

Review of Economic Regulation of RASCO from 2004

Final Proposals

November 2003

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Foreword

Effective from 1 January 2001, RASCO is responsible only for electricity generation and water production activities, which are managed by ADDC and AADC on RASCO's behalf. Electricity and water produced by RASCO are sold to ADDC and AADC for distribution and supply to the final customers.

During 2003, the Bureau has undertaken a review of the economic regulation which applies to RASCO. As part of this review, the Bureau has published two Consultation Papers in May and July and the Draft Proposals in September 2003. These documents set out the Bureau's understanding of RASCO's activities and their economic regulation to date, and discussed how RASCO should be regulated from 2004 onwards.

This document sets out the Bureau's Final Proposals for the economic regulation of RASCO for 2004 onwards. The Bureau proposes two incentive-based CPI-X revenue caps for RASCO, separately for its electricity generation and water production activities. These price controls are due to take effect on 1 January 2004 and to last for two years (to 31 December 2005). While the main features of the price controls remain the same as in the Draft Proposals, the Final Proposals incorporate certain important changes in the calibration of the controls in light of the responses to the Draft Proposals. A separate document is also being sent to RASCO which contains details of the proposed modifications to its licence to give effect to these Final Proposals.

RASCO is requested to state its acceptance or otherwise to the Final Proposals by **17 December 2003** at the following address:

Mark Clifton
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If RASCO accepts these Final Proposals, they will come into effect on 1 January 2004.

Nick Carter
Director General
Regulation and Supervision Bureau

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1 Summary of Draft Proposals

1.1 Introduction

Following the restructuring of its activities and assets with effect from 1 January 2001, the Abu Dhabi Company for Servicing Remote Areas (ADSCRA) (more commonly known as the Remote Areas Services Company or RASCO) is responsible only for electricity generation and water production for sale to the two distribution companies: Abu Dhabi Distribution Company (ADDC) and Al Ain Distribution Company (AADC).

In May 2003, the Regulation and Supervision Bureau (the “Bureau”) commenced a review of the framework of economic regulation which applies to RASCO with the publication of the First Consultation Paper, followed by the Second Consultation Paper in July and the Draft Proposals in September.

This document sets out the Bureau’s Final Proposals on the price controls for RASCO for 2004 onwards. If accepted by RASCO, the new price controls will come into effect on 1 January 2004 and will last for two years (to 31 December 2005).

The following sections summarise the Bureau’s Final Proposals – the latter sections of the document explain these proposals in detail.

1.2 Form of Controls (Section 3)

Main Features of New Price Controls

Broadly speaking, the form of the new controls for RASCO will be similar to that for other monopoly companies in the sector. That it is say:

- Price controls will be of CPI-X type and in the form of a cap on Maximum Allowed Revenue (MAR).
- There will be two separate price controls for RASCO: one for electricity generation and one for water production.
- New price controls will have a duration of two years (2004-2005).
- Price controls will define the cap on the revenue that RASCO can recover from its customers (ADDC and AADC) in respect of its electricity generation and water production businesses.
- For each business, the MAR will be composed of the following components:
 - A fixed revenue term;

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- A variable revenue term containing a 'revenue driver' ("electricity generation capacity" for the electricity business and "water annual production" for the water business);
 - A term allowing the recovery of reasonable fuel costs;
 - A "Q" term to incentivise RASCO to improve its performance on regulatory compliance; that is, the timely submission of audited information to the Bureau. This introduces a Performance Incentive Scheme (PIS) for RASCO similar to that for other monopoly companies in the sector; and
 - A "K" factor (the correction factor) to adjust the allowed revenue of a year for the over or under-recovery of allowed revenue in the preceding year.
- The fuel costs allowed in the MAR will be based on weighted average of RASCO's actual fuel costs and a benchmark unit fuel cost, to incentivise RASCO to improve its fuel consumption efficiency.

Structure of New Price Controls

The structure of the price controls for each business of RASCO is summarized below:

$$\mathbf{MAR_t = a_t + (b_t \times \mathbf{Revenue\ Driver_t}) + F_t + Q_t - K_t}$$

Where:

Revenue Driver = Electricity generation capacity for RASCO's electricity business
 = Water annual production for RASCO's water business

- a_t** is a fixed term (expressed in AED million) for the year "t"
- b_t** is the co-efficient of the revenue driver (expressed in AED/kW for electricity or AED/TIG for water), for the year "t".

a_t, and b_t would be determined by the Bureau for the first year "t" of the control period (i.e. 2004) as part of this consultation process and would be adjusted by CPI-X factor for the following year "t+1" (i.e. 2005) using the following formula:

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

$$\mathbf{b_{t+1} = b_t \times (1 + (CPI_t - X) / 100)}$$

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where “CPI_t” is the UAE Consumer Price Index published by the UAE Ministry of Planning for the year “t” and “X” factor reflects a number of considerations such as expected efficiency improvements and demand growth.

- F_t** is the fuel cost which RASCO is allowed to recover during the year “t”.
- K_t** is the correction factor adjusting any over or under-recovery of revenue in the preceding year “t-1” along with an interest rate. For the first year of control period “t” (i.e. 2004), K_t will be set to zero.
- Q_t** is the adjustment to revenue in year “t” for performance under the PIS in the preceding year (i.e. year t-1).

Allowed fuel costs (F_t) are discussed in Section 1.7 below.

1.3 Revenue Driver Assumptions (Section 4)

The Bureau has proposed a variable revenue driver for each business of RASCO:

- “Electricity Generation Capacity” in kilowatt (kW) for the electricity generation business, referring to the net installed capacity (whether continuous or standby) required to meet the demand and security of supply requirements in a year; and
- “Water Annual Production” in thousand imperial gallons (TIG) per year for the water production business, meaning the net water production in a year from distillers and water well-fields.

The precise definitions of the revenue drivers to be included in RASCO’s licence have been proposed in Section 4 of this document. The projections adopted for each revenue driver are summarized in **Table 1.1** below and explained in Section 4 of this document.

Table 1.1: Assumptions for Revenue Drivers		
	2004	2005
Electricity Generation Capacity (MW)	271.43	287.88
Water Annual Production (MIG per year)	11,302.00	10,637.18

1.4 Operating Expenditure Projections (Section 5)

The Bureau has projected operating expenditure for 2004-2005 at the level (in real terms) of the operating expenditure of RASCO in 2003, with the following adjustments:

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- An increase to reflect increase in costs associated with meeting increase in demand (1.77% p.a. for electricity and -1.31% p.a. for water); and
- A decrease to take account of the assumed efficiency improvement (5% p.a.) over the duration of the control period.

The above methodology applies to operating expenditures excluding depreciation and fuel costs, which are considered separately. The resulting projections are summarized in **Table 1.2** below:

AED million, 2004 prices	2004	2005
Electricity Generation Business	33.95	32.86
Water Production Business	87.88	82.34

Note: Excludes depreciation and fuel costs

Note that the water-related operating expenditure for 2003 obtained from the companies' data submissions has been adjusted downward by AED 12 million from that used in the Draft Proposals to exclude fuel costs which have been erroneously included in the data submissions.

1.5 Capital Expenditure, Depreciation and Asset Valuation (Section 6)

Section 6 describes in detail the Bureau's approach to deriving projections for capital expenditures, depreciation and regulatory asset values (RAVs) for RASCO over the control period. In essence:

- The Bureau has used RASCO's reported closing asset values for 2003 as the opening RAVs on 1 January 2004 without any adjustment. This compares to the Draft Proposals which applied a 50 per cent downward adjustment to the accounting asset values to derive RAVs in the light of certain benchmarking analyses.
- The Bureau has allowed zero new capital expenditure for the water business and has taken an amount equivalent to 3.54 per cent of opening RAV as the new capital expenditure for electricity business. Both figures are consistent with the respective reported demand growths.
- The Bureau has proposed an average asset life of 20 years for the calculation of depreciation of existing and new assets of RASCO.

Based on the above proposals, **Tables 1.3** and **1.4** below present the projected capital expenditure (new investment), depreciation and opening and closing RAVs for the control period (2004-2005):

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Table 1.3: Projected Capex, Depreciation and Opening and Closing RAVs – Electricity Generation

AED million in 2004 prices	2004	2005
Opening RAV	150.55	148.219
Depreciation on Opening RAV (2004)	7.528	7.528
New Investment	5.329	5.329
Depreciation on New Investment to date	0.133	0.400
Closing RAV	148.219	145.621

Table 1.4: Projected Capex, Depreciation and Opening and Closing RAVs – Water Production

AED million in 2004 prices	2004	2005
Opening RAV	344.57	327.342
Depreciation on Opening RAV (2004)	17.229	17.229
New Investment	0.000	0.000
Depreciation on New Investment to date	0.000	0.000
Closing RAV	327.342	310.113

1.6 Cost of Capital (Section 7)

The Bureau has assumed a real, post-tax weighted average cost of capital (WACC) of 6.0 per cent for RASCO, the same as used in setting the first and second price controls for other monopoly companies in the sector.

1.7 Allowed Fuel Costs (Section 8)

For each business, the allowed fuel cost for any year ‘t’ of the control period (2004-2005) will be calculated by using the following formula:

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

Where:

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

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

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BUF = Benchmark unit fuel cost for electricity or water (fils/kWh or AED/TIG) as set by the Bureau based on realistically achievable levels of fuel consumption efficiency by RASCO.

W_A = Weight of the actual fuel costs of RASCO in the allowed fuel costs.

W_B = Weight of the benchmark unit fuel cost in the allowed fuel costs.

The above formula requires the Bureau to set values of the weights of actual and benchmark fuel costs (W_A and W_B) and the benchmark unit fuel cost (BUF) for each business.

The proposed values for the above parameters are set out in **Table 1.5** below:

	W_A	W_B	BUF
Electricity Generation Business	0.95	0.05	20.00 Fils/kWh
Water Production Business	0.95	0.05	8.00 AED/TIG

Both the weights and the BUFs have been revised since the Draft Proposals.

Section 8 explains the Bureau's approach to setting these values in detail.

1.8 Price Control Calculations (Section 9)

Consistent with the approach taken to setting the price controls for other monopoly companies in the sector, the Bureau has adopted a net present value (NPV) framework to establish the level and profile of price-controlled revenue for each business of RASCO for the period 2004 – 2005. However, as explained in Section 3.7, in the Final Proposals the NPV of required revenue over the control period has been calculated using “building block approach”; that is, as the sum of the NPVs (over the period) of the operating expenditure, depreciation and return on capital on mid-year RAV.

Different combinations of the values of the fixed revenue term ‘a’, the coefficient on the revenue driver ‘b’, and X, can yield an amount of revenue equal to the revenue requirement. For the Final Proposals, these values have been calculated by adopting the following constraints:

- 65 per cent of price-controlled revenue over the price control period is recovered via the fixed revenue term and 35 per cent is recovered from the variable revenue term.
- $X = 0.0$.

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

Table 1.6: Proposed Values for Price Controls (2004-2005)			
	Values for 2004		
	X	a	b
Electricity Generation Business	0.00	32.57 AED m	62.76 AED/kW
Water Production Business	0.00	79.35 AED m	3.89 AED/TIG

The annual maximum allowed revenues (excluding allowed fuel costs) projected for each business over the price control period are summarized in **Table 1.7**:

Table 1.7: Projected Maximum Allowed Revenue for 2004-2005		
(AED million, 2004 prices)	2004	2005
RASCO Electricity Generation Business	49.60	50.63
RASCO Water Production Business	123.33	120.74
RASCO – Total	172.93	171.38

Note: Excludes allowed fuel costs.

Table 1.8 below presents the Bureau's estimates of MAR including forecast allowed fuel costs (based on certain assumptions) for the two businesses of RASCO over the control period. This table clearly shows that the water production business of RASCO is twice the size of the electricity generation business in terms of allowed revenue:

Table 1.8: Estimated Total MAR (including Fuel Costs) for 2004-2005				
(AED million, 2004 prices)	2004	% of MAR	2005	% of MAR
Electricity				
MAR excluding Fuel Cost	49.60	56%	50.63	56%
Allowed Fuel Cost	39.20	44%	39.20	44%
Electricity MAR	88.80	100%	89.83	100%
Water				
MAR excluding Fuel Cost	123.33	72%	120.74	71%
Allowed Fuel Cost	48.66	28%	48.66	29%
Water MAR	171.99	100%	169.40	100%

1.9 Performance Incentive Scheme (Section 10)

Similar to the PIS for other monopoly companies in the sector, a PIS is being introduced for each business of RASCO, to provide incentives for RASCO to improve its performance on certain aspects of its operation and statutory obligations.

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The Bureau has proposed a number of “Category A” performance indicators, for which good (poor) performance will lead to an automatic upwards (downwards) adjustment to MAR under the price control formulae (represented by the term “Q”, for quality). This adjustment in any year will be capped at 5 per cent of MAR including allowed fuel costs.

The Category A indicators are summarized in **Table 1.9**, together with the incentive rates. The table also shows the “glide-path” target dates for these indicators i.e. for submission of audited accounts and audited price control returns (PCRs) for the purpose of PIS, which occur at a later date in 2004 than the licence target dates to allow RASCO adequate time to address present shortcoming in its regulatory reporting compliance.

Table 1.9: Incentive Rates for Category A Performance Indicators			
Business	Performance Indicator	Incentive Rate (2004-2005)	
Electricity Generation	Audited Accounts	370,000	AED per month.
	Audited Price Control Return	370,000	AED per month.
Water Production	Audited Accounts	717,000	AED per month.
	Audited Price Control Return	717,000	AED per month.

The incentive rates vary between businesses to reflect the relative size of the businesses in terms of revenue.

Detailed explanations of how the incentive rates will apply are presented in Section 10 of the paper. In essence, the company receives a reward or penalty calculated according to the incentive rate and to the performance 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.

1.10 Main Differences from Draft Proposals

The main differences between the Draft Proposals and the Final Proposals are summarized in **Table 1.10** below. There have been a number of other consequential or more minor refinements of the proposals, which are explained later in this document.

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Table 1.10: Summary of Differences from Draft Proposals

Main Feature	Business	Draft Proposals	Final Proposals
Weights of Revenue Drivers	Electricity, Water	“a” term – 50% “b” term – 50%	“a” term – 65% “b” term – 35%
Definition of Revenue Driver	Electricity	Electricity generation capacity – required to meet the demand	Electricity generation capacity – required to meet the demand or security of supply requirements
Operating Expenditure Allowance	Water	Operating expenditure based on 2003 expenditure from data submission	Downward adjustment by AED 12 million to 2003 operating expenditure from data submission (to exclude fuel costs erroneously included)
Opening Regulatory Asset Value (RAV) as on 1 January 2004	Electricity, Water	50% downward adjustment to accounting asset values on 1 January 2004	No adjustment to accounting asset values on 1 January 2004
Weights of Actual and Benchmark Fuel Costs in Allowed Fuel Costs	Electricity, Water	$W_A = 0.90$ $W_B = 0.10$	$W_A = 0.95$ $W_B = 0.05$
Benchmark Unit Fuel Cost (BUF)	Electricity	BUF = 10 fils / kWh	BUF = 20 fils / kWh
Benchmark Unit Fuel Cost (BUF)	Water	BUF = 4 AED / TIG	BUF = 8 AED / TIG

Due to these changes in the Final Proposals, the results of various calculations in the Final Proposals are significantly different from those of the Draft Proposals. In general, higher RAVs, higher weights of actual fuel costs and higher benchmark unit fuel costs have been allowed in the Final Proposals. However, operating expenditure allowance for water business has been adjusted downward to exclude AED 12 million of fuel costs erroneously included in the base 2003 operating expenditure.

As a result, the estimated annual allowed revenues for RASCO projected in the Final Proposals are about 13% higher than those projected in the Draft Proposals for electricity business and 6% higher for water business, for each year of the control period. In total, the projected annual allowed revenue in the Final Proposals is higher than that in the Draft Proposals by about AED 20 million or 8-9%.

