2002 Price Controls Review

Draft Proposals for PC2

September 2002

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Foreword

During 2002, the Regulation and Supervision Bureau ("the Bureau") has undertaken a review of the price controls which apply to ADWEC, TRANSCO, ADDC and AADC. These price controls determine the Maximum Allowed Revenue (MAR) that each of the companies can recover in respect of their licensed activities in any year.

The Bureau has published two Consultation Papers on the Review (in February 2002 and May 2002 respectively) and a Discussion Paper on the subject of Performance Incentive Scheme (May 2002), and has held a number of meetings with companies to discuss their views. Detailed and helpful responses have been received which have been used by the Bureau to refine and, where necessary, amend its proposed approach. The Bureau has also, separately to each company, clarified a number of issues raised by the companies.

This document sets out the Bureau's Draft Proposals for the revised price controls (the "second price controls" or "PC2"), which are due to take effect on 1 January 2003 and to last for three years.

Written responses to the Draft Proposals are requested by **15 October 2002** at the following address:

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

Following consideration of responses to the Draft Proposals, the Bureau will issue its Final Proposals in mid-November. Each company will then have 28 days within which to accept or reject the Bureau's Final Proposals in respect of that company.

Nick Carter
Director General
Regulation and Supervision Bureau

1 Summary of Draft Proposals

1.1 Introduction

During 2002, the Regulation and Supervision Bureau ("the Bureau") has undertaken a review of the price controls which presently apply to ADWEC, TRANSCO, ADDC and AADC (the "2002 Price Controls Review"). These price controls determine the Maximum Allowed Revenue (MAR) that each of the companies can recover in respect of their licensed activities in any year.

This paper sets out the Bureau's Draft Proposals on the revised or second price controls (PC2). On receipt of responses to these Draft Proposals by **15 October**, the Bureau is due to publish its Final Proposals on PC2 by mid-November.

If accepted by the companies, new price controls will come into effect on 1 January 2003, and last for three years.

1.2 Form of Controls (Section 3)

1.2.1 Retained Features of Existing Controls

Broadly speaking, the form of controls will remain as at present. That it is to say:

- Price controls will continue to be of the form CPI – X and in the form of a cap on Maximum Allowed Revenues (MAR).
- The scope of the controls will continue to be all revenue recovered in respect of licensed activities. (For ADWEC, there will continue to be a slightly different treatment of certain income streams, such as liquidated damages, as explained in the paper).
- Maximum allowed revenues in respect of "own costs" will continue to be determined by "revenue drivers" set to reflect the cost structure of the companies, and to provide desirable incentives.
- The existing "pass-through" items in the controls of ADWEC, ADDC and AADC will be retained.
- There will continue to be separate controls for each of the electricity and water businesses of TRANSCO, ADDC and AADC (and a single control for ADWEC).
- For ADDC and AADC, these controls will continue to encompass both the distribution and supply activities of the relevant business.

1.2.2 New Features of Controls

The revised price controls will incorporate some new features compared to the existing controls:

- A new term will be introduced into TRANSCO's price controls to allow the pass-through of the costs of ancillary services, subject to the existing economic purchasing obligation.
- Two new revenue drivers will be incorporated into ADWEC's price control, to reflect the number of electricity and water units sold under the BST respectively.
- The definitions of all revenue drivers have been reviewed and where necessary amended to remove any ambiguity or inconsistency in the existing definitions.
- CPI will be defined solely in terms of UAE inflation (at present, some of the controls use both UAE CPI and US CPI).
- For ADDC and AADC, the price controls will be extended in scope to also include the distribution and supply businesses assumed to have been inherited from RASCO with effect from 1 January 2001.
- A Performance Incentive Scheme, represented by a new term "Q" in the price control formulae, is being introduced to additionally link maximum allowed revenues to certain aspects of each company's performance.

1.2.3 Structure of Price Controls

The structure of each company's price controls is summarized below:

ADWEC

MAR = PWPA Costs + Fuel Costs + A + Q – K

A = a + (b × Electricity Units Sold) + (c × Water Units Sold)

TRANSCO (separate water and electricity price controls)

MAR = a + (b × Peak Demand) + (c × Metered Units Transmitted) + A + Q - K

Discos (separate water and electricity price controls)

MAR = Electricity or Water Purchase Costs + Transmission Charges + DSR + Q - K

DSR = a + (b × Number of Customers) + (c × Metered Units Distributed)

Where:

'A' for ADWEC means its maximum allowed procurement cost;

'A' for TRANSCO means its ancillary services costs;

'a' is the notified value for the fixed amount (co-efficient of revenue driver 1);

'b' is the notified value for the co-efficient of revenue driver 2;

'c' is the notified value for the co-efficient of revenue driver 3;

'DSR' is the allowed distribution and supply revenue for Discos ;

'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 year prior to the preceding year.

1.3 Revenue Driver Assumptions (Section 4)

The revenue drivers proposed for the revised price controls are summarized in **Table 1.1**.

Table 1.1 Proposed Revenue Drivers for Revised Price Controls

	Revenue Driver 1	Revenue Driver 2	Revenue Driver 3
ADWEC	Fixed amount	Electricity units sold	Water units sold
TRANSCO Electricity	Fixed amount	Peak electricity demand	Metered electricity units transmitted
TRANSCO Water	Fixed amount	Peak water demand	Metered water units transmitted
ADDC Electricity	Fixed amount	Electricity customer accounts	Metered electricity units distributed
ADDC Water	Fixed amount	Water customer accounts	Metered water units distributed
AADC Electricity	Fixed amount	Electricity customer accounts	Metered electricity units distributed
AADC Water	Fixed amount	Water customer accounts	Metered water units distributed

The definitions of all revenue drivers have been reviewed and where necessary amended to remove any ambiguity or inconsistency in the existing definitions.

Two new revenue drivers have been included for ADWEC, so that its allowed revenues in respect of its "own" costs automatically adjust to changes in proxy measures of its workload (units of electricity and water sold under the BSTs).

The projections adopted for each revenue driver are explained in section 4 of the paper. These have been set to reflect a reasonable forecast of the revenue drivers and to provide incentives to the network companies to improve metering at exit points from their respective systems.

1.4 Operating Expenditure Projections (Section 5)

The Bureau has projected operating expenditure for 2003 – 2005 on the basis that operating expenditure can remain constant in real terms at its level in 2001. This assumes that the effect on operating expenditure of demand growth over the period can be offset by efficiency improvements.

In the absence of audited accounts for 2001, the Bureau has estimated 2001 operating expenditure as the average of 2001 operating expenditure (unaudited) and 1999 operating expenditure (draft audited for all companies except TRANSCO). This approach will be updated as set out in the paper to take account of any further audited data submitted before the Final Proposals.

The resulting projections of operating expenditure for 2003 - 2005 are summarized in **Table 1.2**.

Table 1.2 Operating Expenditure Allowances in Revised Price Controls

AED m, 2003 prices	2003	2004	2005
ADWEC (1)	8.04	8.04	8.04
TRANSCO Electricity	79.37	79.37	79.37
TRANSCO Water	76.86	76.86	76.86
ADDC Electricity	182.88	182.88	182.88
ADDC Water	110.45	110.45	110.45
AADC Electricity	91.87	91.87	91.87
AADC Water	87.85	87.85	87.85

Note (1): Includes capital expenditure (ADWEC only)

ADWEC's allowed operating expenditure excludes any costs borne by ADWEC over 2003 – 2005 relating to the use of professional consultancy services by ADWEA for the procurement of IWPPs over that period. An appropriate adjustment will be made for any such costs at the 2005 Price Control Review.

1.5 Capital Expenditure and Asset Valuation for Network Companies (Section 6)

1.5.1 Past (1999 – 2002) Capital Expenditure

The first price controls made no allowance for capital expenditure over 1999 – 2002. The Bureau has agreed to remunerate companies for past efficient capital expenditure at the present review, via an appropriate adjustment to the opening (1 January 2003) Regulatory Asset Value (RAV). However, in the absence of audited data on past capital expenditure, the Bureau has made a *provisional* allowance at the present review, as summarized in **Table 1.3**. These are based on

reported levels of capital expenditure in 1999, which appear to the Bureau to be the most reliable figures.

Table 1.3 Provisional Capital Expenditure Assumptions for 1999 – 2002

AED m, 1999 prices	1999	2000	2001	2002
TRANSCO Electricity	521.8	521.8	521.8	521.8
TRANSCO Water	180.0	180.0	180.0	180.0
ADDC Electricity	262.0	262.0	262.0	262.0
ADDC Water	92.1	92.1	92.1	92.1
AADC Electricity	188.7	188.7	188.7	188.7
AADC Water	66.3	66.3	66.3	66.3

Once audited data on actual 1999 – 2002 capital expenditure is received by the Bureau, it will be reviewed against the efficiency criteria established by the Bureau. Any difference between efficient past capital expenditure and the provisional assumptions summarized in Table 1.3 will be made via an appropriate adjustment to the RAV at the 2005 Price Control Review.

1.5.2 Future (2003 – 2005) Capital Expenditure

In contrast to the initial price control review, the Bureau proposes to include an allowance for future capital expenditure at the present review. However, companies' capital expenditure projections for 2003 – 2005 do not appear to be particularly reliable. The Bureau has therefore also adopted *provisional* projections of companies' future capital expenditure, summarized in Table 1.4:

Table 1.4 Provisional Capital Expenditure Assumptions for 2003 – 2005

AED m 2003 prices	2003	2004	2005
TRANSCO Electricity	557.2	557.2	557.2
TRANSCO Water	500.0	500.0	500.0
ADDC Electricity	279.8	279.8	279.8
ADDC Water	98.4	98.4	98.4
AADC Electricity	201.5	201.5	201.5
AADC Water	70.8	70.8	70.8

The provisional allowances for 2003 – 2005 are similar to the provisional allowances for 1999 – 2002, except for TRANSCO's water business (for which the transmission system requirements of new desalination capacity means that the magnitude of past capital expenditure is regarded as a particularly unreliable indicator of the possible magnitude of future capital expenditure). (Please see Section 6.2 for more details.)

Actual capital expenditure over 2003 -2005 will be reviewed at the 2005 Price Controls Review against the Bureau's efficiency criteria, and appropriate adjustments made at that time.

1.5.3 Projected Regulatory Asset Values (RAVs)

RAVs for the next price control period have been projected as follows:

- The Opening RAVs for each company at 1 January 2003 have been calculated by rolling forward the Initial (1 January 1999) RAVs used in setting the initial price controls for provisional 1999 – 2002 capital expenditure.
- To this figure has been added the net present value (at 1 January 2003) of the financing costs foregone over 1999 - 2002 associated with the provisional 1999 – 2002 capital expenditure.
- The resulting Opening RAVs at 1 January 2003 have been rolled forward for 2003 - 2005 provisional capital expenditure to derive RAVs for each year of the control period.

The resultant opening RAVs (at 1 January each year) are summarized in **Table 1.5** (the opening RAV for 2006 also acts as the closing RAV for 2005):

Table 1.5 Opening Projected Regulatory Asset Values (RAVs)

AED m, 2003 prices	2003	2004	2005	2006
TRANSCO Electricity	5,227.4	5,550.2	5,850.8	6,129.1
TRANSCO Water	2,609.0	2,936.9	3,244.8	3,532.7
ADDC Electricity	3,892.0	3,976.1	4,048.9	4,110.5
ADDC Water	1,120.4	1,138.1	1,151.9	1,161.8
AADC Electricity	2,228.0	2,305.1	2,374.1	2,435.1
AADC Water	453.9	506.4	556.1	603.0

1.6 Cost of Capital and Profit Margin (Section 7)

For the network companies (TRANSCO, ADDC and AADC), the Bureau has assumed a real, post-tax weighted average cost of capital (WACC) of 6.0 per cent; the same as used in setting the initial price controls.

For ADWEC, which has few capital assets, the Bureau has allowed a margin on projected total BST turnover of 0.025 per cent. This has been calculated by applying the cost of capital to an estimate of the hypothetical capital that would be required by a standalone business to back the risks faced by ADWEC.

1.7 Price Control Calculations (Section 8)

Consistent with the approach taken to setting the initial price controls, the Bureau has adopted a net present value (NPV) framework to establish the level and profile of price-controlled revenue for each business for the period 2003 – 2005. The NPV of required revenue over the control period is calculated as (1) the sum of the NPVs of the opening (1 January 2003) RAV and of operating and capital expenditures over the period, minus (2) the NPV of the closing (31 December 2005) RAV. For ADWEC, the NPV of required revenue is calculated as the sum of the NPVs of expenditures and allowed profits on turnover over the period.

Different combination of the co-efficients on the revenue drivers – the "notified values" a, b, c and X - can yield an amount of revenue equal to the revenue requirement. For these Draft Proposals the notified values have been calculated by adopting the following constraints:

- 50 per cent of revenue over the price control period is recovered via the fixed revenue driver and 25 per cent of revenue is recovered from each of the other two variable revenue drivers.
- X = 0.

The resulting notified values are given in **Table 1.6**:

Table 1.6: Proposed Notified Values for Second Price Controls (2003-2005) (PC2)

		Notified Values		
	X	**a**	**b**	**c**
ADWEC Procurement	0.00	4.48 AED m	91.27 AED/GWh	14.34 AED/MIG
TRANSCO Electricity	0.00	333.05 AED m	36.67 AED/kW	0.88 fils/kWh
TRANSCO Water	0.00	223.53 AED m	255.35 AED/TIG	0.92 AED/TIG
ADDC Electricity	0.00	311.42 AED m	697.38 AED/customer account	1.03 fils/kWh
ADDC Water	0.00	130.76 AED m	329.32 AED/customer account	0.91 AED/TIG
AADC Electricity	0.00	180.02 AED m	1,021.62 AED/customer account	1.41 fils/kWh
AADC Water	0.00	69.81 AED m	985.48 AED/customer account	4.27 AED/TIG

The annual maximum allowed revenues projected for each company over the price control period in respect of "own costs" are summarized in **Table 1.7**:

Table 1.7: Projected Maximum Allowed Revenue for 2003-2005			
AED m, 2003 prices	**2003**	**2004**	**2005**
ADWEC Procurement	8.46	8.98	9.51
TRANSCO Electricity	579.91	662.45	766.80
TRANSCO Water	419.78	447.53	477.30
ADDC Electricity	592.04	624.30	655.89
ADDC Water	248.88	262.35	274.84
AADC Electricity	349.39	360.31	371.72
AADC Water	125.32	138.40	156.96

Note: Excludes pass-through costs.

1.8 Performance Incentive Scheme (Section 9)

The Bureau proposes to introduce a Performance Incentive Scheme (PIS) for each company, to provide a stronger incentive for companies to improve their performance than that exists under the present price controls.

The Bureau has proposed a number of "Category A" performance indicators, for which good (poor) performance will lead to an upwards (downwards) adjustment to maximum allowed revenues under the price control formulae (represented by the term "Q", for quality). In order to reduce risk for the companies, this adjustment in any year will be capped at 2 per cent of maximum allowed revenue in respect of "own costs" in that year.

The proposed Category A measures are summarized in **Table 1.8**, together with the incentive rates that will be applied to their performance against each measure. For the 'timeliness' indicators related to audited accounts and audited price control returns (PCRs), the Bureau proposes "glide-path" target dates for the PIS, which occur at a later date in 2003 and 2004 than the licence target dates. For technical performance indicators (i.e. energy lost for TRANSCO and customer minutes lost for Discos), the Bureau proposes that actual performance during the preceding year (audited) will act as the target for the next year.

Detailed explanations of how the incentive rates will applied are presented in the paper. In essence, the company receives a reward or penalty calculated according to the incentive rate and to the improvement or deterioration compared to the target performance for the year (the precise calculation varies from year to year).

In addition, the Bureau has proposed a number of "Category B" performance indicators which will be monitored over the next price control period.

Table 1.8: Incentive Rates for Category A Indicators			
Company / Business	**Performance Indicator**	**Incentive Rate (2003-2005)**	
ADWEC	Audited Accounts	13,000	AED per month
	Audited PCR	13,000	AED per month
	BST	3,000	AED per month
TRANSCO Electricity	Audited Accounts (Electricity)	994,000	AED per month
	Audited PCR (Electricity)	994,000	AED per month
	Energy Lost	33,000	AED / MWh
TRANSCO Water	Audited Accounts (Water)	746,000	AED per month
	Audited PCR (Water)	746,000	AED per month
ADDC Electricity	Audited Accounts (Electricity)	936,000	AED per month
	Audited PCR (Electricity)	936,000	AED per month
	Customer Minutes Lost per Customer	108,000	AED / CML per Customer
ADDC Water	Audited Accounts (Water)	437,000	AED per month
	Audited PCR (Water)	437,000	AED per month
AADC Electricity	Audited Accounts (Electricity)	540,000	AED per month
	Audited PCR (Electricity)	540,000	AED per month
	Customer Minutes Lost per Customer	15,000	AED / CML per Customer
AADC Water	Audited Accounts (Water)	231,000	AED per month
	Audited PCR (Water)	231,000	AED per month

Note: E = Electricity; W = Water; p.m. = per month of delay; MWh = MWh lost improvement; CML = Customer Minutes Lost per Customer improvement

The incentive rates vary between businesses to reflect the relative size of the businesses and, in the case of Discos' technical indicator (customer minutes lost per customer), the different starting positions of ADDC and AADC.

1.9 Next Steps

Following consideration of responses to these Draft Proposals, the Bureau will issue its Final Proposals on PC2 in mid-November, which will take effect on 1 January 2003. Each company will then have 28 days from the date of issue of the Final Proposals within which to accept or reject the Bureau's Final Proposals in respect of that company.

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), responsible for administering government policy towards the sector, restructured and unbundled the former Water and Electricity Department (WED) into a number of new sector companies:

- Four Generation and Desalination Companies (GDs).
- One "single buyer" company, the Abu Dhabi Water & Electricity Company (ADWEC) for purchase and sale of bulk supplies of water and electricity.
- Abu Dhabi Transmission & Despatch Company (TRANSCO) for despatch and transmission of both electricity and water.
- Two Distribution Companies (Discos), that is Abu Dhabi Distribution Company (ADDC) and Al Ain Distribution Company (AADC), for distribution and supply of water and electricity to customers in their respective authorized areas.

The Abu Dhabi government through ADWEA wholly owns these companies. Further, three Independent Water and Power Producers (IWPPs) have subsequently been awarded build, own and operate (BOO) contracts for three generation and desalination stations, including the sale and refurbishment of an existing plant, which has increased the number of GDs to seven.

In addition, the Abu Dhabi Company for Servicing Remote Areas (ADCSRA) (also known as 'RASCO') was established to undertake three activities: the production of water from wellfields, the operation of standby generation installed at hospitals and other sites where security of electricity supply is particularly important, and the generation, distribution and supply of water and electricity to customers in remote areas. RASCO's activities are now being undertaken by ADDC and AADC. Its distribution and supply assets and businesses have been merged with those of the two Discos with effect from 1 January 2001, whereas production activities have been contracted out to the Discos (while remaining the legal responsibility of RASCO). A final decision is yet to be taken on whether stand-by generation should be merged with the distribution businesses of the Discos.

The interactions between the sector companies are as follows:

- ADWEC purchases capacity and output from GDs under the terms of Power and Water Purchase Agreements (PWPAs). ADWEC also purchases fuel for supply to GDs.
- ADWEC then sells bulk supplies of water and electricity to the two Discos at the Bulk Supply Tariffs (BSTs).

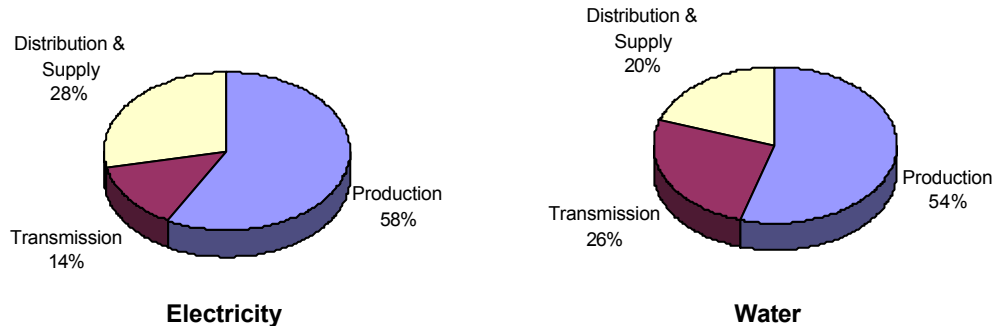
- In addition to payment of BSTs to ADWEC, Discos also pay Transmission Use of System (TUoS) charges to TRANSCO.

- Discos receive revenue from final customers and subsidy from the government.

In the case of IWPPs, the PWPA payments have been subject to an extensive competitive bidding process. ADWEA-owned GDs have not been subject to such competition. The PWPA payments for these GDs have been established in general with reference to the PWPA payments for the IWPPs. Electricity and water purchasing costs are thus subject to effective regulation via an economic purchasing obligation of ADWEC. Since the remaining businesses of TRANSCO, ADDC, AADC and ADWEC each have substantial market power, they are subject to price controls, which are the subject of this paper.

The separation of the sector into segments separately responsible for production, transmission and distribution/supply has increased the transparency of sector costs. **Figure 2.1** shows the composition of electricity and water costs in 1999, which broadly remains the same for the subsequent years. For both water and electricity, production costs account for more than half of total costs. The balance between transmission and distribution and supply, however, varies significantly for water and electricity. Transmission accounts for a higher proportion of water costs than distribution and supply but in the case of electricity distribution and supply accounts for twice the proportion of costs accounted for by transmission.

Figure 2.1: The Component Costs of Electricity & Water



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 a regulated activity requires authorization from the Bureau in the form of a licence or an exemption. It is through the licence conditions that the Bureau is able to influence the conduct of companies.

The "primary duty" (Article 53 of the Law) of the Bureau 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 Bureau's decisions can be challenged by licensees and made the subject of arbitration.

2.3 Current Price Controls (PC1)

ADWEC, TRANSCO, ADDC and AADC have charge restriction conditions in the licences granted by the Bureau which allow the Bureau to set price controls for these companies. The initial price controls (PC1) were set to run for three years starting from 1 January 1999 and were extended for a further year in 2001.

The price controls set by the Bureau are, for the most part, of a "CPI-X" type which constrains changes in the companies' overall revenue to a measure of price inflation less an amount "X" set to take into account factors such as expected efficiency improvements and smoothing of revenue over the control period. A correction factor is used to adjust for over- or under-recovery in the previous year.

Price controls were set to allow the companies to recover an efficient level of costs, including a return on capital. As discussed further elsewhere in this paper, the initial controls 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, when setting the new controls, the Bureau will take account of actual capital expenditure during the current period, provided that expenditure carried out was consistent with planning standards and was efficiently procured.

2.3.1 TRANSCO's Price Controls

TRANSCO has separate price controls on its water and electricity transmission businesses. For both water and electricity businesses, revenue in each year is determined by a formula with three

components, or "revenue drivers": a fixed term (A_{pt} and A_{wt}); an amount related to the peak demand met by the transmission system (B_{pt} and B_{wt}); and an amount related to the total throughput of the transmission system (C_{pt} and C_{wt}).

Each of these revenue drivers changes from year to year by the rate of increase in inflation less an "X" factor. The rate of inflation used in the present price control formulas is based on a composite of UAE and US consumer price indices (CPIs), weighted in the proportion 80:20. The use of US CPI was intended to recognise that much of TRANSCO's expenditure, particularly for capital items, is on imported goods, for which UAE CPI might be an inappropriate index.

The revenue drivers in 1999 and the "X" factor for the water and electricity transmission businesses are summarised in **Table 2.1** below:

Table 2.1: First Price Control Notified Values: TRANSCO

Electricity Transmission			Water Transmission		
Notified Value	**Units**	**Values**	**Notified Value**	**Units**	**Values**
A_{pt}	AED m	186.17	A_{wt}	AED m	167.58
B_{pt}	AED/kW	41.19	B_{wt}	AED/kIG	461.89
C_{pt}	AED/kWh	0.00382	C_{wt}	AED/IG	0.00065
X_{pt}		6.7	X_{wt}		6.0

The fixed terms have a comparatively high weighting, accounting for about 50 per cent of revenue in 1999. This reflects the fact that over the control period, costs are not expected to move significantly with short-term changes in demand, albeit over the longer-term transmission system costs should bear a much stronger relationship to output levels.

2.3.2 Discos' Price Controls

The price controls on the water and electricity businesses of ADDC and AADC also operate through formulae that place a ceiling on the aggregate level of revenue recoverable in each year of the control. The water and electricity price controls are broadly similar and are described here using the electricity control as an example.

Discos are allowed to pass-through the cost of purchases of electricity from ADWEC through the BST and the cost of TRANSCO's electricity transmission use-of-system charges. These two components are treated as pass-through items as they are costs over which Discos have no direct control and are regulated elsewhere.

The price controls used to determine electricity and water network and customer service revenue (denoted by "DSR", for distribution and supply revenue, in the price controls) have a similar form to those for TRANSCO. They also employ three revenue drivers and use a composite of UAE and US

CPI for indexation. One significant difference from the TRANSCO controls is that instead of a measure of peak demand, they incorporate customer numbers as a revenue driver. Whilst peak demand may well be a significant driver of costs for a distribution business, its measurement is not straightforward. Customer numbers are readily available and are likely to be a significant factor in the costs of distribution and supply.

Tables 2.2 and **2.3** summarise the main elements of the price controls that determine network and customer service revenue for the water and electricity businesses of ADDC and AADC respectively:

Table 2.2: First Price Control Notified Values: ADDC

Electricity Distribution & Supply			Water Distribution & Supply		
Notified Value	**Units**	**Values**	**Notified Value**	**Units**	**Values**
A_{pt}	AED m	141.61	A_{wt}	AED m	86.35
B_{pt}	AED/customer	1,501.79	B_{wt}	AED/customer	1,170.62
C_{pt}	AED/kWh	0.00713	C_{wt}	AED/G	0.00076
X_{pt}		8.0	X_{wt}		12.6

Table 2.3: First Price Control Notified Values: AADC

Electricity Distribution & Supply			Water Distribution & Supply		
Notified Value	**Units**	**Values**	**Notified Value**	**Units**	**Values**
A_{pt}	AED m	83.54	A_{wt}	AED m	28.4
B_{pt}	AED/customer	2,048.49	B_{wt}	AED/customer	866.24
C_{pt}	AED/kWh	0.00922	C_{wt}	AED/G	0.00699
X_{pt}		6.0	X_{wt}		11.3

Over the course of the current price control, ADDC and AADC have taken over the distribution and supply functions of RASCO in their respective areas. In future, these RASCO activities will fall within the scope of the revised price controls for ADDC and AADC. In setting revised distribution and supply price controls, account has been taken of the costs of serving the customers concerned.

2.3.3 ADWEC's Price Control

ADWEC's current price control is somewhat different to the controls for the network businesses, as most of ADWEC's costs represent payments under the PWPAs and fuel supply agreements. Linking these costs to movements in demand and general price inflation would be complex and would significantly increase the business risk of ADWEC's activities. In these circumstances, the Bureau

considers the competition required for new production capacity and ADWEC's economic purchasing obligation to be the principal means of regulating the costs of procuring water and electricity production.

Those direct costs over which ADWEC has control – its "procurement costs" - are subject to incentive regulation of the CPI-X variety. In ADWEC's case, indexation is by reference solely to UAE CPI. **Table 2.4** summarises the main elements of ADWEC's price control.

Table 2.4: First Price Control Notified Values: ADWEC

Notified Value	Units	Values
A_t	AED m	7.814
Xa_t		0.0

2.4 Progress on 2002 Price Controls Review

The initial price controls for ADWEC, TRANSCO, ADDC and AADC described above are due to be replaced to take effect from 1 January 2003. The following are the major milestones of the 2002 Price Controls Review to date:

- In ***January 2001***, the Bureau published a consultation document, *'Initial consultation on the review of price controls for Al Ain and Abu Dhabi Distribution Companies, TRANSCO and ADWEC".*

- Responses to the January 2001 Consultation Document enabled the Bureau to publish its First Consultation Paper on the 2002 Price Controls Review in ***February 2002*** describing specific issues which need to be considered in setting the revised price controls.

- Companies' responses to the First Consultation Paper contained a number of important points, which were further discussed and clarified with respondents during ***March-May 2002***. This enabled the Bureau to develop its thinking in relation to the revised price controls.

- Subsequent to publication of the First Consultation Paper in February, the Bureau also asked the price-controlled companies to complete Price Control Information Submissions (PCSs) covering the period 1999-2007. In addition to past data, these submissions include projections of demand for the period 2003 – 2007 and estimates of the costs each company expects to incur in meeting projected demands. The Bureau analyzed these submissions, sought clarifications on specific items and held detailed discussions with the companies during ***April-June 2002*** and subsequently. The Bureau has also been provided with the draft audited accounts of the companies for 1999 for all companies except TRANSCO. In response to detailed discussions, companies in some cases furnished to the Bureau revised Price Control Information

Submissions, which have been extensively used as the basis of the Draft Proposals contained in this paper.

- In the meantime, companies have also submitted to the Bureau their un-audited Price Control Returns (PCRs) comparing their income to the maximum allowed revenues under the initial price controls. These returns have greatly supplemented the Bureau's analysis of the submissions, particularly as concerns the revenue drivers in the first price controls.

- In ***May 2002***, the Bureau published its Second Consultation Paper on the 2002 Price Controls Review, setting out for further consultation the Bureau's then-current thinking on the issues raised in the First Consultation Paper. To accompany this Second Consultation Paper, the Bureau also published a Discussion Paper on the subject of Performance Incentive Scheme (PIS). The PIS was proposed to develop links between important aspects of each company's performance and its price controls so that the company can be rewarded for improved output performance and penalized for deteriorating output performance.

- The Bureau made separate presentations to each company on its proposals on the PIS during ***June-July 2002***. The initial reactions of the price-controlled companies to the PIS at the Bureau's presentations were very useful to the Bureau in developing and refining its proposals.

- On ***30 June 2002***, the Bureau received detailed and timely responses from three of the four price-controlled companies to the Second Consultation Paper and PIS Discussion Paper. These responses raised a number of important and useful points, which are described in this paper. The Bureau thought it appropriate to clarify and respond to many of these points, separately to each company, in advance of the Draft Proposals. Accordingly, the Bureau sent its detailed comments on the companies' responses, supported by further research and review, during ***June-July 2002***, which are also described in this paper, where appropriate.

- The Bureau has indicated to the companies that, based on the consideration of their comments, it is minded to modify or further refine some aspects of the proposed PIS and its earlier thinking on the revised price controls. The Bureau's views on these matters are clarified in this paper.

- In **early August 2002**, the Bureau wrote to the companies explaining its intended approach for the Draft Proposals to developing cost projections for 2003-2005 which had emerged out of the earlier consultation exercise.

- In **mid August 2002**, the Bureau wrote to the companies reminding them for the information which the Bureau requested or which the companies offered to submit and extending the timetable by a short period to allow companies more time to submit the requisite information.

Appendix A to this paper lists all the Bureau's publications and responses, and all of the companies' responses and submissions on the 2002 Price Control Review, along with their dates of issue or receipt.

2.5 Bureau's Earlier Thinking

The following is the summary of the Bureau's earlier thinking on the issues relating to the 2002 Price Control Review, as set out in the Second Consultation Paper and the PIS Discussion Paper issued in May 2002. The Bureau has received responses from the companies to these papers, which are discussed in detail in the relevant sections of this paper. Based on the consideration of the companies' responses, some of the earlier proposals (summarized below) have been modified or refined as described in other sections of this paper.

Type of Regulation

- It was proposed that the price controls should remain of the form CPI-X.

Duration of Controls

- It was proposed that the revised price controls should be of three years' duration, covering the period 1 January 2003 – 31 December 2005 inclusive.

Form of Control

- It was proposed that the form of each control should remain as a cap on revenue.

- It was proposed that price controls for TRANSCO, ADDC and AADC should continue to have the same revenue drivers as the present controls, with necessary clarification of "units distributed" and other terms.

- It was suggested that a new revenue driver for ADWEC should be considered to link its allowed revenue to increases in its workload.

Scope of Controls

- It was proposed that price control of each company should continue to cover all elements of revenues from its customers (including subsidy from the government in the case of ADDC and AADC).

- It was suggested that the case for separate controls for ADDC's and AADC's distribution and supply activities required further consideration. The Bureau proposed to proceed with its analysis in such a way as to enable the separation of the controls should this be required. In case a separation of controls is required, the Bureau's current thinking was to have for each distribution company one supply price control covering both water and electricity.

Asset Valuation

- It was proposed that there will be no further adjustments to the initial (1 January 1999) regulatory asset value for any company.

- The Bureau proposed not to adjust the opening (1 January 2003) regulatory asset value to reflect any failures by companies to achieve the performance levels assumed when the initial price controls were set.

- The degree to which actual capital expenditure incurred over 1999 – 2002 inclusive should be financed within the revised price controls required further analysis being undertaken by the Bureau.

- It was suggested that the financing of capital expenditure over 2003 – 2005 within the revised price controls required further consideration. The Bureau's current thinking was to include some allowance for future capital expenditure in the revised price controls.

Cost of Capital

- It was proposed that the cost of capital for ADDC, AADC and TRANSCO will be assumed to be 6 per cent (in real post-tax terms), applied to the regulatory asset value projected for each year of the control.

- It was proposed that the allowed rate of return for ADWEC should be calculated as a margin on its overall turnover, set in relation to the risks to which it will be exposed. ADWEC's exposure to risks associated with forecasting the BST will be reviewed at the request of the company.

Assessing Future Costs

- The Bureau proposed to assess companies' future operating expenditure requirements by adjusting present costs for demand growth and improvements in efficiency.

- The Bureau proposed to assume that each of the companies can improve their efficiency on average over 2003 – 2005 by 3 – 7 per cent a year in real terms, after allowing for any increases in costs due to increases in demand over the period.

- It was proposed that future operating expenditures would be forecast and financed within the revised price controls (i.e., there would be no additional pass-through items in the price controls).

- It was proposed that "CPI" in the CPI-X formula would be defined for each company solely in terms of UAE inflation. Allowance for any anticipated movements in real input prices would be made in the cost projections.

Performance Incentive Scheme (PIS)

The Bureau's May 2002 proposals were as follows:

- The CPI – X price controls will be supplemented by a Performance Incentive Scheme (PIS) for each company, to ensure companies have an incentive to improve the quality of their service as well as their cost efficiency.

- A new term ("Q", for "Quality") will be added to the current CPI-X price control formula for each company. The mechanism to calculate "Q" needs further consideration.

- The performance in year 't' should be rewarded through an annual adjustment to the revenue in year 't+2'.

- The scale of incentives and penalties should be equal (i.e. symmetric).

- The benchmarks or targets for performance should be set on the basis of companies' past/current performance or as per the requirements of the Law, licences and regulations, as the case may be.

- The size of reward or penalty will be based on the Bureau's view on customer's willingness to pay (WTP), cross-checked against the cost of improving performance, unless the companies provide superior data on WTP.

- The total annual incentives and penalties for each company should be capped as a proportion (say 5% or 10%) of their 'own' annual revenue, i.e., ADWEC's procurement cost, TRANSCO's total price control revenue and Discos' distribution and supply related revenue.

- Certain exceptional events should be excluded from the PIS if they meet the necessary criteria.

- Companies should provide their annual performance data for each year for all the agreed performance indicators by the end of first quarter of the following year, accompanied by an unqualified certificate of robustness and accuracy from the independent suitably qualified professional firm approved by the Bureau.

- There should be a number of performance indicators for Category A (to be monitored and incentivised during the period 2003-2005) and Category B (to be monitored over the period 2003-2005, without any mechanistic incentive or penalty as part of new price controls, but may be subject to a financial adjustment at the subsequent (2005) price controls review for a superior or poor performance). These performance indicators should meet the necessary criteria of being measurable, verifiable, non-manipulable, non-distortionary and customer-oriented.

2.6 Remaining Milestones for 2002 Price Controls Review

As the Bureau has allowed more time for the companies to submit certain data and information required for the Draft Proposals, the original timetable for the 2002 Price Controls Review agreed with the companies and set out in the First and Second Consultation Papers has been slightly modified. This has resulted in an extension of the remaining milestones of the review by about two weeks. The main milestones for the remainder of the review are as follows:

Table 2.5: 2002 Price Control Review Timetable

By 15 October	Companies to respond to Draft Proposals
By mid November	Bureau to publish Final Proposals
1 January 2003	New price controls to be effective

3 Form of Controls

3.1 Type of Regulation

The existing price controls in the sector are of the form CPI-X. This means that 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.

