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2007 Price Controls Review for ADSSC

First Consultation Paper

CR/E02/026

18 September 2006

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Foreword

1. Abu Dhabi Sewerage Services Company (ADSSC) has been established under Law No. 17 of 2005 to provide sewerage services within the Emirate of Abu Dhabi. The Law gives the Bureau the responsibility to regulate ADSSC, and the Bureau has recently issued a licence to ADSSC.
2. This document marks the commencement of a consultation process to formulate a framework for the economic regulation of ADSSC and to set the first price controls for ADSSC.
3. This first consultation document sets out the issues which need to be considered in setting the first price controls for ADSSC and on which the views of respondents are sought.
4. Written responses to the issues raised in this paper should be sent by 15 November 2006 to:

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

NICK CARTER
DIRECTOR GENERAL
REGULATION AND SUPERVISION BUREAU

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1. Introduction and Background

ABU DHABI SEWERAGE SERVICES COMPANY (ADSSC)

- 1.1 **Establishment:** Effective 21 June 2005, ADSSC has been established by the Abu Dhabi Law No.17 of 2005 as a public joint stock company to provide sewerage services in the Emirate of Abu Dhabi. The company has taken over ownership, management and operations of the sewerage system from the Abu Dhabi and Al Ain Municipalities. The Abu Dhabi Water and Electricity Authority (ADWEA) presently wholly owns ADSSC and is responsible for the development of the Emirate's policies concerning the sewerage sector and its privatisation.
- 1.2 **Regulation:** Law No.17 of 2005 requires ADSSC to have a licence from the Bureau to undertake its activities. This law also allows the company, after the Bureau's approval, to charge for providing sewerage services and connection to its sewerage system, and to sell treated wastewater effluent to the Department of Municipalities and Agriculture. ADSSC is also subject to the provisions of Law No.2 of 1998 concerning the regulation of the water and electricity sector in the Emirate of Abu Dhabi to the extent those provisions are not contradictory to Law No.17 of 2005.
- 1.3 **Licensing:** In accordance with the above requirements, the Bureau has issued a licence to ADSSC effective from 21 June 2005. Consistent with licences for other companies in the Abu Dhabi water and electricity sector, ADSSC's licence contains a number of conditions such as those relating to customer charges, to the provision of information to the Bureau, to the preparation of financial accounts, to the planning and security of the sewerage system, to health and safety, and to environmental protection.
- 1.4 **Separate Businesses:** For various purposes, including for the purpose of accounting, ADSSC's licence defines three separate businesses for ADSSC:
- (a) **Sewerage Business:** This refers to the planning, development, construction, maintenance and operation of the sewerage system (consisting of sewerage pipes, pumping stations, tankers and other plant and equipment) used for transportation of wastewater from premises or customers to the wastewater treatment system.

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- (b) **Wastewater Treatment Business:** This involves reception of wastewater (sometimes referred to as ‘sewage’) from the sewerage system, its treatment, and the delivery of resulting products and by-products to the disposal system.
- (c) **Disposal Business:** This involves activities relating to the safe and sustainable disposal, recycling or sale of the various by-products from the wastewater treatment system (such as treated effluent and biosolids).

1.5 **Sewerage System:** Based on the information made available to the Bureau, ADSSC’s assets are presently understood to comprise a sewer network of approximately 7,500 km, two major treatment plants (Mafraq and Al Ain), twenty-two remote treatment plants, and more than 300 wastewater pumping stations. The company has over 300,000 connections, including several thousand “trade” (i.e. industrial) customers. The effluents are required to be treated to an acceptable standard and made available to municipalities and others for irrigation of public areas and mainland plantations. Treated biosolids are composted before bagging and then recycled as fertiliser. There are plans for the privatisation of Mafraq and Al Ain wastewater treatment plants in the near future. Both plants require significant expansion.

THE ROLE AND DUTIES OF THE REGULATOR

- 1.6 **Independent Regulation:** Law No. 2 of 1998 established the Bureau as the independent regulatory body for the water and electricity sector in the Emirate of Abu Dhabi and defines its duties, functions and powers. Law No. 17 of 2005 extends these powers to include the sewerage services sector. Any entity wishing to undertake any of the defined “regulated activities” in the Emirate requires authorization from the Bureau in the form of a licence (or a licence exemption). It is through the licence conditions (or conditions to an exemption) that the Bureau is able to influence the conduct of sector companies.
- 1.7 **Primary Duty:** The “primary duty” of the Bureau (Article 53 of Law No.2 of 1998) is “to ensure, so far as it is practicable for it to do so, the continued availability of potable water for human consumption and electricity for use in hospitals and centres for the disabled, aged and sick”. As noted in paragraph 1.2 above, while Law No.2 of 1998 came into effect before it was

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envisaged that the Bureau would be granted responsibility for regulating sewerage services, Law No.17 of 2005 may be interpreted as implying a corresponding primary duty in respect of essential provision of sewerage services.