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2 Background

2.1 Introduction to RASCO

RASCO is authorised under a licence from the Bureau to undertake a number of regulated activities in the Emirate of Abu Dhabi including electricity generation, water production, and their distribution and supply to customers in remote areas.

The organization, activities and assets of RASCO have been restructured with effect from 1 January 2001 as follows:

- **Generation and production.** RASCO retains ownership of its generation and production assets. However, the responsibility for the operation and maintenance of these assets (and associated staff) has been transferred to ADDC and AADC in their respective authorized areas, in return for a “management fee” paid by RASCO.
- **Distribution and supply.** The distribution and supply activities and associated assets (and staff and customers) of RASCO have been transferred to ADDC and AADC in their respective authorized areas. The costs of such activities are covered, for 2003 onwards, by the second price controls (PC2) for ADDC and AADC.

The above activities have been described in detail in the First and Second Consultation Papers and the Draft Proposals.

2.2 Past Economic Regulation and Subsidy Requirements

Based on discussions with ADWEA, ADDC and AADC, RASCO’s activities during 1999-2003 can be categorized into:

- Dedicated production activities (subject to Bureau’s approved tariffs);
- Non-dedicated production activities (not subject to Bureau’s tariffs); and
- Distribution and supply activities (transferred to ADDC/AADC in 2001).

The previous consultation papers described in detail the economic regulation of RASCO to date, and particularly clarified the Bureau’s view of the appropriate calculation of RASCO’s subsidy requirement in the period up to and including 2003. **Table 2.1** summarises the frameworks of economic regulation and subsidy calculations for each (present or past) activity of RASCO that was in place or could be applied in the Bureau’s view for different periods.

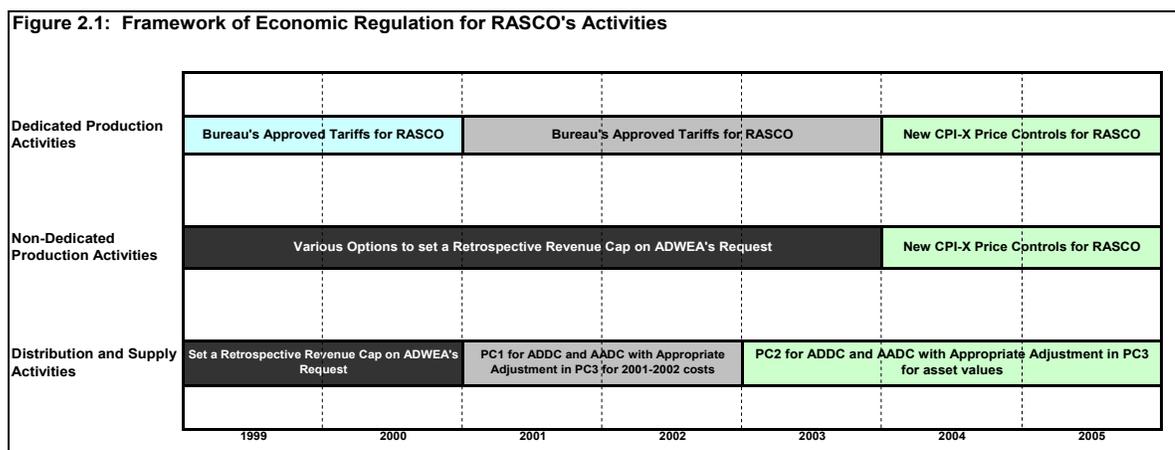
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Table 2.1: Frameworks for Economic Regulation and Subsidy Calculations for Various Activities of RASCO

Activity	Period	Economic Regulation	Subsidy Calculation
Dedicated Production	1999-2000	Bureau's Approved Tariffs for standby and continuous generation, and wellfields and associated desalination	Difference between: <ul style="list-style-type: none"> - revenue based on the Bureau's approved tariffs; and - revenue from: <ul style="list-style-type: none"> • final customers as per ADWEA's approved standard tariffs, and • ADDC and AADC as per the Bureau's approved tariffs.
	2001-2003	Bureau's Approved Tariffs for 1999-2000	Difference between: <ul style="list-style-type: none"> - revenue based on the Bureau's approved tariffs; and - revenue from ADDC and AADC at the BST rates as per the management contracts.
	2004-onwards	New CPI-X Price Controls for RASCO	Subsidy to be provided to ADDC and AADC, provided that the management contracts are amended to revise price of RASCO's water and electricity (see Section 3.8 of this paper).
Non-Dedicated Production	1999-2003	On ADWEA's request, Bureau may suggest a retrospective cap on revenue based on: <ul style="list-style-type: none"> - actual costs of RASCO; - BST rates; - an appropriately weighted average of actual costs and BST costs; or - Bureau's approved tariffs for dedicated production activities. 	Difference between: <ul style="list-style-type: none"> - Bureau's suggested revenue cap; and - revenue from: <ul style="list-style-type: none"> • final customers as per ADWEA's approved standard tariffs (applicable to 1999-2000 only), and • ADDC and AADC as per the agreed tariffs (applicable to 2001-2003 only).
	2004-onwards	New CPI-X Price Controls for RASCO	Subsidy to be provided to ADDC and AADC, if the management contracts are amended to revise price of RASCO's water and electricity (see Section 3.8 of this paper).
Distribution and Supply	1999-2000	On ADWEA's request, Bureau may retrospectively set a revenue cap on the basis of reasonable actual costs	Difference between: <ul style="list-style-type: none"> - Bureau's suggested revenue cap; and - revenue from final customers and ADDC/AADC for these activities (which is understood to be zero);
	2001-2002	ADDC and AADC may be remunerated for the costs incurred during this period through appropriate adjustment to revenue requirements at the PC3 review in 2005.	Subsidy to be provided to ADDC and AADC via the established method (that is, the difference between their MARs and the revenue from customers).
	2003-onwards	Operating expenditure covered in PC2 for ADDC and AADC. The Bureau also intends to make an appropriate revenue adjustment at the PC3 review for ADDC and AADC for the values of assets inherited from RASCO.	Subsidy to be provided to ADDC and AADC via the established method (that is, the difference between their MARs and the revenue from customers).

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Figure 2.1 graphically presents the regulatory arrangements for various activities for different periods. Two activities, non-dedicated production and distribution and supply, are highlighted in black-shaded bars in the figure for which ADWEA may wish the Bureau to set retrospective revenue caps for the periods 1999-2003 and 1999-2000, respectively, for the purposes of calculation of subsidy requirements of RASCO.



As agreed at a meeting between the Bureau, ADWEA, ADDC and AADC on 17 May 2003, ADWEA provided the Bureau with certain data that the Bureau requested to review various alternatives to calculate the subsidy for RASCO in respect of its non-dedicated production activities. The Bureau analysed the data and found it to be incomplete. The Bureau therefore requested ADWEA to provide missing data and explanation for certain discrepancies. Once such information is made available to the Bureau, the Bureau will undertake the requisite analyses and suggest suitable methodologies to ADWEA for calculation of the subsidy requirements of RASCO for 1999-2003.

It may also be noted that in 2002 the Abu Dhabi Finance Department and ADWEA appointed an economic consultancy firm, NERA, to determine the subsidy requirements for the Abu Dhabi water and electricity sector for 1999-2000. That study covers the calculation of separate subsidy requirements for ADDC, AADC and RASCO.

Figure 2.1 highlights the Bureau's intent to make an appropriate retrospective adjustment to the price controls for ADDC and AADC at the PC3 review for the values of distribution and supply assets transferred to these companies. The Bureau will review the valuation of these assets as part of the PC3 review in 2005 for ADDC and AADC to determine whether such valuation is appropriate and/or whether additional information is required.

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2.3 Present Consultation Process for Future Economic Regulation

With distribution and supply activities of RASCO having merged with those of ADDC and AADC and thus covered by the second price controls (PC2) for ADDC and AADC starting from 1 January 2003, RASCO is left solely with electricity generation and water production activities.

To introduce a framework for the future economic regulation of RASCO from 2004 that covers electricity generation and water production, the Bureau commenced the present consultation process with the interested parties. **Table 2.2** below lists the major milestones of this process:

Table 2.2: 2003 RASCO Price Controls Review - Major Milestones	
14 May 2003	First Consultation Paper
21 June	ADDC's response to First Consultation Paper
21-22 June	Meetings between Bureau and ADDC/AADC on First Consultation Paper
23 June	Bureau's Initial Information Request
30 June	AADC's response to First Consultation Paper
8-9 July	ADWEA and ADDC's responses to Initial Information Request
21 July	Second Consultation Paper
23 July	Meeting between Bureau and ADDC to clarify data
23 July	ADWEC's response to Second Consultation Paper
26 July	Bureau's reply to responses to Initial Information Request
July	Meeting between Bureau and ADDC on Second Consultation Paper
13 September	TRANSCO's responses to Second Consultation Paper
21 September	Draft Proposals
October	Meetings between Bureau and ADWEA/ADDC on Draft Proposals
19 October	Bureau's Presentation on Draft Proposals to ADWEA, ADDC and AADC
4 November	ADDC's response to Draft Proposals and revised data submission
5 November	Meeting between Bureau and ADDC on revised data submission
8 November	Bureau's letter to ADDC/ADWEA on revised data submission
17 November	Final Proposals
1 January 2004	New price controls to take effect

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3 Future Economic Regulation of RASCO from 2004

3.1 Introduction

With the re-organization of its assets and activities, RASCO is left solely with electricity generation and water production activities. For each of these production activities, RASCO's "customer" will be the relevant distribution company, as the latter has inherited all responsibility for the relationship with the final customer.

This section focuses on fundamental aspects of framework for the economic regulation of electricity generation and water production activities of RASCO for 2004 onwards. The Final Proposals contained in this document are based on the assumption that standby generation would remain with RASCO. If standby generation assets are transferred to the distribution businesses of ADDC and AADC, the associated costs (prospective and retrospective back to the start of 2001) would need to be taken into account by the price controls for ADDC and AADC and be removed from the price controls for RASCO at the next price control review.

3.2 Type of Regulation

In line with the price controls for other monopoly companies in the sector and in view of the efficiency incentives provided by CPI-X regulation, the Draft Proposals were based on CPI-X regulation for RASCO's production activities for 2004 onwards.

As the Bureau has not received any comments against this proposal, the Final Proposals in this document are based on CPI-X regulation.

3.3 Form of Controls

CPI-X regulation can take the form of either a cap on unit price or a cap on revenue of the business. In line with the CPI-X revenue caps for other monopoly companies in the sector, it was proposed in earlier consultation papers and the Draft Proposals that the future controls for RASCO should take the form of CPI-X revenue cap. This form will automatically determine the maximum allowed revenue (MAR) of RASCO which should be collected in total by RASCO from ADDC and AADC for the water and electricity produced by RASCO for these companies.

In the absence of any objection, the Final Proposals in this document are therefore based on the revenue cap form of CPI-X regulation.

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3.4 Separation of Controls

As with other monopoly companies in the sector, the separation of price controls for electricity and water businesses of RASCO will ensure that separate economic costs and subsidies for water and electricity can be calculated. The Draft Proposals therefore suggested that there should be separate price controls (in the form of separate revenue caps) for electricity generation and water production for RASCO for 2004 onwards:

1. Electricity generation controls should cover the costs of all continuous, standby and mobile generation.
2. Water production controls should cover the costs of well water, associated desalinated water and seawater desalination.

Electricity generated for RASCO's own use in its water production facilities should be regarded as a cost attributable to RASCO's water business.

In the absence of any objection to the proposal, the Final Proposals set out in this document are based on two CPI-X revenue caps for RASCO, one for electricity generation and the other for water production.

3.5 Structure of Controls

MAR Formula for RASCO

The costs for RASCO for any year may be expected to vary with the level of demand or output. To reflect this and in line with price controls of other monopoly businesses, RASCO's revenue formulae were suggested in the Draft Proposals to include a fixed revenue component, a variable revenue component and a separate term for fuel costs.

ADDC in its response to the Draft Proposals suggested a three-term revenue formula with two variable revenue components for RASCO's water business. However, as discussed below, the Bureau has retained the structure of price controls as proposed in the Draft Proposals. That is, the maximum allowed revenue (MAR) for electricity or water production business of RASCO in any year "t" can be calculated from the following formula:

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

Where:

- Revenue Driver_t is the actual value of the relevant revenue driver (i.e. electricity generation capacity or water annual production – discussed further below) for the year "t". This value will be subject to an audit as per a new licence requirement, similar to the licences of the other price-

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controlled companies in the sector. Such an audit will also include confirmation that the reported electricity generation capacity was required to meet the demand or security of supply requirements, as further discussed later in this section and Section 4.

- a_t is a fixed term (expressed in AED) and b_t (expressed in AED/kW for electricity or AED/TIG for water) is the co-efficient of the revenue driver, for the year “t”. a_t , and b_t would be determined by the Bureau for the first year “t” for the control period (i.e. 2004) as part of this consultation process and would be adjusted by CPI-X factor for the following year “t+1” (i.e. 2005) using the following formula:

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

(similar formula for ‘b’)

(where CPI_t is the UAE CPI published by the UAE Ministry of Planning for the year “t”)

- ‘ F_t ’ is the fuel cost which RASCO is allowed to recover during the year “t”.
- ‘ K_t ’ is the correction factor adjusting any over or under-recovery of revenue in the preceding year “t-1” along with an interest rate.

In the Draft Proposals, the Bureau suggested that for the first year of control period “t” (i.e. 2004), K_t should be set to zero. ADDC in its response to the Draft Proposals indicated that there may be significant under-recovery of revenue/costs for RASCO in the past as some production facilities were not subject to specific tariffs and subsidy for them might have not been worked out. The Bureau’s view on this issue is that the k factor for the new price controls should have fresh start (i.e. K for 2004 should be zero) to avoid unnecessary complications with the implementation of the new price controls, with audit of price control returns in the future due to links with the past over or under recoveries or audit of past accounts. The Bureau will consider the matter at next price control review and may make appropriate adjustment to the future price controls for over or under- recoveries of revenue during 1999-2003.

Revenue Drivers for RASCO

The Second Consultation Paper discussed a number of possible revenue drivers for RASCO. At that time, installed production capacity (MW or MGD) emerged as the most appropriate revenue driver for RASCO’s price controls.

However, as mentioned in the Second Consultation Paper, the use of installed capacity as the revenue driver may provide wrong incentives to RASCO whereby

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it can increase its MAR by inefficient capacity planning (i.e., by installing additional production capacity which is not required to meet demand and/or by not retiring existing production capacity which is no longer required to meet the demand). To address this concern, the Bureau in the Draft Proposals proposed an appropriate definition of electricity generation capacity, including the requirement for an auditor's opinion on whether a generation capacity is required or not to meet the demand. However, ADDC in its response to the Draft Proposals expressed concerns that this definition might unintentionally exclude standby generation installed to improve security of supply.

Therefore, while the Bureau in these Final Proposals has retained electricity generation capacity as the only revenue driver for RASCO electricity business, on further consideration and discussion with ADDC the definition of this revenue driver has been revised to provide that such a capacity may be required to meet the demand or *security of supply requirement* (which is usually the reason for most standby generation).

In the case of the water production business, the Draft Proposals used annual water production as the revenue driver since there is no such accurate measure as rated or installed capacity for water well-fields and water production seems to be more cost-reflective of the activity. ADDC in its response to the Draft Proposals considered the installed capacity as the most appropriate driver for water desalination business and hence suggested two revenue drivers for RASCO's water business: annual production from wellfields and installed capacity of distillers. However, as the past or future projections of installed capacity for distillers have not been available to the Bureau as per the information request, the Bureau could not agree to ADDC's suggestion.

In view of the above, the Final Proposals are based on electricity generation capacity and water annual production as the revenue drivers as defined in Section 4 of this document.

Treatment of Fuel Costs

The earlier consultation papers did not support the idea that the fuel costs should be considered as pass-through costs on an actual basis since this would provide no incentive for RASCO to maintain or improve fuel consumption efficiency.

