nature, or only semi-variable, opex can be expected to increase at a slower rate than demand. The effect of such “economies of scale” is to lead to reductions in unit opex in industries where demand is expanding, even if there is no underlying improvement in the efficiency of operations.

At the 2002 price control review, the Bureau assumed that the anticipated demand growth for the sector of about 10% a year would lead to an increase in opex of about 5 % a year, all else equal. This was based on evidence from the academic literature and other regulators which suggested that, in capital-intensive industries, each 1% a year increase in demand could be expected to lead to an increase in opex of about 0.5% a year.

The Bureau would welcome the views of the respondents on the appropriate assumption for opex increases due to demand growth.

- **Adjustment for Efficiency Improvement:** It is also necessary to take account of the assumed efficiency improvement over the duration of the PC3 controls. At the 2002 price controls review, the Bureau presented evidence which demonstrated that efficiency improvements of 3 – 7 per cent a year seemed a reasonable expectation for PC2 in the light of the efficiency improvements made by similar firms in comparable circumstances. On this basis, the Bureau adopted an opex efficiency improvement of 5% a year. The evidence supporting this is reproduced in **Table 5.2**:

²⁵ Opex projections should also be adjusted to finance anticipated improvements in service quality. However, the Bureau has adopted an approach whereby such costs are financed via the incentives incorporated into the Performance Incentive Scheme (PIS) – see Section 8 of this document.

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Table 5.2: Annual Real Unit Operating Cost Reductions in UK Utilities Since Privatisation

	1992	1993	1994	1995	1996	1997	1998	CAGR
Water	-	-	-1.0	-3.1	-4.4	-4.5	-4.1	-3.7
Electricity transmission	15.6	-6.1	-15.0	-14.4	-7.0	-6.4	-11.1	-6.5
Electricity distribution	-3.3	-1.5	1.8	-5.8	-12.5	-14.4	-8.9	-6.8

Source: Adapted from ORR (1999) The Periodic Review of Railtrack's Access Charges: Provisional Conclusions on Revenue Requirement.

Notes CAGR denotes Compound Annual Growth Rate.

These improvements in the UK were calculated after taking account of the effect on costs of changes in output levels and in the level of service quality, and so could be taken to represent “underlying” efficiency improvements.

Since then, this research has been updated by several UK regulators (e.g. Ofgem, Ofwat and ORR) in their most recent price reviews (2003, 2004). This latest evidence will be analysed by the Bureau in the course of this review so that the Bureau can update its opex efficiency improvement assumption in view of recent experience and research.

The Bureau will also attempt to analyse the efficiency improvements made by the Abu Dhabi companies over the PC2 period. In other regulatory environments, efficiency assumptions in price limits have tended to reduce over time as companies have responded to the incentives provided by the price controls, reducing the scope for future improvements. There is little evidence of this effect yet in Abu Dhabi. On the contrary, there may be a case for finding means to further strengthen the efficiency incentives.

The Bureau will also be interested in receiving details as to specific efficiency initiatives that have been taken by the companies during PC2 or which they plan to undertake during PC3.

- **Further Adjustments:** The Bureau also needs to consider any further adjustments for other factors not adequately dealt with by the above methodology. These include:
 - One possible factor affecting future levels of opex is the **degree of capital intensity of each business**. In most network businesses, one would expect an ongoing substitution of capital for operating costs. New equipment sometimes reduces the number of people who need to be employed, whether in production or administrative tasks. It may also allow materials to be used more economically. As a result, the stock of capital tends to increase in relation to other inputs, and opex tends to reduce more rapidly (or increase less rapidly) than costs overall. No adjustment was made for capital substitution effects at the last reviews.
 - Another possible adjustment to opex projections is for the **effect of real input prices** on a firm's costs. Adjustments to opex projections would be required where increases or decreases in real input prices faced by the sector companies are expected (i.e., other than movements reflected in the changes in the UAE CPI already accounted for in the CPI-X indexation formula). In principle, such an adjustment could be upwards or downwards (depending on whether real input

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prices were expected to rise or fall). No adjustment was made at the 2002 price control review since none of the companies presented the Bureau with convincing evidence for any such movements.

In addition, certain costs may be argued to be outside the direct control of the companies. It may be necessary to consider alternative treatment of such costs. For example, the Bureau believes that costs such as a corporate income tax (which is not presently imposed in Abu Dhabi) imposed during a control period after the new controls are set would truly be beyond the control of a company. The Bureau would welcome companies' views on costs which are genuinely outside the companies' control.

However, even if costs are identified as being outside companies' control, it does not mean that pass-through of such costs is the appropriate regulatory treatment. Pass-through would require separate, audited data relating to the costs in question to be recorded. In view of the companies' performance to date in providing audited information on a timely basis, this may not be realistic. A better alternative may be to make due allowance for such prospective costs when setting the price controls, or to exclude such costs from the controls and make an appropriate adjustment for any outturn costs at the subsequent price control review.

5.3 Defining "Operating Expenditure"

As mentioned earlier, the term "operating expenditure", or "opex", is generally used in this document to refer to all operating costs excluding depreciation. However, there are two exceptions to this:

1. ADWEC has few capital assets and to the extent that it has invested (or plans investment) in IT and communications, and in furniture and fittings, the capital costs (both capex and depreciation) are proposed to be included in opex rather than capex for the purposes of price control calculations. This is consistent with the approach used to date in setting price controls for ADWEC. A similar approach may also be considered for the supply businesses of ADDC/AADC (assuming separate controls for distribution and supply) if the projected capital investment of the supply businesses is not significant.
2. For RASCO, the cost of fuel used for electricity generation and water production make a significant part of its total operating costs. Therefore, careful consideration is required to assess fuel costs and to incentivise RASCO to improve its fuel efficiency. Accordingly, these costs are treated separately to other operating expenditures and are discussed later in this section.

Further, based on the arguments made for the scope of the price controls in Section 3.6, all opex relating to the licensed activities, including activities indirectly related to licensed activities, will be accounted for in the opex projections for the relevant businesses. It is proposed that the only exclusion will be opex related to unlicensed activities for which the company has received the Bureau's consents. This will also be reflected in the definition of "regulated revenue" used for monitoring compliance with the price control.

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5.4 Possible “Rolling” Incentive Adjustment

In CPI-X regulation, companies have incentives to reduce actual opex below the levels of opex assumed by the regulator in setting the price controls, and hence to earn additional profits (at least until the next price control review). At the next price control review, such opex efficiency is usually transferred to customers by the regulator re-setting opex projections for the future by reference to the recently achieved levels of opex.

However, the effect of this is that the companies can retain the benefits of opex efficiency for varying periods depending on the time within the price control period at which such improvement were made. For example, for a control period of 5 years, benefits achieved in the first year are retained by the companies for four years, benefits of the second year are retained for three years, and so on.

To address this concern, some regulators have proposed or employed an approach whereby the efficiency benefits achieved in one control period are retained by companies for a “rolling” period of fixed duration. The purpose of such a rolling scheme is to ensure consistency of incentives within and between price control periods.

With a rolling scheme, benefits for each year of the control period can be allowed to be retained by the companies for the same fixed period, say 5 years. The objective is to enable companies to retain the benefit of lower than expected opex for a fixed period, irrespective of whether lower opex occurred early or late in the price control period. Some regulators have applied this rolling approach to both opex and capex (in view of the potential trade-off between the two) by using a rolling allowance for opex and a rolling RAV for the capital costs. In order to provide complete consistency of incentives between opex and capex and to avoid undue variations in price limits (both within and between the price control periods), some researchers have even proposed a “regulatory reserve” (which is used as a “store” for efficiency out-performance to be returned to customers progressively over a relatively long period similar to a time profile used for depreciation of network assets or investments).²⁶

Such an approach could have benefits in Abu Dhabi, by ensuring consistency of efficiency incentives over time. However, given the complexity of the approach it may be premature to introduce it at this review. The Bureau would welcome the views of respondents on this point.

5.5 RASCO’s Fuel Costs

As discussed in Section 4 of this document, RASCO’s price controls for 2004-2005 are based on the following basic formula for its maximum allowed revenue (MAR) in any year ‘t’:

$$MAR_t = a_t + (b_t \times \text{Revenue Driver}_t) + F_t + Q_t - K_t$$

Components involving ‘a’ and ‘b’ of the MAR are subject to CPI-X regulation and are discussed in other sections of this document, but the allowed fuel costs “F” are subject to a different form of regulation.

²⁶ See “Rolling Schemes in Price Control Reviews”, Europe Economics, 10 June 2003 for more details.

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Fuel costs make up to significant part of the total operating costs of RASCO. The 2003 price control review for RASCO showed that allowed fuel costs make up about 44% and 28% of total allowed revenue for RASCO's electricity and water businesses, respectively. Further, the unit fuel costs for RASCO's water and electricity are significantly higher than those of the distillers and generators selling water and electricity to ADWEC. Although there may be good reasons for this, the extent of the difference requires justification.

The Bureau therefore considered it important to establish incentives for RASCO to manage its fuel consumption more efficiently. The mechanism introduced for the present price controls for RASCO requires that the allowed fuel costs for any year 't' of the control period (2004-2005) are calculated by using the following formula, separately for water and electricity:

$$F_t = (W_A \times AF_t) + (W_B \times Z_t \times BUF)$$

Where:

AF_t = Actual fuel costs of RASCO for electricity or water in year t (AED)

Z_t = Quantity of electricity or water produced in year t (kWh or TIG) as defined below.

BUF = Benchmark unit fuel cost for electricity or water (fils/kWh or AED/TIG) as set by the Bureau based on expected levels of fuel consumption efficiency which could be achieved by RASCO over the control period.

W_A = Weight of the actual fuel costs of RASCO in year 't' in the allowed fuel costs. This weight will be the same for all the years of the control period.

W_B = Weight of the allowed fuel costs for RASCO in year 't' which should be based on the BST unit fuel cost benchmark. This weight will be the same for all the years of the control period.

This formula allows RASCO to recover a proportion (at the 2003 review: 95%) of its actual fuel costs and the remaining fuel costs are based on the benchmark fuel unit costs. This provides RASCO with the incentive to improve its fuel consumption efficiency and earn additional revenue if it reduces its unit fuel cost below the benchmarks. The above formula requires the Bureau to establish the values of the weights W_A and W_B and the benchmark unit fuel cost (BUF), separately for electricity generation and water production businesses of RASCO.

At the 2002 review, the data submissions on RASCO indicated that the average fuel unit costs for RASCO's electricity and water production were in the range of 22 – 31 fils/kWh and 11 – 13 AED/TIG, respectively. These unit costs were found to be significantly higher than the average BST unit fuel costs for any year and higher than any specific station in ADWEC's system. The Bureau recognized that there can be various obvious reasons for such higher fuel costs for RASCO, such as differences in fuel types, in plant locations, in technologies, and in plant loadings. The Bureau therefore set 20 fils/kWh and 8 AED/TIG as the benchmark unit fuel costs (BUFs) for RASCO's electricity and water price controls, respectively, for 2004-2005. These were significantly higher than the average BST unit fuel costs and other comparators and were

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intended to make allowances for the different operating environment for RASCO compared to the networked generators.

As part of this review and assuming continuation of the existing form of control for RASCO (see Sections 3 and 4), the Bureau intends to review the regulatory framework for RASCO's allowed fuel costs so as to provide stronger incentives for RASCO to reduce its fuel costs. The Bureau wishes to strengthen the incentive for RASCO, first, to recover its actual fuel costs as much as possible by approaching the benchmarks, and then to earn additional profits by going beyond the benchmarks. There are three options available to further strengthen the incentives for fuel efficiency:

1. Reduce the benchmark unit fuel costs (BUFs);
2. Increase the weight of the benchmark fuel costs (W_B) in the formula for allowed fuel costs – presently this weight is 5% for both water and electricity businesses; or
3. an appropriate combination of the above two options.

The values of benchmarks and weights are closely related to how the “Z” terms in the formula for allowed fuel costs are defined. The definitions of the ‘Z’ terms used for the 2004-2005 price controls are as follows:

“Z_t for Electricity: means the net quantity of electricity produced by, or on behalf of, RASCO in any year t (expressed in kWh) from any generator (whether continuous, emergency or standby) as metered or reasonably estimated; where net means net of any auxiliary or internal consumption of the generating plant or facility.”

“Z_t for Water: means the net quantity of water produced by, or on behalf of, RASCO in any year t (expressed in TIG) from any water production plant (excluding water well-fields and reverse osmosis distillers) as metered or reasonably estimated; where net means net of any auxiliary or internal consumption of the water production plant or facility.”

The Bureau would welcome the views of respondents on whether there is a need to review the above definitions, for example on whether the figures should be continued to be allowed to be “reasonably estimated” as an alternative to “metered”, or whether the Bureau should require that they must be metered.

5.6 Issues for Consultation

This Section 5 raises the following issues for consultation in relation to the PC3 controls:

1. The Bureau favours a “top-down” approach to the assessment of efficient levels of opex. With such an approach, what should be the base level of opex?
2. What role should benchmarking play in the assessment of opex efficiency?

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3. What is the scope for opex efficiency improvements over the PC3 period?
4. To what extent can opex be expected to vary with increases in demand over the PC3 period?
5. What other factors should be taken into account in assessing future opex requirements (e.g., capital substitution, movements in real input prices, one-off events)?
6. Should a 'rolling' scheme be introduced to allow companies to retain the benefits of out-performance of efficiency assumptions for a period of fixed duration?
7. How should the incentives for fuel efficiency for RASCO be improved?

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6 Treatment of Capital Expenditure and Asset Valuation

6.1 Introduction

The Bureau's approach to setting the PC3 controls will be based, broadly speaking, on setting the allowed revenues for each business to recover an efficient level of its costs – that is, operating expenditure (opex) and capital costs (depreciation plus a return on capital). Using the “building-block” approach discussed in Section 4.2 of this document, the annual revenue requirement for each business can be calculated as follows:

$$\text{Required Revenue} = \text{Operating Expenditure} + \text{Depreciation} + \text{Return on Assets}$$

This calculation over the next price control period requires the following:

- projections of opex over the next control period (discussed in Section 5 of this document);
- projections of depreciation over the control period; and
- projections of return on regulatory asset values (RAVs) which in turn require projections of RAVs at the start of the control period, capital expenditure (capex) for each year of the period and annual depreciation.

For capital-intensive industries, capital costs account for a significant proportion of overall costs and hence of charges to customers. For example, TRANSCO reported capex and net fixed assets of the order of AED 3 billion and AED 13 billion, respectively, in 2003. Compare these magnitudes with the sector overall turnover of about AED 6-7 billion in 2003. **Table 6.1** below presents the actual outturn data on capex, depreciation and fixed assets for 1999-2003 for TRANSCO, broken down into its electricity and water businesses. These magnitudes highlight the importance of the regulatory regime that should apply to the assessment and treatment of the capital costs at the price control review.

AED million, nominal prices	1999	2000	2001	2002	2003
Capex – Electricity	493	824	1,103	969	1,159
Capex – Water	124	133	205	651	1,967
Capex - Total	617	958	1,308	1,619	3,127
Depreciation – Electricity	150	166	200	242	264
Depreciation – Water	123	129	137	123	143
Depreciation - Total	273	295	336	366	407
Fixed Assets – Electricity	4,316	4,957	5,951	6,675	7,547
Fixed Assets – Water	2,852	2,806	2,890	3,397	5,213
Fixed Assets – Total	7,168	7,764	8,841	10,072	12,759

Source: TRANSCO's Audited Separate Business Accounts for 1999-2003

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This section discusses:

- The Bureau’s treatment of capex at the 1999, 2002 and 2003 (RASCO) price controls reviews;
- The Bureau’s ongoing efficiency review of capex undertaken over 1999 -2002 and 2003 – 2005, and the remuneration of such capex; and
- The treatment of future capex at the present price controls review.

6.2 Bureau’s Approach at 1999 Price Control Review

The PC1 controls were set in 1999 assuming no capex in the PC1 period for the three network companies (TRANSCO, ADDC and AADC). This was due to the unavailability of reliable projections at that time. It was then agreed that when setting the PC2 controls, the Bureau would take account of capex incurred during the PC1 period (along with its associated foregone financing costs), provided that capex carried out could be shown to be in accordance with the “efficiency criteria” established by the Bureau at the time of setting the PC1 controls. These criteria are that the expenditures:

- were required to meet growth in customer demand or the relevant security standards; and
- were efficiently procured.

Therefore, in essence, the assessment of, and remuneration for, *efficient* capex was deferred to the future price control review when audited data on actual outturn capex would be available. This is termed as an *ex post* approach – i.e., the assessment of efficient capex is made after the event.

Furthermore, in setting the PC1 controls, the opening asset value of TRANSCO at 1 January 1999 was reduced by 15%, following analysis by the Bureau which suggested that the accounting valuation of TRANSCO was over-stated in comparison with current costs of corresponding assets. Such an adjustment was necessary to ensure that TRANSCO’s allowed revenues reflected economic costs.

No adjustment to the opening asset values of the distribution companies was made when setting the PC1 controls, on the grounds that insufficient data was available at that time to justify such an adjustment.