- 1.8 **General Duties:** The Bureau also has a number of “general duties” (Article 54 of Law No.2 of 1998), the most relevant of which in relation to the price control review is to “protect the interest of consumersas to the terms and conditions and price of supply (whether consumers are domestic, commercial or industrial)”.
- 1.9 **General Functions:** The Bureau also has a number of “general functions” (Article 55 of Law No.2 of 1998), including “the regulation of prices charged to consumersand the methods by which they are charged.”
- 1.10 **Obligations and Considerations:** In carrying out its functions under the Law, the Bureau is under an obligation (Article 96 of Law No.2 of 1998) to act consistently, to minimise the regulatory burden on licensees, to take account of the financial position of licensees, and to give reasons for its decisions. Accountability is further reinforced by the fact that the Bureau’s decisions can be challenged by licensees and ultimately made the subject of arbitration.

NEED FOR PRICE CONTROLS FOR ADSSC

- 1.11 Like network companies in the water and electricity sector, ADSSC is a monopoly being the only provider of sewerage services in the Emirate. It is therefore necessary to put in place a mechanism to protect the interests of the consumers of sewerage services both with regards to charges and to the quality of the service. The purpose of the price control is to cap the charges and provide incentives to improve service quality.
- 1.12 The costs of sewerage services are presently subsidised by the government. The price control, by capping ADSSC’s revenue from any source, can therefore provide a mechanism to ensure the subsidy requirement of ADSSC reflects only reasonably efficient costs.
- 1.13 As discussed in Section 3 below, the Bureau’s current thinking is to establish a price control for ADSSC which places a cap on the total revenue that ADSSC can recover from its customers and/or the government subsidy.

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This would be consistent with the present form of price controls for network companies in the water and electricity sector.

PURPOSE AND STRUCTURE OF THIS DOCUMENT

1.14 The purpose of this document is to commence a consultation process with ADSSC and other stakeholders in the sewerage services sector to establish the first price controls for ADSSC.

1.15 The remainder of this document is structured as follows:

- **Section 2** describes the price controls currently in place for the monopoly companies operating in the Abu Dhabi water and electricity sector.
- **Section 3** discusses the possible structure, scope and duration of the first price controls for ADSSC.
- **Section 4** discusses the main inputs to the price control calculations for ADSSC.
- **Section 5** summarises the issues raised in this document for consultation.

TIMETABLE FOR 2007 PRICE CONTROL REVIEW FOR ADSSC

1.16 To assist in setting the first price controls for ADSSC, the Bureau intends to publish a number of consultation papers, to seek information submissions from ADSSC and to hold meetings with the concerned parties, as shown in the proposed timetable in **Table 1.1**.

1.17 The Bureau's information requests will seek from ADSSC past data and future forecasts for the following key inputs to the price control calculations:

- operating expenditures (opex);
- capital expenditures (capex);
- potential revenue drivers such as customer numbers and outputs of the system; and
- measures of size and performance of the system components.

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Table 1.1: 2007 Price Controls Review Timetable (Approximate Dates)

15 September 2006	Bureau publishes this First Consultation Paper
1 November 2006	Bureau to issue First Information Request
15 November 2006	ADSSC to respond to First Consultation Paper
31 December 2006	ADSSC to respond to First Information Request
1 February 2007	Bureau to publish Second Consultation Paper
15 March 2007	ADSSC to respond to Second Consultation Paper
1 April 2007	Bureau to issue Second Information Request
15 May 2007	ADSSC to respond to Second Information Request
15 June 2007	Bureau to publish Draft Proposals
30 June 2007	ADSSC to submit Audited Separate Business Accounts
31 July 2007	ADSSC to respond to Draft Proposals
15 September 2007	Bureau to publish Final Proposals

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2. Price Controls for Water and Electricity Companies

INTRODUCTION

- 2.1 This section explains the price controls which presently apply in the water and electricity sector in the Emirate of Abu Dhabi. The Bureau intends to adopt similar principles for price controls for ADSSC, subject to any sewerage-specific considerations (discussed in later chapters).
- 2.2 The price controls are important because they determine the cap on the annual revenue of each company. For the distribution companies, the difference between the revenue cap and the revenue from customers determines the subsidy required from the government.
- 2.3 The price controls for the water and electricity companies are described in detail in the Bureau's consultation papers published at the time of the 1999, 2002 and 2005 price control reviews and are available on the Bureau's website (www.rsb.gov.ae).

GENERAL STRUCTURE OF PRICE CONTROLS

- 2.4 The price controls that apply to existing monopoly network companies are in the form of revenue caps, defining Maximum Allowed Revenue (MAR) for each company for each of year of the price control duration. The general structure of these price controls can be summarised as follows:

$$\text{MAR} = \text{Pass Through Costs} + a + (b \times \text{Revenue Driver 1}) + (c \times \text{Revenue Driver 2}) + Q - K$$

where:

- **Pass-through costs** are the costs which are subject to competition or regulation elsewhere in the sector (such as, for AADC and ADDC, power or water purchase costs, and transmission charges) and are allowed on an actual basis.
- 'a' is a fixed component (Dirham amount).