In the Draft Proposals, the Bureau therefore proposed to allow only a portion ($W_A = 90\%$) of actual fuel costs of RASCO each year and to benchmark the remaining portion ($W_B = 10\%$) of fuel costs against a reference fuel cost. That is, the allowed fuel cost for any year 't' of the control period (2004-2005) should be calculated by using the following formula, separately for water and electricity:

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

Where:

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

Z_t = Quantity of electricity or water produced in year t (kWh or TIG)

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

W_A = Weight of the actual fuel costs of RASCO in year 't' in the allowed fuel costs. This weight will be the same for both years 2004 and 2005.

W_B = Weight of the allowed fuel costs for RASCO in year 't' which should be based on the BST unit fuel cost benchmark. This weight will be the same for both years 2004 and 2005.

This formula allows RASCO to recover a majority of its actual fuel costs and the remaining fuel costs are based on the benchmark fuel unit costs. This provides RASCO with the incentive to improve its fuel consumption efficiency and earn additional revenue (lose revenue) if it reduces (maintains) its unit fuel cost below (above) the benchmarks.

The above formula requires the Bureau to establish the values of the weights W_A and W_B and the benchmark unit fuel cost (BUF), separately for electricity generation and water production businesses of RASCO.

The Final Proposals contained in this document are based on the same approach for allowed fuel costs as described in the Draft Proposals and summarized above. However, in response to the concerns expressed by ADWEA, ADDC and AADC in discussions, the respective weights (W_A and W_B) have been revised in these Final Proposals to 95% and 5% (from 90% and 10% in the Draft Proposals) and BUF has been doubled to 20 fils/kWh for electricity and to 8 AED/TIG for water (from 10 fils/kWh and 4 AED/TIG, respectively). These changes from the Draft Proposals make these Final Proposals more favourable to RASCO. These matters are further discussed in Section 8 of this paper.

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3.6 Duration of Controls

In view of the quality of data available on RASCO's operations, of the risks associated with long duration of controls, and of the regulatory burden on both the companies and the Bureau, it was proposed in earlier consultation papers and the Draft Proposals that the next price controls for RASCO should have a duration of two years (i.e. 2004-2005). If a two-year duration is adopted, the price controls of RASCO will next be reviewed as part of the 2005 price controls review at the same time as ADWEC, TRANSCO, ADDC and AADC.

No respondent objected to this and so the Final Proposals in this document are based on a duration of two years (2004-2005) for the price controls.

3.7 Bureau's Approach to Price Control Calculations

Objective

The Draft Proposals contained in this document are based on the following MAR formula described in the preceding sections with a control duration of two years (2004-2005):

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

Where:

Revenue Driver = **Electricity generation capacity** for RASCO's electricity business
 = **Water annual production** for RASCO's water business

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

(similar formula for 'b')

$$F_t = (W_A \times \text{AF}_t) + (W_B \times Z_t \times \text{BUF})$$

Setting the price controls means, for each of the two businesses of RASCO – electricity generation and water production - determining and notifying the values of:

- the co-efficients on the fixed term and the variable term in the MAR formula (i.e. 'a' and 'b');
- the 'X' factor; and
- the benchmark unit fuel cost ('BUF') and the weights W_A and W_B .

This section briefly describes the Bureau's approach to the above calculations.

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Determining values of 'a', 'b' and X

In essence, the values of 'a' and 'b' are determined by setting the MAR equal to the required revenue over the control period. (Fuel costs and Q term, which are treated separately, are excluded from this calculation and the correction factor is assumed to be zero.)

This requires two main steps:

- to determine the required revenue (excluding fuel costs) over the control period that would be sufficient to finance an efficient business; and
- to determine the MAR (excluding allowed fuel costs) over the control period from the above MAR formula in terms of 'a' and 'b' based on estimates of the revenue driver for each year of the control period.

All the above calculations are carried out in present value (PV) terms over the control period (2004-2005), and in real 2004 price terms, that is excluding the effect of inflation. That is,:

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

(in real terms, over the control period, excluding fuel costs)

The above calculation methodology applies to electricity and water businesses of RASCO separately. For a given value of X, and an assumed distribution of revenue between the fixed and variable elements in the MAR formula, solving the above equation gives the values of 'a' and 'b' for the first year of the control period (i.e. 2004).

Estimating annual MARs

The estimation of annual allowed revenue (excluding allowed fuel costs) therefore requires:

- setting an appropriate value of 'X' factor;
- making reasonable projections of the revenue driver, the electricity generation capacity or water annual production, for each year of the control period; and
- deciding the appropriate proportions of the allowed revenue which should be recovered from the fixed term 'a' and the variable term involving the revenue driver with co-efficient 'b'.

Section 4 of this document discusses how the projections of the revenue drivers, both for electricity and water, are derived from the data submissions

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for 2004 and 2005. For the Final Proposals set out in this document, the X factor has been set to zero for both the businesses and the weights of 65:35 are proposed for the split of allowed revenue (excluding allowed fuel costs) between fixed and variable components. These issues are discussed in Section 9 of this document.

Estimating annual required revenues

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

For each year:

Required Revenue = Operating Costs + Depreciation + Return on Assets

Or

Over the entire control period:

PV of Required Revenues = PV of Operating Costs + PV of Capital Expenditures

+ PV of Opening Asset Value – PV of Closing Asset Value

The two approaches may sound different, but on a given set of assumptions they give the same answer in PV terms over the control period. The first approach calculates the 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. The Bureau used the second approach to set both the first price controls (PC1) in 1999 and the second price controls (PC2) in 2002 for other monopoly companies in the sector and in the Draft Proposals for RASCO.

However, as the building block approach is more intuitive and is being increasingly used by regulators around the world, the Bureau has adopted this approach for calculating the required revenue in these Final Proposals. This will also increase the familiarity of the sector companies with the building block approach before its use at the PC3 review in 2005.

The building block approach of calculating the present value of the required revenue over the control period requires:

- projections of operating expenditures (opex) over the control period;
- projections of depreciation over the control period; and

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- projections of return on mid-year regulatory asset values (RAVs) which in turn requires projections of RAVs at the start of the control period, capital expenditure (capex) for each year of the period and annual depreciation; and
- a decision on the cost of capital which can be used as the rate of return for the preceding step and as the discount rate to calculate present values (PVs).

Sections 5, 6 and 7 of this document describe the Bureau’s assessment of opex projections, capex projections (including asset valuation), and cost of capital, respectively.

Treatment of Fuel Cost

The above price control calculations exclude the allowed and actual fuel costs from the calculations of allowed and required revenues, respectively. This is because the proposed MAR formulae for RASCO treat the fuel costs separately. In essence, the proposed price control formulae for RASCO allows RASCO to recover a major proportion of its actual fuel costs with the remaining proportion based on a benchmark unit fuel cost which is considered achievable by RASCO. Fuel costs are discussed in Section 8 of this document in order to set the weights of actual and benchmark fuel costs, and the benchmark unit fuel costs (BUFs).

3.8 Customer Tariffs for RASCO’s Services

RASCO to recover all MAR from Distribution Companies

Under the present arrangement after the re-organization of RASCO, RASCO’s “customers” will be only the two distribution companies (ADDC and AADC).

Earlier consultation papers and the Draft Proposals indicated that MAR of RASCO would be considered as pass-through costs of water and electricity purchases under the price controls for ADDC and AADC and hence will contribute to the determination of the subsidy requirements for ADDC and AADC and thus the entire sector. No subsidy will then need to be provided to RASCO separately. RASCO will therefore be regulated like ADWEC or TRANSCO which also do not receive any direct subsidy from the government.

However, according to the present management contracts signed between the distribution companies and RASCO, the distribution companies will be purchasing electricity and water from RASCO at BST rates. If this arrangement continues to be adopted from 2004 onwards, RASCO is not expected to cover all its MAR from its revenue from ADDC and AADC.

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It was therefore proposed that the management contracts should be amended for 2004 onwards to allow electricity and water purchases from RASCO at such tariffs through which RASCO can recover its MAR fully. This would eliminate the need to provide any subsidy to RASCO and hence simplify the annual audit of sector subsidy requirements.

Structure of RASCO Tariffs for Distribution Companies

The above proposal to allow RASCO to fully recover its MAR from ADDC and AADC without any subsidy requirement raises the question of how recovery of RASCO’s MAR should be split between ADDC and AADC. That is, what should be the basis of RASCO’s selling prices for the provision of water and electricity to ADDC and AADC.

In the Draft Proposals, the Bureau proposed that RASCO’s MAR should be apportioned between ADDC and AADC on the basis of the same revenue drivers as used in the price controls. In other words, RASCO’s selling price for electricity to the distribution companies should be expressed in AED/MW and determined by dividing RASCO’s electricity MAR by RASCO’s total installed electricity generation capacity (MW).

On further consideration and discussion with ADDC, the Bureau now proposes the structure of RASCO’s tariffs for distribution companies as follows (electricity and water tariffs to be worked out separately):

- RASCO’s MAR (including allowed fuel costs) may first be split into fixed and variable tariff components (say, 50:50), separately for water and electricity businesses.
- The fixed tariff component (in AED million) be broken down between ADDC and AADC based on the forecasts of RASCO’s electricity or water production capacities in their respective systems.
- The variable tariff component (in AED million) be first expressed in tariff per unit of revenue driver (i.e. AED /kW for electricity or AED /TIG for water) based on the forecasts of respective revenue driver.
- The variable tariff component per unit will then be invoiced to ADDC and AADC based on the actual values of revenue drivers (actual installed capacity for electricity business and actual annual production for water business) in the respective distribution systems.

The above proposal of fixed and variable tariff components aims at avoiding a situation where only one distribution company unnecessarily has to pay all or most of RASCO’s MAR because the actual capacity or output reduces significantly for the other distribution company.

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Bureau's Estimated RASCO Tariffs for Distribution Companies

Based on the above proposed structure and on certain assumptions, the Bureau has attempted to calculate the RASCO's tariffs for sale of water and electricity to ADDC and AADC in 2004 and 2005 using the MARs estimated in these Final Proposals. **Appendix A** to this document presents the Bureau's calculations and **Tables 3.1** and **3.2** below summarises the main assumptions and results of these calculations:

Table 3.1: Estimated RASCO Tariffs for ADDC and AADC – Electricity			
		2004	2005
Total MAR including fuel costs	AED m	88.80	89.83
Fixed Charge – 50% of MAR	AED m	44.40	44.92
Variable Charge – 50% of MAR	AED m	44.40	44.92
Variable Charge	AED / kW	163.58	156.02
Fixed Charge to ADDC – assuming 70% of total capacity in ADDC system	AED m	31.08	31.44
Fixed Charge to AADC – assuming 30% of total capacity in AADC system	AED m	13.32	13.47
Variable Charge to ADDC – assuming certain actual capacity in ADDC system	AED m	31.08	31.44
Variable Charge to AADC – assuming certain actual capacity in AADC system	AED m	13.32	13.47
Total Revenue from ADDC	AED m	62.16	62.88
Total Revenue from AADC	AED m	26.64	26.95

Table 3.2: Estimated RASCO Tariffs for ADDC and AADC – Water			
		2004	2005
Total MAR including fuel costs	AED m	171.99	169.40
Fixed Charge – 50% of MAR	AED m	85.99	84.70
Variable Charge – 50% of MAR	AED m	85.99	84.70
Variable Charge	AED / TIG	7.61	7.96
Fixed Charge to ADDC – assuming 40% of total capacity in ADDC system	AED m	34.40	33.88
Fixed Charge to AADC – assuming 60% of total capacity in AADC system	AED m	51.60	50.82
Variable Charge to ADDC – assuming certain actual production in ADDC system	AED m	34.40	33.88
Variable Charge to AADC – assuming certain actual production in AADC system	AED m	51.60	50.82
Total Revenue from ADDC	AED m	68.79	67.76
Total Revenue from AADC	AED m	103.19	101.64

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In the above tables, the figures shown in **bold** are for those charges (variable charge in AED/kW, fixed charge to ADDC and fixed charge to AADC) that RASCO should calculate and notify the two distribution companies in advance of the year.

The above estimates indicate that ADDC would be paying about 70% of RASCO's electricity MAR and 40% of RASCO's water MAR during 2004-2005. Accordingly, AADC would be paying 30% and 60% of RASCO's electricity and water MARs respectively during the same period. However, note that the above calculations are based on certain assumptions of installed capacities and water production and are in 2004 price terms. In practice, actual values for installed electricity and water capacities and water annual production in the respective systems of ADDC and AADC would be required for implementation of the above structure in 2004-2005, in addition to any revised MAR due to adjustment for inflation and/or revised revenue driver projections.

The Bureau intends to take up the above matter with the relevant parties in due course, separately from the price controls for RASCO which is the subject of this document.

3.9 Licence Modification for Future Economic Regulation of RASCO

The licences of ADWEC, TRANSCO, ADDC and AADC have charge restriction conditions schedules which define the price controls set by the Bureau for these companies from time to time. However, RASCO's licence presently does not contain such a charge restriction conditions schedule. As indicated in the earlier consultation papers, alongside the publication of this document the Bureau has proposed a draft modification to RASCO's licence for ADWEA/RASCO's consideration to include a charge restriction conditions schedule along with a few other related changes to the licence. This modification, when accepted by RASCO, will be issued to give effect to the Bureau's Final Proposals on price controls for RASCO contained in this document. The letter issued to ADWEA/RASCO and copied to other relevant parties, enclosing the draft modification, explains in some detail the main features of the draft modification.

In brief, the above charge restriction schedule for RASCO will contain, for each of the two businesses of RASCO (i.e. electricity generation and water production):

- The MAR formulae;
- The formulae for allowed fuel costs;
- The values of "a" and "b" for 2004;

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- The value of “X” factor;
- The formulae to index values of “a” and “b” to CPI-X;
- The values of W_A , W_B and BUF;
- The formula to calculate “K” factor along with specified interest rates for over and under-recoveries of allowed revenue in a year;
- The definitions of terms used in the above formulae, including the revenue drivers;
- The requirements for RASCO to submit audited Price Control Return (PCR) for a year by 31 March of the following year; and
- Restrictions on the variation of MAR as a result of significant over or under-recovery in the preceding year.

In addition, the proposed licence modification will add definitions of two new terms “electricity generation business” and “water production business” and amend the existing definition of “separate businesses”. The objective of these changes is to require RASCO to submit separate audited accounts for its water and electricity production businesses.

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4 Revenue Driver Assumptions

4.1 The Need for Revenue Driver Assumptions

The Final Proposals have continued with the suggestion set out in the Draft Proposals to have “electricity generation capacity” and “water annual production” as the revenue driver for electricity generation and water production businesses of RASCO. As mentioned in Section 3.5, ADDC suggested two revenue drivers (well water production and desalination capacity) for water business. However, due to unavailability of the requisite data, the Bureau has not been able to consider this suggestion.

As explained in Section 3.7 above, the values of ‘a’, ‘b’ and ‘X’ for each RASCO’s two businesses have been calculated by setting the total allowed revenue (excluding allowed fuel costs) equal, in present value terms, to the total required revenue (excluding fuel costs) over the control period. Given the proposed structure of the price control formulae for RASCO (being based on ‘revenue drivers’), the calculation of the maximum allowed revenue at the time of setting the price controls requires reasonable assumptions of revenue driver data for each year of the control period.

As the Draft Proposals explained, the levels of revenue driver assumptions have serious implications for the accuracy of the price controls and for their implementation (can result in unreasonably lower or higher revenue to the disadvantage of the company or its customers), and therefore require careful consideration. Similarly, 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.

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 definitions of the two proposed revenue drivers for RASCO’s price controls are presented in **Table 4.1**. These definitions would be incorporated into RASCO’s licence through the proposed licence modification as mentioned in Section 3.9 of this document. In the definitions, the term “Licensee” therefore refers to RASCO.