As allowed capex was zero, the opening RAV was carried forward to each subsequent year of the PC1 period (i.e. 2000 onwards) by simply depreciating the opening RAV for the previous year by using the **straight-line** depreciation method and assuming an average asset life of **30 years**:

$$\text{Opening RAV for year } t = \text{Opening RAV for year } t-1 - \text{Depreciation for year } t-1$$

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6.3 Bureau's Approach at 2002 Price Control Review

6.3.1 Provisional Allowances for Past and Future Capex

At the 2002 review, the Bureau faced difficulties in accurately identifying the amount of capex actually undertaken by the companies over the PC1 period due to the lack of audited data for the period at that time. The Bureau was also concerned with the uncertainties associated with the companies' projections of future capex for the PC2 period. The Bureau therefore made provisional capex allowances for both the PC1 and the PC2 periods, as described below and deferred the assessment and full remuneration of efficient capex for both periods to the future:

- For TRANSCO and ADDC, for 1999 and 2000, 75% of draft audited 1999 and 2000 capex (split between water and electricity in the same proportion as unaudited capex reported by the companies in their information submissions) were taken as the provisional figures. For 2001-2005, the provisional figures were calculated as 75% of the unaudited or forecast capex (separately for water and electricity) provided in companies' information submissions.
- For AADC, the provisional capex allowances for all the years of the PC1 and PC2 periods were based on the reported levels of capex in 1999, which appeared to the Bureau to be the most reliable figures available for AADC at that time.

The resulting provisional capex allowances for the PC1 period (in 1999 prices) and for the PC2 period (in 2003 prices) which were included within the PC2 controls are reproduced in **Tables 6.2 and 6.3**, respectively:

AED million, 1999 prices	1999	2000	2001	2002
TRANSCO – Electricity	344.172	533.792	795.288	1,222.498
TRANSCO – Water	118.735	123.456	92.110	289.037
ADDC – Electricity	196.511	300.858	398.342	389.889
ADDC – Water	69.105	44.923	130.471	380.707
AADC – Electricity	188.675	188.675	188.675	188.675
AADC – Water	66.350	66.350	66.350	66.350

Source: Bureau

AED million, 2003 prices	2003	2004	2005
TRANSCO – Electricity	1,267.791	730.378	346.036
TRANSCO – Water	1,261.103	1,280.087	243.243
ADDC – Electricity	461.876	484.969	509.218
ADDC – Water	151.420	158.991	166.941
AADC – Electricity	205.796	205.796	205.796
AADC – Water	72.370	72.370	72.370

Source: Bureau

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This approach was thus in contrast to that adopted at the 1999 review when no allowance for future capex was included in setting the PC1 controls. This approach of allowing some provisional amounts of capex (for both past and future) was principally aimed at minimizing revenue volatility across price control periods, and was thus preferred to the alternative of continuing to allow zero capex pending the receipt of audited data.

6.3.2 Capex Assessment Deferred to the 2005 Review

It was agreed at the 2002 review that, once the Bureau receives a full set of audited data reporting capex for the period 1999 – 2002, the Bureau will undertake an efficiency audit to judge the extent to which the actual capex undertaken complied with the Bureau’s efficiency criteria. The actual capex undertaken over the period 2003-2005 will also be reviewed at a future price control review against the Bureau’s efficiency criteria. An adjustment – upwards or downwards – will then be made to the RAV at the 2005 (or subsequent) price controls review to appropriately remunerate the actual investments over 1999-2002 and 2003 – 2005 that can be shown to be consistent with the Bureau’s efficiency criteria. This upward or downward adjustment will also take account of the financing costs (at the cost of capital underlying the price controls) associated with any delay in including or excluding the expenditure concerned in the RAV.

Due to the absence of audited data, no judgment was made at the 2002 review regarding the efficiency or otherwise of capex undertaken by the companies over 1999-2002 or as to the appropriate level of capex over 2003 – 2005. This assessment was deferred to a later date, when improved information should be available. It was made clear that the levels of past and future capex and depreciation used in setting the PC2 controls were simply provisional and should not be taken as in any way indicative of the Bureau’s views of the appropriate level of capex and depreciation over the periods 1999-2002 and 2003-2005.

6.3.3 Projected RAVs for 2003-2005

As mentioned above, in setting the PC1 controls, the opening asset value (1999) of TRANSCO was reduced by 15%, following analysis by the Bureau, with no such adjustment for the distribution companies. At the 2002 review, the Bureau raised the question of whether these opening RAVs should be subject to any further adjustment. Following the analysis of responses, the Bureau concluded that it would not be appropriate to make any further adjustment to these opening RAVs for any network company.

The RAVs at the start of the PC1 period used in the previous price control calculations are summarized in **Table 6.4**, alongside their annual depreciation.

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Table 6.4: Initial (1 January 1999) RAVs

AED million , 1999 prices	RAV	Annual depreciation
TRANSCO – Electricity	2,907.1	115.1
TRANSCO – Water	2,053.2	113.6
ADDC – Electricity	2,939.2	131.0
ADDC – Water	845.6	57.1
AADC – Electricity	1,516.1	78.8
AADC – Water	129.3	3.9

Source: Bureau

Note: TRANSCO figures incorporate 15% reduction made at the 1999 price control review.

To calculate the regulatory asset values (RAVs) over 2003-2005 based on the provisional figures for past and future capex and associated depreciation, the Bureau employed the following steps:

- The opening RAVs for each network company at 1 January 2003 were calculated by rolling forward for provisional PC1 capex the initial (1 January 1999) RAVs . That is, opening RAV for each year of the PC1 period was adjusted upwards by the provisional capex for that year and downward by the depreciation on both opening RAV and provisional capex for that year to derive the opening RAV for the next year. All these calculations were carried out in 1999 price terms.

Opening RAV for year **t** = Opening RAV for year **t-1** + Provisional Capex for year **t-1** - Depreciation in year **t-1** on Opening RAV and on Provisional Capex for year **t-1**

- To this opening RAV at 1 January 2003 was added the net present value (at 1 January 2003) of the financing costs foregone over the PC1 period associated with the provisional PC1 capex shown in **Table 6.2**. These foregone financing costs for each year of the PC1 period were calculated by adding the depreciation and return on capital foregone in relation to the provisional capex for that year.

Opening RAV for 2003 = Opening RAV for 2003 from previous step + NPV at 1 January 2003 of depreciation and return on capital for Provisional Capex for 1999-2002

- The resulting opening RAVs at 1 January 2003 were adjusted for 2003 prices and then rolled forward for 2003 - 2005 provisional capex (see **Table 6.3**) to derive RAVs for each year of the PC2 period.

Opening RAV for year **t** = Opening RAV for year **t-1** + Provisional Capex for year **t-1** - Depreciation in year **t-1** on Opening RAV and Provisional Capex for year **t-1**

The resultant opening RAVs (at 1 January each year) of the PC2 period in 2003 prices are summarized in **Table 6.5** (the opening RAV for 2006 also acts as the closing RAV for 2005).

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Table 6.5: 2002 Price Control Review - Opening RAVs for 2003 – 2006

AED m, 2003 prices	2003	2004	2005	2006
TRANSCO Electricity	6,150.55	7,149.01	7,585.72	7,626.55
TRANSCO Water	2,480.35	3,555.19	4,606.34	4,612.53
ADDC Electricity	4,180.40	4,440.40	4,707.32	4,981.52
ADDC Water	1,408.11	1,470.82	1,535.81	1,603.18
AADC Electricity	2,237.50	2,324.91	2,405.47	2,479.17
AADC Water	455.90	512.24	566.16	617.67

Source: Bureau

The depreciation associated with each of provisional capex assumptions and RAVs was, following consultation, estimated by assuming an overall average asset life of **30 years**, and **straight-line** depreciation.

6.4 2003 Price Control Review for RASCO

The main features of the approach adopted by the Bureau at the 2003 review for RASCO in relation to the asset valuation and treatment of capex are as follows:

- **Initial RAV.** In setting the price controls for RASCO’s electricity and water production businesses for 2004-2005, the Bureau undertook certain benchmarking analyses to compare the value of RASCO’s production assets with those of other generators and distillers of a comparable nature around the world, based on asset value per unit of net capacity. Based on these comparisons, the accounting values of RASCO production assets were not found to be overstated. The Bureau therefore decided to use the accounting asset values on 1 January 2004 as the opening RAVs for 2004, for both businesses.
- **Capex allowance.** In contrast to the price controls for network companies, the price controls for RASCO were set with firm (not provisional) allowances for future capex (2004-2005), with no further review. This is termed as an “*ex ante*” approach, i.e., assessment of the efficient level of capex was made before the event. If actual capex is less than projected, RASCO will retain any benefit for the duration of the price control period, before the actual capex and depreciation are incorporated into the RAV at this review. The projections for capex were made by applying projected demand or output growth rates to the opening RAVs. This approach resulted in an annual capex allowance of AED 5.329 million (equivalent to 3.54% of opening RAV for 2004) for the electricity business (largely reflecting growth in standby generation capacity), and zero capex for the water business. The Bureau did not consider it appropriate to subject the allowances to ex post review in view of the simplicity of the *ex ante* approach and since significant new assets were not expected to be introduced for RASCO given the forecast capacity and output growth over 2004-2005 and the growing networks of ADDC and AADC (which would gradually result in connecting the remote areas presently supplied by RASCO assets to the main networks).

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- **Depreciation.** Straight-line depreciation was assumed for both opening RAVs and new investment with an average asset life of 20 years, in view of the typical average life of production assets and of the depreciation policy adopted in RASCO’s draft audited accounts for 1999-2000.

The opening RAVs on 1 January 2004 were rolled forward with the capex allowances and depreciation for the relevant year (2004 or 2005) to establish the closing RAVs on 31 December 2004 and on 31 December 2005 (the latter also act as the opening RAVs for 2006). These RAVs are reproduced in **Table 6.6** below:

AED million in 2004 prices	2004	2005	2006
Electricity Generation	150.550	148.219	145.621
Water Production	344.570	327.342	310.113

6.5 Bureau’s Review of Past Capex at this Price Control Review

As explained earlier, the PC1 controls were set in 1999 without any allowance for capex to be undertaken by the network companies during the PC1 period (1999 – 2002). The assessment and remuneration of *efficient* capex incurred during the PC1 period was deferred to the future price controls reviews pending the availability of reliable (audited) information on such capex. In contrast, the PC2 controls were set in 2002 with *provisional* allowances for *efficient* capex undertaken during the PC1 period and to be undertaken during the PC2 period (2003-2005). Similar to PC1, the full assessment and remuneration of *efficient* capex for PC2 period was deferred to the future pending the availability of reliable information on such capex.

A review of capex for network companies (TRANSCO, ADDC and AADC) is therefore required to be carried out by the Bureau to assess how much of the capex undertaken during the PC1 and PC2 periods was in compliance with the efficiency criteria earlier established by the Bureau.²⁷ The outcome of such a review will determine the adjustment to the future revenue requirement at this price control review (or at the future price control review as discussed later in this section) for the difference between the provisional capex allowed at the 2002 review and the capex which is found to be *efficient*. Such an adjustment can be upward or downward depending on whether the efficient capex (as assessed) is greater or lower than the provisional capex (see Section 6.7 for full discussion of the precise adjustments required).

In 2004, the Bureau initiated a review of capex undertaken by the network companies during the PC1 period. The overall objective of the review is to assess the PC1 capex against the efficiency criteria established at the 1999 price control review; that is, whether the capex:

²⁷ No such review is required for ADWEC and RASCO. This is because ADWEC has insignificant capex which has already been allowed *ex ante* via the opex allowance in the PC1 and PC2 controls. Similarly, firm *ex ante* capex allowances for RASCO have been made at the 2003 review for its 2004-2005 price controls, without *ex post* review.

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- was required to meet growth in customer demand or the relevant security standards; and
- was efficiency procured.

The overall approach of this capex review is to review the processes undertaken by the companies in planning, procuring and managing capex projects and to assess a number of selected projects.

The initial indication is that the capex review will overall show a total amount of *efficient* capex for the PC1 period in excess of the *provisional* capex allowance made at the 2002 price control review and hence will result in a positive or upward adjustment to the revenue requirement at this price control review. **Table 6.7** shows the potential additional capex allowances for the past to be remunerated appropriately for TRANSCO (combined water and electricity) at this price control review, for a sample of different potential outcomes of the ongoing PC1 capex review:

Table 6.7: Possible Past Capex Allowances at this Review – Difference Scenarios for TRANSCO					
AED million, nominal prices	1999	2000	2001	2002	2003
Capex – Reported at 2002 Review	617	895	1,225	2,132	3,325
Capex – Provisional Allowance at 2002 Review	463	671	919	1,599	2,494
Capex – Actual Outturn (audited)	617	958	1,308	1,619	3,127
Difference between Provisional and Actual Capex	155	286	390	20	633
Possible Capex Adjustments at this Review					
If 100% of actual capex found <i>efficient</i>	155	286	390	20	633
If 90% of actual capex found <i>efficient</i>	92	191	258	-142	320
If 80% of actual capex found <i>efficient</i>	31	95	127	-304	8

Source: Bureau, TRANSCO's Audited Separate Business Accounts for 1999-2003 and earlier data

At this 2005 price control review, a view may also need to be taken on the capex incurred during the PC2 period (for which only a provisional allowance has, to date, been made). By the time of publication of the Final Proposals for PC3 in August 2005, audited data will be available for 2003 and 2004. The Bureau is therefore considering three options for assessing PC2 efficient capex at this price control review:

1. Separately review PC2 capex for those years in the PC2 period for which audited data is available at the time of finalizing the PC3 controls, and defer consideration of other years (2005 and maybe earlier year(s)) to the subsequent price control review in, roughly, 2009. Or:
2. Apply the PC1 capex assessment outcome to those years in PC2 period for which audited data is available at the time of finalizing the PC3 controls, and defer consideration of other years (2005 and maybe earlier year(s)) to the subsequent price control review in, roughly, 2009. Or:
3. Defer consideration of whole PC2 capex to the next (about 2009) price control review, when audited data for all years of the PC2 period will be available.

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The Bureau is also considering whether, in any case, the magnitude of water capex undertaken by TRANSCO during 2003 and 2004 requires separate assessment.

6.6 Treatment of Future Capex at this Review

6.6.1 Criteria for Assessing Regulatory Approaches

In addition to an assessment and remuneration of past capex, a decision has to be made at this price control review on the approach to the assessment and treatment of capex to be undertaken during the course of the PC3 period (2006 onwards).

For capital-intensive industries such as water and electricity networks, it is often difficult to determine upfront the amount of investment that will be required. Therefore, there is a need to put in place a clear regulatory regime that provides an environment within which investment can occur. There are a number of mechanisms that have been used by other regulators for the treatment of future capex. However, any regulatory framework for investment has to be assessed against a number of criteria, such as:

- incentives for efficiency;
- certainty / risk to companies or their investors;
- timing and accuracy requirements of the data; and
- complexity and administrative cost of implementation.

The incentives for efficiency or cost minimization are often considered to be the most important criterion for assessing any approach. However, information asymmetries (between the regulator and the regulated company) can make it difficult for the regulator to assess the efficiency of investment decisions. Therefore, the regulator's emphasis will usually be on regulation by incentives rather than micro-managing the projects. However, contradictory incentives may co-exist within a regulatory approach – i.e., incentives to over-invest and incentives to under-invest.

Incentives to over-invest are a consequence of the rate of return element of the framework and would result from:

- if the firm's expected return is greater than or equal to its true cost of capital; and
- if the regulator is expected to allow the assets created to be added to the RAV.

Under-investment may result if there is a perceived risk that the regulator will not fully remunerate expenditure. This can be overcome if the regulator develops a clear-cut methodology to allow the company to earn a fair return on investment that fully recovers efficiently-incurred costs.

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6.6.2 Assessment of Main Regulatory Approaches

The earlier sections highlighted two broad approaches to the assessment and treatment of future capex while setting the price controls:

1. **Ex Ante** approach which includes an allowance for a forecast of future capex within the price controls with no (or limited) review subsequently of actual capex incurred; and
2. **Ex Post** approach which includes no (or only some) allowance for the forecast of future capex in the price controls and then makes an ex-post adjustment at the subsequent price control review for the capex judged by the regulator to have been efficiently incurred.

The *ex post* approach has been used by the Bureau at the 1999 review (assuming no future capex) and at the 2002 review (with provisional allowances for future capex). The *ex ante* approach has been adopted at the 2003 review for RASCO.

Both approaches provide incentives for efficient capex but in different ways. The *ex ante* approach allows the companies to retain benefits (depreciation and return on capital) of any under-spend on capex until the next price control review when the RAVs used to set the next controls are adjusted for the actual outturn capex spent during the control period. The *ex post* approach provides incentives for companies to undertake efficient capex as any capex found by the regulator in the ex post assessment to be inefficient will be disallowed at the next review.

The *ex post* approach with no allowance for future capex may be regarded as more pragmatic in that it does not require an accurate forecast of future capex requirements – the situation that the Bureau faced at the previous reviews. Further, this approach being ex post can easily handle both anticipated and unanticipated investment. However, a number of issues can arise in relation to this approach:

- The companies can face a risk of some capex already incurred being disallowed by the regulator particularly if the efficiency criteria is not clearly defined by the regulator at the outset. On the other hand, this also incentivises them to ensure *efficiency* of the capex incurred.
- It may be difficult to make an accurate ex-post assessment of the efficiency of past capex. If a company has, for example, incurred less capex than was expected, this can either be because it has increased its efficiency more than was assumed (which is to be encouraged), or because it has failed to undertake necessary investments (which is undesirable). The two cases may be difficult to be distinguished in practice, at least in the short term. Similarly, it is difficult to distinguish between the efficiency gains due to company's efforts and those due to external factors outside the company's control (e.g., lower construction prices in the wider economy).
- While the companies are compensated in future for the foregone financing costs and depreciation from the time when an *efficient* capex was incurred until the time when such capex was allowed, the companies may face cash flow problems in financing its operations due to the delay in compensation of efficient capex.