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- **'b' and 'c'** are the coefficients of two revenue drivers, expressed in Dirham per unit of the respective revenue driver.
- **'a', 'b', and 'c'** are set by the Bureau for the first year of the control period and are then automatically adjusted each year according to the following formula for (i) the UAE Consumer Price Index (CPI) inflation for the previous year and (ii) an 'X' factor set by the Bureau:

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

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

- **Revenue drivers** are the measures of companies' outputs or demands they meet in a year.
- **'Q'** is the revenue adjustment for performance during a year under a Performance Incentive Scheme (PIS).
- **'K'** is the correction factor adjusting any over- or under-recovery of revenue in the preceding year.

MAIN FEATURES OF PRICE CONTROLS

- 2.5 **CPI-X Regulation:** Price controls are of a "CPI-X" type which constrains changes in the companies' overall revenue to a measure of price inflation (CPI) less an amount "X" set to take into account factors such as expected efficiency improvements, demand growth and revenue profiling over the control period.
- 2.6 **Revenue Caps:** The CPI-X price control for each company or business acts as an annual revenue cap which defines the "Maximum Allowed Revenue" (MAR) that it recovers from its customers (or from government subsidy, in the case of distribution companies) in any year of the control period.
- 2.7 **Duration of Controls:** The control period has varied from one control to another. The third price controls (PC3) have recently been set to apply for four years (2006-2009).
- 2.8 **Structure of Controls:** The MARs include a fixed term but are also partly determined by "revenue drivers" (such as peak demands, metered units transmitted or distributed, number of customers, etc.) set to reflect the cost structure of the companies and to provide desirable incentives such as

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meeting customer demands, reducing system losses and improving system metering.

- 2.9 **Separation of Controls:** Presently, there are separate price controls for the water and electricity businesses of the companies. For the distribution companies, the price controls (separate for water and electricity) presently cover both distribution and supply businesses.
- 2.10 **Pass-Through Costs:** Price controls apply directly to companies' "own costs", which are considered to be within their control. Costs which are subject to competition, or to regulation elsewhere in the supply chain, are treated on a pass-through basis.
- 2.11 **Efficient Levels of Costs:** The price controls have been set to allow the companies to recover an efficient level of costs, comprising allowances for operating expenditure, depreciation and a return on capital. The Bureau has generally assumed that licensees can improve their operating efficiency by 5% a year, all else being equal.
- 2.12 **Incentives for Cost Efficiency:** By virtue of their medium-term revenue cap nature, the price controls provide strong incentives for companies to reduce costs since they are allowed to retain the benefit of any unforeseen efficiency gains (in the form of extra profits) at least until the next price control review.
- 2.13 **Treatment of Capex:** Calculation of depreciation and of the return on capital requires the determination of efficient capital expenditure (capex) allowances. The treatment of capex varied slightly between price controls, but was essentially based on an approach of 'ex-post' assessment – i.e., allowed capital expenditure is determined after the event (based on efficiency criteria established by the Bureau).
- 2.14 **Initial Regulatory Asset Values:** In order to ensure that companies' allowed revenues reflect economic costs, the Bureau undertook a review of reported accounting asset values while setting the first controls for the water and electricity companies in 1999. The opening regulatory asset value of TRANSCO at 1 January 1999 was reduced by 15%, following analysis by the Bureau which suggested that the accounting valuation of TRANSCO was over-stated.

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2.15 **Allowed Rate of Return:** A real, post-tax cost of capital of 5% has been used for PC3 controls (with adjustments for some companies). This cost of capital was estimated based on a review of capital market information in Abu Dhabi and overseas.

2.16 **Performance Incentive Scheme:** A Performance Incentive Scheme (PIS) has been developed to incentivise the companies to meet a range of key performance indicators:

- There are a number of **“Category A”** performance indicators for each company related to the timeliness of submission of audited regulatory statements and to various measures of network performance. Good or poor performance on these indicators leads to an automatic upward or downward adjustment to MAR via the term “Q”. The adjustment to MAR via the Q term in any year has been capped at 4% of MAR in respect of each company’s “own costs” (i.e. excluding pass-through costs) in that year.
- A number of **“Category B”** indicators have also been introduced which are monitored over the control period, with a possible financial adjustment made in respect of particularly good or poor performance at the next price control review, subject to an overall cap on such adjustments.

METHODOLOGY FOR PRICE CONTROL CALCULATIONS

2.17 Setting the price controls means determining the values of the fixed term ‘a’, of the coefficients of revenue drivers ‘b’ and ‘c’ in the MAR formula, and of the X factor. The Bureau has established the following framework for the price control calculations:

- (a) The revenue requirement for each year of the control period (sufficient to finance a reasonably efficient business) is calculated using the “building block approach” as follows:

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

where:

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- Operating expenditure (opex) refers to operating costs excluding depreciation; and
 - RAV is the mid-year average of opening and closing Regulatory Asset Values (RAVs). For each year, the closing RAV is determined by adding the capital expenditure (capex) incurred in that year to, and subtracting the depreciation from, the opening RAV.
- (b) The forecast or projected MAR for each year of the control period is calculated using the proposed structure of the MAR formula, the revenue driver projections, appropriate weightings for the fixed and variable terms, and an appropriate 'X' factor.
- (c) The values of 'a', 'b' and 'c' are then calculated by setting the net present value (NPV) of the projected MARs equal to the NPV of required revenues over the control period using the estimated cost of capital as the discount rate:

NPV of projected annual MARs = NPV of Required Revenues

- (d) All calculations are carried out in real terms (i.e. excluding the effect of inflation). For the purpose of these calculations, pass-through costs and K and Q terms are excluded.