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Table 4.1 Definitions of RASCO’s Revenue Drivers

Revenue Driver	Proposed Definition
Electricity Generation Capacity	The aggregate electricity generation capacity (expressed in kilowatts) owned by the Licensee <u>as of 31 December of a relevant year t</u> (a) as measured or reasonably estimated net of auxiliary or internal consumption of the generation facility, (b) whether used on standby, emergency or continuous basis, (c) whether connected to the electricity distribution or transmission systems of a licensed distribution or transmission operator or connected directly to one or more customers of such operator, and (d) which is required to meet the demand <u>or security of supply requirements</u> .
Water Annual Production	The aggregate amount of water (expressed in thousand imperial gallons per year) produced by the Licensee in relevant year t (a) as measured or reasonably estimated net of auxiliary or internal consumption of the production facility, (b) whether produced from desalination units or ground water wells (in each case, owned by the Licensee), and (c) whether the production facility is connected to the water distribution or transmission systems of a licensed distribution or transmission operator or connected directly to one or more customers of such operator.

The above definitions are the same as set out in the Draft Proposals (which explains in detail various important features of these definitions), except for the following two changes in relation to the definition of “electricity generation capacity”:

- The definition of the electricity generation capacity now clearly states that such capacity has to be measured or estimated at the end of the relevant year. This is required to clearly specify the precise time during the year when the actual value of the capacity-related revenue driver should be assessed for the purposes of price controls. This is also consistent with the capacity projections submitted by ADWEA and ADDC which the Bureau understands have been made as of 31 December of each year.
- The definition now allows this revenue driver to take into account such generation capacity which is required for the purposes of security of supply to customers. In the Draft Proposals, only such capacity was proposed to be allowed which is required to meet the demand. In discussion with the Bureau, ADDC considered that the definition in the

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Draft Proposals will not allow consideration of most of the standby generation in the revenue driver, since such generation is not required to meet the demand per se. This concern has also been raised by ADDC in its written response to the Draft Proposals.

As mentioned in the Draft Proposals, there are certain specific terms in the above proposed definitions of revenue drivers which are not presently defined in RASCO's licence. These terms include 'relevant year', 'relevant year t', 'electricity transmission system' of TRANSCO, 'water transmission system' of TRANSCO, 'electricity distribution system' of ADDC/AADC and 'water distribution system' of ADDC/AADC. Accordingly, the proposed modification to RASCO's licence as mentioned in Section 3.9 of this document includes appropriate definitions of these terms in the charge restriction schedule.

Further discussion of the above definitions of the revenue drivers can be found in the Draft Proposals.

One important aspect of the revenue drivers is worth reiterating here. As at present applied to other monopoly companies in the sector, annual revenue driver data of RASCO will require to be audited as part of the Price Control Return (PCR) to be submitted by RASCO to the Bureau by 31 March each year. This requirement to submit audited PCR along with definitions of the revenue drivers and price control formulae will be incorporated into RASCO's licence through the licence modification suggested in Section 3.9 above.

4.3 Electricity Generation Capacity Assumptions

In the Draft Proposals, the Bureau made revenue driver projections based on the revenue driver data provided by ADWEA and ADDC as part of their data submissions to the Bureau on 8-9 July 2003. Since the total installed generation capacity of RASCO for 2004-2005 was not available, the Bureau projected generation capacities for these years by applying to 2003 total generation capacity of 268.69 MW (as provided by ADWEA) the growth rates implied by generation capacity forecasts in ADDC system i.e. 1.02% and 6.06%. As shown in **Table 4.2** below, the assumptions for electricity generation capacity over the control period remain the same in the Final Proposals as they were in the Draft Proposals as no new data has been submitted to the Bureau after the publication of the Draft Proposals.

MW	2004	2005
Draft Proposals	271.43	287.88
Final Proposals	271.43	287.88

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As noted in the Draft Proposals, the forecast electricity generation capacity of 287.88 MW in 2005 exceeds the maximum installed capacity of 286 MW authorized by RASCO's licence. If the actual installed capacity, as per the forecast, exceeds the licence limit of 286 MW, RASCO's licence will need modification.

4.4 Water Annual Production Assumptions

In the Draft Proposals, the Bureau based its projections for water annual production for 2004-2005 on the data available to the Bureau from the two distribution companies separately from the data submissions of 8-9 July 2003 as the latter did not include the water production in AADC system. In driving the forecasts for 2004 and 2005, the 2002 water production from the data separately available to the Bureau was adjusted by the growth rates for 2003-2005 implied by ADDC's data submission (i.e. -0.8%, 0% and -5.88% for 2003, 2004 and 2005, respectively).

In the absence of any further data or explanation, the Final Proposals continue with the assumptions of the Draft Proposals, as shown in **Table 4.3** below:

Table 4.3: RASCO's Water Annual Production- Bureau's Assumptions		
MIG	2004	2005
Draft Proposals	11,302.00	10,637.18
Final Proposals	11,302.00	10,637.18

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5 Operating Expenditure Projections

5.1 The Overall Approach

The projections of operating expenditure are one of the main inputs to the price control calculations for RASCO, as explained in Section 3.7 of this document. The term “operating expenditure”, or “opex”, in this document refers to operating costs excluding depreciation and fuel costs; depreciation is discussed in Section 6 of this document together with capital expenditure, and fuel costs are treated separately and discussed in Section 8 of this document.

In order to ensure that RASCO is able to finance its businesses, the revenues allowed to be recovered under the price controls are set at an efficient level which is sufficient to finance the projected operating and capital costs for RASCO. In view of its statutory duty to ensure the operation and development of an efficient and economic water and electricity sector, the Bureau proposed in the Draft Proposals an approach to projecting future opex which pays due regard to the current levels of cost of RASCO, while at the same time providing strong incentives for efficiency improvement from this starting point. This approach is the same as adopted in setting the second price controls (PC2) in 2002 for other monopoly companies in the sector.

In essence, the approach requires the Bureau:

1. To set a **base level of opex** for the control period (2004-2005) based on the actual level of opex immediately prior to the control period (2003);
2. To increase the base level of opex to reflect increased costs associated with meeting **increases in demand**; and
3. To reduce the demand-adjusted level of opex to take account of the assumed **efficiency improvement** that can be achieved over the duration of the price controls.

ADDC in its response to the Draft Proposals has expressed concerns on the adjustments to the opex for effect of demand growth and assumed efficiency improvement. However, as discussed later in this section, the Final Proposals contained in this paper are based on the same approach to projecting operating expenditure as used in the Draft Proposals.

5.2 Base Level of Operating Expenditure

In the Draft Proposals, the Bureau analysed the 8-9 July 2003 data submissions of ADWEA, ADDC and AADC to set a base level of operating expenditure for 2004-2005. In view of certain discrepancies in ADWEA’s data submission compared to its understood-to-be source (i.e. data submissions of

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ADDC and AADC), the Bureau decided to rely on ADDC/AADC's data submissions for the purposes of setting base operating expenditure.

In accordance with the approach stated in Section 5.1 above, the Draft Proposals used opex for 2003 as the base level of opex for 2004-2005 for both electricity and water. Since the 2003 opex levels are in 2003 prices and the price control calculations require opex (and other cost projections) in 2004 prices, the Bureau applied appropriate adjustment to 2003 opex levels based on estimated UAE CPI based inflation for 2003 as shown in **Tables 5.1 and 5.2**.

On 4 November 2003, ADDC submitted revised financial information for RASCO. This revised data was significantly different from the earlier submissions of ADWEA, ADDC and AADC. For example, the revised data indicated an operating expenditure (excluding depreciation and fuel costs) of AED 51.59 million in 2003 for the electricity business and AED 65.71 million for the water business against AED 34.11 million and AED 103.19 million respectively shown in the earlier submissions (and used in the Draft Proposals).

Further, the revised information was mainly related to the Bureau's analysis to set the subsidy framework for the past (1999-2003) rather than to the new price controls for future (2004-2005) which is the subject of the Draft and Final Proposals.

This revised data was discussed between the Bureau and ADDC on 5 November but the meeting was unable to resolve a number of discrepancies between this revised data and the data previously submitted to the Bureau. Accordingly, the Bureau wrote to ADDC and ADWEA on 8 November stating that in the absence of receiving by 12 November an adequate explanation for these discrepancies, the Bureau will proceed on the Final Proposals with the previous data as used in the Draft Proposals, except for one change mentioned below:

The one change is as follows. ADDC in its 4 November comments on the Draft Proposals identified the mistreatment of certain water-related fuel costs in the earlier data submission. This issue was further discussed between the Bureau and ADDC on 5 November. According to ADDC, a fuel cost of about AED 12 million was previously erroneously included in the "other" operating expenditure for water production which has been corrected in the revised data submission. In the absence of any further explanation on this issue by 12 November, the Bureau proposed to reduce the base operating expenditure (excluding depreciation and fuel costs) allowance for 2004-2005 by AED 12 million in the Final Proposals.

As the Bureau has not received any explanation contrary to the above, the Final Proposals adopt the same base levels of opex for RASCO's electricity business as was used in the Draft Proposals and adjust the 2003 water opex

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downward by AED 12 million to exclude fuel costs. The resulting base levels of opex for the Final Proposals are presented in **Tables 5.1** and **5.2**:

Table 5.1: Base Level of Opex for 2004 (in 2004 prices) – Electricity	
Draft Proposals	
Base Level of Opex for 2004 in 2003 prices	34.11 AED million
UAE CPI Inflation for 2003 (forecast)	2.86%
Base Level of Opex for 2004 in 2004 prices	35.09 AED million
Final Proposals	
Base Level of Opex for 2004 in 2004 prices	35.09 AED million
Note: exclude depreciation and fuel costs	

Table 5.2: Base Level of Opex for 2004 (in 2004 prices) – Water	
Draft Proposals	
Base Level of Opex for 2004 in 2003 prices	103.19 AED million
UAE CPI Inflation for 2003 (forecast)	2.86%
Base Level of Opex for 2004 in 2004 prices	106.14 AED million
Final Proposals	
Previously reported Opex for 2003 in 2003 prices	103.19 AED million
Fuel costs erroneously included in previous opex data	12.00 AED million
Corrected Opex for 2003 in 2003 prices	91.19 AED million
Base Level of Opex for 2004 in 2003 prices	91.19 AED million
UAE CPI Inflation for 2003 (forecast)	2.86%
Base Level of Opex for 2004 in 2004 prices	93.80 AED million
Note: exclude depreciation and fuel costs	

ADDC in its response to the Draft Proposals identified that the proposed price controls have not made any provision for electricity charges for power taken from the network for use in desalination (no such charges have yet been established). The Bureau considers that any such costs should have been included in the data submissions by the companies. However, the Bureau has been told that presently there is no mechanism in place to bill RASCO for electricity supplied to the production facilities from the networks of the distribution companies. While this seems an issue which should be given immediate attention by the relevant parties, the Bureau is of the view that in the absence of any data on this cost the Bureau cannot make any provision for such costs in the Final Proposals. However, once such data is available, the Bureau will review the matter and consider compensating RASCO through future price controls. Such an adjustment would also reduce ADDC/AADC's subsidy requirements for the relevant period.

5.3 Effect of Demand Growth on Opex

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 but at the same

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time to take into account the fixed nature of many operating expenditures over the course of a year (or, in other words, the effect of economies of scale).

In the Draft Proposals, the Bureau therefore assumed that RASCO's opex will increase by 5 per cent for every 5 per cent increase in demand, i.e., 1% opex increase for every 1% increase in demand (installed electricity capacity or water output). This is a conservative and possibly generous assumption compared to that adopted in setting PC2 for other monopoly companies in the sector. In other words, this assumption for RASCO implies lower economies of scale for RASCO than other monopolies in the sector, in view of RASCO's decentralized assets spread over a wide area.

The average demand growth for RASCO was estimated in the Draft Proposals to be 1.77% a year for electricity and -1.31% a year for water. Therefore, following the assumption set out above, the Bureau expected the operating expenditure of RASCO for electricity to **increase by 1.77% per year** and for water to **decrease by 1.31% per year** during 2004-2005 due to demand growth alone.

ADDC in its response to the Draft Proposals considered that the above approach to adjusting opex for effect of demand growth will result in a reduction of opex at the rate of 1:1 to the relevant driver if demand growth is realized as forecast. Accordingly, ADDC suggested that the standard opex to demand growth ratio of 0.5:1 be maintained for RASCO.

The Bureau does not agree with the approach suggested by ADDC. In principle, the demand growth related adjustment to opex at 1:1 represents lower economies of scale for RASCO than 0.5:1. This is a conservative assumption for RASCO and anyway has a minor impact on the required revenue.

The Final Proposals are therefore based on the same approach as suggested in the Draft Proposals for 1:1 adjustment to base operating expenditure for demand growth.

5.4 Effect of Efficiency Improvement on Opex

It is also necessary to take account of the assumed efficiency improvement over the duration of the revised price control. In the Draft Proposals, the Bureau assumed an efficiency improvement of **5 per cent a year** for RASCO over the control period (2004-2005).

ADDC in its response to the Draft Proposals expressed concerns on the above assumption for efficiency improvement. While ADDC shared the Bureau's desire to see continuous improvements in efficiency, ADDC claimed that many efficiencies had already been achieved by merging the operation of RASCO into both ADDC and AADC. ADDC further stated that there is going to be an initial

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increase in the operating costs to meet the new framework and requirements that the new price controls raise. ADDC therefore suggested to assume no efficiency improvement for RASCO during 2004-2005.

The review of the RASCO's financial data available to the Bureau does not clearly show that the operating expenditures of RASCO have reduced following the restructuring of RASCO to support ADDC's claim that many efficiencies have already been realized by this restructuring. Further, the Bureau does not believe, and has not been provided with any data to demonstrate, that the new price controls as set out in the Draft Proposals or these Final Proposals will increase the operating costs of RASCO.

In view of the above, the assumed efficiency improvement of 5% p.a. has been retained in these Final Proposals.

5.5 Opex Projections

Tables 5.3 and **5.4** present, based on the above, the Bureau's proposed projections of operating expenditures for RASCO over the period 2004-2005 for electricity generation and water production, respectively. Clearly, the opex projections for electricity business in the Final Proposals are the same as for the Draft Proposals. However, water-related opex projections for the Final Proposals are lower than those of the Draft Proposals due to the downward adjustment of AED 12 million to the base opex to exclude fuel costs erroneously included in the previous data submissions. This reduced opex allowance tends to reduce the estimated MAR for water business, however this is more than offset by the increased RAVs as discussed in Section 6 of this document.

Table 5.3: Opex Projections for Electricity		
AED million in 2004 prices	2004	2005
Draft Proposals		
Base Level of Opex (AEDm)	35.09	33.95
Opex Adjustment for Demand Growth	+1.77%	+1.77%
Opex Adjustment for Efficiency Improvement	-5.00%	-5.00%
Net Opex Adjustment	-3.23%	-3.23%
Opex Projections (AEDm)	33.95	32.86
Final Proposals		
Opex Projections (AEDm)	33.95	32.86

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Table 5.4: Opex Projections for Water- Draft Proposals

AED million in 2004 prices	2004	2005
Draft Proposals		
Base Level of Opex (AEDm)	106.14	99.45
Opex Adjustment for Demand Growth	-1.31%	-1.31%
Opex Adjustment for Efficiency Improvement	-5.00%	-5.00%
Net Opex Adjustment	-6.31%	-6.31%
Opex Projections (AEDm)	99.45	93.17
Final Proposals		
Base Level of Opex (AEDm)	93.80	87.88
Opex Adjustment for Demand Growth	-1.31%	-1.31%
Opex Adjustment for Efficiency Improvement	-5.00%	-5.00%
Net Opex Adjustment	-6.31%	-6.31%
Opex Projections (AEDm)	87.88	82.34

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6 Capital Expenditure, Depreciation and Asset Valuation

6.1 The Overall Approach

Using the building-block approach explained in Section 3.7 of this document, the annual revenue requirement for each of the two businesses of RASCO can be calculated as follows:

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

This calculation over the control period requires the following:

- projections of depreciation over the control period; and
- projections of return on mid-year regulatory asset values (RAVs) which in turn requires projections of RAVs at the start of the control period, capital expenditure (capex) for each year of the period and annual depreciation; and

Asset valuations and capital expenditures are therefore important inputs to the calculation of required revenue for RASCO. This section focuses on the assessment of these inputs as follows:

- Based on the financial information available to the Bureau, the closing asset values for the two businesses of RASCO on 31 December 2003 is taken as the opening Regulatory Asset Values (RAVs) on 1 January 2004, without any adjustment. This is in contrast to the Draft Proposals which applied a downward adjustment of 50% to the accounting asset values on 31 December 2003 to establish opening RAVs for 2004 based on a benchmarking analysis.
- Similar to the Draft Proposals, projections are made for capital expenditures of RASCO for 2004-2005 by applying projected demand or output growth rates to the opening RAVs.
- Like the Draft Proposals, straight-line based depreciation with an average asset life of 20 years is assumed for both opening RAVs and new investment.
- The opening RAVs on 1 January 2004 are then rolled forward with the capital expenditures and depreciation for the relevant year (2004 or 2005) to establish the closing RAVs on 31 December 2004 (which are also the opening RAVs on 1 January 2005) and to establish the closing RAVs on 31 December 2005.