CPI-X is a popular form of price control in regulated sectors in a number of countries because of the strong incentives it provides for regulated companies to improve their efficiency. CPI-X is often contrasted with "rate of return" regulation, in which prices are reset more frequently, perhaps annually. While generally regarded as inferior to CPI-X in relation to the incentives it provides to improve efficiency, the fact that prices are reset more frequently under rate of return regulation reduces the risk that allowed prices deviate from cost, and hence may facilitate lower financing costs (i.e., a lower cost of capital) than CPI-X regulation. In practice, the two types of regulation contain many similarities, and the main difference between the two relates to the length of the "regulatory lag" – the period between the resetting of price controls.

In the Second Consultation Paper, the Bureau proposed that the price controls for all the companies should remain of the form CPI-X. Regulated companies continue to support the use of CPI-X regulation, which is therefore used as the basis for the Draft Proposals.

3.2 Duration of Controls

The present price controls were set for three years (1999 – 2001 inclusive), and were extended in 2001 for a further year (to 31 December 2002). The January 2001 Initial Consultation Document suggested that the duration of the new controls could be five years, in the hope that companies can be expected to have improved information and data that would make assessments of present costs and projections of future costs less uncertain. A price control duration in excess of three years would be consistent with best practice elsewhere, notably in the UK, and would improve incentives for efficiency. In responding to that document, the companies generally expressed a preference for a control of shorter duration, on the grounds of the uncertainties within the sector.

On the basis of a further year's experience, the First Consultation Paper considered that the quality of data in the sector remains very disappointing and that the processes that are in place within the companies to develop accurate projections of future costs are inadequate. 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.

The Bureau therefore proposed in the First and Second Consultation Papers that the revised price controls should be of three years' duration, covering the period 1 January 2003 – 31 December 2005

inclusive. This proposal was supported by all the respondents, except for ADDC, which supported a movement towards a longer control period of five years. However, it considered a shorter period appropriate for the new price controls if the controls were to be split between distribution and supply businesses. Although the Draft Proposals are based on the continuation of combined price controls for distribution and supply businesses of Discos (the reasons for which are explained in Section 3.3 below), the Bureau considers a three-year control period remains appropriate for the new price controls in view of responses from all other companies and the continuing poor quality of data available from the companies. This is the basis of the Draft Proposals set out in this paper.

3.3 Separation of Controls

3.3.1 Overall Approach

Presently, there are separate price controls for the water and electricity businesses of the three network companies. There is no such separation of controls for water and electricity procurement activities of ADWEC. The Bureau intends to continue with this approach for the revised price controls.

3.3.2 Discos' Distribution and Supply Businesses

The First Consultation Paper presented the argument for introducing separating price controls for ADDC's and AADC's distribution and supply businesses. The principal argument in favour of such a separation is that it may help to facilitate the introduction of competition into the supply business activities. It would also reflect the licence requirement of both companies to produce separate accounts for their electricity and water distribution and supply businesses.

On the other hand, the introduction of competition into supply is not a high priority in the sector at the present time, the accurate determination of tariffs is more related to the preparation of separate accounts than to separate controls, and the Bureau does not wish to introduce any unnecessary changes to price control arrangements which might reduce the understanding of the price control mechanisms within the companies or among their customers.

The Bureau asked the two Discos to produce common principles for the allocation of costs between distribution and supply. The Second Consultation Paper indicated that the Bureau was concerned that both companies, particularly AADC, had not been able to respond in a timely manner to the Bureau's request for the submission of data to support the revised price controls. Were a separate supply price control (or controls) to be introduced on the basis of an inadequate understanding of costs, this might prove more detrimental than beneficial to the introduction of competition in supply.

In view of the above, the Second Consultation Paper proposed that the Bureau would keep under consideration the desirability and practicality of introducing separate controls for distribution and supply at the present review. The Bureau would proceed with its analysis in such a way as to enable the separation of the controls should this be required. In case a separation of controls is required, the Bureau's then-thinking was to have for each distribution company one supply price control covering

both water and electricity, as supported by respondents in view of the existing organizational structures of the distribution companies and the relatively lesser information that would be required compared to separate supply price controls for water and electricity.

In its response to the Second Consultation Paper, ADDC has supported the separate price controls for distribution and supply businesses if attainable. However, in general, the Bureau has not been able to receive reasonably accurate cost and other data from companies. In particular, audited accounts for the companies as a whole and for their separate businesses for the period 1999 – 2001 are not yet available. The Bureau does not consider it appropriate to rely on such data to set separate price controls for distribution and supply businesses. Therefore, the Draft Proposals set out in this paper are based on the combined price controls for distribution and supply businesses.

3.3.3 TRANSCO's Settlement Function

The January 2001 Initial Consultation Paper considered that a mechanism may be included in TRANSCO's price controls to recover the costs of its settlement function. Linking the revenue that TRANSCO is allowed to collect from its settlement function to its performance in regard to the timely and accurate provision of data would provide TRANSCO with an incentive to ensure systems are in place and data is available to facilitate the timely settlement of financial transactions. TRANSCO's customers supported this proposal. The First Consultation Paper indicated that the Bureau would like to consider this issue within the framework of PIS rather than through the main price control formula. Accordingly, the Bureau proposed in the PIS Discussion Paper a performance indicator on the timeliness of settlement and planning data (which is further discussed in Section 9 of this paper). The Draft Proposals contained in this paper are therefore based on only two separate price controls for TRANSCO, that is for its electricity and water transmission businesses, respectively.

3.4 Scope of Controls

3.4.1 Overall Approach

Broadly speaking, each company's existing revenue cap covers 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 is automatically deducted from the revenue which can be recovered from other customers.

In its First and Second Consultation Papers, the Bureau proposed continuation of this existing broad approach on the grounds that:

- There is 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 is not sufficiently reliable to enable the control to focus on a narrower subset of any company's cost.

The Second Consultation Paper expressed great concern that companies have so far been unable to produce audited accounting data even at the level of their activities in aggregate. Until the quality of such data throughout the sector improves substantially, it would be difficult for the Bureau to reduce the existing broad scope of the price controls.

The Bureau therefore intends to continue with this approach for the new price controls. That is, the revised price controls of each company should continue to cover all elements of revenues from its customers in relation to their licensed activities (including subsidy from the government in the case of ADDC and AADC). This is the basis of the Draft Proposals set out in this paper.

For ADWEC, there is a slightly different treatment, in that 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. For the revised price controls, such income for ADWEC is further discussed in Section 7.2 of this paper in relation to profit margin for ADWEC.

In its response to the Second Consultation Paper, ADDC has indicated that it understands that the scope of its price control will not include revenue from the Central Laboratory nor from any management contract in respect of RASCO's generation activities. The Bureau concurs with this assessment, as these are not licensed activities (should ADDC or AADC wish to undertake them, they will need to apply to the Bureau for a licence consent). However, all income received from customers in respect of licensed activities, including income from any fines or penalties paid by customers, will be covered by the scope of the price controls.

3.4.2 Subsidy to the Sector

In the case of Discos, revenue received from the government in the form of subsidy is – or should be - calculated as the residual of the maximum allowed revenue (MAR) once revenue received from customers is known.

In its response to the Second Consultation Paper, ADDC has expressed concern about the impact of the transfer of RASCO assets on its total revenue in view of how the calculation of subsidy has been agreed between ADDC and ADWEA. ADDC has also sought clarification on how the price control formula and subsidy calculation compliment each other.

The Bureau has asked ADDC to clarify its understanding of the method ADWEA/ADDC uses to estimate the subsidy for RASCO. As regards the subsidy to each Disco, the Bureau has clarified to ADDC that the subsidy in each year should be calculated as the difference between (i) the MAR under the price control formula for that year and (ii) the revenue recovered from the customers in respect of that year. The same principle will apply with RASCO distribution and supply activities being incorporated into the revised price controls. The Bureau does not recognize any other method for calculation of subsidy for Discos.

3.4.3 Connection and Use of System charges

MAR relates to all licensed activities. In the case of TRANSCO and Discos, connection charge revenues should be deducted from their MARs before the calculation of transmission use-of-system (TUoS) charges for TRANSCO and of customer revenue and government subsidy for Discos.

3.4.4 Discos' Distribution and Supply Activities inherited from RASCO

In the Second Consultation Paper, the Bureau clarified that the scope of Discos' price controls would be extended to include the distribution and supply business activities which they have inherited in 2001 from RASCO.

The Bureau has separately clarified to ADDC that the revised price controls for the Discos will include the value of distribution and supply assets inherited from RASCO, keeping in view the agreed purchase price of assets. If the agreed purchase price of assets is not available at the time of this review, any necessary adjustments will be made to the price controls at the next review. The Draft Proposals set out in this paper are based on data and information provided by Discos in their Price Control Information Submissions (which do not indicate any purchase price of distribution and supply assets inherited from RASCO).

No adjustment to the RAVs have been made for any asset transfers to or from licensed companies over the first price control period. The need for any such adjustments will be reviewed once audited data for 1999–2002 has been received. Any adjustment found to be necessary would be implemented via an adjustment to the RAV at the 2005 Price Control Review such as to have the same effect in net present value terms as if the RAV had been adjusted at the time of the transfer. In principle, the Bureau would only anticipate the need to consider such an adjustment if the assets concerned are related to the licensee's licensed business and if there was a financial payment associated with the transfer.

3.4.5 Discos' Supplies to New Large Customers

There has been some developments in the sector in relation to new large customers to be supplied by Discos under the terms of special supply contracts, in pursuance of their licence conditions, with supply terms different from standard customer tariffs (where this can be justified by reference to costs). In response to the First Consultation Paper, ADDC argued that the existing structure of its price control formula may not finance it adequately for the costs of supplying new large customers.

The Second Consultation Paper clarified that the Bureau recognizes that the "fixed" amount within the Discos' price control formulae may not fully reflect the fixed costs associated with an individual large customer. However it will reflect the *average* fixed costs across all customers forecast to be supplied over the period. Any potential shortfall can therefore be alleviated when setting the price controls if Discos prepare more accurate forecasts of future demand, including demand anticipated from new large customers.

In its response to the Second Consultation Paper, ADDC has argued that the costs to develop, maintain and implement any special supply terms contract will be higher than that for the average tariff customer. The Bureau has clarified to ADDC that the revised price controls will be set to recover an efficient level of costs, including the cost of administering 'contract' customers. The Bureau assumes that such costs were reflected in the cost projections provided by ADDC in its Price Control Information Submission. If not, ADDC has been requested to provide the details on the number of contract customers, with their maximum demand and consumption, and estimates of costs required to develop, maintain and implement these contracts in comparison with the average cost related to the average tariff customer.

Pending the receipt of this information, the Draft Proposals have been developed on the basis of cost information provided to the Bureau by ADDC in its Price Control Information Submission.

3.4.6 TRANSCO Ancillary Services Procurement

TRANSCO has raised the question of the financing within its price control of any ancillary services which it purchases from production companies (to date these have been zero). The Second Consultation Paper indicated that the lack of reliable accounting information from the sector means that the Bureau would be reluctant to rely on an approach that would allow costs relating to ancillary services procurement to be "passed through" to TRANSCO's customers, as suggested by TRANSCO. That document also pointed out that there may be any trade-off between the level of ancillary services purchased by TRANSCO and its other transmission costs. Were pass-through of ancillary services to be allowed, TRANSCO may have an incentive to reduce its transmission costs by purchasing ancillary services beyond the optimal level.

In its response to the Second Consultation Paper, TRANSCO sought to alleviate these concerns and strongly recommended the need to incorporate a method to finance ancillary services into its price control formula. The Bureau has therefore reconsidered the issue and as a result has amended its proposed approach.

The Bureau understands that the lack of development of ancillary services to date may be due to the overlapping responsibilities of ADWEC and TRANSCO for procurement of ancillary services, the absence of established pricing rules, the lack of clarity on separation between certain ancillary services and on their procurement over and above PWPA payments, and the unavailability of data required to establish the technical limits and capabilities of the power units in relation to ancillary services.

The Bureau appreciates the initiative taken by TRANSCO by issuing a discussion paper in April 2002, which raises important issues for consideration of the concerned parties. The Bureau considers it desirable to agree with ADWEC and particularly with TRANSCO on certain broad principles before any procurement mechanism and contractual arrangement are agreed upon between TRANSCO and the GDs.

It has been clarified to TRANSCO that the Bureau could only support the pass-through of ancillary services costs under the price controls provided a robust arrangement is in place for TRANSCO to provide the Bureau with reliable accounting information on ancillary services costs.

The Bureau has further clarified to TRANSCO that, to some extent, there exists a trade-off between the design of transmission system (and hence TRANSCO's expenditure) and the amount of ancillary services required. Hence, were ancillary costs to be allowed to be passed through without proper verification, there would be a risk that TRANSCO may delay or even not undertake a capital expenditure that would have more efficiently reduced the amount of Ancillary Services. This could increase overall TRANSCO costs, ultimately at the expense of customers. TRANSCO requested that the Bureau provide an example. The best example is that of reactive power, whose requirements could either be reduced by a design and specification of the transmission system or be purchased from GDs or Discos as an ancillary service. Such a trade-off necessitates establishment of necessary criteria or standards to ensure the most economic or efficient mix of the capital expenditure on transmission system and the cost of ancillary services.

The Bureau sees some merits in TRANSCO's suggestion that ancillary services be introduced as a new pass through item within its price control, subject to certain conditions. Therefore, the Draft Proposals set out in this paper have been developed with the ancillary services costs during the period 2003-2005 as a pass-through item under the price controls, subject to the economic purchasing obligation for ancillary services that already exists in TRANSCO's licence. This is similar to the treatment of ancillary services within ADWEC's price control, the costs of which are passed through to customers (through the 'PWPA' term of the price control formula in that case), again subject to economic purchasing obligation. In the absence of any established pricing and procurement regime for ancillary services in the sector, the Bureau has proposed to TRANSCO its preferred approach to monitoring of TRANSCO's economic purchasing obligation through the use of an opinion of a suitably-qualified professional firm as part of the audited price control returns.

3.5 Structure of Controls

3.5.1 Overall Structure

The First and Second Consultation Papers proposed a continuation of the existing form of control, whereby each of the companies is subject to a control on the maximum revenue which it is allowed to recover each year. This maximum allowed revenue (MAR) is set in relation to the magnitude of various "revenue drivers" which, broadly-speaking, reflect the cost structure of each company (as well as other considerations, such as incentives to improve metering). A full description of the existing price controls for each company is provided in section 2 of this paper.

Such an approach reduces companies' exposure to the risks associated with the rapid pace of growth of water and electricity demand in the Emirate of Abu Dhabi.

None of the respondents dissented to this overall approach, which has therefore been retained for the revised price controls. As proposed in the First and Second Consultation Papers, the selection and

calibration of revenue drivers has been undertaken in a manner designed to ensure that companies are protected from undue risks arising from future changes in demand while at the same time providing the companies with desirable incentives (e.g. to reduce network losses, to improve the extent and accuracy of metering).

The Bureau has undertaken a review of the "revenue drivers" used in the existing price controls and has proposed new definitions of these drivers in Section 4 of this paper. The Bureau has also proposed the inclusion of two new revenue drivers in ADWEC's price control. The following sub-sections present a discussion of the drivers for each company and of the Bureau's view, which is the basis of the Draft Proposals set out in this paper.

In comparison with the existing price control formulas, a new term 'Q' (which could be positive or negative) has been added to the price control formula for each business to incentivise performance under the PIS for the next control period. This is further discussed in Section 9 of this paper.

3.5.2 Structure of ADWEC's Price Control

The Second Consultation Paper proposed that ADWEC's control (which at present consists solely of a constant term, subject to the CPI-X formula) should also include a measure of its "activity" or workload. This will reduce ADWEC's exposure to risks associated with potential increases to its own costs arising from unexpected increases in its workload, a concern which had been emphasized by the company. The Bureau indicated that installed electricity and/or water capacity, the number of ADWEA-owned GDs, and the number of IWPPs were possible activity-based revenue drivers for ADWEC.

In its response to the Second Consultation Paper, ADWEC has identified potential shortcomings for all of these revenue drivers particularly in respect of their individual relationship with ADWEC's costs.

The Bureau has clarified to ADWEC that it has not suggested that only one revenue driver can fully reflect the costs and associated risks faced by ADWEC. Clearly though, inclusion of even one such revenue driver would reduce such risks compared to a price control formula that contained solely a fixed element, as at present. The Bureau's view was that the main activities of ADWEC (planning, PWPA and Fuel contract negotiation and administration, BST calculations, invoice settlement, etc.) are functions of the amount of capacity and related output, and of the number of producers. However, the Bureau's preference would be to keep the price control formula as simple as possible by keeping the number of revenue drivers to the necessary minimum. This will not only make the price control formula easy to understand and apply but also reduce the audit burden on ADWEC in relation to the audited price control returns (which would also involve audit of actual amounts of revenue drivers for the year concerned).

On further consideration of the matter, the Bureau considers that a better revenue driver for ADWEC would be the number of units (GWh or MIG) sold under the BST. In fact, Northern Ireland Electricity plc (NIE)'s Power Procurement Business (PPB) has the numbers of BST and non-BST

units sold as the only revenue drivers in its price control formula for the procurement cost. The Bureau considers the number of units sold to Discos as an appropriate revenue driver for ADWEC since it is more customer-focused and output-based measure than the other possible revenue drivers.

The Bureau therefore proposes that the price control for ADWEC's procurement cost should comprise of three terms: a fixed amount, a term related to electricity units sold under the BST and a term related to water units sold under the BST. This is the basis of the Draft Proposals set out in this paper. PWPA and fuel costs remain pass-through under the price controls.

The proposed structure of price control for ADWEC is therefore as follows:

$$MAR = \text{PWPA Costs} + \text{Fuel Costs} + \text{Allowed Procurement Cost (A)} + Q - K$$

$$A = a + (b \times \text{Electricity Units Sold}) + (c \times \text{Water Units Sold})$$

K is the correction factor to adjust for any under or over-recovery in the previous year; and a, b and c are the co-efficients of the revenue drivers, discussed in Section 8.

3.5.3 Structure of TRANSCO's Price Controls

In its response to the Second Consultation Paper, TRANSCO has accepted that peak demand and throughput (i.e. units transmitted) are the appropriate cost and revenue drivers for its capital expenditure. However, TRANSCO has argued that they are not appropriate cost drivers in relation to its operating expenditure which it considers mainly driven by the number of its assets to be maintained.

It has been clarified to TRANSCO that the "revenue drivers" in the price controls are intended not only to reflect the cost structure of the concerned company but also other considerations such as incentives to improve performance. The Bureau has also noted that capital expenditure accounts for the majority of TRANSCO's costs. Therefore, assuming it is sensible to have a limited number of revenue drivers, it seems appropriate to choose revenue drivers that represent the most significant cost components of the company.

TRANSCO has not mentioned any price control example from elsewhere to justify a measure of the number of assets as a revenue driver. Rather, the examples or arguments offered by TRANSCO relate to how the amount or value of assets have been used by regulators in deriving cost projections underlying the price control, which is also the basis of Bureau's price control calculation in 1999 and of the Draft Proposals set out in this paper.

TRANSCO has quoted from a consultant's report on National Grid Company's (NGC) operating cost efficiency for NGC's latest price control review, that GWh as a cost driver has significant drawbacks in that it is affected by economic cycles and the increase in embedded generation in the UK and therefore may have a poor relationship with the activity of transmission companies, which is essentially asset driven. The Bureau has clarified that this assessment should be seen in the specific

context of NGC in England and Wales, where electricity demand is broadly stable. In the case of TRANSCO in Abu Dhabi, the GWh transmitted has been increasing rapidly in recent years and this trend is expected to continue for the foreseeable future. Furthermore, in contrast to the UK, there has not been an increase in embedded generation (nor desalination) in the Emirate of Abu Dhabi, nor is it expected in the near future. These factors limit the relevance to TRANSCO of the examples it quoted. In any case, even if it were accepted that there were any drawbacks in GWh as a revenue driver, this would be offset by the use of maximum demand (MW) as the second revenue driver which is closely correlated with the transmission assets required.

TRANSCO has stated that NGC's Transmission Owner (TO) present price control does not include any factor for maximum demand or throughput. On the contrary, the Bureau understands that NGC's present TO price controls do involve 'G' factors relating to the capacity in GW of new generator connections. In any case, TRANSCO's argument needs to be assessed keeping in view the difference in situations faced by NGC and TRANSCO. Fixing a revenue cap under a price control without having regard to growing demand in Abu Dhabi would subject TRANSCO to a substantial risk of not recovering its increasing costs incurred to meet the growing demand. In addition to protecting TRANSCO, linking its revenue to peak demand and to throughput will also incentivise it to meet the growing demand and hence will protect its customers.

Contrary to TRANSCO's arguments, the following examples support the use of maximum demand and/or throughput as the revenue drivers for the price controls: NIE's transmission and distribution price controls (for which the revenue drivers are the volume of electricity transmitted and distributed); NGC's first two price controls (system maximum demand); price controls that existed in 2000 for UK Transco's gas transportation business and for the PES distribution businesses (volume of energy transported or distributed); price controls for electricity transmission businesses of ScottishPower and Scottish Hydro-Electric (units transmitted); and revenue caps on electricity network businesses (TransGrid and six distributors) in New South Wales (volume of electricity transported and volume of electricity sold).

TRANSCO has reiterated its earlier proposal for considering the number of "circuit-ends" as a revenue driver for its new price controls, which the Bureau considers is a continuation (and more precise explanation) of its proposal for the 'number of assets'. In addition to the above comments, the Bureau is concerned that using the number of assets as a revenue driver may induce the company concerned to install an excessive number of such assets even where, strictly-speaking, that are not needed, or are not needed in such number, in order to provide the outputs experienced by customers. TRANSCO has not explained how the number of circuit-ends is not open to such manipulation. Rather it has referred to the transmission network Security Standards (to safeguard against any such manipulation). These standards have not yet been established by TRANSCO to the Bureau's satisfaction.

Finally, TRANSCO has implicitly suggested other revenue drivers for its operating expenditure such as the number of substations/pumping stations, number of transformers/pumps, number of switches/valves, kilometers of cable, overhead lines and pipelines: The Bureau would like to

reiterate that it is a matter of principle that the price control should be focused on outputs which are delivered to customers rather than on intermediate factors in which the customer has no direct interest.

The Bureau proposes that TRANSCO's revenue drivers should therefore continue to be a fixed amount, an amount related to peak demand and an amount related to metered units transmitted. In addition, the Bureau proposes inclusion of a new term for pass-through of ancillary services costs (A), subject to conditions set out in Section 3.4 relating to the existing economic purchase obligation (licence condition 18). The number of units transmitted should be the number of units measured as having been delivered to Discos, to provide TRANSCO with incentives to reduce losses on its system and to improve the metering of water and electricity leaving its system (while avoiding any double-counting of incentives under the PIS). Precise definitions of revenue drivers to this effect are set out in Section 4 of this paper and are the basis of the Draft Proposals.

The proposed structure of each of the separate price controls for the water and electricity transmission businesses of TRANSCO is as follows:

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

3.5.4 Structure of Discos' Price Controls

There has been no objection to the proposal in the First and Second Consultation Papers that revenue drivers for ADDC and AADC should continue to be a fixed amount, an amount related to units distributed and an amount related to the number of customers. The Bureau has also reviewed the existing licence definitions of these terms to remove any ambiguity that may exist as to the meaning of "units distributed", and to remove any unnecessary inconsistency between how "number of customers" is defined for ADDC and AADC respectively. In the case of units distributed, the revenue drivers should be defined in terms of the number of units measured as having been delivered to final customers, to provide Discos with incentives to reduce losses on their systems and to improve the metering of water and electricity leaving their networks (while avoiding any double-counting of incentives under PIS). Precise definitions of revenue drivers to this effect are set out in Section 4 of this paper and are the basis of the Draft Proposals.

As explained earlier, the Bureau proposes to continue with single controls covering the Disco's distribution and supply activities. The proposed structure of each of two separate price controls for water and electricity distribution and supply businesses of Discos is therefore as follows ("DSR" refers to distribution and supply revenue):

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

$$\text{Distribution and Supply Revenue (DSR)} = a + (b \times \text{Number of Customers}) + (c \times \text{Units Distributed})$$

3.5.5 Definition of CPI

It is necessary to define the term CPI used in the CPI-X price controls. Under the present controls of TRANSCO, ADDC and AADC, "CPI" is a weighted average of UAE CPI inflation and US CPI inflation. For ADWEC, "CPI" is defined solely in terms of UAE CPI inflation. The use of US CPI was intended to recognize that much of network companies' expenditures, particularly on capital items, is on imported goods, for which the UAE CPI might be an inappropriate index.

However, as explained in the Second Consultation Paper, the Bureau regards this as an imperfect way of dealing with the risk, since the input prices to which the companies are exposed may not be closely correlated with US inflation. Rather, input prices will be affected by inflation in suppliers' own countries, or by the world market, even if expressed in US dollars. The Bureau has therefore proposed to define CPI in the CPI-X formulae solely in terms of UAE inflation, and to instead address input price risks via specific adjustments to the cost projections to take account of any expected movements in real input prices or other "external" impacts on costs. None of the companies has provided the Bureau with any evidence or data for such specific adjustments to the cost projections. Nor has the Bureau yet seen conclusive evidence that the worldwide slowdown has led to a reduction in international construction prices, as has been suggested. The cost projections used in the Draft Proposals as set out in this paper therefore do not include any such adjustments.

4 Revenue Driver Assumptions

4.1 The Need for Assumptions

The notified values a, b, c and X are determined for each business by setting the total allowed revenue equal, in present value terms, to the total required revenue over the control period. The required revenue is determined from the projections adopted by the Bureau, as explained later in this paper. Given the structure of the price control formulae (being based on 'revenue drivers'), the calculation of the maximum allowed revenue in accordance with the price control formula requires reasonable assumptions at the time of setting the price controls of revenue driver data such as customer numbers and units transmitted or distributed over the control period.

These assumptions have serious implications for the accuracy of the price controls and therefore required 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.

Nonetheless, there may be occasions when it is not possible to accurately predict the revenue drivers. For example, in the first price controls, the "units distributed" revenue drivers for the Discos were based on the number of metered units, in order to provide an incentive for the companies to improve the extent of metering. The accuracy of the projection, and hence of whether the companies concerned earned higher or lower revenue and profits than assumed when setting the price controls, depends on how they responded to this incentive.

It is therefore important to clearly define the revenue drivers at the outset and make careful and reasonable assumptions of their projections for the control period.

4.2 Definitions of Revenue Drivers

The Bureau has undertaken a detailed review of the existing definitions of the "revenue drivers" set out in the companies' licences and used in setting the initial price controls. The review has indicated

a need to modify certain aspects of these definitions. Further, the two new revenue drivers proposed for ADWEC also need precise definitions. The Bureau's proposed definitions of all the revenue drivers for the revised price controls are presented in **Table 4.1**, followed by a discussion which highlights their important differences from the revenue drivers adopted for the first price controls.

Table 4.1 Proposed Definitions of Revenue Drivers for Revised Price Controls

Company	Revenue Driver	Proposed Definition
ADWEC	**Electricity Units Sold**	The aggregate quantity of electricity units (expressed in kilowatt-hours) sold to licensed distribution operators in relevant year t as metered or otherwise measured or reasonably calculated at transmission supply points.
	Water Units Sold	The aggregate quantity of water units (expressed in imperial gallons) sold to licensed distribution operators in relevant year t as metered or otherwise measured or reasonably calculated at transmission supply points.
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.
Discos (ADDC and 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.

As at present, annual revenue driver data will require to be audited as part of the Price Control Return (PCR) to be submitted by the companies to the Bureau by 31 March each year (licence target date). For the second price control period, companies will be provided with a financial incentive under the PIS to meet this target date (see Section 9 of this paper). The PCR will also be required to present information relevant to the calculation of the "Q" term under the PIS (see Section 9).

The following are some important points to be noted in relation to the above proposed definitions, in particular the changes from the existing definitions in the licences:

- The Bureau proposes to introduce variable revenue drivers into ADWEC's price control for the first time. Electricity and water units sold by ADWEC have been defined at transmission supply points (i.e. TRANSCO's exit points, as defined in ADWEC's licence) so that they would not be affected by any change in assumptions for transmission loss adjustment factors under the BST. These definitions also reflect the 'true' units sold to Discos that should be reconcilable with the units used for calculating ADWEC's invoices to Discos.

- The proposed definitions will simplify the respective licence conditions by eliminating the need for several intermediate terms that presently exist in the licences of network companies, such as 'metered', 'regulated water units transmitted', 'regulated electricity units transmitted', 'regulated water units distributed', 'regulated electricity units distributed', and 'electricity unit distributed'.

- All other specific terms used in the above proposed definitions will remain as already defined in the respective licences. These terms are 'relevant year', 'relevant year t', 'licensed distribution operator', 'transmission supply point', 'electricity transmission system', 'water transmission system', 'transmission system', 'electricity distribution system', 'water distribution system' and 'distribution system'.

- The review of revenue driver data recently carried out by the Bureau for network companies in connection with their Price Control Returns (PCRs) has helped the Bureau to better understand the basis of companies' revenue driver data presently being reported to the Bureau. This improved understanding is reflected in the more precise definitions of some of the revenue drivers as set out in the above table. For example, the same definitions of "customer accounts" are proposed for ADDC and AADC, as the Bureau has not found any difference between AADC's calculations of the number of 'electricity customer accounts' and the number of 'electricity service connections' (the present definition for AADC).

- The proposed electricity and water units both transmitted and distributed require to be metered at the exit points of the relevant transmission or distribution network, hence providing the network companies with an incentive to improve their system metering and losses. This will remove the facility to 'reasonably calculate' the units transmitted as presently allowed in TRANSCO's licence, and hence provide it with similar incentives as are already in place for the Discos. The implication of this change is that the Bureau needs to have estimates, at the time of setting the

revised price controls, of units transmitted metered at exit points to make reasonable assumptions for the revised price controls.

- Unlike other demand-based revenue drivers for network companies (which require units to be metered at exit points), the 'peak electricity demand' and 'peak water demand' revenue drivers for TRANSCO will continue to have the facility to be "otherwise measured".

- The reference to "pursuant to the Metering and Data Exchange Code" in the definition of 'metered' in TRANSCO's licence has been changed to "in compliance with the Metering and Data Exchange Code" to remove any ambiguity in the definition of "metered electricity units transmitted" and "metered water units transmitted".

- The only revenue drivers for which the facility of 'reasonably calculated' is proposed are 'electricity units sold' and 'water units sold' for ADWEC. This is because ADWEC does not own and operate the related meters and has to rely on figures given by TRANSCO which may be metered or may involve some calculations. (Presently, the measurements of units transmitted were also allowed to be "reasonably calculated" – this has been removed and replaced by a requirement for metered data at exit points in compliance with MDEC.)

4.3 The Overall Approach

The following sections present the Bureau's assumptions on each revenue driver data for the next price control period and describe how the Bureau has arrived at these assumptions. In making these assumptions, the Bureau has attempted as far as possible to use the estimates of revenue driver data provided by the relevant company as part of its Price Control Information Submission (PCS) where it regards them as likely to be reasonably accurate.

The accuracy and reasonableness of the Bureau's estimates are cross-checked by comparing them in the following sections with corresponding or related data provided by the relevant company as part of the latest Price Control Returns (PCRs), or by other companies as part of their PCSs, or by ADWEC and TRANSCO in the latest drafts of their seven and five year planning statements (SYS and FYS respectively). Where necessitated by any error or lack of any data, the Bureau has made adjustments to the relevant company's forecasts of its revenue driver data and has described such adjustments and reasons for them in the following sections. The Bureau has also projected certain revenue drivers to provide companies to improve the scope and quality of metering.

As the following discussion illustrates, it is no exaggeration to say that almost every data submission from the companies appears to contain data revisions (whether intended or unintended) or apparent inconsistencies with related data submitted by other companies. This has necessitated the exercise of a degree of judgement by the Bureau in order to determine reasonable projections.

4.4 Revenue Driver Assumptions for ADWEC

The Bureau has proposed two new revenue drivers for the price control on ADWEC's procurement cost: electricity units sold and water units sold. **Tables 4.2** and **4.3** show the Bureau's assumptions for these revenue drivers **in bold**, which are based on ADWEC's PCS figures for the units entering the transmission system adjusted for transmission losses (of 1.8% for electricity and 4% for water, as per the BST assumptions). These tables also compare ADWEC's PCS adjusted figures with TRANSCO's PCS figures, indicating differences between the two sources for both future forecasts and actual past data (despite the fact that the source of the data seems to be the same, i.e. TRANSCO). In particular, the significant increase in water units projected by ADWEC for 2002 and onwards is not reflected in TRANSCO's data.

Table 4.2 Electricity Units Sold (GWh)

	1999	2000	2001	2002	2003	2004	2005
ADWEC PCS*	15,189	16,319	17,912	19,722	22,203	25,030	28,093
% YoY Change		7%	10%	10%	13%	13%	12%
TRANSCO PCS**	14,576	16,676	17,687	19,433	22,300	24,800	28,000
% YoY Change		14%	6%	10%	15%	11%	13%
Bureau's Assumptions* **	14,915	16,025	17,589	19,367	**21,803**	**24,580**	**27,588**
% YoY Change		7%	10%	10%	13%	13%	12%

* All figures are expressed at entry points to the transmission system.
** All figures are expressed at exit points from the transmission system.
*** Calculated by the Bureau by an adjustment to ADWEC's PCS figures for electricity transmission loss (1.8% as per the BST assumption).

Table 4.3 Water Units Sold (MG)

	1999	2000	2001	2002	2003	2004	2005
ADWEC PCS*	69,081	79,277	88,239	128,507	144,564	163,670	182,237
% YoY Change		15%	11%	46%	12%	13%	11%
TRANSCO PCS**	75,359	79,895	90,085	99,094	110,370	124,400	139,200
% YoY Change		6%	13%	10%	11%	13%	12%
Bureau's Assumptions* **	66,317	76,105	84,709	123,367	**138,781**	**157,124**	**174,947**
% YoY Change		15%	11%	46%	12%	13%	11%

* All figures are expressed at entry points to the transmission system.
** All figures are expressed at exit points from the transmission system.
*** Calculated by the Bureau by applying an adjustment to ADWEC's PCS figures for water transmission loss (4% as per the BST assumption).

4.5 Revenue Driver Assumptions for TRANSCO

The following are the four proposed revenue drivers for TRANSCO's water and electricity price controls, as defined in Table **4.1**:

1. Peak electricity demand
2. Metered electricity units transmitted
3. Peak water demand
4. Metered water units transmitted

The Bureau's assumptions for these revenue drivers are explained in turn in the following sub-sections.

4.5.1 TRANSCO's Peak Electricity Demand (MW)

Table 4.4 presents the data on peak electricity demand available to the Bureau from various sources and their implied percentage increases from year to year. The first two sources in the table indicate the peak demand at transmission system exit points (which is the required basis for this revenue driver), whereas the next three sources provide the peak demand at entry points to the transmission system, hence requiring adjustment for transmission losses (and perhaps for auxiliary consumption of production plant) to estimate the demand at exit points. Though estimated at different points of the transmission system, these sources show similar annual increases in peak demand in percentage terms.

TRANSCO's latest PCR provides the latest available data on actual peak demand for 1999-2001 at transmission system exit points and has been adopted by the Bureau as the basis for its assumptions for 2003-2005, as indicated in the last two rows of **Table 4.4**. However, TRANSCO's PCR does not provide any estimate for the period 2002-2005. The Bureau has therefore applied the annual percentage increase as assumed in TRANSCO's PCS for this period to project forward the assumptions on peak demand (shown **in bold** in the table).

TRANSCO has explained to the Bureau that the figures for peak electricity demand produced for 2000 and 2001 are on a "real time" basis, and so the figures are a measure of the instantaneous peak, rather than the average demand in the peak hour (the latter is required by the existing and proposed definitions of 'peak electricity demand'). They may also erroneously include an element of transmission losses. Both of these factors might overstate the estimated peak demand figures. On the other hand, the peak demand growth assumed by the Bureau is at the lower end of projections, which will tend to offset any over-estimation of the base figure. Nonetheless, the Bureau's assumptions may need further refinement which, pending receipt of further necessary information from TRANSCO, may be made in the assumptions for the Final Proposals.

