



USAID | **JORDAN**
FROM THE AMERICAN PEOPLE

AMMAN WATER MANAGEMENT/ COMMERCIALIZATION ASSESSMENT

PHASE ONE REPORT: COMPARATIVE EVALUATION AND RECOMMENDED ORGANIZATIONAL MODEL

JANUARY 2006

This publication was produced for review by the United States Agency for International Development. It was prepared by SEGURA/IP3 Partners LLC under the SEGIR Privatization II Indefinite Quantity Contract No. AFP-I-00-03-00035-00, Task Order No. 539.

Acknowledgments

The Contractor and consultant team would like to express their thanks and appreciation to the following agencies, their senior management and staff, for the valuable support during the preparation of this report: Hashemite Kingdom of Jordan, Ministry of Water and Irrigation (MWI), Water Authority of Jordan (WAJ), Program Management Unit (PMU), United States Agency for International Development (USAID), Aqaba Water Company, Suez Lyonnaise, Montgomery Watson Arabtech (LEMA).

The following individuals, listed alphabetically, comprised the professional team that participated in the preparation of this report: Ibrahim Alqam (Financial Analyst), Patricia Bakir (Public Relations), Vince Byrne (Utility Specialist), Jerome Donovan (Legal Counsel), David Jankofski (Regulation), Bernardo Gomez (Financial Analyst), Loay Hidmi (Water Engineer), Ala Khalifeh (Legal Counsel), Zaid Qursha (Legal Counsel), Klas Ringskog (Economist), Jorge Segura (Economist), Tarek Tarawneh (Engineer), Kenneth Wright (Human Resources), Guillermo Yepes (Project Technical Advisor), and Jose Valdez (Resident Chief of Party).



AMMAN WATER MANAGEMENT/ COMMERCIALIZATION ASSESSMENT

PHASE ONE REPORT: COMPARATIVE EVALUATION AND RECOMMENDED ORGANIZATIONAL MODEL

DISCLAIMER

In preparing this report, the authors relied on information and data supplied by officials of the Government of Jordan and LEMA; the authors have not independently verified this information and data.

The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

Acronyms

AIC	Average incremental cost
ASEZ	Aqaba Special Economic Zone
ASEZA	Aqaba Special Economic and Zoning Authority
AWC	Aqaba Water Company
BOT	Build Operate and Transfer
CAPEX	Capital Expenditure Program (also referred to as CIP)
CIP	Capital Investment Program
DBO	Design Build and Operate
GAM	Greater Amman Municipality
GIS	Geographic Information Systems
HR	Human Resources
IT	Information technology
JD	Jordanian Dinar
JVA	Jordan Valley Authority
LEMA	Suez Lyonnaise, Montgomery Watson Arabtech. Private Consortium in charge of management contract in Amman
MCC	Mixed Capital Company
MIS	Management Information Systems
MoL	Ministry of Labor
MWI	Ministry of Water and Irrigation
NEWCO	New Company
NRW	Non revenue water
O&M	Operations and maintenance
OPEX	Operation and Maintenance Expenditure Program
PSP	Private Sector Participation
QIZ	Qualified Industrial Zone (industrial parks)
UFW	Unaccounted for water
USAID	United States Agency for International Development
WAJ	Water Authority of Jordan

Units

km ²	Square kilometer
Kw-h	Kilowatt-hour
lcd	Liters/capita per day
mm ³	Million cubic meters
mm ³ /year	Million cubic meters per year

Currency equivalents (2005)

1 JD	= 1.43 US\$ dollars
------	---------------------

CONTENTS

- Executive Summary i**
- Main Report 1**
 - Chapter I: Scope of Work and General Information..... 1**
 - 1. Introduction 1*
 - 2. Methodology of Analysis..... 1*
 - 3. Jordan Highlights..... 1*
 - 4. The Water and Wastewater Sector 2*
 - 5. Sector Organizations 3*
 - Chapter II: Comparative Analysis – Organizational Effectiveness; LEMA and AWC 4**
 - 1. Background and Methodology..... 4*
 - 2. Analysis of LEMA Operations 5*
 - 3. Analysis of AWC Operations..... 10*
 - 4. Comparataive Analysis..... 13*
 - 5. Conclusions..... 17*
 - Chapter III: Organizational Options..... 21**
 - 1. Introduction 21*
 - 2. Scope of Service 21*
 - 3. Public-Private Roles..... 22*
 - 4. Risks..... 28*
 - 5. Regulation..... 28*
 - Chapter IV: Recommended Options..... 29**
 - 1. Introduction 29*
 - 2. Non-responsive Options..... 30*
 - 3. Recommended Model 31*
 - 4. Financial Arrangements and Financial Scenarios 33*
 - 5. Implementation Plan 39*
- Annexes**
 - Annex A: Water and Wastewater Services in Amman..... A-1**
 - Annex B: Water and Wastewater Services in Aqaba and Financial Scenarios..... B-1**
 - Annex C: Human Resources..... C-1**
 - Annex D: Subsidies D-1**
 - Annex E: Selected Financial Scenarios..... D-1**

EXECUTIVE SUMMARY

Section 1 Background

SEGURA-IP3 was selected by Jordan's Ministry of Water and Irrigation (MWI) and the United States Agency for International Development (USAID) to analyze various organizational models and recommend a suitable one for providing water and wastewater services for Greater Amman following the expiration of the contract with Suez Lyonnaise, Montgomery Watson Arabtech in December 2006. The project was organized into three phases:

Phase 1: Options Analysis and Recommended Model

Phase 2: Planning Process – Feasibility Study

Phase 3: Implementation – Management Transfer

To accomplish its assignment, SEGURA-IP3 used the services of a multidisciplinary expatriate and local team of experts working in close cooperation with a Project Development Team (PDT), comprised of officials from MWI, the Water Authority of Jordan (WAJ) including the Project Management Unit (PMU) and USAID. The team conducted repeated interviews with government officials, mainly from MWI and WAJ, as well as with executive personnel of the Aqaba Water Company (AWC) and LEMA. Extensive data collection included the review of key performance documents and raw data provided by LEMA, PMU and AWC. Review and validation of findings were conducted through a series of PDT meetings. Using the resulting data and drawing upon their broad range of international experience in water sector management and Private Sector Participation (PSP); the consultants have developed a proposed organizational model for management of Amman Water and Wastewater Services.

This Executive Summary is organized as follows:

- Section 2 – Organizational Models Reviewed
- Section 3 – Relevance of Organizational Models to Amman Water Management
- Section 4 - Recommendations
- Section 5 - Proposed Organizational Model
- Section 6 - Implementation Plan

Section 2 Organizational Models Reviewed

The consulting team analyzed a range of organizational models that are supported by WAJ law and are relevant to Amman. They are:

1. Management contract¹
2. Lease
3. Concession
4. Mixed capital companies
5. Public companies

All models are meant to promote efficiency and quality of service through the design and implementation of appropriate incentives. The options are characterized as follows:

¹ Under management, lease and concession contracts, the government retains ownership of assets.

1. **Management contract.** Management of services is delegated to the private operator. The government is responsible for the planning and financing of the Capital Expenditure Program (CAPEX) and Operational Expenditure Program (OPEX). The operator is compensated mainly by a fixed management fee and performance incentives and, thus faces low risks.
2. **Lease.** The private operator is responsible for the management, operation and maintenance of the assets, which are financed from tariffs.² Government is responsible for CAPEX. The level of risk to the operator is higher than in a management contract.
3. **Concession.** The private operator is responsible for management, maintenance, and OPEX and CAPEX, which are financed from tariffs. The level of risk to the operator is significantly higher than in a lease contract.
4. **Mixed capital companies.** The government partners with a private investor to enter into different types of contracts such as management, lease, and concessions. Usually the private partner retains a minority ownership but is responsible for the management of the company.
5. **Public companies.** Delivery of services is entrusted to an independent company owned by the government. The company operates under commercial practices closely resembling those of the private sector.

Section 3 Relevance of Organizational Models to Amman Water Management

After extensive consultation with the Project Development Team (PDT) and other staff of MWI, WAJ and PMU, the consulting team reached the following conclusions:³

1. LEMA has contributed significantly to improvements in service levels, but its contract has structural limitations and reached its limit, due to: a) low performance incentives; b) split of OPEX and CAPEX responsibilities; c) dual personnel systems with civil service employee restrictions; d) lack of integrated financial, capital, and development planning; e) no control over tariffs; and f) dependence on government procurement rules.

Therefore, the consultants consider that neither a revised contract with LEMA, nor a full re-bid for a new management contract is a desired solution for Amman.

2. Alternative organizational models that involve private investors like lease, concession and mixed capital companies are not considered feasible at this time. These models were analyzed and ruled out as feasible options for the immediate future for the following reasons:

- Considerable risks associated with lack of an explicit tariff policy and uncertainties of water availability to Amman in the medium to long term.
- Operators/investors specialized in water management are currently retrenching from international investment commitments.
- It is not advisable to bring in large-scale private participation until a more suitable organization—one that is more independent, self-sufficient, efficient, and free from major government limitations—has been in operation for some time to lower the risks to an operator and bring more value to WAJ.

² Under the lease and the concession option, the tariff setting process is critical to determine investor's risk and willingness to participate.

³ A complete discussion of alternative models and a comparative analysis between AWC and LEMA is included in the main text.

3. Although the conditions in Amman and Aqaba differ in important aspects, AWC's fundamental organizational and legal structure has many positive features that should be considered as part of a future organization in Amman. These include:

- Substantial autonomy in the management of financial resources;
- Corporate governing structure involving participation of other stakeholders (Aqaba Special Economic and Zoning Authority—ASEZA);
- Greater organizational accountability with all functions under an appointed General Manager;
- Financial sustainability with adequate revenues to finance capital investment; and
- Unified personnel system with flexibility and incentives for improved personnel performance.

4. With a new organizational and legal structure—including full independence of procurement and civil service regulations—the core of LEMA's operational structure should be maintained as it is capable of sustaining operations in the near term.

LEMA has done a good job of implementing systems and procedures and training staff to provide services in Amman. Provided that competent senior personnel (existing and/or new) are appointed and trained in close cooperation with LEMA before its departure, and all efforts are made to retain qualified staff, the provision of services can continue in the short term without any significant impacts to services provided.

Section 4 Recommendations

The consultants for the management of Amman Water and Wastewater Services recommend a model that includes the following:

1. Creation of an independent company

This company would be in charge of all aspects of water distribution and wastewater collection. It would be: a) an independent organization, b) financially self-sustainable, with revenues adequate to cover all operating and maintenance expenses and needed investments, and c) managed and operated by capable and professional staff.

2. Adopt the existing core LEMA organizational structure

The existing LEMA organizational structure would form the core of the new company. New responsibilities would be added as needed. For instance, strategic planning functions related to the integration of finances with long-term capital investment and operation and maintenance (O&M) needs would be implemented through a specialized unit.

3. Assign to the company all necessary rights and responsibilities to carry out their function

The new company would have all necessary legal powers to exert full management responsibility for the provision of services. The powers conferred would be in accordance to WAJ and Companies Law and should count on Cabinet approval.

4. Transfer all assets to the company

All fixed and movable assets would be under the control of the new company to ensure that they are adequately maintained and replaced when necessary.

5. Implement a one-time start-up project to promote short term service improvements

While WAJ has allocated substantial funds for rehabilitation and improvements, the number of pipe breaks and stoppages in the wastewater collection system are still substantially above best international practices. Therefore, there is need to allocate funds to make urgent improvements closely linked to well targeted quality of services objectives. This project should be managed by NEWCO as part of its launching process and completed within a 4-5 year period. While this start-up project is independent of the financial viability of the proposed company, it would certainly help to accelerate improvements in the quality of service, particularly in providing a continuous water supply.

Section 5 Proposed organizational model

Based on the previous analysis, conclusions and recommendations, the consultant team proposes the creation of a new company—from here on referred to as “NEWCO”—with the following main characteristics:

1. Legal structure

NEWCO would be created as a Private Shareholding Company (subject to approval by MWI). The consultants recommend this option because:

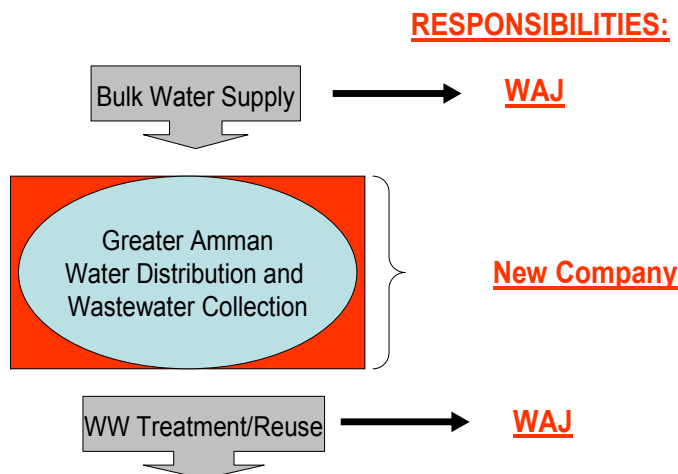
- It combines the best features of a Public Shareholding Co. and a Limited Liability Co., providing for the most flexibility.
- It will signal to both the private sector and the general public that WAJ’s eventual goal is to involve the private sector, Jordanian companies in particular.
- It would allow NEWCO to promote private sector financing.
- It would allow WAJ, as the main shareholder, to have preferential shares—golden share attributes—and thus have special powers over share capitalization, selling of shares by minority shareholders, distribution of dividends, and water resources issues.

2. Delineation of responsibilities

NEWCO will have clearly delineated responsibilities with physical and institutional boundaries in the Greater Amman service area. NEWCO would be responsible for services now provided by LEMA which include: water treatment and distribution, wastewater collection and limited wastewater treatment. Bulk water provision –existing and new sources (Zara Ma’in under construction) and wastewater treatment (As Samra, a BOT under construction) would remain the direct responsibility of WAJ.⁴

⁴ Current facilities operated by LEMA include: the Zai water treatment plant, well fields within the service area and two small wastewater treatment plants. The transfer of these facilities to WAJ or other facilities from WAJ to NEWCO (e.g., two small wastewater treatment plants under development –Main Report, Annex A-) would be assessed as part of the feasibility phase.

Characteristics of Recommended Model



3. Shareholders

NEWCO would be majority-owned by WAJ. The Greater Amman Municipality (GAM) and/or other entities could be invited to be minority owners once the MWI/WAJ approves the final feasibility result and assesses the benefits of this partnership. The corporate governance structure will reflect a strong participation of shareholders following principles of corporate governance and minority shareholder participation.⁵

A review of valuation of assets and alternative ways of transferring assets will be assessed before offering participation to new shareholders.

4. Transfer of assets

WAJ will transfer to NEWCO all necessary assets to operate the service.⁶ NEWCO will assume full responsibility for the registry, maintenance and replacement of these assets.

5. Finances

NEWCO would be fully financed by the revenues generated by the provision of services and would have complete independence in the management of its financial resources. Fees collected by NEWCO would remain within the business entity to pay for O&M costs following industry standards and finance required investments to meet growing needs of the population.⁷ WAJ, as provider of bulk water supply and responsible for wastewater treatment, would sign a supply-purchase agreement with NEWCO preserving its financial viability.

Taking into account approved tariff increases in 2005 and 2006, NEWCO would be able to generate enough revenue to cover full costs of operation, maintenance and investments. However, tariffs would

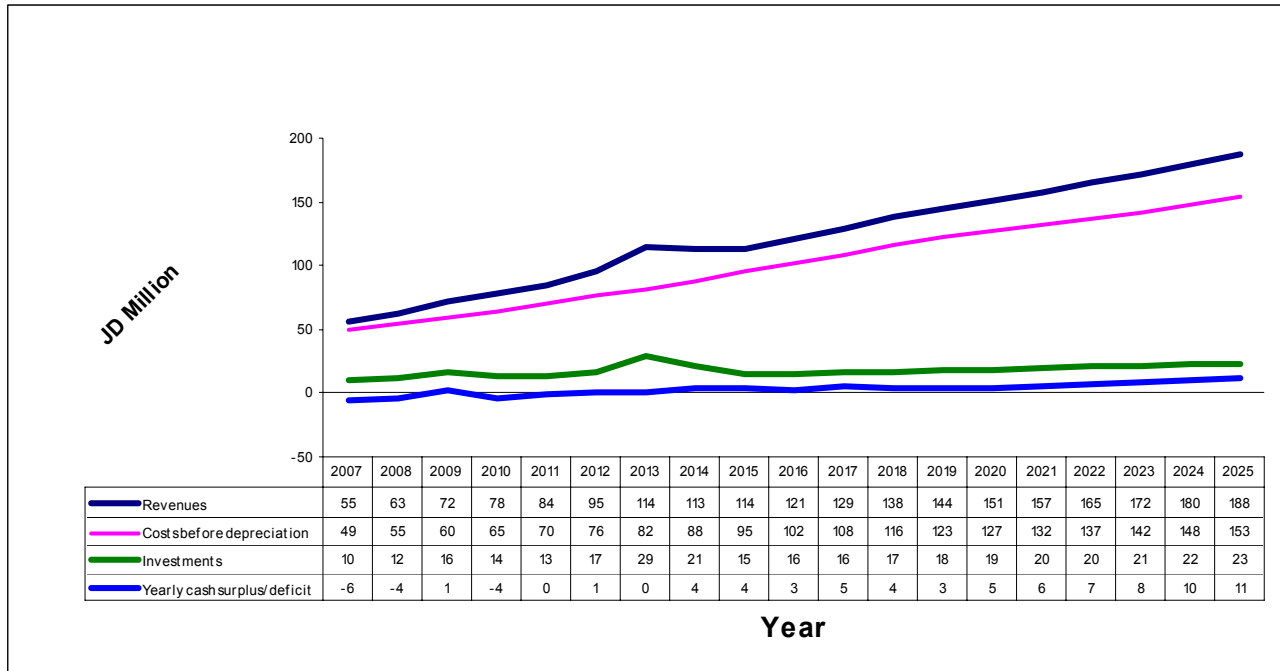
⁵ Strong minority participation to decide, for instance, on accounting practices, transparency and accountability matters, audit mandates and power delegated to officers.

⁶ Terms of transfer will be legally assessed during the feasibility study.

⁷ Estimates of maintenance and capital investment are presented in the main text.

need to be periodically adjusted to compensate increasing costs due to inflation⁸. Under this scenario, NEWCO would be able to internally generate funds⁹ of about JD 400 million in current prices between 2007 and 2025. This internal generation of funds would be adequate to finance the investments in the water distribution and the wastewater collection systems, estimated at JD 340 million.

**NEWCO’s financial viability
(with tariff adjusted for inflation)**



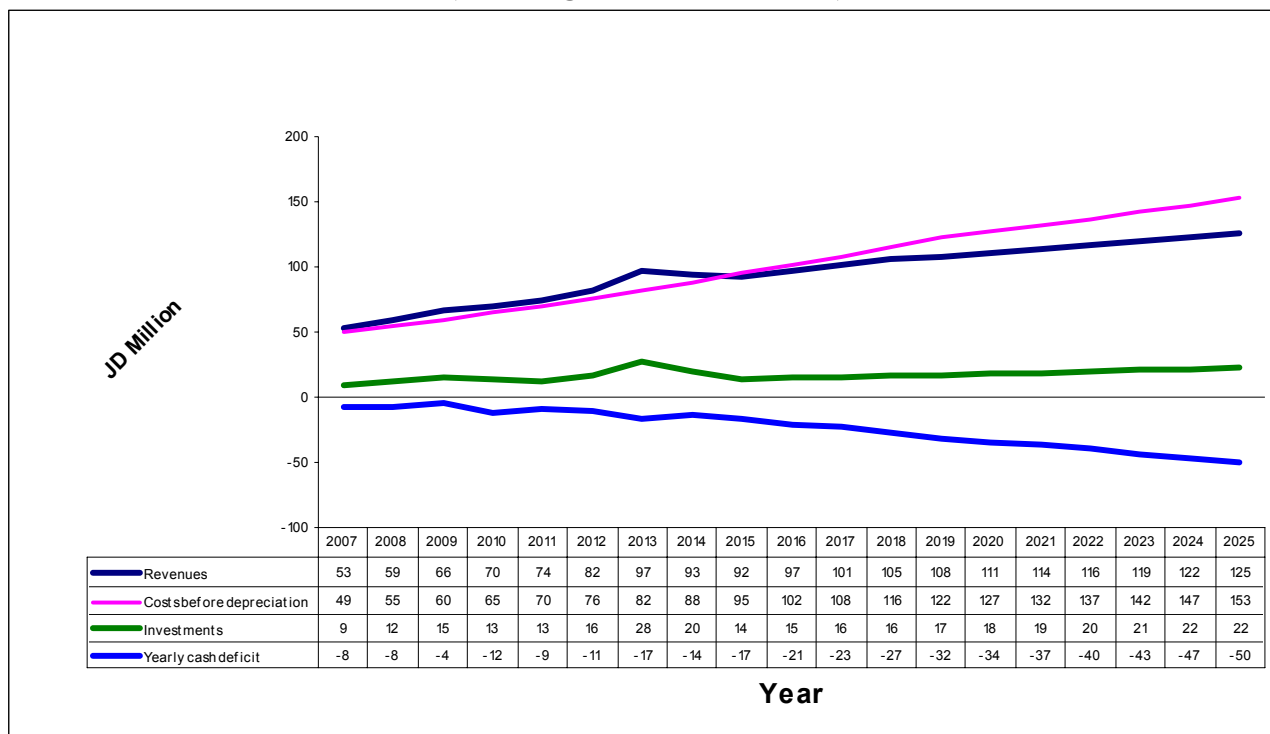
However, during the initial years of operation (about 4) NEWCO, like any new company, needs seed working capital to able from the start of operations to finance its investment plan. In fact, the investment estimated for the 2007-2010 period amounts to JD 65 million while the internal generation of funds amounts to JD 53 million. This JD 12 million financing gap would have to be covered with either loan financing, a government contribution or a combination of both. If the government chooses loan financing, NEWCO will be able to serve this obligation starting in 2011.