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6.2 Opening RAVs on 1 January 2004

Based on various data sources, the Draft Proposals established the opening accounting asset values on 1 January 2004 as **AED 150.55 million** for electricity generation and **AED 344.57 million** for water production (desalination and well-fields). ADDC's data submission of 4 November 2004 has again confirmed these values.

In the Draft Proposals, the Bureau presented the results of its benchmarking exercise which compared the RASCO asset values with other generators and distillers of a comparable nature around the world, based on asset value per unit of net capacity. These comparisons indicated that RASCO's production assets are over-valued against their comparators. The Bureau therefore proposed to apply a 50% downward adjustment to RASCO's accounting asset values on 1 January 2004 to derive the RAVs on 1 January 2004, giving the results shown in **Table 6.1** below:

Table 6.1: RASCO's Opening RAVs on 1 January 2004 – Draft Proposals	
RASCO Business	Opening RAVs for 2004 (AED million)
Electricity Generation	75.275
Water Production	172.285

However, subsequent to the Draft Proposals, ADWEA in a meeting identified to the Bureau an error in the RASCO asset value calculations. Correction of this error has changed the benchmarking results significantly. With the correction, the RASCO production asset values have not been found to be overstated against their comparators, probably because of their age. The Bureau has therefore decided not to apply any adjustment to the accounting asset values of the RASCO to drive the opening RAVs for 2004. Hence, for these Final Proposals, the opening RAVs for 2004 are as presented in **Table 6.2** below:

Table 6.2: RASCO's Opening RAVs on 1 January 2004 – Final Proposals	
RASCO Business	Opening RAVs for 2004 (AED million)
Electricity Generation	150.550
Water Production	344.570

This increase in RAVs from the Draft Proposals has alone increased the annual MAR for electricity by about AED 8 million and for water by AED 18 million, or in total by over AED 26 million, for both the years 2004 and 2005. This indicates an increase of MAR (excluding allowed fuel costs) for electricity by about 20% and for water by 16% from the Draft Proposals. Alternatively, this implies an increase in MAR (including allowed fuel costs) for both electricity

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and water businesses by about 10% each year. However, for the water business, these MAR increases due to increased RAVs have been offset to some extent by the reduced allowance for operating expenditure as discussed in Section 5.2 of this document.

6.3 Capital Expenditure Projections

No data on capital expenditures for any year of the past and future has been provided by ADWEA, ADDC and AADC in their data submissions on RASCO before or after the Draft Proposals.

The issues and options related to the levels and treatment of capital expenditure in the price controls are discussed in the Draft Proposals in some detail. In view of that discussion, the Bureau assumed zero capital expenditure for new assets during 2004 and 2005 in relation to water business consistent with no forecast growth in water production capacity or output. However, the Bureau allowed an annual capital expenditure for new assets of electricity business equal to 3.54 per cent of the electricity-related opening RAV for 2004, consistent with the 3.54 per cent growth in electricity generation capacity forecast for 2004-2005. Any investment to replace the existing assets of RASCO to meet the demand can be financed from the depreciation of existing assets.

The Bureau indicated in the Draft Proposals that it is open-minded on the issue of capital expenditure projections and will review any new data available at the time of publication of Final Proposals for RASCO and may revise its proposals accordingly. However, no data has been made available to the Bureau by any party on the capital expenditure. The Bureau has therefore decided to retain the same approach for capital expenditure allowance in the Final Proposals. With the opening RAVs for 2004 now increased in the Final Proposals (as discussed in the preceding section), the capital expenditure allowance for electricity (being 3.54% of opening RAV for 2004) has also doubled. The resulting capex allowances for the Final Proposals are set out in **Table 6.3** below, along with those proposed in the Draft Proposals:

Table 6.3: Capital Expenditure Allowances		
AED million in 2004 prices	2004	2005
Draft Proposals		
Electricity Generation	2.665	2.665
Water Production	0.000	0.000
Final Proposals		
Electricity Generation	5.329	5.329
Water Production	0.000	0.000

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In the Draft Proposals, the Bureau proposed allowances for capital expenditure without any further review or adjustment for the capital expenditure on actual or efficient basis at the next price control review. ADDC in response to the Draft Proposals while recognizing the uncertainties around the forecast of capital expenditure suggested a retrospective review and allowance at the next price control review in 2005 for any expenditure that is spent efficiently during 2004-2005 and is beyond what provided for in the 2004-2005 price controls. ADDC considered this in line with the approach utilized in setting the price controls for other monopoly businesses in the sector.

The Bureau however does not consider it appropriate to allow adjustment at the next review as suggested by ADDC as the Bureau does not expect to have accurate data on RASCO's capital expenditures for 2004-2005 available at the time of next review in 2005, in the light of the experience with other companies. Further, the Bureau does not expect introduction of significant new assets in RASCO assets given the forecast capacity and output growth over 2004-2005 and the growing networks of ADDC and AADC.

The Bureau is considering adopting a similar approach for other monopoly businesses through the PC3 price controls.

6.4 Depreciation

The Draft Proposals used a straight-line basis of depreciation and assumed an average asset life of 20 years for the calculation of depreciation of existing assets (RAVs) and new investment (capital expenditure projections). This was based on the consideration of depreciation policy adopted in RASCO's draft audited accounts for 1999-2000 (10-30 years) and first and second price controls for other monopoly companies (30 years) and of the typical average life of production assets (20-30 years). The Draft Proposals indicated that longer the asset life assumed for price controls, the lower would be the required revenue for RASCO.

ADWEA in a meeting expressed concerns on the 20-year life assumption. ADDC in response to the Draft Proposals also expressed similar concerns. Both argued that this assumption may not be prudent due to the uncertainties about the future of RASCO or its functions. ADDC suggested that the life of any new assets in RASCO should not be taken longer than 10 years for the purposes of price controls.

The Bureau is not convinced by the above suggestion for shorter asset life assumption. The price controls for RASCO, like any other company, is based on RASCO being a "going concern". It is for the owners of RASCO to undertake appropriate analysis and see whether it is economic or otherwise necessary to make new investment in RASCO and/or to take any decision on the future of

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RASCO keeping in view the asset life and any residual value or market value at a point of time.

The Final Proposals set out in this document are therefore based on the straight-line depreciation with the assumption of an average asset life of 20 years.

6.5 Projected RAVs for 2004-2005

Opening RAVs, capital expenditure allowances and depreciation policies discussed in the preceding sections can be used to make projections of annual depreciation and closing RAVs over the control period. As in the Draft Proposals, the closing RAV for any year can be calculated as follows:

- Add the new investment (capital expenditure) for that year to the opening RAV of that year; and
- Subtract from the result of the previous step the depreciation on the opening RAV on 1 January 2004 and the depreciation on the new investment to date in that year (assuming new investment is made in the mid of the year and hence accrues only half-year depreciation).

Based on the above steps, **Tables 6.4** and **6.5** below present the depreciation and opening and closing RAVs for the control period (2004-2005) which have been used in the Final Proposals in this document:

Table 6.4: Opening and Closing RAVs for 2004-2005 – Electricity Generation		
AED million in 2004 prices	2004	2005
Draft Proposals		
Opening RAV	75.275	74.109
Depreciation on Opening RAV (2004)	3.764	3.764
New Investment	2.665	2.665
Depreciation on New Investment to date	0.067	0.200
Closing RAV	74.109	72.810
Final Proposals		
Opening RAV	150.550	148.219
Depreciation on Opening RAV (2004)	7.528	7.528
New Investment	5.329	5.329
Depreciation on New Investment to date	0.133	0.400
Closing RAV	148.219	145.621

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Table 6.5: Opening and Closing RAVs for 2004-2005 – Water Production

AED million in 2004 prices	2004	2005
Draft Proposals		
Opening RAV	172.285	163.671
Depreciation on Opening RAV (2004)	8.614	8.614
New Investment	0.000	0.000
Depreciation on New Investment to date	0.000	0.000
Closing RAV	163.671	155.057
Final Proposals		
Opening RAV	344.570	327.342
Depreciation on Opening RAV (2004)	17.229	17.229
New Investment	0.000	0.000
Depreciation on New Investment to date	0.000	0.000
Closing RAV	327.342	310.113

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7 Cost of Capital

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. In the Draft Proposals, the Bureau proposed a real post-tax cost of capital of 6 per cent for RASCO. The same cost of capital was used for both the first price controls (PC1) and the second price controls (PC2) for other monopoly companies in the sector. This cost of capital has been calculated as the weighted average cost of capital (WACC), using techniques like Capital Asset Pricing Model (CAPM) and supplemented with available information regarding the cost of capital in the UAE, the UAE's sovereign debt ratings, and the financing of the IWPPs in Abu Dhabi. The figure of 6 per cent was consistent with the estimates of the cost of capital for similar businesses in other countries with similar regulatory regimes.

In its response to the Draft Proposals, ADDC argued for a higher cost of capital for RASCO than 6 per cent because of the nature of proposed price controls for RASCO and mainly because of the risks and uncertainties for the future of RASCO. ADDC considered that the risk for RASCO is higher than IWPPs who have contracts and than the network business of TRANSCO, ADDC and AADC who are "guaranteed" monopolies. ADDC suggested a cost of capital of 6.6 per cent in line with the higher estimate from the Bureau's earlier cost of capital calculations reproduced in the Draft Proposals.

In the Bureau's view the structure of the new price controls for RASCO is consistent with those for other monopoly companies in the sector. In these Final Proposals, potential risks for RASCO due to higher proportion of variable revenue driver term and lower benchmark unit fuel costs (BUFs) have been reduced significantly. Further, RASCO remains a monopoly for the production of water and electricity in the remote areas and hence comparable to other monopoly businesses in the sector. As far as the risks or uncertainties in respect of the future of RASCO are concerned, the Bureau considers that if there are any such risks, they are completely within the control of RASCO's owner (i.e. ADWEA) who is the direct beneficiary of the cost of capital and is expected to take into account the economic feasibility of RASCO, among other factors, while making any decision regarding the future of RASCO.

Furthermore, there is some evidence worldwide to suggest that the cost of capital for regulated monopolies has reduced since the 6% value was first adopted by the Bureau.

The Bureau therefore believes that a **cost of capital of 6 per cent** remains appropriate for RASCO. Accordingly, the Final Proposals for RASCO's price controls contained in this document are based on this estimate of the cost of capital.

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8 Treatment of Fuel Cost

8.1 Introduction

As discussed in detail in Section 3.5 of this document, the Final Proposals for RASCO's price controls for 2004-2005 are based on the following basic formula for its maximum allowed revenue (MAR):

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

Except for the allowed fuel costs (F), other components of the MAR are subject to CPI-X regulation and discussed in detail in other sections of this document and are dealt with in the price control calculations in Section 9.

The fuel costs make significant part of the total operating costs of RASCO. Earlier data submissions indicated that fuel costs could be up to 43% of the total operating costs of RASCO. Therefore a mechanism is required to incentivise RASCO to controls these costs. In line with the Draft Proposals, the Final Proposals suggest that the allowed fuel cost for any year 't' of the control period (2004-2005) should be calculated by using the following formula, separately for water and electricity:

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

Where:

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

Z_t = Quantity of electricity or water produced in year t (kWh or TIG) as precisely defined later in this Section 8.

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

W_A = Weight of the actual fuel costs of RASCO in year 't' in the allowed fuel costs. This weight will be the same for both years 2004 and 2005.

W_B = Weight of the allowed fuel costs for RASCO in year 't' which should be based on the BST unit fuel cost benchmark. This weight will be the same for both years 2004 and 2005.

This formula allows RASCO to recover a majority of its actual fuel costs and the remaining fuel costs are based on the benchmark fuel unit costs. This provides

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RASCO with the incentive to improve its fuel consumption efficiency and earn additional revenue (lose revenue) if it reduces (maintains) its unit fuel cost below (above) the benchmarks. The above formula requires the Bureau to establish the values of the weights W_A and W_B and the benchmark unit fuel cost (BUF), separately for electricity generation and water production businesses of RASCO.

Participants at the Bureau’s presentation of the Draft Proposals on 19 October expressed concerns on not allowing RASCO the full recovery of all fuel costs on actual basis and considered it a significant risk for RASCO. While they acknowledged that given its statutory duties the Bureau cannot allow a pass-through of fuel costs on actual basis, they argued that a higher proportion of actual fuel costs than proposed in the Draft Proposals (i.e. 90%) should be allowed and the benchmark unit fuel costs (BUFs) should be increased to make them more realistic and achievable and hence reduce the risks for RASCO. ADDC expressed similar concerns in its response of 4 November to the Draft Proposals.

As explained in Section 3.7 of this document, the Final Proposals set out in this document do not allow pass-through of all fuel costs and instead retain the formula proposed in the Draft Proposals and discussed above for the allowed fuel costs. However, in response to the concerns expressed by the respondents to the Draft Proposals, the Bureau has altered in the Final Proposals the values of the weights W_A and W_B and the benchmark unit fuel costs (BUFs) for both businesses of RASCO. The following sections describe how these weights and BUFs have been altered.

8.2 Setting Unit Fuel Cost Benchmark for Electricity

The data submissions on RASCO indicate that the average electricity related fuel unit cost for RASCO is in the range of **22 – 31 fils/kWh**. These unit costs are significantly higher (about 4 to 6 times) than the average BST unit fuel costs for any year and than any specific station in ADWEC’s system. The Draft Proposals explained such comparisons in detail. However, the Bureau recognize there can be various obvious reasons for such higher fuel costs for RASCO. In the Draft Proposals, the Bureau proposed **10.00 fils/kWh** as the unit fuel cost benchmark (BUF) for RASCO’s electricity price controls for 2004-2005. This was about twice the average BST unit fuel cost and was intended to make allowances for the different operating environment for RASCO compared to the networked generators.

As mentioned above, companies including ADDC have expressed concerns about the benchmark of 10 fils/kWh for RASCO. In its response to the Draft Proposals, ADDC provided specific comments on the proposed treatment of fuel costs and explained that unit fuel cost for RASCO is expected to increase as the networks of distribution companies grow and more and more continuous

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generators become standby. ADDC proposed a number of alternatives to set efficiency target for RASCO fuel costs based on RASCO's average cost or type of plant. However, data submissions have significant discrepancies in fuel costs providing no reliable data and do not provide sufficient details required for breakdown of data into types of generators. The Bureau has therefore not been able to accede to ADDC's suggestions which are similar to the third option identified in the Second Consultation Paper and the Draft Paper for treatment of RASCO's fuel costs.