Table 4.4: TRANSCO Peak Electricity Demand (MW)*							
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
TRANSCO PCR	2,759	2,998	3,334	-	-	-	-
% YoY Change		9%	11%				
TRANSCO PCS	2,759	2,998	3,334	3,500	4,056	4,519	5,109
% YoY Change		9%	11%	5%	16%	11%	13%
TRANSCO FYS (Entry)	-	-	-	4,304	4,714	5,315	5,965
% YoY Change					10%	13%	12%
ADWEC PCS (Entry)	2,768	2,943	3,306	3,731	4,094	4,615	5,180
% YoY Change		6%	12%	13%	10%	13%	12%
ADWEC SYS (Entry)	3,104	3,304	3,723	4,202	4,610	5,197	5,833
% YoY Change		6%	13%	13%	10%	13%	12%
Bureau's Assumptions	2,759	2,998	3,334	3,500	**4,056**	**4,519**	**5,109**
% YoY Change		9%	11%	5%	16%	11%	13%

* Unless otherwise stated, all figures are as measured at transmission system exit points.
PCR = Price Control Return (latest); PCS = Price Control Information Submission (latest);
SYS = Seven-Year Statement (latest draft); FYS = Five-Year Statement (latest draft)
YoY = Year-on-year

4.5.2 TRANSCO's Metered Electricity Units Transmitted

Table 4.5 shows the data on electricity units transmitted from various sources and their implied annual percentage increases. Data from TRANSCO relates to units transmitted at transmission system exit points, but includes both metered and unmetered units (whereas the proposed definition of 'metered electricity units transmitted' in **Table 4.1** specifies metered units only). On the other hand, ADWEC's submitted units are as measured at entry points. Hence, for comparison purposes, the Bureau has converted the entry point data submitted by ADWEC to an estimate at exit points by applying a transmission loss adjustment factor of 1.8% (in line with the BST assumption).

There are significant differences between the data from TRANSCO and ADWEC, even for the past years despite the fact that the very source of these data is understood to be the same (i.e. TRANSCO). Sometimes such a difference appears anomalous and requires explanation. For example, in 2000, TRANSCO's units transmitted at exit points are higher than those of ADWEC at entry points.

An assumption is required as to the number of electricity units metered at exit points. TRANSCO has informed the Bureau that presently none of the meters can be considered as MDEC compliant, but that it plans to let a project which, if implemented, would enable 100% metering (MDEC compliant) within about a year. The Bureau is concerned with such a poor metering on the transmission system, despite the lapse of about three and half year of TRANSCO's existence. Whether the specific project mentioned above is implemented or not, it is important that TRANSCO improves its metering significantly over a short time. The Bureau has therefore taken overall units

transmitted as per TRANSCO's latest PCR as the base and assumed that 50%, 75% and 100% of these units would be metered (as per the proposed new licence definition) in 2003, 2004 and 2005, respectively. These assumptions will act like targets for metering improvements which, if TRANSCO fails to achieve them, will cause it to lose some allowed revenue during the next control period. On the other hand, if it over-performs these assumptions, TRANSCO will receive additional revenue. The third last row in **Table 4.5**, marked as 'Metered Only', shows the Bureau's assumptions (**in bold**) for 'metered electricity units transmitted' for the purpose of Draft Proposals.

Table 4.5: TRANSCO Metered Electricity Units Transmitted (GWh)

	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
TRANSCO PCR (total)	14,576	16,676	17,687	-	-	-	-
% YoY Change		14%	6%				
TRANSCO PCS (total)	14,576	16,676	17,687	19,433	22,300	24,800	28,000
% YoY Change		14%	6%	10%	15%	11%	13%
ADWEC PCS (at entry points)	15,189	16,319	17,912	19,722	22,203	25,030	28,093
% YoY Change		7%	10%	10%	13%	13%	12%
ADWEC PCS (at exit points)*	14,916	16,025	17,589	19,367	21,803	24,580	27,588
% YoY Change		7%	10%	10%	13%	13%	12%
Bureau's Assumptions							
Total	14,576	16,676	17,687	19,433	22,300	24,800	28,000
% YoY Change		14%	6%	10%	15%	11%	13%
Metered Only as % of Total					50%	75%	100%
Metered Only					**11,150**	**18,600**	**28,000**
% YoY Change					-	67%	51%

* Calculated by the Bureau by using an assumption of 1.8% electricity transmission loss (BST assumption).

4.5.3 TRANSCO's Peak Water Demand

As shown in **Table 4.6**, the Bureau has used as the basis for its assumptions (shown **in bold** in the table) the peak water demand for 2003-2005 as estimated in TRANSCO's FYS and ADWEC's SYS (latest drafts). Since the figures from these statements are a measure of peak water demand at transmission system entry points, the Bureau has applied a water transmission loss adjustment factor of 3% (the same as used in these statements) to arrive at peak water demand at transmission system exit points. TRANSCO has recently submitted (without explanation) lower peak water demand estimates as part of a revised PCS, but unless it is furnished with an explanation the Bureau does not propose to adopt those figures.

The Bureau is not clear on the reasons for differences between TRANSCO's and ADWEC's actual data for past years and is currently attempting to clarify this with the companies concerned.

Table 4.6: TRANSCO Peak Water Demand (MGD)*							
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
TRANSCO PCR	227	241	273	-	-	-	-
% YoY Change		6%	13%				
TRANSCO PCS	227	241	273	328	378	426	477
% YoY Change		6%	13%	20%	15%	13%	12%
TRANSCO FYS (Entry)	-	-	346	368	401	454	505
% YoY Change				6%	9%	13%	11%
ADWEC PCS (Entry)	211	235	261	402	439	497	554
% YoY Change		12%	11%	54%	9%	13%	11%
ADWEC SYS (Entry)	-	-	-	368	401	454	505
% YoY Change					9%	13%	11%
Bureau's Assumptions							
At Entry Points				368	401	454	505
% YoY Change				35%	9%	13%	11%
At Exit Points**	227	241	273	357	**389**	**440**	**490**
% YoY Change		6%	13%	35%	9%	13%	11%

* Unless otherwise stated, all figures are as measured at transmission exit points.
** 2002-2005 figures derived by the Bureau by using an assumption of water transmission loss of 3% (SYS / FYS assumption)

4.5.4 TRANSCO's Metered Water Units Transmitted

There are significant differences between the data available to the Bureau from ADWEC and TRANSCO on water units transmitted, even for the actual units transmitted in the past. As shown in **Table 4.7**, the Bureau has taken total units transmitted for 2001 as per TRANSCO's PCR as the base and has increased it by the same percent for subsequent years as assumed by TRANSCO in its PCS. Since metered units are required as per the proposed new definition of 'water units transmitted', it has been assumed that 93% of total water units transmitted are metered in all years up to 2002 (in line with the present metering coverage of water transmission system reported by TRANSCO in its PCS) and that the metering coverage would be increased to 95% in 2003, 97% in 2004 and 100% in 2005. The second last row (marked as 'Metered Only') of the table shows the Bureau's assumptions (**in bold**) for 'metered water units transmitted' for the purpose of Draft Proposals.

Table 4.7: TRANSCO Metered Water Units Transmitted (MG)*							
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
TRANSCO PCR (total)	75,359	79,895	90,085	-	-	-	-
% YoY Change		6%	13%				
TRANSCO PCS (total)	75,359	79,895	90,085	99,094	110,370	124,400	139,200
% YoY Change		6%	13%	10%	11%	13%	12%
TRANSCO PCS (metered only)	75,359	74,419	83,779	92,157	-	-	-
% YoY Change		-1%	13%	10%			
ADWEC PCS (at entry points)	69,081	79,277	88,239	128,507	144,564	163,670	182,237
% YoY Change		15%	11%	46%	12%	13%	11%
ADWEC PCS (at exit points)**	66,318	76,105	84,709	123,367	138,781	157,124	174,947
% YoY Change		15%	11%	46%	12%	13%	11%
Bureau's Assumptions							
Total	75,359	79,895	90,085	99,094	110,370	124,400	139,200
% YoY Change		6%	13%	10%	11%	13%	12%
Metered Only as % of Total	93%	93%	93%	93%	95%	97%	100%
Metered Only	70,084	74,302	83,779	92,157	**104,852**	**120,668**	**139,200**
% YoY Change		6%	13%	10%	14%	15%	15%

* Unless otherwise stated, all figures are as measured at transmission exit points.
** Derived by the Bureau by using an assumption of 4% water transmission loss (BST assumption).

4.6 Revenue Driver Assumptions for ADDC

The four proposed revenue drivers for ADDC distribution and supply price controls, as defined in **Table 4.1**, are:

1. Electricity customer accounts
2. Metered electricity units distributed
3. Water customer accounts
4. Metered water units distributed

The following sub-sections explain the Bureau's assumptions for these revenue drivers in turn. In contrast to revenue drivers for ADWEC and TRANSCO, which relate to the sector as a whole, there are less sources available to assess the data on revenue drivers for ADDC and AADC.

4.6.1 ADDC's Electricity Customer Accounts

Table 4.8 shows the Bureau's assumptions (**in bold**) that are simply based on the data provided by ADDC as part of its PCS and PCR. These assumptions indicate that electricity customer accounts are expected to grow by about 6-8% per annum over the next control period. This growth is not inconsistent with what has been experienced during the present control period and with external forecasts of population growth.

ADDC has informed the Bureau that it has sourced the number of electricity customer accounts for the past years from the records held on its New Billing System (NBS), which replaced the previous billing system (WANG) in late 1999. Effective from 1 January 2001, ADDC also formally became the supplier for approximately 2,000 electricity customers of RASCO's distribution and supply business (previously, ADDC had carried out the billing function for these customers on behalf of RASCO). ADDC has explained that the figures it has submitted for the past as well as the future include the RASCO's customer accounts for all the years (1999-2005).

For 2002 and onwards, ADDC has calculated the forecast growth by taking the Bechtel forecast demand growths and attributing 50% of these growths to the existing customers and the remaining 50% to new customers for each year. ADDC believes that the resulting annual percent growth rates are reflective of the customer growths it has experienced in the past i.e. customer growth rate is lower than the electricity demand growth. The Bureau also finds this a reasonable approach in the present circumstances in the absence of better information.

Table 4.8 ADDC Electricity Customer Accounts (Numbers)

	1999	2000	2001	2002	2003	2004	2005
ADDC PCR	165,469	175,798	183,899	-	-	-	-
% YoY Change		6%	5%				
ADDC PCS	165,469	175,798	183,899	194,778	207,628	225,110	238,920
% YoY Change		6%	5%	6%	7%	8%	6%
Bureau's Assumptions	165,469	175,798	183,899	194,778	**207,628**	**225,110**	**238,920**
% YoY Change		6%	5%	6%	7%	8%	6%

PCR = Price Control Return (latest); PCS = Price Control Information Submission (latest);
YoY = Year-on-year

4.6.2 ADDC's Metered Electricity Units Distributed

Table 4.9 shows how the Bureau's assumptions on electricity units distributed have been derived from ADDC's PCS. ADDC's source for electricity units distributed is the NBS in 2000 and 2001 and a combination of NBS and the old WANG system in 1999. ADDC has reviewed 1999-2001 data to make adjustments for meter reading and billing inaccuracies where necessary. It regards 1999 and 2000 data as settled although there may be some further minor adjustments to the 2001 data.

As for electricity customer accounts, the figures for electricity units distributed for all years include electricity units distributed to customers of the former RASCO distribution and supply business.

ADDC has a number of customers who are unmetered, the most significant of which is the Abu Dhabi Municipality (for street lighting etc). The estimated consumption of the municipality has been excluded by ADDC from the data provided for 2000 and onwards (but not 1999) to determine the metered units distributed at exit points. Total units distributed at exit points for 2002 onwards have been assumed by ADDC to grow at the same rate as calculated from certain ADWEC's forecasts

available to ADDC although ADDC has subsequently clarified that there are errors in its resulting calculation for 2002 and onwards which result in an apparent increase in the proportion of distribution losses. The Bureau has therefore reviewed ADDC's calculation holding distribution losses constant (in % terms) at the 2001 level to correctly incorporate ADDC's demand growth assumption. Using 2001 metered data as the base, these growth rates are 16%, 12%, 15% and 14% for each year of the period 2002-2005, respectively. The Bureau's assumptions for the revenue driver are shown **in bold** in **Table 4.9**.

The Bureau has assessed ADDC's figures for total units at entry and exit points against those calculated from ADWEC's PCS and has found no obvious major inconsistency.

Table 4.9 ADDC Metered Electricity Units Distributed (GWh)

	1999	2000	2001	2002	2003	2004	2005
ADWEC PCS							
Total at Entry to TRANSCO*	10,465	10,820	11,979	13,859	15,492	17,786	20,295
% YoY Change		3%	11%	16%	12%	15%	14%
Total at Entry**	10,276	10,625	11,763	13,610	15,213	17,466	19,930
% YoY Change		3%	11%	16%	12%	15%	14%
Total at Exit***	9,627	9,954	11,020	12,750	14,253	16,363	18,672
% YoY Change		3%	11%	16%	12%	15%	14%
ADDC PCR (Metered at Exit)	8,957	9,655	10,176	-	-	-	-
% YoY Change		8%	5%				
ADDC PCS							
Total at Entry Points	10,359	10,711	11,801	13,648	15,252	17,506	19,971
% YoY Change		3%	10%	16%	12%	15%	14%
Total at Exit Points	9,258	10,047	10,568	11,126	12,714	14,593	16,648
% YoY Change		9%	5%	5%	14%	15%	14%
Metered at Exit Points	8,957	9,655	10,176	10,713	12,242	14,051	16,029
% YoY Change		8%	5%	5%	14%	15%	14%
Bureau's Assumptions							
Metered at Exit Points	8,957	9,655	10,176	11,768	**13,152**	**15,095**	**17,221**
% YoY Change		8%	5%	16%	12%	15%	14%
As % of Total at Exit Points	97%	96%	96%	96%	96%	96%	96%

* Calculated by the Bureau by applying a transmission loss of 1.8% to ADWEC's figures for ADDC.
**Calculated by the Bureau by applying a transmission and distribution loss of 8% to ADWEC's figures for ADDC.

4.6.3 ADDC's Water Customer Accounts

Table 4.10 shows that the Bureau's assumptions for ADDC's water customer accounts (shown **in bold**) are simply based on ADDC's PCS. ADDC's PCR is not relevant here as it provides water

customer accounts for 1999-2001 from the NBS corrected to be aligned with the basis of old WANG system (which was used for setting the initial price controls), which is no longer regarded as reliable.

As mentioned above for electricity customer accounts, ADDC's PCS data on water customer accounts for 1999-2001 has been derived from the NBS. Similarly, as for electricity customer accounts, ADDC has calculated the forecast growth in water customer accounts for 2002 and onwards on the basis of Bechtel forecast demand growths. The past estimates and the forecast of water customer accounts include RASCO accounts. The forecast annual percentage growth in water customer accounts forecasts is the same as that of electricity customer accounts forecasts, i.e. about 6%-8%.

Table 4.10 ADDC Water Customer Accounts (Numbers)

	1999	2000	2001	2002	2003	2004	2005
ADDC PCR (WANG based)	75,184	76,892	81,019	-	-	-	-
% YoY Change		2%	5%				
ADDC PCS (NBS based)	157,672	159,381	163,508	173,179	184,601	200,151	212,461
% YoY Change		1%	3%	6%	7%	8%	6%
Bureau's Assumptions	157,672	159,381	163,508	173,179	**184,601**	**200,151**	**212,461**
% YoY Change		1%	3%	6%	7%	8%	6%

4.6.4 ADDC's Metered Water Units Distributed

In its PCR, ADDC has been unable since 1999 to provide any reliable estimate of "metered water units distributed" (i.e. metered at distribution system exit points). ADDC is concerned that the figures for 2000 derived from the NBS differ significantly from the 1999 and 2001 figures. According to ADDC, it is continuing to work towards resolving these issues. To complete its PCR, ADDC has used the 1999 figure for 2000 and 2001 for the time being. ADDC has also not provided any figure in its PCS for 'metered water units distributed' (as defined in **Table 4.1**) for any of the past and future years. Given the lack of data received from ADDC, the Bureau has therefore derived an assumption for 'metered water units distributed' by reference to the data provided by ADDC in its PCS for past and future years regarding total water units distributed (metered plus unmetered), total number of exit points, and number of metered exit points.

Table 4.11 shows how the Bureau has derived its assumptions (shown **in bold**) for water units distributed (as metered at exit points) for the next control period. In essence, the Bureau has assumed that the proportion of total water units distributed which are metered at exit points is the same as the proportion of total number of exit points which are metered. Total number of water units distributed used in the Bureau's assumptions are those indicated in ADDC's PCS. ADDC has explained that its total water units distributed have been derived from water units received, or forecast to be received, from ADWEC plus output from RASCO production plants, after applying adjustments for transmission loss (4%) and distribution loss (15%), where necessary.

ADDC's figures assume an increase in the proportion of exit points from the water distribution network which are metered from 56% in 2001 to 72% in 2005, which is also reflected in the Bureau's projections.

Table 4.11 ADDC Metered Water Units Distributed (MG)

	1999	2000	2001	2002	2003	2004	2005
ADDC PCR (metered at exit)	21,133	21,133	21,133	-	-	-	-
% YoY Change		-	-				
ADDC PCS							
Total at Entry Points	56,869	63,482	73,105	102,781	115,001	123,590	133,214
% YoY Change		12%	15%	41%	12%	7%	8%
Total at Exit Points	48,339	53,960	62,140	87,364	97,751	105,052	113,232
% YoY Change		12%	15%	41%	12%	7%	8%
Number of Exit Points (Nos)							
Metered	*74,691*	*82,337*	*91,427*	*104,020*	*118,364*	*136,836*	*152,068*
Unmetered	*81,058*	*75,003*	*72,081*	*69,159*	*66,237*	*63,315*	*60,393*
Total	*155,749*	*157,340*	*163,508*	*173,179*	*184,601*	*200,151*	*212,461*
Metered as % of Total	*48%*	*52%*	*56%*	*60%*	*64%*	*68%*	*72%*
Bureau's Assumptions							
Total at Exit Points	48,339	53,960	62,140	87,364	97,751	105,052	113,232
% YoY Change		12%	15%	40%	11%	8%	8%
Metered at Exit Points	21,133	28,237	34,746	52,474	**62,669**	**71,798**	**81,012**
% YoY Change		34%	23%	51%	19%	15%	13%
As % of Total at Exit Points	44%	52%	56%	60%	64%	68%	72%

4.7 Revenue Driver Assumptions for AADC

The Bureau has proposed the same four revenue drivers for AADC distribution and supply price controls as for ADDC, as defined in **Table 4.1**, i.e.:

1. Electricity customer accounts
2. Metered electricity units distributed
3. Water customer accounts
4. Metered water units distributed

Given the poor quality of data received from AADC, it is difficult to make reasonable assumptions for AADC's revenue drivers. For the Draft Proposals, the Bureau has attempted to ensure that any inaccuracies in calibrating the Notified Values err on the side of ensuring that AADC receives no financial benefit as a result of the poor quality of its data. The Bureau is open to reviewing its assumptions in the light of any improved data received from AADC.

4.7.1 AADC's Electricity Customer Accounts

Table 4.12 shows the Bureau's assumptions (**in bold**) which are simply based on the data provided by AADC as part of its PCS and PCR. Electricity customer accounts are expected to grow by about 5% per annum over the next control period. This growth is consistent with what has been experienced during the present control period.

AADC has informed the Bureau that it has sourced the number of electricity customer accounts for the past years from the records held on the NBS, which is maintained by its sales department. These numbers are cross-checked by AADC's finance department by adding to the number of customers supplied by former WED in 1998, the net customer additions (new customers less disconnections) shown in its billing system (WANG to late 1999, and NBS subsequently). The disconnections subtracted from the service connection base are only permanent disconnections such as those for construction contractors of buildings. A permanent disconnection is realized in the billing system (by removing the service connection name from the system) only when the meter is removed from the customer property. AADC explained that temporary disconnections (e.g. for rental houses when the tenant moves out and houses demolished and rebuilt later) are not removed from the system or subtracted from the customer base, irrespective of the period for which these accounts remain dormant.

It is therefore not entirely clear whether AADC's calculations incorporate the appropriate treatment of dormant accounts (these may erroneously be included in the figures) and disconnections (only takes account of temporary disconnections?). Note that the proposed definition of electricity customer accounts requires considering only those customer accounts for any year which are shown registered with AADC as of 31st December of that year and which are supplied with electricity during that year. Due to the lack of clarity about how AADC's calculations treat dormant accounts, the Bureau has not made any adjustment to AADC's PCS figures for customer accounts within the projections. However, AADC will be required to produce accurate data, fully consistent with the new licence conditions, as part of its PCRs for 2003-2005.

AADC also told the Bureau that the data provided includes (for past years) 250 or so customers of the ex-RASCO distribution and supply business. AADC has also explained that its sales department (which has produced the customer accounts figures) or its billing system does not distinguish between electricity customer accounts and electricity service connections, as each service connection means a metered connection which is registered as one customer account. In other words, one property may have one or more metered connections and hence is counted as customer accounts as many times as it has metered connections. As a result, the definition of customer numbers for AADC has been brought into line with that for ADDC in the new licence definitions.

Table 4.12 AADC Electricity Customer Accounts (Numbers)							
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
AADC PCR	66,557	71,842	77,353	-	-	-	-
% YoY Change		8%	8%				
AADC PCS	69,000	74,113	77,675	80,000	84,000	88,202	92,612
% YoY Change		7%	5%	3%	5%	5%	5%
Bureau's Assumptions	69,000	74,113	77,675	80,000	**84,000**	**88,202**	**92,612**
% YoY Change		7%	5%	3%	5%	5%	5%

PCR = Price Control Return (latest); PCS = Price Control Information Submission (latest);
YoY = Year-on-year

4.7.2 AADC's Metered Electricity Units Distributed

AADC has not been able to provide any data on electricity or water units distributed as part of its PCS. For the past years, AADC has provided this data as part of its PCR, the source for which is AADC's billing system. AADC has explained to the Bureau that a customer only receives a bill when its meter is read, and that meters are read infrequently. This means that the figures provided may not correctly allocate the units distributed to the year in which they were consumed.

In addition, a further adjustment has been made to 1999 figures (by AADC's consultants at the time, PriceWaterhouseCoopers (PWC)), which AADC told the Bureau caused the 1999 figures to be over-stated by about 300 GWh (about 6 per cent). (One effect of this is that the reported 1999 figure for electricity units distributed exceeds the amount which AADC had received under the BST).

AADC has subsequently informed the Bureau that it intends to submit revised data on electricity units distributed (among other revenue drivers), as the data seems to be overstated compared to what has actually been metered on its system. At the time of issue of this paper, the Bureau has not yet received any revised data.

In the absence of any data from AADC for future years, the Bureau has relied in part on the figures provided in ADWEC's PCS for Al Ain region. **Table 4.13** shows how the Bureau's assumptions on electricity units distributed (shown **in bold**) have been derived from ADWEC's PCS. For these assumptions, total units indicated by ADWEC as entering the transmission system have been adjusted for transmission and distribution losses (8%) to calculate the total electricity units at distribution system exit points. Of these calculated units at exit points, the same proportions (i.e. 96%) as indicated in the Bureau's assumptions for ADDC have been assumed to be metered.

Table 4.13 AADC Metered Electricity Units Distributed (GWh)							
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
ADWEC PCS							
Total at Entry to TRANSCO	4,724	5,498	5,933	5,863	6,711	7,244	7,798
% YoY Change		16%	8%	-1%	14%	8%	8%
Total at Entry*	4,639	5,400	5,827	5,757	6,590	7,113	7,657
% YoY Change		16%	8%	-1%	14%	8%	8%
Total at Exit**	4,346	5,059	5,459	5,394	6,174	6,664	7,174
% YoY Change		16%	8%	-1%	14%	8%	8%
AADC PCR (Metered at Exit)	4,815	5,427	5,493	-	-	-	-
% YoY Change		13%	1%				
Bureau's Assumptions							
Metered at Exit Points	4,205	4,861	5,256	5,168	**5,915**	**6,385**	**6,873**
% YoY Change		16%	8%	-2%	14%	8%	8%
As % of Total at Exit Points	97%	96%	96%	96%	96%	96%	96%

* Calculated by the Bureau by applying a transmission loss of 1.8% to ADWEC's figures for AADC.
**Calculated by the Bureau by applying a transmission and distribution loss of 8% to ADWEC's figures for AADC.

4.7.3 AADC's Water Customer Accounts

Table 4.14 shows that the Bureau's assumptions for AADC's water customer accounts (**in bold**) are simply based on AADC's PCS. For its PCR, AADC had erroneously supplied data for the number of new connections, rather than for the total number of customer accounts. AADC has agreed to provide corrected figures as part of its revised PCR (not yet received). In relation to AADC's PCS data, it is not clear whether such data includes customers supplied free of charge or those not registered with AADC but which have been supplied for a long time (AADC does not consider these customers illegal, rather as being "inherited" from WED days). The Bureau's view is that all registered customers should be included in the 'water customer accounts' data, as per the licence definition.

Table 4.14 AADC Water Customer Accounts (Numbers)							
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
AADC PCR*	786	1,725	1,805	-	-	-	-
% YoY Change		119%	5%				
AADC PCS	25,580	27,590	30,070	31,713	33,619	35,529	37,321
% YoY Change		8%	9%	5%	6%	6%	5%
Bureau's Assumptions	25,580	27,590	30,070	31,713	**33,619**	**35,529**	**37,321**
% YoY Change		8%	9%	5%	6%	6%	5%

* Erroneous data supplied by AADC: number of new connections in a year, rather than total number of customer accounts.

4.7.4 AADC's Metered Water Units Distributed

AADC has provided the Bureau with the total number of water units distributed at exit points (i.e. metered plus unmetered) in both its PCS and PCR. The Bureau has also calculated total water units for AADC at its entry points, as the difference between figures for water units provided in ADWEC's PCS and ADDC's PCS. Both AADC's PCS and PCR figures are found to be significantly higher than these calculated units. However, the Bureau understands that AADC also receives water from wells, in addition to water from ADWEC. To ensure Notified Values are not over-estimated, the Bureau has adopted AADC's PCS figures for 1999-2005, the highest of the three sources, and the most recent estimate submitted by AADC as the basis for the calculation of metered units.

Since no data on water metering is available for AADC, the Bureau has reviewed the assumptions made at the time of setting the initial price controls in 1999. At that time, the Bureau assumed that 4.72% of total water units at AADC's distribution system exit points (based on the then available forecast) would be metered and that metered water units will grow by 59% per annum in 2000 and 2001. Accordingly, for its assumptions for the Draft Proposals, the Bureau has taken 4.72% of total water units (derived as described in the preceding paragraph) as the water metered units in 1999 and then has increased the resulting figure by 59% p.a. during 1999-2001 and then by 50% p.a. during 2002-2005. The Bureau's assumptions for 'metered water units distributed' are presented in **Table 4.15** (**in bold**) along with the underlying calculations. These assumptions indicate that the Bureau assumes that AADC should be able to increase its water metering coverage from approximately 5% in 1999 or 13% in 2002 to about 35% in 2005. This is less than half the coverage assumed for ADDC by the same time, and so is an achievable target.

Table 4.15 AADC Metered Water Units Distributed (MG)							
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
ADWEC PCS (Total at Entry)*	66,317	76,105	84,709	123,367	138,781	157,124	174,947
% YoY Change		15%	11%	46%	12%	13%	11%
ADDC PCS (Total at Entry)	56,869	63,482	73,105	102,781	115,001	123,590	133,214
% YoY Change		12%	15%	40%	11%	8%	8%
Implied AADC (Total at Entry)**	9,448	12,623	11,604	20,586	23,780	33,534	41,733
% YoY Change		34%	-8%	77%	16%	41%	24%
AADC PCR (Metered at Exit)***	17,583	19,912	22,120	-	-	-	-
% YoY Change		13%	11%				
AADC PCS (Total at Exit)	19,523	26,392	28,198	30,115	33,036	35,943	38,495
% YoY Change		35%	7%	7%	10%	9%	7%
Bureau's Assumptions							
Total at Exit Points	19,523	26,392	28,198	30,115	33,036	35,943	38,495
% YoY Change		35%	7%	7%	10%	9%	7%
Metered at Exit Points	921	1,465	2,330	3,494	**5,242**	**7,862**	**11,794**
% YoY Change		59%	59%	50%	50%	50%	50%
As % of Total at Exit Points	5%	6%	8%	12%	16%	22%	31%

* Calculated by the Bureau by applying a transmission loss of 4% to ADWEC's figures for ADDC plus AADC.
** Calculated by the Bureau by taking the difference between (i) ADWEC's figures for ADDC plus AADC and (ii) ADDC PCS, both for Total at Entry.
*** Erroneous data supplied by AADC: total units distributed at exit points, rather than units metered at exit points.

5 Operating Expenditure Projections

5.1 The Overall Approach

The operating expenditure projections are one of the main inputs to the price control calculations for each company. In order to ensure that the price controlled companies are able to finance their businesses, the revenues allowed to be recovered under the price controls are set at a level sufficient to finance the projected operating and capital costs for the companies. 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 when determining the Bureau's cost projections, adjustments are made where necessary to ensure that future projections of "efficient costs" are not over-stated.

A number of approaches may be taken to assessing future expenditure requirements. Some overseas' regulators have adopted the approach of scrutinizing, on a "line-by-line" basis each item of expenditure by the companies, and hiring expensive consultants for this purpose, before "approving" costs for inclusion in the cost base. However, the Bureau takes the view that this involves the regulator in excessive "second-guessing" of detailed operational decisions which are best left to the management of the company. Furthermore, ultimately it is the quantum of total costs which is of importance to the customers, not how that total is precisely broken down into individual components within the company. The Bureau has therefore adopted an approach which focuses on the (efficient level of) *total* operating expenditure borne by each of the businesses subject to price control.

In view of the above, the Bureau has proposed instead an approach to projecting future operating expenditure which pays due regard to the current levels of cost of each company (as evidenced by the most recent reliable accounting data), while at the same time providing strong incentives for efficiency improvement from this starting point. (By "operating expenditure", the Bureau is normally referring to operating costs excluding depreciation; depreciation is discussed in Section 6 of this paper).

In principle, future operating expenditure can be expected to differ from past or current levels of operating expenditure for some or all of the following reasons:

- changes in the level of outputs (whether related to demand or service quality);
- changes in the level of efficiency;
- changes in the level of input prices; and

- changes in capital intensity.

As discussed in the Second Consultation Paper (pages 23 - 25), the Bureau's approach to assessing future operating expenditure for each company is as follows:

- For the base level of operating expenditure, assess the actual level of operating expenditure at the end of the first price control period, based on the most reliable recent actual data submitted by the companies.

- To forecast future (2003 – 2005) operating expenditure, make necessary adjustments to the base level of operating expenditure to reflect increased costs associated with meeting increases in demand.

- Make a further adjustment to this demand-adjusted level of operating expenditure to take account of the assumed efficiency improvement over the duration of the revised price control.

- Make any further adjustments to operating expenditure projections which may be appropriate.

On 4 August, the Bureau wrote to each of the price-controlled companies (ADWEC, TRANSCO, ADDC and AADC) explaining that its intended methodology is to assume that operating expenditure for 2003, 2004 and 2005 can remain constant in real terms at the level incurred in the latest completed financial year (2001), if audited data for 2001 is available. This assumes that any increases in operating expenditure over the next price control period that would otherwise result from demand growth can be offset by efficiency improvements. This approach is further described in the following section, highlighting where the Bureau has slightly modified its approach from that explained in its 4 August letter.

5.2 Implementation of the Approach

5.2.1 Base Level of Operating Expenditure

The Bureau's preferred methodology would be to use the audited level of operating expenditure in the most recently completed financial year (2001) as the base level of operating expenditure. Audited accounts for 2001 were due to be received from the companies by 30 June. However, none of the companies has yet been able to submit these accounts to the Bureau. The Bureau indicated in its letter of 4 August that if audited 2001 data is not available before the Draft Proposals or the Final Proposals are due to be published, the Bureau will use the latest year for which audited data is available to determine the base level of operating expenditure for the next price controls.

At the present time, the Bureau has received draft audited accounts for 1999 for all of the companies except for TRANSCO, but no audited accounts for any company for the years 2000 and 2001. Under the methodology described above (the use of the most recent *audited* accounting data), the Bureau would be justified in adopting 1999 operating expenditure as the basis for its future operating expenditure projections. However, having reviewed the level of 1999 operating expenditure, and

unaudited data for 2000 and 2001 provided by the companies, the Bureau is not satisfied that using 1999 operating expenditure as the basis for projecting future (2003 – 2005) operating expenditure will be sufficient to ensure that companies can finance their operations.

The Bureau has therefore adopted a ***slightly modified approach***, which is more favourable to the companies, and has taken ***the average of the 1999 and 2001 operating expenditure*** submitted by the companies in their most recent Price Control Information Submissions. The implications of this approach for each of the companies is set out in their relevant sections below.

The Bureau will ***update this approach for the Final Proposals*** in the light of any additional audited account data received from the companies:

- If 2000 (but not 2001) audited accounts become available, the Bureau will adopt the average of 2000 (audited) and 2001 (unaudited) operating expenditure as the base level of operating expenditure for the purpose of driving operating expenditure projections over 2003 – 2005.

- If 2001 audited accounts become available, the Bureau will solely adopt 2001 operating expenditure as the base level of operating expenditure for the purpose of driving operating expenditure projections over 2003 – 2005.

Operating expenditures have been rising over 1999 – 2001 according to the unaudited accounts provided by the companies. Failure by any company to produce audited accounts for these years in time for the Final Proposals will therefore effectively result in a self-imposed financial penalty in the form of lower expenditure allowances for the second price control period than the Bureau is, in principle, willing to allow.

5.2.2 Effect of Demand Growth on Operating Expenditure

To forecast future operating expenditure, it is necessary to make adjustments to the base level of operating expenditure to reflect increased operating expenditures associated with meeting increases in demand. However, to the extent that many operating expenditures will be fixed over the course of a year, and so won't vary with demand growth within a year, operating expenditures 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 operating expenditure in industries where demand is expanding, even if there is no underlying improvement in the efficiency of operations.

In these Draft Proposals, the Bureau has assumed that the demand growth anticipated for the sector would lead to an increase in operating expenditure of about 5 per cent a year, all else equal. This is based on increases of about 10 per cent a year for the demand-related revenue drivers and about 5 per cent a year for the customer numbers-related revenue drivers. This assumption is consistent with the RPI-X price controls that existed in 2000 for UK Transco's gas transportation business and for the PES distribution businesses. These were structured so that 50 per cent of revenue is fixed (based on pre-specified levels of output), while 50 per cent is dependent on the volume of energy

transported or distributed. (Source: *"The Transmission Price Control Review of the National Grid Company from 2001: Initial Thoughts Consultation Document"*, OFGEM, March 2000.)

Similarly, revenue caps on electricity network businesses (TransGrid and six distributors) in New South Wales, Australia include volume of electricity transported and volume of electricity sold as revenue drivers. For example, under TransGrid's cap, a 10% increase in the volume of electricity transported could translate into an increase in revenue of up to 5%, depending on the maximum demand of the additional load. (Source: "*Pricing for Electricity Networks and Retail Supply: Issues Paper*", IPART, September 1998).

Such a relationship between costs and volumes would also be broadly consistent with the weights that the Bureau proposes to give to each of the revenue drivers in the companies' revised price controls. As discussed in Section 8 of this paper, the Bureau in its Draft Proposals has assumed that 50 per cent of revenue comes from the "fixed" term within the formulae, with the remaining 50 per cent of revenue split between the other two (variable) revenue drivers.

5.2.3 Effect of Efficiency Improvement on Operating Expenditure

It is also necessary to take account of the assumed efficiency improvement over the duration of the revised price control. As described above, the Bureau intends to incorporate efficiency improvements by assuming that companies can improve their efficiency taking their current operating expenditure as the starting point. In the First and Second Consultation Papers, the Bureau presented evidence which demonstrated that efficiency improvements of 3 – 7 per cent a year seem a reasonable expectation in the light of the efficiency improvements made by similar firms in comparable circumstances. This evidence is reproduced in **Table 5.1**:

Table 5.1: 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 are calculated after taking account of the effect on costs of changes in output levels and the level of service quality, and so can be taken to represent "underlying" efficiency improvements.