2.18 For a full description of the above, please refer to pages 91-94 of the Bureau's publication "Draft Proposals for PC3" (July 2005) for the water and electricity companies.

2.19 Therefore, price control calculations require the following inputs:

- (a) Opex projections;
- (b) Initial Regulatory Asset Value (RAV);
- (c) Capex projections (to determine RAVs for each year);
- (d) Assumptions for depreciation (e.g. profile and average asset life);
- (e) Revenue driver projections;
- (f) Appropriate X factor;

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- (g) Appropriate weightings for fixed and variable terms in MAR formula;
and
- (h) Appropriate cost of capital (to be used as the allowed rate of return on RAV and as the discount rate to calculate NPVs).

2.20 The Bureau has used the above framework for its price control calculations for water and electricity companies to date and intends to use it for ADSSC.

3. Form of Control

INTRODUCTION

3.1 The previous sections have identified the type of issues that will need to be addressed in setting the price controls for ADSSC. This section discusses issues in relation to the structure, scope and duration of price controls in more detail.

TYPE OF REGULATION

3.2 There are two main types of regulation of monopoly companies:

- (a) **Rate of Return (ROR) Regulation:** Under this regulatory regime, prices are adjusted frequently, often on an annual basis, to ensure that a target rate of return is earned. This reduces perceived risk, resulting in a lower cost of capital. However, this regime lacks adequate incentives for companies to reduce costs and can provide an incentive for a firm to over-invest in capital assets.
- (b) **Price Cap or CPI-X Regulation:** This regime sets prices or revenues over a medium term period (3 to 5 years), such that a well-run company can expect to earn a fair rate of return, with the opportunity to earn and retain higher profits (at least up to the next price review) if the company reduces costs. This gives the company a greater incentive for efficiency. However, by not guaranteeing a certain rate of return, this regime is perceived to be riskier than ROR regulation, resulting in a higher cost of capital.

3.3 In practice, price cap and ROR regulation are quite similar. In both the regimes, the regulator has to assess the efficient level of costs and the rate of return that a company should earn. Further, both models require the regulator to review the price controls from time to time. The main difference between the two approaches relates to the length of the “regulatory lag” – the period between the resetting of price controls.

3.4 **Bureau’s Current Thinking:** For consistency with the regulatory framework for the Abu Dhabi water and electricity companies, the Bureau believes that CPI-X regulation should be applied to ADSSC. The Bureau considers that

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the efficiency incentives inherent in this approach are consistent with its statutory duty towards an efficient and economic sector (Article 54 of Law No.2 of 1998).

FORM OF REGULATION

3.5 There are three main forms of price controls:

- (a) **Revenue Yield Control:** This caps the revenue per unit of output for a company and is most appropriate for utility sectors subject to significant demand growth. It provides an incentive for a company to reduce unit costs below the allowed unit revenue, but also ensures the company receives additional revenue to cover the additional costs arising from demand growth.
- (b) **Pure Revenue Cap:** This places an overall lump-sum limit on total revenue without any variation for output changes. This provides an incentive for a company to reduce overall costs below the overall revenue (and hence increase its profits). However, it does not allow the company additional revenue for demand growth, thereby exposing it to demand risk if costs vary with demand.
- (c) **Hybrid Approach:** This is a combination of the above two approaches in which the revenue cap consists both of a fixed component (similar to the pure revenue cap) plus one or more “revenue drivers” linking allowed revenue to defined output measures (similar to the revenue yield control). This provides an incentive for a company to provide for the growing demand for services while at the same time limiting the deviation of revenues from costs by setting the fixed and variable revenue components, broadly speaking, to reflect the fixed and variable costs of the company. Any incentive to over-invest or to expand unnecessarily can be balanced by adopting an appropriate weighting of the ‘fixed’ term within the structure of the controls.

3.6 **Potential Revenue Drivers:** In addition to reflecting the company’s cost structure, the choice of revenue drivers may contain other objectives – for example, to provide incentives to serve new customers and areas. In line with those for water and electricity companies, output measures such as the number of customers served, and annual and/or peak flows/loads can be considered potential revenue drivers for ADSSC.

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- 3.7 During this price control review process, ADSSC will be required to provide historical data and future projections of the potential revenue drivers, which will be used to inform inputs to the price control calculations.
- 3.8 **Bureau's Current Thinking:** Based on the experience to date with the use of the hybrid form of revenue cap for the Abu Dhabi water and electricity companies, the Bureau's current thinking is to adopt this form for ADSSC. However, as discussed below, a pure revenue cap may be appropriate for retrospective application of price controls back to the establishment of ADSSC in June 2005, as the actual costs and revenue driver values would be known for the past. The Bureau is currently considering customer number and annual and/or peak flow/load as the potential revenue drivers for ADSSC.