If tariffs are not adjusted for inflation NEWCO would not be in a position to generate internally enough cash to finance the investments in the expansion of the distribution system. The alternative of financing the planned investments with loans is not feasible, as NEWCO would have no expectations of a positive cash flow to service the debts. Under these conditions, the financial gap would have to be closed with government subsidies, which is an approach not consistent with the recommendations of this report, that is, the establishment and development of an autonomous and financially viable company.

⁸ Projections are based on the historical 2000-2004, average annual inflation of 2%.

⁹ Net internal cash generation is the income after covering all O&M expenses (without depreciation charges), less working capital requirements and debt service, if any.

**NEWCO's Fixed Tariffs Scenario¹⁰
(Including 2006 tariff increases)**



A detailed analysis of tariffs and subsidies is included in the main text. This analysis shows that tariff rebalancing to target better the subsidies to poor families, and reduce the subsidies to more affluent families could provide an additional JD 14 million per year to NEWCO.

6. Management structure

NEWCO would be governed by a General Assembly and a Board of Directors appointed by the General Assembly. The Board, in turn, would appoint the General Manager and delegate authority to him/her and its staff for NEWCO's day-to-day operations. The Board of Directors would have representation from professionals with business acumen to contribute technical and financial knowledge in the decision making process.

7. Personnel system

All workers at LEMA, WAJ-seconded and direct hires would be offered the opportunity to continue their employment with NEWCO under a unified personnel system.¹¹ NEWCO would mainly follow current LEMA personnel practices but an improved incentive structure would be introduced.¹²

¹⁰ With 2006 – 07 payments for bulk water and wastewater tariffs to WAJ.

¹¹ The transfer of WAJ seconded personnel should be carried out without affecting their government benefits and following procedures already implemented by AWC.

¹² A review of current personnel practices with recommended changes is included the report and would be further reviewed in the feasibility study.

8. Implementation issues

- **Technical assistance.** Even though NEWCO is capable of sustaining operations with its own personnel, technical assistance would be needed for the initial start-up of operations with the new management. This assistance should be mainly focused on operations, to offset the risks associated with the departure of LEMA's top-level staff and their replacement with new staff not fully familiar with the service.
- **Regulation.** The PMU would assume a regulatory role for NEWCO, to be clearly outlined in the company agreements.

9. Start-up Project

- **Purpose:** The proposed start-up project should support the achievement of well defined service improvements that could be clearly appreciated by consumers. One example of such a goal-driven project would be the development of infrastructure to a level where it could handle continuous supply without increasing the risk of additional water losses¹³. One of the overriding goals of achieving service improvements is to garner greater public support for NEWCO and for a rational tariff policy.
- **Main characteristics:** This project would be managed by NEWCO and would be a one-time effort. Defined improvements should also help improve the efficiency by reducing water losses and repairs that would contribute to water savings.
- **Cost and finance considerations:** Approximately JD 40-60 million is needed to show significant service improvements.¹⁴ Financing would be provided from a basket of funds combining donor and government contributions, funding sources should be promptly identified, given the lead time needed to get funds appropriations from different donors or government agencies. NEWCO's financial viability is independent of this project, though it would benefit greatly from its execution.
- **Timing:** The start-up project would commence within the first year of NEWCO's operations; the estimated project completion is 4-5 years.

Section 6 Implementation Plan

Once the government approves the preferred option ending Phase 1, Phases 2 and 3 will commence:

- Phase 2: Preparatory Process - Feasibility Study
- Phase 3: Implementation - Management Transfer

The success of the preparatory and the implementation processes depends on joint cooperation between the consultants, MWI/WAJ/PMU, LEMA executive personnel, and key personnel assigned to NEWCO early in Phase 2 with the understanding that they would assume management responsibilities once LEMA's contract expires.

¹³ This would be feasible after the Zara Ma'in project becomes operational and the start-up project is well under way.

¹⁴ An investment outline of this project is presented in the main text (Annex A).

Phase 2 - Preparatory Process – Feasibility Study

The preparatory process, a detailed feasibility study, would commence once the government approves the preferred option and a detailed work plan is agreed upon between the consultants, MWI/WAJ/PMU and USAID. The study would include a full evaluation of the technical, financial, organizational, legal, and human resource components of the service. Phase 2 would conclude with the presentation and discussion of the feasibility study results.

A key activity at the start of Phase 2 would be explaining to relevant stakeholders the government's plans for managing Amman's water and wastewater services, starting in January 2007. This is especially important for current LEMA staff (both LEMA direct-hire and WAJ-seconded staff), who need to be informed about their future prospects with NEWCO.

Phase 3 - Implementation process – Management transfer

Following the government's acceptance of the feasibility study and authorization to proceed, a memorandum of understanding would be drafted between the parties (MWI/WAJ/PMU and possibly GAM) that would include the terms of the transfer of rights and assets and the terms of the implementation of the new organization. More detailed actions would be contemplated during this stage, such as the completion of the legal structure, the organizational, financial, and technical implementation—including the company formation—and the transition activities up to the start of full independent operations.

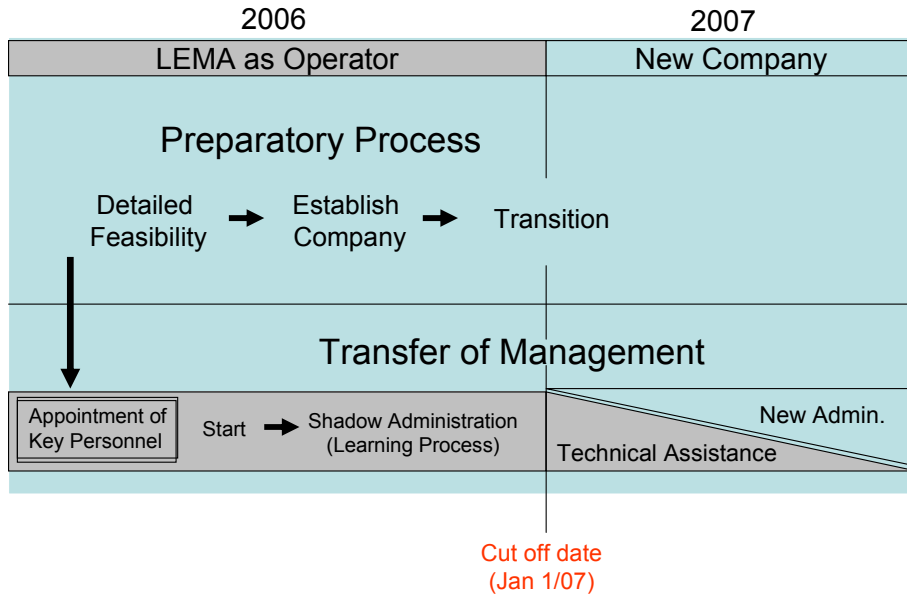
Some activities from both phases will be conducted simultaneously in order to facilitate and expedite the transfer process. However, the feasibility study must be completed and approved before any registration and or partnerships are established.

Next Steps

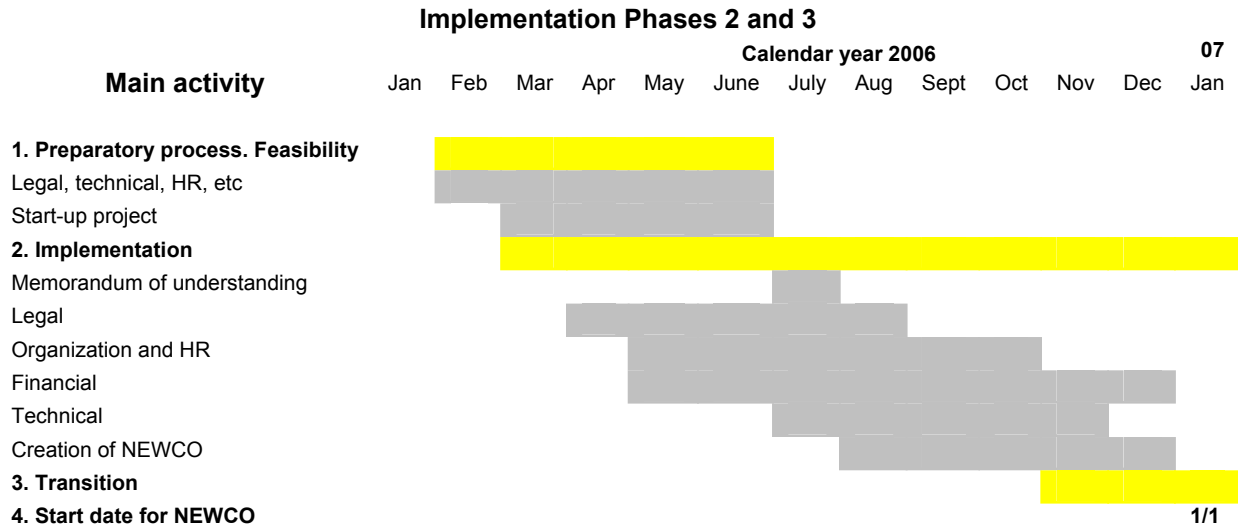
An important step in the creation of NEWCO is the appointment of key management personnel to work full time during the preparatory and implementation phases. Any personnel coming from MWI/WAJ or PMU would be relieved from their previous responsibilities. Personnel would be positioned to take responsibilities when NEWCO starts operations in January 2007. They would be part of the developmental process and undertake a shadow management responsibility.

At the start of the company's operations, technical assistance would accompany the new administration for a limited period.

Next Steps to Implement Recommended Model



Summary timetable for Phases 2 and 3



MAIN REPORT

Chapter I

Scope of Work and General Information

1. Introduction

The Ministry of Water and Irrigation (MWI) of the Hashemite Kingdom of Jordan and the US Agency for International Development (USAID) Mission in Jordan have retained the services of SEGURA IP3 Partners LLC Consultants, in collaboration with the Jordanian firms Interdisciplinary Research Consultants (IdRC) and Khalifeh & Partners (Law firm) to undertake the Amman Water Management and Commercialization Assessment over the period September 2005 to January 2007.

The assignment comprises three phases: Phase 1: Analysis of the organizational models of Amman (LEMA) and Aqaba Water Company (AWC), and recommendation of an organizational option for the provision of water and wastewater services in Greater Amman; Phase 2: Preparation of a feasibility study and detailed road map for the option selected by the government; and Phase 3: Providing assistance to the government in the implementation of the selected option. This report presents the analysis and recommendations pertaining to Phase 1.

2. Methodology of Analysis

In their assessment of LEMA and AWC, and in their analysis of responsive organizational options for Amman, the consultants were guided by two main considerations: a) that the proposed organizational model should be able to provide services of the highest quality to all the inhabitants of Amman; and b) that the new company should be sustainable in the long term and with the ability to generate adequate internal resources to meet service quality goals.

The report is divided into four chapters:

- Chapter 1 Discussion of the scope of work, methodology and general information about the country and the sector.
- Chapter 2 Comparative analysis of organizational models of LEMA and AWC and lessons learned.
- Chapter 3 Analysis of other organizational options applicable to Amman.
- Chapter 4 Recommended organizational model and main steps for the feasibility and implementation phases.

3. Jordan Highlights

Geography and climate. The Hashemite Kingdom of Jordan, with a surface of 92,300 sq. km. is strategically located in the heart of the Middle East. It borders Syria to the north, Israel and the West Bank to the west, the Red Sea to the south, Saudi Arabia to the southeast and Iraq to the east.

Jordan's climate is arid with small semi-arid areas close to the Jordan Valley. Annual rainfall varies from 50 mm in the desert to 600 mm in the eastern mountains close to the Jordan valley, but climatic conditions translate into a high level of evaporation (85%).

Population. The population of Jordan, according to the 2004 census was 5.35 million of which some 82% live in urban areas¹⁵. About 90% of the population lives in the central and northern areas of the country and 39% in the Amman Governorate. The combined effect of 70% of Jordan's population being under 30 and recent migration flows are likely to translate into high population growth and a total population that could reach 8 million by 2020. This growth will exert a significant pressure on public services and on water resources.

The economy. Jordan's economy is experiencing one of the most dynamic periods of growth in recent history, enjoying record levels of 7.7% in GDP growth for the first quarter of 2005, with services as the main contributor sector (78% in 2004). A parallel and significant increase in capital expenditures of about 30% in 2004 has also contributed to a reduction in unemployment rates, from approximately 19% in 1993 to 13% in 2004. Economic growth has also helped reduce the absolute level of poverty from 21% in 1997 to 14% in 2003.¹⁶

The export sector grew by 39% in 2004, due mostly to the increased dynamism in the 14 QIZ¹⁷ that multiplied the number of export companies from 2 in 1999 to 60 in 2004, contributing to almost 65% of total exports or US\$ 1.1 billion in 2004. Other indicators of a dynamic economic growth are the performance of the Amman Stock Exchange that increased its trading volume by 100% in 2004 raising its price index by 62%, and the construction boom and growth in construction licenses (22%) in 2004.

Jordan's recent economic profile has moved it up in the ranks as a leading destination for international and in particular, regional investors. Jordan is positioned as a modern state, thanks to an educated work pool, quality infrastructure, judicial independence, efficient legal framework and protection of minority shareholder's interests.

4. The Water and Wastewater Sector

Water resources. Yet, in terms of water resources, Jordan is the poorest country in the Middle East and one of the poorest countries in the world,¹⁸ with a per capita availability of 234 m³/year¹⁹ in 2000. According to the Water Poverty Index, Jordan's water resources only cover 16% of its food needs. Population growth is stretching these limited resources and it is projected that by the year 2025, water availability will be reduced to about 90 m³/capita/year.

The agriculture sector uses about 65% of water resources. Currently, the water supply sector is characterized by low efficiency, with unaccounted-for-water (UFW) in municipal systems estimated at 40% of production and quality of service below acceptable benchmarks.

Between 1995 and 1996, the First Water Strategy was formulated to manage water resources. MWI began an ambitious US\$ 2.4 billion program to develop a multi-pronged approach to foster system improvements. Currently, international donors contribute about 20% of the resources required to finance relevant projects in the sector.

¹⁵ Includes towns of 5,000 people or more as defined in the Population & Housing Census of 2004.

¹⁶ Absolute poverty level is defined as JD\$ 392 per capita per year.

¹⁷ Qualifying Industrial Zones are industrial parks in Jordan or Israel established in 1996 as part of the Middle East peace process support. The zones are granted immediate tariff and quota-free access to the U.S. market to goods produced in the QIZ and meeting specific rules of origin requirements.

¹⁸ The Hashemite Kingdom of Jordan, Ministry of Water and Irrigation, Water Sector Planning and Associated Investment Program 2002-2011. February 2002. Amman, Jordan.

¹⁹ A country is considered water-poor when its water resources are less than 1,000 m³/capita/year.

5. Sector Organizations

The main government agencies entrusted with water resources responsibilities in general and with drinking water supply and wastewater services are:

- **Ministry of Water and Irrigation (MWI).** Created in 1992 to manage the country's water resources, MWI is responsible for the formulation and implementation of water and wastewater development programs and for recommending water sector policies to the Council of Ministers.
- **Water Authority of Jordan (WAJ).** Established by law in 1988 as an autonomous entity with financial and administrative independence beholden to government and civil service regulations, WAJ was later incorporated into the MWI. WAJ is governed by a ten-member Board of Directors chaired by the Minister for Water and Irrigation, representatives of the Ministry of Planning, Agriculture and Health, as well as the Secretary-General of WAJ and the Secretary-General of the Jordan Valley Authority (JVA). WAJ's head is the Secretary-General and reports to the MWI.

WAJ is in charge of the implementation of policies related to the provision of domestic and municipal water and wastewater disposal services. Its responsibilities include the design, construction, and operation of these services, as well as the supervision and regulation of construction of public and private wells, licensing well drilling rigs and drillers, as well as issuing permits to engineers and licensed professionals to perform water and wastewater related activities. WAJ also submits recommendations to the Council of Ministers to set water policies, including tariffs.

Under Art. 28, the Council of Ministers, with the recommendation of the MWI, may assign any of WAJ's duties or projects to any other body from the public or private sector or to a company owned totally or partially by the WAJ.

The Program Management Unit (PMU), was established within WAJ to monitor the LEMA management contract and to oversee the capital investment program for the Amman area. The PMU's role has recently been expanded to monitor future private sector participation contracts in the sector.

- **Jordan Valley Authority.** The JVA was created in 1988 and given the mandate to develop the Jordan Valley and the area south of the Dead Sea. JVA was later incorporated into the MWI. JVA's responsibilities include: the development of water resources (irrigation, domestic, industrial and municipal), development of towns and villages; design and construction of road networks, domestic water supply, electricity, telecommunications and provision of tourist facilities.
- **Ministry of Health.** Defines and enforces water quality policies.
- **Environmental responsibilities.** WAJ and the Corporation for Environmental Protection share environmental responsibilities related to water resources.

Chapter II

Comparative Analysis - Organizational Effectiveness LEMA and AWC

This chapter examines the operations of LEMA and AWC to determine their effectiveness in providing water and wastewater services to their respective customer base. The chapter also compares each of the organizational models against the proposed organizational model to illustrate why it would work best for the future operation of the Amman water and wastewater systems.

1. Background and Methodology

LEMA's current organizational structure has been in place for six years; the organizational structure of AWC has been in place for less than two (through December 31, 2005). The marked differences in the operational characteristics of the two service areas relate to age and condition of facilities, density of service area, customer base and size, and topography. In addition, the water supply in Aqaba is continuous, while Amman's is not. A comparison of operational trends in order to paint a picture of the progress and strength of the organizations in these two cities is not meaningful, as AWC is still a very young organization.

Data for the two systems was not always comparable for several reasons, including the difference in the definition of terms, as well as a discrepancy in the time periods covered. Furthermore, reliable and comprehensive data measuring the operational performance of the organizations was not always available. These factors limit the equilibrium of any comparative analysis and may affect public perceptions about operational performance.

The analysis of the effectiveness of the organizational models of LEMA and AWC included the following factors:

- Evaluations of specific functional areas in each organization
- Measurement of the degree of utilization of internationally accepted "best practices"
- A comparison of contractual and business plan targets with actual performance, as well as comparisons with internationally accepted performance benchmarks based on companies in developing countries at similar stage of economic development.

Functional evaluation. The evaluations for LEMA and AWC are based on the following functional areas:

- General performance
- Management and organization
- Human resources
- Operation and maintenance
- Pricing policies and subsidies
- Customer base
- Financial situation and performance

Best practices. These have been analyzed based on internationally accepted “best practices” in the following areas:

- Strategic financial planning
- Capital improvement planning
- Annual budget with periodic monitoring
- Organizational development program
- Periodic reporting of reliable performance data
- Personnel policies, procedures, and employee benefits
- Procurement policy
- Rules and regulations for the provision of service
- Meter management program
- Information technology (IT) plan
- Water conservation program
- Public relations program
- Customer service outreach program
- Fair, transparent, and economically based tariff system

Contract performance. Each of the organizations operates under contract based upon certain performance objectives. During the analysis, the actual performance of each organization was evaluated against its performance objectives as specified in the management contract for LEMA and the business plan for AWC. These include non-revenue water (loss), response time for responding to leakage/burst reports, collection ratio, customers billed and illegal connections.

Benchmark performance. The organizations were evaluated using internationally recognized benchmark performance indicators:

- Percentage population served (water and wastewater)
- Water losses – unaccounted-for water
- Water losses per m³/day per km of mains
- Number of breaks per km of mains in service
- Number of employees per thousand customers
- Number of employees per thousand m³ of water sold
- Collection ratio, current ratio and accounts receivables

2. Analysis of LEMA Operations

Water and wastewater services in Amman are provided under a management contract awarded to LEMA by WAJ in 1999. The responsibility for supervising contract performance is under the jurisdiction of WAJ, which discharges this responsibility through the Program Management Unit (PMU). It is important to note that the LEMA management contract was the first such contract of its kind in the water and wastewater sector in Jordan.