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- The step changes in the prices or revenue requirement between the control periods (due to allowing capex ex post in the future period) are undesirable. This may also raise the issue of customers' equity, as future customers have to bear the burden of past capex.

Issues associated with the effective regulation of capex have arisen in a number of cases in UK regulation and elsewhere, and have yet to be resolved satisfactorily. In some cases where companies have under-spent against capex projections, relatively arbitrary judgments have been made by regulators to attribute this to improved efficiency, on one hand, or failure to invest in a way that jeopardises outputs, on the other. Continuing concerns on behalf of the regulators over this approach have led to an increased degree of annual monitoring of companies' capex programmes, and an increased regulatory burden for both the companies and the regulator.

An alternative approach which we would like to consider would be to include an allowance for future capex within the price controls, with no subsequent review of the expenditure actually incurred – that is an *ex ante* approach. This would remove the regulator from the need to make an ex post judgement as to whether past capex had been efficiently incurred. However, this approach may pose the following challenges:

- It would place greater emphasis on the accuracy of the allowed capex projections included in the price controls – they might, for example, be based on an average of the annual capex incurred in the previous period (with any necessary adjustments for efficiency improvement or for differences in growth of outputs or for large one-off schemes undertaken in the past or future).
- The regulator may need to employ consultants to assess the investment plans, which may be costly and become overly intrusive. The requirement for specialized engineering expertise for the regulator, both in-house and external consultants, is often higher with an ex ante approach than that for the ex post approach, as in the latter case the outturn capex provides the starting point for the assessment of efficient capex.
- It would also require careful incentivisation and/or monitoring of each company's outputs, to ensure that any cost savings compared to projections were not the result of a deteriorating quality of service rather than efficiency improvements.
- There can be unanticipated investments which cannot be forecast, say because they arise from a change in law (for example, environmental standards) or because of an unforeseen event or development (for example, a new development launched by the Government).

In practice, the ex ante approach may therefore also require an ex post assessment for certain factors such as for any unanticipated investment obligations, for under-spends against the allowed capex and for output performance. However, such a review could be structured to be much more limited in scope (limited to pre-defined circumstances) than is necessary with the present ex post approach to capex regulation.

At present, the Bureau therefore prefers to move towards an *ex ante* approach of assessment and treatment of future capex with minimal or limited *ex post* assessment and adjustment (discussed

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further below). This would in turn require the companies to submit robust projections of future capex and to demonstrate to the Bureau that:

- the projects underlying these projections are required to meet the demand or security standards; and
- the estimated costs are efficient.

As discussed in Section 3.4, the Bureau is presently minded to set the PC3 controls for a longer duration (say 4 years) than the present price controls. If adopted, a longer duration of PC3 controls would further increase the requirement for the Bureau to have more information on the companies' future capex and to undertake a more detailed review of future capex than previous reviews before it makes any firm or provisional capex allowances.

Nevertheless, the Bureau believes that, after six to seven years of sector restructuring and after two price control reviews, the companies should be able to make robust plans for their capital projects over a medium term period. TRANSCO already incorporates most of its projects in its five-year planning statement. Distribution companies also have plans to develop similar planning statements. The costs for those projects which have already been tendered may be readily available whereas the costs for other planned projects can be estimated on the basis of recently achieved prices. The introduction of the Performance Incentive Scheme (PIS) at the last review, and its retention and further enhancement at this review, means that the sector should also be able to move more towards output-based regulation – a requirement for the *ex ante* approach.

The *ex ante* approach also requires the Bureau to assess the future capex plans submitted by the companies at this price control review before allowing them to be included in the price control calculations. Such an assessment could be carried out along similar lines to the Bureau's ongoing review of past capex – that is, review of the processes and sample projects.

It seems appropriate that an *ex ante* approach would need to be supplemented by *ex post* assessments in certain pre-specified areas. However, such an *ex post* assessment and adjustment should be limited in scope - in contrast to the *ex post* approach used by the Bureau to date. For example, any *ex post* assessment and adjustment for an *ex ante* approach could be limited to the following cases:

- if there is an under-spending compared to the *ex ante* capex plan allowed in the PC3 controls, and if the company can demonstrate that such under-spending was the result of efficiency gains of the company, the company will be allowed to retain these efficiency gains during the PC3 control period (but its RAV will be adjusted downward at the next price control review to exclude the under-spent capex);
- if there is an under-spending compared to the *ex ante* capex plan allowed in the PC3 controls, but if the company cannot demonstrate such under-spending was the result of efficiency gains of the company (i.e., if it cannot demonstrate the planned outputs were achieved but for a lower cost), the company's RAV will be adjusted downward at the next price control review to exclude both the under-spent capex and an appropriate

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proportion of the benefits the company received in respect of the under-spent capex accrued by virtue of inclusion of such capex in the PC3 controls;

- if there is an over-spending compared to the *ex ante* capex plan allowed in the PC3 controls, and if the company can demonstrate that such over-spending was the result of an external factor (such as the passage of an environmental legislation) and was efficiently procured, at the next price control review the company will be allowed to recover the foregone financing costs of this over-spending (and its RAV will be adjusted upward to include the over-spent capex); and
- if there is an over-spending compared to the *ex ante* capex plan allowed in the PC3 controls, but the company cannot demonstrate that some or all of such over-spending was the result of an external factor or that it was efficiently procured, at the next price control review the company will not be allowed to recover the foregone financing costs of this over-spending and its RAV will not be adjusted upward to include the over-spent capex.

It thus follows that a detailed ex post review by the Bureau will only be required if the company is unable to demonstrate that any significant underspend is due to efficiency improvements or that any significant overspend is due to additional investment obligations.

There might be a need to specify at this review a materiality threshold (e.g., 10%) for any under-spend or over-spend which will trigger the above review / adjustments at the next price control review. However, even when actual capex spend is within the materiality threshold, it is necessary to confirm that the outputs/schemes assumed in setting the controls have been delivered.

The Bureau would welcome respondents' views on all of the issues covered in this section.

6.7 Updating of Regulatory Asset Values (RAVs)

The Bureau intends to employ an approach to updating the RAVs for the next control period similar to the one used at the previous reviews. Broadly this will involve the following steps:

1. The opening RAVs for each network company at 1 January 2006 will be calculated from the closing RAVs at 31 December 2005 as used in setting the PC3 controls by (a) adding the difference between the *efficient* capex for PC1 period (as determined by the ongoing review of PC1 capex) and the *provisional* capex for PC1 period allowed at the 2002 review, and (b) subtracting the difference between the depreciation on *efficient* capex for PC1 period and the depreciation on *provisional* capex for PC1 period allowed at the 2002 review. A similar adjustment would also be required for PC2 capex to the extent the Bureau's review of PC2 capex efficiency is completed.

For RASCO, the closing RAVs at 31 December 2005 as used in setting the 2004-2005 price controls will be used as the opening RAVs at 1 January 2006, unless actual capex is less than the projected capex (in which case the RAVs at 1 January 2006 will be adjusted to reflect the actual capex and depreciation).

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2. To the opening RAVs at 1 January 2006 calculated in the previous step, the net present value of the foregone financing costs (both return on capital and depreciation) associated with the difference between the *efficient* capex for PC1 period and the *provisional* capex for PC1 period will be added. (Alternatively, these foregone costs may be spread over the PC3 control period only by treating them, effectively, similar to future opex within the price control calculations. However, such an approach may result in significant price variation from the PC2 period to the PC3 period.)

A similar adjustment would also be required for PC2 capex to the extent the Bureau's review of PC2 capex efficiency is completed.

No such adjustment is required for RASCO as it was allowed capex on *ex ante* basis at the last review.

3. The resulting opening RAVs at 1 January 2006 will then be rolled forward for future capex allowances (net of depreciation) to derive the RAVs for each year of the PC3 period.

All the above calculations will be converted into 2006 prices.

If separate price controls are introduced for distribution and supply, a suitable method for allocating the distribution companies' RAVs between their separate businesses will need to be identified.

6.8 Issues for Consultation

This Section 6 raises a number of important issues for consultation in relation to the treatment of past and future capex in the PC3 controls:

1. Do you agree with how the Bureau proposes to apply the results of the PC1 capex review?
2. Should the assessment of PC2 capex be undertaken at this price control review for those PC2 years for which audited data becomes available or deferred completely to the next price control review (when audited data for all PC2 years will be available)?
3. To the extent that PC2 capex is assessed at this price control review, can the findings of PC1 capex review also be applied to PC2 capex or should PC2 capex be reviewed separately?
4. The Bureau wishes to, if possible, adopt more of an *ex ante* approach to the regulation of PC3 capex. How can the scope of any *ex post* review of capex at the next price review be limited?

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7 Cost of Capital and Profit Margin

7.1 Introduction

This section discusses the overall approach to the calculation of the cost of capital for network businesses. In normal circumstances a business must seek to make a return on the capital that is actively employed by the business that is at least equal to its cost of capital. The Bureau's cost of capital calculations draw on estimates of the cost of capital of similar businesses in other countries such as the UK, USA, and Australia. The Bureau however intends to cross-check these estimates against the information available on various components of the cost of capital from local and regional capital markets in order to capture any particular factors that may be specific to the Abu Dhabi businesses.

In contrast to the network businesses, ADWEC and, to some extent, the supply businesses of distribution companies have few capital assets but are exposed to risks associated with large financial flows. Therefore, the application of a cost of capital to an asset value may not be the best means of estimating the allowed returns for these businesses. This section therefore discusses the Bureau's intention to, as at the last review, express ADWEC's allowed return in the form of a margin on its turnover although still based on the cost of capital estimated for network businesses. A similar approach may be considered for the supply businesses of ADDC / AADC.

Similarly, the Bureau expects to apply a similar cost of capital to RASCO as to other businesses since RASCO enjoys similar monopoly status in its geographical areas and faces similar risks as the other monopoly businesses.

7.2 Approach to Cost of Capital Calculations for Network Businesses

7.2.1 Overall Approach

Most companies will usually be financed by a mixture of debt and equity. The cost of capital is therefore usually calculated as a weighted-average of the cost of debt finance and the cost of equity finance, known as the weighted average cost of capital (WACC), as follows:

$$\text{WACC} = [\text{Cost of Equity} \times \text{Proportion of Equity}] + [\text{Cost of Debt} \times \text{Proportion of Debt}]$$

As well as providing a return on debt and equity, companies must also finance their tax liabilities (where applicable) and the cost of capital is adjusted, when necessary, to allow for taxation. Since in the UAE there are no business or personal taxes, the pre-tax and post-tax rates of return are equal. In jurisdictions where taxation is applicable, investors are concerned with the return they receive after the deduction of taxes (i.e., the post tax cost of capital). It is therefore the post-tax cost of capital that provides the relevant comparison from other countries.²⁸

²⁸ Regulators vary in whether they use a pre-tax cost of capital or a post-tax cost of capital or some variant of the two. For example, Ofwat uses a post-tax cost of capital whereas Ofgem presently uses a "vanilla" cost of capital (which is a combination of pre-tax and post-tax costs of capital). The objective is to be consistent when performing the price control calculations. If a post-tax cost of capital is used, the tax payments the company is expected to make must be included as part of the costs it is allowed to recover.

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The cost of capital calculation therefore requires estimation of the **cost of debt**, the **cost of equity**, and the **gearing** (the ratio of debt to the sum of debt and equity), which are discussed below in turn.

Further, since the price control calculations are carried out by the Bureau in real terms, the Bureau uses a real post-tax cost of capital, calculated as follows:

$$\text{Real Post-Tax WACC} = [\text{Real Cost of Equity} \times (1 - \text{Gearing})] + [\text{Real Cost of Debt} \times \text{Gearing} \times (1 - \text{Tax Rate})]$$

Price controls are forward-looking and so regulators and researchers often prefer cost of capital calculations on a forward-looking basis rather than simply based on historical data. However, historical data are often used to set forward-looking estimates of future cost of capital components if there is an absence of reliable alternative sources.

7.2.2 Gearing

A business is usually financed partly by shareholders' equity and lenders' debt. The cost of capital that a firm faces represents the return investors expect from investing in a firm with a specific set of risks. The risks that an investor in a company faces are influenced by the ratio of debt versus equity that comprises the capital structure of the company. There are two main advantages of debt financing which should be taken into account while deciding the capital structure or gearing of a business:

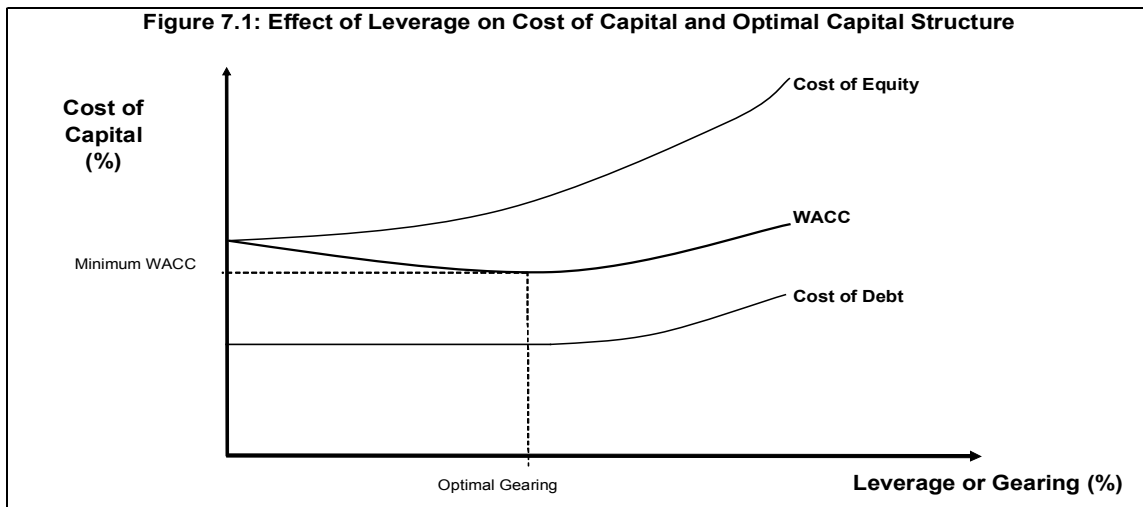
- Debt, by virtue of the fact that it has a higher priority on claims in the event that a firm goes into bankruptcy, implies a lower risk for lenders than for equity holders.
- Interest payments, unlike dividends for equity holders, are normally a tax deductible expense for a company. While not presently applicable in Abu Dhabi, in jurisdictions where corporate taxation applies it is therefore possible to reduce the overall cost of capital by switching from equity to debt.

Higher gearing will increase the firm's equity cost (due to increased volatility of equity earnings) but over a certain range this will be more than compensated for by cheaper cost of debt finance. The simple stylized illustration in **Figure 7.1** shows the effect of gearing on the costs of equity and debt and thus on the overall cost of capital. This shows that as gearing increases, the cost of equity increases but this is more than offset by the 'cheaper' debt financing, resulting in a decreasing overall cost of capital or WACC. However, beyond a certain point, the WACC starts increasing as the increase in the cost of equity due the increasing gearing is no longer fully offset by the cheaper debt financing (in addition, the cost of debt also starts increasing due to increasing

The combination of the lower post-tax cost of capital and the higher costs should yield the same result as the higher pre-tax cost of capital, excluding tax payments from the company's costs. See *Resetting Price Controls for Privatized Utilities – A Manual for Regulators*, Richard Green and Martin Rodriguez Pardina, Economic Development Institute of the World Bank, 1999.

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default risk). The point of minimum WACC represents the optimal gearing or capital structure for the firm.²⁹



In line with the overall objective to set price controls based on efficient levels of costs, an optimal gearing (irrespective of the actual capital structure of the companies) is often assumed by regulators when assessing the cost of capital – thus giving incentives for companies to achieve an optimal gearing over the medium to long term.

7.2.3 Cost of Debt

The cost of debt is usually estimated by adding a suitable corporate debt premium to a risk-free rate. That is:

$$\text{Cost of Debt} = \text{Risk Free Rate} + \text{Debt Premium}$$

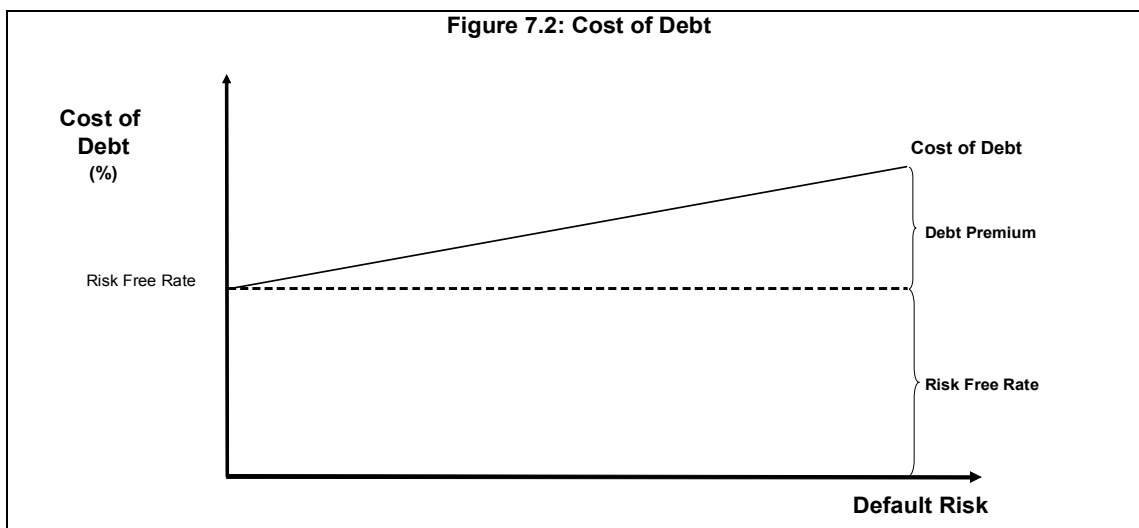
The **risk-free rate** represents the return available from a completely riskless form of investment; that is, one whose cashflows are fixed and that carries no (or very low) risk of default. Typically, bonds issued by the UK or US Governments are taken as the most suitable risk-free investment (as the risk of default for these governments is negligible). A suitable risk-free rate for Abu Dhabi needs to be identified. An advantage of using bonds issued by the UK and US Governments is that both issue index-linked securities; that is, bonds that, to all intents and purposes, guarantee a real rate of return unaffected by inflation. No such bonds are issued by the Government of Abu Dhabi or by the UAE Central Bank. A further issue is the maturity of the bond used to provide the risk-free rate. The yield on a medium- to long-term government bond is normally chosen to determine this parameter. These bonds have an advantage as a benchmark in that they reflect not only today’s short-term interest rate, but also future expected interest rates.