DURATION OF CONTROLS

- 3.9 While ROR regulation usually works on a short-term basis, the control period for CPI-X regulation is usually 4-5 years. A number of factors need to be considered while deciding a control duration for ADSSC:
- (a) There is evidence that a longer duration provides stronger incentives for companies to implement efficiency savings.
 - (b) However, a longer duration also increases the possibility of performance being at variance with expectations at the time of setting the price control.
 - (c) A longer control duration would reduce the efforts and costs involved both for the company and the regulator in frequent price control reviews.
 - (d) It may be desirable that the price controls for ADSSC expire on the same date as the current PC3 controls for Abu Dhabi water and electricity companies (i.e. 31 December 2009). This would facilitate a combined future price control review for all licensees.
 - (e) An additional consideration in the case of ADSSC is that the price controls are required to apply retrospectively from the time of its formation or the passage of Law No.17 of 2005 (i.e. 21 June 2005). This is necessary for subsidy calculations for ADSSC from that date.

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3.10 **Bureau's Current Thinking:** In view of the above, the Bureau's current thinking is that the first price controls for ADSSC should apply from 21 June 2005 up to 31 December 2009. New price controls will then be required for ADSSC for 2010 onwards, as with the water and electricity companies.

SCOPE OF CONTROLS

3.11 At present, there are two main options available: first, a single control covering all businesses of ADSSC; and second, separate controls for different businesses of ADSSC

3.12 The licence defines three separate businesses for ADSSC: sewerage, wastewater treatment, and disposal, and requires the preparation of separate accounts for these three businesses. This accounting separation of businesses could, in theory, facilitate the introduction of separate price controls for each business.

3.13 In principle, separation of controls enhances cost transparency between businesses and can help to facilitate the introduction of competition in certain activities, such as wastewater treatment and disposal.

3.14 The expected privatisation of the two major wastewater treatment plants of ADSSC (Mafraq and Al Ain) also raises issues for the regulatory framework to be established for ADSSC. Depending on the timing of the privatisation relative to the finalisation of the price controls, it may be necessary to develop a forecast of costs associated with such plants or it may be possible to allow the pass-through of such costs. It is presently uncertain as to the precise form which any privatisation of wastewater treatment, or contracting out of other elements of the business, will take. These issues will be explored further.

3.15 **Bureau's Current Thinking:** In view of the above, the Bureau is presently open minded as to whether a single control encompassing all businesses or separate controls for separate businesses is appropriate for ADSSC.

PERFORMANCE INCENTIVE SCHEME (PIS)

3.16 **Need for Incentive Regulation of Service Quality:** In competitive markets, customers choose between services or products on the basis of quality as well as price. Customers in a regulated industry generally do not have this

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flexibility, creating a need for regulation of both prices and quality. By effectively fixing revenues for a medium term, CPI-X price controls give companies an incentive to reduce costs. However, such price controls do not by themselves provide incentives to companies to meet service standards or improve their output performance. Regulating prices without corresponding regulation of outputs runs the risk that companies will be able to increase profits at the expense of service quality.

- 3.17 There is therefore a clear trend worldwide towards incorporating service quality incentives into price controls. Furthermore, one of the Bureau's functions under Law No.2 of 1998 (Article 55) is to establish and enforce technical and performance standards. A number of the Bureau's duties under Law No.2 of 1998 (Article 54) also require it to establish, monitor and enforce technical and performance standards.
- 3.18 At the 2002 price controls review, the Bureau therefore introduced a Performance Incentive Scheme (PIS) for the water and electricity companies subject to price control, which was further enhanced at the 2005 price controls review.
- 3.19 **Potential PIS for ADSSC:** Given the success of the PIS for the water and electricity companies, the Bureau wishes to formulate a PIS for ADSSC which links important aspects of ADSSC's performance to its price controls. ADSSC will then be rewarded via the scheme for improved output performance and penalised for poor output performance. Similar to water and electricity companies, two types of performance indicators can be defined for ADSSC:
- (a) **Category A** performance indicators, which will be incentivised on a year on year basis through a mechanistic annual financial adjustment to MAR in the next year through the term 'Q'. Given the importance of audited separate accounts and audited price control returns (PCRs), and the desire to keep the PIS for ADSSC as simple as possible, the timeliness of these audited statements should be included in Category A. To limit the financial risks for ADSSC, the overall adjustment to MAR for these indicators need to be capped.
 - (b) **Category B** performance indicators, which will be monitored during the control period for a possible positive or negative financial

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adjustment to the future revenue at the next price control review for particularly good or poor performance during the current control period. There may also be a need to cap the total financial adjustments for Category B. Possible Category B indicators for ADSSC include:

- Performance of sewerage system (such as, availability and reliability);
- Customer complaints (e.g., in relation to odour and flooding)
- Environmental performance;
- Timeliness of annual preparation of five-year planning statement; and
- Timeliness of interim profit and loss account.