However, in response to the above concerns on the benchmark, the Bureau has decided to double the BUF for RASCO's electricity business (i.e. to **20.00 fils/kWh**) for the Final Proposals.

Table 8.1: Benchmark Unit Fuel Cost (BUF) for RASCO's Electricity Business	
Draft Proposals	10.00 fils/kWh
Final Proposals	20.00 fils/kWh

8.3 Setting Unit Fuel Cost Benchmark for Water

Similar to electricity business, RASCO's average unit fuel cost for water is significantly higher than its comparators. The data submissions on RASCO indicate that the average water related fuel unit cost for RASCO is in the range of **11 – 13 AED/TIG**. The comparisons in the Draft Proposals indicated that these unit costs are higher (about 3 times) than the average BST unit fuel costs for any year and than any specific station in ADWEC's system. The Draft Proposals suggested **4.00 AED/TIG** as the unit fuel cost benchmark (BUF) for RASCO's electricity price controls for 2004-2005.

Participants at the Bureau's presentation of the Draft Proposals on 19 October expressed concerns about the benchmark of 4 AED/TIG for RASCO and considered it unrealistic for RASCO. In its response to the Draft Proposals, ADDC summarized the results of its internal analysis which shows that the most efficient gas-based plant of RASCO (at Jabel Dhana) has a unit fuel cost of 6.7 AED/TIG, whereas the most efficient non-gas based plant has a unit fuel cost of 39.6 AED/TIG. ADDC therefore suggested a significant increase in BUF.

In view of the above concerns and consistent with the proposal for electricity business, the Bureau has decided to double the BUF for RASCO's water business (i.e. to **8.00 AED/TIG**) for the Final Proposals.

Table 8.2: Benchmark Unit Fuel Cost (BUF) for RASCO's Water Business	
Draft Proposals	4.00 AED/TIG
Final Proposals	8.00 AED/TIG

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8.4 Defining Quantity Produced (Z_t)

As discussed in Sections 3.5 and 8.1 of this document, the allowed fuel cost for any year 't' of the control period (2004-2005) will be calculated by using the following formula, separately for water and electricity:

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

Where:

Z_t = Quantity of electricity or water produced in year t (kWh or TIG)

The Draft Proposals in line with the measurements of unit fuel cost benchmarks set out the proposed definitions for Z_s for electricity and water. For the Final Proposals, the Bureau has retained those definitions but with one change to Z for water in response to ADDC's comments on the Draft Proposals. The definition of Z for water in the Draft Proposals included all water produced from any source excluding well fields as the latter do not consume fuel to produce water. However, RASCO has a number of reverse osmosis (RO) distillers which also do not use any fuel such as gas or diesel and mainly use electricity as the input. Therefore, the Bureau has revised the definition of Z for water in the Final Proposals to exclude production from RO distillers as well. As a related issue, ADDC in its response to the Draft Proposals identified that the proposed price controls have not made any provision for electricity charges for power taken from the network for the use in desalination. This issue is discussed in Section 5.2 of this document.

The definitions of Z_s for these Final Proposals are as follows:

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

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

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8.5 Setting Weights for Actual and Benchmark Fuel Costs

The unit fuel costs for RASCO’s water and electricity are significantly higher than those of the distillers and generators selling water and electricity to ADWEC. This highlights the importance of establishing sufficient incentives for RASCO to manage its fuel consumption more efficiently and hence reduce its unit fuel costs. This in turn suggests that a significant proportion of allowed fuel cost should be based on benchmark unit fuel cost. Accordingly in the Draft Proposals, the Bureau proposed that, for both electricity and water businesses of RASCO, allowed fuel costs should be based on **90 per cent** of actual fuel costs and **10 per cent** of benchmark fuel costs. An example in the Draft Proposals indicated that these proportions meant that if electricity-related actual fuel costs in a year were AED 30 million, only AED 28 million would be allowed to be recovered through the price controls.

Participants at the Bureau’s presentation of the Draft Proposals in general and ADWEA in a meeting and ADDC in its response to the Draft Proposals in particular expressed concerns on the proportions of 90:10 as this will not allow RASCO to recover its full fuel costs even if it improves on its fuel consumption efficiency (unless it reduces its fuel costs to below the BUFs). They therefore suggested to increase the weight given to actual fuel costs.

In response to these concerns, the Bureau has now increased for these Final Proposals the proportion of actual fuel costs to **95 per cent** and that of benchmark fuel costs to **5 per cent**.

Table 8.3: Weights for Actual and Benchmark Fuel Costs – Water and Electricity		
Draft Proposals		
Weight for Actual Fuel Cost	W_A	0.90
Weight for BST Benchmark Fuel Cost	W_B	0.10
Final Proposals		
Weight for Actual Fuel Cost	W_A	0.95
Weight for BST Benchmark Fuel Cost	W_B	0.05

The implication of this revision can be seen using the same example adopted in the Draft Proposals. Let us say RASCO’s actual unit fuel cost for electricity in any year of the control period is 30 fils/kWh for a total net generation of 100 GWh in that year, implying the actual fuel costs for the year as AED 30 million. The allowed fuel cost using the revised benchmark and weights for electricity would be:

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

$$\begin{aligned}
&= (0.95 \times 30 \text{ AEDm}) + (0.05 \times 100\text{GWh} \times 20.00 \text{ fils/kWh}) \\
&= 28.5 \text{ AEDm} + 1 \text{ AEDm} \\
&= 29.5 \text{ AEDm}
\end{aligned}$$

That is, RASCO will be allowed a total fuel cost for that year (for electricity) of AED 29.5 million against its actual fuel cost of AED 30 million. Clearly, the revision of BUFs and weights in the Final Proposals reduce the risks for RASCO. However, the revised parameters provide strong incentives for RASCO to reduce its fuel costs, first to recover its actual fuel costs as much as possible by approaching the benchmarks and then to earn additional profits by going beyond the benchmarks.

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9 Price Control Calculations

9.1 The Overall Approach

As explained in Section 3.7 of this document, setting the price controls means determining the values of the fixed term (a), of the co-efficient of the variable term in the MAR formula (b), and of the 'X' factor for each business of RASCO.

To determine these values, the sum of the present values (PVs) of annual 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.

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

(in real terms, over the control period, excluding fuel costs)

All calculations are carried out in 2004 real price terms, that is excluding the effect of inflation. As discussed in the following sections, these calculations are also subject to constraints which are put on shares of different revenue terms to the total revenue.

The required revenue for any year of the control period has been calculated as follows:

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

This approach to the calculation of required revenue, known as “building-block” approach, is more intuitive and straightforward than the approach used in the Draft Proposals for RASCO and in setting price controls PC1 and PC2 for other monopoly companies in the sector. This approach requires projections of operating expenditures, depreciation and regulatory asset values (RAVs) over the price control period, which are discussed in detail in Sections 5 and 6 of this document. The rate of return applied on the mid-year RAVs to calculate the return on assets is the cost of capital discussed and set out in Section 7 of this document (i.e. 6%, real post-tax). This rate is also the discount rate used in the PV calculations.

The annual MARs are calculated from the following basic formulae, as set out in Section 3 of this paper:

$$\text{MAR}_t = a_t + (b_t \times \text{Electricity Generation Capacity}_t) + F_t + Q_t - K_t \quad (\text{for electricity})$$

$$\text{MAR}_t = a_t + (b_t \times \text{Water Annual Production}_t) + F_t + Q_t - K_t \quad (\text{for water})$$

The calculation of MARs for the purposes of this section are carried out excluding the fuel costs, which are separately discussed in Section 8 of this

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document. The projections of revenue drivers (generation capacity and water production) over the control period required to calculate MARs are presented in Section 4 of this document. Full results are reported in **Appendices B** and **C** for water electricity and water businesses, respectively.

9.2 Approach to Calibrating Price Controls

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 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 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 RASCO.

In the Draft Proposals for both electricity and water businesses, the Bureau assumed 50:50 weights for the two revenue terms (i.e. fixed term and variable terms) in the PV of total price-controlled revenue. Participants at the Bureau's presentation of the Draft Proposals showed some concerns on these proposed weights and suggested lower weight for variable revenue term to reduce the risks for RASCO. The Bureau has also given further thought to these weights particularly in view of the poor quality of the data on revenue drivers and concerns expressed by ADDC on the revenue driver for water in its response to the Draft Proposals. The Bureau has therefore revised in these Final Proposals these weights to 65:35. These weights are consistent with those assumed in the setting the second price controls (PC2) in 2002 for other monopoly companies in the sector covering the period 2003-2005.

Table 9.1: Weights of Terms in Revenue

Business	Revenue Term	Related Revenue Driver	Weight in Revenue	
			Draft Proposals	Final Proposals
Electricity Generation	First Term ('a')	Fixed Amount	50%	65%
	Second Term (involving 'b')	Electricity Generation Capacity	50%	35%
Water Production	First Term ('a')	Fixed Amount	50%	65%
	Second Term (involving 'b')	Water Annual Production	50%	35%

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As in the Draft Proposals, the Bureau has used Microsoft Excel for its price control calculations in the Final Proposals 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 9.1** and X of zero. These weights relate to the present value of total revenue over the control period and 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 Final Proposals for both businesses of RASCO in view of the following considerations:

- to avoid any confusion between the implied efficiency improvement (for 5 per cent a year – see Section 5 of this paper) 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 costs over the period).

The outputs of the solver run are the co-efficients of the two terms in the MAR formula (i.e. a and b). The Excel based price control calculation model also reports two financial indicators for each business, 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.

Once the values a and b are determined for the first year of the control period (i.e. 2004), they will automatically be adjusted by CPI-X for each subsequent year of the period (i.e. 2005), according to the following formula:

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

(similar formula for 'b')

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

9.3 Price Control Calculations

Appendices B and **C** to this paper present detailed calculations for final price controls of the two businesses of RASCO, as follows:

Appendix B: Final price control calculations for RASCO's electricity business

Appendix C: Final price control calculations for RASCO's water business

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To carry out all the price control calculations as discussed in Section 9.1 above, the Bureau has developed an Excel based simple spreadsheet model which is available from the Bureau on request. This model was described in the Draft Proposals in detail by a commentary on line-by-line basis.

While some of the inputs (e.g. operating expenditure allowance, RAVs, proportions of fixed and variable revenue terms) have changed from the Draft Proposals, the model itself remains the same. However, the model has been slightly modified to employ the “building-block” approach to calculate the required revenue. In the “Inputs” section of the model, the line 2 for “New Investment Allowance” has been replaced with the line 4 for “Mid-Year RAV”. In the section “Required Revenue Calculations” of the model, lines 12-15 have been revised to calculate required revenue from operating expenditure, depreciation and return on assets, rather than from operating and capital expenditures and change in RAV over the period.

Like the Draft Proposals, lines 26-27 show the implied annual profit and the implied return on the mid-year RAV. The lines 28-30 summarize the values of the fixed term ‘a’, co-efficient of variable revenue driver ‘b’ and the ‘X’ factor as set by the above calculations.

9.4 Final Proposals and Projected Allowed Revenues

The Bureau’s Final Proposals for the values of fixed revenue term ‘a’, co-efficient of variable revenue term ‘b’ and X factor for both the businesses of RASCO are summarized in **Tables 9.2** below, which also shows the Draft Proposals’ values for comparison. These proposals are the same as calculated in **Appendices B** and **C** to this paper and summarized in the preceding section. However, the values here are expressed in appropriate units for clearer understanding. The values given in **Table 9.2** (to the accuracy expressed therein) will be those used to calculate maximum allowed revenues when the new price controls are implemented.

Table 9.2: RASCO Price Controls 2004-2005			
Values for 2004			
	X	a	b
Draft Proposals			
Electricity Generation Business	0.00	20.82 AED m	74.50 AED/kW
Water Production Business	0.00	57.28 AED m	5.22 AED/TIG
Final Proposals			
Electricity Generation Business	0.00	32.57 AED m	62.76 AED/kW
Water Production Business	0.00	79.35 AED m	3.89 AED/TIG

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Table 9.3 presents the projected maximum allowed revenue (MAR), excluding allowed fuel costs, in respect of each business of RASCO and as a whole for RASCO for 2004-2005 based on the proposed values of 'a', 'b' and 'X' as set out above for the Final Proposals and the forecasts or assumptions for revenue drivers adopted in this paper. (Of course, actual revenue during 2004-2005 will be different due to different actual revenue driver data and the effect of inflation on values of 'a' and 'b'). MARs from the Draft Proposals are also shown in the table for comparison purposes only. The projected MARs are approximately 20-21% higher than the Draft Proposals for the electricity business and about 6-7% for the water business. These higher projected MARs are the result of higher RAVs allowed in the Final Proposals than the Draft Proposals. However, in the case of water business, the increasing effect of RAVs has to some extent offset by the reduced opex allowance (see Section 5.1 of this document for AED 12 million downward adjustment to base opex for water to exclude fuel costs erroneously included in the opex data submission).

Table 9.3: Projected Maximum Allowed Revenue for 2004-2005		
(AED million, 2004 prices)	2004	2005
Draft Proposals		
RASCO Electricity Generation Business	41.04	42.26
RASCO Water Production Business	116.25	112.78
RASCO – Total	157.29	155.04
Final Proposals		
RASCO Electricity Generation Business	49.60	50.63
RASCO Water Production Business	123.33	120.74
RASCO – Total	172.93	171.38

Note: Excludes fuel costs.

The Bureau is satisfied that the results of the price control calculations indicate reasonable levels of profitability for both businesses of RASCO in both years.

9.5 Analysis of the Draft Proposals

Estimated Total MAR (including Fuel Costs)

The Bureau has attempted to estimate total MARs including fuel costs for both the businesses of RASCO. For this purpose, the Bureau has made a number of assumptions for total production and actual fuel costs in 2004 and 2005 for the businesses, based on the data submissions, particularly the data for 2000 as it provides figures on a total basis for RASCO (i.e. production in ADDC and AADC systems) – data for other years appears to be related to RASCO only in the ADDC system. These assumptions and the resulting estimates of total MAR for the two businesses are presented in **Tables 9.4** and **9.5** below.

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These estimates are about 13% and 6% higher than those in the Draft Proposals for electricity and water businesses, respectively, reflecting the change in RAVs, and the weights and the BUFs for fuel costs.