A corporate **debt premium** is added to the risk-free rate to estimate the cost of debt for businesses. This is because the risk-free rate is not an appropriate measure of the cost of debt for

²⁹ The classic “Modigliani-Miller” theory holds that gearing has no effect on the firm’s cost of capital. This theory assumes a perfect capital market where there are no taxes and other market frictions; however it has not been proved in the real world.

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businesses with uncertain cashflows and default risk. The debt premium measures the additional return required over and above the risk-free rate by a given business. The credit rating awarded to a business by an international credit rating agency such as Moody’s Investors Services and Standard & Poor’s is often helpful in determining an appropriate debt premium for a business. The lower the credit rating, the higher will be the default risk and hence the higher the debt premium. This is shown in **Figure 7.2** below:



In the absence of sufficient information on an appropriate debt premium for Abu Dhabi water and electricity businesses, the debt premium can be estimated by analyzing the yields that corporate bonds of similar businesses in the country or elsewhere with the same credit rating have produced over and above the risk-free rate.

Most of the overseas regulatory decisions generally assume regulated companies have an “investment grade” credit rating i.e. Moody’s Baa or higher. The Bureau’s cost of capital calculations to date have effectively treated Abu Dhabi companies as having the same debt rating as the UAE Government (Moody’s A2 country rating given to the UAE).

Whereas any company would normally require an additional premium over and above that of the government of the country in which it is based, the UAE’s country rating probably overstates the country risk of the Abu Dhabi Government whose financial position is significantly stronger than that of the rest of the UAE federation. The Bureau has in the past therefore regarded the UAE country rating as incorporating a premium over the cost of debt for the Abu Dhabi Government and hence as probably close to the credit rating that would be accorded to the Abu Dhabi companies (which are wholly owned by the Abu Dhabi Government).

7.2.4 Cost of Equity

The standard method to estimate cost of equity is the Capital Asset Pricing Model (CAPM). In principle, this model assumes that the return on any asset is equal to the risk-free rate of return, plus an equity risk premium to reflect that the returns to shareholders are much riskier.

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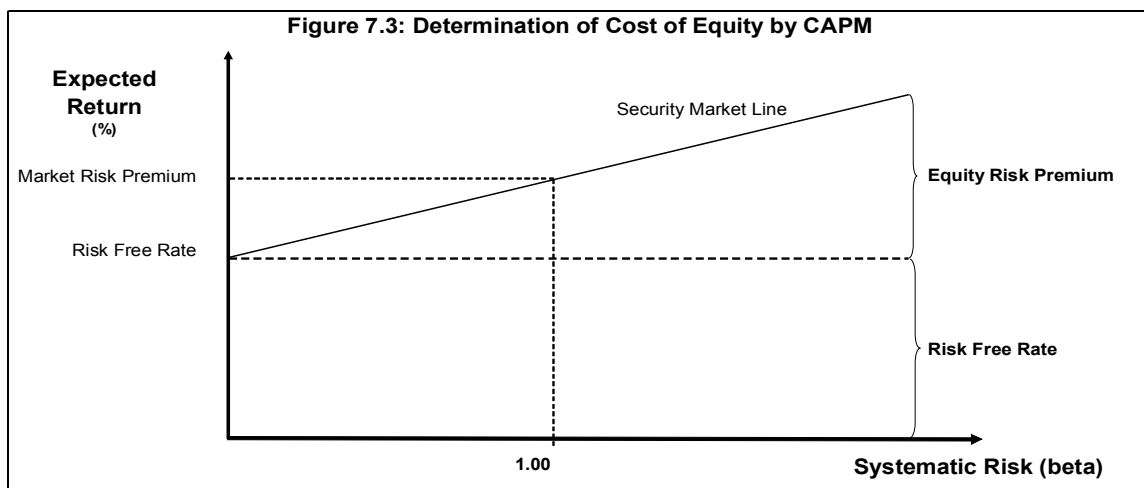
The CAPM assumes that the equity risk premium required for a business is proportional to its *beta* coefficient. The equity risk premium for a specific business is determined by multiplying the market risk premium by the beta for the business. That is:

$$\text{Cost of Equity} = \text{Risk Free Rate} + [\text{Equity Beta} \times \text{Market Risk Premium}]$$

The **market risk premium** is the extra return required on *average* for investment in equities (i.e. shares or stocks) compared to the risk-free rate. This effectively measures the risk premium for the market as a whole and is usually calculated for a stock market index which covers many companies of varying business nature.

The **equity beta** measures the riskiness of a given investment (buying shares of a specific business) relative to the average level of risk in the market. Note that the beta measures only *systematic* risks for a business (i.e. the risks which affect all the businesses, albeit to different degrees, such as inflation) since it is assumed that *non-systematic* risks (i.e. risks specific to a business) can be eliminated by investors through diversification.

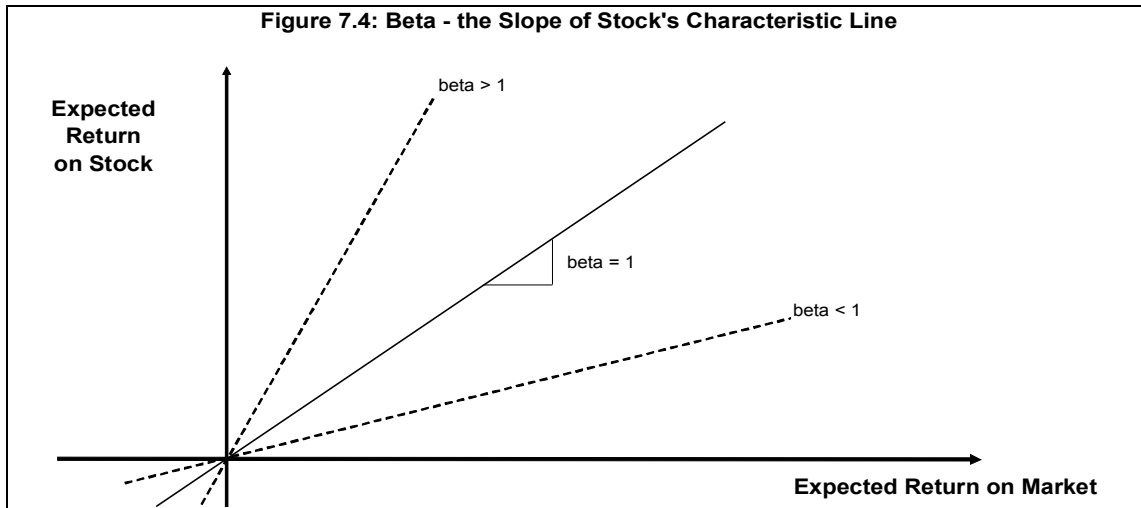
The CAPM is graphically illustrated in **Figure 7.3**:



A beta of one indicates that a company is perceived as having average risk; a lower figure suggests lower than average risk; and a higher figure indicates higher than average risk. Utilities are generally regarded as comparatively low risk investments (ie, a beta of less than one).

The beta coefficient for a specific company quantifies the sensitivity of the returns for the company to changes in the returns for the market as a whole. In academic terms, a stock's beta is the slope of the stock's "characteristic line" – that is, the regression line showing the relationship between expected returns on the market and the stock, as shown in **Figure 7.4** below:

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The beta is calculated as the ratio between (a) the covariance between the return on the company's share and the return on the market, and (b) the variance of return on the market. The choice of period, market index, and other details of measurement can produce a wide range of beta estimates. The principal areas of contention are: whether to include dividends to estimate returns; what should be the frequency of data (daily, weekly, monthly, annual); and whether to make a so-called "Bayesian adjustment" (to move the final beta towards the value of 1).³⁰ The most widely used method is to calculate beta from five-year monthly data (pioneered by the London Business School).

Further complications can arise if the regulated company is not quoted on a liquid stock market, or is only quoted as part of a much larger group, which may mean that the CAPM can not be used reliably. Even when it is applicable, calculations based on CAPM should still be supplemented with other information, such as the proportion of regulated business within the overall group of companies, and betas for other parts of the group.

Further, as mentioned earlier, to forecast the future cost of capital, all inputs to CAPM should in theory be ex ante (i.e., forward-looking), yet only ex post (historical) out-turn data are available. Regulators therefore often draw on a mixture of historical data and assumptions about the future in determining the cost of capital.

Finally, like any financial or economic theory, the CAPM has a number of underlying assumptions which in practice may not necessarily be observable.³¹ It is therefore considered appropriate to have a range of estimates by varying details of measurements.³²

³⁰ Numerous studies reach the conclusion that the betas tend to regress towards the market mean. In other words, high beta stocks tend to decline over time towards unity, while low beta stocks tend to increase towards unity over time. Because all the betas are estimated with some error, this means that high (low) estimated betas tend to be overestimated (underestimated). Therefore, some adjustment towards the market mean value of 1.0 may be appropriate.

³¹ CAPM assumptions include: only systematic risk is relevant as non-systematic risks can be eliminated by diversification by investors; all investors are wealth maximisers who choose among alternative portfolios based on expected returns and risks; all investors can borrow or lend an unlimited amount at a given risk-free rate; all investors have identical estimates of returns; all assets are perfectly divisible and

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The CAPM is the standard method to calculate the cost of equity used by regulators and investors around the world. However, there are alternative or complementary methods, such as Arbitrage Pricing Theory (APT) and the Dividend Growth Model (DGM):

- As with CAPM, APT assumes that only non-diversifiable risk is relevant in determining expected returns. However, there may be several non-diversifiable risk factors that are systematic or macroeconomic in nature and thus affect the returns of all stocks to some degree. Unlike CAPM, APT may specify returns as a linear function of more than a single factor. That is, according to APT:

$$\text{Expected return} = \text{risk free rate} + [b_1 \times f_1] + [b_2 \times f_2] + [b_3 \times f_3] + \dots + [b_n \times f_n]$$

Where ‘f_i’ is any factor ‘i’ and ‘b_i’ is the reaction or sensitivity coefficient for factor ‘i’.

However, APT faces several major hurdles in implementation, of which the most severe is that the APT does not identify the relevant factors beforehand, nor does it even identify how many factors should appear in the model. APT requires intensive data analysis in order for the researcher to identify the relevant factors and estimate their reaction coefficients.³³ Although the APT model is widely discussed in literature, practical usage to date has been limited.

- The DGM uses the expected annual dividend growth rate for a stock to estimate the rate of return on that stock. Using the simplest example of a constant dividend growth (g) forever, if D₀ is the most recent dividend paid per share and P₀ is the current share price, the expected or required return on equity according to DGM is:

$$\begin{aligned} \text{Expected return} &= \text{Expected dividend yield} + \text{Expected dividend growth} \\ &= [D_0 \times (1 + g) / P_0] + g \end{aligned}$$

The DGM methodology is based on the principle that investors are concerned with expected dividend payments and their present value. The major difficulty in applying the DGM is how to determine the forward-looking expected annual dividend growth rate. Some regulators have attempted to use DGM, but its use has been limited mainly to cross-check or supplement the CAPM results rather than as an alternative.³⁴

perfectly liquid; there are no transaction costs; there are no taxes; all investors are price takers’ and quantities of all assets are given and fixed. However, research work has shown that relaxing many of these assumptions has produced reasonable results for practical purposes.

³² “Setting the Right Cost of Capital”, The Utilities Journal, May 2004.

³³ Ross and Roll have identified five specific factors: 1) change in expected inflation; 2) unanticipated change in inflation; 3) unanticipated change in industrial production; 4) unanticipated change in the yield differential between low and high grade bonds (the default risk premium); and 5) unanticipated change in the yield differential between long-term and short-term bonds (the term structure of interest rates). See “An Empirical Investigation of the Arbitrage Pricing Theory”, Richard Roll and Stephen Ross, Journal of Finance, December 1980.

³⁴ For example, at the last two price reviews, the UK water regulator, Ofwat, assessed the cost of equity using the CAPM, supplemented by DGM. See “Setting the Right Cost of Capital”, The Utilities Journal, May 2004.

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In view of the unproven use of other techniques combined with the limitations of data for Abu Dhabi, the Bureau intends to continue to use the CAPM for its cost of capital calculations. The CAPM is well understood and widely used by the financial community, regulators and companies around the world. Further, betas and equity risk premiums for listed companies in developed markets are readily available.³⁵

7.3 Bureau's Cost of Capital Calculations at Previous Reviews

At the previous price control reviews, the Bureau used the Capital Asset Pricing Model (CAPM) to estimate the cost of equity to the Abu Dhabi businesses. The cost of debt was found by adding a suitable debt premium to a risk-free rate. For all these reviews (including RASCO), the Bureau estimated a cost of capital of 6% (real, post-tax).

In view of the lack of information on the cost of capital from the UAE capital markets to date, the Bureau's cost of capital calculations drew heavily on estimates of the cost of capital of network businesses in the UK, USA, and Australia. The Bureau's review of the component elements of the cost of capital calculations is described in detail in Annex E of the January 2001 Consultation Document for PC2 and is summarized in **Table 7.1** below:

	Low	High
Real Risk-free rate (%)	3	4
Debt premium (%)	1	2
Real Cost of debt	4	6
Real Risk-free rate (%)	3	4
Equity risk premium	3.5	5
Equity beta	0.6	0.8
Real Cost of equity	5.1	8
Debt proportion (%)	50	70
Real (Post-tax) WACC	4.55	6.6

On the basis of these estimates, the Bureau at the 2002 review initially proposed a real cost of capital for the second price control period in the range 4.55 – 6.6 % and finally used a cost of capital of 6% (real, post-tax). The Bureau also highlighted latest examples at that time where overseas regulators adopted estimates of the cost of capital towards the lower end of the Bureau's proposed range. These examples are reproduced in **Table 7.2** below and are all converted, where necessary, to real, post-tax terms to provide a suitable comparison. These examples demonstrated that the Bureau's decision for a cost of capital of 6% (real, post-tax) was towards the upper range of recent regulatory decisions elsewhere.

³⁵ For example, from London Business School (UK) and Ibbotson Associates (USA).

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S.No.	Regulatory Decision or Proposal	Post-Tax Real WACC
1	England and Wales PESs' Distribution Business: OFGEM's Final Proposals (December 1999)	4.5%
2	NSW Electricity Distributors, Australia: IPART determination (December 1999)	3.6 – 4.5%
3	TransGrid, Australia: <ul style="list-style-type: none"> • ACCC draft decision (May 1999) • TransGrid submission (June 1999) • ACCC final decision (January 2000) 	3.81% 4.40% 5.00%
4	NGC Transmission Asset Owner, UK: OFGEM draft and final proposals (September 2000) <i>(Final proposals were based on the high case.)</i>	3.86 - 4.37%
5	Electricity Distributors, Victoria (Australia): ORG price determination (September 2000)	5.82 - 5.90%
6	SMHEA, Australia: ACCC final decision (February 2001)	6.3%
7	Transco's Price Controls: OFGEM's Final Proposals (September 2001)	4.4%
8	Heathrow, Gatwick, Stansted and Manchester Airports' Price Caps: CAA Preliminary Proposals (November 2001)	4.7 – 6.0%
9	Queensland Transmission, Australia: <ul style="list-style-type: none"> • Powerlink's Proposal • ACCC's Draft Decision • ACCC's Final Decision (November 2001) 	5.41% 4.78% 4.68%
10	NIE Transmission and Distribution, Northern Ireland: OFREG initial proposals (March 2002) <i>(Final proposal was based slightly lower than the high case)</i>	4.05 - 4.74%
11	Dutch Electricity Network Companies, 2000	3.6%
12	ENEL, vertically integrated Electricity Sector, Italy, 2000	4.8%
13	Scottish and Southern Energy, distribution activities, 2000	4.6%
14	EDP, regulated activities, Portugal	5.0%

Source: "2002 Price Controls Review – Draft Proposals for PC2", Bureau, September 2002 contains specific references to overseas documents

Despite some evidence that the cost of capital might have fallen since 1999, the Bureau at the 2002 review retained its estimate of 6% for real post-tax cost of capital from the 1999 review. The Bureau adopted such an approach *inter alia* to ensure that companies have a strong incentive to invest to meet the forecast demand growth in the sector in good time and to ensure that companies remain able to finance their operations. Such a return also intended to accommodate any additional risks that may have been perceived by the companies as being associated with the strengthening of incentive mechanisms within the PC2 controls. Some companies argued for a higher cost of capital but were unable to provide any convincing supporting evidence.

