مكتب التنظيم و الرقابة
Regulation & Supervision Bureau

Water and electricity

Sector overview

2010 - 2013

A brief introduction to the Regulation & Supervision Bureau and the Sector it regulates in the Emirate of Abu Dhabi

النسخة العربية متوفرة أيضاً

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The Sector in 2010

The water, wastewater and electricity Sector in the Emirate of Abu Dhabi consists of specialised companies responsible for the different stages of the provision of water and electricity to customers plus the collection, treatment and disposal of wastewater.

The water and electricity companies were created in 1999*, when the Sector was restructured or 'unbundled'. This included the formation of the Abu Dhabi Water and Electricity Authority (ADWEA), which retained sole ownership of these companies at the time. However, in 2000, the first Independent Water and Power Producer (IWPP), a joint venture (JV) between a foreign partner and ADWEA called Emirates CMS Power, was created.

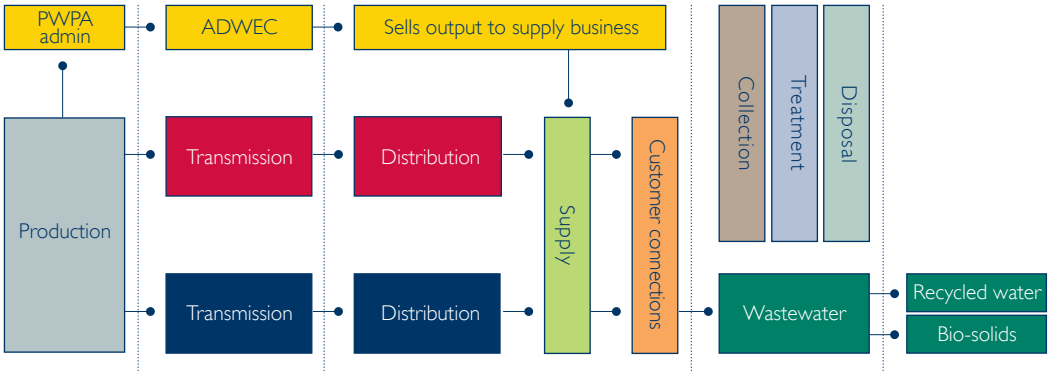
A public joint stock wastewater company was created in 2005 with the transfer of assets from the two Abu Dhabi municipalities to form the Abu Dhabi Sewerage Services Company (ADSSC).

This unbundled structure contrasts significantly with a vertically-integrated sector, in which one entity (normally a government) would own and be responsible for the whole supply chain; from the provision of primary fuel to the supply of electricity or water to customers' premises and possibly the collection of wastewater products.

The Abu Dhabi Sector structure is known as a Single Buyer model because there is no competitive pool arrangement; all production output is purchased by the Single Buyer (ADWEC).

** Law No (2) of 1998 allowed for the break-up of the old Water and Electricity Department (WED)*

Core activities



PWPA – Power and Water Purchase Agreement

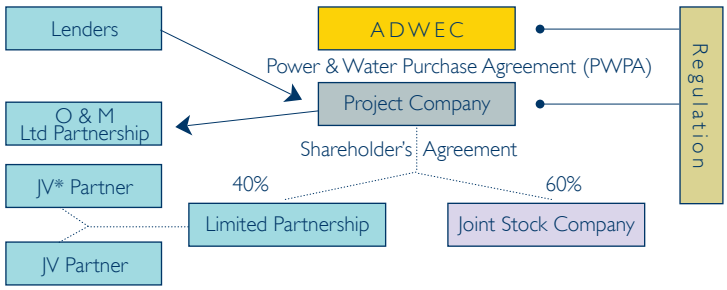
Production

The production of electricity and the desalination of water are dominated by large-scale operators using conventional technologies such as gas turbines and thermal desalination, common in the region. Such arrangements, where depleted steam from steam generators is used to help desalinate water, are known as co-generation operations. However, emerging alternatives are also in use, including wind and solar power for electricity and reverse osmosis (RO) for water.