3.20 **Summary of Bureau's Current Thinking:** The Bureau's initial thinking is to introduce a simple PIS for ADSSC at this review with only two Category A indicators; namely, timeliness of audited separate accounts and timeliness of audited price control returns. Adjustments would be subject to an overall cap on total incentives equal to, say, 4% of annual MAR. The Bureau also seeks views of the respondents on the potential Category B indicators for ADSSC and any cap on the total incentives for such indicators.

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4. Price Control Calculations

INTRODUCTION

4.1 Section 2 briefly describes the overall framework for price control calculations and lists the main inputs required for these calculations:

- Opex projections;
- Initial regulatory asset value (RAV);
- Future capex;
- Depreciation;
- Revenue driver projections (discussed in Section 3)
- Cost of capital; and
- Weightings of MAR terms, X factor and CPI.

4.2 This section discusses each of these inputs in turn.

OPEX PROJECTIONS

4.3 As mentioned in Section 2, the calculation of annual revenue requirements requires projections of annual operating expenditure (opex) over the control period. (The term “Operating expenditure” or “opex” in this document refers to operating costs excluding depreciation).

4.4 In view of its statutory duties and functions, the Bureau has to take into account two main considerations while assessing opex projections:

- (a) the allowed revenue under the price controls should be sufficient to enable the company to finance its business; and
- (b) to ensure the economy and efficiency of the sector, opex projections should reflect the costs expected of a reasonably efficient operator.

4.5 There are a number of approaches to assess opex allowances:

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- (a) **Bottom-up Approach:** Some regulators have adopted the approach of assessing or benchmarking each main item of expenditure of the company against that of similar companies in the sector or elsewhere. However, this requires the identification of suitable comparators from elsewhere and is highly data intensive (there is normally a limited amount of publicly available data on comparators).
- (b) **Top-down Approach:** An alternative (or complementary) approach is to assess the total opex of the company as a whole. This can take a number of forms:
 - (i) **Use of Benchmarking Tools:** Regulators can use benchmarking tools to assess the efficient levels of total opex for a company. Benchmarking tools vary from simple ratios of total opex to outputs (such as average total cost per customer) to more ‘formal’ techniques (e.g., regression analysis, data envelopment analysis) linking total opex (and capex or asset values) to multiple outputs and other factors.
 - (ii) **Actual Outturn Costs with Efficiency Assumptions:** A regulator can also use recent or present cost levels of a company as the base level for future years, with adjustments to reflect reasonable expectations of future efficiency improvements and other factors.

4.6 **Bureau’s Preferred Approach:** The Bureau has used the following top-down approach for the water and electricity companies:

- (a) **Base level:** Determine a base level of opex by using the recent actual level of opex;
- (b) **Adjustment for demand growth:** Adjust the base level of opex to reflect increased costs for future demand increases (for example, a 0.75% increase in opex for each 1% increase in demand was adopted at the most recent water and electricity price control review);
- (c) **Adjustment for efficiency improvement:** Adjust the demand-adjusted opex for efficiency improvement expected over the control period (e.g. 5% decrease in opex per year); and

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- (d) **Other adjustments:** Make further adjustments to opex projections which may be appropriate; for example, for one-off costs (or cost reductions) which were not observed in the past but are known about in advance for the future.

4.7 **Bureau's Current Thinking:** The Bureau favours placing most emphasis on a top-down approach to projecting future opex which uses recent cost levels as the base level and provides strong incentives for efficiency improvement from this starting point. However, the Bureau may also need to more closely examine certain cost components to inform its overall assessment.

INITIAL REGULATORY ASSET VALUE (RAV)

4.8 For capital-intensive industries like sewerage services, capital costs account for a significant proportion of overall costs. As mentioned in Section 2, capital costs enter into the price control calculations in the form of (i) the return of capital (or depreciation) and (ii) the return on capital. Both of these components for each year are determined from the Regulatory Asset Values (RAVs) for that year. The initial RAV for the start of the first control period (as with future capex) is therefore of significant importance for price control calculations.

4.9 In order to ensure that the company's allowed revenue reflects true economic costs, regulators often undertake an assessment of the companies' opening accounting asset values to establish their economic values while setting the first price controls.

4.10 While the first audited accounts for ADSSC are currently under preparation, the Bureau understands that its accounting asset value is of the order of several billion Dirhams. Given this magnitude, it is worth investigating whether this accounting value reflects the present economic value of the assets. To some extent, this exercise is circular, in the sense that it is future allowed regulated revenues that ultimately determine the economic value of the assets. Nevertheless, if suitable comparable sewerage services utilities can be identified from elsewhere, and the data on their assets are available, some comparisons might be possible. Any analysis by ADSSC to support its accounting asset value will be welcomed and considered in the above assessment.

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4.11 **Bureau's Current Thinking:** The Bureau intends to review the accounting asset value of ADSSC while setting the initial RAV and will consider any analysis submitted by ADSSC to support this value.

FUTURE CAPITAL EXPENDITURE

4.12 The price control calculations use future capex projections (capex net of projected depreciation) to update the RAV from year to year over the control period. However, for capital-intensive industries such as sewerage networks, it is often difficult to determine upfront the amount of investment that will be required.