7.4 Recent Overseas Regulatory Developments

Since 2002, a number of overseas' regulators have published further analyses of the cost of capital in their respective sectors. These will be reviewed by the Bureau in detail during the course of this review to assess their relevance to the estimation of the cost of capital to the Abu Dhabi companies. The Bureau's initial research is summarised in **Table 7.3** below:

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S.No.	Regulatory Decision or Proposal	Post-Tax Real WACC
1	England and Wales water and sewerage business: Ofwat's Draft Determinations (August 2004)	5.1%
2	England and Wales Electricity Distribution Businesses: OFGEM's Initial Proposals (June 2004)	4.6%
3	New South Wales (Australia) Electricity Distribution Businesses: IPART Final Report (June 2004)	3.6 – 4.6%
4	TransGrid (Australia) Electricity Transmission: ACCC Draft Decision (April 2004)	4.59%
5	EnergyAustralia (Australia) Electricity Transmission: ACCC Draft Decision (April 2004)	4.4%
6	BGE Gas Transmission, Distribution and Supply Businesses (Ireland): NERA Report for Commission for Energy Regulation (June 2003)	5.72%
7	Sydney Water Corporation (Australia): IPART (May 2003)	3.00 - 4.10%

Sources: Various as indicated in the table:

It can be seen that recent regulatory decisions from overseas suggest a real, post-tax cost of capital significantly less than the 6% presently allowed in Abu Dhabi. The very recent price control reviews undertaken by Ofwat and Ofgem for the water and electricity sectors respectively suggest a real, post-tax cost of capital closer to 5%, or less. Given a total RAV for the Abu Dhabi companies combined likely to be in excess of AED 20 billion over the PC3 period, and increasing thereafter, a 1 percentage point reduction in the cost of capital would save the sector at least AED 200 million per year and reduce the annual subsidy requirement by a corresponding amount.

The Bureau considers that the overseas calculations of the cost of capital may provide a useful insight for the Abu Dhabi water and electricity sector. This is because the regulatory regime developed for Abu Dhabi has drawn deliberately on best practice in the UK and elsewhere to minimize the level of unnecessary risk to which the businesses might be exposed. Therefore, the return required by water and electricity distribution businesses in Abu Dhabi may not be materially different from that required by comparable businesses in the UK, Australia, US and elsewhere.

7.5 Local Capital Markets – Position at 2002 Review

As discussed earlier, the Bureau's cost of capital calculations for the Abu Dhabi companies to date have been based on the estimates of the cost of capital of network businesses in the UK, USA, and Australia. Equity markets in these countries are well developed and are subject to robust regulation. Information issued to the markets by quoted companies must meet stringent standards of disclosure. Trading is active with high ratios of turnover and liquidity, and there is wide diversity in respect of sector coverage. These factors provide a degree of confidence that statistical analyses of information from these markets, such as those used in cost of capital calculations, are reliable.

In contrast, while there have been equity markets in the Middle East for some time, there were no official and regulated UAE stock markets until March 2000. In preparation for the 2002 price

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controls review, the Bureau compared indicators of the size and liquidity of the UAE market with other markets. This comparison showed that:

- The value of UAE trades in 1999 expressed as a percentage of annual GDP was a little under 2%. This was the lowest ratio of all Middle East markets in that year and was significantly below the ratios observed in the UK (92%), Australia (116%), and the USA (164%).
- In terms of market liquidity, the UAE turnover ratio (the value of shares traded as a percentage of average market capitalization) in 1999 was just over 3%, compared to 53% for the UK, 52% for Australia, and 106% for USA.
- The capitalisation of the UAE market in 1999 was just 55% of annual GDP, compared to 173% in the UK, 224% in Australia, and 154% in the US.

The coverage and liquidity of the UAE capital markets were therefore such that the Bureau was reluctant to reference its cost of capital calculations to them at the 2002 review. Nevertheless, data available to the Bureau at that time suggested that the costs of capital of IWPPs and oil and gas companies in the Emirate of Abu Dhabi (data being confidential in nature is not reported here) were consistent with the cost of capital used by the Bureau.

The Bureau was hopeful that, as the official UAE stock markets develop, they will provide information relevant to an assessment of the required cost of capital of the Abu Dhabi businesses. The Bureau therefore indicated it would continue to monitor the development of the official UAE markets and review the situation at this review.

7.6 Local Capital Markets – Development since 2002 Review

Since the 2002 price controls review, there have been a number of positive developments in the local and regional capital markets. Some examples of these developments are as follows:³⁶

- Abu Dhabi Securities Market (ADSM) and Dubai Financial Market (DFM), which were launched as the official stock exchanges in November 2000 and March 2000 respectively, along with the establishment of a regulatory authority, the Emirates Securities and Commodities Authority (ESCA), pursuant to Law No (4) of 2000, have witnessed increases in their size, liquidity and coverage increasing. For example:
 - The number of listed companies on ADSM increased from 15 by the end of 2001 to 24 by the end of 2002 (and to 33 in 2004). During the same period, the market capitalization of ADSM increased from AED 21.2 billion to AED 74.8 billion.

³⁶ These are based on various sources including ADSM and UAE’s annual reports, daily Gulf News, MEED magazine issues, National Bank of Abu Dhabi’s economic and financial bulletins, National Bank of Dubai’s economic reports, Economist Intelligence Unit’s UAE country reports, BMI’s UAE quarterly reports, Shua Capital’s Insight reports.

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- The UAE official bourse presently has 48 listed companies, including 33 in ADSM and 15 in DFM.³⁷ Further, there are at least 15 to 20 companies trading their shares “over the counter” (OTC) in unofficial markets.
- The market capitalization of UAE stocks (all active shares traded at ADSM, DFM and OTC) has increased from about AED 130.2 billion by end December 2002 to AED 231.9 billion by end June 2004 (equivalent to about US\$ 63 billion). The current market capitalization of the UAE market therefore stands at about 79% of the 2003 GDP.³⁸ With respect to market capitalization, the UAE official market is the third largest market in the GCC after Saudi Arabia and Kuwait.
- The value of traded shares in the UAE has increased from about AED 2 billion in 2001 to about AED 8 billion in 2003 and to AED 19.5 billion during the first half of 2004. This latter figure is equivalent to 6.65% of 2003 GDP, representing rapid growth in liquidity.³⁹ This represents a turnover ratio of about 8.4% (value traded as % of market capitalization) for a six-month period, which while an increase over previous years is still very low by international standards. The UAE lower turnover relative to other markets is due to a substantial part of the market being owned by the Government, a few large investors holding for the long term, and limited participation of foreign investors. Further, there are few mutual funds, no institutional investors such as pension funds, and few professional traders.
- The markets have seen a number of initial public offerings (IPOs), which were oversubscribed, such as Finance House, Amlak Finance, and Abu Dhabi Islamic Bank. Particularly, the year 2004 got off to a strong start with an IPO in January in Amlak Finance, a property finance subsidiary of Emaar Properties. The offer was open to foreign investors as well (though subject to certain limits) and was 30 times oversubscribed.
- While the unofficial or OTC market still exists, its size has been declining over time. Further, the Government and the ESCA have been pressing on UAE joint stock companies which are being traded on OTC to list their shares in the country’s official markets. The ESCA has been working on legislation that will make it compulsory for all UAE joint stock companies to list their shares on the official markets.
- The UAE Government has allowed citizens from the UAE’s five partners in the GCC to set up companies and own and trade shares of listed firms.

³⁷ In addition, there are two bonds (Emirates Airlines and Dubai government) and five mutual funds listed on DFM.

³⁸ On the basis of the UAE Ministry of Planning’s estimated GDP of AED 293.12 billion for 2003.

³⁹ This increased liquidity has moved the UAE stock market up to the third place in the GCC with respect to liquidity during the first half of 2004. Saudi Arabia with the total value of shares traded of AED785 billion tops the GCC markets, followed by Kuwait (AED 102 billion), UAE (AED 19.5 billion), Qatar (AED 15 billion), Oman and Bahrain. Out of AED 19.5 billion trading in the UAE, DFM accounted for AED 13.7 billion, ADSM for AED 5.5 billion and OTC for AED 0.3 billion. (Gulf News, 26 July 2004).

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- In May 2004, the ESCA has unified the display screen of ADSM and DFM which will save time and effort of investors to make investment decisions.
- A number of sovereign and corporate bonds have been issued in the region as well as in the UAE. Most of these are listed in the local / regional markets while some are listed in international markets. These bonds include those of Emirates Airline group (largest ever unrated Eurobond issue by an airline and the largest unsecured corporate bond issue in the Middle East), Emaar Properties, Emirates Bank, Mashreqbank, Bahrain Monetary Agency, Shuaa Capital, Omani Government and Dubai Government. Particularly, as part of debt refinancing for Taweelah A2 IWPP (Emirates CMS Power Company), Abu Dhabi Power Bond (containing both conventional and Islamic structured products) has been issued in mid 2004 to be listed in Luxembourg and perhaps on ADSM. These bonds will be analysed in detail by the Bureau in the course of this price control review to inform on the inputs to the cost of capital calculations.
- Efforts are also being made to establish Dubai International Financial Centre (DIFC) as the financial hub in the region and a globally recognized centre for institutional finance. The relevant regulatory authority, Dubai Financial Services Authority (DFSA), has been working on to develop an independent regulatory framework for DIFC.

The positive developments in the GCC financial markets are attributable to a number of factors, which include increase of oil prices, low returns in international markets, and a regional movement towards liberalization and transparency in the concerned companies.

The Bureau is aware that the above developments have led to certain research work on the cost of capital in the local / regional markets, for example, equity research for the IPOs and research reports on bond yields. Furthermore, the recently established Bahrain Telecommunications Regulatory Authority (TRA) has done some work to cross-check its cost of capital calculations for Bahrain Telecommunications Company (Batelco) drawn from overseas developed markets against the regional estimates.

The Bureau intends to undertake a thorough review of the available sources during the course of this price control review in order to gather information from local and regional capital markets on the cost of capital that can be used to cross-check its cost of capital calculations.

7.7 Profit Margin for Non-Network Businesses

As mentioned earlier, in contrast to the network companies, ADWEC and the supply businesses of the distribution companies have few capital assets but are exposed to risks associated with large financial flows. Therefore, the application of a cost of capital to an asset value may not be the best means of estimating the allowed returns for non-network businesses.

At the 2002 price controls review, the Bureau therefore expressed ADWEC's allowed return in the form of a margin on its maximum allowed revenue. This involved analyzing the risks to which ADWEC is exposed and which it cannot mitigate (or which it would be costly to mitigate).

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Broadly speaking, the Bureau adopted a methodology which calculates the amount of hypothetical capital that would be required by a standalone company exposed to ADWEC's risks, and then calculates the profit margin that would be consistent with the application of the cost of capital to this hypothetical capital base. Such an approach has been used in the UK to determine the appropriate profit margin for regulated energy trading businesses and may therefore also be appropriate for the supply businesses of ADDC and AADC if separate distribution and supply controls are adopted.

The following steps were involved in calculating an appropriate profit margin for ADWEC:

- Identify the risks to which ADWEC is exposed;
- Calculate ADWEC's potential exposure to these risks;
- Calculate the capital that would be required by a standalone company in order to "back" these risks;
- Apply the cost of capital to this hypothetical capital value; and
- Express the resulting return in the form of a margin on BST turnover.

Based on the "hypothetical" capital requirement estimated at AED 14.5 million and a cost of capital of 6%, this equated to a margin of about 0.025% on ADWEC's turnover (at the time) of AED 3 – 4 billion.

The Bureau proposes to adopt a similar methodology for ADWEC at this review. It is for consideration whether a similar approach should be introduced for the supply businesses of ADDC and AADC (if separate supply business controls are introduced).

7.8 Issues for Consultation

This Section 7 raises the following issues for consultation in relation to the PC3 controls:

1. The Bureau intends to continue to apply the CAPM approach to calculate the real, post-tax cost of capital.
2. The Bureau intends to draw upon estimates of the cost of capital for overseas companies similar to Abu Dhabi businesses with the same regulatory regime, and to cross-check these estimates against the information available from the local / regional capital markets to capture local risks.
3. Is it reasonable to assume the same cost of capital for RASCO as for the network companies?
4. Do you agree that the profit margin approach to calculate allowed return for ADWEC at the 2002 review remains appropriate at this review?
5. How should the rate of return for ADDC/AADC's supply businesses be calculated / applied?

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8 Performance Incentive Scheme

8.1 Introduction

In competitive markets, customers choose between services or products on the basis of quality as well as price. Customers in a regulated industry generally do not have this flexibility, creating a need for regulation of both prices and quality.

By effectively fixing revenues for a medium-term period (subject to changes in CPI and in the revenue drivers), the price controls of CPI-X form give companies an incentive to reduce costs. However, the CPI-X price controls do not by themselves provide sufficient incentives to companies to meet service standards or improve their output performance. Regulating prices without corresponding regulation of outputs runs the risk that companies will be able to increase profits at the expense of service quality.

There is therefore a clear trend worldwide towards incorporating service quality incentives into price controls. For example, there is increasing interest from the US regulators in the application of “Performance Based Regulation” (PBR) to factor in quality as well as price concerns. Similarly, the UK and Australian regulators have developed incentive schemes to reward or penalize companies via the CPI-X price controls for good or poor performance on various aspects of their operations and services.⁴⁰

Furthermore, one of the Bureau’s functions under Law No 2 of 1998 (Article 55) is to establish and enforce technical and performance standards. A number of the Bureau’s duties under the Law (Article 54) also require it to establish, monitor and enforce technical and performance standards.

The Bureau therefore introduced a Performance Incentive Scheme (PIS) at the last price controls reviews, linking important aspects of each company’s performance to its price controls. Companies are rewarded via the scheme for improved output performance and penalized for deteriorating output performance.

This section describes the features of the PIS that presently applies to the monopoly companies. While the Bureau intends to retain the overall regulatory framework of the present PIS for the PC3 controls, it is timely to review the operation of the scheme and, if necessary, modify certain aspects of the framework.

8.2 Main Features of the Current PIS

8.2.1 Performance Indicators

The 2002 price controls review identified the urgent need for a PIS for each monopoly company in the sector. The current PIS has two types of performance indicators:

⁴⁰ For more details on the need for, and examples of, performance incentive schemes, see “2002 Price Controls Review: Performance Incentive Scheme”, Bureau’s Discussion Paper, May 2002.

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- “**Category A**” performance indicators, which are incentivised on a year on year basis through a mechanistic annual financial adjustment to the company’s maximum allowed revenue (MAR) in the next year; and
- “**Category B**” performance indicators, which are monitored during the current control period. This is so that they can be ready for consideration as Category A indicators at this present price control review, and also for a possible ad hoc financial adjustment at this review for a poor or superior performance during the current control period.

For Category A indicators, the Bureau introduced a term “Q” in the MAR formula for each business at the last review, as discussed in Section 3 and 4 of this document. This term “Q” adjusts MAR upwards or downwards each year for performance during the preceding year against the set targets for Category A indicators.

For Category B indicators, any adjustment for good or poor performance will be made to future allowed revenues determined at this or subsequent price reviews.

8.2.2 Category A Performance Indicators

Two Category A indicators were introduced at the previous price controls reviews:

- **Audited Accounts Timeliness**; and
- **Audited Price Control Return (PCR) Timeliness**

In each case, there are separate indicators for the separate licensed businesses of all the monopoly companies. Each Category A indicator has been precisely defined along with a clear-cut target date and incentive rate. Other important features are as follows:

- Performance on both measures is assessed as the difference (in months) between the actual date of submission and the target date for submission to the Bureau of the relevant audited statement in the preceding year.
- While the licences set out the due dates for the submission of audited accounts and audited PCRs (30 June and 31 March, respectively), the target dates for the purposes of the PIS have been set on a “glide-path” basis, initially allowing the companies more time to submit these audited statements than required by the licence. These glide-path target dates have been structured so that by the end of the current price control period (i.e. by end 2005) the sector companies will not get a reward unless they comply with the due dates stated in the licences and will be penalised otherwise.
- Incentive rates have been defined as the amount expressed in AED per month of delay or earliness. The methodology for calculating the incentive rates, which were set proportional to the size of each business, is set out in detail in the consultation papers for PC2.

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The parameters of the scheme are set out in the Schedule Restriction Conditions Schedule of each company's licence (as modified following the last price controls reviews⁴¹). The target dates and incentive rates are reproduced in **Tables 8.1** and **8.2**, respectively:

S. No.	Performance Indicator	Formula Year	Performance Measure	Licence Target Date	Glide-Path Target Date for PIS
1	Audited Accounts Timeliness	2004	Audited accounts for: 2002	30-Jun-03	31-Dec-03
		2005	2003	30-Jun-04	30-Sep-04
		2006	2004	30-Jun-05	30-Jun-05
2	Audited Price Control Return (PCR) Timeliness	2004	Audited PCR for: 2002	31-Mar-03	30-Sep-03
		2005	2003	31-Mar-04	30-Jun-04
		2006	2004	31-Mar-05	31-Mar-05

Notes: 1) There are separate indicators for water and electricity businesses of all companies except for ADWEC; and 2) For RASCO, the "audited accounts timeliness" indicator applies only for formula year 2005 and onwards, and the "audited PCR timeliness" indicator applies only for formula year 2006 and onwards. "Formula Year" refers to the year in which the revenue adjustment via Q term will be applied.