Private large-scale water and power production

The majority of large-scale production companies are privately operated and partly owned (40%) by foreign investors. All electricity and water output is sold to the Abu Dhabi Water and Electricity Company (ADWEC), known as the Single Buyer. This model creates a high level of certainty between producers and ADWEC through long-term (typically 20 years) Power and Water Purchase Agreements (PWPAs), more commonly referred to as 'off-take agreements'.

Typical IWPP structure



** JV = joint venture*

The Bureau regulates only ADWEC and each project company. However, we carry out a range of checks before issuing a licence to satisfy ourselves that the company has an appropriate financial position and the technical and managerial competence to carry out the regulated activities it is licensed to undertake.

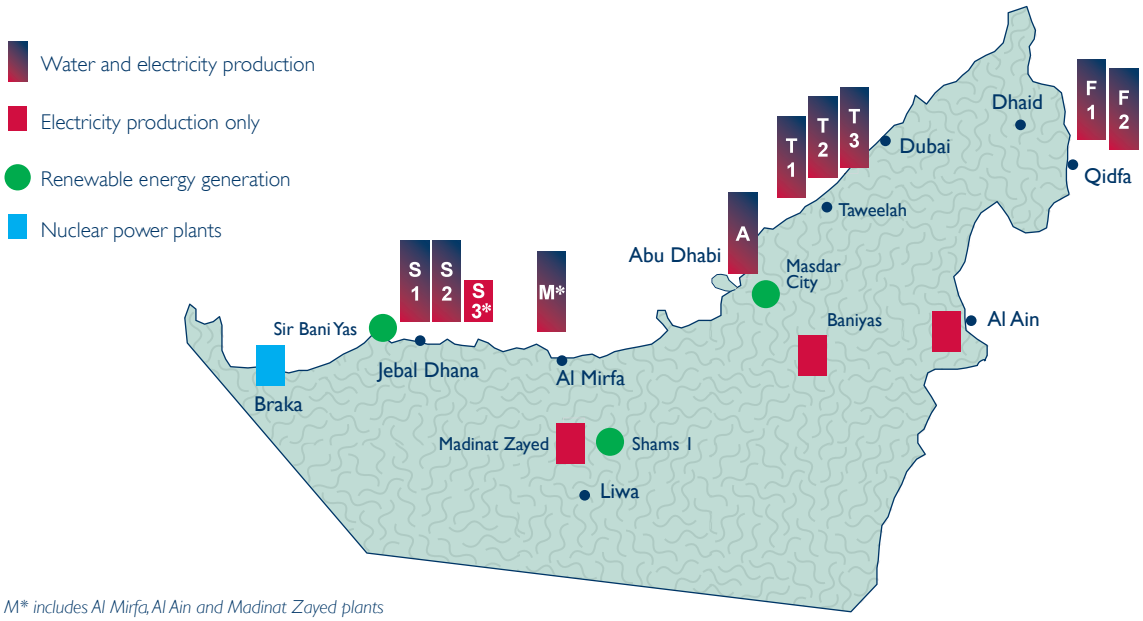
Two or more JV partners may own 40 percent of a project company but the Bureau ensures each entity does not collectively own more than 25 percent of the market by capacity.

Production sites

Most production sites are located along the coast, as they need water to raise steam in boilers to drive steam turbines. This increases efficiency and creates large quantities of water for the thermal desalination process to turn into drinking water.

The most efficient generation combination consists of gas turbines with the very hot exhaust gases from these turbines directed to boilers to raise steam. The steam is used to power turbines which in turn drive more generators. These steam turbine generators produce additional electricity without the need for significantly more fuel. This is known as 'combined-cycle generation'.

Gas turbines operating in what is known as 'single-cycle mode' do not use steam to drive the generators and consequently can be sited inland, but they are less efficient than combined-cycle plants.