4.13 There are two main approaches to the assessment and treatment of future capex while setting the price controls:

(a) **Ex Ante** approach which includes an allowance for a forecast of future capex within the price controls, with no review (or only a limited review) subsequently of actual capex incurred; and

(b) **Ex Post** approach which includes no allowance (or only some provisional allowance) for the forecast of future capex in the price controls, and then makes an ex post adjustment at the subsequent price control review for the capex judged by the regulator to have been efficiently incurred.

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

4.15 **Ex-ante Approach:** This approach places greater emphasis on the accuracy of the allowed capex projections included in the price controls, requiring costly and intensive preparation and assessment of the investment plans by a company and the regulator. The approach requires some ex-post assessment to ensure that any cost savings compared to allowed capex

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projections are the result of efficiency improvements rather than a failure to deliver anticipated outputs.

- 4.16 **Ex-post Approach:** The ex-post approach may be regarded as more pragmatic in that it does not require an accurate forecast of future capex and can easily handle both anticipated and unanticipated investments. However, companies risk some capex already incurred being disallowed by the regulator and can (unless provisional allowances are sufficient) face cash flow problems in financing their operations due to a delay in compensation of efficient capex.
- 4.17 **Efficiency Criteria:** To reduce risks, a set of clear-cut **efficiency criteria** are often established upfront against which the actual outturn capex incurred by a company during the control period can be assessed. The Bureau proposes to adopt the same efficiency criteria as it has been using for the water and electricity companies since 1999. That is, capital expenditures will be considered efficient if the expenditures:
- (a) were required to meet growth in customer demand or the relevant security standards; and
 - (b) were efficiently procured (procurement to be interpreted both in relation to both the tendering process and project management).
- 4.18 **Bureau's Current Thinking:** The Bureau has identified two possible methods for the regulation of capex for the first price controls for ADSSC. Given its existing approach in this regard, the Bureau is likely to adopt an ex post approach for ADSSC.

DEPRECIATION

- 4.19 **Depreciation:** Depreciation represents the return of capital invested by a company, often considered as a fund enabling the company to replace its capital assets upon the expiry of their useful life. Depreciation is one of the three building blocks of the revenue requirement calculations. In the price control calculations, depreciation for any year is calculated in relation to the opening RAV for that year.
- 4.20 Calculation of depreciation requires assumptions about the appropriate depreciation profile and the average asset lives for the company. In the case

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of water and electricity network companies, price control calculations to date have used the straight-line depreciation method and an average asset life of 30 years. However, a longer life may be more appropriate for sewerage networks.

- 4.21 **Infrastructure Renewals Charge:** In the England and Wales water and sewerage industry, the accounting approach of an “infrastructure renewals charge” is used for underground assets instead of depreciation. This is because underground water and sewerage assets will generally be maintained indefinitely rather than replaced – the infrastructure renewals charge is intended to reflect the average annual maintenance costs to keep the system in steady state. Determination of such a charge requires information on historical maintenance costs and service levels, which can be used as a reference point for the future.
- 4.22 For above-ground assets, a depreciation approach is standard practice. However, for underground assets, the infrastructure renewals charge approach may be preferred if it is more practical to estimate the annual maintenance cost required to keep the condition of the asset in steady state than it is to estimate the asset life.
- 4.23 **Bureau’s Current Thinking:** The Bureau requests views on whether to adopt the depreciation approach or the infrastructure renewals charge methodology for underground assets, and on suitable assumptions for ADSSC.

COST OF CAPITAL

- 4.24 **Importance of Cost of Capital:** The cost of capital is the minimum return investors will accept for investing in a particular company, taking account of its risks. Since the cost of capital is applied to the RAV to calculate the return on capital element of the revenue requirement, it is a key input to setting price controls for capital intensive businesses.
- 4.25 A regulator’s estimate of the cost of capital for price control calculations is also important because it can incentivise or otherwise a business to make an investment.
- 4.26 **Overall Approach:** Companies are usually financed by a mixture of debt and equity. The cost of capital is therefore usually calculated as a weighted-

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average of the cost of debt finance and of the cost of equity finance, often referred to as the Weighted Average Cost of Capital (WACC), as follows:

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

4.27 The Bureau's First Consultation Paper on PC3 for water and electricity companies published in August 2004 contains full details of the above approach. The most important features are:

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

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

- The **cost of equity** is estimated by using the Capital Asset Pricing Model (CAPM):

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

- The **risk-free rate** represents the return available from a completely riskless form of investment, typically, medium- to long-term government bonds.
- **Debt premium** measures the additional return on debt required over and above the risk-free rate by a given business subject to uncertain cashflows and default risks.
- **Market risk premium** is the extra return required by investors in the stock market as a whole for investment in equities (i.e. shares or stocks) compared to the risk-free rate.
- The **equity beta** measures the riskiness of a given investment (i.e. buying shares of a specific business) relative to the average level of risk in the equity market.
- Keeping in view the cost advantages of debt at reasonable levels of gearing, the **gearing** (the ratio of (i) debt to (ii) debt plus equity) needs to be set at an optimal level where overall risks and hence the WACC are at a minimum.