Efficiency improvements towards the lower/middle of the range (3 – 7 per cent a year) would be sufficient to offset the increase in costs that would otherwise be expected from the growth in demand and customer numbers, described above. None of the respondents to the Second Consultation Document has been able to convince the Bureau that efficiency improvements of this order of magnitude for present levels are not unachievable, and are therefore the basis (in combination with

the economies of scale assumption) for the Bureau's price control assumption that operating expenditures over 2003 – 2005 can remain constant, in real terms, at their base level.

Companies have argued for a lower efficiency improvement assumption than the Bureau's suggested range of 3%-7% and have referred to the efficiency assumptions adopted by the UK regulators during the past which, they have argued, show a lower range for efficiency improvements. The Bureau has responded separately to each company in detail. A summary of these responses is as follows:

1. Companies' responses have frequently drawn a parallel between the "X" factors in their present controls and the efficiency assumptions that have been adopted by UK regulators. The Bureau has explained that X is set to reflect a number of factors other than just efficiency improvements, and so such a comparison is flawed. For example, the Bureau could, in principle, for the first price control have set the X factor equal to zero (with notified values at lower levels than what they were actually set at), while allowing the companies the same allowed revenue (in present value terms) over the price control period. Therefore, the X factor has been used by the Bureau as a smoothing factor and does not necessarily accurately represent the underlying efficiency improvement assumption.

2. Experience from the UK shows that efficiency targets have tended to be increased from one price review to the next. For example, the second distribution price controls for the UK Public Electricity Suppliers (PESs) set in 1994 stipulated significant one-off ("P_0") price cuts, varying between 11% and 17% and setting an X factor of 2% for all companies (in combination, much greater than the X factors for the first price controls which varied over a range of –2.5% to 0%). The price control review process was re-opened by OFFER in July 1995, resulting in further price cuts in terms of Po and X factors. The next price controls review in 1998-1999 for the control period 2000-05 resulted in more significant Po cuts (18% - 35%) with X-factor of 3% for all PESs.

3. Further, the UK experience shows that the actual efficiency improvements made by regulated companies (**Table 5.1**) have been well above those assumed by the regulators in setting price controls (available from the Bureau on request). The Bureau considers the efficiency improvements actually achieved by the utilities more relevant than the efficiency improvements assumed, as the former indicate the extent of efficiency improvements that can actually be realized.

4. Even if one decides to adopt the efficiency improvements assumed by the other regulators (as distinct from the companies' actual efficiency improvements):

    - the efficiency improvement (5%) assumed by the UK electricity regulator (OFGEM) for the second price control period of National Grid Company (NGC) seems particularly relevant to the second price control period of TRANSCO.

- the efficiency improvement (3%) assumed by the Northern Ireland (NI) energy regulator, OFREG, for NIE Power Procurement Business' (PPB's) second price control period seems more relevant to ADWEC's second price control period than ADWEC's suggestion for 0% efficiency improvement based on PPB's first price control period.

5. ADWEC has regarded the Bureau's proposal on the efficiency improvement over the next control period (3-7% per annum) as too high since it is based solely on the efficiency achieved by transmission and distribution companies. ADWEC regards NIE's PPB as its most appropriate comparator. NIE's PPB had an X factor of 3% applied only after the first 5 years of price control and ADWEC has argued that it has been operating in a more mature market than the Abu Dhabi water and electricity sector and has not been facing as many restructuring challenges as ADWEC. ADWEC has therefore suggested that a X factor of 0% should apply to it during the next control period. The Bureau is not persuaded by ADWEC's arguments for an efficiency improvement factor of 0%, because:

   - The UK regulation experience shows that the regulators have not significantly distinguished between wholesale, retail and network businesses with regards to the scope for efficiency improvements.

   - ADWEC has argued that it is less able to reduce costs that network businesses, because a greater proportion of its costs are staff costs. However, all of the utility companies in the UK have shown that there is much scope to introduce more efficient working practices when subjected to commercial or regulatory pressure. ADWEC has made a reference to staff reductions. In the present environment of a rapidly expanding electricity and water sector, the Bureau considers it more likely that efficiency improvements will show up in a slower rate of increase in staff numbers than would otherwise occur, or perhaps stable or slightly falling staff numbers. ADWEC has further argued that, if anything, its staff costs may rise, as staff numbers are currently below the budgeted level. The Bureau has already understood, via meetings with ADWEC, the nature of ADWEC's budgets and (as discussed further below) does not regard them as particularly relevant to the present exercise.

   - ADWEC's price control information submission indicates that about 28% of its total annual costs is not related to any of its licensed activities.

6. Notwithstanding the foregoing, the Bureau agrees with ADWEC that its comparators should ideally be single buyer or whole-sellers rather than distribution or transmission businesses. However, the Bureau has noted the following points in relation to ADWEC's comparison with NIE's PPB and the related arguments:

   - There has been growing concerns that electricity regulation in Northern Ireland (NI) has not been able to achieve the same efficiency or deliver the same reduction in prices as achieved in the Great Britain (GB). The Bureau therefore finds it unreasonable to simply follow regulatory decisions in NI regarding specific figures such as the X factor.

- The Bureau is also not convinced by ADWEC's argument that NIE's PPB is not faced with as many restructuring challenges as ADWEC. The Bureau has explained various examples of uncertainty and challenges faced by NIE's PPB that demonstrate otherwise (with NIE's PPB as a very small organization (7 people only in 2000, compared to ADWEC's 30 or so employees)). These PPB examples include uncertainty surrounding its price control reviews, power purchase contracts restructuring, BST as well as non-BST sales, challenges due to adoption of the European Union Directive EC/96/92 concerning the Internal Market in Electricity (IME) including the transition of PPB from a single buyer of wholesale power to a market participant, growing number of interconnectors (e.g. interconnections with the Republic of Ireland, Scotland), and the emergence of indigenous IPPs.

5.2.4 Other Adjustments

The Bureau has also considered the necessity for further adjustments for other factors not adequately dealt with by the above methodology.

One possible factor is the effect of input prices on a firm's costs. Adjustments to projections for expenditure requirements would be required were increases or decreases in input prices faced by the sector companies to be expected (other than movements reflected in the changes in the CPI already accounted for in the CPI-X formula). In principle, such an adjustment could be upwards or downwards (depending on whether real input prices were expected to rise or fall). No adjustment has been made in these Draft Proposals since none of the companies has presented the Bureau with convincing evidence for any such movements.

Another possible factor affecting future levels of operating expenditure 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 operating expenditures tends to reduce more rapidly (or increase less rapidly) than costs overall. While a case can be made for such an adjustment, which would unambiguously have a downward impact on the Bureau's operating expenditure allowances over 2003 – 2005, in order to be conservative no adjustment has been made for capital substitution effects in these Draft Proposals. This should assist the companies in matching or exceeding the operating expenditure efficiency assumption assumed in these Draft Proposals.

Companies have argued to the Bureau that operating expenditure projections should take account of a number of factors, including administrative costs which ADWEA incurs on their behalf or causes them to incur, and labour cost issues specific to the UAE. The Bureau acknowledges this concern, but only in relation to those costs which are genuinely outside the control of the companies' management and shareholder. The use of the most recently audited data for each companies' actual operating expenditure as the basis for future projections ensures that these considerations are adequately taken into account in the revised price controls.

Companies have argued for pass-through treatment of costs incurred by ADWEA and charged to the companies. For the following reasons, the Bureau in principle does not agree with the companies that costs incurred by ADWEA for and on behalf of the price-controlled companies or costs incurred by these companies due to ADWEA's actions or decisions should be treated as pass-through items in the price control formulae:

- The price control for a company relates to the company, and does not distinguish between costs directly incurred by the management of the company and the costs incurred by the shareholders of the company on its behalf (or the costs incurred by the management due to shareholder's decisions or actions). It would clearly be ineffective to set a price control for a company that allows costs incurred due to shareholder's actions or in-actions to be passed through to its customers unchallenged – such an approach would undermine the whole concept of independent economic regulation that has been established for Abu Dhabi and could put the Bureau in breach of its statutory duty to ensure the operation and development of an efficient and economic water and electricity sector in the Emirate. If ADWEA incurs or causes to incur any cost over or above the efficient level assumed while setting the price controls, ADWEA as a shareholder will face lower profits than assumed – as the shareholder, this is therefore a matter for its decision.

- Since ADWEA's costs and control and other similar factors are reflected in the cost levels during the first control period, and the efficient levels of costs for the purpose of the new price controls have been derived from such levels of costs (among other considerations), such factors will in any case be financed to some extent by the new price controls.

- The fact that ADWEA costs are not passed through under the price controls provides the companies with an incentive to scrutinize and if necessary challenge the costs which ADWEA incurs on their behalf or causes the companies to incur. One of the sector companies in its response has confirmed this incentive and the Bureau appreciates the efforts made by the companies in this regard. The Bureau sees no reason why such an incentive should not continue.

One company has argued that its shareholder (i.e. ADWEA) is not necessarily influenced by the same profit motive, which is the prime motive of shareholders in other companies. Thus ADWEA's decisions may be detrimental to the financial position of the company, and therefore create a potential conflict between the company and its shareholders. The Bureau makes the following comments on these arguments:

- If the company's shareholder (i.e. ADWEA) is not interested in the company earning profit, one would not expect the company's management to be too concerned with the company's financial performance either. However, the company's response clearly demonstrates that the management is concerned with the impact of factors such as the price control review and the PIS.

- Article 14 of Law No.2 of 1998 clearly identifies dividends paid to ADWEA by the companies as one of the source of ADWEA's funds.

- The objective of the price controls is to incentivise the company to reduce its costs, irrespective of whether the control of 'the company' or its costs lies with its management or its shareholder. How the owner incentivises the management to improve the company's performance and profits is outside the scope of the price controls. The objective of the price controls is not to highlight or resolve conflicts between the company, its management and its shareholder.

On a concern raised by a company in relation to additional regulatory burden and costs due to the PIS, the Bureau has explained to the company that the Bureau does not consider that it is proposing or asking anything which should not be expected from any efficiently managed company. In fact, the Bureau has proposed performance indicators that the companies are already required to comply with under their licences or have already been reporting to the Bureau. For example, production of audited accounts in a timely manner should not increase any regulatory burden on the companies. Similarly, reporting on some technical or operational performance aspects should also not be considered as additional burden as the companies have already been reporting them to the Bureau. As a matter of fact, companies should monitor themselves for their own purposes even if the Bureau does not require them to be reported.

The Bureau agrees that, in principle, costs associated with administering the PIS should be reflected in allowed revenues in the revised price controls. To the extent that such costs would be incurred anyway by an efficiently managed firm operating in a commercial environment, they will already be reflected in the Bureau's proposed approach to determining an efficient level of allowed revenues. However, if the company believes there are additional costs, the Bureau has stated that it may be willing to consider any quantitative analysis the company can provide.

5.2.5 ADWEA Costs for Procurement of IWPPs

One particular issue arises in relation to any costs borne by ADWEC over 2003 – 2005 relating to the use of professional consultancy services by ADWEA for the procurement of IWPPs over that period. These costs relate to the preparation and negotiation of PWPAs. Although in principle to a significant extent an ADWEC responsibility, to date such costs have been borne by ADWEA and not charged to ADWEC. ADWEC has provided the Bureau with projections of such costs that ADWEA expects to incur on ADWEC's behalf over the next price control period (2003 – 2005).

In principle, the Bureau considers it appropriate for ADWEC to bear the efficient cost of (and, to that extent, to be appropriately remunerated for) such advisory costs, as ADWEC as a stand-alone company would be incurring such costs (irrespective of whether the activity had been sub-contracted to a third-party such as ADWEA or its consultants).

Given the uncertainty as to the level of such costs, and as to the extent to which they will be borne by ADWEC, it is not appropriate to simply include ADWEC's estimates of such costs within its allowed operating expenditure requirements. Rather, the Bureau is minded to treat such costs in the revised price controls in a similar manner to future capital expenditure for the network companies (see Section 6 of this paper). Specifically, the Bureau intends to make a conservative judgement

(zero in this case) as to the amount of such future costs to take account of at the present price control review.

The actual costs borne by ADWEC over 2003 – 2005 relating to the use of professional consultancy services by ADWEA for the procurement of IWPPs over that period will then be reviewed at the 2005 Price Controls Review against the Bureau's efficiency criteria. To the extent that relevant such costs have not taken into account at the present price control review but are subsequently found to be in accordance with the Bureau's efficiency criteria, an appropriate upward adjustment will be made to future allowed revenues at the 2005 Price Controls Review. This adjustment will be made in such a way that ADWEC will be no better or worse off in net present value terms than if the expenditure had been included in ADWEC's revenue allowance at the time it was borne by ADWEC.

5.3 Operating Expenditure Projections for Each Company

Using the approach described in the preceding sections (i.e. adjusting the 1999 and 2001 unaudited costs for 2003 prices and taking their average as the base level of costs), the Bureau has forecast operating expenditure projections for the companies, which are described in turn for each company in the following sub-sections. The actual and assumed CPIs for the past and future years are shown in **Table 5.2**.

Table 5.2: Actual and Assumed CPIs

(1995 = 100)	**1999**	**2000**	**2001**	**2002**	**2003**
		Actuals		Estimate	
UAE CPI	109.2	110.7	113.1	114.7	116.6

Source: UAE Ministry of Planning for 1999 - 2001.
2002 estimate based on projection of Economist Intelligence Unit.

5.3.1 Operating Expenditure Projections for ADWEC

ADWEC's actual operating expenditure for 1999-2001, its estimate for 2002, and its forecast for 2003 – 2005 are reproduced in **Table 5.3** below.

Table 5.3: ADWEC Operating Expenditure

(All figures in AED m)	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
		Actuals		Estimate	Forecasts		
		(nominal prices)			(2002 prices)		
Information Submission	6.58	9.37	8.78	14.99	15.11	20.72	21.09
Draft audited accounts	6.67	n/a	n/a	n/a	n/a	n/a	n/a

Source: ADWEC

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, and related depreciation, these are included in the

above figures. It can be seen that costs are projected by ADWEC to increase by 71 per cent in 2002. The 2002 figures is then used by ADWEC as the basis for forecasts for the 2003 – 2005 price control period, with another substantial increase in costs of 37% projected for 2004.

In order to help understand the basis for the large cost increase projected by ADWEC for 2002, a detailed breakdown of 2002 estimated costs compared to 2001 costs is provided in **Table 5.4**:

Table 5.4: Comparison of ADWEC 2001 Actual Costs and ADWEC 2002 Estimated Costs

Prices of the day, AED m	2001	2002	Variance 2002 on 2001
Basic salary	2.672	4.025	+ 51%
Allowances	1.907	3.473	+ 82%
Staff costs	1.951	3.028	+55%
Office expense	0.575	1.015	+77%
Vehicle expense	0.186	0.452	+ 143%
Professional fees & expense	0.054	1.438	+ 2,563%
Insurance	0.034	-	- 100%
General overhead expense	0.894	1.144	+ 28%
Capital expenditure	0.508	0.417	- 18%
Total	**8.781**	**14.991**	**+ 71%**

Source: ADWEC

ADWEC has explained that its estimate for 2002 is based on the budget approved by ADWEA for 2002. In order to see whether this is a useful basis for estimating actual future costs, the Bureau requested ADWEC to provide its budgets for 1999, 2000 and 2001 in relation to basic salary, allowances and staff cost. These are presented in **Table 5.5** below.

Table 5.5: Comparison of ADWEC Budgets and Actual Expenditure for Basic Salary, Allowances and Staff Costs

Prices of the day, AED m	1999	2000	2001	2002
Budgeted amount	9.542	7.701	9.341	10.526
Actual amount	4.369	5.757	6.530	n/a
Actual amount as proportion of budgeted amount	46%	75%	70%	n/a

Source: ADWEC

The approval of ADWEC's budget by ADWEA is a matter for ADWEC and ADWEA and the Bureau makes no comment upon it. However, past figures suggest a poor correlation between ADWEC's budget and its actual expenditure. The Bureau is therefore not satisfied that the figures put forward by ADWEC for 2002, based on its budget, can be justified in relation to the costs that would be incurred by an efficient operator, nor that there is much likelihood in practice that the

suggested level of costs will actually be incurred by ADWEC. The Bureau has therefore disregarded ADWEC's 2002 cost estimate in re-setting the price control.

The second main reason for the projected increase in costs by ADWEC is the inclusion in the figures, from 2002 onwards, of estimates of the costs to be borne by ADWEC relating to the use of professional consultancy services by ADWEA for the procurement of IWPPs over that period. To date, such costs have been absorbed by ADWEA. These costs are estimated by ADWEC at AED 1.44m (2002 prices) in 2002, increasing to AED 6.63m (2002 prices) from 2004 onwards. The Bureau has been presented with no strong evidence to suggest that the present treatment of these costs by ADWEA will change. Indeed, ADWEA's budget statement for 2002 states in relation to such costs that "the cost of IWPP…has not been allocated…[to ADWEC]… for 2002, since this amount will be claimed from the Government…". This statement appears to contradict ADWEC's submission, in relation to 2002 at least. Such costs have therefore been excluded by the Bureau from projections underlying the revised price control for ADWEC. Nevertheless, should any such costs in the event be passed on to ADWEC over 2003 – 2005, and if they are consistent with the Bureau's efficiency criteria, Section 5.2.5 above describes how the Bureau intends to remunerate ADWEC for these costs at the 2005 Price Controls Review.

As described above, pending receipt of more recent audited accounts the Bureau has based operating expenditure projections for 2003 – 2005 on the average of 1999 audited and 2001 unaudited operating expenditures. The resultant figures (adjusted to 2003 prices) are summarized in **Table 5.6**. As previously explained, "operating expenditure" is taken to include the small amount of capital expenditure undertaken by ADWEC.

Table5.6: Bureau Proposals for ADWEC Operating Expenditure

2003 prices, AED m	**2003**	**2004**	**2005**
Operating Expenditure	8.04	8.04	8.04

Source: Bureau

Note that following the Bureau's proposed methodology, operating allowances for ADWEC would increase by over 1m AED per year (by taking average of 2000 audited and 2001 unaudited costs or by simply taking 2001 audited costs, as the case may be, as the base level of costs) if it is able to provide the Bureau with audited accounts for 2000 or 2001 before the Bureau issues its Final Proposals.

Note that the above levels of costs do not include ADWEC's profit based on the Bureau's proposed profit margin, which is dealt with separately later in this paper.

5.3.2 Operating Expenditure Projections for TRANSCO

TRANSCO is the only company for which no audited information of any form for any year has been received by the Bureau.

TRANSCO's projections for operating expenditure from its Price Control Information Submission are summarized in **Table 5.7** below. As with the Bureau, TRANSCO has assumed that operating expenditure for 2003 – 2005 remains broadly constant at the base level of costs (for which TRANSCO had adopted its estimate of 2002 costs).

Table 5.7: TRANSCO Operating Expenditure (excluding Depreciation)

(All figures in AED m)	1999	2000	2001	2002	2003	2004	2005
		Actuals		Estimate		Forecasts	
		(nominal prices)			(2002 prices)		
Information Submission – electricity	53.97	69.29	98.09	107.37	105.36	105.50	105.48
Information Submission – water	50.82	65.21	96.46	108.69	107.00	107.35	107.41
Draft audited accounts	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: TRANSCO

The Bureau has raised a number of queries in relation to financial aspects of TRANSCO's Price Control Information Submission in a letter dated 2 July but has yet to receive a comprehensive reply.

In particular, it has not been explained to the Bureau why costs have apparently increased to such a great extent over the period 1999 – 2001, and why a further increase is expected by TRANSCO for 2002.

Applying the methodology described earlier in this section (i.e. by adjusting the 1999 and 2001 unaudited costs for 2003 prices and taking their average as the base level of costs), the Bureau's operating expenditure allowances for TRANSCO are summarized in the **Table 5.8**:

Table 5.8: Bureau Proposals for TRANSCO Operating Expenditure

2003 prices, AED m	2003	2004	2005
Operating Expenditure (excluding depreciation) – electricity	79.37	79.37	79.37
Operating Expenditure (excluding depreciation) – water	76.86	76.86	76.86

Source: Bureau

As with other companies, the Bureau is open to the review of these figures if it is in receipt of audited information for 2000 and 2001.

5.3.3 Operating Expenditure Projections for ADDC

ADDC's projections for operating expenditure from its Price Control Information Submission are summarized in **Table 5.9** below for its electricity and water businesses, in addition to audited accounting data for 1999 (which has not at present been provided separately for ADDC's separate businesses as required by ADDC's licence).

Given the Bureau's proposal to continue with distribution and supply price controls combined (one for electricity and one for water), the figures reflect supply costs as well as distribution costs. Figures relating to 2001 onwards include additional costs to reflect the costs of the distribution and supply businesses of RASCO which are assumed to have been inherited with effect from 1 January 2001.

Table 5.9: ADDC Operating Expenditure (excluding Depreciation)

(All figures in AED m)	1999	2000	2001	2002	2003	2004	2005
		Actuals		Estimate		Forecasts	
		(nominal prices)			(2002 prices)		
Information Submission – electricity	159.99	180.14	189.07	214.26	224.97	236.22	248.03
Information Submission – water	91.12	104.78	119.90	132.15	138.76	145.70	152.99
Draft audited accounts	238.28	n/a	n/a	n/a	n/a	n/a	n/a

Source: ADDC

Even accounting for the additional RASCO costs and for the effects of inflation, ADDC's costs have increased over 1999 – 2001, although not to the same extent as TRANSCO's.

The Bureau and ADDC have met to discuss and clarify ADDC's submission. Following the meeting, ADDC agreed to make some amendments to its submission, but this further information is still awaited by the Bureau. For example, ADDC has explained to the Bureau that its cost increases for 2003 – 2005 are over-stated: ADDC expects its operating expenditure to increase by 5 per cent a year in *nominal* terms (i.e., including the effects of inflation), not in real terms by 5 per cent a year as implied by its Price Control Information Submission.

The Bureau's operating expenditure allowances for ADDC's electricity and water businesses respectively following the previously described methodology (i.e. adjusting the 1999 and 2001 unaudited costs for 2003 prices and taking their average as the base level of costs) are summarized in **Table 5.10**.

Table 5.10: Bureau Proposals for ADDC Operating Expenditure

2003 prices, AED m	2003	2004	2005
Operating Expenditure (excluding depreciation) – electricity	182.88	182.88	182.88
Operating Expenditure (excluding depreciation) – water	110.45	110.45	110.45

Source: Bureau

5.3.4 Operating Expenditure Projections for AADC

ADDC's operating expenditure projections are summarized in **Table 5.11**. As with ADDC, they relate to the combined distribution and supply businesses for water and electricity respectively, including that inherited from RASCO with effect from 1 January 2001.

Table 5.10: AADC Operating Expenditure (excluding Depreciation)							
(All figures in AED m)	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
		Actuals		Estimate	Forecasts		
		(nominal prices)			(2002 prices)		
Information Submission – electricity	87.78	94.28	87.30	140.88	147.92	155.31	163.07
Information Submission – water	59.00	75.46	109.33	91.59	96.17	100.98	106.03
Draft audited accounts	143.32	n/a	n/a	n/a	n/a	n/a	n/a

It can be seen that there are significant variation in operating expenditure for electricity and water between 1999 and 2001, which do not seem to follow a consistent pattern, varying from year-to-year, and between water and electricity. This causes the Bureau to attach some caution to these figures, at least before audited data is provided. In particular, the 61 per cent increase in electricity business related operating expenditure in 2002 could not be reflected in revised price limits in the absence of a convincing explanation.

The Bureau's operating expenditure allowances for ADDC for 2003 – 2005 are summarized in **Table 5.12**, being an average of 1999 and 2001 Price Control Information Submission data (adjusted for 2003 prices).

Table 5.12: Bureau Proposals for AADC Operating Expenditure			
2003 prices, AED m	**2003**	**2004**	**2005**
Operating Expenditure (excluding depreciation) – electricity	91.87	91.87	91.87
Operating Expenditure (excluding depreciation) – water	87.85	87.85	87.85

6 Capital Expenditure and Asset Valuation for Network Companies

6.1 The Overall Approach

Consistent with the approach taken to setting the initial price controls, the Bureau has used a net present value (NPV) framework to establish the level and profile of price controlled revenue for TRANSCO, ADDC and ADDC for the period 2003 – 2005. (For ADWEC, a slightly different approach is adopted – see section 7.2).

To set the controls, the sum of present values (PVs) of annual maximum allowed revenues (MARs), based on the forecasts or assumptions of revenue drivers for all the years of the control period, is set equal to the present value of the company's annual required revenues (all calculations are carried out in real terms, that is excluding the effect of inflation). That is:

NPV of annual MARs = NPV of Required Revenues

(in real terms, over the control period)

The required revenue can be calculated in two ways:

1) Required Revenue for each year = Operating Costs + Depreciation + Return on Assets (both existing assets and new investment) for each year; or

2) PV of Required Revenues = PV of Operating Costs + PV of Capital Expenditures + PV of Opening Asset Value – PV of Closing Asset Value, over the entire control period.

The two approaches may sound different, but on certain assumptions they give the same answer. The first approach calculates the annual required revenue for each year of the control period separately using a "building block" methodology. Annual required revenues are then discounted to determine the 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. In 1999, the Bureau used the second approach to set the initial price controls. As the sector companies and other interested parties are already familiar with this approach, the Bureau proposes to continue with it. Accordingly, the Draft Proposals employ the second approach for price control calculations. However, the first approach has also been used to cross check the results of the calculations under the second approach, to ensure the financial viability of the sector companies on a year-to-year basis.

The calculation for the network companies is summarized below:

$$\mathbf{PV\ (Rev) = PV(RAV_{opening}) + PV(Opex) + PV(Capex) - PV(RAV_{closing})}$$

where,

PV is the present value at 1 January 2003;

Rev is the total revenue over the price control period

$RAV_{opening}$ is the opening regulated asset value on 1st January 2003;

Opex is the total operating expenditure over the price control period;

Capex is the total capital expenditure over the price control period; and

$RAV_{closing}$ is the closing regulated asset value on 31st December 2005.

More intuitively, this equation can be rearranged to show that the opening asset value (the "regulatory" value of the business) is equal to the present value of the cash which the business generates over the period of the price control (revenue less opex less capex) plus the present value of the terminal value of the business (closing asset value). The discount rate used in the present value calculation is the cost of capital discussed and set in Section 7 of this paper.

Such an approach ensures a smooth profile of allowed revenues across the price control period (i.e., the same value of 'X' in the CPI-X formula in each year). In addition, the Bureau has cross-checked the resulting profile of allowed revenues against accrued operating costs on an annual basis to ensure that it does not result in undue volatility from year-to-year in the reported financial position of any of the companies.

This calculation requires projections to be made of operating expenditure and capital expenditure over the price control period. The Bureau's projections for operating expenditure over 2003 – 2005 are described in Section 5 of this paper. In this section, the Bureau explains how provisional allowances for capital expenditure for the periods 1999 – 2002 and 2003 – 2005 respectively have been used in the Draft Proposals to drive the 2003 – 2005 RAV calculations used in calculating 2003 – 2005 allowed revenues.

6.2 Approach to Rolling Forward Regulatory Asset Values

6.2.1 Initial (1 January 1999) RAV

As described above, the calculations of RAVs are an important element of the Bureau's estimation of the costs that need to be recovered via allowed revenues under the price controls. RAVs are calculated annually by updating the previous year's RAV for net new investment over the year (where net new investment is capital expenditure less depreciation).

In setting the initial price controls, the opening asset value of TRANSCO (as at 1 January 1999) was reduced by 15 per cent, following analysis by the Bureau which suggested 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 initial price controls, on the grounds that insufficient data was available at that time to justify such an adjustment. However, the possibility that the distribution companies' opening asset value (and indeed the adjusted TRANSCO asset value) would be reconsidered at the present price control review was signalled when setting the initial price controls.

In its First Consultation Document for the 2002 Price Controls Review, the Bureau raised the question of whether these initial RAVs should be subject to any further adjustment. In its Second Consultation Document, following the analysis of responses, the Bureau concluded that it would not be appropriate to make any further adjustment to the initial RAVs. This assumption is reflected in the calculations used to derive these Draft Proposals.

6.2.2 Capital Expenditure and Depreciation 1999 - 2002

1999 Price Controls Review

The Bureau set the initial price controls assuming no capital expenditure in the first price control period for the three network companies (TRANSCO, ADDC and AADC), due to the unavailability of reliable projections at that time. It was agreed that when setting the next price controls, the Bureau would take account of capital expenditure incurred during the current period (along with its associated foregone financing costs), provided that expenditure carried out could be shown to be in accordance with the "efficiency criteria" established by the Bureau at the time of setting the first price controls. These criteria are that the expenditures:

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

2002 Price Controls Review

Following this principle, the Bureau has taken account of 1999 – 2002 capital expenditure in deriving the opening RAV (1 January 2003) for the second price control period. In this way, capital expenditure over the period 1999 – 2002 is financed via future (i.e., 2003 onwards) allowed revenues.

Specifically, updating the RAV has involved making an adjustment for an amount of new capital expenditure over the period 1999 – 2002 (net of related depreciation), plus an adjustment for the foregone financing costs (i.e. return on capital) and depreciation associated with the delay in its inclusion within the RAV compared to when it was incurred.

However, the Bureau has had great difficulty in accurately identifying the amount of capital expenditure actually undertaken by the companies over the first price control period. None of the sector companies has yet been able to provide the Bureau with what is considered to be an accurate record of capital expenditure over the first price control period. No audited data has been provided by TRANSCO, and ADDC and AADC have only been able to provide draft audited data for 1999. Even in these latter cases, audited data for 1999 is given only at the level of the company overall, rather than separately for the water and electricity businesses (as required by the companies' licences).

The Bureau has therefore made in these Draft Proposals a conservative judgement as to the amount of past capital expenditure accounted for at the present price control review.

The provisional figures, which apply to each year of the first price control period, have been derived as follows:

- For TRANSCO, in the absence of *any* audited data, unaudited 1999 capex for water and electricity figures has been taken from its Price Control Information Submission.

- For ADDC, draft audited total 1999 capex has been split between water and electricity in the same proportions as unaudited capex in its Price Control Information Submission.

- For AADC, audited total 1999 capex has been split between water and electricity in the same proportions as unaudited capex in *ADDC*'s Price Control Information Submission (since AADC's Price Control Information Submission is not regarded as sufficiently reliable for this purpose).

Depreciation associated with this expenditure has been estimated by assuming an average asset life of 25 years and straight-line depreciation. These depreciation assumptions have been derived following review of ADWEA's accounting policies and procedures. However, they should not be taken as reflecting the Bureau's view of the appropriate depreciation policy.

In determining provisional 1999 – 2002 capital expenditure, the Bureau has taken into consideration, inter alia, the following factors:

- Some companies may erroneously have included, in their Price Control Information Submissions, capital expenditure which relates to the period prior to 1999 (such expenditure will already have been reflected in the initial 1999 RAV, and so should not be double-counted).

- Some companies may erroneously have included capital expenditure which should be allocated to other companies in relation to projects jointly incurred between two or more companies.

- The need to ensure that allowed revenues within the revised price controls do not exceed economic costs.

- The effect of different assumptions on the profile of each companies' maximum allowed revenues over time.

The resulting provisional allowances for 1999 – 2002 annual capital expenditure, and associated depreciation, are given in **Table 6.1**.

Table 6.1: Provisional 1999 – 2002 Annual Capital Expenditure assumed in Bureau's Draft Proposals

AED million per annum, 1999 prices	Capital expenditure	Depreciation
TRANSCO – Electricity	521.8	20.9
TRANSCO – Water	180.0	7.2
ADDC – Electricity	262.0	10.5
ADDC – Water	92.1	3.7
AADC – Electricity	188.7	7.5
AADC – Water	66.3	2.7

Source: Bureau

The Bureau is open to reviewing these assumptions if the companies are able to provide any additional audited data in time to be taken into account for the Final Proposals.

2005 Price Controls Review

Once the Bureau is in receipt of a full set of audited data reporting capital expenditure for the period 1999 – 2002, it will undertake an efficiency audit to judge the extent to which the actual expenditure undertaken complied with the Bureau's efficiency criteria, as stated above:

- To the extent that capital expenditure is not taken into account at the present price control review but is subsequently found to be in accordance with the Bureau's efficiency criteria, an appropriate upward adjustment will be made to the RAV at the 2005 Price Controls Review.

- Similarly, if a capital expenditure is taken into account at the present price control review but is subsequently not found to be in accordance with the Bureau's efficiency criteria, an appropriate downward adjustment will be made to the RAV at the 2005 Price Controls Review.

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.

Thus, no judgement has been made at the present review as to the efficiency or otherwise of past capital expenditure undertaken by the companies. This assessment has been deferred to a later date, when improved information should be available. The provisional levels of past capital expenditure and depreciation used in setting the revised price controls should not be taken as in any way

indicative of the Bureau's views of the appropriate level of capital expenditure and depreciation over the period.

6.2.3 Capital Expenditure 2003 - 2005

The assumption of zero capital expenditure made at the time of setting the first price controls was a pragmatic and practical approach in the prevailing circumstances. However, as explained in the Second Consultation Paper on the 2002 Price Controls Review, these Draft Proposals *do* include some allowance for future capital expenditure (in this case, for the period 2003 – 2005). This is principally so as to minimize revenue volatility across price control periods, and to ensure that unreasonable demands are not made of the ex-post efficiency review (although such a review will still not be straightforward). This represents a slight modification to the approach previously adopted by the Bureau, which has the effect of increasing the speed at which companies are remunerated for their capital expenditure compared to the alternative approach.

The Bureau's approach for future capital expenditure is similar to that for past capital expenditure as explained above. That is:

- ***2002 Price Controls Review:*** In some cases by their own admission, companies' estimates of future capital expenditure do not currently appear to be particularly reliable. This principally appears to be because much of the activity is in effect sub-contracted to a division of the companies' shareholder, ADWEA, which (the companies indicate) exercises the principal influence over capital expenditure decisions and procurement. In view of this uncertainty, the Bureau has again made a conservative judgement as to the amount of future capital expenditure to take account of at the present price control review. The opening RAV (1 January 2003 at 2003 prices) has been rolled forward to take account of this provisional level of projected new capital expenditure, net of associated depreciation, over 2003 - 2005.

- ***2005 Price Controls Review:*** The actual capital expenditure undertaken over the period will then be reviewed at the 2005 Price Controls Review against the Bureau's efficiency criteria, and appropriate adjustments made to the future RAV at that point. An adjustment – upwards or downwards – will then be made to the RAV at the 2005 price control review to appropriately remunerate actual investment over 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.

The Bureau is currently considering whether improved reporting and monitoring on an annual (or more frequent) basis over 2003 – 2005 of capital expenditure being undertaken will ease the task of making ex post judgements about the efficiency of such expenditure, thereby reducing regulatory risk, and may wish to discuss this issue with the companies in due course.

Given the poor quality of the data which the companies have been able to provide, factors similar to those identified for making a provision for past capital expenditure have therefore also been considered for establishing the provisional level of 2003 – 2005 capital expenditure. The figures adopted are, with one exception, the same annual amounts as assumed for 1999 – 2002, but expressed in 2003 prices (the price base for the revised controls) rather than 1999 prices (the price base for the initial controls). The one exception relates to TRANSCO's water transmission business, for which past levels of capital expenditure are likely to prove a particularly poor guide to future capital expenditure given the magnitude of the water transmission system investment expected to be associated with the new Shuweihat generation and desalination plant, for which procurement has already begun. An increased provision (of 500m AED per annum in 2003 prices) has therefore been assumed for the TRANSCO water transmission business for 2003 – 2005; as with other provisional allowances, this will be subject to ex post review at the 2005 Price Controls Review.