The management contract provides LEMA with a management fee, incentives, and penalties based on performance, as measured against contractual benchmarks. The management fee was JD 1.6 million in 2004 and required LEMA to provide four expatriates as well as several other key employees and technical assistance. Performance awards over the past five years of the contract totaled JD 800,000 or JD 160,000 per year on average. The original contract was extended twice in the past six years, and several of the performance indicators were changed on the basis of agreements with PMU and WAJ. The current

management contract is due to expire on December 31, 2006. LEMA's technical and financial performance has been audited every year by independent auditors. This analysis has been largely based on these audits.²⁰

2.1 Overall performance

LEMA's provision of services to Amman has been generally good. As a profit-making company, LEMA receives incentives for improving performance, which have contributed to an ethic of hard work and increased efficiency, including numerous operational improvements that have contributed to increased cash surpluses²¹ and better service. The improvements have included:

- Greater use of information technology: Before LEMA, there were few computers and no IT department.
- Consolidation of the customer call-center function using automatic call directory hardware and software prevalent in well-operated utilities.
- Efficient meter-reading and billing: Use of hand-held computer meter-reading devices has increased efficiency and contributed to a reduction in un-billed accounts.
- Better response time in addressing break/burst reports.
- Reduction in non-revenue water.
- More hours of training for all employees.
- Better written procedures and policies.

Although LEMA has not met expectations in certain areas, its overall performance and contribution to the efficiency of operations has been positive. As the same time, as often happens when an organization becomes entrenched in the operation—there has been a tendency for LEMA to become complacent and resigned to the continuation of major system problems, and the penalties and bonuses established in the contract are not significant enough to promote behavioral changes in LEMA. This situation has contributed to LEMA's inability to make significant progress over the past 2 to 3 years in the major areas in need of system-wide improvement, reduction in water losses, for example.

Management and organization

In its six years operating the system, LEMA has made significantly improvements in efficiency. It has reduced staffing through IT, new equipment, and performance incentives. The expatriate employees and the technology of LEMA's parent organization have been important factors in explaining performance improvements.

LEMA's management contract required it to institute training programs to improve the technological capacity of the staff and to ensure the professional development and growth of second-tier management employees so that they may assume key positions in the future. While it is difficult to assess the growth of individual employees, there is a sense of potential among existing staff to take on managerial responsibilities. The level of training for all employees has been significantly improved by LEMA, and the company has been successful at meeting its contractual obligations in this area.

²⁰ The last audit report, dated May 1, 2005, was prepared by Shawn R. Niaki, Abt Associates and Ernst & Young and covers the period January 1, to December 31, 2004.

²¹ One indication of LEMA's performance has been the JD 5 million of surplus cash in FY 2004 in WAJ's revenue account. Prior to LEMA, the water/wastewater systems were generating a negative cash flow.

LEMA has a clear and transparent organization chart, with clear lines of authority, accountability, and responsibility. This type of top-to-bottom organizational structure has proven effective in the most successful water/sewer companies in the world. The hierarchical structure provides for clear accountability—an essential component to a successful operation.

On the other hand, a major flaw is the lack of periodic and accurate reporting of key data elements for all parts of the system. This is a critical issue since accurate data is essential in identifying and correcting system problems.

Although the LEMA contract is monitored by PMU, WAJ still exercises operational control. This dual reporting and coordination responsibility places an administrative burden on LEMA that results in delays in timely decisions.

Human Resources

LEMA has done a good job in improving staff productivity by reducing the total number of employees. At the start of the contract, there were approximately 1,600 WAJ employees. Currently there are about 1,300 total employees, with the number of WAJ- seconded employees totaling about 700. This was accomplished by LEMA in a difficult environment as human resource management has been one of the most difficult functional areas identified for LEMA (Annex C). These difficulties have their root in the dual personal system in place; seconded employees transferred to LEMA retained their government salaries and benefits and many of their rights under the WAJ personnel system, while employees hired directly by LEMA have salaries and benefits that are market-driven and, in many cases, not comparable to the salaries of WAJ seconded employees.

Senior managers hired by LEMA are generally compensated at a higher rate than WAJ employees, while lower level job classifications are generally compensated at a lower rate. In order to compensate for these inequities, LEMA and WAJ have agreed to make many exceptions to the system including:

- Paying WAJ-seconded employees a 10% bonus
- Establishing fixed allowances for overtime compensation
- Paying WAJ employees a quarterly bonus, with some senior WAJ employees receiving bonuses equivalent to 100% of their base salaries.

Other problems in personnel management have stemmed from the different rules and procedures that apply to WAJ employees versus direct LEMA employees. Overtime is a good example: for WAJ employees, there are restrictions on overtime pay—what qualifies as “overtime” and how much compensation can be earned under the category. In contrast, LEMA employees are paid for actual overtime earned and receive incentives for performing overtime work. Thus, most overtime is earned by LEMA employees and not by seconded WAJ employees, which is problematic.

Operations and maintenance

The consulting team evaluated operation and maintenance performance against contract provisions. An area where contractual obligations have been satisfactorily met is plant maintenance. Observations at the Zai water treatment plant indicated a well-functioning and well-maintained facility. This is apparent during plant downtime, during which it maintains the acceptable range for facilities of that type and complexity. That said, the fact that the Zai plant is being operated with at least four staff members on a continuous basis, including a mechanic and an electrician, suggests the possibility of frequent breakdowns or overstaffing. In addition, the response-time to customer calls regarding bursts/leaks, contractually set to a maximum of six hours, has been met. However, because water pipes are not routinely pressurized, it is

not possible to test the quality of a burst repair until water pressure has been restored, adding a further need to inspect the same site—a very inefficient way to handle these types of situations. Pipe breaks continue to be substantially higher than good international practice (Table 2.4); for instance, they numbered 60,100 in 1999 and 56,650 in 2004 (11 per 100 km per year). Similarly, breakdowns in the wastewater collection network remain high and almost unchanged (18,926 in 2001 and 18,880 in 2004)²².

An examination of the list of vehicles supporting the operation indicates that they are relatively new and well maintained and that LEMA has adequately equipped its operation with the necessary resources to accomplish the mission.

Water losses have been reduced but not as much as stipulated in the contract and as MWI would have expected. Several explanations have been given, the primary one being the lack of a continuous supply, which causes pressure surges (water hammer) that exacerbate the bursts/breaks problem that far exceeds the international best practice (Table 2.4). Other reasons include the lack of defined pressure zones (currently being fixed) and inferior equipment and facilities (piping) and inadequate pricing signals (Annex C). It should also be noted that LEMA has replaced some 600 km of water mains, or about 10% of a total.

Customer base

LEMA reportedly serves approximately 365,180 metered water customers with an estimated population of approximately two million. A high rate of growth has not been accompanied by a plan to identify and accommodate it; according to some staff, this is the case with the wastewater collection system.

Meter reading is done using hand-held computer devices, which are technologically superior and follow international practices. This type of meter reading system greatly reduces the probability of customers not receiving a bill and can contribute to finding illegal connections.

In addition, the customer call center is a state-of-the-art system that uses automatic all-directory hardware and software, significantly increasing productivity and reducing customer response time. The system tracks work orders and is integrated with a GIS system, which enables work crews to pinpoint the exact location of the customer. The oldest meter in the system was reported to be installed within the last five years. LEMA has opened two new customer service centers within the past year and has also introduced door-step billing. These improvements to customer service have led to a reduction in customer visits.

Furthermore, the billing system is automated, with bills containing a detailed breakdown of charges—a transparency that contributes to customer understanding and response.

Finally, there was no evidence of a water conservation program, either through customer education or through pricing.

Financial situation and performance

Currently, WAJ finances the provision of water and sanitation Services in Greater Amman through tariffs and connection fees (current revenues), from grants and loans from multilateral and bilateral agencies to WAJ, and from WAJ's own budget. The rules for the management of current revenues and expenses are included in the management contract between WAJ and LEMA. As established in the contract, LEMA collects revenues from customers and deposits them in a WAJ bank account (Revenue Account). WAJ, in turn, transfers funds from this account to a LEMA account (Operating Expenditure Account) in

²² Source: LEMA water indicators

accordance with an agreed timetable and budget. Any cash surplus from operations remains in WAJ. LEMA covers its operating expenditures with funds from its Operating Expenditure Account.

Also, in accordance with the management contract, WAJ carries out and finances the Service's investment program, using the proceeds from grants or loans from multilateral and bilateral agencies (which it is responsible for servicing), as well as from its own budget.

The current financial arrangement makes it difficult to provide an overall picture of the financial situation, as there are no consolidated financial statements for current transactions carried out by LEMA and investment transactions carried out by WAJ. The Service's financial statements include only operational revenues and expenses, current assets and current liabilities, and cash transactions between WAJ and LEMA. They do not include calculations of the value of the infrastructure, nor the corresponding depreciation charges, nor capital expenditures.

Revenues and expenses. The service's income statements for the four accounting periods between August 1, 2000 and December 31, 2004²³ show rapidly-growing revenues that have been sufficient to cover operational expenses, as well as the payments to LEMA to cover fees and incentives under the management contract. Current expenses have grown at a slower pace than revenues, thus, the Service has generated a cash surplus in WAJ's Revenue Account. Between 2001 and 2004, the profit margin (net income from operations as a percentage of revenues) increased from 3.7% to 16.4%. The rate of return on assets is not estimated, since the service's financial statements do not present the value of fixed assets.

LEMA's cash surpluses are expected to increase significantly in 2005 and 2006 as a result of the tariff increase implemented at the end of 2005 and a further increase to be implemented at the end of 2006. Table 2.1 presents a summary of the income statements.

Table 2.1 Income statements (Current JD Million)

Concept	Year Ended			
	31/07/01	31/07/02	12/31/03 ²⁴	12/31/04
Revenues	29.7	31.8	53.5	42.7
Expenses ²⁵	28.6	28.1	43.8	34.4
Provision for doubtful debts	0.0	0.0	7.4	1.3
Net income from operations	1.1	3.7	2.3	7.0
Management contract fee (fixed)	1.6	1.6	2.3	1.6
Management contract (incentive)	0.0	0.2	0.4	0.2
Surplus transferred to WAJ	(0.5)	1.9	(0.4)	5.2

The cash surplus in WAJ's Revenue Account has been the result of improved bill collection (as discussed later in the report) and of the subsidies implicit in the current financial arrangements, as discussed in Annex D (Subsidies) and summarized below.

First, there is a maintenance subsidy, as WAJ is executing and financing most of the expenditures in system maintenance, rehabilitation, and upgrading. Indeed, these expenditures have been a significant part of the 1999-2005 Capital Investment Program, estimated at JD 176 million. This maintenance subsidy has allowed LEMA to allocate resources to system maintenance, rehabilitation, and upgrading in amounts that are substantially below the requirements of the service and also below a level typical of well-maintained

²³ The fiscal years were from August to July until July 2002, from August 2002 until December 2003, and from January to December in 2004.

²⁴ From August 1, 2002 to December 31, 2003 (17 months).

²⁵ Without depreciation charges.

water and sewerage utilities. In fact, the amount LEMA has allocated to these areas is about JD 2.5 million a year, which represents approximately 0.5% of the gross value of the service's fixed assets²⁶—well below the 1% to 3% of gross fixed assets allocated by water and sewerage companies implementing good asset management practices.

Second, the prices of the inputs (bulk water and wastewater treatment) provided by WAJ to LEMA are substantially below the economic or financial cost of the inputs. The average price of bulk water provided by WAJ to LEMA in 2004 was JD 0.08 per m³, while the price charged by WAJ to AWC was JD 0.25, although water production costs are higher in Amman. The wastewater treatment fees paid by the Service (JD 0.02 per m³) are also substantially below the price it will have to pay (JD 0.11 per m³) once the As-Samra wastewater treatment plant enters into operation in 2006.

Third, there appears to be a subsidy in the price of energy, as the water companies pay about JD 0.043 per kw-h while other large customers, such as commercial users and hotels, pay about JD 0.070 per kw-h (both prices include fixed charges).

Working capital management. The management of LEMA's Operating Expenditure Account has proven difficult because of WAJ's delays in fully replenishing the account. These delays mean LEMA is unable to pay its bills on time. The most serious delays are the payment of energy bills, as illustrated by the situation at the end of 2004, when outstanding energy bills amounted to JD 11.2 million—the equivalent of 8 months of billing. Other current liabilities rose steadily from JD 2.0 million at the end of 2001 to JD 4.7 million at the end of 2004.

Bill collection has improved significantly under the management contract, increasing from JD 25.4 million as of July 31, 2002 to JD 43.1 million as of December 31, 2004—an increase of 70% in annual bill collection compared to an increase of 34% in the amounts billed (JD 31.8 million in the fiscal year ending on July 31, 2002 vis-à-vis 42.7 million in the fiscal year ending on December 31, 2004). In other words, the amounts collected as a percentage of amounts billed were 80% and 101% during the fiscal years ended July 31, 2002 and December 31, 2004, respectively.

3. Analysis of AWC Operations

Water and wastewater service in Aqaba is provided by a limited liability company named the Aqaba Water Company (AWC), which was formed in March 2004. Although WAJ is formally responsible for water and wastewater service, the system's operation was legally transferred to AWC in June of 2004. AWC is 85 % owned by WAJ and 15% by ASEZA and is managed by a “representative” board of directors—five from WAJ and two from ASEZA.

Overall performance

AWC has a commercially oriented business environment that strives for a level of performance consistent with an efficient and effective utility. Its organizational structure and vertical integration of all aspects related to the provision of water supply and collection and treatment of wastewater, permits full accountability of its objectives.

The make-up of the representative shareholder board of directors seems to put WAJ firmly in control of the AWC operation—a situation that could potentially make ASEZA representatives feel superfluous, since WAJ always has the controlling votes. While the rationale is correct in terms of shareholding

²⁶ Fixed assets for Amman are estimated at 40% of WAJ fixed assets.

participation, it may not represent best management practices. A diversified technical board might create a more energetic and open environment for key decision-making.

Management and organization

AWC has an organization chart with clear lines of authority, accountability, and responsibility. This type of top-to-bottom organizational structure has proven effective in the most successful water/sewer system companies in the world. The hierarchical structure provides for clear accountability—an essential component to a successful operation.

As part of its management process, AWC adopted at the beginning of its operations a “Business Plan” for FY 2005. This type of management tool contributes to successful performance: inherent in the business plan are performance goals and objectives, which AWC is making progress towards completing.

As part of its business plan, AWC planned to institute training programs to improve the technological capacity of staff and to ensure that second-tier management employees were given the opportunity to assume key positions in the future. It is difficult to assess the success of this plan or the general capability of AWC managerial employees at this time, but there is a sense that the goal will be accomplished over the next several years.

Human resources

Human resource management has been very effective since AWC took over the management of the system (Annex C). As a limited liability corporation (LLC), AWC has been able to create a personnel system without some of the restrictive provisions inherent in a governmental system. A bonus system that rewards employees seems to be working, and key performance indicators have shown improvement.

Nonetheless, internal human resources procedures for disciplinary actions reflect a compromise with the Ministry of Labor and the need to refine them (Annex C).

The success of the new personnel system is reflected in the addition of staff members with university and diploma degrees. From July 2004 to December 2004, AWC filled key management positions with an additional 13 employees with university or diploma degrees.

Management Information System

AWC has been actively working to develop a comprehensive Management Information System (MIS). Developed systems include: billing, financial accounting, customer services (complaints, meters, cadastre), fix assets, control of employee working hours, archives and quality improvement programs.

Operations and Maintenance

Operations and maintenance performance can best be measured against the organization’s business plan objectives. AWC reported²⁷ that non-revenue water was reduced by about 4% over the last half of 2004; however, no reliable data exists to verify this claim. The performance benchmark of six-hour response time for complaints was also achieved. Also significant is the reported meeting of the target of six days per week of continuous supply. This is a result of the excellent condition of the facilities and can be attributed to an ongoing preventive maintenance program.

²⁷ AWC. Annual Report 2004.

An assessment of the list of vehicles supporting the O&M function indicates that AWC is providing sufficient equipment resources to accomplish its mission. Water and wastewater quality meet Jordanian standards. Additionally, the goal of maintaining proper pressure in the water distribution system with less than a 50% variation has been largely completed.

Customer base

AWC reportedly serves some 19,310 metered water customers with the number of properties served at 9,087. Of the total billings, AWC has reported collecting 100% of customer billings and 20% of accounts receivable. This superior collection rate is attributed to an employee incentive payment plan, which rewards employees for achieving collection rate targets.

Meter reading is being done with state-of-the-art hand-held computer devices, which are technologically superior to manual reads. This system greatly reduces the probability of customers' not receiving a bill and can contribute to finding illegal connections. Billing is automated and bills contain a detailed breakdown of charges, a transparency that contributes to customer understanding and use.

There was no evidence of a conservation program either through aggressive customer education or through pricing.

Financial situation and performance

AWC's balance sheet is characterized by a negligible "paid-in-capital," which amounts to only JD 15,000 while total assets amount to about JD 30 million at the end of 2004. The bulk of the financing corresponds to shareholders current account of about JD 27 million. This situation makes for a weak balance sheet, as it is administratively easy for shareholders to request distribution of any cash surpluses to reduce the shareholders' current account, rather than to wait for a shareholders meeting to approve the distribution of dividends.

AWC's liquidity position is strong. Its assets as of the end of 2004 amounted to JD 6.4 million and its liabilities to only JD 2.0 million. The cash position was also strong as it amounted to JD 1.0 million.

An early indication of AWC's performance has been the net income of approximately JD 900,000 between August and December 2004.²⁸ The profit margin (net income before taxes as a percentage of total revenues) is 20%. The rate of return on assets is the equivalent to 3.2 % over a six-month period or 6.4% on an annual basis. A summary of the income statement is presented in Table No. 2.2

**Table No. 2.2 Income Statement –August-December 2004
(000 JDs)**

<i>Concept</i>	<i>Amount</i>
Revenues	4,503
Expenses	2,752
Income before depreciation and provisions	1,751
Depreciation and provisions	803
Income before income tax	948
Income tax	48
Net income	900

²⁸ AWC was established in March 2004 but it initiated operations in August 2004.

The ability of AWC to retain its net income in future years, for use in expanding, rehabilitating, and improving the system will greatly increase the quality and level of service provided by AWC to its customers over the long term. Financial scenarios for 2005-2025 are presented in Annex B.

4. Comparative Analysis

This section compares the Amman and Aqaba operations in three areas: (1) best practices, (2) contract performance, and (3) benchmark performance.

Best practices

The consultants took into account 14 operational and managerial areas to assess Amman and Aqaba managerial performance.

- **Strategic financial planning**

Neither LEMA nor AWC has developed a comprehensive financial plan that integrates total revenues with OPEX and CAPEX expenses or which makes projections of cash requirements over a five/ten-year time period. It is essential that they do so.

The LEMA/PMU/WAJ organizational structure has not developed a comprehensive capital improvement program that would include projected needs for capital over the next ten years. AWC has developed a capital improvement program for its needs over the period 2005-2008, but it has yet to develop a comprehensive investment and financial planning capacity. The WAJ-LEMA management contract does not provide the incentives to implement this management practice because the split of authority and responsibilities between the two organizations.

- **Annual budget with periodic monitoring**

Both organizations have developed a comprehensive annual budget for operation and maintenance, which is closely monitored during the year.

- **Organizational development program**

Neither organization has developed a formal organizational development program to train managers and supervisors to assume more responsibility. LEMA has conducted many training programs for particular operational areas, but neither LEMA nor AWC have programs specifically designed to increase the managerial capacity of its managers.

- **Periodic reporting of reliable performance data**

Although much data has been gathered on LEMA's operation there is no single source of approved data that can be relied upon to compare operations from year to year. LEMA's annual technical audits include detailed data required to determine performance penalties and incentives, but do not provide consolidated historical information to assess overall performance during the life of the contract.

AWC has produced operational data for its first year of operation (2004) but since the year started in August there is not yet a meaningful series of annual data available for comparison against LEMA or its annual performance targets.

- **Personnel policies, procedures, and employee benefits**

AWC has developed clear personnel policies and procedures, including an employee incentive plan, which is working well for the company. LEMA has dual personnel systems—one for its seconded employees and a different one for those directly hired by LEMA—making it extremely difficult for management to operate an effective personnel policy and negatively impacting productivity. In short, it requires best personnel procedures practices if commercialization is to be implemented with the capacity to hire and terminate non-performers.

LEMA management believes that the current dual employment system has long surpassed its purpose and ought to be eliminated before the transition to the new company. Moreover, management estimates that it can operate with 100 fewer employees.

- **Procurement policy**

Procurement at AWC is straightforward and monitored by the General Manager. At LEMA procurement is more cumbersome and bureaucratic due to the interaction with WAJ in the handling and approval of budgetary items.

- **Rules and regulations for the provision of service**

Both organizations have made great progress in documenting policies and procedures for the provision of service. Neither organization has adopted a comprehensive set of rules and regulations for the provision of water and wastewater service.