Company / Business	Performance Indicator	Incentive Rate* (2003-2005)	
ADWEC	Audited Accounts	18,000	AED per month
	Audited PCR	18,000	AED per month
TRANSCO Electricity	Audited Accounts (Electricity)	1,335,000	AED per month
	Audited PCR (Electricity)	1,335,000	AED per month
TRANSCO Water	Audited Accounts (Water)	893,000	AED per month
	Audited PCR (Water)	893,000	AED per month
ADDC Electricity	Audited Accounts (Electricity)	1,136,000	AED per month
	Audited PCR (Electricity)	1,136,000	AED per month
ADDC Water	Audited Accounts (Water)	505,000	AED per month
	Audited PCR (Water)	505,000	AED per month
AADC Electricity	Audited Accounts (Electricity)	605,000	AED per month
	Audited PCR (Electricity)	605,000	AED per month
AADC Water	Audited Accounts (Water)	237,000	AED per month
	Audited PCR (Water)	237,000	AED per month
RASCO Electricity	Audited Accounts (Electricity)	370,000	AED per month
	Audited PCR (Electricity)	370,000	AED per month
RASCO Water	Audited Accounts (Water)	717,000	AED per month
	Audited PCR (Water)	717,000	AED per month

* See note (2) for RASCO to the previous table.

⁴¹ The licence modification for RASCO implementing the 2004 and 2005 price controls has been accepted by RASCO but has not yet been formally issued pending the possible incorporation of additional licence modifications.

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8.2.3 Operation of PIS for Category A Indicators

As mentioned earlier, the MAR for a business for any year 't' is presently adjusted by the term 'Q' upward or downward (i.e. Q can have a positive or negative value) each year based on the performance on Category A indicators in the preceding year.

The term Q_t , the performance adjustment for year t, is calculated in AED terms according to the following formula:

$$Q_t = Q1_t + Q2_t$$

where

$Q1_t$ is the revenue adjustment in respect of the timeliness of submission of the audited accounts; and

$Q2_t$ is the revenue adjustment in respect of the timeliness of submission of the audited price control return (PCR).

The PIS for Category A indicators is operated for the present control period as follows:⁴²

- **For all “timeliness” indicators in all the years**, in the case of any delay beyond the glide-path target date, the company will receive a **penalty** equal to the monthly incentive rate multiplied by the number of months by which the audited accounts or audited PCRs are late in comparison with the glide-path target date.

That is, the penalty for delay is given by the following formula ('Q' term will automatically take a negative sign for delays):

$$Q \text{ Term} = \text{Incentive Rate} \times (\text{Glide-path target date} - \text{Actual month achieved})$$

- **For all “timeliness” indicators adjustment in 2004 and 2005 Formula Years⁴³**, in the case of submission in advance of the glide-path target date, the company will receive a **reward** equal to the product of (i) the monthly incentive rate in case of 2004, or twice the monthly incentive rate in case of 2005, and (ii) the number of months by which the audited accounts or PCRs are early in comparison with the glide-path target date.

That is, reward for 2004 Formula Year:

$$Q \text{ Term} = \text{Incentive Rate} \times (\text{Glide-path target date} - \text{Actual month of submission})$$

and reward for 2005 Formula Year:

⁴² These details have been incorporated into the licences through modifications following the conclusion of the previous price control reviews.

⁴³ The term “Formula Year” means the year in which the revenue adjustment via the Q term is applied. For example, the Formula Year is 2004 for the submission of 2002 audited statements in 2003.

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$$Q \text{ Term} = 2 \times \text{Incentive Rate} \times (\text{Glide-path target date} - \text{Actual month of submission})$$

The rewards were structured in this way to provide a more equal incentive (upside and downside), given that the glide-path target date in Formula Year 2005 is earlier than in Formula Year 2004. As the number of months by which it is potentially possible to submit the indicator in advance of the glide-path target date is reduced, the incentive reward rate is correspondingly increased. Similar considerations applied to the structuring of the incentive reward rate for the 2006 Formula Year (below).

- **For all “timeliness” indicators in 2006 Formula Year**, if the company meets the target date it will receive a **reward** equal to six times the monthly incentive rate. That is:

$$Q \text{ Term} = 6 \times \text{Incentive Rate}$$

- The **maximum delay** in any indicator is capped at the penalty that would be incurred if the audited accounts or PCRs are submitted on the glide-path target date for the same indicator for the following year.
- The **maximum reward** for any indicator is capped by the licence target date.
- For the purpose of all the indicators, the number of “months” is calculated assuming the date of submission of audited account or PCRs to the Bureau as the last day of the previous month if such audited accounts or PCRs are received by the Bureau on or before the 15th day of a month, or as the last day of the current month if such audited accounts or PCRs are received by the Bureau after the 15th day of the month but before the end of the month. (This effectively gives companies a further 15 days ‘grace period’ on top of the glide-path target dates.)
- The total reward or penalty under the PIS for any business (the “Q” term in its price control formula) for performance in any year (say ‘t’) is capped at 2% (5% for RASCO) of the MAR in relation to its ‘own’ cost in that year (‘t’). “Own” costs means procurement cost for ADWEC, transmission costs for TRANSCO, distribution and supply costs for ADDC/AADC, or whole MAR for RASCO.

8.2.4 Category B Performance Indicators

In addition to Category A indicators, a number of Category B performance indicators have been identified at the previous price control reviews for each company. These Category B indicators are listed in **Table 8.3** below:⁴⁴

⁴⁴ For definitions of these Category B indicators, see “2002 Price Controls Review – Final Proposals for PC2”, Bureau, November 2002, and “Review of Economic Regulation of RASCO from 2004 – Final Proposals”, Bureau November 2003.

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Table 8.3: Present Category B Performance Indicators by Company

S. No.	ADWEC	TRANSCO	ADDC/AADC	RASCO
1.	Generation Security Standard	Electricity Transmission Security	Electricity Distribution Security	Water Quality
2.	Desalination Security Standard	Electricity Average Incident Duration	Energy Lost	Generation Availability
3.	Interim P&L Account Timeliness	Energy Lost	Customer Minutes Lost	Water Capacity Availability
4.	PWPA Timeliness	Water Transmission Security	Electricity Meter Reading	Interim P&L Account Timeliness
5.	Seven-Year Planning Statement Timeliness	Water Average Incident Duration	Electricity Distribution Loss	Environmental Incidents
6.	BST Timeliness	Water Quality	Water Distribution Metering	Safety Incidents
7.	Economic Purchase Indicator	Electricity Transmission Loss	Water Meter Reading	
8.		Water Transmission Loss	Low Pressure	
9.		Economic Despatch	Water Supply Method	
10.		Settlement Data Accuracy and Timeliness	Water Quality	
11.		Planning Data Accuracy and Timeliness	Customer Satisfaction	
12.		Statement of Connection and Use of System Charges Timeliness	Interim P&L Account Timeliness	
13.		Interim P&L Account Timeliness		
14.		Five-Year Planning Statement Timeliness		

In contrast to Category A indicators, the performance against the Category B indicators is not subject to an automatic or mechanistic annual revenue adjustment for good or poor performance. This is because the measures did not yet meet all the criteria for inclusion as a Category A indicator (see Section 8.3.2 below). In particular, in some cases there were concerns over the quality of data held by the companies. It was therefore agreed at the previous reviews that these indicators will be monitored during the present control period with the following two objectives:

- Certain financial adjustments could be made at this 2005 price control review to the future revenue requirements for the companies for good or poor performance (as assessed by the Bureau) on the Category B indicators over the PC2 control period; and
- Certain Category B indicators could be defined more precisely at this review with clear-cut targets and incentive rates so that they can be included in Category A at this review for automatic annual revenue adjustment for good or poor performance during the PC3 control period.

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The Bureau is presently assessing the performance of the companies on Category B indicators. A number of other areas of companies' operations have also identified which need to be incentivised for better performance (e.g. timely submission of information required by the Bureau). Possible financial adjustments at this review for performance against the present Category B indicators and other performance areas are discussed in Section 9 of this document.

8.3 Performance Incentive Scheme (PIS) for PC3

8.3.1 Assessment of Experience to date

The experience with the present PIS has shown some positive results. In particular, the Category A indicators have been able to influence the companies to initiate and furnish to the Bureau the audited separate accounts and audited PCRs for 2003 and earlier years in a more timely manner. The submission of these audited statements not only meet the statutory requirements, they facilitate the accurate calculation of the sector subsidy requirement and will also help the Bureau and companies to project future costs and revenue drivers at this price control review with greater accuracy.

Table 8.4 below lists the submission dates to the Bureau of the audited accounts and audited PCRs for the financial years 2002 and 2003 (correct as at 16 August 2004):

Table 8.4: Performance of Companies on Category A Indicators – Submission Dates				
Business	Financial Year 2002		Financial Year 2003	
	Audited Accounts	Audited PCRs	Audited Accounts	Audited PCRs
ADWEC	26 May 2004	N/C	N/R	N/R
TRANSCO (E)	7 April 2004	7 April 2004	11 May 2004	14 April 2004
TRANSCO (W)	7 April 2004	7 April 2004	11 May 2004	14 April 2004
ADDC (E)	N/R	11 August 2004	N/R	N/R
ADDC (W)	N/R	11 August 2004	N/R	N/R
AADC (E)	N/R	N/R	N/R	N/R
AADC (W)	N/R	N/R	N/R	N/R
RASCO (E)	N/A	N/A	N/R	N/A
RASCO (W)	N/A	N/A	N/R	N/A

Notes: 'N/R' denotes 'not received' by the Bureau.
 'N/C' denotes 'not complete' (incomplete statement received by the Bureau).
 'N/A' denotes 'not applicable'.

ADWEC submitted its audited PCR for 2002 on 2 June 2004 but it was incomplete and while the missing information has now been provided the Bureau has as yet been unable to obtain confirmation from ADWEC that this particular information (which relates to information at the level of each PWPA) has been audited. In any case, the missing information was not provided by ADWEC until 31 July 2004, which is after the date at which the maximum penalty for this indicator was incurred (ie, even if the missing information were audited it would not reduce the penalty that will apply).

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The submission dates listed in **Table 8.4** above can be used to apply the penalties/rewards against the glide-path target dates (see **Table 8.1**) using the PIS incentive rates (see **Table 8.2**). **Table 8.5** below shows the penalties/rewards of each company for 2002 and 2003 audited accounts and PCRs (to be applied to adjust the MARs for years 2004 and 2005, respectively). For those companies, whose audited accounts and PCRs have not been (to date) submitted to the Bureau, no incentive has been calculated. Also note that the 2% or 5% overall cap on the total incentives for each business has been ignored in these calculations.

Business	Formula Year 2004		Formula Year 2005	
	Audited Accounts	Audited PCRs	Audited Accounts	Audited PCRs
ADWEC	- 0.09	-0.162	tbd	tbd
TRANSCO (E)	-4.005	-8.010	+8.010	+8.010
TRANSCO (W)	-2.679	-5.358	+5.358	+5.358
ADDC (E)	tbd	-10.224	tbd	tbd
ADDC (W)	tbd	-4.545	tbd	tbd
AADC (E)	tbd	-5.445	tbd	tbd
AADC (W)	tbd	-2.133	tbd	tbd
RASCO (E)	N/A	N/A	tbd	N/A
RASCO (W)	N/A	N/A	tbd	N/A

Notes: 'tbd' denotes 'to be determined'.
'N/A' denotes 'not applicable'.

It can be seen that those companies who have performed well will receive bonuses while those companies that have performed poorly will receive penalties. The best performer to date has been TRANSCO, which will receive additional MAR in Formula Year 2005 of almost AED 27 million due to the audited statements related to the 2003 Financial Year being submitted by the licence target dates. However, all companies have an opportunity to receive bonuses in future years if the recent progress made in terms of auditing sector data is continued and further improved upon.

Certain Category B indicators have also caused the companies to perform better on other areas of their operations. For instance, the Category B indicators for the timeliness of the BST and TUoS charges statement have encouraged ADWEC and TRANSCO to finalise their charging statements for 2004 in a timely manner for the first time since the sector restructuring in 1999.

However, there are other aspects of companies' operations, such as the manner in which TRANSCO has responded to the Bureau's review of its despatch processes, where performance has not been so satisfactory. The Bureau is currently assessing the companies' performance against all indicators and expects to publish a detailed assessment in the course of this review, together with proposals for appropriate financial adjustments (see section 9.3).

In view of the companies' performance to date and the experience with the present PIS, the Bureau believes that a PIS similar to the present one is required for the PC3 controls. While the Bureau would like to retain the main features of the present PIS, there appears to be a case for an

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enhanced PIS for the future. Possible refinements of the PIS are discussed in the following sub-section.

8.3.2 Future Category A Indicators

The Bureau intends to retain Category A indicators incentivised through automatic adjustment to annual revenue via the terms ‘Q’ in the MAR formulae for the businesses. As at present, there will be separate Q terms for the businesses which have separate price controls. That is, separate Q terms for the electricity and water businesses of TRANSCO and RASCO. If separate PC3 controls are introduced for the electricity and water businesses of ADWEC, there should be separate Q terms for these businesses. Similarly, if PC3 controls are to be split between the distribution and supply businesses of ADDC and AADC, there should be separate Q terms for each of the four separate businesses of these companies (i.e. electricity distribution, electricity supply, water distribution and water supply). Accordingly, separate Category A indicators will need to be defined for each such business.

Category A indicators must meet the objective criteria established at the previous review:

- **Measurable:** Companies must be able to accurately measure performance outputs.
- **Verifiable:** The regulator must be able to verify the company’s measurement of the outputs.
- **Non-manipulable:** The measurement of the outputs must not be open to manipulation by the company to improve its reported performance.
- **Non-distortionary:** Incentivising one aspect of performance must not unduly detract from the company’s performance in other areas which are not similarly incentivised.
- **Customer-oriented:** The output must be significantly and positively valued by customers of the company.

The Bureau therefore wishes to review which specific measures should be considered for Category A indicators for the future PIS:

1. **Present Category A Indicators:** Given the importance of audited separate accounts and audited PCRs, the Bureau’s present thinking is to retain the present Category A indicators. These indicators clearly meet the above objective criteria. However, it is for consideration whether the incentive rates for these indicators should be reassessed. The issue of future performance targets for these indicators is discussed separately in the following sub-section. However, the Bureau is considering continuing for the PC3 period, broadly-speaking, with the scheme in operation in 2006 Formula Year – i.e. to remove the ‘glide-path’ concept and link performance directly to the licence target dates.
2. **Possible New Category A Indicators:** There are other areas of companies’ operations which may need stronger incentives by treating them as Category A indicators. The new Category A indicators can come from the present list of Category B indicators or can be

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fresh candidates. Presently, both the Category A indicators relate to the timeliness of audited statements. There is presently no indicator in the Category A which assesses the companies' performance on technical matters. The factors that the Bureau should take into account while assessing an indicator for Category A must include the importance of the indicator and its compliance with the objective criteria mentioned above. The candidates for new Category A indicators may include:

- Timeliness of charging statements such as BST and TUoS charges statement for ADWEC and TRANSCO, respectively. However, it is arguable whether they meet the objective criteria for indicators given the lack of a standard pro-forma or procedure for these statements and the emergence of new issues while preparing and finalizing these statements.
- Timeliness of planning statements for ADWEC and TRANSCO (although the same comments apply as mentioned above)
- Technical performance indicators – eg, measures of network performance, such as 'customer minutes lost' for distribution companies (provided that they meet the objective criteria).

A number of issues will arise if technical performance indicators are included in Category A for the future PIS. These issues were discussed in detail in the Bureau's consultation papers on the 2002 price control review (particularly in the Draft Proposals for PC2) as certain technical indicators were being considered at that time. These issues will again need to be discussed during the course of this review. In essence, the Bureau would require the companies to get their annual performance data on technical Category A indicators audited by an independent suitably qualified professional firm approved by the Bureau. Further, a company should not be penalized or rewarded for certain exceptional events if such events are material and outside the company's control. The Bureau would like to introduce at least one technical performance measure for each company into Category A and would welcome respondents views as to which technical performance indicators may meet the objective criteria and hence should be considered as Category A indicators at this review.