The provisional annual capital expenditure figures for 2003 – 2005 for each business together with associated annual depreciation (assuming a 25-year asset life and straight-line depreciation) are shown in **Table 6.2**:

Table 6.2: Provisional 2003 – 2005 Annual Capital Expenditure assumed in Draft Proposals

AED million per annum, 2003 prices	Capital expenditure	Annual Depreciation
TRANSCO – Electricity	557.2	22.3
TRANSCO – Water	500.0	20.0
ADDC – Electricity	279.8	11.2
ADDC – Water	98.4	3.9
AADC – Electricity	201.5	8.1
AADC – Water	70.8	2.8

Source: Bureau

Again, no assessment has been made at the present review as to the appropriate level of capital expenditure over 2003 – 2005. This appraisal has been deferred to a later date, when improved information should be available. The provisional levels of future capital expenditure and depreciation used in setting the revised price controls should not be taken as in any way indicative of the Bureau's views of the appropriate level of capital expenditure and depreciation over the period.

6.3 Calculation of 2003 – 2005 Projected Regulatory Asset Values

In accordance with the preceding discussion, the calculation of regulated asset values (RAVs) for 2003 – 2005 has involved the following steps:

- Identify the **Initial (1 January 1999) RAVs** for each company used in setting the first price controls.

- Update the **Initial (1 January 1999) RAVs** to take account of **Provisional Net New Capital Expenditure over 1999 – 2002**, to derive a figure for the **Opening (1 January 2003) RAVs excluding 1999 – 2002 Financing Costs Foregone** .

- Calculate the **1999 – 2002 Financing Costs Foregone.** These are the capital costs (return on capital) and depreciation over 1999 - 2002 associated with capital investment over 1999 – 2002 (as such expenditure was not financed in the first price controls).

- Calculate the **Opening (1 January 2003) RAVs including 1999 – 2002 Financing Costs Foregone** as the sum of (i) **Opening (1 January 2003) RAVs excluding 1999 – 2002 Financing Costs Foregone** and (ii) **1999 – 2002 Financing Costs Foregone** (where the latter are expressed in terms of their net present value as of 1 January 2003).

- Roll forward the **Opening (1 January 2003) RAVs including 1999 – 2002 financing costs foregone** to take account of **Provisional Net New Capital Expenditure over 2003 – 2005** to calculate the **RAVs for 2003 – 2005** which are used within the revised price controls.

The Bureau's calculations are summarized below. Detailed calculations are provided in **Appendix B** to this paper. The results of this exercise in terms of Maximum Allowed Revenues and Notified Values over the price control period are provided in Section 9 of this paper.

6.3.1 1999 Initial Regulatory Asset Values

The regulatory asset values at the start of the first price control period used in setting the initial price controls are summarized in **Table 6.3**, alongside the depreciation associated with those regulatory asset values.

Table 6.3: Initial (1 January 1999) Regulatory Asset Values (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

6.3.2 Opening (1 January 2003) RAVs excluding 1999–2002 Financing Costs Foregone

Opening (1 January 2003) RAVs excluding 1999 – 2002 Financing Costs Foregone are calculated in **Table 6.4** by updating the Initial (1 January 1999) RAVs to take account of Provisional Net New Capital Expenditure over 1999 – 2002 (see Table 6.1 above).

Table 6.4: Opening 1 January 2003 RAVs excluding 1999 – 2002 Financing Costs Foregone (FCF)		
AED million, 1999 prices	**1st January 1999 RAV**	**1st January 2003 RAV (excluding FCF)**
TRANSCO – Electricity	2,907.1	4,325.2
TRANSCO – Water	2,053.2	2,246.6
ADDC – Electricity	2,939.2	3,358.6
ADDC – Water	845.6	948.6
AADC – Electricity	1,516.1	1.880.3
AADC – Water	129.3	352.6

Source: Bureau

6.3.3 Opening (1 January 2003) RAVs including 1999–2002 Financing Costs Foregone

1999 to 2002 Financing Costs Foregone (FCF) are calculated as shown in **Table 6.5**, expressed in terms of their net present values as of 1 January 2003. These are the capital costs (return on capital and depreciation) over 1999 -2002 associated with capital investment over 1999 – 2002 (as such expenditure was not financed in the first price controls).

Opening (1 January 2003) RAVs including 1999 – 2002 Financing Costs Foregone are then calculated in the table as the sum of (i) Opening (1 January 2003) RAVs excluding 1999 – 2002 Financing Costs Foregone and (ii) 1999 – 2002 financing costs foregone.

Table 6.5: **Opening (1 January 2003) RAVs excluding 1999 – 2002 Financing Costs Foregone**			
AED m, 1999 prices	**1st January 2003 RAV (excluding FCF)**	**FCF (NPV @ 1st January 2003)**	**1st January 2003 RAV (including FCF)**
TRANSCO – Electricity	4,325.2	570.4	4,895.6
TRANSCO – Water	2,246.6	196.8	2,443.4
ADDC – Electricity	3,358.6	286.4	3,645.0
ADDC – Water	948.6	100.7	1,049.3
AADC – Electricity	1,880.3	206.3	2,086.6
AADC – Water	352.6	72.5	425.1

6.3.4 Regulated Asset Values (RAVs) for 2003 – 2005

The opening and closing **RAVs for 2003 – 2005** which are used as the basis for the revised price controls as shown in Table 6.6 and have been calculated by rolling forward the Opening (1 January 2003) RAVs including 1999 – 2002 financing costs foregone to take account of Provisional Net New Capital Expenditure for 2003 – 2005 (see **Table 6.2**).

(Closing RAVs for 1999 – 2002 shown in **Table 6.5** are expressed in 1999 prices and have been converted into 2003 prices in **Table 6.6** to become Opening RAVs for 2003 – 2005).

Table 6.6: Provisional Opening and Closing RAVs for Second Price Control Period (2003 - 2005)

AED million, 2003 prices	1st January 2003 RAV	31st December 2005 RAV
TRANSCO – Electricity	5,227.4	6,129.1
TRANSCO – Water	2,609.0	3,532.7
ADDC – Electricity	3,892.0	4,110.5
ADDC – Water	1,120.4	1,161.8
AADC – Electricity	2,228.0	2,435.1
AADC – Water	453.9	603.0

Source: Bureau

All the above calculations are reported in full in **Appendix B** to this report.

7 Cost of Capital and Profit Margin

7.1 Cost of Capital for Network Companies

7.1.1 Overall Approach

The cost of capital is the rate of return at which investors need to be rewarded if they are to continue to finance a business, based on investors' perceptions of the risks associated with the business. The cost of capital is usually calculated as a weighted-average of the cost of debt and equity finance, i.e. the weighted average cost of capital (WACC). 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. For its price control calculations in real terms, the Bureau uses post-tax real cost of capital which is calculated by using the following formula:

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

Gearing refers to the ratio of debt to the sum of debt and equity. The Bureau uses the Capital Asset Pricing Model (CAPM) to estimate the cost of equity to the Abu Dhabi businesses. The cost of debt is found by adding a suitable corporate debt premium to a risk-free rate.

The Bureau's cost of capital calculations for the Abu Dhabi companies draw on 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 close supervision. There have been equity markets in the Middle East for some time, but no official and regulated UAE stock market until March 2000. The Bureau compared indicators of the size and liquidity of the UAE market with other markets in the Middle East and in the UK, Australia, and the USA. However, the present coverage and liquidity of the UAE market is such that the Bureau is reluctant to reference its cost of capital calculations to it at this time.

As the official UAE stock market develops, the Bureau is confident that it will provide information relevant to an assessment of the required cost of capital of the Abu Dhabi businesses that are subject to price controls. The Bureau will continue to monitor the development of the official UAE market and review the situation at the time of the next price control reviews.

7.1.2 Bureau's Proposal

The January 2001 Consultation Document and the First Consultation Paper discussed in detail the available evidence on the cost of capital for the Abu Dhabi water and electricity companies. On the basis of this evidence, including an analysis of the relevance of recent regulatory determinations from overseas, the Bureau proposed a real cost of capital for the second price control period in the range 4.55 – 6.6 per cent (post-tax equivalent). This compares to the real cost of capital of 6 per cent used in setting the initial price controls. The Bureau's review of the component elements of the cost of capital calculations was described in detail in Annex E of the January 2001 Consultation

Document and Section 3.6 of the First Consultation Paper and is summarized in **Table 7.1**. The Bureau suggested that 6 per cent remained the appropriate figure for revised price controls

Table 7.1 Bureau's Estimates of the Cost of Capital		
	Low	**High**
Risk-free rate (%)	3	4
Debt premium (%)	1	2
Cost of debt	4	6
Risk-free rate (%)	3	4
Equity risk premium	3.5	5
Equity beta	0.6	0.8
Cost of equity	5.1	8
Debt proportion (%)	50	70
(Post-tax) WACC	**4.55**	**6.6**

In the First Consultation Paper, the Bureau also highlighted recent examples where overseas regulators have adopted estimates of the cost of capital towards the lower end of the Bureau's proposed range. On the other hand, respondents to the First Consultation Paper quoted instances where overseas regulators had apparently allowed a higher cost of capital (although the Bureau is sceptical of the validity of such claims – see below).

Given the difficulties in accurately estimating the cost of capital in the UAE (where capital markets are relatively undeveloped), the Bureau accords high weight to two additional considerations, as follows:

- The Bureau has received no convincing representation to suggest that the 6 per cent cost of capital used in the present price controls is substantially either too high or too low.

- The need to finance the large capital investment requirements of the sector means that any potential detriment from maintaining the cost of capital at its present level (as opposed to a lower level) may be limited. By contrast, there may be greater risk in seeking to reduce the allowed cost of capital to the lowest conceivable level.

In the Second Consultation Paper, the Bureau proposed to continue to assume a cost of capital of 6 per cent (real, post-tax) for the network companies (TRANSCO, ADDC and AADC). This estimate was retained, despite some evidence that the cost of capital may have fallen over the present price control period. The Bureau adopted such an approach 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 assuming they operate efficiently.

7.1.3 Companies' Responses

In its response to the Second Consultation Paper, TRANSCO has argued that the Bureau appears to be focused only on regulation of the UK utilities sector for its proposals or determination of cost of

capital for Abu Dhabi companies and has argued for a higher cost of capital than 6%. The Bureau does not agree with these arguments, as explained further in the following references:

- For the 1999-2002 price controls, the Bureau's calculation of cost of capital was based on clear references to both the UK and the US.

- The Bureau's cost of capital calculations in the January 2001 Consultation Document have references to the UK, USA and Australia.

- The Bureau's First and Second Consultation Papers drew on the previous discussion and highlighted additional examples from the UK of recent regulators' estimates. To further substantiate its proposal for 6% cost of capital (real post-tax), the Bureau has researched some additional examples. **Table 7.2** lists the Bureau's calculations of the post-tax real cost of capital used in recent regulatory decisions overseas, and the duration of the related price controls. These examples demonstrate that the Bureau's proposal of 6% for post-tax real WACC may, in fact, be relatively generous in comparison to recent regulatory decisions elsewhere.

- In addition to the above, TRANSCO has itself provided the Bureau with information on some recent regulatory decisions made in Europe on WACC. Those decisions, which quoted a real post-tax WACC, are summarized in **Table 7.3**. Contrary to TRANSCO's assertion, these decisions also do not support a real post-tax WACC in excess of the Bureau's proposal of 6%.

ADDC has accepted the Bureau's cost of capital assumption (post-tax real WACC of 6%) subject to a three-year control period. Although the Bureau is indeed proposing to set the new price controls for a three-year period (2003-2005), it is important to clarify that the Bureau's proposal on cost of capital is not subject to any specific duration of the controls. **Table 7.2** supports this in that it shows that other regulators have opted for a cost of capital lower than 6% for a longer control duration than 3 years.

TRANSCO has sought an explanation of why the UK experience is valid in the Abu Dhabi context in relation to the cost of capital. Notwithstanding the fact that the Bureau has taken into consideration the cost of capital estimates available from the US and Australia in addition to UK, the consultation papers published in 1999 for setting the initial price controls and the January 2001 Consultation Document explained the reasons why the UK cost of capital estimates are informative in relation to the Abu Dhabi water and electricity companies. 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 need not be materially different from that required by comparable businesses in the UK. Further, the comparable credit rating of businesses is the other major reason why the Bureau considers the UK estimate of cost of capital should be taken into consideration for the Abu Dhabi businesses. Similar arguments also apply to the Bureau's consideration of the US and Australian cost of capital estimates. Another reason for considering cost of capital estimates from these countries is the ready availability of the required information.

Table 7.2: Recent Regulatory Decisions on Cost of Capital

S.No.	Regulatory Decision	Post-Tax Real WACC	Duration of Control Period
1	England and Wales PESs' Distribution Business: OFGEM's Final Proposals (December 1999)[1]	4.5%	5 years
2	NSW Electricity Distributors, Australia: IPART determination (December 1999)[2]	3.6 – 4.5%	About 4.5 years
3	TransGrid, Australia[3]:		5 years
	• ACCC draft decision (May 1999)	3.81%	
	• TransGrid submission (June 1999)	4.40%	
	• ACCC final decision (January 2000)	5.00%	
4	NGC Transmission Asset Owner, UK: OFGEM draft and final proposals (September 2000)[4] *(Final proposals were based on the high case.)*	3.86 - 4.37%	5 years
5	Electricity Distributors, Victoria (Australia): ORG price determination (September 2000)[5]	5.82 - 5.90%	5 years
6	SMHEA, Australia: ACCC final decision (February 2001)[6]	6.3%	5 years
7	Transco's Price Controls: OFGEM's Final Proposals (September 2001)[7]	4.4%	5 years
8	Heathrow, Gatwick, Stansted and Manchester Airports' Price Caps: CAA Preliminary Proposals (November 2001)[8]	4.7 – 6.0%	5 years
9	Queensland Transmission, Australia[9]:		5 years
	• Powerlink's Proposal	5.41%	
	• ACCC's Draft Decision	4.78%	
	• ACCC's Final Decision (November 2001)	4.68%	
10	NIE Transmission and Distribution, Northern Ireland: OFREG initial proposals (March 2002)[10] *(OFREG's final proposal of June 2002[11] is based on WACC slightly lower than the high case of initial proposal.)*	4.05 - 4.74%	5 years

[1] *"Reviews of Public Electricity Suppliers 1998 to 2000: Distribution Price Control Review – Final Proposals"*, OFGEM, December 1999.
[2] *"Regulation of New South Wales Electricity Distribution Networks – Determination and Rules under the National Electricity Code"*, IPART, December 1999.
[3] *"NSW and ACT Transmission Network Revenue Caps 1999/00-2003/04"*, Decision, ACCC, 25 January 2000.
[4] *"The transmission price control review of the National Grid Company from 2001: Transmission Asset Owner – Final Proposals"*, OFGEM, September 2000.
[5] *"Electricity Distribution Price Determination 2001-05"*, Office of the Regulator-General, Victoria, September 2000.
[6] *"Snowy Mountains Hydro-Electric Authority Transmission Network Revenue Cap 1999/00-2003/04"*, Decision, ACCC, 7 February 2001.
[7] *"Review of Transco's Price Control from 2002: Final Proposals"*, OFGEM, September 2001.
[8] *"Heathrow, Gatwick, Stansted and Manchester Airports' Price Caps 2003-2008: CAA Preliminary Proposals"*, Consultation Paper, CAA, November 2001.
[9] *"Queensland Transmission Network Revenue Cap 2002-2006/07"*, Decision, ACCC, 1 November 2001.
[10] *"Transmission and Distribution Price Control Review Initial Proposals for Northern Ireland Electricity"*, A consultation paper, OFREG, March 2002.

Table 7.3: Other European Decisions on Cost of Capital		
S.No.	**European Decisions on WACC**	**Real Post-Tax WACC**
1	Dutch Electricity Network Companies Electrical Sector Holland Source: Dte 2000	3.6%
2	ENEL Vertically integrated Electricity Sector Italy Source: Dresdner Kleinwort Wassertein 2000	4.8%
3	Scottish and Southern Energy Regulated Distribution activities Great Britain Source: Schroeder Saloman Smith Barney 2000	4.6%
4	EDP Regulated activities Portugal Source: Schroeder Saloman Smith Barney 22/09/2000	5.0%

TRANSCO has contended that its cost of capital is higher than in other markets due to political uncertainty, oil price volatility and regulatory risk. However, any political uncertainty and oil price volatility, among various other factors, will be reflected in credit rating of the UAE government, which has been taken into account in the Bureau's cost of capital calculations to date. The Bureau's cost of capital calculations effectively treat Abu Dhabi companies (wholly-owned by the Abu Dhabi government through ADWEA) as having the same debt rating as the UAE government (Moody's A2 country rating given to the UAE). While it might be argued that any company would 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 Abu Dhabi government whose financial position is significantly stronger than that of the rest of the federation. On balance, therefore, the Bureau concludes that UAE country rating is probably close to the credit rating that would be accorded to the Abu Dhabi companies. Furthermore, data available to the Bureau suggests that the cost of capitals of IWPPs and oil and gas companies in the Emirate of Abu Dhabi (data being confidential in nature is not reported here) are consistent with the cost of capital proposed by the Bureau.

TRANSCO has also referred to the following two regulatory determinations on the cost of capital in support of its argument:

- Powerlink, Queensland, Australia with a post-tax WACC of 7%.
- REN, Portugal with a pre-tax WACC of 9% (=7.5% post-tax).

[11] *"Transmission and Distribution Price Control Review: Final Proposals for Northern Ireland Electricity plc"*, OFREG, June 2002.

At first sight, these decisions appear to allow a higher cost of capital than 6% proposed by the Bureau. However, closer review of these determinations shows that:

- The ACCC determination (1 November 2001) for Powerlink of 7% is for nominal post-tax WACC, whereas the Bureau's proposal is 6% for real post-tax WACC. Using the inflation estimate assumed by ACCC in its determination (2.32%), ACCC's determination is based on a real post-tax WACC of 4.68%, which is lower than the Bureau's proposal of 6%.

- TRANSCO's English translation of an extract of the Portuguese Regulator's decision for REN does not clarify whether the pre-tax rate of return of 9% and TRANSCO's earlier mentioned figure of 7.5% post-tax are real or nominal.

Regarding the regulatory risk, the cost of capital estimates from the UK and Australia should cater for such a risk as the companies in these countries and TRANSCO are subject to similar regulatory regime or model.

7.1.4 Conclusion

The Bureau concludes that there is no reliable evidence in support of a cost of capital in excess of 6 per cent (real, post-tax) for Abu Dhabi water and electricity businesses. The Bureau has therefore retained its estimate of 6%, despite some evidence that the cost of capital may have fallen over the present price control period. The Bureau has 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 accommodates any additional risks that may be perceived by the companies as being associated with the strengthening of incentive mechanisms within these revised price controls.

7.2 Profit Margin for ADWEC

7.2.1 Overall Approach

The First Consultation Paper highlighted that ADWEC, in contrast to the network companies, has few capital assets but is exposed to risks associated with large financial flows. Therefore, the application of a cost of capital to an asset value is not the best means of estimating the allowed returns for ADWEC. The Bureau proposed to express ADWEC's allowed return in the form of a margin on its maximum allowed revenue, recognising that by nature it is a "retail" or "wholesale" business rather than a "network" business. In the Second Consultation Paper, the Bureau expressed its intention to proceed by considering what might constitute an appropriate margin on turnover for ADWEC. This has involved analyzing the risks to which ADWEC is exposed and which it cannot mitigate (or which it would be costly to mitigate). For example, under the present terms of its licence, ADWEC incurs a financial penalty should it recover, in any given year, an amount of revenue under its BST that exceeds its maximum allowed revenue (MAR) by more than 2%. This penalty is equal to 3% of the over-recovery. ADWEC has requested that its exposure to this risk due

to events out of its direct control (such as delays in the commissioning of production plant, which affect the accuracy of its cost forecasts) be reduced.

The Bureau further clarified to ADWEC through a letter of 23 June 2002 its approach on how the margin on turnover should be calculated. Broadly speaking, the Bureau proposes to adopt a methodology which calculates the amount of 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.

The following steps are therefore 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.

7.2.2 Profit Margin Calculation

In order to proxy for all of the risks faced by ADWEC, the Bureau has considered a "worst case" scenario for BST forecasting risk whereby ADWEC over-recovers the BST by 5% in each year of the control period due to any reason. This over-recovery is equivalent to about AED 160 million to AED 203 million per year based on the BST turnover estimated by ADWEC during the next control period (of AED 3,218 – 4,072 million). Under ADWEC's existing licence, ADWEC is subject to a "penalty" interest rate of 3% if ADWEC over-recovers the BST by more than 2% of MAR. ADWEC's maximum exposure to risk in any year is therefore calculated to be in the range of AED 4.5 – 5.1million. On the basis of a worst case scenario, capital of approximately AED 14.5 million (obtained by adding the present values of the capital requirement for each year of the price control period) would, in principle, be required to back this risk over the three-year price control period. Applying the cost of capital of 6 per cent to this hypothetical capital value of AED 14.5 million would produce an annual return on capital of AED 0.87m. Applied to ADWEC's total annual turnover (of AED 3 - 4 billion), this would represent a profit margin of about 0.024 per cent. **Table 7.4** shows these calculations.

The assumption of BST over-recovery by 5 per cent may be over-generous to ADWEC. In practice, average over-recovery would be expected to be lower than this: one should expect that if ADWEC over-recovers in one year, it will calculate BST in the future in a manner so as to avoid over-recoveries in subsequent years. This calculation also does not take into consideration the liquidated

damages or other income that ADWEC can be expected to receive from the GDs for events such as delays in plant commissioning that result in BST over-recovery, which in principle reduce the level of capital required to back such risks.

Table 7.4: Calculation of Profit Margin for ADWEC

(all figures in AED million or otherwise stated)		**2003**	**2004**	**2005**
ADWEC's Estimated BST Turnover (MAR)		3,218	3,628	4,072
Assumed Over-recovery (worst case)	(5% of MAR)	161	181	204
Penalty on Over-recovery	(3% p.a.)	4.83	5.44	6.11
Cost of Capital	6% p.a.			
Discount Factor		0.9434	0.8900	0.8396
Present Value of Annual Penalty		4.55	4.84	5.13
Required Hypothetical Capital (total PV)	**14.52**			
Required Rate of Return	6% p.a.			
Required Return on Hypothetical Capital		**0.87**	**0.87**	**0.87**
Margin on BST Turnover		0.0271%	0.024%	0.0214%
Average Margin on BST Turnover	**0.02417%**			

The assumption of 'worst case' scenario for BST over-recovery due to any reason is intended to remunerate ADWEC for all the risks that it may be exposed to, some of which may not be quantifiable as the risks associated with the BST over-recovery.

The above calculation is based on ADWEC's existing licence (and degree of risk exposure), and a lower allowed margin may be appropriate were the licence to be amended to reduce ADWEC's exposure to risks.

Based on the above calculations, the Bureau proposes a profit margin of **0.025%** for ADWEC on its projected allowed turnover, as a proxy or return for all the risks that ADWEC faces.

7.2.3 ADWEC's Response

ADWEC has shown its willingness to agree in principle to the Bureau's proposal for a margin on its turnover. However, ADWEC has raised a number of points regarding the Bureau's proposed methodology to set ADWEC's margin. In particular, ADWEC has argued that this methodology only addresses ADWEC's risks associated with penalty interest on over-recoveries under the BST due to delay in commissioning of new capacities. ADWEC has identified 12 other risks which it considers are not addressed by the proposed margin methodology.

The Bureau has welcomed ADWEC's in-principle agreement to the Bureau's proposal regarding margin on turnover and has clarified to ADWEC that its proposed methodology to calculate margin on turnover addresses the risk of penalty interest on the BST over-recovery due to *any* reasons

beyond ADWEC's control (not just delays in commissioning of plant. Other reasons include unanticipated difference between budgeted and actual "shared facility costs" (the costs charged by Al Taweelah Shared Facilities Company to the three GDs located at Taweelah site for providing certain common services), unanticipated differences between estimated and actual fuel costs, unanticipated differences between assumed and actual availability of plant, unanticipated difference between assumed and actual outputs of plant, and so on. The Bureau's view is that some of the 13 risks listed in ADWEC's response are already addressed by the proposed margin methodology or pass-through nature of PWPA and fuel costs. In fact, the Bureau considers that the BST over-recovery of 5% assumed in the Bureau's calculation example, if anything, over-estimates the risks faced by ADWEC, as the actual BST over-recovery in any of the past years has never approached 5% (and if it had consistently been so large the Bureau would have expected ADWEC to have amended its forecasting approach).

Another risk identified by ADWEC is "actions or in-actions by ADWEA", which is discussed in Sections 5.2 of this paper.

The Bureau has not been able to fully understand all of the other risks identified by ADWEC i.e. "actions or in-actions by UAE government", "regulatory costs", "terrorist insurance risk prior to PCOD", "force majeure risks", "data to be received from TRANSCO", "approval risk related to RSB's actions", "Regulatory risk of imposed price control", "delay imposed on IWPP implementation by TRANSCO due to system constraints (claims)", and "change in law". The Bureau has therefore asked ADWEC to explain these risks and quantify the past costs incurred by ADWEC for such risks. Notwithstanding the foregoing, the Bureau considers that many if not all of the above risks appear to be ADWEC-specific examples of normal commercial risks that are already reflected in the 6 per cent real cost of capital used to calculate the appropriate margin for ADWEC as per the Bureau's proposed methodology.

ADWEC has suggested that any margin should not be subject to an efficiency factor, and that the margin should not be based on the MAR which is itself subject to financial penalties. The Bureau earlier proposed to ADWEC the following revised formula for its MAR to incorporate the profit margin ("Margin") into price controls:

$$MAR = (PWPA\ Costs + Fuel\ Costs + A - K) \times (1 + Margin)$$

However, on further considerations and to avoid undesirable complexities in the correction factor (K) calculation, ***the Bureau has now incorporated profits into the 'A' term (or more precisely in the notified values a, b and c within the 'A' term), based on the proposed margin (0.025%) applied to ADWEC's forecast BST turnover for the next control period***. Therefore, the Draft Proposals are based on the following MAR formula (Q term reflects incentives under PIS as discussed in Section 9 of this paper):

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

7.2.4 ADWEC Licence Modification to Reduce Risks

The calculation of profit margin for ADWEC is closely linked with the risks to which ADWEC is exposed and which it cannot mitigate (or which it would be costly to mitigate). For example, under the present terms of its licence, ADWEC incurs a financial penalty (at 3% of over-recoveries) should it recover, in any given year, an amount of revenue under its BST that exceeds its maximum allowed revenue (MAR) by more than 2%. ADWEC requested that its exposure to this risk due to events out of its direct control (such as delays in the commissioning of production plant) be reduced. The profit margin calculation described in Section 7.2.2 above is based on the existing licence.

During June-July 2002, the Bureau invited ADWEC to propose precise amendments to its licence to reduce its exposure to risk. Note that ADWEC's existing licence excludes (from the calculation of its maximum allowed revenue (MAR) under the BST) any income received or payment made by ADWEC in relation to damages, claims, late payments or events of default. The Bureau considers that ADWEC has identified potential risks/events which could result in certain payments by ADWEC (refer to Section 7.2.3 above), but that ADWEC has ignored other similar events that could result in income for ADWEC (in some cases in recompense for these risks). If ADWEC wishes to address its risks through its margin and/or licence amendment, it may also be necessary to make an adjustment to the way in which the present price control formula deals with any possible income received by ADWEC because of such events.

In particular, in the case of a modification to ADWEC's licence that will reduce or eliminate ADWEC's risks from delays in commissioning, it may be appropriate to introduce a parallel amendment to ADWEC's licence which will partially or fully pass the liquidated damages received by ADWEC from GDs in lieu of such risks on to Discos and their customers. In such a case, ADWEC should ensure that all PWPAs (including those of ADWEA-owned GDs) have provisions for reasonable liquidated damages in case of delay in commissioning of new plant.

The Bureau has proposed to ADWEC the following three possible options for addressing ADWEC's exposure to risks outside of its control:

Option 1: Retain the existing Charge Restriction Schedule of ADWEC's licence in relation to BST calculations and to penal interest on over-recoveries, and provide ADWEC with a reasonable margin on its turnover under the price control to reflect these risks. This is the basis of the proposed margin of 0.025 per cent on turnover in the Draft Proposals.

Option 2: Modify the licence with respect to BST calculations to remove some/all of ADWEC's risks of over-recoveries due to events out of ADWEC's control (while keeping the existing provision of penal interest on over-recoveries). The quid pro quo for such an amendment would be to require an appropriate sharing (say 50%-50%) of liquidated damages and other such income between ADWEC and the Discos under the BST. Depending on the extent to which ADWEC was removed of its risks, it would be necessary to consider whether a margin on turnover in excess of zero could be justified.

Option 3: Keep the existing licence as it is with regards to BST calculations, however reduce the penal interest (presently 3%) on over-recoveries and/or increase the threshold of over-recoveries (presently 2%) beyond which the penal interest applies. Depending on where these new rates are set, this option would probably justify a margin on turnover lower than that under Option 1 but higher than that under Option 2.

The Bureau has not received any precise response from ADWEC on how ADWEC would like to see its licence and risk exposure be altered and has therefore proceeded on the basis of the risk exposure implicit in the licence as presently drafted.

7.2.5 Conclusion

In the continuing absence of a precise proposal from ADWEC as to how it would envisage a licence amendment under Option 2 or 3, the Bureau proposes to proceed on the basis of Option 1. Accordingly, the Draft Proposals are based on Option 1 i.e. a margin of **0.025%** on projected MAR without any amendment to the clauses of ADWEC's licence discussed above.

8 Price Control Calculations

8.1 Approach to Calculating Revenue Requirement

Setting the price controls means determining and notifying the values of the co-efficients on the fixed term and the two variable terms in the price control formula (i.e. 'a', 'b' and 'c') and 'X' factor for each business.

It is important to be transparent about the way in which price controls are calculated. Setting CPI-X price controls requires an estimate of the revenue that would be sufficient to finance an efficient business. As mentioned in Section 6.1 of this paper, consistent with the approach taken to setting the initial price controls, the Bureau has used a net present value (NPV) framework to establish the level and profile of price controlled revenue for each business for the period 2003 – 2005. The calculation of required revenue over the control period is as follows:

$$PV(Rev) = PV(RAV_{opening}) + PV(Opex) + PV(Capex) - PV(RAV_{closing})$$

That is, the PV of required revenue over the control period is calculated as (1) the sum of present values of opening (1 January 2003) RAV and of operating and capital expenditures over the period, minus (2) the present value of closing (31 December 2005) RAV. Over time, the price-controlled revenue may be considered the sum of: the allowed operating costs; an allowance for the depreciation of the regulatory asset base; and a return on the appropriate regulatory asset base (refer to Section 6.1).

The above calculation methodology applies to electricity and water MARs for TRANSCO, to maximum allowed electricity and water distribution and supply revenues (DSRs) for Discos, and to maximum allowed procurement cost (A) for ADWEC. However, in the case of ADWEC, asset values, depreciation and capital expenditures being very small will be set to zero in the above calculations and instead included in the operating expenditures. That is, for ADWEC, the PV of required revenue is calculated as the sum of present values of operating expenditures (which includes ADWEC's capital expenditures as well) and profits on turnover over the control period.

The price control calculation requires projections to be made of operating and capital expenditures and RAVs over the price control period. The Bureau's projections for operating expenditure over 2003 – 2005 are described in Section 5 of this paper. The provisional allowances for capital expenditure and opening RAVs for the periods 1999 – 2002 and 2003 – 2005 are described in Section 6 of this paper. The present value of required revenue over the next control period is calculated by using these cost projections or allowances in the formula stated above. The discount rate used in the present value calculation is the cost of capital discussed and set out in Section 7 of this paper (i.e. 6%, real post-tax).

8.2 Approach to Calibrating Notified Values

To determine the notified values (a, b, c and X), the sum of the present values (PVs) of annual maximum allowed revenues (MARs) over the control period, based on the annual projections of revenue drivers for the control period, is set equal to the PV of total required revenue calculated as above. All calculations are carried out in 2003 real terms, that is excluding the effect of inflation. Once the PV of total required revenue is established, the control itself can be sculpted in different ways to yield the same present value of revenue. That is, different values of a, b, c and X are tried in the MAR formula with the forecasts or assumptions of revenue drivers to equate the total MAR to the total required revenue over the control period, in PV terms. Different combinations of values of a, b, c and X are possible to satisfy this equality condition. However, a unique set of these values is obtained when constraints are put on shares of different revenue terms to the total revenue and on the value of X.

The above PV approach ensures a smooth profile of allowed revenues across the price control period (i.e., the same value of 'X' in the CPI-X formula in each year). In addition, the Bureau has cross-checked the resulting profile of allowed revenues against accrued operating costs on an annual basis to ensure that it does not result in undue volatility from year-to-year in the reported financial position of any of the companies.

For the price control calculations, the Bureau has assumed appropriate weights for the three terms (i.e. fixed term and two variable terms) in the PV of total price-controlled revenue. These weights are the same for all companies and businesses and are summarized in **Table 8.1**. In making assumptions for these weights, the Bureau has given consideration to the following factors:

- the cost structure of the companies;
- the accuracy of revenue driver data received from the companies;
- where applicable, the incentive required for companies to improve metering on networks; and
- the risks associated with possible volatility of revenue drivers.

Table 8.1: Weights of Terms in Revenue for PC2

Revenue Term	Related Reve nue Driver			Weight in Revenue
	ADWEC	**TRANSCO (E/W)**	**Discos (E/W)**	
First Term ('a')	Fixed Amount	Fixed Amount	Fixed Amount	**50%**
Second Term (involving 'b')	Electricity Units Sold	Peak Electricity / Water Demand	Electricity / Water Customer Accounts	**25%**
Third Term (involving 'c')	Water Units Sold	Metered Electricity / Water Units Transmitted	Metered Electricity / Water Units Distributed	**25%**
Total				**100%**

The Bureau has used Microsoft Excel for its price control calculations and has employed an Excel solver (an optimization tool in Excel) to carry out these calculations equating the allowed revenue to the required revenue in present value terms subject to the constraints that each term in the revenue has the weight as set out in **Table 8.1**. These weights relate to the present value of total revenue over the control period. However, these weights may vary from year to year, depending on the relative movement in revenue drivers in each year.

The 'X' factor has been used as an input, among many others, to the above calculations. The choice of 'X' is largely an arbitrary one and has been set to zero in these Draft Proposals for all regulated business in view of the following considerations:

- to avoid any confusion between the efficiency improvement and the X-factor; and
- to allow lower revenue in the early part of the control period and higher in the later (than what would have been allowed by a higher X factor), consistent with companies' submissions (which generally projected an increase in revenue over the period).

The outputs of the solver run are the co-efficients of the three terms in the MAR formula (i.e. a, b and c). The Excel based price control calculation model also reports two financial indicators for each of the network businesses, namely the implied annual profit (in AED million) and the implied return (in percentage terms) on the average of the opening and closing RAVs in each year. For ADWEC, the financial indicators used are the implied annual profit (in AED million) and the implied profit margin on BST turnover (in percentage terms).

Once the notified values a, b and c are determined for the first year of the control period, they will automatically be adjusted by CPI-X for each subsequent year of the period, according to the following formula:

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

(same formula for 'b' and 'c')

This formula has also been incorporated into the Bureau's Excel based price control calculations with X set to zero.

Detailed price control calculations for ADWEC, TRANSCO, ADDC and AADC are presented in **Appendices C, D, E and F** to this paper, respectively. Electronic versions of these calculations are available from the Bureau to companies on request. These appendices contain tables, which are standardized to the extent possible for convenience of discussion and understanding. Each row in these tables is given a "Line" number for reference purposes. Section 8.3 describes price control calculations with reference to these line numbers, while highlighting some differences applicable to ADWEC which are necessary because of the slightly different approach taken to its price control calculations.

Section 8.4 summarizes the main inputs and results of the price control calculations for each regulated business. Some implications for sector unit costs resulting from these calculations are discussed in Section 8.5 below.

8.3 Price Control Calculations

Appendices C through F to this paper present detailed calculations for draft price controls of the four companies, as follows:

Table C.1 in Appe ndix C: Draft price control calculations for ADWEC

Table D.1 in Appendix D: Draft price control calculations for TRANSCO electricity business

Table D.2 in Appendix D: Draft price control calculations for TRANSCO water business

Table E.1 in Appendix E: Draft price control calculations for ADDC electricity business

Table E.2 in Appendix E: Draft price control calculations for ADDC water business

Table F.1 in Appendix F: Draft price control calculations for AADC electricity business

Table F.1 in Appendix F: Draft price control calculations for AADC water business

As mentioned earlier, these calculations are presented in a standard form with reference to Line numbers that appear in the first column of each table in the appendices. However, there are some differences for ADWEC. The price control calculations are explained below with reference to Line numbers for network companies while highlighting any difference for ADWEC.