- **Meter management program**

Both LEMA and AWC have been aggressive in replacing aging meters, though neither organization has adopted formal policies and procedures involving the testing and replacement of meters in the system.

- **Information technology plan**

Both organizations have made good use of adequate technology to accomplish their mission and improve performance.

- **Water conservation program**

Neither LEMA nor AWC have been overly aggressive about promoting water conservation in their respective service areas. While AWC has developed an educational display about water conservation devices at its main customer service center, LEMA, as a profit-making company that realizes a monetary bonus on increase in net revenues, has no real incentive to promote water conservation.

Although not the responsibility of the respective organizations, the pricing and subsidy mechanisms for residential customers do not promote water conservation.

- **Public relations program**

AWC has done a very good job of community outreach and education through the institution of several programs, including new corporate logos promoting “partnership” with the community, as well as a customer service center that is open 24-hours a day.

- **Customer service outreach program**

LEMA has done a very good job in customer outreach, improving customer relations in many ways, including the opening of two new customer service centers. Likewise, AWC does a good job of serving its customers as demonstrated by its recently opened 24-hour customer service center.

- **Fair, transparent, and economically based tariff system**

The extensive subsidies, characteristic of the pricing system in Jordan, do not reach the country’s poorest families (Annex D) that do not have access to services, while middle and high income domestic customers receive substantial subsidies. Moreover, tariffs do not cover the full economic costs of services. Hence, they do not encourage water conservation²⁹. Furthermore, the system is complex and difficult to understand. Neither LEMA nor AWC is responsible for the rate level and structure; this responsibility rests with the Cabinet.

Rebalancing of the tariff structure in Amman (ANNEX D), to reduce subsidies to the more affluent residential consumers while maintaining the existing level of subsidies to families that use less than 20m³/quarter, can substantially help improve the financial position of the company. This rebalancing has the potential of increasing revenues and bring an additional 14 JD million per year (33% additional over 2004 total revenues). In Aqaba a similar rebalancing could bring an additional 1.3 JD million per year (10% additional over 2005 revenues) to AWC. This potential source of additional revenues can postpone the need for tariff increases for many years, particularly in Amman.

- **Revenue base**

LEMA and AWC exhibit substantial differences, particularly in the relative weight on non-residential customers in the composition of the customer base and water use as shown in Table No. 2.3.

Table 2.3 LEMA and AWC billing in 2004

Service	Average Water users per quarter		Consumption		Total W+WW Charges		Average rate JD/m ³
	No	%	mm ³	%	million JD	%	
AMMAN							
Residential	353,056	91.9	56.5	89.4	28.09	74.1	0.50
Non-residential	31,133	8.1	6.7	10.6	9.83	25.9	1.47
Sub total	384,189	100	63.1	100	37.93	100.0	0.60
AWC							
Residential	23,531	85.5	3.3	22.3	1.65	12.3	0.50
Non-residential	3,981	14.5	11.5	77.7	11.72	87.7	1.02
Sub total	27,512	100	14.8	100	13.38	100	0.90

²⁹ For example in 2004, 91% of the customers in Amman and 86% in Aqaba were subsidized.

Contract performance

- **Non-revenue water**

Although LEMA has made progress in reducing the percentage of Non Revenue Water (NRW) since the start of its contract, it has not been able to meet the 40% target. In 2004, UFW was 43% in 2004 and 45% in 2005³⁰.

- **Response time to leakage/burst requests**

This is also an area where LEMA has made progress and has achieved the goal of average response time of less than six hours. AWC does not face the same challenges responding to breaks and leaks since continuous supply and a comprehensive rehabilitation program, to be completed this year, greatly contribute to the ability of the organization to respond.

- **Collection ratio**

For FY 2004, LEMA reported a 101% collection rate.³¹ AWC reports that it collected 100% of billings and 20% of past due billings.

- **Customers billed**

LEMA is currently reading and billing 96% of its customers compared to 85% at the start of the contract. Although LEMA has improved in this area, reaching the target of 100% should remain a high priority. AWC does not have a problem in this area; it reads and bills close to 100% of its customers.

- **Illegal connections**

Illegal connections are still a big problem in Amman. Approximately 22,000 such connections were reported to exist in 2004. This problem has much less magnitude in Aqaba.

Benchmark performance

As can be seen from the comparative analysis in LEMA (Table No. 2.4), the ratio of water produced to water billed indicates water losses of 43% in 2004. Water losses at AWC are also high at about 37%³². Both figures are well above the best international practice of less than 10-15%. Another performance indicator is the number of employees per 1,000 water and wastewater customers: LEMA's ratio in 2004 was 2 while AWC's was 7.4. While the former is close to best practice (Table 2.4), there is room for improvement in AWC.

Several other indicators at LEMA are similarly far above international best practices, but in many cases this can be attributed to a lack of continuous supply, as well as years of maintenance neglect. Pilot programs have demonstrated that the number of leaks/bursts is significantly reduced when the system is operating under a continuous supply.

³⁰ Source: WAJ/PMU and LEMA information

³¹ Total bill collection: bills from the current and previous years, as a percentage of amounts billed during the year.

³² AWC. Annual Report 2004

5. Conclusions

Both LEMA and AWC have successfully provided services to their customers. While neither was perfect in meeting its contractual goals, data indicates that both have been on the right track.

Diversification of ownership at AWC has several benefits.

Although AWC is 85% owned by WAJ, there are several benefits to be realized by permitting additional ownership in the company. Representatives from the community, whether public or private, can provide a different perspective and bring different experiences to the AWC organization. This type of outside input guards against a complacent and insulated approach to the provision of water and wastewater services in Aqaba.

AWC's organizational structure has many advantages compared to LEMA's, though there is room for improvement in the way the Management and Board might provide technical support and advice.

AWC's management structure in which all functions are contained in one organization, gives it several advantages over the organizational model of WAJ/LEMA. These include:

- More flexible personnel and purchasing systems.
- Development of a capital improvement program.
- Utilization of distribution system planning.
- Clear accountability for performance

Furthermore, the board of directors at AWC has been more responsive to management issues than the combination of WAJ/LEMA.

The AWC Board of Directors meets monthly and works from an agenda prepared by the General Manager. In this way, the General Manager can introduce important issues for board consideration and get immediate feedback and an immediate decision, if necessary. This type of decision-making is not possible under WAJ/LEMA's management arrangement.

The LEMA contract contains little incentive for improving performance.

At this time, the LEMA management contract contains few incentives to continue to improve operational performance. This occurs for two major reasons:

- LEMA receives five percent of the improvement in cash flow, based on a comparison of the current year to the prior year. After six years of improvement in many operational areas, there is very little improvement to be realized as compared to the prior year.
- Penalties and bonuses are small in relation to the management fee, and provide little incentive for continuous improvement.

Some form of technical assistance in the Amman operation would be beneficial after January 1, 2007.

Although the number of expatriates provided by LEMA (four) are few in relation to the total personnel complement, they are senior managers involved in some of the most important service functions. In addition, LEMA brings a culture of high performance since it is a profit-making enterprise. It would be

wise to retain some or all of the LEMA senior personnel in some form during the transition to a new management structure.

The water supply and wastewater organization in place should continue to function even if LEMA's contract is terminated on December 31, 2006.

LEMA has done a good job of putting systems and procedures in place to handle many of the functions involved with providing retail service in Amman. LEMA has also instituted training programs that have improved staff capability. For these reasons, it is recommended that the current organization should continue after January 1, 2007 until such time as the new management gains hand-on experience.

There are many stakeholders in Amman who could contribute to the water/wastewater operation. The community being served by LEMA in Amman contains many diverse public organizations—including the municipality of Amman—as well as private ones. It would be beneficial if some of those organizations that represent the customer's interests could be represented on the board and make a contribution to the operation of the water and wastewater services.

More emphasis should be placed on the collection and reporting of accurate data.

During the data collection and analysis activity, it was discovered that much of the operational data was not being collected and reported on a consistent basis. For example in 2004, the volume of water supplied from other governorates³³ to LEMA was reported by WAJ as 90.6 mm³/y³⁴ but as 82.3 mm³/y according to LEMA. It would be of great benefit to those in decision-making positions to have accurate and consistent data to fully discharge their obligations.

On balance, LEMA has made a significant contribution to improving operational performance in Amman.

Although LEMA has not met several of its contractual goals, it has significantly improved the level of water and wastewater service for the Amman customers. A clear example of this is that LEMA has reduced the total number of employees required to operate the system from 1,600 at contract inception to 1,300 currently while improving cash flow from a negative to a positive JD 5 million in 2004.

However, the lack of comprehensive financial plans that project future revenues and expenses is a serious issue as there is no clear understanding of the total capital needs in the future.

The separate personnel systems required to be managed by LEMA have had a negative impact on productivity.

In addition to the problems of having employees performing the same work under two different pay scales and benefit packages, the management of LEMA has stated that it could perform its mission with 100 fewer employees if it could eliminate many of the WAJ seconded employees.

Continuous supply should be a high priority in Amman, regardless of the form of the new organizational structure.

Several pilot studies over the past several years have shown that continuous supply greatly reduced the number of burst/breaks and provided a clear increase in productivity, thereby increasing customer satisfaction. Additionally, continuous supply is estimated (by LEMA) to cause only a 10-15% increase in

³³ Khaw, KAC, Wala, Lajjoun

³⁴ MWI. Annual Report, 2004; LEMA Audit Report, 2004.

total demand,³⁵ and thus, it would be feasible to satisfy this demand from existing sources, including the new Sara Me'in new water augmentation project to be commissioned in 2006.

Greater input could be expected from an AWC board that had more local diversity.

Other public/private organizations could be invited to join AWC as shareholders. In addition to more local presence, the domination by Amman-based WAJ members would be lessened.

Greater accountability is possible under the AWC organizational model.

AWC's clear accountability standards mean that it avoids finger-pointing when things go wrong and makes it much easier to achieve improvements.

³⁵ The experience in several cities with an intermittent supply is that water use, on a per capita basis, decreased when continuous service was established. This outcome is unlikely in Amman, where water use, on average, is less than 100 lcd.

Table No. 2.4 Benchmark Indicators – Fiscal Year 2004

Indicator	LEMA	AWC	Best practice
1. General information			
Total Population (000)	2,000	107.5	n.a.
Size of Governorate (Km2)	7,579	6,900	n.a.
2. Operations			
Water Customers (000)	365.2	19.6	n.a.
Wastewater Customers (000)	260.4	14.4	
Total Water Supplied (mm3/year)	114.4	15.1a/	
Total Water Sold (mm3/year)	65.5	8.0a/	
Water mains (kms)	6,150	877	
• Meters of pipes/customer	16.8	44.7	n.a.
Wastewater collection mains	2,031	276	
• Meters of pipes/customer	7.8	19.2	n.a.
Service Bursts/Leaks (No.)	55,650	1,379	
Employees (No.)	1,272	250	
Revenue Billed (M\$JD)	33.30	NA	
Revenue Collected (M\$JD)	32.60	NA	
3. Performance Indicators			
Population served (%)			
• With public water	97	99	100
• Public wastewater	78	73	100
Employees			
• Per (000) customers (W+WW)	2.0	7.4	< 1
• mm3 of water sold per year	22	45	> 200
Bursts/leaks per year			
• No. per km of water main	9	2	< 0.4
Water losses			
• % of water supplied	43	27	< 25
• m3/day/km of pipe	22	10	< 10
Financial			
• Collection ratio	1.1	n.a.	1 (long term)
• Current ratio	1.2	3.2	> 2
• Accounts receivable (months)	4.4	7.2	< 2

n.a. Not applicable/available

a/ Chemonics (July 2005 report, Cited).

Chapter III

Organizational Options

1. Introduction

In selecting an organizational model tailored to the particular circumstances of Amman's water and sewerage services, it is necessary to consider:

- The “*scope of service*” of responsibilities from planning, financing, construction and operation assigned to one or more agencies³⁶ for all or parts of the systems' components (raw water production to wastewater treatment).
- The roles (“*PP Roles*”) of the public and the private sectors in the operation and financing of the whole or parts of the system.
- The “*risks*” to the public and private sectors that stem from the operation and financing of the services. Allocation of these risks can affect the cost of services, the performance of the service provider, the quality of service to consumers, the government and general public and the environment.
- The “*regulation*” of the quality of services (in the amplest form—coverage, reliability, quality of drinking water and protection of the environment) and their pricing to promote efficiency, water conservation and targeting of subsidies to meet social goals.

2. Scope of Service

There are two basic alternatives for the provision of services:

- **Integrated services.** Assignment of all system responsibilities to one company. Under this model, all investment decisions, from maintenance to expansion of services, as well as all the associated risks fall under one company, and therefore, responsibility and accountability for the overall quality of services.³⁷
- **Unbundled services.** Splitting of responsibilities and risks for different parts of the systems to different companies.³⁸ This model is advisable when critical aspects of the provision of services, such as the development of new water sources with potential multipurpose uses, as in Jordan, can be better assigned to and managed by a specialized government agency. Responsibility for other parts of the system, such as water distribution and wastewater collections, are assigned to another agency(ies).

Unbundling is also advisable when it is possible to introduce competition in the market,³⁹ at least for some components of the system. There is consensus that competition promotes better efficiency to the benefit of consumers.

³⁶ In this chapter, the terms agency and company are used interchangeably.

³⁷ This is the case in the provision of water and sewerage services in Aqaba by AWC.

³⁸ This is the case in the provision of services in Amman. WAJ is in charge of bulk water supply and of wastewater treatment (As- Samra BOT).

³⁹ This is the case, for instance in the electricity sector, where ample competition in power generation is left, by far, to the private sector and pricing to market forces. However, in the same sector, power transmission is less, if at all, open to competition. Direct market competition in the water supply and wastewater sector is difficult due to economies of scale. Nonetheless, several regulators, notably OFWAT, continue to promote ways to introduce competition in the market.

However, unbundling poses significant organizational challenges, such as:

- The need to assign clear responsibilities and risks to the different agencies involved in the planning, operation and financing of investments of different parts of the systems, to ensure an efficient allocation of resources and accountability;
- If present, subsidized transfer prices (Annex D) can give wrong signals to these agencies, which in turn affect the efficiency of operations and investments and may undermine water conservation efforts.

3. P-P Roles

A second important consideration in the selection of a responsive model is the role that the government would like to assign to the public and private sectors in the provision and financing of services. Quality and efficiency of services are the most important considerations in the selection of a given model. Local conditions should help to determine the degree of participation of the public and private sectors. There is wide consensus among practitioners that there is no “one-size-fits-all” solution. However, in all cases the government regulates the quality and pricing of services.

There are two basic approaches to help define these roles:

- i. The State assumes the leading role in the planning, financing and operations of services (such as in Jordan and Egypt);
- ii. The government retains the responsibility of formulating sector development policies but delegates the provision and financing of services to the private sector (such is the case in England).

Public sector options

- **Central Government Agencies (CGA).** Under this model, services are entrusted to ministries or specialized agencies under a ministry. The agency in charge operates under general government policies and budgetary, procurement, and civil service practices. This is the predominant organizational model in Jordan and was extensively used, for instance, in Latin America from the 1950s through the 70’s.

In most countries, government agencies operating under a CGA model have consistently failed to deliver good and efficient services and meet development goals, as governments have found extremely difficult to:

- *Introduce financial discipline and accountability into CGA institutions.* These agencies almost always operate under a “soft budget constraint.” That is, operational and developmental goals are quite flexible within a budget envelope.
- *Ensure long-term adequate resources from the budget.* Government budgets everywhere have many competing demands. Availability of necessary resources to cover OPEX and CAPEX is therefore uncertain in the long term. The end result is that OPEX and CAPEX often take a second seat to other government priorities, and quality of service and efficiency of operations suffer.
- *Inject financial discipline due to well-defined cost recovery objectives (tariffs adequate to meet service goals).* Governments often find it more convenient to postpone tariff adjustments and compensate them by budget transfers or by delaying OPEX and CAPEX.

- *Streamline administrative procedures, including accounting principles (budgetary), procurement, and personnel to promote agile and good managerial practices.*

For the above reasons, the CGA model has lost acceptance in most countries, as governments and users became disillusioned with results. Jordan is beginning, with understandable caution, to question this model and to explore other non-CGA organizational options such as the recent (2004) creation of the Aqaba Water Company.

- **Independent public companies.** Under this option, the delivery of services is entrusted to an independent government company that operates under commercial practices closely resembling those of the private sector. Jordanian law allows three basic type of companies operating under private commercial practices:
 - Public shareholding companies (PuSC)
 - Private shareholding companies (PSC)⁴⁰
 - Limited Liability companies (LLC).

Table No. 3.1 presents a summary of the main features of these companies:

Private sector participation (PSP) options

There is a wide menu of private sector participation options,⁴¹ ranging from service contracts to concessions. These options can be assessed by their impact on the management of services, the degree of financial responsibility of the private operator (PO) and compatible tariff levels, the risks to the private operator and, by extension, the complexity of the regulation/supervision of the contract by the government. The most relevant PSP options for water and wastewater services in Amman and their characteristics are listed and presented in Table 3.2.

- **Service contracts.** Outsourcing the provision of specific services, such as maintenance, meter reading, etc. These contracts are the most modest of PSP alternatives and do not entail significant risks and financing by the PO. They are also compatible with other more advanced forms of PSP.⁴² Risks to the PO are not significant.
- **Management.** Delegation of all administrative/management functions to a PO and the government retaining responsibility for the planning and financing of the CAPEX and OPEX programs (LEMA contract).⁴³ Usually, the PO advises the government on the investment plans. Management contracts transfer modest risks to a PO.

⁴⁰ Article 28 of the Water Authority Law (Law 62 of 2001) provides “The council of ministers upon the recommendation of the minister (minister of water & irrigation) may assign any of the authority’s duties/functions or any of its projects or the implementation of any stage or part thereof to any other party from the public or the private sector or to a public shareholding company or limited liability companies wholly owned by the authority or that the authority subscribes to part of its capital.” The spirit of the law not does preclude a private shareholding company; however, interpretation of this article by the Special Bureau or Legal Opinion by the Legislative Bureau is needed before proceeding with this option.

⁴¹ The options discussed do not include divestiture.

⁴² The creation of private employment is an important benefit in Jordan, where there is excess public sector employment and the need to promote and expand the corps of private entrepreneurs. In some countries, service contracts are mandated on other types of PSP contracts to improve overall efficiency (for instance, on divested private owner-operator companies in England).

⁴³ The LEMA contract is closer to a management consultancy than to a management contract in terms of its impact on the quality and efficiency of services, precisely because the risks to the operator are so limited.

Table No. 3.1 Main features of independent public companies

Corporate feature	Public shareholding PuSC	Private shareholding PSC	Limited liability LLC
Number of shareholders			
<ul style="list-style-type: none"> • Minimum 	Two, however company may be formed by one shareholder with the Minister of Industry and Trade approval upon recommendation of the Comptroller.	Two, however company may be formed by one shareholder with Ministry of Industry and Trade approval upon recommendation of the Comptroller.	Two, however company may be formed by one shareholder with the approval of the Comptroller.
<ul style="list-style-type: none"> • Maximum 	Unlimited	Unlimited	Unlimited
Duration	Indefinite	Indefinite	Indefinite
Powers of General Assembly	Absolute for holders of 75% of shares.	Absolute for holders of 75% of shares, unless agreed with a higher percentage in the Memorandum of Association.	Absolute for holders of 75 % of shares, unless agreed on a higher percentage in the Memorandum of Association.
Board of Directors	<ul style="list-style-type: none"> • Directors must be shareholders. • Managing the company; accountable to the General Assembly. • Board seats in proportion to share ownership. 	<ul style="list-style-type: none"> • Directors do not have to be shareholders. • Manager of the company; accountable to the General Assembly. • Powers to be decided in Memorandum of Understanding 	<ul style="list-style-type: none"> • Directors do not have to be shareholders. • Manager of the company; accountable to the General Assembly.
Distribution of profits	Board of Directors recommends and General Assembly decides	Board of Directors recommends amount. Articles of agreement can include provision to use profits towards capital expenditures or not distributed them at all.	Board of Directors recommends. General Assembly resolves whether to distribute them or not.
Involuntary liquidation (bankruptcy)	.	If company is exposed to gross loses so that it becomes unable to meet its obligations to creditors, the Board shall call a General Assembly meeting to issue a decision: liquidate, issue new shares or other decision which would guarantee its ability to fulfill its obligations	

- **Leasing.** Delegation of management and maintenance responsibilities to a PO. Leasing constitutes the next level of shifting risks to the private operator as it needs to produce an operating surplus large enough to cover the leasing fee and profit requirements.⁴⁴ The Government is responsible for the CAPEX program. As in a management contract, the PO acts as advisor to the government on the planning of CAPEX programs.
- **Concession.** The PO is responsible for the management and maintenance activities and financing of the CAPEX program. Therefore, the level of risk to the operator increases significantly⁴⁵ over a lease contract, as revenues from tariffs need to cover all these costs and return on investments as well.
- **Build Operate and Transfer (BOTs and similar forms).** Similar in concept to a concession but of more limited scope. These contracts are attractive for Amman water and wastewater services as the As-Samra wastewater treatment plant BOT—to be commissioned in late 2006—demonstrate.⁴⁶
- **Public-Private Partnerships (PPP).** In addition to the PSP options described, several governments (e.g. Spain, Brazil, Chile and Colombia to name a few) have introduced the PPP model or mixed capital (public-private) companies (MCCs). See Table No. 3.3 and Box 3.1.⁴⁷ MCC share, in general, some common characteristics:
 - The PO, in general, is given the authority to appoint key management positions and responsibility for the day-to-day operation of the company.
 - The government retains:
 - Control of critical decisions as defined in the shareholder agreement.
 - Regulation (pricing and quality) of services and formulation of policy decisions.
 - With the exception of partial divestiture or concession models, the government assumes financial responsibility for the CAPEX.
 - The level of service rates, and by extension the financial obligations of the Government,⁴⁸ have to be consistent with the overall objectives of the services to be provided by the MCC and obligations of the PO.⁴⁹

⁴⁴ This surplus is only possible if the operator can successfully manage to bill and collect for services provided, and exercise control of the operating and maintenance costs.