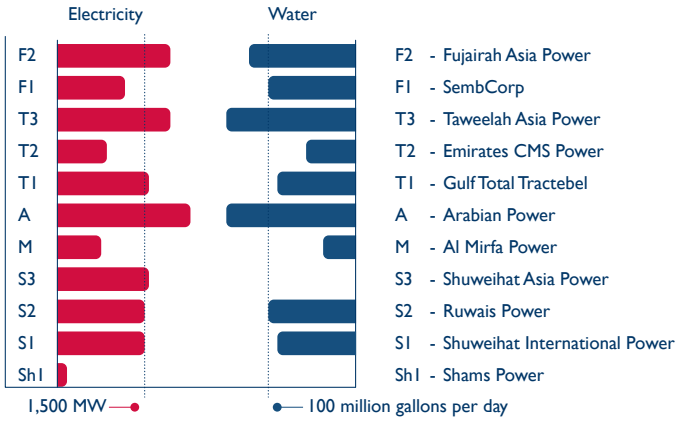
M includes Al Mirfa, Al Ain and Madinat Zayed plants*
S3 and nuclear power plants* under construction*

Water production

All production sites along the coast use the combined-cycle method to produce electricity. The waste steam from the turbines is passed to a desalination unit which uses thermal desalination techniques to produce potable water. The majority of potable water production in the Emirate uses this method, which does not require significant quantities of extra fuel, and is thus highly efficient. Such plants are known as 'co-generation plants'.

Also used in the Sector is reverse osmosis (RO), a non-thermal process whereby power (electricity) is used to pump sea water through a series of membranes to produce potable water. However, at the moment these plants are located in the east of the UAE in Qidfa (Emirate of Fujairah) because this area is less salty than the Gulf.

Major production companies - output capacities



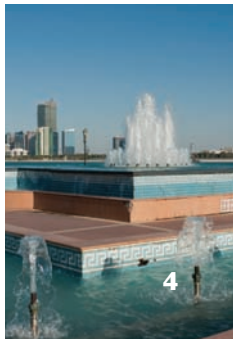
Renewable energy generation sources

In addition to conventional generation utilising gas, renewable energy (RE) sources are now being developed in the Emirate. In 2008, we issued the first licence for a small (less than 1 MW) wind turbine on Sir Bani Yas Island in Al Gharbia (the Western Region). Further RE technology developments are also in operation, such as the Masdar City photovoltaic 10 MW generation plant just south of the main city of Abu Dhabi. This development is part of a wider plan to provide renewable energy to the whole of this Masdar City in the future.

Both these small-scale plants connect with the Sector via the electricity distribution system; this arrangement is known as 'embedded generation'.

Furthermore, Shams 1, one of Masdar's flagship projects, is a 110 MW concentrated solar power plant under construction in Madinat Zayed, also in Al Gharbia. The plant will be commissioned in 2012 and will be connected to the transmission network.

All such generation is licensed by the Bureau, which also informs the Government on suitable Green Tariffs such plants should attract in the future.



The Single Buyer (ADWEC)

ADWEC is the Single Buyer of all water and electricity from production plants which connect to the Sector's transmission grid, utilising long-term Power and Water Purchase Agreements (PWPAs). The cost of purchasing power, water and gas plus ADWEC's operational costs form the basis of what is called a Bulk Supply Tariff (BST). This tariff is in effect the wholesale power and water tariff for the Sector, and must be approved by the Bureau each year prior to publication.

The BST represents between 50 and 60 percent of total Sector costs.

Transmission

The transmission and despatch of water and electricity in the Emirate is carried out by the Abu Dhabi Transmission and Despatch Company (TRANSCO). Transmission grids are the backbone of any utility supply chain such as gas, electricity and water. They form the strategic link between the production of power and water and the provision of these vital resources to consumers via local distribution networks. TRANSCO operates a load despatch centre in the capital and is responsible for making sure producers have sufficient 'real-time' generation and water capacity available to meet continuously varying customer demands.