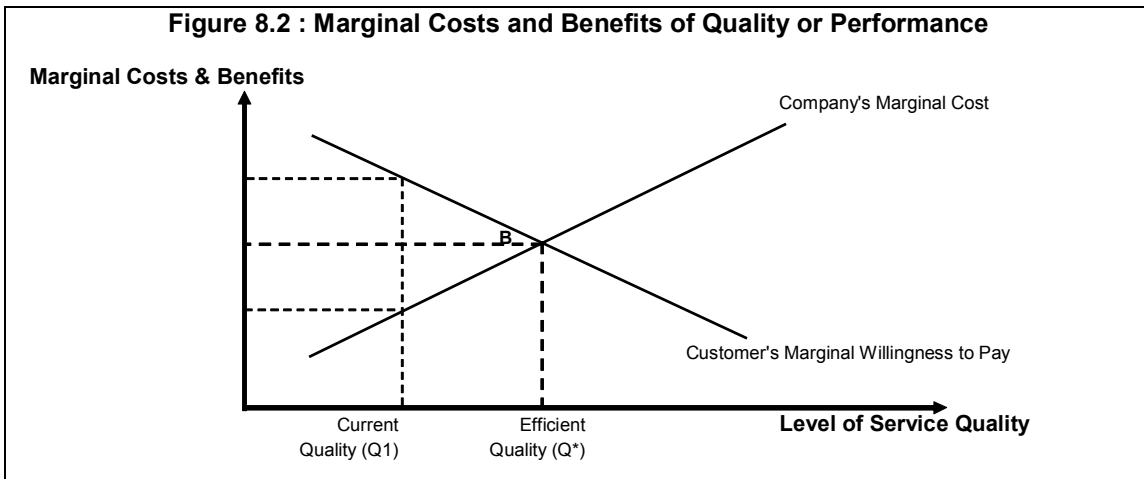
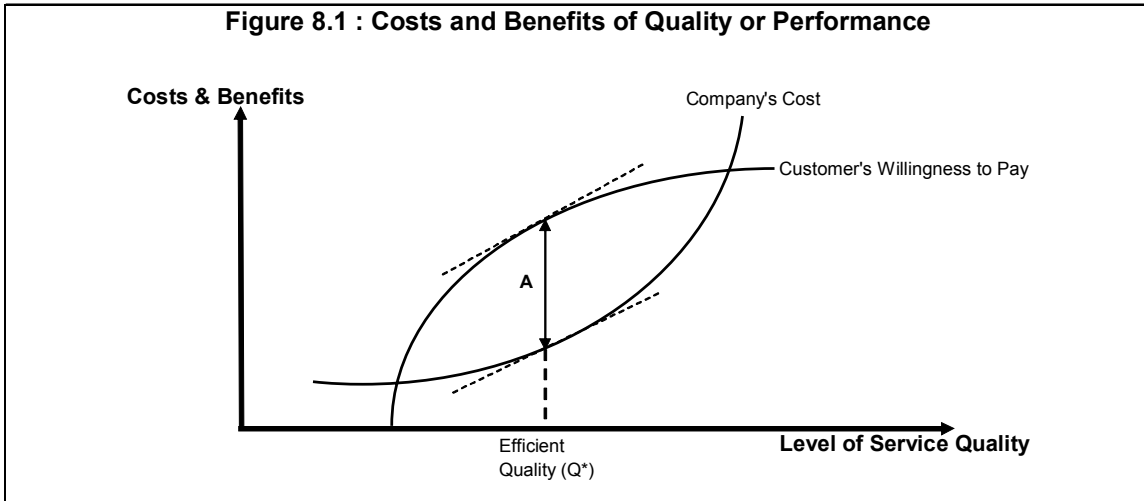
8.3.3 Future Performance Targets for Category A Indicators

An important question is how the future performance target for any indicators should be set. In theory, the target for any performance indicator can be set on the basis of:

- The 'optimal' level of performance (see below);
- The company's recent performance (such as its performance on the corresponding indicator in the previous year);
- Recent performance of comparable companies in similar circumstances; or
- Statutory targets (such as target dates specified in the licence or the Law).

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In principle, companies should be incentivised to offer the performance or quality of service at the level where the marginal benefit to its customers of an extra unit of performance or quality is equal to the marginal cost to the company of an extra unit of performance or quality. That is, where the difference between the total benefits and total costs of quality (i.e. the net benefit of quality) is maximized. This is illustrated in **Figures 8.1** and **8.2**. Point A in **Figure 8.1** represents such an optimal performance, where the vertical distance between two curves representing the net benefits of quality of service is at a maximum. This corresponds to Point B in **Figure 8.2** where the marginal cost equals the marginal benefit, hence representing an efficient level of performance or quality Q^* .



In order to identify the optimum level of quality of service, the regulator requires information about the marginal costs and benefits of quality improvements. Cost information is typically known by the utility (or can be analysed). However, due to the nature of the utility sector, characterized by limited competition and little if any observable differentiation in service quality, there is generally little market information on the value customers place on quality (or, customer's willingness to pay (WTP), as it is sometimes known).

A practical approach to target-setting would be to take the current level of performance as the starting point, and then provide an incentive for the company to move towards the optimum or

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efficient level of performance, Q^* (See **Figure 8.2**). For example, suppose the initial level of quality is Q_1 , where $Q_1 < Q^*$. If the company is provided with a reward for a quality improvement based on the marginal benefit to the customer at point B, the company will have an incentive to improve quality up to (but not beyond) the optimum Q^* . This is because in the range Q_1 to Q^* , the marginal revenue which the company is receiving for a quality improvement, based on customer's marginal benefit, exceeds the company's marginal cost.

Performance targets for Abu Dhabi companies can also be established by comparison with similar companies elsewhere in the world. However, there would then be a need to address issues relating to the difference in environment in which Abu Dhabi companies are working, and issues related to inherited performance.

In view of the above, it seems appropriate to set the performance targets for Category A indicators as follows:

1. **Performance Targets for Present Category A Indicators:** The due dates for submission of audited statements are specified in the companies' licences. While glide-path target dates were considered appropriate at the previous review in view of the past poor performance of the companies on these statements and the backlog of work required, the glide-path targets were structured such that they become the same as the licence due dates by the end of the present control period (i.e. by end 2005). As the companies have made significant progress on the audit of these statements and the PIS target dates already (from 2005) coincide with the licence due dates, the Bureau's present view is that the licence due dates should be the target dates for the audited accounts and audited PCRs for the future PIS (i.e. 30 June and 31 March, respectively).
2. **Performance Targets for Possible New Category A Indicators:** There are certain performance indicators for which the benchmarks or targets have already been set (or where the Bureau is given discretion to set) by the Law, the licences or the relevant regulations. Such indicators include timeliness of charging statements and planning statements for ADWEC and TRANSCO and water quality indicators for all companies. In the case of other technical indicators, the targets for any new Category A indicators could be set based on the companies' recent performance.

8.3.4 Future Incentive Rates for Category A Indicators

At the previous price control review, the incentive rates for Category A indicators were calculated as follows:

- First, the maximum penalty or reward was calculated by applying 2% (5% for RASCO) to the forecast MAR (in relation to "own costs") of each company for 2004.
- Second, the resulting amount was equally apportioned to the two performance indicators in Category A of the business concerned.

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- Third, the incentive rate for each indicator was derived by dividing the relevant amount apportioned as above by the variance between target performance and performance of 6 month delay beyond the glide-path target date.

While this was a pragmatic approach, it did not pay direct regard to the costs and benefits of performance improvement. Ideally, as discussed above, the size of the incentive for a performance indicator should in general be bound by the company’s cost of achieving the desired level of performance (as the lower limit) and the customer’s willingness to pay (WTP) for that level of performance (as the upper limit, assuming *inter alia* that the performance level is below the optimal or efficient level of performance). That is, the amount of incentives should be greater than the cost to companies of achieving an improvement of performance, but less than the value that customers place on that improvement of performance.

In practice, therefore, a conservative estimate of customers’ WTP, cross-checked against the companies’ marginal cost, ought to provide a reasonable incentive. However, as mentioned earlier, while cost information may be known by the utility, there is generally little market information on the value people place on quality in utility sectors.

In view of the foregoing, regulators have sometimes based incentives on the cost of providing the performance. For example, the Victorian regulator has based incentive and penalty payments on the (annualized) marginal cost of reliability for each electricity distributor, rather than the value customers place on improved service.⁴⁵

The Bureau would welcome any estimates the companies may have of the marginal cost of performance improvements and results of any market research (or similar analysis) that the companies may wish to undertake to better understand the requirements of their customers for service improvements. However, the Bureau may have to rely on the approach it used at the previous price control reviews. That is, the Bureau may first decide the amount “at risk” for the companies (i.e. cap on Q term, say 5% or 10% of MAR, as discussed below) and then apportion this amount between all the Category A indicators. At the previous reviews, the amount was apportioned equally between the two Category A indicators. However, at this review, the Bureau may need to consider higher incentive rates (i.e. higher allocation of amount at risk) for certain indicators (say, new Category A indicators) than others.

The above approach effectively allows the Bureau to objectively judge the appropriate incentive, taking account of relevant objectives and available data. This seems particularly suitable for those performance indicators where the Bureau is the customer for the provision of a company’s service, such as timeliness of audited statements.

Further with respect to the existing Category A indicators, the Bureau also wishes to review whether it remains appropriate to reward companies with a bonus in the event of audited accounts and audited PCRs being submitted on time. As timely submission of such audited statements is a licence obligation and the costs associated with their preparation are already

⁴⁵ “*Electricity Distribution Price Determination 2001-05*”, Office of Regulator-General (now, Essential Services Commission), September 2000.

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financed within the price controls, it is for consideration whether the PIS should be amended for PC3 to simply penalise companies in the event of non-compliance for these indicators.

8.3.5 *Future Cap on Incentives for Category A Indicators*

In carrying out its functions, the Bureau has a duty under the Law (Article 96) to take into account the need for licensees to finance and plan their businesses with a reasonable degree of assurance.

At the previous price control reviews, the Bureau therefore capped the total incentive and penalty for Category A under the PIS for each year at 2% of MAR (5% of MAR for RASCO) in relation to their ‘own costs’ (i.e. excluding pass-through items). This was in addition to the caps that at present apply separately to individual Category A performance indicators (see Section 8.2.3).

The Bureau intends to continue with the concept of an overall cap on annual incentive amounts for the Category A indicators in the future PIS. However, as discussed in Section 4.6, to accommodate an increase in the number of Category A indicators and/or to provide stronger incentives for improved performance, the present annual caps on the term ‘Q’ may need to be increased to say 5% or 10% of MAR in respect of companies’ own costs. It may be worth noting that the Bureau initially suggested a cap of 5%-10% for the Q term at the 2002 review. However, the cap of 2% was finally agreed in view of the companies’ arguments for a lower cap due to the fact that the PIS was being applied for the first time. A cap of 5% was successfully applied at the subsequent RASCO review. Experience with past operation of the scheme should allow the cap to be increased for all companies at this review.

8.3.6 *Future Category B Indicators*

As mentioned earlier, there are various Category B indicators in the present PIS which, in contrast to Category A indicators, are not subject to automatic incentive adjustment to annual MAR via the term ‘Q’. Rather, these Category B indicators are monitored during the present control period for the possibility of appropriate financial adjustment to the future revenue requirement calculations at this review and for consideration to include some of them in the Category A for the future PIS.

The Bureau would like to retain this concept of Category B indicators in the PIS for PC3, but would like to raise some issues for respondents’ consideration:

- **Review of Present Category B Indicators:** It is for consideration whether all of the present Category B indicators remain appropriate or should some of them be removed and/or some new ones be added to the lists.
- **Precise Definitions:** To provide clarity and certainty for the companies, it may be appropriate to the extent possible to develop and agree on more precise definitions of Category B indicators.
- **Basis of Performance Targets:** While it may not be possible to agree on precise performance targets for all the indicators for all the years, it may be practicable and

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desirable to agree on a broad basis (such as the performance in the preceding year) to determine suitable targets for some of the indicators to be used at the next review for financial adjustments.

- **Cap on Financial Adjustment at Next Review:** To provide further certainty for the companies, it may be necessary to set an overall cap on the financial adjustments to be made at the next review for each company’s performance on Category B indicators (similar to the present cap on overall adjustment for Category A indicators).

The Bureau’s assessment of companies’ performance on the present Category B indicators at this review should inform the above issues.

8.4 Issues for Consultation

This Section 8 raises the following issues for consultation in relation to the PC3 controls:

1. The Bureau proposes to continue with the existing Category A indicators. What additional performance indicators should be included in Category A for the future PIS?
2. How should the performance targets and incentive rates for Category A indicators for PC3 be set?
3. Given that the existing Category A indicators reflect licence obligations, does it remain appropriate to reward companies via bonuses for meeting their licence obligations or can the same regulatory objectives be met in these cases by simply applying penalties for late or non-submission?
4. Should the overall cap on annual incentives (i.e. cap on Q term) for Category A indicators be increased in PC3 to, say, 5% or 10% of each business’ MAR (in relation to business’ own costs, that is excluding any pass-through costs)?
5. What additional performance indicators should be included in Category B for the future PIS?
6. How should performance against Category B indicators be assessed and incentivised?
7. What cap, if any, should be applied to the overall financial adjustment made at the subsequent price control review in respect of Category B indicators?

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9 Financial Adjustments

9.1 Introduction

The previous sections discuss various “building-blocks” of the price control calculations including opex projections, capex allowances, depreciation and RAVs. As discussed in Section 4.2, the required revenue for each year of the control period can be as follows:

$$\text{Required Revenue} = \text{Opex} + \text{Depreciation} + \text{Return on Assets}$$

Annual required revenues are then discounted to determine their present values at the beginning of the control period and then summed up to calculate the present value of the total required revenue for the period.

At this price control review, the Bureau also intends to make a number of additional one-off adjustments to the future revenue requirement (as discussed below). Therefore, in simple terms, the required revenue formula can be amended as follows:

$$\text{Required Revenue} = \text{Opex} + \text{Depreciation} + \text{Return on Assets} \pm \text{Financial Adjustments}$$

Alternatively, certain of the financial adjustments may, due to their nature, need to be applied via adjustments to the RAVs, rather than applied directly to the revenue requirement calculations.

The financial adjustments that the Bureau intends to make at this review can be grouped as follows:

- RASCO-related financial adjustments:** As discussed during the 2002 price controls review, certain adjustments need to apply to the two distribution companies at this review to reflect the transfer of RASCO’s distribution and supply activities to the distribution companies in 2001. The adjustments are required for (i) the opex incurred by the distribution companies in 2001 and 2002, and for (ii) any capital costs from 2001 onwards associated with the assets transferred from RASCO to the distribution companies in 2001.
- Financial adjustments for performance on PIS Category B:** These are the financial adjustments that are required to be made to each company’s future revenue for its performance on Category B indicators under the PIS during the PC2 period, as agreed at the 2002 price control review.
- PCR-related financial adjustments:** These adjustments will apply to TRANSCO and the two distribution companies for any over-statement of revenue drivers and/or under-statement of regulated revenue in their audited Price Control Returns (PCRs) for 1999-2002.
- Financial adjustments for asset transfer / disposal:** For price-controlled companies which have transferred assets to any other price-controlled company or to a third-party, or who have otherwise disposed of any of their assets, it may be necessary to apply appropriate adjustment to either their RAVs or revenue requirement at this review.

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Similarly, adjustments may be required for assets transferred to or otherwise acquired by licensed companies (but only to the extent not included within the financing of capex).

5. **Other financial adjustments:** This group covers certain other adjustments not covered by the above groups.

Each group is discussed below in turn. Note that the groups or items covered by these groups may not be an exhaustive list of all possible financial adjustments required at this review. During the course of this review, the Bureau will consult with the companies on any other financial adjustment that may be required.

Many of the adjustments relate to past years. Where appropriate, the adjustment will be made in the same NPV terms as if it had been made at the time of occurrence of the event to which it relates.

9.2 RASCO-Related Financial Adjustments

With effect from 1 January 2001, the distribution and supply activities of RASCO have been transferred to ADDC and AADC in their respective authorized areas and hence are subject to the PC1 and PC2 controls for these companies for 2001 onwards. This transfer has given rise to the need of certain financial adjustments at this review:

1. While opex relating to these activities for 2003 onwards has been taken into account while setting PC2 for ADDC and AADC, such expenses incurred during 2001-2002 may need to be remunerated through appropriate adjustment at this review.
2. If the distribution companies paid for the distribution and supply assets inherited from RASCO, the Bureau also intends to make an appropriate adjustment at this review for ADDC and AADC for capital costs (both return on capital and depreciation) since 2001 associated with these assets.

These adjustments have been discussed during the previous price control reviews and are expected to increase the future revenue requirement of the distribution companies. During the course of this review, the Bureau will request information from the distribution companies on the above matters in order to determine the adjustment required.

9.3 Financial Adjustments for Performance on PIS Category B

As discussed in Section 8, at the previous price control reviews, a number of Category B performance indicators were introduced for each company as part of the PIS to incentivise the company's performance on various aspects of their operations and licence compliance (see **Table 8.3** in Section 8.2). In contrast to Category A indicators, these indicators are not subject to an automatic or mechanistic annual revenue adjustment for good or poor performance. Further, precise definitions, clear-cut targets and incentive rates were not set out for these Category B indicators. It was agreed at the previous reviews that these indicators will be monitored during the present control period with the following two objectives:

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- Certain financial adjustments could be made at this 2005 price control review to the future revenue requirements for the companies for their good or poor performance on the Category B indicators over the PC2 period; and
- Certain Category B indicators could be defined more precisely with clear-cut targets and incentive rates so that they can be included in Category A at this price control review for automatic annual revenue adjustment for good or poor performance during the PC3 control period.

The Bureau is presently assessing the performance of the companies on Category B indicators. The full assessment requires actual outturn data for the previous years, particularly on the technical indicators (which the Bureau will be requesting from the companies). The Bureau's initial finding based on the information presently available to the Bureau indicates a number of Category B indicators where the companies' good performances are expected to result in positive financial adjustments at this review (i.e. resulting in increases in the future revenue requirement) and a number of Category B indicators where the Bureau's initial review indicates a poor performance of the companies and hence the possibility of negative financial adjustments at this review.

The Bureau will continue to monitor the performance of the companies on Category B indicators (including the above examples) during 2004 before the financial adjustments are finalized in the Final Proposals for PC3 which are due in August 2005. Adjustments for performance in respect of 2005 will be deferred to the next (approximately 2009) price controls review. The companies therefore have opportunity and more time to further improve their performance to increase net rewards (reduce net penalties) under the scheme.