⁴⁵ At this point in time, a concession in Amman is considered highly unlikely as international operators are retrenching from international contracts (e.g. Buenos Aires) or demanding considerably higher premiums to compensate for perceived higher financial risks.

⁴⁶ However, substantial grant financing, of the order of 54% of investment costs, was necessary for this operation to close financially.

⁴⁷ Also considered in Jordan as Private Shareholding Companies.

⁴⁸ In several countries (e.g., Brazil, States of Sao Paulo and Bahia) the government has created specialized financial agencies to guarantee its financial obligations with the private sector.

⁴⁹ As a MCC reaches full financial viability, it can access local and international capital markets, without government guarantees.

Table 3.2 Outline of relevant characteristics of Private Sector Options

CONCEPT	PSP OPTIONS				
	SERVICE CONTRACT	MANAGEMENT	LEASE	CONCESSION	BOT
Duration (years)	1-5	5-10	10-20	More than 15	Several years
Source of and responsibility for payment to PO	Utility revenues & Government	Utility revenues & Government	Utility revenues	Utility revenues	Government
Effect on utility performance	Marginal	Increasing			Marginal
Financing of O&M	Government	Utility revenues			PO
Financing of investments	Government	Government		Utility revenues	PO
Financing of working capital of utility	Government	Utility revenues			Government
Utility employees	N.A.	Authority of PO defined in contract			N.A.
Interaction with users	Limited	PO under contractual rules			N.A.
Risks to PO	Increasing				Similar to concession
Complexity of contract oversight	Government Increasing				Moderate

Notes: PO Private Operator; BOT Build, Own, Operate and Transfer; N.A. Not applicable

Table No. 3.3 Examples of mixed capital companies

Country	Responsibility of MCC company & Government	Responsibility of Private Sector	Example
<i>Spain</i>	Operation & maintenance of services. CAPEX financed by Gov.	PO Manages MCC company	Murcia, Alicante
<i>Brazil</i>	Full development and financing of services. Company listed in the New York Stock Exchange Access to international and local capital markets	International private investors own 50% of MCC Investors receive dividends but do not participate in the management of the company.	Sao Paulo (SABESP)
<i>Chile</i>	Full development and financing of services. Access to international and local capital markets.	Strategic PO owns 40% of MCC company and manages it	Santiago (EMOS)
<i>Colombia</i>	Operation and maintenance of services CAPEX financed by Local Gov.	PO manages MCC company	Cartagena (ACUACAR)

PO. Private Operator; Gov. Government

Box 3.1 MCC. Cartagena, Colombia

The city of Cartagena, located on the Caribbean Sea, has a population of about 1 million. Water and wastewater services, under Colombian law, are the responsibility of local governments. Fixed assets belong to the local government and cannot be sold. Price and quality of service regulation rest with central government autonomous agencies.

Until the end of the 1980s, services provided by a municipal company, were deteriorating due to political cronyism which translated into highly inefficient services and low coverage. Service rates were not adequate to cover for operation, maintenance and expansion of services.

Displeased with results, in 1992, the local mayor decided to abolish the old municipal company, and to create a new MCC company to operate and maintain the services with active participation of the private sector. Under competitive bidding, a strategic private operator (Aguas de Barcelona) was selected and offered 45% of the shares; the municipality retained 51% of the shares and the rest was placed with local entrepreneurs.

After several years of operation, service quality and consumer satisfaction improved dramatically as shown by a list of selected indicators.

Indicator	Before PSP	After PSP
	1994	2004
Employees/1000W&WW connections	15.0	1.2
Water coverage -%-	56	99
Sewerage coverage -%-	30	95
Unaccounted for water %	60	40
Response to pipe breaks - days	6	< 0.5

4. Risks

In the allocation of risks, it is advisable to follow the accepted principle that a given risk should be assumed by the party that is in better position to control it. For example, risks associated with:

- Currency exchange rates, convertibility and right to transfer of profits overseas are assumed by the government.
- Cash flow shortfalls due to untimely contractual adjustment of service rates are also assumed by the government.
- In unbundled services:
 - CAPEX and OPEX obligations. Unmet obligations by one agency may affect the performance or cash flow of other agencies. Therefore CAPEX and OPEX risks are assigned to the agency responsible for them or to the government.
 - Operating risks –growth in the customer base; billing and collection are assigned to the agency in charge of operations.
 - Water supply risks (not able to meet water demand) are assumed by the agency responsible for the provision of bulk water.
 - Environmental and third party liability. These risks are assigned to the agency responsible for the undesirable outcome.

5. Regulation

The regulation of services includes quality as reflected in service coverage and service standards and pricing. Both are different sides of the same coin and are complementary. In some countries, as in Jordan, these two functions are entrusted to different bodies: the PMU (quality) and the Council of Ministers (pricing). In some countries, all regulatory functions are assigned to one specialized agency.

Ideally the regulator should be independent from the government and operate under a set of rules defined by the legislature. The current regulatory model in Amman is regulation by contract (between WAJ/PMU and LEMA). The PMU monitors compliance with performance targets set in the management contract. The model in Aqaba is to a large extent a self-regulatory one, as WAJ and ASEZA, as shareholders of the company, are entrusted with this function. In both cases, services rates are approved by the Cabinet.

The regulatory arrangements in both Amman (LEMA) and AWC are less than optimum solutions because of potential conflict of interests on the part of agencies such as WAJ as owners and supervisors. Moreover, quality of service and pricing are not yet fully integrated and thus it is difficult to enforce quality if the financial resources available to operate, maintain, and invest in the services are not aligned with quality requirements.

In the short term, however, the regulatory responsibility for the new Amman Company should continue to rest in the PMU.⁵⁰ While not a formal regulatory agency, PMU is the only organization with regulatory expertise in the water and wastewater sector in Jordan. To this end, it is important to introduce performance indicators in the memorandum of agreement between WAJ, as supplier of bulk water and wastewater treatment and the new company.⁵¹ These indicators should be revised periodically, perhaps every five years, to reflect new priorities and progress made.

⁵⁰ The PMU is being supported both financially and technically by the EU. One of the deliverables under this TA is a document on regulatory functions to be presented by end of March 2006. Much of this effort is concentrated on benchmarking certain aspects of water and wastewater services.

⁵¹ In many ways as it is now functioning in the supervision of the LEMA contract.

Chapter IV

Recommended Option

1. Introduction

The selection process of a recommended organizational model is guided by the objective of ensuring the long-term sustainability of efficient services and of the highest quality.

The assessment of LEMA and AWC organizational experiences, developed in Chapter III was primarily directed to understand the strength and weaknesses of these organizational models and their relevance to the design of the organizational model for the provision of water and wastewater services in Amman. It is important to learn from these lessons to identify successful and sustainable traits that can be incorporated in a new organizational model for Amman. These lessons are summarized below in Table No. 4.1.

Table No. 4.1 Main lessons from AWC and LEMA

MODEL	LESSONS	
	Positive	Less positive
LEMA CONTRACT	<ul style="list-style-type: none"> • Laid the basis for a thorough reorganization of services in Amman 	<ul style="list-style-type: none"> • Inherent coordination and accountability issues to split of CAPEX and OPEX obligations • Imbalance between management fee and incentives (weak) • Uncertain protocol for the provision of raw water • Lack of an integrated and comprehensive strategic development plan
LEMA OPERATIONS	<ul style="list-style-type: none"> • Improvements in: <ul style="list-style-type: none"> – Quality of services – Customer services – Response time – Cash flow • Sound organizational structure 	<ul style="list-style-type: none"> • Agreed targets below expectations <ul style="list-style-type: none"> – Water losses • Different pay scales for seconded and LEMA staff
AWC	<ul style="list-style-type: none"> • Clear accountability for overall operations • Full control of financial resources • Local participation in decision making • Management committed to provide good services • High customer satisfaction • Personnel management • Motivated staff 	<ul style="list-style-type: none"> • Financial position uncertain <ul style="list-style-type: none"> – No tariff law or explicit policy (tariffs determined by Cabinet) • Board of Directors (managing committee) dominated by majority shareholder (WAJ) • Excess staff

2. Non-responsive Options

Most of the options considered initially, as detailed in Table No. 4.2, are deemed that do not adequately respond to the development objectives or present high risks, and therefore are not recommended.

Table 4.2 Non-responsive options

Characteristic	Model	Comments
Scope of service	Vertical integrated company	Water resource issues too complex to be dealt by a service company.
	Public sector	
	<ul style="list-style-type: none"> Government agency 	Outdated model. Low accountability.
	<ul style="list-style-type: none"> Limited liability company (LLC) 	Dominated by major shareholder. Limited authority of minority board members. Financial autonomy in doubt as ring-fencing of accounts not feasible.
	Private sector	
Public-private Roles	<ul style="list-style-type: none"> Management contract 	Split responsibilities and low accountability. Does not adequately respond to challenges.
	<ul style="list-style-type: none"> Lease 	Split responsibilities and low accountability. Does not adequately respond to challenges. No significant change with respect to management contract.
	<ul style="list-style-type: none"> Concession 	Long term uncertainty about rates and water availability cloud this model (could be considered in the future).
	<ul style="list-style-type: none"> Mixed capital company 	Long-term uncertainty on service rates and thus ability to distribute profits cloud this model (could be considered in the future).

In addition, the consultant team considered a government company in charge of operations and maintenance (a similar concept to a lease contract). This model is not recommended for the same reasons that a lease model was ruled out.

Similarly, renegotiating the existing LEMA contract to incorporate a substantial shift in the management fee/bonus structure and streamlining operating procedures and management of cash was also ruled out. This renegotiation would likely be protracted and cumbersome and without the benefit of competition. The consultants also consider that the management contract, while relevant when it was awarded, has outlived its usefulness.

A concession with a private operator, as a stand-alone contract or under the umbrella of a mixed capital company has significant development potential and could be implemented at a later stage, provided that the government commits itself to a contractual arrangement to set rates in accordance with predetermined criteria. Otherwise, the private sector will perceive a financial high risk and will demand a high and likely unacceptable premium.

3. Recommended Model

To ensure the long-term sustainability of services, the main characteristics of the new Greater Amman water company (from here on referred to as NEWCO) should include:

- Creation of a private shareholding company in charge of all aspects of the water distribution and wastewater collection services. This company should be:
 - An independent organization managed and operated by capable and professional staff.;
 - Financially self-sustainable, with revenues from operations adequate to cover all its operational, maintenance, and investment needs;
- Use of existing core functions of the existing LEMA organizational structure. New responsibilities should be added as needed; for instance, strategic planning for CAPEX and OPEX responsibilities could be assigned to a specialized unit.
- Conferring to NEWCO all necessary legal powers to exert full management responsibility for the provision of services. The powers would be in accordance with the Companies Law and confirmed by the Cabinet.
- The transfer of all assets to NEWCO, which should be under its full control to ensure that they are adequate maintained and replaced when necessary.
- Implementation of a one-time start-up project (discussed further in the report) to make urgent and additional improvements to the water distribution and wastewater collection systems to reach clearly defined service level quality objectives. This project should be implemented by NEWCO, early in its operational phase and as part of its asset management responsibilities,

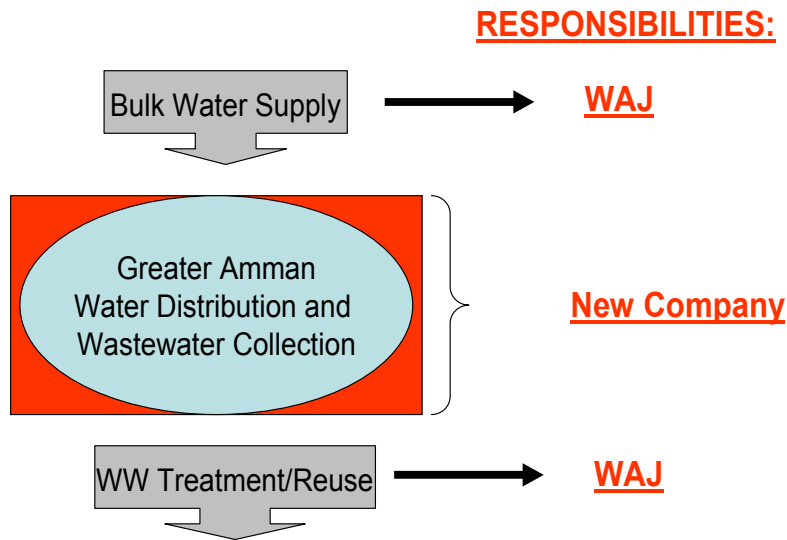
Based on the previous analysis, conclusions and recommendations, the consultants propose the creation of a new company –NEWCO- with the following characteristics:

Legal structure. NEWCO should be created as Private Shareholding Company. This is the best option because:

- It provides the greatest flexibility, combining the best features of the Public Shareholding Co. and the Limited Liability Co.
- It will signal to both the private sector and the general public that WAJ's eventual goal is to involve the private sector, particularly of Jordanian companies.
- It would allow it to promote private investment.
- It would allow WAJ, as main shareholder, to have preferential shares and thus have special powers on share capitalization, distribution of dividends or golden share attributes.

Responsibilities. NEWCO would have clearly delineated responsibilities together with physical and institutional boundaries in the Greater Amman service area. NEWCO would be responsible for water distribution and wastewater collection. Bulk water provision and wastewater treatment would remain under WAJ direct responsibility.

Figure 1 Characteristics of Recommended Model



Shareholders. NEWCO would be majority owned by WAJ. GAM and/or other entities may be invited to participate as minority owners. The corporate governance structure would reflect meaningful participation of minority shareholders following principles of corporate governance and minority shareholder participation.

Transfer of assets. WAJ would transfer to NEWCO all necessary assets to operate the service. The transfer would be compensated in shares equal to the best available valuation at the time of transfer. NEWCO would assume full responsibility for the registry, maintenance and replacement of assets. A review of asset valuation and transfer alternatives would be developed during Phase 2.

Management structure. NEWCO would be governed by a General Assembly represented by a Board of Directors that would delegate day-to-day management to a General Manager and a group of executive staff. The Board of Directors would have representation from qualified professionals whose business acumen and technical and financial expertise would contribute to the decision-making process.

Personnel system. All workers at LEMA, WAJ-seconded and direct hires would be offered the opportunity to continue working under a unified personnel system. Initially, NEWCO would mainly follow current LEMA personnel practices, but an improved incentive structure would be introduced as early as possible.

Start-Up Project. The Zara Ma'in water augmentation project makes it feasible to provide continuous service provided that the number of pipe bursts is brought under control to reduce water leakage⁵². It would also impact on the company efficiency and contribute to water savings. Toward this end, a start-up project should be carried out with the objective of achieving significant improvements in service and garner greater public support for a rational tariff policy.

⁵² While substantial resources have been allocated to rehabilitation, the number of bursts remain substantial (60,105 in 1999 versus 55,650 in 2004); likewise the number of breakdowns in the wastewater collection network are high (18,826 in 2001 versus 18,870 in 2005).

- **Main characteristics:** The start-up project, managed by NEWCO as part of its asset management responsibilities.
- **Cost.** Approximately JD 40-60 million⁵³, over five years, is needed to show significant service improvements. A more definitive cost figure would be developed during the feasibility phase, in close consultation with WAJ and LEMA.
- **Financing.** The project could be financed from a basket of funds combining donor and government contributions. NEWCO's financial viability would be independent of the existence of this project, though it would benefit greatly from its execution. It is important to start promptly identifying sources of funding since it takes some time to get funds appropriations from different donors or the government.
- **Timing.** Implementation of the start-up project should start within one year of the creation of NEWCO and better still to coincide with NEWCO's start of operations. The estimated project duration is 4 to 5 years.

4. Financial Arrangements and Financial Scenarios⁵⁴

Proposed financial arrangements

The proposed financial arrangements aim at making more transparent the management of the service's resources through one major change over the current arrangement. The change consists in WAJ delegating authority to NEWCO not only for the day-to-day operation of the infrastructure but also for financing and carrying out the repairs, renewal and rehabilitation of the infrastructure, as well as the expansion of the water distribution and wastewater collection systems. WAJ would continue carrying out and financing the required investments in the development of water resources and of wastewater treatment facilities. The proposed start-up project would be financed by a combination of bilateral grants and government funds.

Operational and financial scenarios

The consultants developed a number of operational and financial scenarios aiming at assessing the financial viability of the proposed financial arrangements. These scenarios inevitably assign weights or priorities to conflicting practices in Jordan. For example, there are trade-offs between "desirable" low tariffs and low subsidies and higher standards of service; between continuously investing in maintenance or shifting the burden to future generations as capital rehabilitation projects.

The consultants, taking into account the terms of reference and the discussions at PDT developed operational and financial scenarios which imply minimum impact on the status quo in terms of tariffs and subsidies, while at the same time allowing for continuing the trend of improvements in the standards of service in Greater Amman. The operational scenario recommended by the consultants is outlined below and detailed in the financial model (Annex E). Alternative financing plans are discussed after the presentation of the operational scenario.

Operational scenario. The scenario assumes a 2.5% rate of population growth in Greater Amman, and increases in service coverage targets, which are particularly significant in the case of sewerage. Table No. 4.3 presents a summary of the market and the recommended service targets.

⁵³ A more definitive cost figure will be developed during the feasibility phase in close consultation with WAJ and LEMA.

⁵⁴ These financial scenarios were prepared using information based on inputs and data received from the Ministries, government agencies, LEMA and other sources and assumptions made by the consultants.

Table 4.3 The market for water and wastewater services

Item	2004	2010	2020	2025
Total population (million)	1.9	2.3	2.9	3.3
Population served with water (%)	97	99	99	99
Population served with sewer (%)	78	82	90	90
Water sales per connection/month(m3) ⁵⁵	14	18	23	23
Total volume sold (million m3)	66	97	155	174
Production (million m3)	114	165	221	232
Non-revenue water (%)	43	41	30	25

It is important to note that meeting the growing demand for water would require substantial increases in raw water production, which the scenario assumes would be supplied by WAJ. WAJ would also be responsible for wastewater treatment.

Operational costs. The scenario considers a substantial change in the service's operational cost structure due to the need that NEWCO management allocates additional resources to system maintenance, rehabilitation and repairs. More specifically, the scenario considers that NEWCO management should increase the budgetary allocations for maintenance, rehabilitation and repairs from 0.4% in 2004 to 2.5% of gross fixed assets in 2019 and thereafter.

Projected budgetary allocation for maintenance, rehabilitation and repairs for selected years is shown in Table 4.4.⁵⁶

Table 4.4 Maintenance and rehabilitation budget (Million JD)

Year	Budget		
	(2004 prices)	(Current prices)	Percent ⁵⁷
2004	2.1	2.1	0.4
2010	3.8	4.2	0.7
2020	17.9	24.4	2.5
2025	20.6	30.9	2.5

Investments. The investments in expansion of the distribution system to achieve the proposed service targets over the 2007-2025 period are shown in Table 4.5 for selected years. These estimates were prepared on the basis of an average cost of serving an additional customer: JD 500 for water and JD 600 for sewerage. These estimates need to be confirmed during the feasibility study.

Table 4.5 Investments in expansion – NEWCO (million JD)

Year	Water		Sewerage		Total	
	2004 prices	Current	2004 prices	Current	2004 prices	Current
2010	5.1	5.7	7.5	8.3	12.6	14.0
2020	6.6	8.9	7.2	9.8	13.8	18.7
2025	7.5	11.2	8.1	12.2	15.6	23.4
2007-25	116	148	152	191	268	339

⁵⁵ Sales to retail customers. Excludes sales to other governorates.

⁵⁶ The figures in current prices include an adjustment of 2% per year corresponding to the assumed inflation. 2% was the average inflation for 2000-04. Source: Kingdom of Jordan, Department of Statistics. *Jordan in Figures*. May 2005.

⁵⁷ Percent of gross fixed assets.