Distribution / supply

Two companies are currently responsible for the distribution and supply of power and water in the Emirate of Abu Dhabi: Abu Dhabi Distribution Company (ADDC) and Al Ain Distribution Company (AADC). Distribution and supply are two distinct activities which the companies are licensed to carry out and account for separately. Distribution is traditionally the physical link between a transmission company and final users (customers).

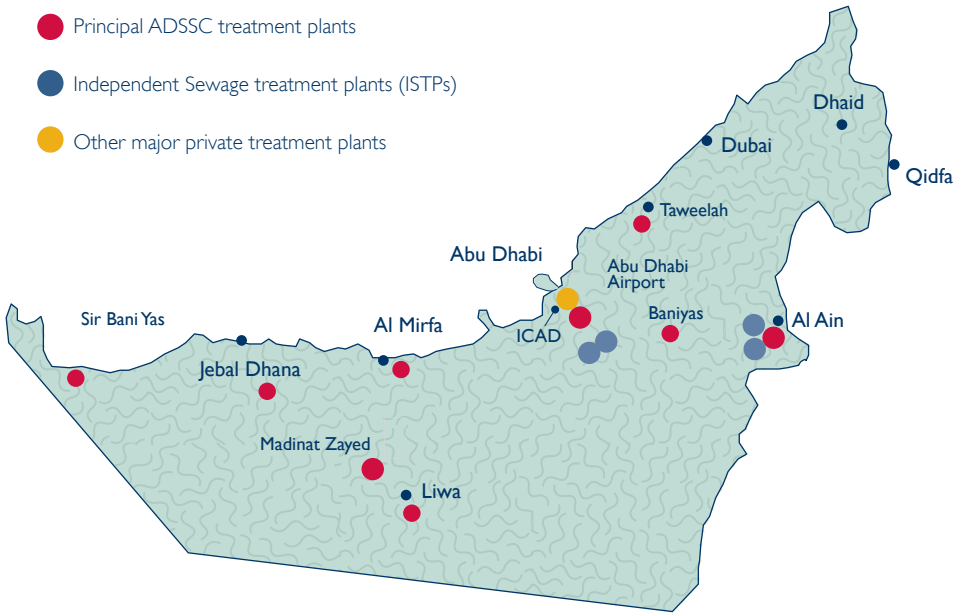
Wastewater

The three regulated activities in the wastewater sector are wastewater collection, treatment and disposal. Wastewater from domestic, commercial or industrial customers is collected using a network of sewers and pumping stations and transferred to one of over twenty wastewater treatment plants located throughout the Emirate, where it is treated to a high standard suitable for disposal or reuse.

Independent Sewerage Treatment Plants (ISTPs)

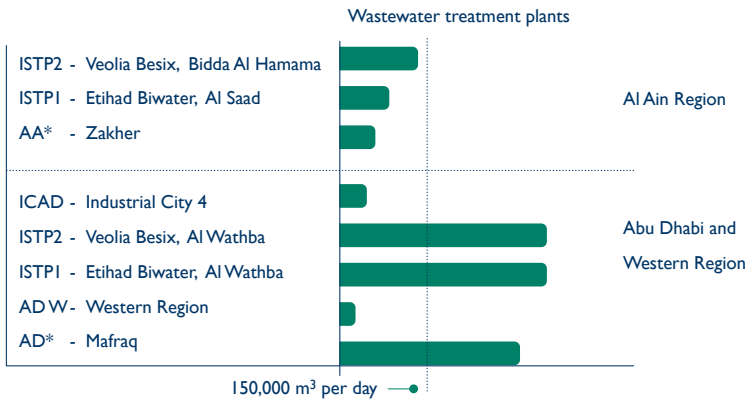
Currently there is only one major provider of the full range of wastewater services, namely Abu Dhabi Sewerage Services Company (ADSSC). However, new private wastewater treatment plants have been established to take wastewater from ADSSC, treat it and then return the treated product to ADSSC. The model for these companies is similar to the IWPP project finance arrangements described earlier, in that 60 percent of a company's equity is owned indirectly by the Abu Dhabi Government. The remaining 40 percent is privately owned. However, both these major ISTP companies are established on a build, own, operate and transfer (BOOT) basis rather than the BOO system employed in the production sector.