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- Since price controls are forward-looking, the cost of capital calculations should be based, where possible, on **forward-looking** estimates rather than simply historical data.
- In Abu Dhabi, the **tax rate** is zero and so the quoted cost of capital is comparable to that reported on a post-tax basis in other jurisdictions.
- Since the Bureau's price control calculations are carried out in **real terms** (i.e. excluding inflation), the inputs to the cost of capital calculation should also be in real terms.

4.28 **Use of Local and International Market Data:** The Bureau's cost of capital calculations for water and electricity companies have drawn heavily on the latest estimates of cost of capital components used by regulators of similar businesses in the UK and Australia subject to similar regulatory regime. However, these were cross-checked against the information available from local and regional capital markets in order to capture any particular factors that may be specific to the businesses operating in Abu Dhabi.

4.29 **Bureau's Cost of Capital Estimates to date:** The Bureau used a real, post-tax cost of capital of 6% for setting PC1 and PC2 controls for water and electricity companies, and a basic cost of capital of 5% for PC3 (with certain adjustments). The full calculations are given in the PC3 consultation papers.

4.30 **Bureau's Current Thinking:** The Bureau intends to use the same standard approach to calculate the cost of capital for ADSSC as that currently employed for water and electricity companies (i.e. the CAPM approach). The calculations will be updated for the latest data (both generic assumptions and those specific to ADSSC).

WEIGHTINGS OF MAR TERMS, X FACTOR AND CPI

4.31 **Weightings of MAR Terms:** As mentioned in Section 3, the price control calculations require a decision on the appropriate proportions of the allowed revenue which should be recovered from the fixed term 'a' and any variable terms involving revenue drivers with co-efficients 'b' and 'c'. For the PC3 calculations for water and electricity companies, the Bureau used a weighting of 70% for the fixed term and 30% for the variable terms (equally apportioned between the revenue drivers where there was more than one revenue driver). These weightings are applied to the present value of total

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revenue over the control period. The weightings may thus vary slightly from year to year, depending on the relative movement in revenue drivers in each year.

- 4.32 Weightings need to strike a balance between (a) the cost structure of the company, and (b) the incentives for the company to perform well against the objectives of the various revenue drivers. A higher weighting for a variable term means a greater incentive for performance on that revenue driver. However, a higher weighting for the fixed term means greater surety for companies to earn revenue irrespective of the outturn demand or revenue driver performance.
- 4.33 **Choice of X-Factor:** Price control calculations also require a decision on an appropriate value of 'X' factor. The choice of X factor impacts mainly on how allowed revenues are profiled across different years of the price control period. For example, for a given revenue requirement (in NPV terms) over the price control period, a higher X factor (eg, CPI-5) would give higher revenue in the early years and lower revenue in latter years of the control period than a lower X factor. The choice of X factor is not to be confused with the efficiency assumptions which are incorporated elsewhere into the Bureau's price control calculations (within the opex and capex calculations). The X factor should therefore be viewed as a 'revenue profiling factor' rather than an 'efficiency factor' per se. To avoid any such confusion, the Bureau has set X equal to zero for the PC2 and PC3 controls for the water and electricity companies.
- 4.34 **Choice of CPI:** An appropriate CPI is required to adjust 'a', 'b' and 'c' on a year-on-year basis for inflation while calculating annual MARs during the control period. The Bureau has used the official UAE CPI as published by the UAE Central Bank (or the UAE Ministry of Planning) as the appropriate basis of this inflation for water and electricity companies.
- 4.35 **Bureau's Current Thinking:** In the absence of additional information or different relevant circumstances pertaining to ADSSC, the Bureau intends to adopt a similar approach to that used for the water and electricity companies. The Bureau is therefore currently minded to use a weighting of 70% for the fixed revenue term and 30% for the variable terms (equally apportioned between revenue drivers), a value of zero for the X factor, and UAE CPI as the basis of inflation.

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5. Summary of Issues for Consultation

- 5.1 The Bureau would welcome respondents' views on the following issues:
- (a) The price controls for ADSSC should have the form of a CPI-X revenue cap, with a fixed term and one or two variable terms involving revenue driver(s). Which revenue drivers should be considered? How should the weightings of the fixed and variable revenue terms be determined?
 - (b) Should there be a single control or separate controls for different businesses?
 - (c) Whether the first price control period for ADSSC should run from 21 July 2005 to 31 December 2009?
 - (d) How should privatisation of wastewater treatment plants or other major developments be treated in the price controls?
 - (e) A simple Performance Incentive Scheme (PIS) should accompany the first price controls. What are the appropriate Category A and B performance indicators under PIS for ADSSC? What should be the cap on the total incentives for such indicators?
 - (f) How should the future opex requirements for ADSSC be projected? Is a top-down approach to projecting future opex appropriate?
 - (g) The accounting asset values of ADSSC should be assessed for economic efficiency while setting the initial RAV.
 - (h) How should capex be regulated (ex ante or ex post)?
 - (i) Whether a depreciation approach or an infrastructure renewals charge methodology for underground network should be used?
 - (j) How should an appropriate cost of capital be estimated for ADSSC?
 - (k) How should the X factor be set to ensure an appropriate profile of revenue over the control period?

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