Working capital. The scenario considers a significant increase in the company's working capital aiming at allowing it to make payments to contractors and suppliers, including the energy company, within 30 days on average. The scenario also assumes account receivables equivalent to two months of billings.

Alternative financing scenarios

The consultants developed a number of financial scenarios for the operational plan outlined above. At the end, the consultants selected three scenarios to include in the report. The scenarios were selected to answer two main issues discussed with the PDT during the study: 1) the required tariff levels; and 2) the amount of subsidies required for the provision of the service.

The three scenarios are expressed in current JDs, that is, taking into account changes in prices because of inflation. A scenario in constant 2004 prices is also included in the financial annex.

The three scenarios in current prices are:

- Scenario 1. Not adjusting tariffs to compensate for inflation, but adjusting costs to reflect the impact of inflation on the prices of required inputs.
- Scenario 2. Not adjusting tariffs or WAJ-provided inputs to compensate for inflation.
- Scenario 3. Adjusting tariffs and costs to reflect the impact of inflation.

Other premises implicit in all the alternative financing plans are:

- The inflation rate as measured by the Consumer Price Index is assumed at 2% per annum, which was the average for the 2000-2004-period.⁵⁸
- An additional surcharge on water and sewerage tariffs – already approved, equivalent to an 8% tariff adjustment will become effective in the last quarter of 2006.⁵⁹
- No staff increases – gradual productivity increases.
- WAJ would continue servicing its outstanding debts. The proposed company would not contribute funds to WAJ for this purpose.
- The proposed company would be allowed to reinvest all cash operational surpluses (no dividends).
- The proposed company would not be subject to income tax.

Scenario 1. Not adjusting tariffs to compensate for inflation

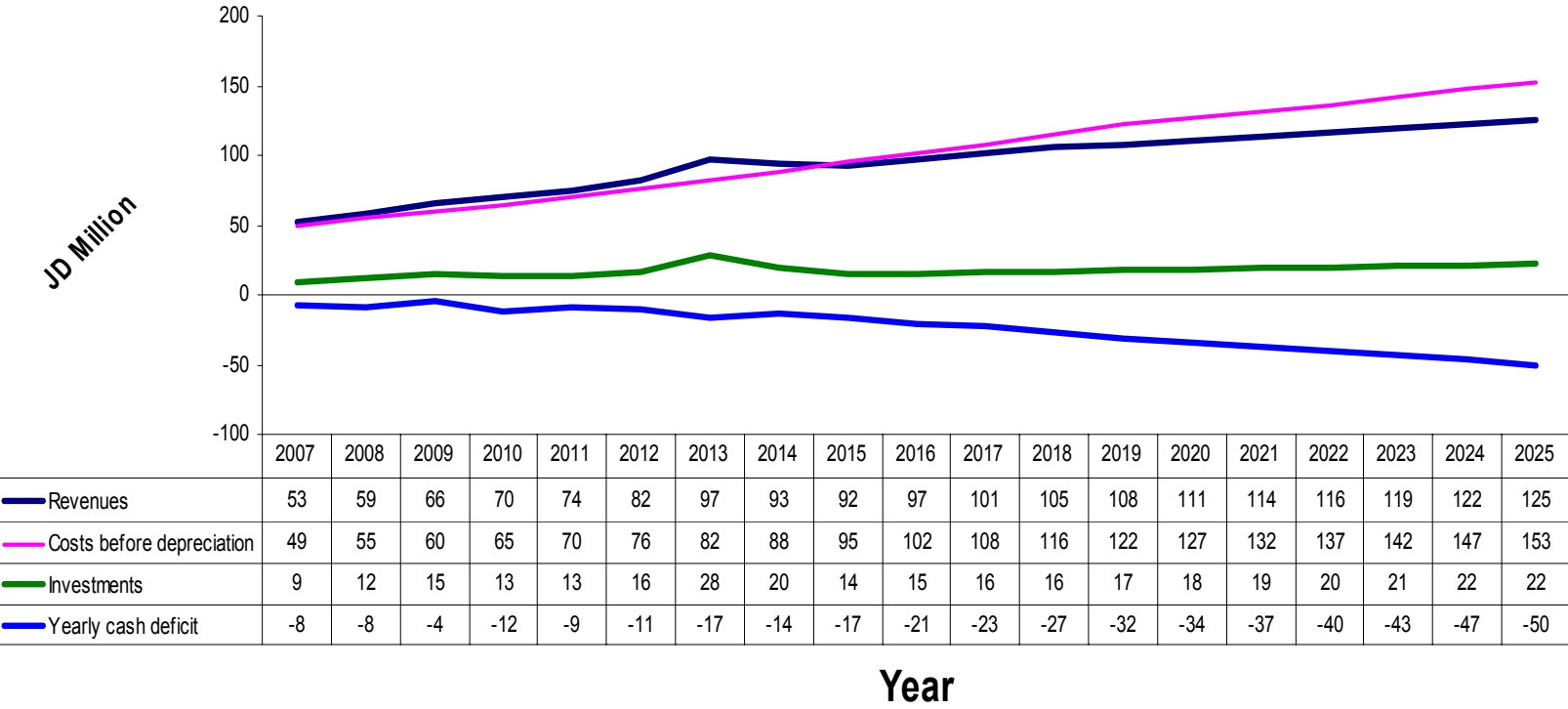
The recommended operational plan would not be feasible under this scenario, as NEWCO would not be in a position to generate internally enough cash to finance the investments in the expansion of the distribution system. The lack of funds for investment increases over time because of the cumulative effect of inflation. In fact, in the outer years of the scenario NEWCO would be unable to cover its personnel and operating costs and the working capital requirements, and even less investments in system expansion. Graph 1 illustrates the above points.

The alternative of financing the planned investments with loans is not feasible, as NEWCO would have no expectations of a positive cash flow to service the debts. Under these circumstances, the financial gap would have to be closed with government subsidies, which are not consistent with the recommended approach of developing a financial self-sufficient company.

⁵⁸ Source: Kingdom of Jordan. Department of Statistics. Jordan in Figures. May 2005.

⁵⁹ The surcharge effective the last quarter of 2005 is also incorporated.

Graph 1
Scenario 1: NEWCO Selected Financial Variables



Scenario 2. Not adjusting tariffs or WAJ-provided inputs to compensate for inflation

The operational plan would not be feasible under this scenario either, as the reduction in NEWCO payments to WAJ for bulk water and wastewater treatment (increased subsidy via prices of WAJ-provided inputs) is not enough to finance fully the investment plan.

Scenario 3. Adjusting tariffs and costs according to inflation

The recommended operational plan would be feasible under this scenario, as the proposed company would be able to generate internally funds for investment and for debt service, if any (Graph No. 2). The scenario considers implementing periodic tariff adjustment to compensate for inflation.

The comparison between the already approved tariffs, that is, including the 8% increases in 2005 and 2006, and the tariffs adjusted to compensate for inflation until 2010 is shown in Table No. 4.6. The adjustments correspond to the assumed 2% annual increase in the Consumer Price Index.

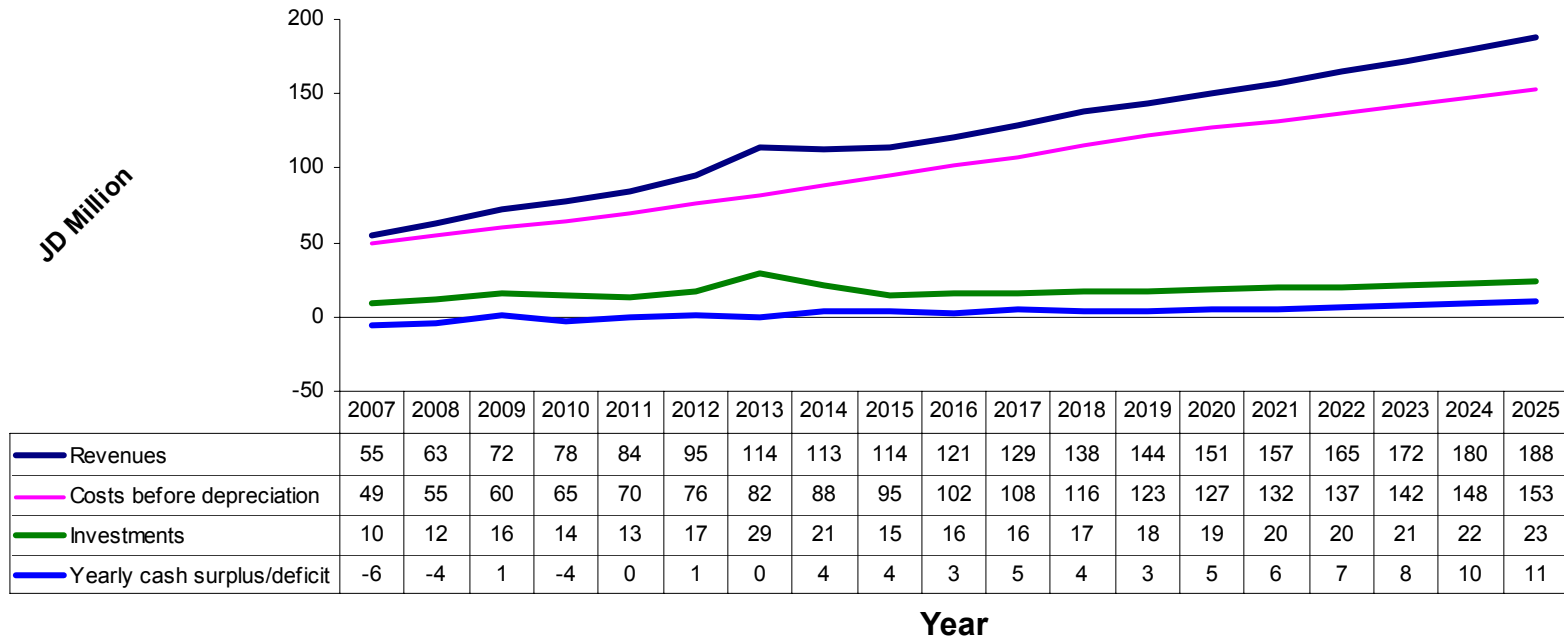
**Table 4.6 Combined water and sewerage tariffs per m³⁶⁰
(Current JD)**

Year	Approved	Adjusted
2004	0.59	0.59
2005	0.63	0.63
2006	0.70	0.70
2007	0.70	0.73
2008	0.70	0.74
2009	0.70	0.76
2010	0.70	0.79

The required increase in the average tariff could be achieved through a tariff rebalancing (Chapter II and Annex D).

⁶⁰ The tariffs at the end of years 2005 and 2006 include the 8% tariff adjustment already approved by the Council of Ministers.

Scenario 3: NEWCO Selected Financial Variables



Transition to NEWCO's financial arrangements

The financial scenarios assume that NEWCO would initiate operations with the assets of the existing service plus WAJ's fixed assets corresponding to Greater Amman. These assets include also the accumulated cash surpluses in WAJ's Revenue Account⁶¹, which are likely to be significant as a result of the tariff increases implemented in 2005 and 2006. This cash surplus at the end of 2006 could constitute WAJ's contribution to NEWCO's initial capital. If the government does not take this step, NEWCO would have to obtain a medium-term loan to cover the JD 12 million financial gap mentioned at the beginning of this scenario.

As NEWCO's net income⁶² during the first five years would be negative (a total of JD 24 million during the five years) it would be necessary that the initial NEWCO capital is sufficient to avoid the possibility that it would be referred to the Court for compulsory liquidation in accordance with the provisions of the Companies Law No. 22 for the year 1997 and its amendments.

NEWCO's net income would be moderately positive in later years (from the equivalent to 1% of assets in 2012 to 3% in 2025). Graph 2 shows revenues, operating costs and investments.

The feasibility study should include detailed estimates of NEWCO's initial balance sheet.

5. Implementation Plan

Once the government approves the preferred option, Phase 1 will end. The two main stages outlined below will commence. The timetable and main concepts are presented in Graph 3 and Table 4.9 at the end of this chapter.

- Phase 2: Preparatory Process - Feasibility Study
- Phase 3: Implementation - Management Transfer

The success of the preparatory and the implementation processes depends on a close cooperation between the consultants, MWI/WAJ/PMU, LEMA executive personnel, and key personnel assigned early in Phase 2 who will take on the management of NEWCO.

Phase 2 - Preparatory process – Feasibility Study

The preparatory process, a detailed feasibility study, will commence once the government approves the preferred option and a detailed work plan is agreed upon between MWI/WAJ/PMU, USAID and the consultants. The study would include a detailed evaluation of the technical, financial, organizational, legal and human resources components. Phase 2 concludes with the presentation and discussion of the feasibility study results.

A key activity at the start of Phase 2 will be to communicate to relevant stakeholders and the public at large, the proposed plans for the management of Amman water and wastewater starting from January 2007. This is especially important for current LEMA staff (both LEMA direct hire and WAJ-seconded staff), who need to be informed about future prospects with NEWCO.

⁶¹ Bank account where LEMA deposits the service's revenues.

⁶² Total revenues less cash operating costs and depreciation charges (non-cash cost).

Phase 3 - Implementation process – Management transfer

Following acceptance of the feasibility study and authorization to proceed, the implementation process would start with a memorandum of understanding between the parties (MWI/WAJ/PMU and possibly GAM) that would include the terms of the transfer of rights and assets and the terms of the implementation of the new organization. More detailed actions would be contemplated in this stage, such as the completion of the legal structure, the organizational, financial and technical implementation, including the company formation and the transition activities up to the start date of full independent operation.

Some activities from both phases could be conducted simultaneously in order to facilitate and expedite the transfer process. However, the feasibility study would have to be completed and approved before any registration and or partnerships are established.

Implementation issues

- **Technical assistance.** Even though NEWCO is capable of sustaining operations with its own personnel, technical assistance will be needed for the initial period of start-up of operations with the new management. This assistance will be mainly focused on operations, to offset the risks of LEMA’s expatriate staff departure and in support to the newly appointed key management personnel.
- **Regulation.** The PMU will assume a regulatory role for NEWCO that will be clearly specified in the company agreements.

Next steps

The initial key step in the creation of NEWCO should be the appointment of key management personnel to work in the preparatory and implementation phases. Personnel coming from MWI/WAJ or PMU would be relieved from their previous responsibilities and placed in a position to take on responsibilities when the company starts operations in January 2007. They would be part of the developmental process and will undertake a shadow management responsibility until January 2007.

Once NEWCO starts operations, technical assistance will accompany the new administration for a limited period and as needed.

Graph 3. Steps to implement recommended model

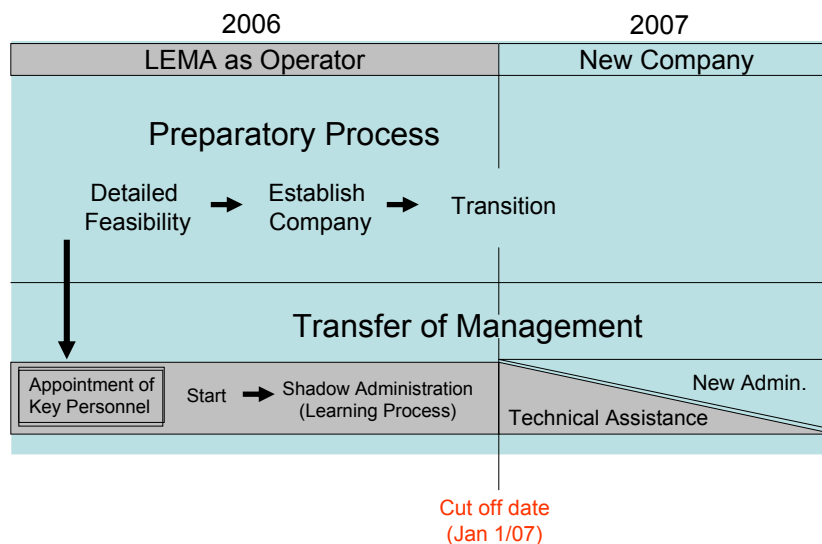


Table 4.9 Implementation timetable

Main activity	Implementation Phases 2 and 3												2007
	Calendar year 2008												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan
1. Preparatory process.													
Feasibility													
Legal, technical, HR, etc													
Start-up project													
2. Implementation													
Memorandum of Understanding													
Legal													
Organization and HR													
Financial													
Technical													
Creation of NEWCO													
3. Transition													
4. Start date for NEWCO													1/1

ANNEX A

Water and Wastewater Services in Amman

1. Geography

Amman is well known for a complex topography, with an approximate elevation difference of 400 m between the highest and lowest points of the city.

The Greater Amman region as delimited in the LEMA service area, includes part of the Amman and Balqa governorates. The service area boundaries are: to the north, the University District; to the east the Marka district; to the south east the Muaggar, Suhab and Quaismeh districts; to the south by the Jeza district; to the south west by the Na'ur district; and to the west by Wadi Al Seer district. The districts are dispersed over 19 hills cover an area of 530 km², of which 170 km² are built up areas, and 220 km² zoned ones (i.e. open to different types of activities). Most districts are fully incorporated as part of the Greater Amman service area of LEMA with the exemption of Jeza, Muaggar and Suhab, with approximately 30%, 60% and 20% respectively of the population in their area serviced.

Table 1 Districts Covered by the Service Area

#	District Name	% of districts covered by LEMA ¹	Limits
1	Na'ur District	100%	South-West
2	Quaismeh District	100%	South East
3	Jeza District	30%	South
4	Muaggar District	60%	South-East
5	Suhab District	20%	South-East
6	Wadi Al-Seer District	100%	West
7	University District	100%	North
8	Central Amman District	100%	Center
9	Marka District	100%	East
	Amman Governorate	40%	

¹ Area percentage estimated by the Consultant

2. Population

The population within the Greater Amman service area is approximately 2 million (2004 National Census). Recent increases in immigration flows mainly from Iraq are taken into account in the above figures⁶³. The two largest districts of Central Amman and Marka account for half of the total population (Table 2).

⁶³ Government of Jordan, Department of Statistics (personal interview on December 19,2005)

**Table 2 Population in Greater Amman Area
2004 Census**

#	District Name	Population on Oct. 12 2004 ¹
1	Na'ur District	66,020
2	Quaismeh District	260,368
3	Jeza District	41,333
4	Muaggar District	29,765
5	Suhab District	172,942
6	Wadi Al-Seer District	56,875
7	University District	277,831
8	Central Amman District	550,434
9	Marka District	483,837
	Amman Governorate	1,939,405

Source: National Census 2004

¹ District population in service area

3. LEMA

In April 1999, a French/ Jordanian consortium named LEMA formed by Suez Lyonnaise des Eaux⁶⁴/Arabtech Jardaneh and Montgomery Watson, was awarded a four-year performance-based management contract for Greater Amman Area. The joint venture, started operations in August 1999 with a \$ 55 million World Bank loan to help improve services and pay for the management and performance fees.

The Contract has been modified in three opportunities. The first Memorandum of Understanding (MOU No. 1 signed on September 2001) redefined targets affected by externalities, implemented a coordinated plan to improve human resource management policies and redefined unaccounted for water targets according to an action plan. The second MOU (signed in August 2002) extended the contract for 17 months until December 2004, and adjusted payments for such extension, and modified targets for unaccounted water and constancy of supply. The third MOU (signed on May 2004) included the extension of the contract for 24 months until December 2006, and modified some targets and details of payment agreements.

The contract main objectives as specified in the Terms of Reference include:

- Increase effectiveness and efficiency of Amman Governorate water management
- Increase the accounted for water by at least 25%
- Attract capital for improving and refurbishing the water infrastructure serving Amman
- Improve the constancy of supply to all subscribers in the Service Area.
- Improve the quality of water
- Ensure sound financial management and improve cost recovery.

The operator is responsible for billing and collection and the proceeds are deposited into WAJ's account. Technically, LEMA has full discretion to manage the day to day operations and, within the budget limits, ample discretion to carry out maintenance, repairs and rehabilitation.

⁶⁴ Presently known as ONDEO.

The PMU (within WAJ) is the direct government counterpart in charge of monitoring contractual responsibilities. Over the years, and particularly of the execution of various investment projects, the LEMA-PMU institutional relationship has evolved from a normal client-service provider to a closer partnership sharing responsibilities and coordination. This has helped LEMA to carry out its work more effectively; however, it has also allowed a more flexible contractual relationship and enforcement of contract obligations is less clear than was originally intended.

During the life of the contract the top executive was changed once and expatriate staff was reduced to 4 in 2005. The contract started with full employment positions filled by WAJ seconded employees. During the first four years, 50% of original employees were returned to WAJ and some of these positions were replaced by direct hires.

To manage contract expenditures, three accounts were set: 1) Fixed Fee payment, 2) Operating Expenses, and 3) Performance Incentive Compensation. In the third year of the contract (2002) and in the MOU No. 2, a modification was introduced in respect to the Capital Investment Interface Team to be paid to LEMA in accordance with Terms of Reference, Schedule of Deliverables and Job Descriptions contained in the formal documents submitted to the various local and foreign authorities. These additional payments are funded by the World Bank loan.