The two major wastewater treatment plant licence holders (ISTPs) are licensed by the Bureau and are subject to the same form of controls as any other licence holder in the Sector.



Major wastewater treatment plants

The main plants in terms of treatment capacity and their location are given below.



** to be decommissioned in 2012*

Sector customers

Demand

Customer demand for both water and electricity continues to grow, and to a large extent reflects the expansion of the Emirate. The diagram below shows the number of units supplied in any one year but is not a measure of peak demand, which normally occurs in the latter part of the summer when many people return to Abu Dhabi for the start of the new school year.

2010 total annual unit demand

Customer connections 2010

To some extent, annual growth reflects customer connections, but much depends on the type of connection; for example, a large industrial connection will use much more energy or water than a residential customer in a small flat.

Electricity customers	>370,000	Street lamp connections	>200,000
Water customers	>270,000	UAE nationals residential electricity connections	> 70,000
Wastewater (est.)	>290,000	Expatriate residential electricity connections	>150,000

> = greater than

02

The Bureau's duties and responsibilities

The Regulation and Supervision Bureau

The Regulation and Supervision Bureau (Bureau) is the independent regulator of the water, wastewater and electricity Sector in the Emirate of Abu Dhabi. Its powers, duties and functions are set out in various Abu Dhabi laws. The main duty of the Bureau is to ensure secure supplies of electricity and water to the people of the Emirate of Abu Dhabi. However, the laws also impose a range of general duties on the Bureau; this section explores how we regulate the Sector to ensure the overall objectives of all Sector companies are met in full.

In regulating electricity, water, sewerage, wastewater treatment and disposal, we are responsible for the protection of public health, the environment and customer interests while minimising any public nuisance from these activities.

Regulation

The need for regulation is brought about due to the monopoly status of many of the companies operating in the Sector, namely transmission, distribution and other network companies including wastewater collection. When receiving services or products from a monopoly company, a customer has no real choice as to the provider.

Therefore, where companies, which may be privately-owned, are structured to provide monopoly services, regulation is the only real alternative to full government ownership. Regulators everywhere have a primary duty to protect the rights of customers from potential abuses monopoly entities might wish to exercise. How such protection is administered varies from one sector to another, but the practices employed by the Bureau are in common use elsewhere, especially in power and water utility regulation.

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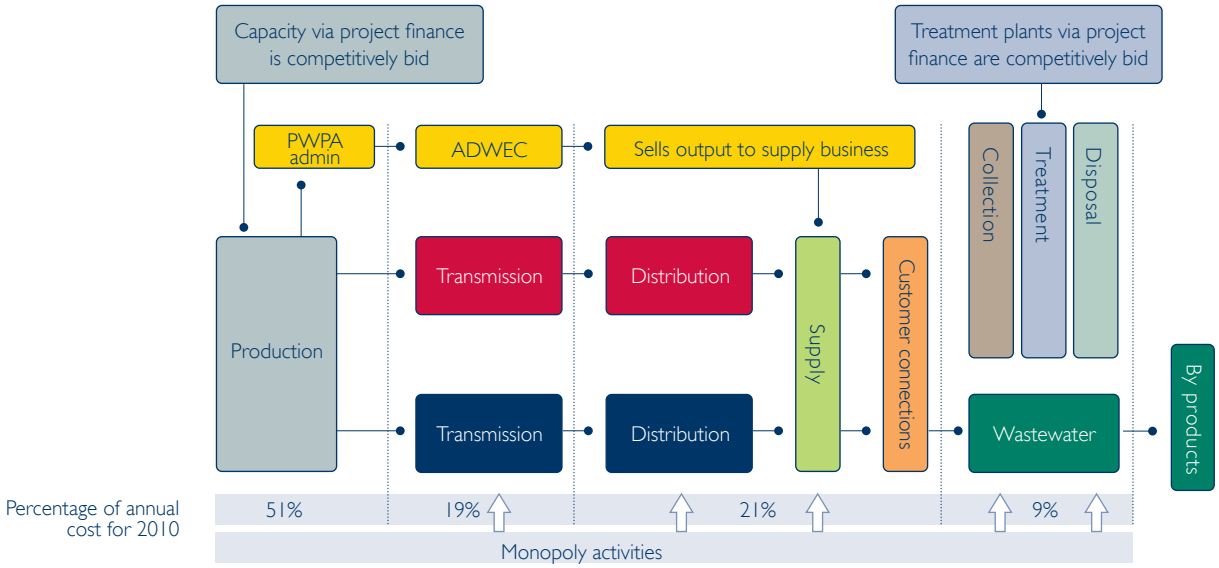
Competitive and monopoly utility service companies