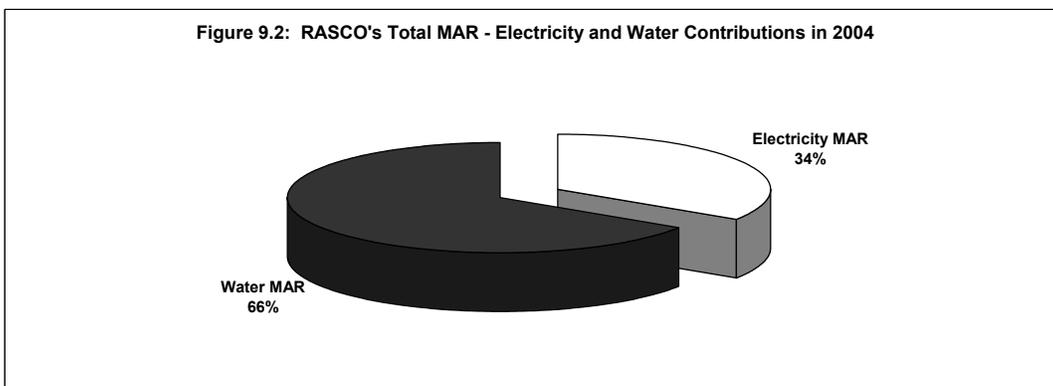
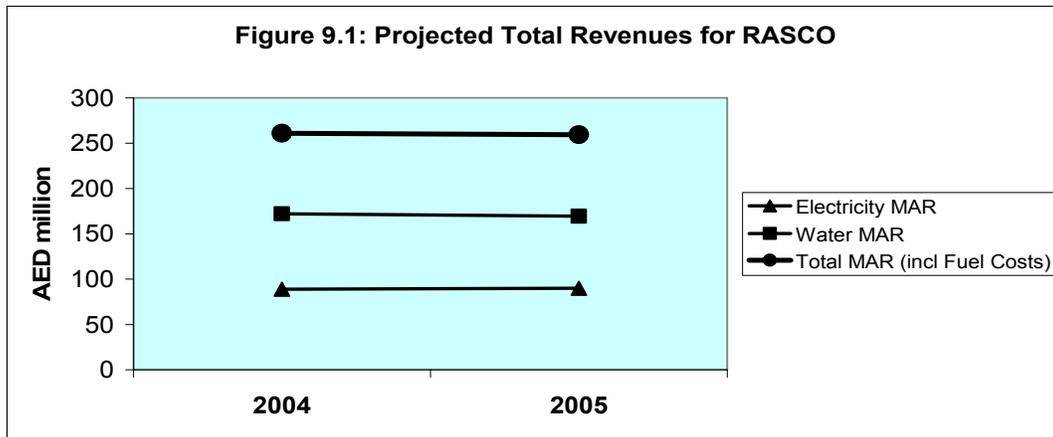
Table 9.4: Estimated Electricity MAR (including Fuel Costs) for 2004-2005		
(AED million, 2004 prices)	2004	2005
Assumptions		
Actual Fuel Costs	40.00	40.00
Total Units Produced (GWh)	120.00	120.00
Results based on BUF = 20.00 fils/kWh		
Allowed Fuel Cost	39.20	39.20
MAR excluding Fuel Cost	49.60	50.63
Total MAR	88.80	89.83

Table 9.5: Estimated Water MAR (including Fuel Costs) for 2004-2005		
(AED million, 2004 prices)	2004	2005
Assumptions		
Actual Fuel Costs	50.00	50.00
Units Produced from non-RO Distillers (MIG)	2,887.77	2,887.77
Results based on BUF = 8.00 AED/TIG		
Allowed Fuel Cost	48.66	48.66
MAR excluding Fuel Cost	123.33	120.74
Total MAR	171.99	169.40

Note that the estimated fuel costs, and hence estimated MAR including fuel costs, are *estimates* based on a number of assumptions and as such *do not* make a part of the price control calculations or the Final Proposals.

As shown in **Figure 9.1** below, the expected total revenue (including fuel costs) for RASCO from both businesses is estimated to be about **AED 259 – 261 million** during 2004-2005. Further, as **Figure 9.2** shows, water business contributes around two-thirds of the total revenue of RASCO. The above expected total revenues are higher by about AED 20 million or 8-9% than the total revenue of AED 239-241 million estimated in the Draft Proposals.

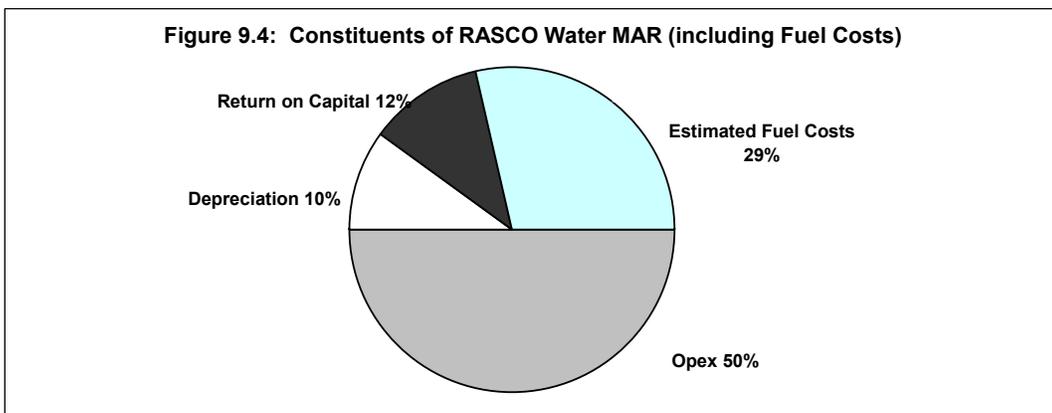
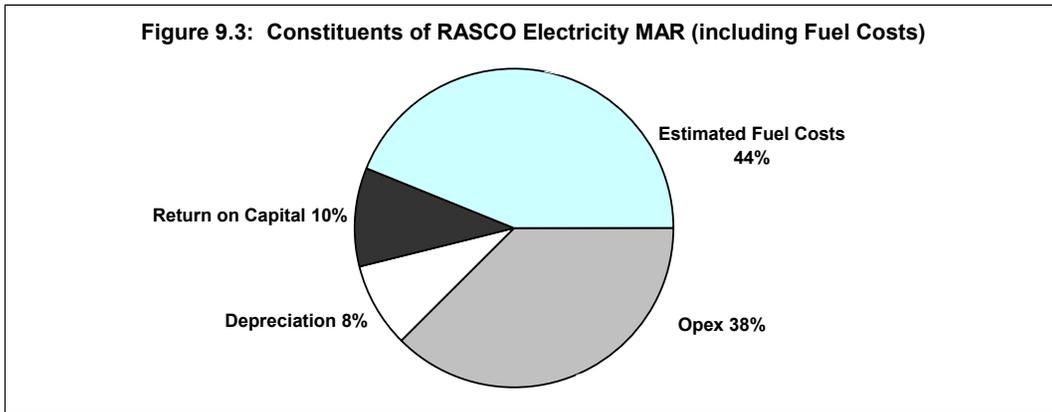
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Constituents of MAR (excluding Fuel Costs)

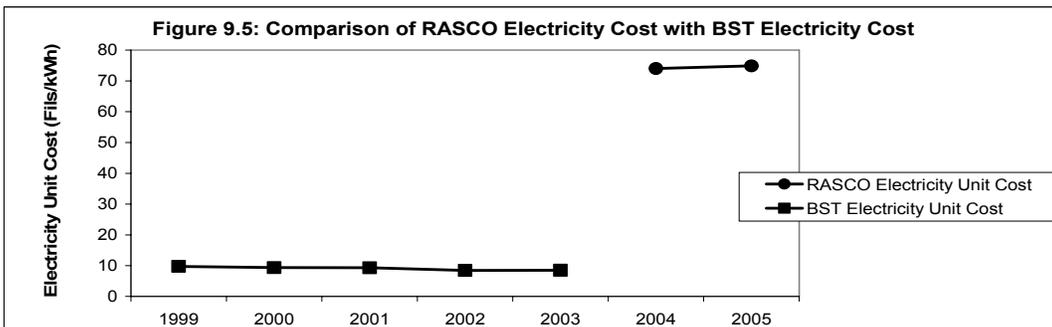
The “building block” approach of calculating the required revenue is quite intuitive and helpful in identifying the important constituents of the revenue (i.e. opex, depreciation and return on capital). Based on this calculation and the forecast of fuel costs presented above, **Figures 9.3** and **9.4** below present the percentage breakdown of total revenue into operating expenditure, depreciation, return on capital and fuel costs, for water and electricity businesses, respectively. Clearly, operating expenditure and fuel costs account for most of the allowed revenue – the former is significantly higher than fuel costs in the case of water business. The depreciation and return on capital contributes almost equally to the revenue for both businesses. In contrast to the Draft Proposals, the proportions of depreciation and return on capital to the required revenue have doubled due to the doubling of the opening RAVs.

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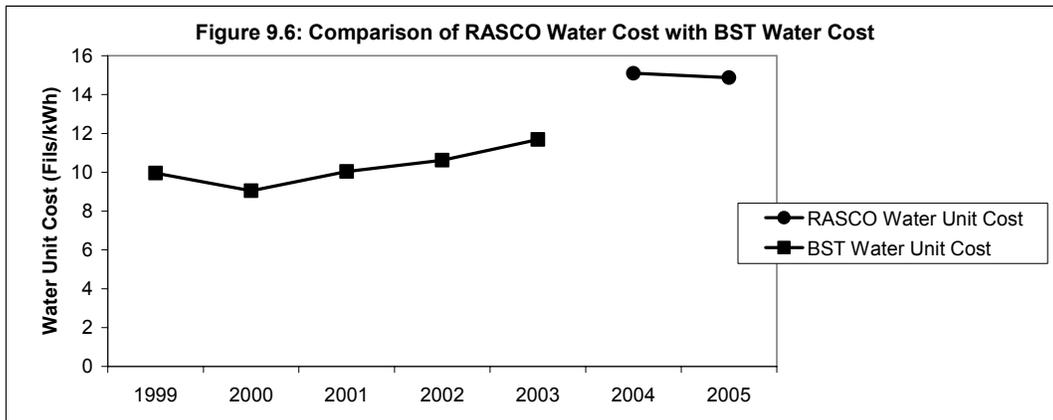


RASCO’s Unit Cost Comparison with BST

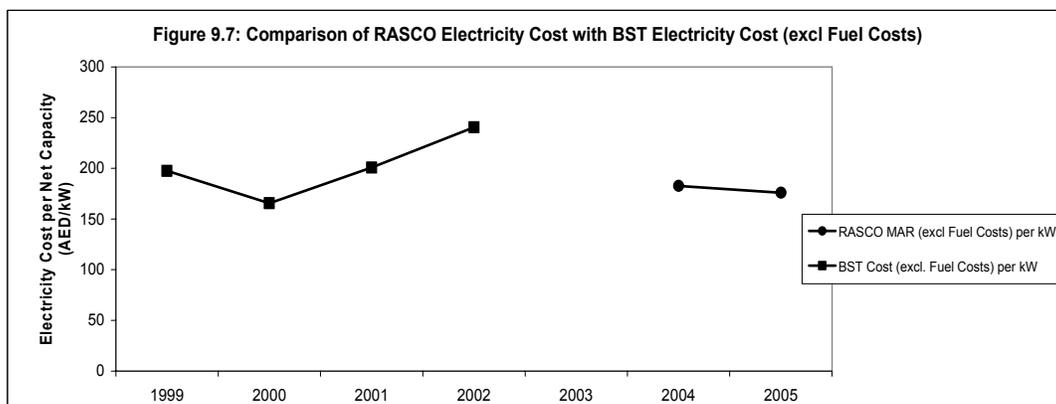
Based on the above estimated total MARs for the two businesses, **Figures 9.5** and **9.6** present comparisons of RASCO’s forecast unit costs against ADWEC’s BST unit costs for electricity (fils/kWh) and for water (AED/TIG), respectively. The figures show that RASCO’s allowed unit costs are forecast to be significantly higher than the BST unit costs - about 8 to 9 times in case of electricity and by 27% to 67% in case of water. Obviously due to the higher allowed revenue in the Final Proposals, these differences are higher than those implied in the Draft Proposals.



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However, a comparison based on units produced may not be fair to RASCO in the case of electricity since RASCO has significant standby generation which does not materially contribute to number of units produced in a year. A better comparison for electricity may therefore be based on costs (excluding fuel costs) per unit of net installed capacity. In such a comparison, costs associated with generation should not include fuel costs as the fuel costs will be dependent on the units produced which again raises the issue of relatively small production from standby generators. **Figure 9.7** presents such a comparison indicating RASCO's electricity MAR (excluding allowed fuel costs) per installed kW is generally comparable to ADWEC's BST electricity cost (excluding fuel costs) per installed kW. Note that such a comparison may still be not complete as it does not take into account the quality of service or performance of the plants – the Bureau understands that the plants in ADWEC system show very high availability.



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10 Performance Incentive Scheme

10.1 Introduction

In line with the Performance Incentive Scheme (PIS) for other companies in the sector, the Draft Proposals introduced a PIS for RASCO. Similar to those for other companies, the Bureau proposed two types of performance indicators for RASCO to be monitored to assess its performance:

- **“Category A”** performance indicators, which would be monitored and incentivised through mechanistic annual financial adjustment to RASCO’s MARs during 2004-2005; and
- **“Category B”** performance indicators, which would be kept under close monitoring during 2004-2005 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 2004-2005.

A term “Q” to adjust MAR upward or downward each year for improved or deteriorated performance of RASCO during the preceding year against the set targets for Category A indicators was proposed in the Draft Proposals:

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

In the absence of any objection, the Final Proposals retain the above PIS for RASCO. The following sections describe in some detail the PIS for RASCO.

10.2 Performance Indicators

Table 10.1 shows the Category A performance indicators for RASCO – same as proposed in the Draft Proposals. In essence, there are four Category A indicators in total: two for electricity generation business and two for water production business.

As far as the submission of audited accounts is concerned, RASCO is already required by its licence condition 11 to deliver audited accounts for a year to the Bureau by 30th June of the following year. RASCO has never complied with this condition and hence needs to be incentivised to do so.

All other monopoly companies in the sector are required under their charge restriction schedules of licences to deliver audited price control returns (PCRs) to the Bureau by 31st March each year showing their actual revenues for the preceding year against their MARs. As proposed in Section 3.9 of this document, RASCO’s licence will be amended to include a charge restriction schedule to incorporate the new price controls effective from 1st January 2004. This schedule will include, among others, a requirement for RASCO to deliver

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audited PCRs (separately for electricity and water businesses) for each year (2004 or 2005) to the Bureau by 31st March of the following year (2005 or 2006, respectively). In view of the experience showing lack of compliance with such requirements in the sector, this aspect of RASCO's performance is proposed to be included in Category A indicators under the proposed PIS.

Table 10.1: Category A Performance Indicators for RASCO

<i>Audited Electricity Accounts Timeliness</i>	Difference (measured in months) between the actual date and the target date for submission to the Bureau of audited accounts for electricity generation business for the preceding year.
<i>Audited Water Accounts Timeliness</i>	Difference (measured in months) between the actual date and the target date for submission to the Bureau of audited accounts for water production business for the preceding year.
<i>Audited Electricity Price Control Return (PCR) Timeliness</i>	Difference (measured in months) between the actual date and the target date for submission to the Bureau of audited PCR for electricity generation business for the preceding year.
<i>Audited Water Price Control Return (PCR) Timeliness</i>	Difference (measured in months) between the actual date and the target date for submission to the Bureau of audited PCR for water production business for the preceding year.

Table **10.2** below lists a number of Category B indicators for RASCO, performance against which will be precisely defined and monitored during 2004 and 2005 for a possible financial adjustment to revenue requirement at the 2005 price control review and for inclusion as Category A indicators at the next review.

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Table 10.2: Category B Performance Indicators for RASCO

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 by many companies in the sector.
Generation Availability	The ratio between (a) the generation capacity (MW) available times the duration (hours) for which such generation capacity was available during the year and (b) the total generation capacity installed (MW) times the total number of hours in the year (e.g. 365×24 hours).
Water Capacity Availability	The ratio between (a) the water production capacity (MGD) available times the duration (days) for which such production capacity was available during the year and (b) the total water production capacity installed (MGD) times the total number of days in the year (e.g. 365 days).
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 RASCO's Licence Condition 11)
Environmental Incidents	Number / impact of incidents affecting the environment
Safety Incidents	Number / impact of incidents affecting the health and safety of the employees/general public.

10.3 Regulatory Framework

The Final Proposals continue with the Draft Proposals on the following regulatory framework to implement the PIS for RASCO. This framework will be incorporated in RASCO's licence through the proposed charge restriction schedule related modification.

1. The performance in year t should be rewarded through an annual adjustment to the revenue in year t+1.
2. Incentives and penalties for any performance indicator on a monthly basis may be different but the total possible rewards and penalties would be same.

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3. For the purposes of PIS, glide-path target dates for submission of audited accounts and PCRs (more favourable to RASCO than the licence targets) would apply.
4. The total annual incentives and penalties should be capped at 5 per cent of the annual revenue. (This is higher than the 2 per cent cap for the PC2 controls for other monopoly companies in the sector as experience is showing that a 2 per cent cap is not providing an adequate incentive.)

10.4 “Q” Term in MAR Formula

As shown in section 10.1 above, RASCO’s MAR for any year “t” will be adjusted by a term “Q” upward or downward (i.e. Q can have a positive or negative value) each year based on RASCO’s performance on category A indicators in the preceding year.