After 6 years of implementation, the contract has introduced new administrative techniques in Customer Information System (CIS), billing system (X7 – a software package), Geographical Information System (GIS), Asset Management Control System (AMS) and Financial Management System. Some of these improvements have already been transferred by WAJ to other areas of the country.

4. Water and wastewater services in Greater Amman

4.1 Water services

In 2004, about 97 % of the total population was served by LEMA. However, service is rationed as only about 60% of customers receive water more than 36 hours per week; some areas are receiving a continuous supply since August 2003.

Greater Amman water resources come from two main sources: 1) rivers or springs, and 2) deep wells. The Yarmouk River and water collected from 10 other sources located in the northern part of the Jordan Valley, feed the King Abdullah canal that ultimately supplies the Zai water treatment plant. The intake at Deir Alla is located at 230 meters below sea level and the water is pumped through a system of 4 pumping stations to 880 meters above sea level. From the Zai plant the water is pumped to the Dabouq reservoir before being distributed to the distribution system. A total of 54.7 mm³/year were provided in 2004 from this source (46 % of the total).

In addition, a total of 16 well production fields inside LEMA's service area, contribute total of 35.6 mm³/year (30% of the total). These well fields include a total of 82 wells and one spring, as listed in Table. 3.

Table 3 Wells fields production (2004)

	Source Name	Governorate	Total Production Mm3/year
1	Qatraneh	Karak	2.8
2	Swaqa	Amman	7
3	Irainbeh	Amman	0.2
4	Musaitbeh	Amman	0.5
5	Muwaqquer	Amman	1.3
6	Qastal	Amman	1.3
7	Yadodeh	Amman	0.3
8	Wadi Essir Springs	Amman	2.8
9	Abdoun	Amman	0.3
10	Wadi Saqra	Amman	0.3
11	Wadi Qattar	Amman	0.05
12	Ras El-ain	Amman	3.4
13	Muhajreen	Amman	1.3
14	Taj	Amman	8.5
15	Ain Ghazal (Russaifah)	Amman + Zarqa	5.3
16	Yajouz	Zarqa	0.2
Total Production			35.6

The remaining 24 % (equivalent to 28.2 mm³/year) of the water supplied to LEMA in the year 2004, came from external sources listed in Table 4. During 2004, LEMA also exported 7.7mm³/year to other governorates, mainly Karak, Madaba, and Balqaa.

Table 4 External water sources

	Source Name	Governorate	Total Production mm3/year
1	Khaw	Zarqa	16.4
2	Walla	Madaba	6.6
3	Lajjoun	Karak	12.8
Total Production			35.8

The distribution system has some 6,150 km of pipelines. About 36% are old galvanized iron pipes of less than 100 mm and about 20% of the system's pipes are less than 32 mm in diameter. The primary distribution is not able to meet demand when water supply is restricted to a few hours a day. The frequent closing and opening of valves, to accommodate shifts in supply to different areas, contributes to the high level of pipe breaks.

A major rehabilitation project of US\$ 250 million and reinforcement of the primary distribution system have been carried out with assistance of the donor community and it is expected to be concluded by mid 2006. While these projects have significantly facilitated the operation of the system, substantial rehabilitation works are still needed. For instance, the number of pipe breaks in the distribution system in 2004, of 55,650 is still high, or 9 breaks/km/year (Table 2.4) when compared with international best practice (< 0.4 per year).

Additional efforts implemented under the LEMA contract during the past 6 years and aimed to reduce non revenue water include an aggressive meter replacement program reaching almost 200,000. These efforts include advanced techniques for leak detection and repair as well as the implementation of a system to

reduce the response time to repairs. Nonetheless, after 6 years of improved management and rehabilitation works the system still registers a high level of non-revenue water of around 43% (2004)⁶⁵. High levels of leaks due to old pipes and illegal connections are believed to be the main cause. Tests in certain districts where a continuous supply was introduced have helped to significantly reduce losses to levels in these areas.

4.2 Wastewater services

Wastewater services by a house connection cover 78% of Greater Amman population. The system has some 2,000 Km of pipelines. Blockages presently amount to about 18,900 per year (2004) or 9 stoppages per km of network per year far exceed international best practices and present an increasing bottle neck to operations and to the development of new real state projects. The system needs to be upgraded and expanded to meet present and future demand; however, detailed engineering plans are not yet available.

Presently there are two wastewater treatment plants operated by LEMA: Abu Nsseir activated sludge plant (4,000 m³/day or 1.5 mm³/year) and Wadi Essier (4,000 m³/day). In addition, WAJ operates one pretreatment plant in Ain Ghazal⁶⁶. The present lagoon system that receives 225,000 m³/day (82 mm³/year) will be closed when the As Samra plant becomes operational, and is developing three new wastewater treatment plants:

- As Samra secondary treatment plant, being built under a BOT scheme, with financial assistance from USAID. This plant has four treatment trains with a total capacity of 267,000 m³/day (97 mm³/year). This capacity will be gradually made available between June/06 (expected completion of the first train) and January/07. Additional capacity of 267,000 m³/day is planned at a later stage.
- South Amman secondary wastewater treatment plant, being built with financial assistance from Korea. This plant has a capacity of 31,000 m³/day (11.3 mm³/year) and is expected to be operational in early 2008.
- Giza-Talbiea secondary treatment plant, being built with financial assistance from Italy. This plant has a capacity of 2,300 m³/day (0.8 mm³/year) and is expected to become operational by mid 2007.

Until recently, billing practices included sewerage charges in relation to water consumed from the distribution system, and customers who purchase water from tankers or had other sources did not pay for wastewater discharged to the collection system. This practice is being corrected and represents a significant addition in revenues from sewerage services. Likewise, significant numbers of illegal connections have been identified and procedures to obtain payments are currently enforced.

4.3 Capital expenditures

The growing demand for water and sanitation services due to the rapid population and economic development puts increasing pressure on the institutions (WAJ and NEWCO companies) to improve efficiency in the use of water resources to satisfy the needs of different user groups and to avoid negative impacts on the environment and the national economy.

Water supply and wastewater services incur a long series of activities (water extraction, treatment, distribution, collection of wastewater and treatment) and related costs to meet demand. Often consumers have an incomplete understanding of these costs.

⁶⁵ Non revenue water figures for 2005, as reported by LEMA (February 5, 2006) are: 1st quarter 50%; 2nd quarter 45%; 3rd quarter 41% and 4th quarter 44% (tentative), or an average of 45% for the year.

⁶⁶ This plant will continue to operated by the BOT operator.

Under the assumption that the water sector objectives are to manage the country's water resources in an environmentally sustainable manner all costs are incurred although they are not necessarily reflected in actual financial or monetary payments. Many countries conclude that the costs of collecting, treating and safely disposing of wastewater are beyond their means and defer the corresponding investments and costs to the future. By doing so the costs do not disappear – they merely accumulate in the form of environmental damages that eventually at a future date forces the country to invest in adequate wastewater management.

Similarly, the effect of over-exploiting available water resources (mining groundwater aquifers), only postpones the investments to replace such resources to a future date. The effect of both deferred wastewater investments and over-exploited water resources is to shift costs from the present generation to future generations.

Jordan's arid climate and the rapid growth of agricultural and municipal demand pose the challenge of balancing supply and demand at the least cost. The level of the challenge has facilitated the integration of wastewater management in the water cycle for the simple reason that collecting, treating and reusing wastewater becomes an economic necessity, corresponding to the least cost of meeting selective agricultural demand. The same conditions of extremely fragile and scarce water resources have advanced both schemes to mine groundwater but also to create more potable water by capturing brackish groundwater and intercepting flash waters in order to recharge groundwater aquifers. In both cases the result are escalating costs, some or all of which may be passed on consumers who through their demand give signals to producers as to how much water they wish to consume at the prevailing tariff. In the case of groundwater exploitation the cost is partly borne by the environment, whereas in the case of desalinization and groundwater recharge schemes the actual costs become a reality although they may not always be passed on to consumers.

4.3.1 Estimated capital investment

The total population in the service area is expected to grow from about 2.0 million in 2004 to 3.3 million in 2025. Water supply coverage is expected to grow slightly from 97% in 2005 to 99% in 2009, and remain constant thereafter, as rapid population growth makes it unlikely to reach 100% coverage. Wastewater collection is projected to increase from 78% to 90% in 2025, taking into account that low density areas could be served at a lower cost by septic tanks. Over this period total demand (including water losses) is expected to grow from 114 mm³/year in 2004 to 232 mm³/year in 2025, and water losses to gradually diminish to 25% by 2025. Sewage flows over the same period, are expected to increase from 48 mm³/year to 144 mm³/year. Graphs 1 and 2.

Two upcoming water augmentation projects are expected to meet future demand. The first, the Zara Ma'in project under construction, is expected to provide by 2006 up to 40 mm³/year⁶⁷ of desalinated water from springs in the Wadi Zara area near the Dead Sea. The second, the Disi aquifer, located in the southern part of Jordan and shared with Saudi Arabia, is expected to become operational in about 7 years from now, and deliver about 100 mm³/year.

Capital investments for Amman are difficult to estimate due to the extreme complexity of water supply projects with a multiplicity of sources and complex interaction between agricultural, industrial, environmental and municipal demands and cost uncertainties of future projects, particularly Disi. Similarly these estimates are problematic because of the substantial needs to rehabilitate large portions of the distribution system that are obsolete. Finally, there is the fact that individual consumers have responded to the inadequate service by investing in their own systems to meet at least part of their needs

⁶⁷ WAJ might reduce supply from other sources and deliver a net increase of 18 mm³/year.

for water and wastewater services: the clearest example is when consumers construct their own storage capacity, or build their own wastewater systems. With these provisos an estimate has been made of the capital investment requirements over the 2007-2025 for Amman's water supply and wastewater system to meet the projected growth in demand. This projection is based on several assumptions:

- The safe yield of existing sources is about 120 mm³/year
- Hours of service will gradually increase to reach 24 hours service within five years
- The new Zara Ma'in water augmentation project will become fully operational by the end of 2006 and will supply an additional 35 mm³/year⁶⁸.
- The Disi project will become operational early in the next decade and provide an additional 100 mm³/year of water.
- The level of water losses will gradually decrease to about 25% by the year 2025.
- The As-Samra wastewater treatment plant, with a capacity of 267,000 m³/day (98 mm³/year) will be fully operational by mid 2007.
- The total treatment capacity of the smaller four wastewater plants is about 41,300 m³/day (15 mm³/year).
- An expansion of As-Samra, to double its present capacity, will be needed around 2015.

Based on these assumptions, investments needed to meet this demand are listed and cost out in Table No. 5.

**Table 5. Estimated investment requirements 2007-2025
Million JD (2004 prices)**

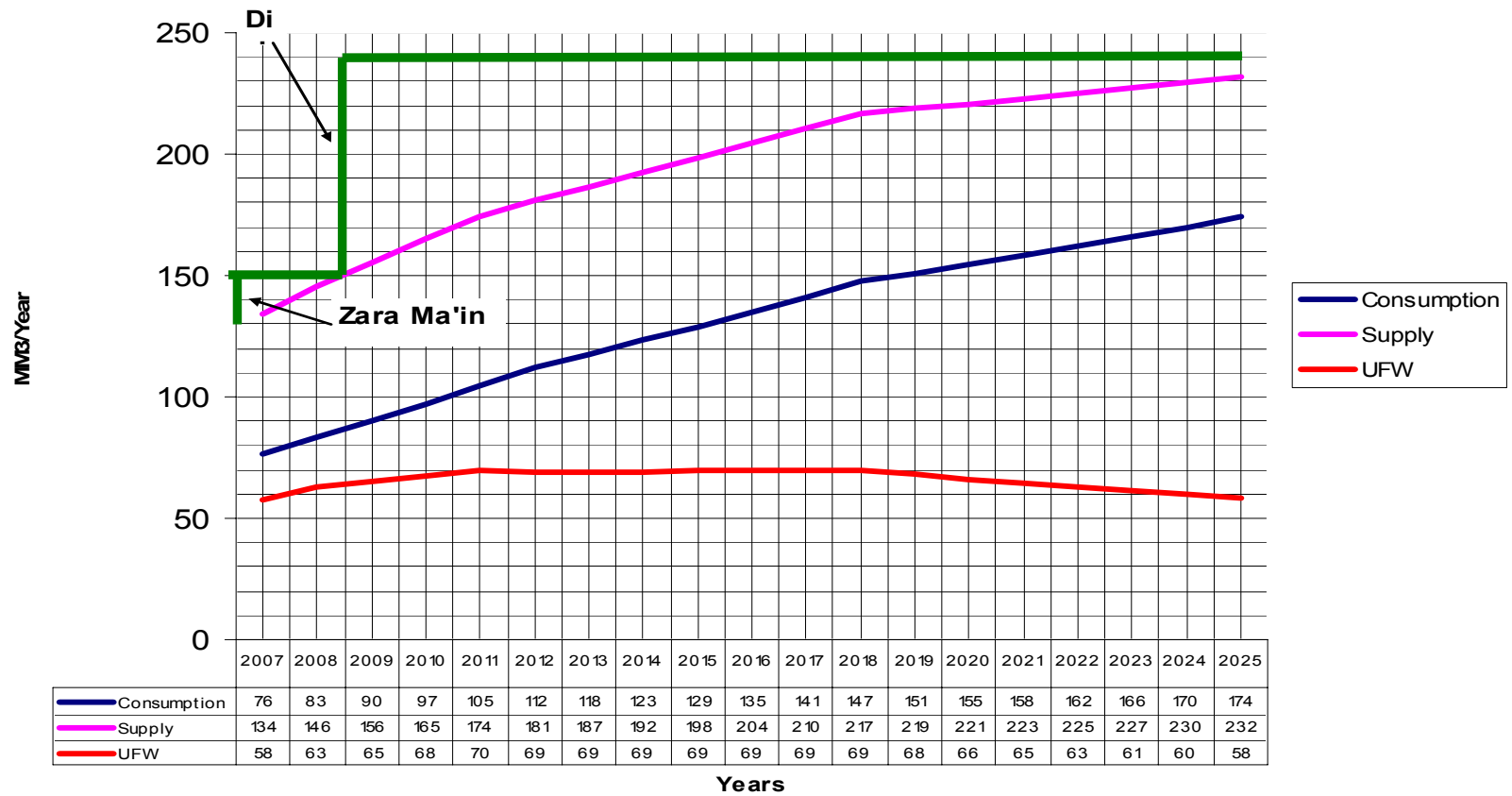
Agency responsible	Project	Capacity mm ³ /year	Year commissioned	Water supply	Waste water
WAJ	Zara Ma'in a/	35	2007	(85)	
	Disi	100	~ 2010	460	
	As-Samra Stage 1 a/	98	2006		(120)
	As-Samra Stage 2	98	2015		120
	South Amman a/	11	2008		(17)
	Giza-Talbiea a/	0.8	2007		(7.5)
	Start up project	Rehab.		2007-2011	40
NEWCO	Water distribution	Distributed over the years to meet demand		116	
	Wastewater collection				152
Totals				556	292

Note: a/ The cost of projects already financed (in parenthesis) is not included in the totals

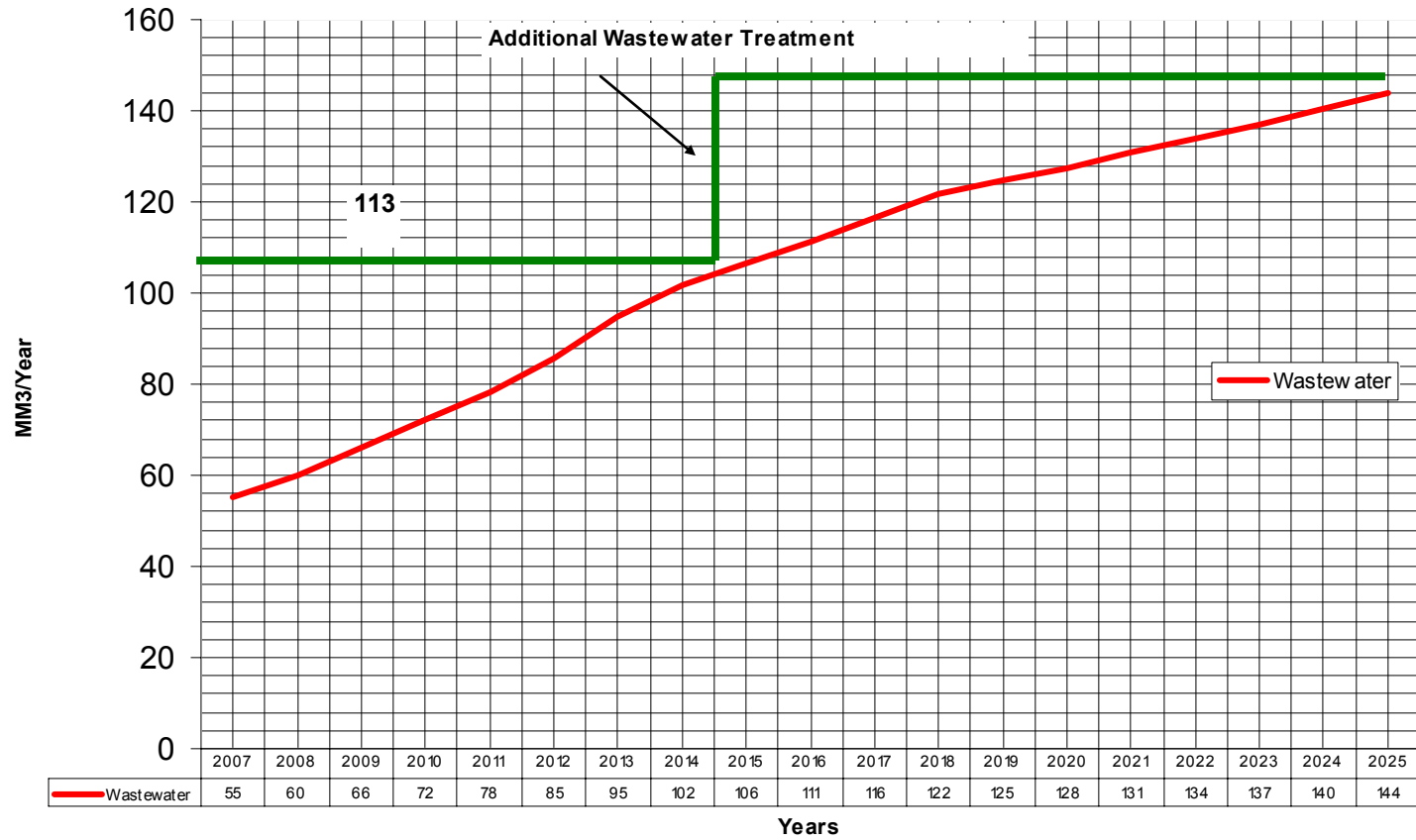
Rehabilitation and maintenance needs of the water distribution and wastewater collection networks over the 2007-2025 period amounts to JD 214 million. These costs are considered operational costs and therefore they have been excluded from the above table, but taken into account in the financial projections.

⁶⁸ As recommended by MWI Committee in October 2005. This recommendation includes providing 40 mm³/year and reducing Khaw sources by 5 mm³/year for a net increase of 35 mm³/year.

Graph 1. Water Supply



Graph 2. Wastewater



Total capital investments for water and wastewater services over the 2007-2025 period will amount to JD 848 million, corresponding to an average annual investment of about JD 45 million. WAJ and NEWCO contributions, will be JD 620 million (including the proposed start-up project) and JD 486 million (including maintenance) respectively.

Proposed start up project. In spite of substantial investments⁶⁹ in recent years to rehabilitate the water distribution and wastewater collection there is still a significant backlog in rehabilitation needs. As previously indicated, the number of pipe breaks in the water distribution system and stoppages in the waste water collection system are very high by international best practices. For this reason the consultants recommend, that to give impetus to NEWCO’s quest for high quality services there is a need to consider an start-up project. This project, should aim to reach specific objectives: 1) reaching a continuous service to the whole population within 4-5 years; 2) reduction of pipes breaks to reduce the level of water losses; and 3) reduction in the number of stoppages in the wastewater collection system.

This cost of this project has been estimated at between 40 to 60 million JDs, and its main components are:

**Table 2 Start-up project
million of JDs**

Concept	Quantity	Unit price	Cost range
Rehabilitation of water distribution system and house connections	200-300 kms	90,000/km	18 - 27
Pipe reinforcements to primary distribution	20 -30 kms	200,000/km	4 - 6
Rehabilitation of sewerage system	40 – 100 kms	150,000/km	6 - 15
IT equipment and unallocated	Lump sum		12 - 12
Total			40 - 60

The details of this project need to be developed in the feasibility stage in close coordination with and confirmed with representatives of WAJ and LEMA.

⁶⁹ Contracts C-01 to C-16, include the installation of some 2,000 kms of pipes of diameters equal or larger than 50 mm; which represent about 20% of the distribution network.