Inputs (Lines 1-13)

Lines 1-13 for all the companies show the inputs to the main price control calculations:

- Line 1 shows the operating expenditure allowances in 2003 prices, which are the same as proposed in Section 5.3 of this paper.

- Line 2 lists the provisional figures for new investment in 2003 prices for network companies, same as those proposed in Section 6.2 of this paper.

  As mentioned earlier, ADWEC's new investment is included within its operating expenditure (Line 1). In addition, there are some calculations relating to profit on turnover specific to ADWEC (see Section 7.2). Accordingly, Line 2 is replaced with a number of other lines for ADWEC as follows: Line 2.1 shows the BST turnover projected by ADWEC for 2003-2005 in 2002 prices reproduced from ADWEC's Price Control Information Submission and shown in Section 7.2. BST turnover in 2003 prices calculated from Line 2.1 and using CPI data presented in Section 5.3 of this paper are shown in Line 2.2. Line 2.4 shows the annual profit in 2003

prices for the period 2003-2005, calculated by applying the profit margin of 0.025% (see Line 2.3) as proposed in Section 7.2 to the BST turnover in Line 2.2.

- Lines 3-5 for all the companies list the assumptions for the three revenue drivers (i.e. the fixed amount and the two variable amounts). The assumptions for the two variable revenue drivers are the same as concluded in Section 4, whereas the first revenue driver is set to unity because of its fixed nature.

- Lines 6-8 are specific to network companies and are not used for ADWEC. Lines 6 and 7 list the opening RAV for the next control period (1 January 2003) and annual depreciation on this RAV, both in 2003 prices, respectively (see Section 6.3 and **Appendix B** for details). Line 8 shows the assumption for average asset life for new investment underlying the calculation of the annual depreciation charge.

- Line 9 shows the post-tax real cost of capital of 6% as discussed in Section 7. This is used to calculate the present values in the model for all the companies.

- Lines 10-12 for all the companies list the weights (in percentage form) for the three revenue drivers in the price-controlled revenue, which are the same as shown in **Table 8.1** above.

- Line 13 shows the Bureau's assumption for the X factor as input to the model (as well as one of the proposed notified values).

Required Revenue Calculations (Lines 14-23)

Required revenue calculations differ significantly between network companies (which involve RAVs, capital investment and depreciation) and ADWEC:

- For network companies, Lines 14-19 calculate the opening and closing RAV for each year of the control period, with all calculations being in 2003 prices. Line 14 starts with the opening (1 January 2003) RAV as in Line 6. The opening RAVs for 2004 and 2005 are simply the closing RAVs for 2003 and 2004, respectively. Line 15 shows the depreciation on opening RAV for each year, as calculated in **Appendix B** and shown in Line 7. Line 16 simply reproduces the figures for provisional levels of new investment from Line 2, whereas Line 17 provides the cumulative new investment (or moving sum for new investment) from 2003 to date for each year. Line 18 calculates the depreciation on cumulative new investment by dividing Line 17 by Line 8 (assumed average asset life for new investment). Finally, Line 19 calculates the closing RAV for each year by adding Line 14 (opening RAV) and Line 17 (new investment 2003 to date) and subtracting Line 15 (depreciation on opening RAV) and Line 18 (depreciation on new investment 2003 to date). There are no Lines 14-19 for ADWEC.

- For all the companies, Lines 20-23 calculate the total discounted costs or the required revenue in present value terms, as follows:

- Line 20 for all the companies shows the present value of the annual operating expenditure, calculated by discounting Line 1 by the proposed cost of capital (i.e. 6%). The final column figure is the sum of annual discounted operating expenditures.

- Line 21 for network companies show the discounted capital expenditure, calculated by taking the present value of Line 2 or 16 (new investment). The final column figure is the sum of annual discounted capital expenditure. There is no Line 21 for ADWEC.

- Line 22 for network companies calculates the difference between present values of opening (1 January 2003) RAV and closing (31 December 2005) RAV. In case of ADWEC, Line 22 shows the present values of annual profit on turnover, which are calculated by discounting Line 2.4 (profit on turnover), and the last figure is the total discounted profit over the control period.

- For network companies, Line 23 calculates the present value of the required revenue over the control as the sum of last column figures of Lines 20-22. For ADWEC, Line 23 calculates the present value of the required revenue simply as the sum of Lines 20 and 22.

Revenue Forecast and Notified Values Calculations (Lines 24-37)

- For all companies, Lines 24-27 relate to revenue driver 1 (i.e. the fixed amount). Line 24 shows the driver forecast, which in this case is set to unity due to the fixed nature of this driver. Line 25 shows the notified value 'a' for each year of the control period. Initially, this value is unknown. However, in the Excel worksheet, formulae are introduced in the cells that ensures that the notified value decreases by the X factor from year to year. Therefore, once the notified value for 2003 is calculated, those for 2004 and 2005 are automatically calculated. In Line 26, revenue forecast is calculated by multiplying Line 24 (driver forecast) with Line 25 (notified value). The last figure in Line 26 is the present value of the revenue forecast related to revenue driver 1 over the control period. Line 27 calculates the share of revenue related to revenue driver 1 in the total annual revenue by dividing Line 26 (revenue forecast for revenue driver 1) by Line 36 (annual revenue) and expressing it in percentage terms. The last column figure in Line 27 is the ratio of present value of revenue forecast for revenue driver 1 to the present value of total revenue shown as the second last term of Line 37 (total discounted allowed revenue). This present value share is also unknown at the initial stage of calculation (i.e. before running the Excel solver).

- Lines 28-31 and Lines 32-35 follow the same calculations as those explained for Lines 24-27 above but are related to revenue drivers 2 and 3 (i.e. the two variable revenue drivers), respectively. Again, the notified values for 2004 and 2005 are linked to that for 2003 which is unknown before running the Excel solver.

- Line 36 calculates the annual revenue forecast as the sum of revenue forecasts for each of the three revenue drivers (i.e. Lines 27, 31 and 35). Line 37 simply shows the discounted figures for

annual revenues shown in Line 36 and also shows the total present value of the revenue forecast over the control period. The last column figure in Line 37 ("Difference") is the difference between present values of revenue forecast (Line 36) and required revenue (Line 23). This difference will be zero if the present value of the total allowed revenue is equal to the present value of the total required revenue.

- After inputting the required data and formulae in Lines 24-37, the Excel solver is run to set the last column figure in Line 37 (the Difference between present values of revenue forecast and required revenue) to zero (i.e. to equate the two present values). The solver is allowed to do so by changing the notified values for 2003 (in Lines 25, 29 and 33). The solver run is also subject to the constraints that shares of the present values of revenue forecasts for the three revenue drivers to the present value of total revenue forecast (shown at the end of Lines 27, 31 and 35) must be equal to the weights set out in **Table 8.1** above (or Lines 10, 11 and 12, respectively). The target cell, variable cells and constraint cells for the solver are shown as shaded cells in the appendix and also indicated by arrows.

- As the result of the solver run, the notified values for 2003 are set at appropriate levels so as to equate the present values of allowed and required revenues and to satisfy the constraints relating to the weights of revenue terms. All remaining cells in this part of the calculations, which were vacant initially though contained linking formulae, including projected (in real terms) notified values for 2004 and 2005, are automatically calculated and given appropriate figures.

Implied Financial Indicators (Lines 38-39)

- For all companies, Line 38 shows the implied annual profit, calculated by subtracting Line 1 (operating expenditure allowance), Line 15 (depreciation on 2003 opening RAV – none for ADWEC) and Line 18 (depreciation on cumulative new investment – none for ADWEC) from Line 36 (annual allowed revenue).

- For network companies, Line 39 calculates the implied return on the average of the opening and closing RAVs ("mid-point RAV") in percentage terms from Line 38 (implied annual profit), Line 14 (opening RAV) and Line 19 (closing RAV). However, in case of ADWEC, Line 39 calculates the profit margin on turnover in percentage terms from Line 38 (implied annual profit) and Line 2.2 (BST turnover projected by ADWEC).

Both indicators show that proposed notified values will result in reasonable profit for each year and on average over the control period.

Notified Values (Lines 40-43)

These lines summarize the notified values as set by the above calculations.

8.4 Summary of Results of Price Control Calculations

Important inputs and results of the above calculations are summarized in **Tables 8.2 through 8.5** below for each company, along with the resultant notified values. These figures are the same as in **Appendices C through F** and can be verified or cross-checked against those in the appendices with the help of the Line numbers referred to in the following tables:

Table 8.2: Summary of Price Control Calculations for ADWEC (AED, 2003 prices)

	Line Ref	2003	2004	2005
Operating expenditure allowance	Line 1	8,040,000	8,040,000	8,040,000
Allowance for profit on turnover	Line 2.4	817,805	921,938	1,034,763
Present Value of Required Revenue	Line 23	24,659,948		
Notified Value, 'X'	Lines 13/40	0.00		
Notified Value, 'a' (AED)	Line 25/41	4,480,313		
Notified Value, 'b' (AED / GWh)	Line 29/42	91.2691		
Notified Value, 'c' (AED / MG)	Line 33/43	14.3371		
Annual allowed revenue	Line 36	8,460,000	8,976,367	9,506,442
Present value of allowed revenue	Line 37	24,659,948		

Table 8.3: Summary of Price Control Calculations for TRANSCO (AED million, 2003 prices)				
	Line Ref	**2003**	**2004**	**2005**
TRANSCO Electricity Business				
Operating expenditure allowance	Line 1	79.37	79.37	79.37
Provisional new investment	Line 2	557.2	557.2	557.2
Opening RAV	Line 14	5,227.4	5,550.2	5,850.8
Closing RAV	Line 19	5,550.2	5,850.8	6,129.1
Discounted capital calculation	Line 22	81.3		
Present Value of Required Revenue	Line 23	1,833.1		
Notified Value, 'X'	Lines 13/40	0.00		
Notified Value, 'a' (AED m)	Lines 25/41	333.0477		
Notified Value, 'b' (AED m / MW)	Lines 29/42	0.03667186		
Notified Value, 'c' (AED m / GWh)	Lines 33/43	0.00879995		
Annual allowed revenue	Lines 36	579.9	662.4	766.8
Present value of allowed revenue	Lines 37	1,833.1		
TRANSCO Water Business				
Operating expenditure allowance	Line 1	76.9	76.9	76.9
Provisional new investment	Line 2	500.0	500.0	500.0
Opening RAV	Line 14	2,609.0	2,936.9	3,244.8
Closing RAV	Line 19	2,936.9	3,244.8	3,532.7
Discounted capital calculation	Line 22	-357.1		
Present Value of Required Revenue	Line 23	1,230.4		
Notified Value, 'X'	Lines 13/40	0.00		
Notified Value, 'a' (AED m)	Lines 25/41	223.535		
Notified Value, 'b' (AED m / MG)	Lines 29/42	0.25535171		
Notified Value, 'c' (AED m / MG)	Lines 33/43	0.00092441		
Annual allowed revenue	Lines 36	419.8	447.5	477.3
Present value of allowed revenue	Lines 37	1,230.4		

Table 8.4: Summary of Price Control Calculations for ADDC (AED million, 2003 prices)				
	Line Ref	**2003**	**2004**	**2005**
ADDC Electricity Business				
Operating expenditure allowance	Line 1	182.88	182.88	182.88
Provisional new investment	Line 2	279.8	279.8	279.8
Opening RAV	Line 14	3,892.0	3,976.1	4,048.9
Closing RAV	Line 19	3,976.1	4,048.9	4,110.5
Discounted capital calculation	Line 22	440.8		
Present Value of Required Revenue	Line 23	1,714.1		
Notified Value, 'X'	Lines 13/40	0.00		
Notified Value, 'a' (AED m)	Lines 25/41	311.418		
Notified Value, 'b' (AED m /customer account)	Lines 29/42	0.00069738		
Notified Value, 'c' (AED m / GWh)	Lines 33/43	0.01032780		
Annual allowed revenue	Lines 36	592.0	624.3	655.9
Present value of allowed revenue	Lines 37	1,714.1		
ADDC Water Business				
Operating expenditure allowance	Line 1	110.45	110.45	110.45
Provisional new investment	Line 2	98.4	98.4	98.4
Opening RAV	Line 14	1,120.4	1,138.1	1,151.9
Closing RAV	Line 19	1,138.1	1,151.9	1,161.8
Discounted capital calculation	Line 22	144.9		
Present Value of Required Revenue	Line 23	719.7		
Notified Value, 'X'	Lines 13/40	0.00		
Notified Value, 'a' (AED m)	Lines 25/41	130.760		
Notified Value, 'b' (AED m / customer account)	Lines 29/42	0.00032932		
Notified Value, 'c' (AED m / MG)	Lines 33/43	0.00091478		
Annual allowed revenue	Lines 36	248.9	262.4	274.8
Present value of allowed revenue	Lines 37	719.7		

Table 8.5: Summary of Price Control Calculations for AADC (AED million, 2003 prices)				
	Line Ref	**2003**	**2004**	**2005**
AADC Electricity Business				
Operating expenditure allowance	Line 1	91.87	91.87	91.87
Provisional new investment	Line 2	201.5	201.5	201.5
Opening RAV	Line 14	2,228.0	2,305.1	2,374.1
Closing RAV	Line 19	2,305.1	2,374.1	2,435.1
Discounted capital calculation	Line 22	183.5		
Present Value of Required Revenue	Line 23	990.8		
Notified Value, 'X'	Lines 13/40	0.00		
Notified Value, 'a' (AED m)	Lines 25/41	180.019		
Notified Value, 'b' (AED m /customer account)	Lines 29/42	0.00102162		
Notified Value, 'c' (AED m / GWh)	Lines 33/43	0.01412463		
Annual allowed revenue	Lines 36	349.4	360.3	371.7
Present value of allowed revenue	Lines 37	990.8		
AADC Water Business				
Operating expenditure allowance	Line 1	87.85	87.85	87.85
Provisional new investment	Line 2	70.8	70.8	70.8
Opening RAV	Line 14	453.9	506.4	556.1
Closing RAV	Line 19	506.4	556.1	603.0
Discounted capital calculation	Line 22	-52.4		
Present Value of Required Revenue	Line 23	384.2		
Notified Value, 'X'	Lines 13/40	0.00		
Notified Value, 'a' (AED m)	Lines 25/41	69.807		
Notified Value, 'b' (AED m / customer account)	Lines 29/42	0.00098548		
Notified Value, 'c' (AED m / MG)	Lines 33/43	0.00427098		
Annual allowed revenue	Lines 36	125.3	138.4	157.0
Present value of allowed revenue	Lines 37	384.2		

8.5 Draft Proposals and Projected Allowed Revenues

8.5.1 Notified Values

The Bureau's Draft Proposals for the notified values for all the regulated businesses of ADWEC, TRANSCO, ADDC and AADC are summarized in **Tables 8.6** below. These proposals are the same as calculated in **Appendices C through F** to this paper and summarized in the preceding section. However, the notified values here are expressed in appropriate units for clearer understanding. The notified values given in **Table 8.6** (to the accuracy expressed therein) will be those used to calculate maximum allowed revenues when the new price controls are implemented.

Table 8.6: Draft Proposals for PC2 (Notified Values for 2003)

	Notified Values			
	X	**a**	**b**	**c**
ADWEC Procurement	0.00	4.48 AED m	91.27 AED/GWh	14.34 AED/MIG
TRANSCO Electricity	0.00	333.05 AED m	36.67 AED/kW	0.88 fils/kWh
TRANSCO Water	0.00	223.53 AED m	255.35 AED/TIG	0.92 AED/TIG
ADDC Electricity	0.00	311.42 AED m	697.38 AED/customer account	1.03 fils/kWh
ADDC Water	0.00	130.76 AED m	329.32 AED/customer account	0.91 AED/TIG
AADC Electricity	0.00	180.02 AED m	1,021.62 AED/customer account	1.41 fils/kWh
AADC Water	0.00	69.81 AED m	985.48 AED/customer account	4.27 AED/TIG

8.5.2 Projected Allowed Revenues

Table 8.7 presents the projected maximum allowed revenue in respect of "own costs" for each company for 2003-2005 based on the proposed notified values and the forecasts or assumptions for revenue drivers adopted in this paper. (Of course, actual revenue during 2003-2005 will be different due to different actual revenue driver data and the effect of inflation on notified values).

Table 8.7: Projected Maximum Allowed Revenue for 2003-2005 (AED million, 2003 prices)

	2003	**2004**	**2005**
ADWEC Procurement	8.46	8.98	9.51
TRANSCO Electricity	579.91	662.45	766.80
TRANSCO Water	419.78	447.53	477.30
ADDC Electricity	592.04	624.30	655.89
ADDC Water	248.88	262.35	274.84
AADC Electricity	349.39	360.31	371.72
AADC Water	125.32	138.40	156.96

Note: Excludes pass-through costs.

8.6 Estimate of Effect of Draft Proposals on Sector Costs

The Bureau has analysed the effect on sector electricity and water unit costs that would result from the Draft Proposals. This is shown graphically (separately for electricity and water) in **Figures 8.1** and **8.2** (respectively) for 1999-2000 and 2003-2005 (figures for 2002 are not yet available).

Figure 8.1: Total Electricity MAR Unit Costs of Network Companies (fils/kWh) in 2003 prices

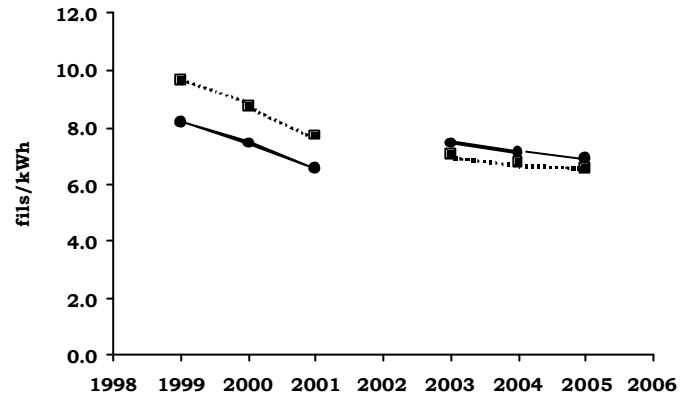
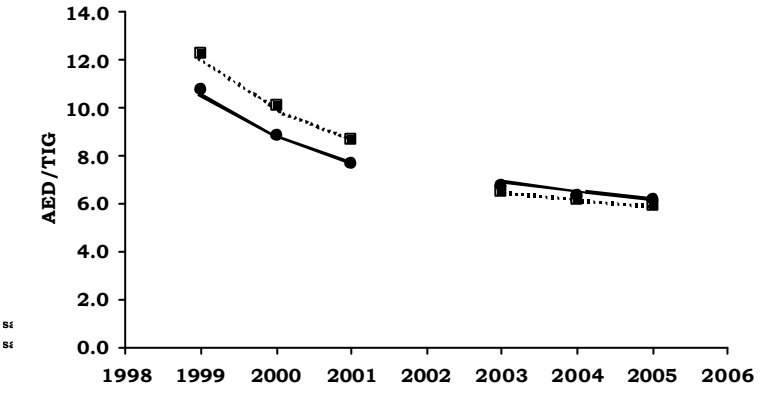


Figure 8.2: Total Water MAR Unit Costs of Network Companies (AED/TIG) in 2003 prices



Figures 8.1 and **8.2** show the effect solely on the unit costs (electricity and water, respectively) which are attributable to the resetting of price controls. They exclude the effect of changes in the purchase price of water and electricity (i.e. BST costs), which accounts for the majority of sector costs.

Solid lines in the above figures represent the MARs per unit under the initial price controls and revised price controls as implemented (or proposed to be implemented).

The dotted lines in the above figures show the MARs per unit in the two price control periods had capital expenditure during the first control period been financed within the initial price controls.

It can be seen that in terms of price-controlled costs only, the revised price controls would continue the downward trend of sector unit costs seen since the Bureau first implemented price controls in 1999.

While there is some discontinuity in this general trend at the start of the second control period, this is explained by the fact that the capital expenditure incurred during 1999-2002 was not financed within the first controls and so has had to be financed within the second price controls (as well as 2003-2005 capital expenditures).

Had 1999-2002 capital expenditures been financed within the first price control period, unit costs over 1999-2002 (shown by dotted lines) would have been higher than the actual MARs per unit (shown by solid lines). Furthermore, unit costs over 2003-2005 (shown by dotted lines in the above figures) would have been lower than those implied by the Draft Proposals set out in this paper (shown by the solid lines).

In summary, therefore, abstracting from the financing of the first control period's capital expenditure, these Draft Proposals represent a continuation of the significant and ongoing reduction in the sector unit economic costs attributable to the network companies.

9 Performance Incentive Scheme

9.1 Introduction

9.1.1 Need for the PIS

The current price controls of CPI-X form set in 1999 give each of the Abu Dhabi companies an incentive to reduce costs. However, the present 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. For this reason, Abu Dhabi companies are required under their licences to adhere to certain standards of performance in regard to network performance, customer service and the provision of regulatory information. It is also one of the Bureau's functions under Law No 2 of 1998 (Article 55) 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 quality of services provided by price-controlled companies is important for the companies themselves (as customers to each other) and to final customers alike.

The Bureau has extensively consulted with the price-controlled companies as part of the 2002 Price Controls Review on the feasibility of linking important aspects of each company's performance to its price controls. By developing such links, companies can be rewarded for improved output performance and penalised for deteriorating output performance. This will provide an incentive for companies to improve their performance, and some protection for customers in the event that they receive poor service.

9.1.2 Bureau's General Approach

The Bureau proposed the Performance Incentive Scheme (PIS) in the First Consultation Paper and, on receipt of a supportive response from the respondents to that paper, issued a separate discussion paper on the subject of PIS in May 2002. In the PIS Discussion Paper, the Bureau explained that there is a clear trend worldwide towards incorporating service quality incentives into price controls and mentioned regulatory examples from the US, the UK and Australia. The Bureau believes it is desirable to implement similar schemes, while taking full account of the particularities of the sector in Abu Dhabi. Given the present quality of data produced by the sector, the Bureau regarded it as a reasonable goal to implement in the revised price controls a simple PIS for each company, with the aim to develop a more comprehensive incentive system during the course of the second price control period, ready for full implementation at the subsequent price review scheduled for 2005.

Keeping in view this objective, the Bureau proposed a number of "Category A" performance indicators (indicators which should be monitored and incentivised through mechanistic annual financial adjustment under the PIS during 2003-2005) and "Category B" performance indicators (which should be kept under close monitoring during 2003-2005 so that they be ready for

consideration as Category A indicators at the 2005 Price Controls Review and for also a possible financial adjustment at that review for a poor or superior performance during 2003-2005). The Bureau established proposed criteria for Category A indicators of being measurable, verifiable, non-manipulable, non-distortionary and customer-oriented, as set out in the First Consultation Paper and further explained in the PIS Discussion Paper.

9.1.3 Companies' General Comments on PIS

In general, the sector companies have recognized and supported the need for the PIS concept, although some questioned whether now was the right time to introduce such a scheme. At the same time, they highlighted a number of important points which the Bureau has either further clarified to the companies separately or addressed in the PIS by modifying some of its aspects. These points are briefly discussed below:

Management Control

Companies highlighted the influence of ADWEA over them and argued that they should not be penalized for poor performance caused by ADWEA. One of the companies questioned the objective and suitability of the PIS under the current circumstances in the sector where ADWEA exercises significant control over it and argued that the company or its management has no incentive under the PIS to improve performance.

The Bureau has clarified in detail to these respondents that it considers that the objective of the proposed PIS is to incentivise the company, irrespective of whether the operational control of the company lies with its management or shareholder/owner (i.e. ADWEA). In law, and as far as the regulator and customers are concerned, it is 'the company' that performs its licensed activities.

If the PIS is incorporated into the new price controls, the impact of a company's performance will clearly be seen in its profits. If the company's performance is adversely affected by the actions or decisions of its owner or management, lower profits than assumed will signal to owner and management the need to review their actions or decisions and take appropriate steps to improve performance. Similarly, if the company's performance improves, the owner and management will see the benefits in terms of its increased profits.

Notwithstanding the foregoing, the Bureau does not agree that a company or its management will have no incentive under the PIS to improve performance. The fact that the management of the companies have signalled their concern about the risks of penalties supports the rationale that PIS does provide an incentive to management to improve performance.

Evidence of Poor Performance

Two companies questioned the Bureau's 'assumption' that their past performance has been poor or below the efficient or optimal levels, particularly in the light of lack of accurate measurement of the existing levels of their performance. While the Bureau recognizes the need for accurate

measurement of performance levels on various aspects of companies' operation, the Bureau regards the companies' existing performance on timeliness indicators (such as production of audited accounts and audited price control returns by the dates specified by the licences) as being undoubtedly below the required performance level and probably indicative of performance more generally. However, the improved measurement of performance that should result from the PIS will help to clarify whether or not the firms' claims are correct, and reward/penalise them accordingly.

Company's Right to Manage Business

In relation to a concern expressed by ADDC, the Bureau has clarified that it does not consider that the PIS would detract from the company's right to manage the business as it sees fit - a principle with which the Bureau in general agrees. However, the PIS aims at bringing the customer satisfaction aspect of a company's performance more directly into consideration of the company while making any decisions or managing its business. Given its exposure to commercial incentives, and its monopoly position, such aspects of the company's operations that directly affect the customers cannot be left entirely to the company's discretion. The company needs to take into account both the commercial benefits of its decision and the associated rewards and penalties under the PIS while deciding the level of its performance.

International Experience

TRANSCO argued that the international experience referred to in the PIS Discussion Paper is exclusively related to distribution companies and pointed to an apparent lack of experience on the incentive schemes for electricity transmission. TRANSCO also mentioned that out of 13 European countries only two countries have incentive schemes in place for transmission companies and that these schemes apply to only one performance indicator.

The Bureau has explained to TRANSCO that it is the experience in relation to the concept or principle of incentive schemes that the Bureau attempted to highlight in the PIS Discussion Paper. The concept has a strong economic basis and has been applied in various industries including network businesses like electricity and water transmission and distribution. The nature and scope of incentive schemes would obviously vary from case to case depending on factors such as the regulatory regime, extent of sector restructuring and the performance of the companies. There are incentive schemes in water and electricity industries in other countries which cover from a few performance indicators to dozens of indicators.

The Bureau does not agree with TRANSCO that the international examples mentioned in the PIS Discussion Paper are exclusively related to distribution companies. Further, it is not clear to the Bureau why TRANSCO appears to believe that performance incentives can be applicable to electricity distribution but not to electricity transmission. The Bureau agrees that two specific regulatory examples (OFGEM and ORG) mentioned in the PIS Discussion Paper are exclusively related to the electricity distribution businesses. However, the other two examples (PBR in the US and OFWAT) are related to both transmission and distribution. Further, TRANSCO itself mentioned

that there are incentive schemes in place for the electricity transmission system operator function in a number of countries, including two European countries (Spain and Norway). The Bureau's review of a survey report referred to by TRANSCO indicates that incentive schemes for transmission companies are also either under consideration or a possibility in three other places (England & Wales, Germany and Ireland). The Bureau also highlighted to TRANSCO how the US and Australian regulators are incentivising or planning to incentivise electricity transmission businesses.

Benefits of PIS to Final Customers

On another issued raised by ADDC, the Bureau agrees that until the subsidy is removed the final customers will not see any benefit from the PIS in relation to financial recompense for 'poor' service of Discos, other than compensation through the related Guaranteed Standards when implemented. However, the government (which is acting on behalf of customers for the purpose of full payment of their consumption) will be directly benefited in terms of reduced subsidy payments. It should also be remembered that the PIS is a means to an end, the 'end' being to raise companies' performance, which will directly benefit customers. Further, for some of the proposed performance indicators (e.g. timeliness of production of audited accounts and price control returns), the Bureau is effectively a customer who will see the benefit in terms of more effective regulation of the sector (which will also benefit final customers).

Increased Regulatory Risk

ADDC argued that the proposed PIS envisages increased regulatory burden and risks. The Bureau does not believe that the PIS will significantly affect regulatory risks, and in any case considers that its cost of capital proposal fully remunerates all potential risks. The Bureau also does not consider that it is proposing or asking anything under the PIS which should not be expected from any efficiently managed company. In fact, in the Draft Proposals the Bureau has proposed performance indicators that the companies are already required to comply with under their licences or have already been reporting to the Bureau.

9.2 Regulatory Framework

In the PIS Discussion Paper, the Bureau raised a number of practical issues in relation to the regulatory framework for the design of the PIS and made various proposals in the light of international best regulatory practice and the particular characteristics and experience to date of the Abu Dhabi water and electricity sector. These proposals are summarized in the following sub-sections, ***in italic***, along with discussion of responses from the companies and any resulting change in these proposals made for the Draft Proposals:

9.2.1 Timing of Revenue Adjustment

The Bureau proposed that *the performance in year t should be rewarded through an annual adjustment to the revenue in year t+2*.

In view of the generally positive responses from the companies, the Bureau intends to proceed with this proposal.

9.2.2 Scale of Incentives

The Bureau proposed that *the scale of incentives and penalties should be equal (i.e. symmetric).*

The companies have supported this proposal, while emphasizing that the targets for performance should be set on the basis of their present performance. On further consideration, the Bureau's view is that it is not appropriate for many of the timeliness related performance indicators to give incentives for companies to publish the relevant statement before they are required to do by the licences, which may adversely affect the quality and accuracy of the regulatory statements and documents such as the BST. The Bureau is therefore, in the light of these considerations, minded to ***alter the symmetric nature of scale of incentives for some performance indicators, while retaining appropriate rewards for timely compliance***. This aspect is further clarified in the Section 9.4 of this paper.

9.2.3 Setting Targets for Performance

The Bureau proposed that *the benchmarks or targets for performance should be set on the basis of companies' past/current performance or as per the requirements of the Law, licences and regulations, as the case may be.*

TRANSCO highlighted the need for the Bureau to establish the existing level of performance before a PIS could be implemented. The Bureau acknowledges the difficulty in accurately establishing (other than for 'timeliness' indicators) the existing (2001 and earlier) performance level. However, once the audited information on performance indicators on 2002 and onwards becomes available, the performance benchmarks for 2003 and onwards will be set on the basis of accurately measured levels of the then-existing performance.

The companies strongly recommended that the present delays in relation to the timeliness performance indicators should be considered in setting the target dates for such indicators. ADWEC has specifically suggested that the Bureau adopt a glide-path approach towards the setting of these target dates. The Bureau is therefore prepared to agree with ADWEC and concede the ***introduction of a glide-path for target dates*** for audited accounts and audited Price Control Returns (PCRs), provided this is structured so that by the end of the next control period (i.e. by 2005) the sector companies must be able to comply with the target dates set out in the licences for these statements. This is reflected in the proposed targets in Section 9.3 of this paper.

ADWEC also raised the concern that approval of certain regulatory submission relied to some extent on the Bureau's judgement. The Bureau acknowledges ADWEC's concerns on the possibility of the non-consensus on the quality of reports like the BST (and ADWEC's Seven-Year Planning Statement). The Bureau has therefore discussed and agreed with ADWEC's relevant staff appropriate timetables for the 2003 BST (the Seven-Year Statement timeliness indicator has been

dropped from the list of Category A indicators – see below). This timetable sets the target dates for intermediate pieces of analysis which are necessary for the calculation of the BST for ADWEC as well as the Bureau. To the extent that the Bureau delays its inputs or approval beyond the target dates, ADWEC will not be penalized for the delay that is equal to the Bureau's delay period (provided that ADWEC has incorporated the Bureau's earlier comments or suggestions in the BST). However, if ADWEC submits the BST on time to the Bureau but ADWEC did not incorporate the Bureau's earlier comments, any delay in the approval will be considered ADWEC's responsibility and taken into consideration under the PIS penalty scheme.

9.2.4 Size of Incentives

The Bureau proposed that *the size of reward or penalty will be based on the Bureau's view on customer's willingness to pay (WTP), cross-checked against the cost of improving performance, unless the companies provide superior data on WTP*.

As also acknowledged in the PIS Discussion Paper, the Bureau agrees with ADDC's comments on the difficulties in measuring customers' WTP. However, as clarified in Sections 9.3 and 9.4 below, for most of the proposed Category A performance indicators, the Bureau (rather than end customers) is the recipient of the related information, or the "customer" of the companies.

ADWEC showed concerns about the Bureau being both ADWEC's "customer" for the audited accounts and the regulator or the judge to decide the penalty or customer's WTP. The Bureau has clarified to ADWEC that other utility regulators have established the customer's WTP or penalties on the companies for the provision of a service for which the regulators are the customers. In this regard, the Bureau has explained the approach of the UK water and energy regulators (OFWAT and OFGEM) on calculating the size of the detriment to effective regulation associated with (in that case) the loss of a comparator due to merger of water companies and electricity distribution companies.

9.2.5 Cap on Incentives

The Bureau proposed that *the total annual incentives and penalties for each company should be capped as a proportion (say 5% or 10%) of their 'own' annual revenue, i.e., ADWEC's procurement cost, TRANSCO's total price control revenue and Discos' distribution and supply related revenue*.

ADDC and TRANSCO argued for a lower cap on maximum total rewards or penalties for the second price controls (PC2) due to the uncertainty associated with shorter control period and the first time application of a PIS. They also pointed to the precedent of UK energy regulator (OFGEM) setting a cap of 2% as part of the Information and Incentives Project for electricity distribution companies.

The Bureau's objective is to provide sufficient incentives for companies to improve their performance while limiting the risk of penalties to a level that does not jeopardize the company's financial position. In view of this consideration and companies' responses, the Bureau now proposes that the ***cap on maximum total rewards or penalties be set at 2% of their 'own' annual revenue*** *(i.e., ADWEC's procurement cost, TRANSCO's total price control revenue and Discos' distribution*

and supply related revenue). This cap is significantly lower than each company's expected annual profits during the next control period, and so limits its risk exposure. The Bureau also considers that this lower cap is justified in view of the fewer performance indicators proposed now in this paper for Category A than those proposed in the PIS Discussion Paper.

9.2.6 Exceptional Events

The Bureau proposed that *certain exceptional events should be excluded from the PIS if they meet the necessary criteria. The Bureau proposed to exclude an event from the operation of the PIS where it can be clearly demonstrated that: it was outside the control of the company; the company was unable to mitigate the impact of the event (and could not reasonably have been expected to have done so); and it had a material impact on the company's performance.*

However, any action or inaction of ADWEA or the impact thereof would not be considered as an 'exceptional event'. A company wishing to exclude the impact of a certain event from the operation of the PIS would need to address the above criteria, and support its submission with the opinion of an independent, suitably qualified professional firm.

A number of companies raised concerns as to aspects of this approach, which the Bureau has sought to clarify in responses to the individual companies concerned. For example, ADDC proposed that the PIS must take account of the inter-dependency of the companies. It highlighted this point by mentioning audited accounts and water quality-related performance indicators as two examples where a company may be punished for a failure caused by other parties if care is not taken in defining the PIS. The Bureau has clarified in detail to ADDC that the PIS does intend to take into account these aspects. In essence, the PIS Discussion Paper recognized the inter-dependency of performances between the sector companies and hence proposed to treat such events as exceptional events, where appropriate. Further, the Bureau has also proposed the same audited accounts related timeliness performance indicators for all sector companies which should encourage them to act in a timely manner with regards to completion of transactions with ADDC and other entities.

The Bureau therefore adopts the above proposed mechanism and criteria for the treatment of exceptional events under the PIS.

9.2.7 Performance Audit

The Bureau proposed that *companies should provide their annual performance data for each year for all the agreed performance indicators by the end of first quarter of the following year, accompanied by an unqualified certificate of robustness and accuracy from the independent suitably qualified professional firm approved by the Bureau. If a company fails to provide the Bureau with such a certificate for its reported performance by 31 March following the year of performance, the company will be penalized to the full extent for the performance indicators to which such certificate is related. This certification mechanism will not apply to timeliness performance indicators on which accurate information will be readily available to the Bureau.*

ADDC argued that the proposed 'unqualified' opinion or certificate for a suitably professional firm is not desirable or could not be achieved. Instead, ADDC suggested a sliding scale return approach where the incentives for the performance achieved should vary with the level of qualification. The Bureau understands ADDC's concerns on this matter, but believes the approach suggested by ADDC would be unduly subjective and thus not provide sufficiently clear incentives.