The following diagram illustrates how the Sector can be divided into monopoly and competitive operators. In the Abu Dhabi Sector the competitive part is dominated by the prices at the time of each bid to build a project company rather than by, for example, the daily bidding process which occurs in electricity pools elsewhere.



Regulation as practised by the Bureau is concerned with both economic and technical matters regarding all aspects of each licence holder's activities.

- Technical regulation through the application of:
  - Regulations
  - Operating codes/security standards
  - Licence conditions
- Economic regulation through the application of:
  - Price controls
  - Competitive bidding
  - Licence conditions

Licences

Any company wishing to undertake a range of regulated activities in the Sector in the Emirate of Abu Dhabi is required to obtain a licence from the Bureau. Regulated activities include: generation, desalination, transmission, distribution, supply and the full range of wastewater services.

Licences are a key controlling instrument, and their issue is often a complicated affair as we must ensure applicants possess the necessary operational and management skills to carry out an activity. They will also need to meet a range of financial and legal checks.

Some licences are time-banded, but all will contain a range of conditions including market share constraints, health, safety, environment and operating conditions. In law, we have the right to remove a licence should the licence holder fail to comply with the terms of their licence conditions.

Fees, income and reporting

All licences contain a condition concerning the payment of fees to the Bureau in order for us to carry out our duties. This is a unique aspect of regulation in the UAE in that we are not funded by government, but by the very companies we license and regulate. This provides a degree of financial independence and means that the Bureau is defined more as a non-governmental organisation (NGO) or semi-governmental and not as a government department.

The Board of directors is appointed by the Chairman of the Executive Council for a period of five years; their reporting structure is to the Executive Council.

Technical regulation

Various controlling documents exist to ensure world-class technical standards are met; some of the more important are listed below.

Regulations

These cover a wide range of subjects and are enforceable in law. They are normally associated with technical matters, and are issued subject to a wide consultation process with various stakeholders.

Operating codes

These codes are highly technical and deal with the operations of the Sector, for example voltage levels or connection requirements to a network. They are maintained by licence holders, but the Bureau must agree content and any changes.

Planning statements

As it is imperative that the Sector plans ahead, a number of licence holders are required to produce planning statements as part of their licence conditions. Examples include ADWEC's 7-year generation expansion plan and network companies' 5-year expansion plans.

The forward-looking time requirements (in years), generally reflect typical planning and implementation horizons.

Codes of practice

These are generally concerned with the way customers are dealt with by customer-facing companies (such as those involved in water and electricity distribution and wastewater collection activities). They are normally produced in conjunction with these companies, who are then required to publish them.