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

$$Q_t = Q1_t + Q2_t$$

where

$Q1_t$ is the revenue adjustment in year t reflecting total reward or penalty for performance in year t-1 in respect of timeliness of submission of audited accounts for the relevant business to the Bureau against the target date; and

$Q2_t$ is the revenue adjustment in year t reflecting total reward or penalty for performance in year t-1 in respect of timeliness of submission of audited price control return (PCR) for the relevant business to the Bureau against the target date.

There will be separate Q terms for the separate water and electricity price controls of RASCO, representing the revenue adjustments for water and electricity business-related performance indicators. Performance indicators on timeliness of audited accounts and audited PCR for the water business will be reflected in the Q terms of water price controls and those for the electricity business in the Q terms of electricity price controls.

10.5 Targets for Performance Indicators

Table 10.3 below shows the glide-path target dates for Category A performance indicators for RASCO. These targets are the same as in the Draft Proposals and the same as those for ADWEC, TRANSCO, ADDC and AADC for the years in question (2004, 2005).

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Table 10.3: Targets for Category A Performance Indicators

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

10.6 Performance Incentive Rates

Applying the same approach as in the Draft Proposals, the Bureau has calculated the final incentive rates for Category A performance indicators for RASCO as follows:

- The maximum penalty or reward under the PIS has been calculated by applying 5% to the forecast MAR (including fuel costs) of each business of RASCO for 2004.
- The resulting amount has been equally apportioned to the two performance indicators in the PIS of the business concerned.
- The incentive rate for each indicator has been derived by dividing the relevant amount apportioned as above by the variance between target performance and hypothetical worst-case actual performance (i.e. 6 month delay beyond glide-path target date).
- The same incentive rates are then employed in 2004 and 2005.

See **Table 10.4** below for various intermediate and final results of the above calculations. The resulting incentive rates for all the performance indicators of RASCO (same for each year of the next control period) are presented in the last column of **Table 10.4**, which have been rounded to the nearest thousand Dirhams. The incentive rates for the timeliness indicators are the payments expressed in AED per month of delay. A slight different treatment is applied in 2004 and 2005 to calculate the reward or penalty, as explained in Section 10.7

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of this document. For the purpose of this Scheme, anything received by the Bureau up to 15th day of a month will be regarded as having been received by the last day of the previous month.

The incentive rates shown in the last column of **Table 10.4** will not change during the next control period and will be independent of the assumptions underlying their calculations.

Table 10.4: Incentive Rate for Each Category A Indicator					
Business	Total Amount at Stake (AED)	Performance Indicator	Weights in the PIS	Total Incentive Amount (AED)	Incentive Rate (2004-2005) (AED per month)
RASCO (E)	4,440,000	Audited Accounts (E)	50%	2,220,000	370,000
		Audited PCR (E)	50%	2,220,000	370,000
RASCO (W)	8,599,299	Audited Accounts (W)	50%	4,299,649	717,000
		Audited PCR (W)	50%	4,299,649	717,000

E = Electricity; W = Water

The final incentive rates are higher than those of the Draft Proposals – by about AED 44,000 per month or 13% for electricity business and by AED 39,000 per month or 6% for water business – due to the increase in the estimated total MAR for the two businesses in the Final Proposals.

10.7 Operation of Scheme

Based on the targets and incentive rates as set out in **Tables 10.2** and **10.3**, the following incentive schemes will apply to each Category A indicator of each business under the new price controls:

- **For all Category A indicators in all the years**, in case of any delay beyond the glide-path target date, RASCO will receive a penalty equal to the monthly incentive rate (see **Table 10.3**) multiplied by the number of months by which the audited accounts or audited PCRs are late in comparison with the glide-path target date.

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

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

- **For all Category A indicators in 2004**, RASCO will receive a reward equal to the product of (i) twice the monthly incentive rate, and (ii) the number of months by which the audited accounts are early in comparison with the glide-path target date.

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That is, reward for 2004 would be:

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

- **For all Category A indicators in 2005**, if the company meets the target date it will receive a reward equal to six times the monthly incentive rate. That is:

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

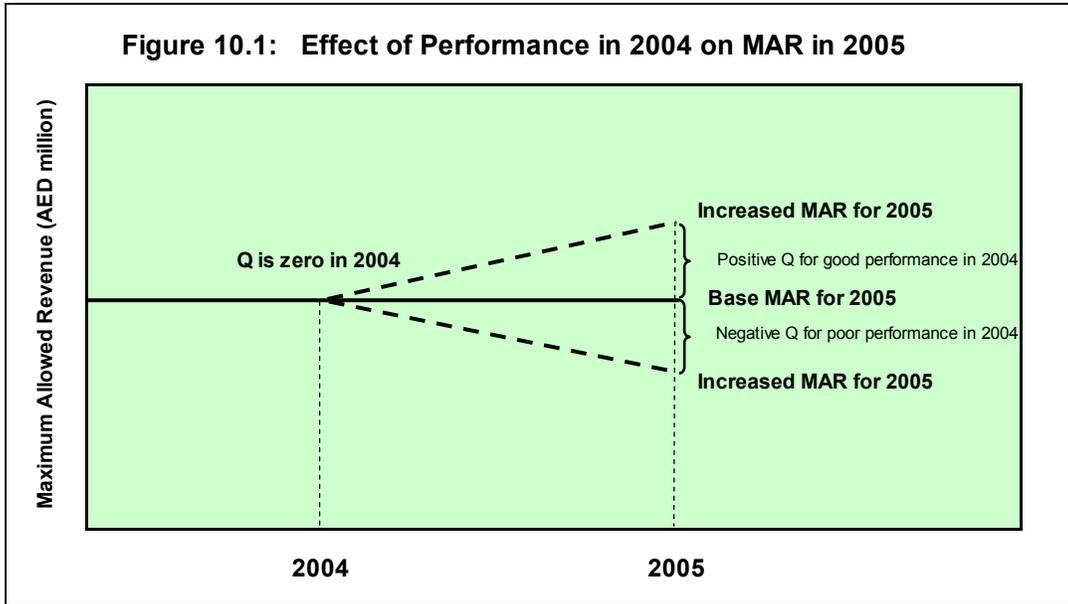
- The **maximum delay** in any indicator will be capped at the penalty that would be incurred if the audited accounts or PCRs were submitted on the glide-path target date for the same indicator for the following year.
- The **maximum reward** for any indicator will be capped by the licence target date.
- For the purpose of all indicators, the number of “months” shall be calculated assuming the date of submission of audited account or PCRs to the Bureau as the last day of the previous month if such audited accounts or PCRs are received by the Bureau on or before the 15th day of a month, or as the last day of a month if such audited accounts or PCRs are received by the Bureau after the 15th day of the month but before the end of the month. (This proposal effectively gives RASCO a further 15 days ‘grace period’ on top of the glide-path target dates.)
- The total reward or penalty under the PIS for any business of RASCO (i.e. the “Q” term in its price control formula) for performance in any year will be capped at 5% of the MAR in that year excluding the Q term itself.

The above scheme is the same as set out in the Draft Proposals.

10.8 Financial Implications of Scheme

The “Q” terms in the MAR formulae for electricity and water businesses of RASCO will reward or penalize RASCO in a year for its performance on Category A performance indicators in the preceding year. Being the first year of the control period, MARs in 2004 will have Qs equal to zero. However, as shown in **Figure 10.1** below, the performance in 2004 will determine the values of Qs for the MARs in 2005.

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For each of RASCO's two businesses, there is only one Category A indicator (i.e. audited account timeliness) which would be monitored in 2004 to establish the value of Q for 2005. Based on the forecast total revenues presented in Section 9 of this paper, Q terms can increase or decrease the combined MAR for electricity and water businesses of RASCO by up to AED 6.5 – 9.8 million in 2005. The difference in MAR for 2005 between the worst and the best performance in 2004 is about **AED 16 million**. This should provide RASCO with strong incentives to achieve best possible performance in 2004.

The above amount of reward or penalty relates only to Category A performance indicators and only to 2005. When all the four Category A indicators would be monitored during 2005, the MAR for 2006 (as determined in the 2005 price controls review) can increase or decrease by 5 per cent.

The financial implications of Category B indicators cannot be ascertained at this stage, as these indicators need to be further refined and rewards and penalties related to them would be determined at the next price controls review in 2005 for appropriate financial adjustment to the future revenue requirements of RASCO.

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Appendix A: Sample Calculations of RASCO Customer Tariffs

Customer Tariff Calculations - Electricity

		2004	2005
Total MAR (including Fuel Costs)	AED m	88.80	89.83
Proposal			
Fixed Charge	% of MAR	50.00%	50.00%
Variable Charge	% of MAR	50.00%	50.00%
Assumptions			
Forecast Installed Capacity in ADDC System	% of total	70.00%	70.00%
Forecast Installed Capacity in AADC System	% of total	30.0%	30.00%
Forecast Revenue Driver - Total Installed Capacity	MW	271.43	287.88
Tariff Calculations			
Fixed Charge	AED m	44.40	44.92
Fixed Charge from ADDC	AED m	31.08	31.44
Fixed Charge from AADC	AED m	13.32	13.47
Variable Charge	AED m	44.40	44.92
	AED / kW	163.58	156.02
RASCO Revenue Breakdown			
Actual Installed Capacity for ADDC - for Variable Charge	MW	190.00	201.52
Revenue from ADDC			
Fixed	AED m	31.08	31.44
Variable	AED m	31.08	31.44
Sub-Total	AED m	62.16	62.88
Actual Installed Capacity for AADC - for Variable Charge	MW	81.43	86.36
Revenue from AADC			
Fixed	AED m	13.32	13.47
Variable	AED m	13.32	13.47
Sub-Total	AED m	26.64	26.95
Total Revenue	AED m	88.80	89.83

Customer Tariff Calculations - Water

		2004	2005
Total MAR (including Fuel Costs)	AED m	171.99	169.40
Proposal			
Fixed Charge	% of MAR	50.00%	50.00%
Variable Charge	% of MAR	50.00%	50.00%
Assumptions			
Forecast Installed Capacity in ADDC System	% of total	40.00%	40.00%
Forecast Installed Capacity in AADC System	% of total	60.0%	60.00%
Forecast Revenue Driver - Total Annual Water Production	MG	11,302.00	10,637.18
Tariff Calculations			
Fixed Charge	AED m	85.99	84.70
Fixed Charge from ADDC	AED m	34.40	33.88
Fixed Charge from AADC	AED m	51.60	50.82
Variable Charge	AED m	85.99	84.70
	AED / TIG	7.61	7.96
RASCO Revenue Breakdown			
Actual Annual Water Production for ADDC - for Variable Charge	MG	4,520.80	4,254.87
Revenue from ADDC			
Fixed	AED m	34.40	33.88
Variable	AED m	34.40	33.88
Sub-Total	AED m	68.79	67.76
Actual Annual Water Production for AADC - for Variable Charge	MG	6781.20	6382.31
Revenue from AADC			
Fixed	AED m	51.60	50.82
Variable	AED m	51.60	50.82
Sub-Total	AED m	103.19	101.64
Total Revenue	AED m	171.99	169.40

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Appendix B: Final Price Control Calculations for Electricity

Line (all amounts are in 2004 prices)				2004	2005	
Inputs						
1	Operating Expenditure Allowance (AED m, 2004 prices)			33.95	32.86	
2	Opening RAV (AED m, 2004 prices)			150.55	148.22	
3	Closing RAV (AED m, 2004 prices)			148.22	145.62	
4	Mid-Year RAV (AED m, 2004 prices)			149.38	146.92	
5	Depreciation on Existing and New Assets (AEDm)			7.66	7.93	
6	Forecast for Revenue Driver 1 (Fixed Term)			1.00	1.00	
7	Forecast for Revenue Driver 2 (Electricity Generation Capacity, MW)			271.43	287.88	
8	Cost of Capital (real, post-tax)		6.00%			
9	Weight in revenue for Revenue Driver 1		65.00%			
10	Weight in revenue for Revenue Driver 2		35.00%			
11	X Factor		0.00			
Required Revenue Calculations						
				2004	2005	PV over period
12	Operating expenditure			33.95	32.86	63.08
13	Depreciation			7.66	7.93	14.70
14	Return on mid-year RAV			8.96	8.82	16.78
15	Annual revenue requirement (AED m)			50.58	49.60	94.57
Revenue Forecast and Profiling						
				2004	2005	PV Share in TOTAL
16	Revenue driver 1	Revenue Driver forecast	None	1.00	1.00	
17		Fixed Revenue Term (a)	AED m	32.57	32.57	
18		Revenue forecast	AED m	32.57	32.57	61.47
19		Share of revenue	%	66%	64%	65.00%
20	Revenue driver 2	Revenue Driver forecast	MW	271.43	287.88	
21		Co-efficient of Variable Revenue Term (b)	AED / MW	62,757.20	62,757.20	
22		Revenue forecast	AED m	17.03	18.07	33.10
23		Share of revenue	%	34%	36%	35.00%
24	Annual revenue (AED m)			49.60	50.63	TOTAL
25	Discounted annual revenue (AED m)			48.18	46.39	94.57
						0.00
						Target for Solver Run
Implied Financial Indicators						
				2004	2005	
26	Implied annual profit (AED m)			7.99	9.85	
27	Implied return on mid-point RCV (%)			5.35%	6.70%	
Results						
28	X Factor			0.00		
29	Fixed Revenue Term (a)			32.57 AED million		
30	Co-efficient of Variable Revenue Term (b)			62.76 AED / kW		

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Appendix C:

Final Price Control Calculations for Water

Line (all amounts are in 2004 prices)				2004	2005	
Inputs						
1	Operating Expenditure Allowance (AED m, 2004 prices)			87.88	82.34	
2	Opening RAV (AED m, 2004 prices)			344.57	327.34	
3	Closing RAV (AED m, 2004 prices)			327.34	310.11	
4	Mid-Year RAV (AED m, 2004 prices)			335.96	318.73	
5	Depreciation on Existing and New Assets (AEDm)			17.23	17.23	
6	Forecast for Revenue Driver 1 (Fixed Term)			1.00	1.00	
7	Forecast for Revenue Driver 2 (Water Annual Production, MIG)			11,302.00	10,637.18	
8	Cost of Capital (real, post-tax)		6.00%			
9	Weight in revenue for Revenue Driver 1		65.00%			
10	Weight in revenue for Revenue Driver 2		35.00%			
11	X Factor		0.00			
Required Revenue Calculations						
				2004	2005	PV over period
12	Operating expenditure			87.88	82.34	160.81
13	Depreciation			17.23	17.23	32.52
14	Return on mid-year RAV			20.16	19.12	37.10
15	Annual revenue requirement (AED m)			125.27	118.69	230.43
Revenue Forecast and Profiling						
				2004	2005	PV Share in TOTAL
16	Revenue driver 1	Revenue Driver forecast	None	1.00	1.00	
17		Fixed Revenue Term (a)	AED m	79.35	79.35	
18		Revenue forecast	AED m	79.35	79.35	149.78
19		Share of revenue	%	64%	66%	65.00%
20	Revenue driver 2	Revenue Driver forecast	MIG	11,302.00	10,637.18	
21		Co-efficient of Variable Revenue Term (b)	AED / MIG	3,891.55	3,891.55	
22		Revenue forecast	AED m	43.98	41.40	80.65
23		Share of revenue	%	36%	34%	35.00%
24	Annual revenue (AED m)			123.33	120.74	TOTAL
25	Discounted annual revenue (AED m)			119.79	110.64	230.43
						Difference
						0.00
						Target for Solver Run
Implied Financial Indicators						
				2004	2005	
26	Implied annual profit (AED m)			18.22	21.18	
27	Implied return on mid-point RCV (%)			5.42%	6.64%	
Results						
28	X Factor			0.00		
29	Fixed Revenue Term (a)			79.35 AED million		
30	Co-efficient of Variable Revenue Term (b)			3.89 AED / TIG		

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