The Bureau instead proposes a minor modification to its earlier proposal made in the PIS Discussion Paper for the requirement of an unqualified opinion or certificate. The Bureau's modified proposal is that:

> ***If the company provides an unqualified opinion or certificate from the independent professional firm, the Bureau will adopt the reported performance. If the company provides a qualified opinion or certificate from the independent firm, the Bureau will determine the appropriate performance based on the independent firm's report and notify this value to the company. The Bureau would only expect to depart from the company estimates if the independent firm's report raised significant doubts as to its accuracy.***
>
> ***The report(s) of the independent professional firms in relation to performance indicators in 2003, 2004 and 2005 will be required to be submitted as part of the audited 2004, 2005 and 2006 price control returns, respectively. The related adjustments to allowed revenues will then be made in 2005, 2006 and 2007, respectively (following the t-2 methodology mentioned in Section 9.2.1, with necessary adjustments to ensure continuity across price control periods). There will also be an additional requirement for the network companies in 2003 to provide audited data for performance in 2002 on the technical performance indicators (Energy Lost and Customer Minutes Lost per customer), so as to determine the target benchmark for 2003 performance on these indicators.***

9.2.8 Addition of 'Q' term to Price Control Formulas

In the Second Consultation Paper, the Bureau clarified its then current thinking on how to implement the proposed PIS into the price control formulae:

The CPI – X price controls will be supplemented by a Performance Incentive Scheme (PIS) for each company, to ensure companies have an incentive to improve the quality of their service as well as their cost efficiency.

A new term ("Q", for "Quality") will be added to the current CPI-X price control formula for each company. The mechanism to calculate "Q" needs further considerations as discussed in the PIS Discussion Paper.

The Second Consultation Paper further clarified that a number of different formulaic approaches can be considered to implement the PIS. Assuming that 'N' number of performance indicators (along with associated annual targets) are identified, and that revenue is adjusted in year t for the

performance exhibited during year t-2 (see above), a term 'Q' can be added to the main price control formula of the company as follows:

Proposed New Price Control Formula = Current Price Control Formula + Q_t

The term Q_t, the performance adjustment to revenue for year t for a particular company, is calculated in AED according to the following formula:

$$Q_t = Q1_t + Q2_t + Q3_t + \ldots\ldots\ldots + QN_t$$

where

QN_t is the revenue adjustment in year t reflecting total reward or penalty for performance in year t-2 on indicator N and can be calculated, for example, by multiplying the difference in actual and target performance by an incentive rate (in AED per unit of improvement).

Based on the above approach, the resulting price control formulas for the companies are as follows:

ADWEC

MAR = PWPA Costs + Fuel Costs + A + **Q** – K

A = a + (b × Electricity Units Sold) + (c × Water Units Sold)

TRANSCO (separate water and electricity price controls)

MAR = a + (b × Peak Demand) + (c × Metered Units Transmitted) + A + **Q** - K

Discos (separate water and electricity price controls)

MAR = Electricity or Water Purchase Costs + Transmission Charges + DSR + **Q** - K

DSR = a + (b × Number of Customers) + (c × Metered Units Distributed)

There will be separate Q terms for the separate water and electricity price controls of network companies, representing the revenue adjustments for water and electricity related performance indicators. For example, performance indicators on timeliness of audited accounts and audited PCR for the water business will be reflected in the Q term of water price controls. Similarly, timeliness indicators on audited accounts and audited PCR for the electricity business and any electricity related technical performance indicator will be reflected in the Q term of electricity price controls.

9.3 Performance Indicators

9.3.1 Short-listing of Performance Indicators

In the PIS Discussion Paper, the Bureau proposed a number of performance indicators, both technical and regulatory, for each of ADWEC, TRANSCO and Discos. As mentioned earlier, the proposed indicators for each company are classified into two broad categories: Category A and Category B. Based on its further review and responses received from the companies, the Bureau has short-listed the possible performance indicators under Category A and moved the remaining from Category A to Category B. For example, the Bureau agrees with ADWEC's concern that a Generation Security Standard (GSS) Category A performance indicator may give an inappropriate incentive to ADWEC to contract for surplus production capacity. Similarly, ADDC highlighted a number of issues in relation to water quality related performance indicator for Discos, which may not be adequately addressed at this price control review. TRANSCO raised issues in relation to transmission availability indicators with which the Bureau now agrees in part. Another objective of short-listing the performance indicators is the Bureau's stated preference to have a simple PIS at this price control review with only the most important and clearly defined performance indicators.

It will be clear from the following tables on individual businesses that the Bureau has only kept few performance indicators in Category A for the PIS. Most of these indicators are common between the companies and are related to audited accounts and PCRs, which the Bureau consider vital to effective regulation of the sector.

9.3.2 Proposed Performance Indicators for Draft Proposals

The Bureau proposes three performance indicators for ADWEC under Category A, which are listed in **Table 9.1** along with the licence target dates and glide-path target dates for the PIS (see Section 9.2.3 above). There are five Category A performance indicators for each of the network companies as described in **Tables 9.2** and **9.3** with their targets. Four of these indicators are related to audited accounts and PCRs for the two separate water and electricity businesses of network companies. The remaining one indicator relates to companies' technical performance in respect of incidents or interruptions on their transmission or distribution systems (as the case may be). Category B performance indicators for the four companies are listed in **Appendix G**. It can be noticed from the three tables in this appendix that a number of earlier proposed indicators (such as unavailability of components of the system or faults on the system) have been dropped altogether from the PIS in view of their intermediate nature rather than being customer oriented, as per one of the Bureau's criteria.

Although excluded from Category A for these Draft Proposals, the Bureau is continuing to review the possibility of including another timeliness performance indicator related to **Statements of Connection and Use of System Charges** in Category A for TRANSCO. The related timeliness indicator was in Category A in the PIS Discussion Paper and now has been moved to Category B. Almost four years after their due date, these statements have not yet ever been published by

TRANSCO, despite a number of requests and inputs from the Bureau. The Bureau has asked TRANSCO to prepare and get approved by the Bureau these statements by 31 December 2002 (to come into effect on 1 January 2003). To meet this deadline, the Bureau has suggested a timetable for TRANSCO's drafts and the Bureau's comments. Towards that end, TRANSCO should forward the first complete drafts of these statements to the Bureau by 30 September 2002. In case the Bureau receives no positive response from TRANSCO, the Bureau will consider implementing an incentive scheme for these statements similar to the BST timeliness indicator for ADWEC.

TRANSCO argued that the Energy Lost related performance indicator in the PIS would result in double counting of the same measure since electricity units transmitted is already in its price control formula and it loses income for energy not supplied. The Bureau considers that the revenue driver 'metered electricity units transmitted' proposed for the price control formula mainly aims to provide TRANSCO with incentives to design its system in order to meet the growing demand, improve metering on the system and reduce transmission losses. On the other hand, the precise objective of the Energy Lost indicator in the PIS is to incentivise TRANSCO to reduce total energy unsupplied due to incidents on the transmission system by reducing the number of incidents on its system and/or their duration and/or the demand lost by the incident. The Bureau has therefore retained this indicator for the PIS.

9.3.3 Defining Proposed Performance Indicators

ADDC's and TRANSCO's responses have highlighted the need for clear and appropriate definitions of the proposed performance indicators in order to avoid any ambiguity and unintended risks for the companies. The Bureau looks forward to working closely with the companies to develop robust definitions of the proposed performance indicators and the related terms suitable to be incorporated into their licences. In layman's terms, the proposed Category A performance indicators are as follows:

- **Audited Accounts Timeliness** for any company is the difference (measured in months) between the actual date and the target date for submission to the Bureau of audited accounts for the relevant business for the preceding year.

- **Audited Price Control Return (PCR) Timeliness** for any company is the difference (measured in months) between the actual date and the target date for submission to the Bureau of audited PCR for the relevant business for the preceding year.

- **Bulk Supply Tariff (BST) Timeliness** for ADWEC is the difference (measured in months) between the actual date and the target date for publication of the following year's BST.

- **Energy Lost** for TRANSCO is the total amount of energy (in MWh) which is lost or un-supplied during the year due to incidents on the electricity transmission system. The total amount of energy lost in a year is calculated from the summation over the year of the products of the power lost (in MW) during each incident and the duration of that incident (in hours). An incident is

defined as any event or chain of events on the transmission system that causes a loss of supply to one or more customers for 3 minutes or longer.

- **Customer Minutes Lost Per Customer** for Discos is the summation over the year over all outages of the products of (a) the number of customers interrupted in each outage and (b) the duration of interruption (in minutes) in that outage, with the summation then divided by the number of customers. An outage or interruption is defined as any event or chain of events on the distribution system that causes a loss of supply to one or more customers for 3 minutes or longer.

9.3.4 Setting Targets for Proposed Performance Indicators

Tables 9.1, **9.2** and **9.3** show the Bureau's proposed performance targets for Category A performance indicators for the four price-controlled companies. These targets are further explained below:

Table 9.1: Proposed Performance Indicators for ADWEC – Category A

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

Table 9.2: Proposed Performance Indicators for TRANSCO – Category A

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

Table 9.3: Proposed Performance Indicators for Discos – Category A

S. No.	Performance Indicator	Formula Year	Performance Measure	Licence Target Date	Glide-Path Target Date for PIS
1	Audited Electricity Accounts Timeliness		Audited accounts for:		
		2003	2002	30-Jun-03	31-Dec-03
		2004	2003	30-Jun-04	30-Sep-04
		2005	2004	30-Jun-05	30-Jun-05
2	Audited Water Accounts Timeliness		Audited accounts for:		
		2003	2002	30-Jun-03	31-Dec-03
		2004	2003	30-Jun-04	30-Sep-04
		2005	2004	30-Jun-05	30-Jun-05
3	Audited Electricity Price Control Return (PCR) Timeliness		Audited PCR for:		
		2003	2002	31-Mar-03	30-Sep-03
		2004	2003	31-Mar-04	30-Jun-04
		2005	2004	31-Mar-05	31-Mar-05
4	Audited Water Price Control Return (PCR) Timeliness		Audited PCR for:		
		2003	2002	31-Mar-03	30-Sep-03
		2004	2003	31-Mar-04	30-Jun-04
		2005	2004	31-Mar-05	31-Mar-05
5	Customer Minutes Lost Per Customer (CML)		CML for:		Target = CML in
		2003	2003		2002
		2004	2004		2003
		2005	2005		2004

Audited Accounts and PCR Timeliness for all Companies

In its response to the PIS Discussion Paper, ADWEC considered the licence target dates for production of audited accounts (six months after year end) at 'world record' level. The Bureau would undoubtedly like to follow the best international practice in respect of regulation of the sector. However, it does not agree with ADWEC that the licence requirements for audited accounts are at 'world record' level or cannot be achieved in Abu Dhabi as implied by ADWEC. The Bureau has drawn ADWEC's attention to three UAE examples of legal requirements for preparation or submission of audited accounts to the relevant regulators or authorities indicating targets that are more stringent than or comparable with ADWEC's licence targets; namely: licensed securities and commodities market (within **one month** of the end of the market's fiscal year); the UAE Central Bank (**three months**); and Public Joint Stock Companies, Private Joint Stock Companies and Limited Liability Companies (**four months**, under UAE Commercial Companies Law No.8 of 1984).

The Bureau has also researched the actual dates of preparation, audit, approval, or publication of accounts or annual reports by other companies in the UAE. The Bureau has explained to ADWEC its findings on six banks and three companies covering a number of past years showing that these entities have audited accounts for the year well within the **first three months** from the end of the year. This research clearly indicates that the licence targets for production of audited information can be achieved in the UAE and the Emirate of Abu Dhabi.

Notwithstanding the above, as suggested by the companies, the Bureau proposes to set the target dates for submission of audited accounts and audited PCRs under the PIS on a glide-path approach keeping in view the present performance of the companies. However, the glide-path targets are such that, by the end of the next control period (i.e. by 2005), companies must be able to meet the target dates set by their licences. Like the licence target dates, the proposed glide-path target dates are the same for all the four companies.

It can be seen that the first set of audited accounts and PCRs are not scheduled until December 2003, which provides amply time for the management/shareholder of the companies to resolve any impediments there may have been to date in getting the statements audited.

BST Timeliness for ADWEC

The BST timeliness indicator will come into effect for the first time for the 2004 BST. The target date for the publication by ADWEC of the BST for the following year remains 31 December of each year, so that Discos can be invoiced and charged smoothly during the year and Discos and their customers (if and when time-of-the day metering is introduced) can plan accordingly for the forthcoming year. The Bureau and ADWEC need to agree a detailed timetable for future BST data submissions in order to meet this target, similar to the one already agreed for the current (2003) BST exercise. Where the BST is delayed for reasons which the Bureau agrees are genuinely outside of ADWEC's control they will be treated as exceptional events for the purposes of calculated PIS reward/penalties.

Energy Lost for TRANSCO

According to the (unaudited) information available to the Bureau, the energy lost by TRANSCO in 2001 was 4,184 MWh (due to occurrence of 8 incidents) and 398 MWh in 2000 (due to 8 incidents). The reason for relatively very poor performance in 2001 was one incident in May 2001, which alone resulted in a loss of 4,091 MWh, whereas the remaining 93 MWh energy lost was due to 7 other incidents.

Compare this performance with those of NGC, ScottishPower and Hydro-Electric from the UK, which show respectively average annual energy lost of 303 MWh (due to 8 incidents on average per year), 258 MWh (9 incidents) and 153 MWh (13 incidents) over the last 10 years (91/92-00/01). This gives an overal UK average of 238 MWh over this period.

Customer Minutes Lost Per Customer for Discos

Information available to the Bureau shows that ADDC's performance was 163 customer-minutes lost per connected customer in 2000 and 116 in 2001. Respective figures showing AADC's performance are 697 and 472. Compare this performance with those from the UK:

- The individual annual figures for the fourteen UK distribution companies vary between 36 and 293 over a 10-year period (91/92-00/01).

- The individual average figure for these companies over the same period ranges between 48 and 175. The overall average for all the companies is about 81.

- During 2000/2001, the average figure was 79.

- The customer weighted average figure for minutes lost per customer of the UK distribution companies has declined from 226 to 81 over a nine-year period (90/91 to 98/99), i.e. an overall reduction of 64%.

9.4 Performance Incentive Rates

9.4.1 The Overall Approach

The Bureau has set the incentive rates for the proposed Category A performance indicators for the four companies as follows:

- First, the maximum penalty or reward under the PIS has been calculated by applying 2% to the forecast MAR (in relation to "own costs") of each company for 2004 (see **Table 9.4**). For each company, the forecast MAR for 2004 lies between those for 2003 and 2005 and is hence considered a reasonable basis for calculation of incentive rates for the whole period.

- Second, the resulting amount has been apportioned to the different performance indicators in the PIS of the company concerned in proportion to the relative importance of indicators as judged by the Bureau (see **Table 9.5**).

- Third, the Bureau has derived hypothetical projections of the worst or best likely performance under each indicator (see **Table 9.5**).

- Fourth, incentive rates for each indicator have been derived by dividing the amounts apportioned under first step above by the variance between target performance and hypothetical actual performance derived in the third step above (**see Table 9.5**).

- The same incentive rates are then employed in each of 2003, 2004 and 2005 (**see Table 9.5**).

For example, the total amount for a timeliness indicator is divided by the hypothetical 'worst case' delay from the glide-path target to arrive at an incentive rate in terms of AED per month (of delay). Similarly, the total amount for a technical performance indicator for TRANSCO or a Disco is divided by an assumed improvement in the technical performance compared to the target – this improvement is assumed for the purposes of calibrating the incentive rates to be 10% of the target performance (which for the purposes of this calculation has been based on the network companies' recent performance). This gives an incentive rate in terms of AED per MWh lost (for TRANSCO) or AED per customer minutes lost per connected customer (for Discos).

Once this approach is applied and incentive rates are obtained, the Bureau has formulated a scheme for each performance indicator. This scheme has symmetric scale of rewards and penalties as far as the total amount is concerned based on the expected delay or improvement from the target. The companies receive higher rewards the earlier in advance of the glide-path target dates they publish audited accounts and PCRs. One difference relates to the BST timeliness indicator (in all years) and to the production of audited accounts and PCRs (in the final year, 2005, only). In these cases, the reward for achieving the target date (i.e. 31 December, 31 March or 30 June as the case may be) is set equal to the total incentive amount without any further incentive for publication of the BST earlier than this target date.

9.4.2 Incentive Rates

The Bureau's assumptions about the total amount at stake for each company with respect to PIS, weights of indicators in the PIS, and assumed delay from the target date or assumed improvement from the target technical performance, as explained in the preceding sub-section, are presented in **Tables 9.4** and **9.5** below. For each company, the total amount at stake for the PIS for any year is calculated by taking 2% of the forecast of its 'own' MAR or costs for 2004, as shown in **Table 9.4**.

Table 9.4: Assumptions for Total Amount at Stake for PIS

Company/Business	Company's 'Own' Allowed Revenue (based on 2004 projections)	Total Amount at Stake for PIS (for any year)
ADWEC	AED 8,976,367	AED 179,527
TRANSCO Electricity	AED 662,446,927	AED 13,248,939
TRANSCO Water	AED 447,533,391	AED 8,950,668
ADDC Electricity	AED 624,299,392	AED 12,485,988
ADDC Water	AED 262,353,940	AED 5,247,079
AADC Electricity	AED 360,313,407	AED 7,206,268
AADC Water	AED 138,399,990	AED 2,768,000

The resulting incentive rates for all the performance indicators of each company (same for each year of the next control period) are presented in the last column of **Table 9.5**, which have been rounded to the nearest thousand. The incentive rates for the timeliness indicators are the payments expressed in

AED per month of delay. A slight different treatment is applied in 2003, 2004 and 2005 to calculate reward or penalty, as explained in Section 9.4.3 of this paper. Note that incentive rate applies on a full month basis rather than on pro-rata basis of number of days of delays. That is, if any audited account or PCR or BST is published or submitted to the Bureau on any day late or early, the delay or acceleration would be considered as a full month.

For technical performance indicators, incentive rates are expressed as payments in AED per unit improvement from the target (the basis for the targets are set out in **Tables 9.2** and **9.3**). For example, if the target for ADDC CML for 2004 is 100 customers minutes lost per customer (based on the actual performance achieved in 2003) but ADDC actually achieves 96 customer minutes lost per customer in 2004, it will receive an additional revenue through the Q term in the 2006 electricity price control formula amounting to AED 432,000 (i.e. AED 108,000 per CML, times 4 CML i.e. 100 less 96).

Table 9.5: Calculation of Incentive Rate for Each Category A Indicator*

Company /Business	Performance Indicator	Weights in the PIS	Total Incentive Amount	Assumed Delay or Improvement from Target for any Year	Incentive Rate** (2003-2005)	
ADWEC	Audited Accounts	45%	AED 80,787	6 months	13,000	AED p.m.
	Audited PCR	45%	AED 80,787	6 months	13,000	AED p.m
	BST	10%	AED 17,953	6 months	3,000	AED p.m.
TRANSCO (E)	Audited Accounts (E)	45%	AED 5,962,022	6 months	994,000	AED p.m.
	Audited PCR (E)	45%	AED 5,962,022	6 months	994,000	AED p.m.
	Energy Lost	10%	AED 1,324,894	10% of 398 MWh	33,000	AED/MWh
TRANSCO (W)	Audited Accounts (W)	50%	AED 4,475,334	6 months	746,000	AED p.m.
	Audited PCR (W)	50%	AED 4,475,334	6 months	746,000	AED p.m.
ADDC (E)	Audited Accounts (E)	45%	AED 5,618,695	6 months	936,000	AED p.m.
	Audited PCR (E)	45%	AED 5,618,695	6 months	936,000	AED p.m.
	Customer Minutes Lost	10%	AED 1,248,599	10% of 116 CML	108,000	AED/CML
ADDC (W)	Audited Accounts (W)	50%	AED 2,623,539	6 months	437,000	AED p.m.
	Audited PCR (W)	50%	AED 2,623,539	6 months	437,000	AED p.m
AADC (E)	Audited Accounts (E)	45%	AED 3,242,821	6 months	540,000	AED p.m.
	Audited PCR (E)	45%	AED 3,242,821	6 months	540,000	AED p.m.
	Customer Minutes Lost	10%	AED 720,627	10% of 472 CML	15,000	AED/CML
AADC (W)	Audited Accounts (W)	50%	AED 1,384,000	6 months	231,000	AED p.m.
	Audited PCR (W)	50%	AED 1,384,000	6 months	231,000	AED p.m.

* E = Electricity; W = Water; p.m. = per month of delay; MWh = MWh lost improvement; CML = Customer Minutes Lost per Customer improvement

** Incentive rates are rounded to the nearest thousand after calculation from total incentive amounts.

Once the incentive rates are calculated as shown in the last column of **Table 9.5** (or as updated in Final Proposals if necessary), they will not change during the next control period and will be independent of the assumptions underlying their calculations. That is, the assumptions (set out in **Tables 9.4** and **9.5** above) have been used solely in calculating the fixed incentive rates and will be of no significance during the implementation of the PIS or price controls in 2003-2005.

9.4.3 Proposed Incentive Schemes

Based on the targets and incentive rates as set out in **Tables 9.1 through 9.3** and **Table 9.5**, respectively, the Bureau proposes the following incentive schemes for each indicator of each company or business:

- **For all "timeliness" indicators in all the years**, in case of any delay beyond the glide-path target date, the company will receive a **penalty** equal to the monthly incentive rate (see **Table 9.5**) multiplied by the number of months by which the audited accounts or audited PCRs or the BST are late in comparison with the glide-path target date.

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

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

- **For all "timeliness" indicators** where the glide-path target is not equal to the licence target date (i.e. audited accounts and PCRs in 2003 and 2004), the company will receive a **reward** equal to the product of (i) the monthly incentive rate in case of 2003, or <u>twice</u> of the monthly incentive rate in case of 2004, 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 2003:

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

  and reward for 2004:

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

- **For all "timeliness" indicators** where the glide-path target date is equal to the licence target date (i.e. ADWEC's BST in all years and the audited accounts and PCRS for all companies in 2005), if the company meets the target date it will receive a **reward** equal to <u>six</u> times the monthly incentive rate. That is:

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

- **For "technical" indicators** (i.e. Energy Lost for TRANSCO and Customer Minutes Lost per Customer for Discos), the company will receive a reward (or penalty) equal to the unit incentive rate (see **Table 9.5**) multiplied by the improvement (or deterioration) in the number of units compared to the audited performance in the previous year (or where audited performance for the previous year has not been established, compared to its assumed performance in the previous year as determined by the Bureau for the purposes of this scheme). That is:

  $$\text{Q Term} = \text{Incentive Rate} \times (\text{Target Performance} - \text{Actual Performance})$$

- The maximum delay in ***any "timeliness" indicator*** will be capped at the penalty that would be incurred if the audited accounts or PCRs or the BST was submitted or published on the glide-path target date for the same indicator for the following year. For example, if the audited accounts for 2002 are delayed beyond the relevant glide-path target date (i.e. 31 December 2003) and are not even submitted by the glide-path target date for the audited accounts for 2003 (i.e. 30 September 2004), the penalty for the 2002 accounts will be calculated as if they had been submitted on September 2004.

- The maximum reward for ***any "timeliness" indicator*** will be capped by the licence target date, i.e., any submission in advance of the licence target date will be assumed to have been received on the licence target date for the purpose of calculation of reward (Q term).

- Where a company does not provide a professional firm's certificate in relation to a "technical" indicator by the due date, the company will receive a penalty as if its performance was 10% worse than its target. That is, in case of non-submission of a certificate from the professional firm:

  $$\text{Q Term} = \text{Incentive Rate} \times (\text{Target Performance} \times 0.1)$$

- For the purpose of the "timeliness" indicators, "months" shall be calculated as the sum of the number of whole months and the number of part months.

- The total reward or penalty under the PIS for any company (the "Q" term in its price control formula) for performance in any year (say 't') will be capped at 2% of the maximum allowed revenue in relation to its 'own' cost in that year ('t') ("own" costs being procurement cost, transmission costs, and distribution and supply costs, in relation to ADWEC, TRANSCO and ADDC/AADC, respectively).

Appendix A: 2002 Price Controls Review Process

(Only up to 26 August 2002)

13 January **Letter from Bureau to all companies, initiating 2002 Price Controls Review**

- 21 January: initial meeting with TRANSCO
- 22 January: initial meeting with ADDC
- 26 January: initial meeting with ADWEC
- 5 February: initial meeting with AADC
- 16 February: further meeting with ADDC and AADC (cost allocation)
- 14 April: further meeting with AADC
- 27 April: further meeting with AADC

27 February **Bureau publishes First Consultation Paper**

- 18 March: ADWEC response
- 31 March: ADDC response
- 31 March: TRANSCO response
- 3 April: Bureau sends follow-up queries on ADWEC response
- 3 April: Bureau sends follow-up queries on TRANSCO response
- 9 April: meeting with ADDC

19 March **Letter from Bureau to all companies, reminding them of requirement to submit audited price control return by 31 March**

- 31 March: TRANSCO submits price control return (unaudited)
- 13 April: ADDC submits price control return (unaudited)
- 20 April: ADWEC submits price control return (unaudited)
- 19 June: AADC submits price control return (unaudited)
- 27 July: TRANSCO submits price control return (revised, unaudited)

31 March **Bureau issues Initial Price Control Information Request**

- 15 May: ADWEC response
- 18 May: TRANSCO response
- 1 June: ADDC response
- 4 June: TRANSCO response (revised)
- 8 June: Bureau meeting with ADWEC
- 24 June: ADWEC submits supplementary information
- 2 July: Bureau sends follow-up queries on TRANSCO response
- 6 July: Bureau sends follow-up queries on ADDC response
- 7 July: AADC response
- 8 & 9 July: Bureau meeting with ADDC
- 13 July: Bureau sends follow-up queries on AADC response
- 23 July: Bureau meeting with AADC
- 23 July: AADC submits revised information
- 19 August: TRANSCO submits revised information

19 May **Bureau publishes Performance Incentive Scheme Discussion Paper**

- 9 June: Presentation to TRANSCO
- 12 June: Presentation to AADC
- 24 June: Presentation to ADWEC
- 26 June: Presentation to ADDC
- 30 June: Response from ADWEC
- 30 June: Response from ADDC
- 1 July: Response from TRANSCO
- 23 July: Bureau queries on ADWEC response
- 24 July: Bureau queries on ADWEC response
- 3 August: Bureau queries on ADDC response

29 May **Bureau publishes Second Consultation Paper**

- 30 June: TRANSCO response
- 30 June: ADWEC response
- 30 June: ADDC response
- 20 July: Bureau queries on TRANSCO response
- 24 July: Bureau queries on ADWEC response
- 3 August: Bureau queries on ADDC response

23 June **Bureau letter to ADWEC setting out proposed approach to allowed profit margin**

30 June **Deadline for receipt of 2001 audited accounts passes (none received)**

1 July **Letter from Bureau to TRANSCO, ADDC and AADC, about the review of revenue driver data**

- 8 & 9 July: meetings with ADDC
- 23 July: meeting with AADC
- 28 July: meeting with TRANSCO
- 7 August: further meeting with AADC

4 August **Letter from Bureau to companies setting out its proposed approach to developing cost projections for the revised price controls**

18 August **Letter from Bureau to companies extending deadline (to 26 August) for receipt of data / information to be incorporated into Draft Proposals**

Appendix B: Updating Regulatory Asset Values (RAVs)

Table B.1: TRANSCO Electricity - Updating RAVs

Inputs		1999	2000	2001	2002	2003
Provisional figure for new investment (AEDm, 1999 prices)		**521.8**	**521.8**	**521.8**	**521.8**	**n/a**
Historical CPI (1995 = 100)		**109.2**	**110.7**	**113.1**	**n/a**	**n/a**
Forecast CPI (1995 = 100)		**n/a**	**n/a**	**n/a**	**114.7**	**116.6**
Initial (1 January 1999) RAV (AED m, 1999 prices)	**2907.1**					
Depreciation on Initial RAV (AED m, 1999 prices)	**115.1**					
Assumed average asset life for new investment (years)	25					
Cost of capital (real)	6.00%					

Calculation of PCR1 Closing RAV (excluding PCR1 Financing Costs Foregone)

1999 prices	1999	2000	2001	2002
Opening RAV	2,907.1	3,292.9	3,657.9	4,002.0
Depreciation on Initial (1 January 1999) RAV	115.1	115.1	115.1	115.1
New investment	521.8	521.8	521.8	521.8
New investment 1999 to date	521.8	1,043.6	1,565.4	2,087.2
Depreciation on new investment 1999 to date	20.9	41.7	62.6	83.5
Closing RAV (excluding PCR1 Financing Costs Foregone)	3,292.9	3,657.9	4,002.0	4,325.2

Calculation of PCR1 Financing Costs Foregone

1999 prices	1999	2000	2001	2002
Depreciation foregone	20.9	41.7	62.6	83.5
Return on capital foregone	31.3	62.6	93.9	125.2
Total financing costs foregone	52.2	104.4	156.5	208.7
Years from year mid point to 1 Jan 2003	3.5	2.5	1.5	0.5
NPV @ 1 Jan 2003 of financing costs foregone	64.0	120.7	170.8	214.9
Accumulated NPV (@ 1 Jan 2003) of financing costs foregone	64.0	184.7	355.5	570.4

PCR Closing RAV (including PCR1 Financing Costs Foregone)

in 1999 Prices	4,895.62
in 2003 Prices	**5,227.37**

Total Depreciation (Initial Depreciation and Depreciation on New Investment)

in 1999 Prices	198.59
in 2003 Prices	**212.05**

Table B.2: TRANSCO Water - Updating RAVs

Inputs		1999	2000	2001	2002	2003
Provisional figure for new investment (AEDm, 1999 prices)		**180.0**	**180.0**	**180.0**	**180.0**	**n/a**
Historical CPI (1995 = 100)		**109.2**	**110.7**	**113.1**	**n/a**	**n/a**
Forecast CPI (1995 = 100)		**n/a**	**n/a**	**n/a**	**114.7**	**116.6**
Initial (1 January 1999) RAV (AED m, 1999 prices)	**2,053.19**					
Depreciation on Initial RAV (AED m, 1999 prices)	**113.65**					
Assumed average asset life for new investment (years)	25					
Cost of capital (real)	6.00%					

Calculation of PCR1 Closing RAV (excluding PCR1 Financing Costs Foregone)

1999 prices	1999	2000	2001	2002
Opening RAV	2,053.2	2,112.3	2,164.3	2,209.1
Depreciation on Initial (1 January 1999) RAV	113.6	113.6	113.6	113.6
New investment	180.0	180.0	180.0	180.0
New investment 1999 to date	180.0	360.0	540.0	720.0
Depreciation on new investment 1999 to date	7.2	14.4	21.6	28.8
Closing RAV (excluding PCR1 Financing Costs Foregone)	2,112.3	2,164.3	2,209.1	2,246.6

Calculation of PCR1 Financing Costs Foregone

1999 prices	1999	2000	2001	2002
Depreciation foregone	7.2	14.4	21.6	28.8
Return on capital foregone	10.8	21.6	32.4	43.2
Total financing costs foregone	18.0	36.0	54.0	72.0
Years from year mid point to 1 Jan 2003	3.5	2.5	1.5	0.5
NPV @ 1 Jan 2003 of financing costs foregone	22.1	41.6	58.9	74.1
Accumulated NPV (@ 1 Jan 2003) of financing costs foregone	22.1	63.7	122.6	196.8

PCR Closing RAV (including PCR1 Financing Costs Foregone)

in 1999 Prices	2,443.39
in 2003 Prices	**2,608.96**

Total Depreciation (Initial Depreciation and Depreciation on New Investment)

in 1999 Prices	142.45
in 2003 Prices	**152.10**

Table B.3: ADDC Electricity - Updating RAVs

Inputs		1999	2000	2001	2002	2003
Provisional figure for new investment (AEDm, 1999 prices)		262.0	262.0	262.0	262.0	n/a
Historical CPI (1995 = 100)		109.2	110.7	113.1	n/a	n/a
Forecast CPI (1995 = 100)		n/a	n/a	n/a	114.7	116.6
Initial (1 January 1999) RAV (AED m, 1999 prices)	2939.2					
Depreciation on Initial RAV (AED m, 1999 prices)	130.95					
Assumed average asset life for new investment (years)	25					
Cost of capital (real)	6.00%					

Calculation of PCR1 Closing RAV (excluding PCR1 Financing Costs Foregone)

1999 prices	1999	2000	2001	2002
Opening RAV	2,939.2	3,059.8	3,169.9	3,269.5
Depreciation on Initial (1 January 1999) RAV	131.0	131.0	131.0	131.0
New investment	262.0	262.0	262.0	262.0
New investment 1999 to date	262.0	524.0	786.0	1,048.0
Depreciation on new investment 1999 to date	10.5	21.0	31.4	41.9
Closing RAV (excluding PCR1 Financing Costs Foregone)	3,059.8	3,169.9	3,269.5	3,358.6

Calculation of PCR1 Financing Costs Foregone

1999 prices	1999	2000	2001	2002
Depreciation foregone	10.5	21.0	31.4	41.9
Return on capital foregone	15.7	31.4	47.2	62.9
Total financing costs foregone	26.2	52.4	78.6	104.8
Years from year mid point to 1 Jan 2003	3.5	2.5	1.5	0.5
NPV @ 1 Jan 2003 of financing costs foregone	32.1	60.6	85.8	107.9
Accumulated NPV (@ 1 Jan 2003) of financing costs foregone	32.1	92.7	178.5	286.4

PCR Closing RAV (including PCR1 Financing Costs Foregone)

in 1999 Prices	3,645.02
in 2003 Prices	**3,892.03**

Total Depreciation (Initial Depreciation and Depreciation on New Investment)

in 1999 Prices	172.87
in 2003 Prices	**184.58**

Table B.4: ADDC Water - Updating RAVs

Inputs		1999	2000	2001	2002	2003
Provisional figure for new investment (AEDm, 1999 prices)		**92.1**	**92.1**	**92.1**	**92.1**	**n/a**
Historical CPI (1995 = 100)		**109.2**	**110.7**	**113.1**	**n/a**	**n/a**
Forecast CPI (1995 = 100)		**n/a**	**n/a**	**n/a**	**114.7**	**116.6**
Initial (1 January 1999) RAV (AED m, 1999 prices)	**845.56**					
Depreciation on Initial RAV (AED m, 1999 prices)	**57.13**					
Assumed average asset life for new investment (years)	25					
Cost of capital (real)	6.00%					

Calculation of PCR1 Closing RAV (excluding PCR1 Financing Costs Foregone)

1999 prices	1999	2000	2001	2002
Opening RAV	845.6	876.8	904.4	928.4
Depreciation on Initial (1 January 1999) RAV	57.1	57.1	57.1	57.1
New investment	92.1	92.1	92.1	92.1
New investment 1999 to date	92.1	184.2	276.3	368.4
Depreciation on new investment 1999 to date	3.7	7.4	11.1	14.7
Closing RAV (excluding PCR1 Financing Costs Foregone)	876.8	904.4	928.4	948.6

Calculation of PCR1 Financing Costs Foregone

1999 prices	1999	2000	2001	2002
Depreciation foregone	3.7	7.4	11.1	14.7
Return on capital foregone	5.5	11.1	16.6	22.1
Total financing costs foregone	9.2	18.4	27.6	36.8
Years from year mid point to 1 Jan 2003	3.5	2.5	1.5	0.5
NPV @ 1 Jan 2003 of financing costs foregone	11.3	21.3	30.2	37.9
Accumulated NPV (@ 1 Jan 2003) of financing costs foregone	11.3	32.6	62.8	100.7