While the Bureau's assessment will focus on those Category B indicators which show significantly poor or superior performance, to decide any financial adjustment for Category B indicators a number of issues need to be addressed at this review. For example:

1. What should be the performance target for each Category B indicator? While certain indicators have precise targets (such as charging statements, planning statements, interim profit and loss accounts, etc.), other indicators need their targets to be established. For many of the technical indicators, the performance of the company during the preceding year may act as the target for the following year provided the Bureau is satisfied with the reliability of the data.
2. Whether there should be an overall cap on the total financial adjustment under Category B for each company or business? Such a cap may be necessary to limit the exposure of the company (as well its customers) in line with the Bureau's statutory duty to take account of each company's financial position. In line with the cap for Category A for the present price controls, the Bureau's present thinking is to cap the total incentives for Category B over the PC2 period at 2% of the relevant MAR for each company or business (except for RASCO, where a 5% cap may be appropriate).
3. What should be the amount of incentive for each Category B indicator? As discussed in Section 8, this is a difficult issue as the company's cost of achieving performance

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improvement and the customer's willingness to pay are not known for any of the indicators. As was the case when setting the targets for the Category A indicators, it may be possible to apportion the total amount of incentives for Category B for each company or business suitably between its Category B indicators. Alternatively, in the absence of information from companies as to the costs and benefits of performance improvement, the Bureau may simply be required to make a judgement as to the appropriate reward/penalty (subject to the overall Category B cap mentioned in point 2 above, to limit companies' exposure).

The Bureau would welcome respondents' views on these questions.

9.4 PCR-Related Financial Adjustments

Each price-controlled company is required by its licence annually to submit an audited Price Control Return (PCR) for each of its price-controlled businesses showing the audited MAR derived from revenue drivers and the audited regulated revenue recovered. As discussed earlier in this document, the Bureau is very much encouraged by the recent initiative and progress to date on the audit of PCRs for all the previous years back to 1999.

During the course of the audit of PCRs for TRANSCO, ADDC and AADC, certain issues have arisen in relation to the revenue drivers and the regulated revenue. These are mainly due to some ambiguity in the definitions of certain terms in the licences (e.g. which income streams constitute the regulated revenue) and due to general data problems and system changes in the distribution companies.

In order to progress the work on the audited PCRs for 1999-2002 and pending the availability of certain information, the Bureau has shown willingness to these companies and/or their auditor to accept certain treatments for the purposes of the audit of the PCRs. However, these treatments may not be fully consistent with the licences and/or the intent of PC1 controls. The Bureau has therefore indicated to the companies and/or auditor that such treatments will be reviewed at this review (separately from the audit work on the PCRs) to assess any financial adjustment necessary to remove any windfall gain for the companies due to such treatments.

There are two main types of financial adjustments which may be required:

1. **Financial adjustments for revenue drivers:** For ADDC and AADC, there are issues with regards to the definitions and data availability for certain revenue drivers. Specifically, these are:
 - **'Water customer accounts'** revenue driver for **AADC**, where the company has not been able to reconcile its data between the old billing system (WANG on the basis of which the PC1 controls were set in 1999) and the new billing system (OMNIX, the present system). The new system shows a significantly higher number (almost twice) of water customers than the old system and hence results in significantly higher MAR than originally intended at the 1999 price control review. While ADDC has solved this problem by reconciling its new system data to the old system data and hence showing similar customer numbers (and

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MAR) as projected at the 1999 review, AADC has not been able to solve this problem. The Bureau has therefore advised AADC that new system data (higher customer numbers) can be used in the audited PCRs but a necessary financial adjustment will be made at this review to remove the significant windfall for AADC compared to the data used at the 1999 review.

- **‘Metered electricity units distributed’** revenue driver for **ADDC** in the audited PCRs for 1999 and 2000 may contain units which were produced and distributed by RASCO and not distributed via ADDC’s distribution system (contrary to the licence definition of the revenue driver). This would result in a higher MAR than justified. While the Bureau has agreed to allow such treatment for the purposes of the audit of the PCRs, it has advised ADDC of the necessity of making a financial adjustment at this review to remove the additional MAR earned due to this. However, the impact of this adjustment is expected to be relatively minor.

2. **Financial adjustment for ‘other’ income:** The audit work has identified a number of income streams for **TRANSCO**, **ADDC** and **AADC** which the companies variously argue may fall outside the definition of “regulated revenue”. This is in addition to the income from unlicensed activities for which the Bureau has issued consents (which is unambiguously outside “regulated revenue”). Such incomes include compensation, claims, penalties and damages from the general public, contractors and insurers, interest on deposits and foreign exchange loss or gains. On the Bureau’s request, some companies promptly provided information about the levels of these incomes. Pending the receipt of more information and in order to accelerate the audit, the Bureau has indicated to the companies its willingness to accept only (i) income from customers, (ii) subsidy from the Government (where applicable), and (iii) insurance claims, to constitute the regulated revenue for the purposes of the audited PCRs. However, as discussed in Section 3.6, the Bureau believes that in principle all ‘other’ income should be included in the regulated revenue, as the costs associated with these incomes have been financed within the PC1 and PC2 controls. The Bureau is therefore minded to make necessary financial adjustments at this review to remove the gains earned due to the exclusion of such incomes from the regulated revenue in the audited PCRs.

It is noted that the Bureau (as at 16 August 2004) is yet to receive audited PCRs from AADC, and is yet to complete its review of other companies’ PCRs. There may therefore be other adjustments to the PC1 PCRs which the Bureau is not presently aware of but may find necessary during the course of this review.

The Bureau’s present thinking is to restrict any adjustments at this review to the 1999-2002 (i.e. PC1) PCRs and reserve any adjustments in respect of the PC2 (i.e. 2003-2005) PCRs to the next (approximately 2009) price controls review.

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9.5 Financial Adjustments for Asset Disposal or Transfer

In 1999, the Regulatory Asset Values (RAVs) for TRANSCO, ADDC and AADC were set on the basis of accounting asset values (in the case of TRANSCO, with a 15% downward adjustment). Since then, these RAVs have been de-linked from the accounting values and are rolled forward for the efficient allowed capex net of depreciation.

Where the price-controlled companies have transferred their assets to each other or disposed of assets otherwise, the company should not earn any return on asset and depreciation under the price controls from the date of the transfer. Irrespective of the prices received by the transferring company for the assets, to the extent such assets have a residual value they should be removed from the RAVs of that company. This therefore requires appropriate financial adjustment to the RAVs at this review for the asset transferred and the associated depreciation and return on capital.

With respect to the company which acquires an asset (from any party within or outside the sector), where the purchase of any such asset is reflected in the capex in the audited accounts for that company, the RAV for that company should automatically be updated by the efficient capex allowance, and so no additional analysis/adjustment will be required.

The Bureau will be requesting detailed information on asset transfers and disposals within the forthcoming PC3 Information Request. Further adjustments may be required depending on whether or not incomes from asset sales / transfers have been included within “regulated revenue” in the audited PCRs.

9.6 Other Financial Adjustments

At present, the Bureau is aware of the following additional areas where a financial adjustment at this review may be necessary:

1. **Failure to Submit Required Information:** As discussed in Section 4.4, the Bureau is concerned about the unavailability (or delay in availability) of data from certain companies, particularly ADWEC. In 2003, the Bureau requested the price-controlled companies to submit information about their operations such as opex, capex, demand and revenue as per a standard pro-forma. All the companies, except ADWEC, responded positively to the Bureau’s request and provided the requisite information (though the Bureau was not fully satisfied with the accuracy and completeness in certain cases). Information from ADWEC was first requested by the Bureau on 9 June 2003 and the submission was due on 30 July 2003. However, despite numerous requests, clarifications and offers by the Bureau to reduce the information requirement, ADWEC has not provided any information to date (after the lapse of more than a year).

As with the other companies in the sector, and due to delays in the audit of the accounts, ADWEC’s data is subject to uncertainties and changes significantly from time to time. ADWEC’s data shown in audited statements differs significantly from data which ADWEC had earlier provided to the Bureau and upon which the Bureau had relied. For example, BST income for 2002 submitted by ADWEC to the Bureau in early 2004 for

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the purposes of approving the 2004 BST was AED160m lower than the corresponding audited figure for 2002 submitted just a few months later.

The provision of accurate and timely information to the Bureau is necessary if the Bureau is to carry out its duties effectively. The Bureau therefore intends to make an adjustment at this review to ADWEC’s future allowed revenues to reflect past poor performance in relation to the provision of information. Such an approach would be based on the Bureau’s estimate of the detriment to effective regulation resulting from ADWEC’s failure to provide information.

Equally importantly, almost all of ADWEC’s costs are presently not subject to CPI-X price controls. Instead, they are treated on a pass-through basis subject to ADWEC’s economic purchasing obligation under its licence. All these factors make it important to keep ADWEC’s costs under regular review. As discussed in section 4, the Bureau is also reviewing whether pass-through remains appropriate for ADWEC in view of the above considerations combined with steadily rising water and electricity unit purchase costs since 1999.

AADC has also performed less well than is to be expected in responding to the regulator’s requests for information, although its performance in this regard has improved in recent weeks. If this progress is maintained and sufficient emphasis is given to regulatory compliance, it may be that any adjustment can be limited.

2. **Exclusion of TRANSCO ‘Manpower Services’ Income from Regulated Revenue:** During the course of the audit of PCRs, the Bureau became aware of what TRANSCO terms “manpower services” which it has been providing to AADC (and perhaps others) outside of its licensed activities. Subsequently, the Bureau has issued a consent to TRANSCO for undertaking this unlicensed activity – this consent takes effect retrospectively from 1999. While the manpower services constitute an unlicensed activity, the costs associated with these services (though relatively small compared to TRANSCO’s overall costs) have erroneously been financed within the PC1 and PC2 price controls (as the price controls were set on the basis of costs which unknown to the Bureau included costs of these services). Furthermore, in the audited PCRs for TRANSCO, the income from these services has been treated as ‘other’ income and excluded from the regulated revenue of TRANSCO. Thus, as things stand, the costs have been fully-financed within the price controls plus TRANSCO has retained the revenue outside of regulated revenue. The Bureau is therefore presently minded to make a financial adjustment to TRANSCO’s future revenue requirement at this review to remove this double counting. In future, such costs and revenues will be outside the price controls.

3. **Requirement for Accurate Information on Category B Indicators:** As discussed earlier, the Bureau needs to assess companies’ performance on Category B indicators during the PC2 period and to make necessary financial adjustments at this review for the companies’ good or poor performance. Accordingly, as part of the forthcoming PC3 Information Request, the Bureau will be requesting detailed data from licenses regarding their performance against the Category B technical indicators. The companies have

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known since the 2002 price controls review that they would be required to furnish the Bureau with accurate data on such indicators. If such information is not forthcoming, or not considered reliable, a separate financial adjustment may be made to the future revenue requirement of the concerned company to reflect the resulting detriment to effective regulation.

4. Incentive for Income Collection by Distribution Companies

It is important that the distribution companies are provided with an incentive to collect the income to which they are entitled from their customers. For this reason, the subsidy paid by the Government to the sector should be calculated as the difference between (i) the audited MARs (including pass-through costs) of the distribution companies and (ii) the revenue they should have collected by customers as per ADWEA's approved tariffs. Revenue the distribution companies *should have* collected, rather than actual income, is used to provide the distribution companies with a strong incentive to collect revenue from customers (otherwise, any failure to collect revenue would simply be made up by a corresponding increase in the subsidy). This distinction was made clear in the licence modifications issued to ADDC and AADC with the new PC2 controls, and so for the PCRs relating to the 2003 financial year (which were due to be received by the Bureau by 31 March 2004) the auditors will be required to take a view as to potential revenue not collected as well as to revenue actually collected. The audited PCRs for ADDC and AADC relating to the 2003 financial year have not yet (as of 16 August 2004) been received by the Bureau. When they are received, the Bureau will review the analysis of collected and non-collected revenue, to ensure that the subsidy requirement is not overstated.

9.7 Issues for Consultation

This Section 9 raises the following issues for consultation in relation to the PC3 controls:

1. Do you agree with the financial adjustments described in this section?
2. Are there any additional financial adjustments which are necessary at this review?
3. Should the adjustments be applied to the companies' allowed revenues over the PC3 period, or to their RAVs (to spread their effect over a longer period)?

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10 Summary of Issues for Consultation

This section summarises the issues which have been discussed in this first consultation document and on which the respondents' views are sought:

Section 3 (Form of Controls)

1. The Bureau's current thinking is to continue with CPI-X type of regulation for the new price controls.
2. The Bureau's current thinking is to continue with a hybrid of a pure revenue cap and revenue driver approach for the form of the price controls.
3. Should the duration of the PC3 controls be three years as at present, or be extended to, say, four years?
4. Should separate water and electricity businesses be defined for ADWEC's activities, allowing separate controls for the two businesses?
5. Should there be separate price controls for the supply and distribution businesses of ADDC and AADC? (That is, four controls in total for each company: (i) electricity distribution, (ii) electricity supply, (iii) water distribution, and (iv) water supply.)
6. Do you agree that income associated with licensed activities but collected from parties other than customers should count towards "regulated revenue" in determining compliance with the price controls?

Section 4 (Structure of Price Controls)

7. Should the revenue drivers (and/or the present definitions of existing revenue drivers) be reviewed? If so, which alternative revenue drivers or what changes to the definitions of existing revenue drivers should be considered?
8. The Bureau's current thinking is that the TRANSCO peak demand revenue drivers, and the RASCO revenue drivers, should be amended so that they are based solely on metered units.
9. If there are to be separate price controls for distribution and supply businesses, what should be the revenue drivers for each business?
10. Should one or more revenue driver(s) be introduced into ADWEC's price control (whether or not there is a separation of control into water and electricity businesses)?
11. Should the treatment of PWPA and fuel costs on a pass-through basis for ADWEC be reviewed? If so, what alternative approaches may be considered?
12. Do you agree that the cap on the PIS-related MAR adjustment via the term "Q" for Category A performance indicators should be increased to, say, 5% or 10%?

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13. How should the weights for the fixed term and variable terms (involving revenue drivers) in the price controls be set?

Section 5 (Assessment of Operating Expenditures)

14. The Bureau favours a “top-down” approach to the assessment of efficient levels of opex. With such an approach, what should be the base level of opex?
15. What role should benchmarking play in the assessment of opex efficiency?
16. What is the scope for opex efficiency improvements over the PC3 period?
17. To what extent can opex be expected to vary with increases in demand over the PC3 period?
18. What other factors should be taken into account in assessing future opex requirements (e.g., capital substitution, movements in real input prices, one-off events)?
19. Should a ‘rolling’ scheme be introduced to allow companies to retain the benefits of out-performance of efficiency assumptions for a period of fixed duration?
20. How should the incentives for fuel efficiency for RASCO be improved?

Section 6 (Treatment of Capital Expenditure and Asset Valuation)

21. Do you agree with how the Bureau proposes to apply the results of the PC1 capex review?
22. Should the assessment of PC2 capex be undertaken at this price control review for those PC2 years for which audited data becomes available or deferred completely to the next price control review (when audited data for all PC2 years will be available)?
23. To the extent that PC2 capex is assessed at this price control review, can the findings of PC1 capex review also be applied to PC2 capex or should PC2 capex be reviewed separately?
24. The Bureau wishes to, if possible, adopt more of an ex ante approach to the regulation of PC3 capex. How can the scope of any ex post review of capex at the next price review be limited?

Section 7 (Cost of Capital and Profit Margin)

25. The Bureau intends to continue to apply the CAPM approach to calculate the real, post-tax cost of capital.
26. The Bureau intends to draw upon estimates of the cost of capital for overseas companies similar to Abu Dhabi businesses with the same regulatory regime, and to cross-check these estimates against the information available from the local / regional capital markets to capture local risks.

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27. Is it reasonable to assume the same cost of capital for RASCO as for the network companies?
28. Do you agree that the profit margin approach to calculate allowed return for ADWEC at the 2002 review remains appropriate at this review?
29. How should the rate of return for ADDC/AADC's supply businesses be calculated / applied?

Section 8 (Performance Incentive Scheme)

30. The Bureau proposes to continue with the existing Category A indicators. What additional performance indicators should be included in Category A for the future PIS?
31. How should the performance targets and incentive rates for Category A indicators for PC3 be set?
32. Given that the existing Category A indicators reflect licence obligations, does it remain appropriate to reward companies via bonuses for meeting their licence obligations or can the same regulatory objectives be met in these cases by simply applying penalties for late or non-submission?
33. Should the overall cap on annual incentives (i.e. cap on Q term) for Category A indicators be increased in PC3 to, say, 5% or 10% of each business' MAR (in relation to business' own costs, that is excluding any pass-through costs)?
34. What additional performance indicators should be included in Category B for the future PIS?
35. How should performance against Category B indicators be assessed and incentivised?
36. What cap, if any, should be applied to the overall financial adjustment made at the subsequent price control review in respect of Category B indicators?

Section 9 (Financial Adjustments)

37. Do you agree with the financial adjustments described in Section 9?
38. Are there any additional financial adjustments which are necessary at this review?
39. Should the adjustments be applied to the companies' allowed revenues over the PC3 period, or to their RAVs (to spread their effect over a longer period)?

Respondents are invited to submit to the Bureau by **13 October 2004** their views on any issues raised in this document, and any other issues which the respondent considers relevant to the review.

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