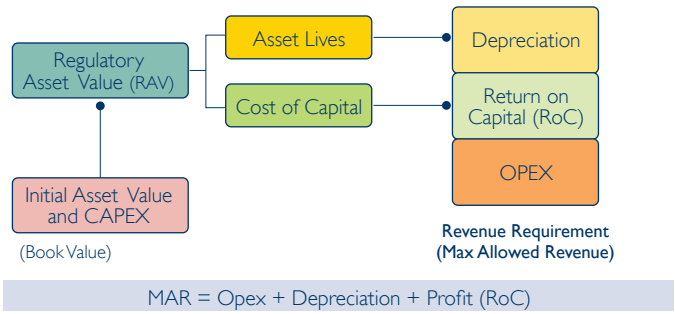
Economic regulation

Price controls

Network licensees and ADWEC are regulated using 'price controls'. Such controls limit the prices and revenues that licensees can recover from customers and include performance standards to protect the quality of service.

The price controls on network licensees are set by using a building block approach to determining regulated revenue. This is illustrated in the diagram below, with each licensees' Maximum Allowed Revenue (MAR) being made up of an estimate of its operating costs, regulatory depreciation and regulatory returns.

Revenue requirement determination – basic model



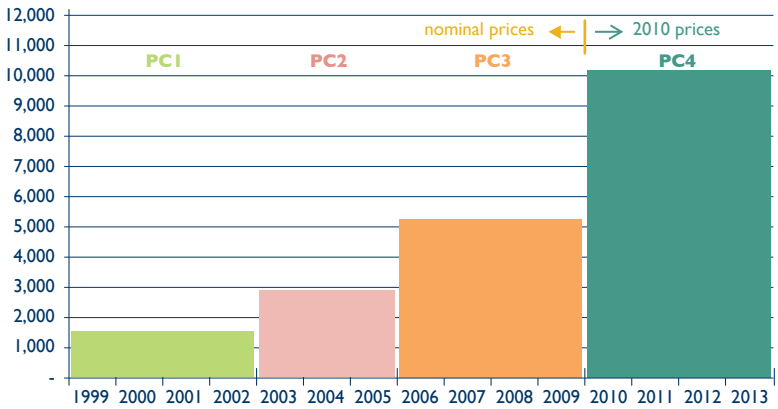
MAR = Opex + Depreciation + Profit (RoC)

Should a company spend more than its MAR (perhaps to fund increasing capital expenditure), it can borrow to fund the cash short fall and so it should always be able to fund efficient investment. Such investment would be added to the regulatory asset value and so will increase the MAR over time, allowing the company to pay back its borrowings.

The intention behind price control regulation is that it encourages efficiency while protecting quality of service. Price controls are typically set for periods of 4 or 5 years, during which time the licensee and its shareholders benefit from any efficiency gains above the target levels envisaged in setting the price control. After this time the process of price control review and resetting provides an opportunity to share these benefits with customers.

Price controls work best when there is active shareholder pressure to improve efficiency and performance.

Network MAR-average over PC period (AED million)



Annual information submissions and price control returns

In order to undertake the price-control reviews and set new controls, each company is required to submit annual data submissions. This data is gathered for the company by independent technical and financial auditors with the intention of ensuring accuracy and transparency.

Capital expenditure reviews (capex)

Water, wastewater and electricity networks are capital-intensive industries, where capital costs (depreciation and return on capital) account for the majority of each company's costs. It is therefore important to ensure that the capital expenditure of these companies is undertaken efficiently. Because of this, we carry out a detailed analysis of how such capital is spent 'after the event' using the criteria below:

- the capex was required to meet growth in customer demand or relevant security and performance standards; and
- the capex was efficiently procured (procurement to be interpreted both in relation to the tendering process and to project management).

We then appoint independent consultants at the end of each price control period to assess the efficiency of the capital expenditure in that period against these criteria. Where necessary we make appropriate adjustments to the price controls to ensure that only efficiently-incurred costs are remunerated.

مكتب التنظيم و الرقابة
Regulation & Supervision Bureau

P.O.Box 32800 Abu Dhabi,
United Arab Emirates
Email: bureau@rsb.gov.ae
www.rsb.gov.ae

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