PCR Closing RAV (including PCR1 Financing Costs Foregone)

in 1999 Prices	1,049.28
in 2003 Prices	**1,120.39**

Total Depreciation (Initial Depreciation and Depreciation on New Investment)

in 1999 Prices	71.87
in 2003 Prices	**76.74**

Table B.5: AADC Electricity - Updating RAVs

Inputs		1999	2000	2001	2002	2003
Provisional figure for new investment (AEDm, 1999 prices)		**188.7**	**188.7**	**188.7**	**188.7**	**n/a**
Historical CPI (1995 = 100)		**109.2**	**110.7**	**113.1**	**n/a**	**n/a**
Forecast CPI (1995 = 100)		**n/a**	**n/a**	**n/a**	**114.7**	**116.6**
Initial (1 January 1999) RAV (AED m, 1999 prices)	**1,516.14**					
Depreciation on Initial RAV (AED m, 1999 prices)	**78.78**					
Assumed average asset life for new investment (years)	25					
Cost of capital (real)	6.00%					

Calculation of PCR1 Closing RAV (excluding PCR1 Financing Costs Foregone)

1999 prices	1999	2000	2001	2002
Opening RAV	1,516.1	1,618.5	1,713.3	1,800.6
Depreciation on Initial (1 January 1999) RAV	78.8	78.8	78.8	78.8
New investment	188.7	188.7	188.7	188.7
New investment 1999 to date	188.7	377.4	566.1	754.8
Depreciation on new investment 1999 to date	7.5	15.1	22.6	30.2
Closing RAV (excluding PCR1 Financing Costs Foregone)	1,618.5	1,713.3	1,800.6	1,880.3

Calculation of PCR1 Financing Costs Foregone

1999 prices	1999	2000	2001	2002
Depreciation foregone	7.5	15.1	22.6	30.2
Return on capital foregone	11.3	22.6	34.0	45.3
Total financing costs foregone	18.9	37.7	56.6	75.5
Years from year mid point to 1 Jan 2003	3.5	2.5	1.5	0.5
NPV @ 1 Jan 2003 of financing costs foregone	23.1	43.7	61.8	77.7
Accumulated NPV (@ 1 Jan 2003) of financing costs foregone	23.1	66.8	128.6	206.3

PCR Closing RAV (including PCR1 Financing Costs Foregone)	
in 1999 Prices	2,086.63
in 2003 Prices	**2,228.03**

Total Depreciation (Initial Depreciation and Depreciation on New Investment)	
in 1999 Prices	108.97
in 2003 Prices	**116.36**

Table B.6: AADC Water - Updating RAVs

Inputs		1999	2000	2001	2002	2003
Provisional figure for new investment (AEDm, 1999 prices)		**66.3**	**66.3**	**66.3**	**66.3**	**n/a**
Historical CPI (1995 = 100)		**109.2**	**110.7**	**113.1**	**n/a**	**n/a**
Forecast CPI (1995 = 100)		**n/a**	**n/a**	**n/a**	**114.7**	**116.6**
Initial (1 January 1999) RAV (AED m, 1999 prices)	**129.32**					
Depreciation on Initial RAV (AED m, 1999 prices)	**3.85**					
Assumed average asset life for new investment (years)	25					
Cost of capital (real)	6.00%					

Calculation of PCR1 Closing RAV (excluding PCR1 Financing Costs Foregone)

1999 prices	1999	2000	2001	2002
Opening RAV	129.3	189.1	246.3	300.8
Depreciation on Initial (1 January 1999) RAV	3.9	3.9	3.9	3.9
New investment	66.3	66.3	66.3	66.3
New investment 1999 to date	66.3	132.6	198.9	265.2
Depreciation on new investment 1999 to date	2.7	5.3	8.0	10.6
Closing RAV (excluding PCR1 Financing Costs Foregone)	189.1	246.3	300.8	352.6

Calculation of PCR1 Financing Costs Foregone

1999 prices	1999	2000	2001	2002
Depreciation foregone	2.7	5.3	8.0	10.6
Return on capital foregone	4.0	8.0	11.9	15.9
Total financing costs foregone	6.6	13.3	19.9	26.5
Years from year mid point to 1 Jan 2003	3.5	2.5	1.5	0.5
NPV @ 1 Jan 2003 of financing costs foregone	8.1	15.3	21.7	27.3
Accumulated NPV (@ 1 Jan 2003) of financing costs foregone	8.1	23.5	45.2	72.5

PCR Closing RAV (including PCR1 Financing Costs Foregone)

in 1999 Prices	425.08
in 2003 Prices	**453.89**

Total Depreciation (Initial Depreciation and Depreciation on New Investment)

in 1999 Prices	14.46
in 2003 Prices	**15.44**

Appendix C: Price Control Calculations for ADWEC

Table C.1: Draft Proposal Price Control Calculations for ADWEC

Line	(all amounts are in 2003 prices)						
	Inputs		**2003**	**2004**	**2005**		
1	Operating expenditure allowance (AED , 2003 prices)		8,040,000	8,040,000	8,040,000		
2.1	Turnover (AED , 2002 prices)		3,217,916,040	3,627,659,362	4,071,606,130		
2.2	Turnover (AED , 2003 prices)		3,271,220,665	3,687,751,366	4,139,052,091		
2.3	Profit Margin on Turnover (%)	0.025%					
2.4	Profit on Turnover (AED , 2003 prices)		817,805	921,938	1,034,763		
3	Forecast for revenue driver 1		1	1	1		
4	Forecast for revenue driver 2 (GWh sold)		21,803	24,580	27,588		
5	Forecast for revenue driver 3 (MG sold)		138,781	157,124	174,947		
9	Cost of Capital (real)	6.00%					
10	Weight in revenue for Revenue driver 1	50.00%					
11	Weight in revenue for Revenue driver 2	25.00%					
12	Weight in revenue for Revenue driver 3	25.00%					
13	X Factor	0.00					
	PCR2 Required Revenue Calculations						
	PCR2 Discounted Costs		**2003**	**2004**	**2005**	**TOTAL**	
20	Discounted operating expenditure		7,809,138	7,367,112	6,950,105	22,126,355	
22	Discounted profit on turnover		794,323	844,778	894,492	2,533,593	
23	**Total discounted costs (= revenue requirement) (AED)**		8,603,461	8,211,890	7,844,597	**24,659,948**	
	PCR 2 Revenue Forecast			**2003**	**2004**	**2005**	**PV Share in TOTAL**
24	**Revenue driver 1**	Driver forecast	Units	1	1	1	
25		Notified value (a)	AED	**4,480,313**	4,480,313	4,480,313	
26		Revenue forecast	AED	4,480,313	4,480,313	4,480,313	12,329,974
27		Share of revenue	%	53%	50%	47%	**50%**
28	**Revenue driver 2**	Driver forecast	Units	21,803	24,580	27,588	**Constraints for Solver Run**
29		Notified value (b)	AED / GWh	**91.27**	91.27	91.27	
30		Revenue forecast	AED	1,989,964	2,243,350	2,517,887	6,164,987
31		Share of revenue	%	24%	25%	26%	**25%**
32	**Revenue driver 3**	Driver forecast	Units	138,781	157,124	174,947	
33		Notified value (c)	AED /MG	**14.34**	14.34	14.34	
34		Revenue forecast	AED	1,989,723	2,252,704	2,508,242	6,164,987
35		Share of revenue	%	24%	25%	26%	**25%**
		Variables for Solver Run					
36	Annual revenue (AED m)			8,460,000	8,976,367	9,506,442	**TOTAL** Difference
37	**Discounted annual revenue (AED)**			8,217,078	8,225,111	8,217,758	**24,659,948** 0.00
							Target for Solver Run
	PCR2 Implied Financial Indicators			**2003**	**2004**	**2005**	**Average**
38	Implied annual profit (AED, 2003 prices)			420,000	936,367	1,466,442	940,936
39	Implied profit margin on turnover (%)			0.0128%	0.0254%	0.0354%	0.0246%
	PCR2 Notified Values			**2003**			
40	X Factor			0.0			
41	Notified Value (a)			4,480,313	AED		
42	Notified Value (b)			91.2691	AED /GWh		
43	Notified Value (c)			14.3371	AED /MG		

Appendix D: Price Control Calculations for TRANSCO

Table D.1: Draft Proposal Price Control Calculations for TRANSCO (Electricity)

Line	(all amounts are in 2003 prices)							
	Inputs				**2003**	**2004**	**2005**	
1	Operating expenditure allowance (AED m, 2003 prices)				79.37	79.37	79.37	
2	Provisional figure for new investment (AEDm, 2003 prices)				557.2	557.2	557.2	
3	Forecast for revenue driver 1				1.0	1.0	1.0	
4	Forecast for revenue driver 2 (MW)				4,056	4,519	5,109	
5	Forecast for revenue driver 3 (GWh metered)				11,150	18,600	28,000	
6	Opening (1 January 2003) RCV (AED m, 2003 prices)			5,227.37				
7	Depreciation on Initial RCV (AED m, 2003 prices)			212.05				
8	Assumed average asset life for new investment (years)			25				
9	Cost of capital (real)			6.00%				
10	Weight in revenue for Revenue driver 1			50.00%				
11	Weight in revenue for Revenue driver 2			25.00%				
12	Weight in revenue for Revenue driver 3			25.00%				
13	X Factor			0.00				
	PCR2 Required Revenue Calculations							
	PCR2 RCV Calculations				**2003**	**2004**	**2005**	
14	Opening RCV				5,227.4	5,550.2	5,850.8	
15	Depreciation on Opening (1 January 2003) RCV				212.0	212.0	212.0	
16	New investment				557.2	557.2	557.2	
17	New investment 2003 to date				557.2	1,114.4	1,671.6	
18	Depreciation on new investment 2003 to date				22.3	44.6	66.9	
19	Closing RCV				5,550.2	5,850.8	6,129.1	
	PCR2 Discounted Costs				**2003**	**2004**	**2005**	**TOTAL**
20	Discounted operating expenditure				77.1	72.7	68.6	218.4
21	Discounted capital expenditure				541.2	510.6	481.7	1533.4
22	Discounted Difference between Opening and Closing RAVs				5,227.4		-5,146.1	81.3
23	**Total discounted costs (= revenue requirement) (AED m)**							**1,833.1**
	PCR 2 Revenue Forecast				**2003**	**2004**	**2005**	**PV Share in TOTAL**
24	**Revenue driver 1**	Driver forecast	Units		1.0	1.0	1.0	
25		Notified value (a)	AED m		**333.048**	333.048	333.048	
26		Revenue forecast	AED m		333.0	333.0	333.0	916.6
27		Share of revenue	%		57%	50%	43%	**50%**
28	**Revenue driver 2**	Driver forecast	Units		4,056.0	4,519.0	5,109.0	**Constraints for Solver Run**
29		Notified value (b)	AED m / MW		**0.0367**	0.0367	0.0367	
30		Revenue forecast	AED m		148.7	165.7	187.4	458.3
31		Share of revenue	%		26%	25%	24%	**25%**
32	**Revenue driver 3**	Driver forecast	Units		11,150.0	18,600.0	28,000.0	
33		Notified value (c)	AED m / GWh		**0.0088**	0.0088	0.0088	
34		Revenue forecast	AED m		98.1	163.7	246.4	458.3
35		Share of revenue	%	**Variables for Solver Run**	17%	25%	32%	**25%**
36	Annual revenue (AED m)				579.9	662.4	766.8	**TOTAL** Difference
37	**Discounted annual revenue (AED m)**				563.3	607.0	662.9	**1,833.1** 0.00
								Target for Solver Run
	PCR2 Implied Financial Indicators				**2003**	**2004**	**2005**	
38	Implied annual profit (AED m)				266.2	326.5	408.5	
39	Implied return on mid-point RCV (%)				4.94%	5.73%	6.82%	
	PCR2 Notified Values				**2003**			
40	X Factor				0.0			
41	Notified Value (a)				333.048	AED million		
42	Notified Value (b)				0.03667186	AED million / MW		
43	Notified Value (c)				0.00879995	AED million / GWh		

Table D.2: Draft Proposal Price Control Calculations for TRANSCO (Water)

Line	(all amounts are in 2003 prices)							
	Inputs				**2003**	**2004**	**2005**	
1	Operating expenditure allowance (AED m, 2003 prices)				76.86	76.86	76.86	
2	Provisional figure for new investment (AEDm, 2003 prices)				500.0	500.0	500.0	
3	Forecast for revenue driver 1 (units)				1.0	1.0	1.0	
4	Forecast for revenue driver 2 (MGD)				389	440	490	
5	Forecast for revenue driver 3 (MG metered)				104,852	120,668	139,200	
6	Opening (1 January 2003) RCV (AED m, 2003 prices)			2,608.96				
7	Depreciation on Initial RCV (AED m, 2003 prices)			152.10				
8	Assumed average asset life for new investment (years)			25				
9	Cost of capital (real)			6.00%				
10	Weight in revenue for Revenue driver 1			50.00%				
11	Weight in revenue for Revenue driver 2			25.00%				
12	Weight in revenue for Revenue driver 3			25.00%				
13	X Factor			0.00				
	PCR2 Required Revenue Calculations							
	PCR2 RCV Calculations				**2003**	**2004**	**2005**	
14	Opening RCV				2,609.0	2,936.9	3,244.8	
15	Depreciation on Opening (1 January 2003) RCV				152.1	152.1	152.1	
16	New investment				500.0	500.0	500.0	
17	New investment 2003 to date				500.0	1,000.0	1,500.0	
18	Depreciation on new investment 2003 to date				20.0	40.0	60.0	
19	Closing RCV				2,936.9	3,244.8	3,532.7	
	PCR2 Discounted Costs				**2003**	**2004**	**2005**	**TOTAL**
20	Discounted operating expenditure				74.7	70.4	66.4	211.5
21	Discounted capital expenditure				485.6	458.2	432.2	1,376.0
22	Discounted Difference between Opening and Closing RAVs				2,609.0		-2,966.1	-357.1
23	**Total discounted costs (= revenue requirement) (AED m)**							**1,230.4**
	PCR 2 Revenue Forecast				**2003**	**2004**	**2005**	**PV Share in TOTAL**
24	**Revenue driver 1**	Driver forecast	Units		1.0	1.0	1.0	
25		Notified value (a)	AED m		**223.535**	223.535	223.535	
26		Revenue forecast	AED m		223.5	223.5	223.5	615.2
27		Share of revenue	%		53%	50%	47%	**50%**
28	**Revenue driver 2**	Driver forecast	Units		389.0	440.4	489.9	**Constraints for Solver Run**
29		Notified value (b)	AED m / MGD		**0.2554**	0.2554	0.2554	
30		Revenue forecast	AED m		99.3	112.5	125.1	307.6
31		Share of revenue	%		24%	25%	26%	**25%**
32	**Revenue driver 3**	Driver forecast	Units		104851.5	120668.0	139200.0	
33		Notified value (c)	AED m / MG		**0.0009**	0.0009	0.0009	
34		Revenue forecast	AED m		96.9	111.5	128.7	307.6
35		Share of revenue	%		23%	25%	27%	**25%**
				Variables for Solver Run				
36	Annual revenue (AED m)				419.8	447.5	477.3	**TOTAL** Difference
37	**Discounted annual revenue (AED m)**				407.7	410.1	412.6	**1,230.4** 0.00
								Target for Solver Run
	PCR2 Implied Financial Indicators				**2003**	**2004**	**2005**	
38	Implied annual profit (AED m)				170.8	178.6	188.3	
39	Implied return on mid-point RCV (%)				6.16%	5.78%	5.56%	
	PCR2 Notified Values				**2003**			
40	X Factor				0.0			
41	Notified Value (a)				223.535	AED million		
42	Notified Value (b)				0.25535171	AED million / MGD		
43	Notified Value (c)				0.00092441	AED million / MG		

Appendix E: Price Control Calculations for ADDC

Table E.1: Draft Proposal Price Control Calculations for ADDC (Electricity)

Line	(all amounts are in 2003 prices)						
	Inputs		**2003**	**2004**	**2005**		
1	Operating expenditure allowance (AED m, 2003 prices)		182.88	182.88	182.88		
2	Provisional figure for new investment (AEDm, 2003 prices)		279.8	279.8	279.8		
3	Forecast for revenue driver 1		1.0	1.0	1.0		
4	Forecast for revenue driver 2 (Electricity Customer Accounts)		207,628	225,110	238,920		
5	Forecast for revenue driver 3 (GWh metered)		13,152	15,095	17,221		
6	Opening (1 January 2003) RCV (AED m, 2003 prices)	3,892.03					
7	Depreciation on Initial RCV (AED m, 2003 prices)	184.58					
8	Assumed average asset life for new investment (years)	25					
9	Cost of capital (real)	6.00%					
10	Weight in revenue for Revenue driver 1	50.00%					
11	Weight in revenue for Revenue driver 2	25.00%					
12	Weight in revenue for Revenue driver 3	25.00%					
13	X Factor	0.00					
PCR2 Required Revenue Calculations							
	PCR2 RCV Calculations		**2003**	**2004**	**2005**		
14	Opening RCV		3,892.0	3,976.1	4,048.9		
15	Depreciation on Opening (1 January 2003) RCV		184.6	184.6	184.6		
16	New investment		279.8	279.8	279.8		
17	New investment 2003 to date		279.8	559.6	839.4		
18	Depreciation on new investment 2003 to date		11.2	22.4	33.6		
19	Closing RCV		3,976.1	4,048.9	4,110.5		
	PCR2 Discounted Costs		**2003**	**2004**	**2005**	**TOTAL**	
20	Discounted operating expenditure		177.6	167.6	158.1	503.3	
21	Discounted capital expenditure		271.8	256.4	241.9	770.0	
22	Discounted Difference between Opening and Closing RAVs		3,892.0		-3,451.3	440.8	
23	**Total discounted costs (= revenue requirement) (AED m)**					**1,714.1**	
	PCR 2 Revenue Forecast			**2003**	**2004**	**2005**	**PV Share in TOTAL**
24	**Revenue driver 1**	Driver forecast	Units	1.0	1.0	1.0	
25		Notified value (a)	AED m	**311.418**	311.418	311.418	
26		Revenue forecast	AED m	311.4	311.4	311.4	857.0
27		Share of revenue	%	53%	50%	47%	**50%**
28	**Revenue driver 2**	Driver forecast	Units	207628.3	225110.4	238919.6	**Constraints for Solver Run**
29		Notified value (b)	AED m / Cust. Account	**0.0007**	0.0007	0.0007	
30		Revenue forecast	AED m	144.8	157.0	166.6	428.5
31		Share of revenue	%	24%	25%	25%	**25%**
32	**Revenue driver 3**	Driver forecast	Units	13151.6	15094.7	17220.7	
33		Notified value (c)	AED m / GWh	**0.0103**	0.0103	0.0103	
34		Revenue forecast	AED m	135.8	155.9	177.9	428.5
35		Share of revenue	%	23%	25%	27%	**25%**
			Variables for Solver Run				
36	Annual revenue (AED m)			592.0	624.3	655.9	**TOTAL** Difference
37	**Discounted annual revenue (AED m)**			575.0	572.1	567.0	**1,714.1** 0.00
							Target for Solver Run
	PCR2 Implied Indicators			**2003**	**2004**	**2005**	
38	Implied annual profit (AED m)			213.4	234.5	254.8	
39	Implied return on mid-point RCV (%)			5.42%	5.84%	6.25%	
	PCR2 Notified Values			**2003**			
40	X Factor			0.0			
41	Notified Value (a)			311.418	AED million		
42	Notified Value (b)			0.00069738	AED million / Cust. Account		
43	Notified Value (c)			0.01032780	AED million / GWh		

Table E.2: Draft Proposal Price Control Calculations for ADDC (Water)

Line	(all amounts are in 2003 prices)							
	Inputs				**2003**	**2004**	**2005**	
1	Operating expenditure allowance (AED m, 2003 prices)				110.45	110.45	110.45	
2	Provisional figure for new investment (AEDm, 2003 prices)				98.4	98.4	98.4	
3	Forecast for revenue driver 1 (units)				1.0	1.0	1.0	
4	Forecast for revenue driver 2 (Water Customer Accounts)				184,601	200,151	212,461	
5	Forecast for revenue driver 3 (MG metered)				62,669	71,798	81,012	
6	Opening (1 January 2003) RCV (AED m, 2003 prices)	1,120.39						
7	Depreciation on Initial RCV (AED m, 2003 prices)	76.74						
8	Assumed average asset life for new investment (years)	25						
9	Cost of capital (real)	6.00%						
10	Weight in revenue for Revenue driver 1	50.00%						
11	Weight in revenue for Revenue driver 2	25.00%						
12	Weight in revenue for Revenue driver 3	25.00%						
13	X Factor	0.00						
	PCR2 Required Revenue Calculations							
	PCR2 RCV Calculations				**2003**	**2004**	**2005**	
14	Opening RCV				1,120.4	1,138.1	1,151.9	
15	Depreciation on Opening (1 January 2003) RCV				76.7	76.7	76.7	
16	New investment				98.4	98.4	98.4	
17	New investment 2003 to date				98.4	196.8	295.2	
18	Depreciation on new investment 2003 to date				3.9	7.9	11.8	
19	Closing RCV				1,138.1	1,151.9	1,161.8	
	PCR2 Discounted Costs				**2003**	**2004**	**2005**	**TOTAL**
20	Discounted operating expenditure				107.3	101.2	95.5	304.0
21	Discounted capital expenditure				95.6	90.2	85.1	270.8
22	Discounted Difference between Opening and Closing RAVs				1,120.4		-975.4	144.9
23	**Total discounted costs (= revenue requirement) (AED m)**							**719.7**
	PCR 2 Revenue Forecast				**2003**	**2004**	**2005**	**PV Share in TOTAL**
24	**Revenue driver 1**	Driver forecast	Units		1.0	1.0	1.0	
25		Notified value (a)	AED m		**130.760**	130.760	130.760	
26		Revenue forecast	AED m		130.8	130.8	130.8	359.86
27		Share of revenue	%		53%	50%	48%	**50%**
28	**Revenue driver 2**	Driver forecast	Units		184601.1	200151.0	212460.8	**Constraints for Solver Run**
29		Notified value (b)	AED m / Cust.Account		**0.0003**	0.0003	0.0003	
30		Revenue forecast	AED m		60.8	65.9	70.0	179.9
31		Share of revenue	%		24%	25%	25%	**25%**
32	**Revenue driver 3**	Driver forecast	Units		62669.2	71798.5	81011.6	
33		Notified value (c)	AED m / MG		**0.0009**	0.0009	0.0009	
34		Revenue forecast	AED m		57.3	65.7	74.1	179.9
35		Share of revenue	%	**Variables for Solver Run**	23%	25%	27%	**25%**
36	Annual revenue (AED m)				248.9	262.4	274.8	**TOTAL** Difference
37	**Discounted annual revenue (AED m)**				241.7	240.4	237.6	**719.7** 0.00
								Target for Solver Run
	PCR2 Implied Financial Indicators				**2003**	**2004**	**2005**	
38	Implied annual profit (AED m)				57.8	67.3	75.8	
39	Implied return on mid-point RCV (%)				5.11%	5.88%	6.56%	
	PCR2 Notified Values				**2003**			
40	X Factor				0.0			
41	Notified Value (a)				130.760	AED million		
42	Notified Value (b)				0.00032932	AED million / Cust. Account		
43	Notified Value (c)				0.00091478	AED million / MG		

Appendix F: Price Control Calculations for AADC

Table F.1: Draft Proposal Price Control Calculations for AADC (Electricity)

Line	(all amounts are in 2003 prices)					
	Inputs		**2003**	**2004**	**2005**	
1	Operating expenditure allowance (AED m, 2003 prices)		91.87	91.87	91.87	
2	Provisional figure for new investment (AEDm, 2003 prices)		201.5	201.5	201.5	
3	Forecast for revenue driver 1 (units)		1.0	1.0	1.0	
4	Forecast for revenue driver 2 (Electricity Customer Accounts)		84,000	88,202	92,612	
5	Forecast for revenue driver 3 (GWh metered)		5,915	6,385	6,873	
6	Opening (1 January 2003) RCV (AED m, 2003 prices)	2,228.03				
7	Depreciation on Initial RCV (AED m, 2003 prices)	116.36				
8	Assumed average asset life for new investment (years)	25				
9	Cost of capital (real)	6.00%				
10	Weight in revenue for Revenue driver 1	50.00%				
11	Weight in revenue for Revenue driver 2	25.00%				
12	Weight in revenue for Revenue driver 3	25.00%				
13	X Factor	0.00				
	PCR2 Required Revenue Calculations					
	PCR2 RCV Calculations		**2003**	**2004**	**2005**	
14	Opening RCV		2,228.0	2,305.1	2,374.1	
15	Depreciation on Opening (1 January 2003) RCV		116.4	116.4	116.4	
16	New investment		201.5	201.5	201.5	
17	New investment 2003 to date		201.5	403.0	604.5	
18	Depreciation on new investment 2003 to date		8.1	16.1	24.2	
19	Closing RCV		2,305.1	2,374.1	2,435.1	
	PCR2 Discounted Costs		**2003**	**2004**	**2005**	**TOTAL**
20	Discounted operating expenditure		89.2	84.2	79.4	252.8
21	Discounted capital expenditure		195.7	184.6	174.2	554.5
22	Discounted Difference between Opening and Closing RAVs		2,228.0		-2,044.6	183.5
23	**Total discounted costs (= revenue requirement) (AED m)**					**990.8**

	PCR 2 Revenue Forecast			**2003**	**2004**	**2005**	**PV Share in TOTAL**
24	**Revenue driver 1**	Driver forecast	Units	1.0	1.0	1.0	
25		Notified value (a)	AED m	**180.019**	180.019	180.019	
26		Revenue forecast	AED m	180.0	180.0	180.0	495.4
27		Share of revenue	%	52%	50%	48%	**50%**
28	**Revenue driver 2**	Driver forecast	Units	84000.0	88202.0	92612.0	**Constraints for Solver Run**
29		Notified value (b)	AED m / Cust. Account	**0.0010**	0.0010	0.0010	
30		Revenue forecast	AED m	85.8	90.1	94.6	247.7
31		Share of revenue	%	25%	25%	25%	**25%**
32	**Revenue driver 3**	Driver forecast	Units	5915.2	6385.0	6873.3	
33		Notified value (c)	AED m / GWh	**0.0141**	0.0141	0.0141	
34		Revenue forecast	AED m	83.5	90.2	97.1	247.7
35		Share of revenue	%	24%	25%	26%	**25%**
			Variables for Solver Run				
36	Annual revenue (AED m)			349.4	360.3	371.7	**TOTAL** Difference
37	**Discounted annual revenue (AED m)**			339.4	330.2	321.3	**990.8** 0.00
							Target for Solver Run

	PCR2 Implied Financial Indicators	**2003**	**2004**	**2005**
38	Implied annual profit (AED m)	133.1	136.0	139.3
39	Implied return on mid-point RCV (%)	5.87%	5.81%	5.79%

	PCR2 Notified Values	**2003**
40	X Factor	0.0
41	Notified Value (a)	180.019 AED million
42	Notified Value (b)	0.00102162 AED million / Cust. Account
43	Notified Value (c)	0.01412463 AED million / GWh

Table F.2: Draft Proposal Price Control Calculations for AADC (Water)

Line	(all amounts are in 2003 prices)							
	Inputs				**2003**	**2004**	**2005**	
1	Operating expenditure allowance (AED m, 2003 prices)				87.85	87.85	87.85	
2	Provisional figure for new investment (AEDm, 2003 prices)				70.8	70.8	70.8	
3	Forecast for revenue driver 1 (units)				1.0	1.0	1.0	
4	Forecast for revenue driver 2 (Water Customer Accounts)				33,619	35,529	37,321	
5	Forecast for revenue driver 3 (MG Metered)				5,242	7,862	11,794	
6	Opening (1 January 2003) RCV (AED m, 2003 prices)			453.89				
7	Depreciation on Initial RCV (AED m, 2003 prices)			15.44				
8	Assumed average asset life for new investment (years)			25				
9	Cost of capital (real)			6.00%				
10	Weight in revenue for Revenue driver 1			50.00%				
11	Weight in revenue for Revenue driver 2			25.00%				
12	Weight in revenue for Revenue driver 3			25.00%				
13	X Factor			0.00				
	PCR2 Required Revenue Calculations							
	PCR2 RCV Calculations				**2003**	**2004**	**2005**	
14	Opening RCV				453.9	506.4	556.1	
15	Depreciation on Opening (1 January 2003) RCV				15.4	15.4	15.4	
16	New investment				70.8	70.8	70.8	
17	New investment 2003 to date				70.8	141.6	212.4	
18	Depreciation on new investment 2003 to date				2.8	5.7	8.5	
19	Closing RCV				506.4	556.1	603.0	
	PCR2 Discounted Costs				**2003**	**2004**	**2005**	**TOTAL**
20	Discounted operating expenditure				85.3	80.5	75.9	241.8
21	Discounted capital expenditure				68.8	64.9	61.2	194.8
22	Discounted Difference between Opening and Closing RAVs				453.9		-506.3	-52.4
23	**Total discounted costs (= revenue requirement) (AED m)**							**384.2**
	PCR 2 Revenue Forecast				**2003**	**2004**	**2005**	**PV Share in TOTAL**
24	**Revenue driver 1**	Driver forecast	Units		1.0	1.0	1.0	
25		Notified value (a)	AED m		**69.807**	69.807	69.807	
26		Revenue forecast	AED m		69.8	69.8	69.8	192.1
27		Share of revenue	%		56%	50%	44%	**50%**
28	**Revenue driver 2**	Driver forecast	Units		33619.0	35529.0	37321.0	**Constraints for Solver Run**
29		Notified value (b)	AED m / Cust. Account		**0.0010**	0.0010	0.0010	
30		Revenue forecast	AED m		33.1	35.0	36.8	96.1
31		Share of revenue	%		26%	25%	23%	**25%**
32	**Revenue driver 3**	Driver forecast	Units		5241.6	7862.4	11793.6	
33		Notified value (c)	AED m / MG		**0.0043**	0.0043	0.0043	
34		Revenue forecast	AED m		22.4	33.6	50.4	96.1
35		Share of revenue	%		18%	24%	32%	**25%**
				Variables for Solver Run				
36	Annual revenue (AED m)				125.3	138.4	157.0	**TOTAL** Difference
37	**Discounted annual revenue (AED m)**				121.7	126.8	135.7	**384.2** **0.00**
								Target for Solver Run
	PCR2 Implied Financial Indicators				**2003**	**2004**	**2005**	
38	Implied annual profit (AED m)				19.2	29.4	45.2	
39	Implied return on mid-point RCV (%)				4.00%	5.54%	7.79%	
	PCR2 Notified Values				**2003**			
40	X Factor				0.0			
41	Notified Value (a)				69.807	AED million		
42	Notified Value (b)				0.00098548	AED million / Cust. Account		
43	Notified Value (c)				0.00427098	AED million / MG		

Appendix G: Category B Performance Indicators for Companies

Tables G.1, G.2 and G.3 list the proposed Category B performance indicators for ADWEC, TRANSCO and ADDC/AADC, respectively. Category B indicators will be monitored during the second price control period. Adjustments may be made to financial projections in 2005 for next price control review in light of assessed performance. Such indicators may be considered for suitability for Category A indicators in the PIS at the 2005 Price Controls Review.

Table G.1: Proposed Performance Indicators for ADWEC – Category B

Performance Indicator	Description/Formula
Generation Security Standard (GSS)	Planning standard to ensure that supply of electricity to customers will not be discontinued for a total of more than 1 day in any period of 10 years i.e. Loss of Load Expectation ≤ 0.1 day / year (Refer to ADWEC's Licence Condition 17)
Desalination Security Standard (DSS)	(Refer to ADWEC's Licence Condition 17 and Seven-year Statement of July 2001)
Interim P&L Account Timeliness	Difference between the actual date and the target date (30th September each year) for submission of un-audited interim profit and loss account for the first six months of the year (Refer to ADWEC's Licence Condition 6)
PWPA Timeliness	Difference between the actual date and the target date (31st December each year) for signing of the PWPAs for the following year
Seven-Year Planning Statement Timeliness	Difference between the actual date and the target date (31 May, to be agreed) for submission of the statement (Refer to ADWEC's Licence Condition 18)
Economic Purchase Indicator	Year-on-year difference in total production costs per unit for ADWEA owned GDs due to ADWEC's efforts (Refer to ADWEC's Licence Conditions 14-17)

Note: None of the performance indicators proposed for ADWEC in the PIS Discussion Paper (May 2002) have been excluded in the Draft Proposals – they have been included in either Category A or B.

Table G.2: Proposed Performance Indicators for TRANSCO – Category B	
Performance Indicator	**Description/Formula**
Electricity Transmission Security	Number of incidents
Electricity Average Incident Duration	Total duration of all incidents as a proportion of the number of incidents (where incident is an event causing of loss of supply)
Water Transmission Security	Number of incidents
Water Average Incident Duration	Total duration of all incidents as a proportion of the number of incidents
Water Quality	The number of samples that pass water quality regulations as a proportion of the total number of samples that are required to be taken in accordance with the sampling frequency regulations (whether taken or not). In effect, this indicator will be calculated from the actual sampling frequency and samples that fail to comply with the Water Quality Regulations 2000, both of these indicators are being reported presently
Electricity Transmission Loss	Difference between the numbers of units entered into the system and units exit from the system as a proportion of the number of units entered into the system
Water Transmission Loss	Difference between the numbers of units entered into the system and units exit from the system as a proportion of the number of units entered into the system
Economic Despatch	Under discussion between the Bureau and TRANSCO (Refer to TRANSCO's Licence Condition 22)
Settlement Data Accuracy and Timeliness	Under discussion between the Bureau and ADWEC and to be discussed with TRANSCO
Planning Data Accuracy and Timeliness	Under discussion between the Bureau, TRANSCO and ADWEC
Statement of Connection and Use of System Charges Timeliness	Difference between the actual date and the target date (31 December each year, to be agreed) for submission of the statement (Refer to TRANSCO's Licence Condition 15)
Interim P&L Account Timeliness	Difference between the actual date and the target date (30th September each year) for submission of un-audited interim profit and loss account for the first six months of the year (Refer to TRANSCO's Licence Condition 8)
Five-Year Planning Statement Timeliness	Difference between actual date and target date (30 June each year, to be agreed) for submission of the statement (TRANSCO's Licence Condition 15)

Note: The following performance indicators proposed for TRANSCO in the PIS Discussion Paper (May 2002) have been excluded in the Draft Proposals:

- Electricity Transmission Availability (included Category A in PIS Discussion Paper)
- Water Transmission Availability (included Category A in PIS Discussion Paper)

All other indicators proposed in PIS Discussion Paper have been included in the Draft Proposals either in Category A or B.

Table G.3: Proposed Performance Indicators for Discos – Category B	
Performance Indicator	**Description/Formula**
Electricity Distribution Security	Number of customers interrupted
Energy Lost	Energy lost (MWh) due to interruption
Electricity Meter Reading	Number of electricity customer meters read
Electricity Distribution Loss	Difference between the number of units purchased from ADWEC and RASCO and the number of units billed to customers, as a proportion of the number of nits purchased from ADWEC and RASCO
Water Distribution Metering	Difference between the number of units purchased from ADWEC and RASCO and the number of units billed to customers, as a proportion of the number of nits purchased from ADWEC and RASCO
Water Meter Reading	Number of water customer meters read
Low Pressure	Number of low pressure customers per connected customers, where low pressure customers mean the customers in all such zones, sectors and areas where the measured pressure at any of the three randomly selected locations is below the pre-agreed head or pressure i.e. 5m or 0.5 bar; however number of customers in the zones with one low pressure location can be weighed 1/3, those with two low pressure locations can have a weighting of 2/3 and those with three low pressure locations can have a weighting of 1
Water Supply Method	Number of network-connected customers as a proportion of total number of customers, where the number of customers with unrestricted supply and timed supply will be given different weightings, say 1 and 0.5 respectively
Water Quality	The number of samples that pass water quality regulations as a proportion of the total number of samples that are required to be taken in accordance with the sampling frequency regulations (whether taken or not). In effect, this indicator will be calculated from the actual sampling frequency and samples that fail to comply with the Water Quality Regulations 2000, both of these indicators are being reported presently
Customer Satisfaction	To be discussed.
Interim P&L Account Timeliness	Difference between the actual date and the target date (30th September each year) for submission of un-audited interim profit and loss account for the first six months of the year (Refer to Disco's Licence Condition 9)

Note: The following performance indicators proposed for ADDC/AADC in the PIS Discussion Paper (May 2002) have been excluded in the Draft Proposals:

- Electricity Distribution Reliability (included Category B in PIS Discussion Paper)

All other indicators proposed in PIS Discussion Paper have been included in the Draft Proposals either in Category A or B.