ANNEX B

Water and Wastewater Services in Aqaba and Financial Scenarios

1. Geography

The Aqaba Special Economic Zone (ASEZ) is the country's access to the Red Sea, the lead trade gateway and a key area for the expansion of industry, commerce and tourism. The Kingdom has placed a significant effort in the development of this area and in 2001 assigned responsibilities to the Aqaba Special Economic Zone Authority (ASEZA), as the main government representative to develop and manage ASEZ.

Aqaba has a 26 km shoreline and an area of approximately 6900 km². It limits with Eilat in Israel in the west, Saudi Arabia in the south and Egypt in the south west. Aqaba has a strategic location, an important contributing factor to its rapid recent development. Multibillion projects in real state, tourism and light manufacturing such as Tala Bay, Aqaba lagoon, Saraya Al-Aqaba are expected to accelerate the growth of this region.

2. Population

The population of the Aqaba Governorate, according to the 2004 National Census was 101,740, of which 86% live in urban areas. The population in the city of Aqaba area was 80,530. Most of the population in the Governorate lives in the ASEZ area and in small villages located in the regions of Quwaira and Wadi Araba which live from the tourism and agro activities. Population growth between the 1994 and 2004 censuses was 2.45%; based on this growth rate the population in 2025 is estimated to reach 169,100; population estimates for the city of Ababa for 2025 range from 131, 300 to 154,500.⁷⁰

3. ASEZA

ASEZA was also given the mandate to develop the water and wastewater utility services in the zone and establish operating policies which were incorporated in the Development Agreement of the newly created (2004) Aqaba Water Company (AWC). It is contemplated that ASEZA's ownership in AWC will soon be transferred to the Aqaba Development Corporation which is majority owned by ASEZA but has key participation from the private sector.

4. Aqaba Water Company

Previous to 2004, WAJ was in charge of the provision of water and wastewater services in Aqaba. In August 2004, these responsibilities were transferred to AWC. AWC is an integrated company in charge of all aspects of the services from water extraction to wastewater treatment including financing of expansion.

AWC governance structure includes representation of ASEZA, as minority shareholder (15%), and WAJ as majority shareholder with 85% of the shares. Thus WAJ retains full control of the General Assembly's decisions. The Management Committee (Board of Directors) and the general manager of the company are responsible for the day-to-day management of the services.

⁷⁰ Chemonics International Inc. Review of Aqaba Water Demand and Expanded Evaluation of Water Resources. June 2005. (Report funded by USAID).

The company's creation involved the voluntary transfer of all employees from a civil service to a private sector employee status. AWC created additional organizational divisions that didn't exist before, such as finance and administration as well as planning. AWC started operations with a responsive and modern organizational and operational structure and with detailed internal procedures and a four-year business development plan. It also implemented a new remuneration system that introduced significant performance based bonuses for key positions.

AWC from the beginning improved its public relation activities with customers and implemented guidelines for customers requesting access services and a 24 hour system to handle complaints, and a computerized billing system to facilitate payments,

5. Water and wastewater services in Aqaba⁷¹

5.1 Water services

In 2004, Aqaba Water Company served 99% of the population of ASEZ with potable water. Water is provided by the Disi well field and several nearby wells located to the northeast of Aqaba; this water is pumped to a series of pressure break tanks, and then delivered by gravity to the distribution system. AWC pays a water extraction fee (0.25 JD per m³) to WAJ and sells reuse treated wastewater to the industrial sector.

Water extraction from the Disi aquifer is limited by MWI to 17.5 mm³/year with a potential of 20 mm³/year over a two year period⁷². Once this limit is reached other sources of water will need to be developed. The provision of potable water, wastewater services, and reclaimed water are clearly interrelated in the definition of the least cost alternative to increase water sources to Aqaba. As discussed in the Chemonics's report, "tertiary reclaimed water can be substituted for potable Disi water, in some industrial, touristic, agricultural and green-belt alternatives".

In 2004, total water demand was 10.5 mm³/year. Water demand by sector was: 4.7 mm³, industry; 2.8 mm³, residential use; 2.6 mm³, commercial; 0.3 mm³, tourism and 0.02, agriculture (including reclaimed water). It is worth noting that industrial consumption from 1999 to 2004 decreased, on average, by 0.7%. During the same period residential use increased by 4.9% per year, and commercial by 12.1% per year. Over this period population growth was about 2.3%.⁷³

To meet this demand, Chemonics (cited) developed several scenarios. The recommended least cost alternative represents a combination of re-developing the Wadi Yatun Well Field and partial desalination of brackish water from Wadi Araba. Additional reused water, treated to tertiary quality standards, would be needed to meet demand under the high growth scenario and made available between 2010 and 2016. Further studies are needed to confirm the safe yield of these well fields.

A rehabilitation program initiated prior to the creation of AWC and to be completed in 2006, created two pressure zones in the distribution system to help manage pressure better and is likely to reduce pipe breaks and unaccounted-for water.

⁷¹ Most of this analysis is based on Chemonics report. Cited

⁷² Chemonics. Cited

⁷³ Chemonics. Cited

At the end of 2004 AWC achieved a level of 37% of UFW for the whole system⁷⁴. The company is pursuing further reductions with a formal leak detection program and an aggressive program to repair leaks, improve metering, and a concerted effort to reduce theft.

5.2 Wastewater services

The sewerage collection system (2004) network has 276 km of sewer collections and mains serving 73% of the population (83% in the ASEZ area). The rest of the population relies primarily on septic systems for treatment. The average wastewater flow in 2004 was about 3.8 mm³/year and it is projected to grow to about 13.0 mm³/year by 2005.

Because of the unique nature of the Aqaba area, and the effects on tourism and the Red Sea, no wastewater discharge to the Red Sea is allowed. All treated wastewater will be reused for irrigation and reuse to meet other non-potable water uses such as cooling water.

AWC has taken decisive actions to expand the coverage of the system. During its first year of operation aggressive policies of connections of wastewater resulted in an increase in connections of 700% above the goals set in the Business Plan.

AWC operates a simple facultative lagoon with a capacity of 3.3 mm³/year. A new tertiary wastewater treatment plant with an initial capacity of 4.4 mm³/year started operations during the second half of 2005. This plant was financed by USAID. This plant can be expanded to double its initial capacity at an estimated cost of 12 JD millions⁷⁵. Total wastewater treatment capacity is 7.7 mm³/year.

6. Estimated capital investment needs for Aqaba⁷⁶

Population in the service area is projected to grow to 169,100 by 2025 under the normal growth scenario. Over the same period coverage of services is projected to remain at 100% for water supply and increase to 90% for wastewater collection. Water demand, under this scenario by 2025, water demand is expected to reach about 21 mm³/year in 2025⁷⁷ and total water production 24 mm³/year. Unaccounted for water is projected to steadily decrease from 24% in 2005 to 15% by 2014 and remain at this level thereafter. Similarly, wastewater flows are expected to increase from 3.3 mm³/year in 2004 to about 9.4 mm³/year in 2005. Graphs 1 and 2.

Major capital investments are not required until about the end of the decade. Over this period, minor investments in the water distribution and wastewater collection systems would be required to keep pace with demand growth.

Investment requirements to meet this growing demand for water are⁷⁸:

- Rehabilitation of seven wells to discharge the existing Low Terminal Reservoir
- Construction of a 3,500 m³ High Terminal reservoir
- A 350 mm pipeline connecting the Low and High terminal reservoirs
- A new 400 mm pipeline from the High terminal Reservoir to the existing North High Reservoir
- Drilling new horizontal wells in Wadi Araba

⁷⁴ AWC. Annual Report 2004

⁷⁵ Chemonics, June 2005 Report. Cited

⁷⁶ Most of this analysis is based on Chemonics' report of June 2005. Cited

⁷⁷ Water demand in 2025, as projected by Chemonics, would be about 22mm³/year.

⁷⁸ Chemonics, June 2005 report. Cited

- Drilling of observation wells to monitor quality and water levels
- Nanofiltration desalination in Wadi Araba (2mm³/year)
- Pumping. A 18 km pipeline to existing North Low reservoir for blending with Disi/Wadi Yutum water

Total investment costs (2007 – 2025) for water and wastewater services are presented in Table No. 1.

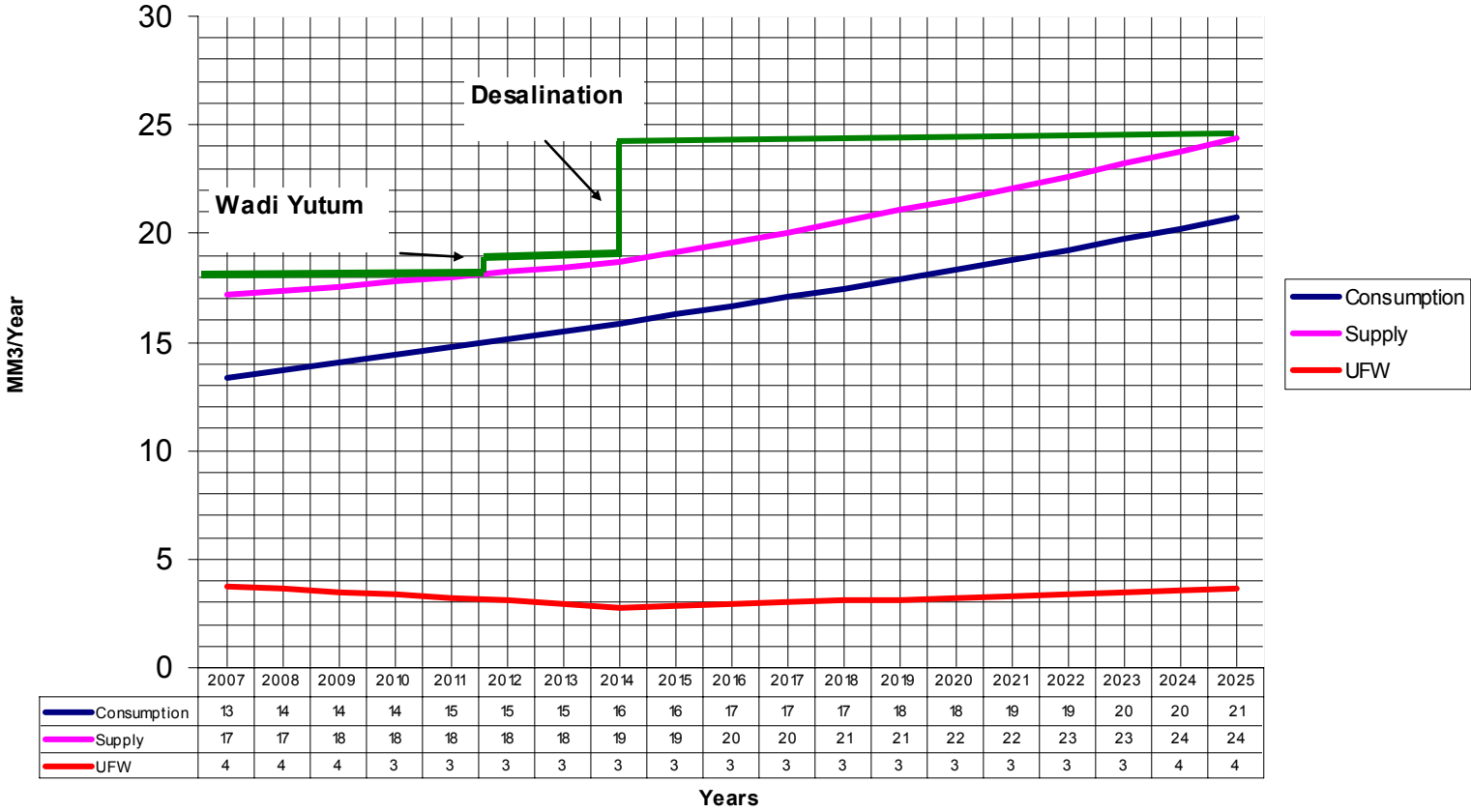
**Table 1 Estimated investment requirements for Aqaba
Normal growth scenario 2007-2025⁷⁹**

Project	Description	Year in operation	Million JDs
Water supply			
• Production	• Well rehabilitation, new wells (Wadi Yutum), pipelines and storage reservoirs	2010	3.2
	• Desalination facilities (Wadi Araba water)	2015	4.4
• Distribution	• Distribution system and connections		6.2
Sub total water			14
Waste water			
• Treatment	Additional capacity a/ Collection system and south coast works	2009	12
• Collection		2007-2025	8.5
Sub total WW			21
Total investments			35

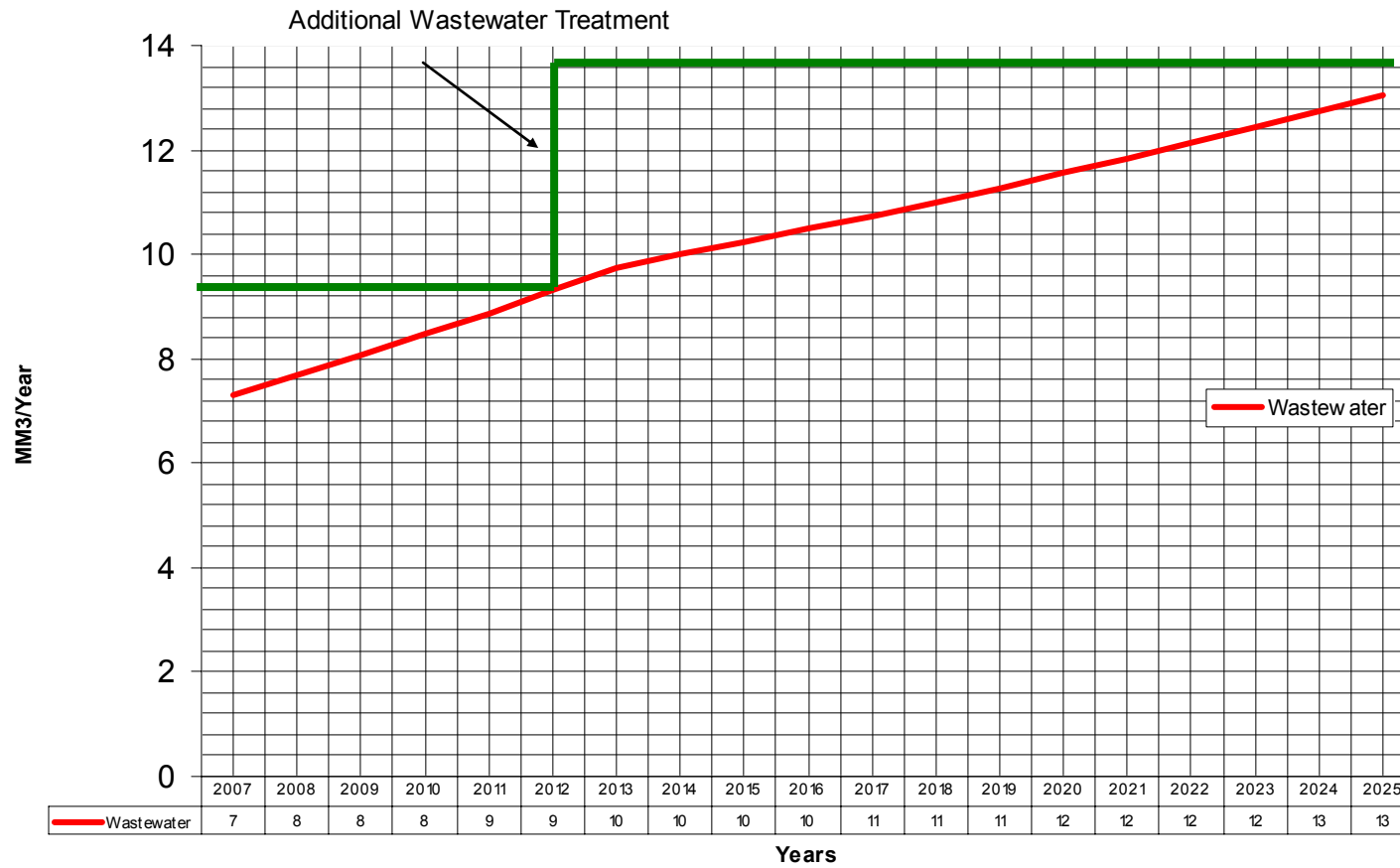
a/ Type of plant (secondary or tertiary) will depend on the demand for reclaimed water by industry, parks and agriculture.

⁷⁹ Major cost works taken from Chemonics, June 2005 report. Cited

Graph 1. Water Supply



Graph 2. Wastewater



7. AWC financial scenarios

The operational and financial scenarios for Aqaba Water Company are based on: the Pre-feasibility Report prepared by Chemonics International Inc.⁸⁰; the Review of Aqaba Water Demand and Expanded Evaluation of Water Resources prepared also by Chemonics⁸¹; financial information provided by AWC; and consultant's assumptions.

Operational scenario. The scenario is based on the expected rate of population growth according to the Department of Statistics (2.45% per year)⁸² The service coverage targets and estimated sales are as shown in Table 2.

Table 2. The market for water and wastewater services

Item	2004	2010	2020	2025
Total population (thousands)	102	118	150	169
Population served with water (%)	99	100	100	100
Population served with sewer (%)	73	84	90	90
Water sales per connection/month (m3)	42	51	51	51
Total volume sold (million m3)	5	14	18	21
Production (million m3)	8	18	22	24
Non-revenue water (%)	37	19	15	15

Investments. Aqaba's estimated investment for the period 2007-2025 amount to JD 35 million at 2004 prices (JD 14 million in water supply and JD 21 in wastewater).

Financing scenario. Aqaba's current tariffs would allow it to finance its operational plan while leaving a substantial cash surplus. The scenario does not foresee tariff adjustments as AWC seems to be able to absorb substantial cost increases for inflation. AWC's ability to absorb additional costs is due to a large extent to the current gross margin (33%)⁸³ estimated for 2005. The gross margin by 2025 would be still substantial (20%). If tariffs were adjusted for inflation, the gross margin would increase from 33% to 46%.

⁸⁰ Chemonics International Inc. Aqaba Water Company. Pre-feasibility Report. Finalized Submission. January 31, 2003.

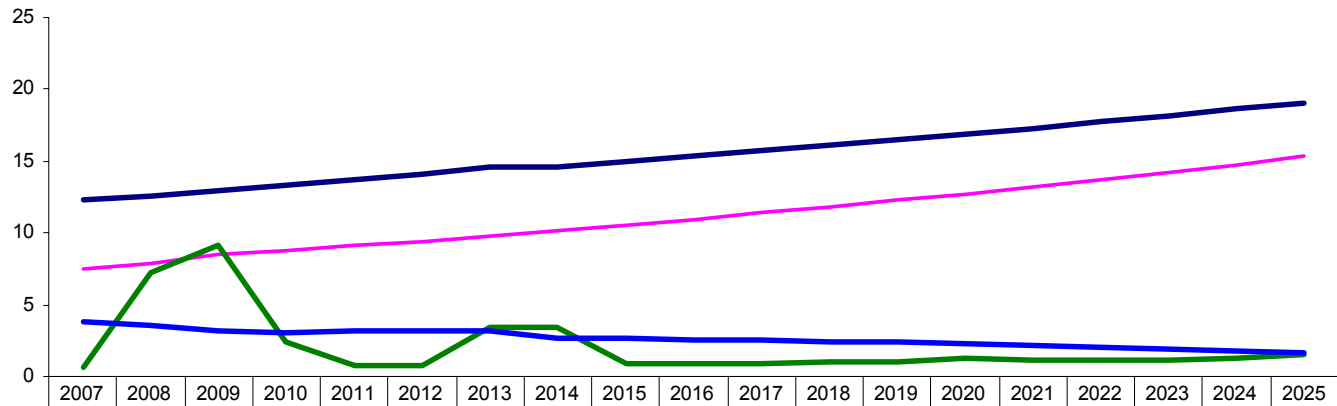
⁸¹ Chemonics International Inc. Review of Aqaba Water Demand and Expanded Evaluation of Water Resources. June 2005.

⁸² Jordan's Department of Statistics. 2004 National Census.

⁸³ The difference between the average revenue per m3 sold and the average cost per m3 sold (not including depreciation), expressed as a percentage of the average revenue per m3 sold.

Graph 3. AQABA Selected Financial Variables

JD Million



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Revenues	12	13	13	13	14	14	15	15	15	15	16	16	16	17	17	18	18	19	19
Costs before depreciation	7	8	8	9	9	9	10	10	11	11	11	12	12	13	13	14	14	15	15
Investments	1	7	9	2	1	1	3	3	1	1	1	1	1	1	1	1	1	1	2
Yearly cash Surplus / deficit	4	4	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2

Year

ANNEX C

Human Resources

1. LEMA Review of HR Current Policies

In a general meeting with senior LEMA officials, working relationships under the existing management contract and possible issues which need to be addressed were outlined. A meeting was later held with other senior line managers on their view of the issues. There was unanimous agreement among everyone interviewed that HR problems were the single biggest issue within the current LEMA contract.

1.1 Double status of employees

Over the initial four years of the LEMA contract, WAJ seconded staff had been replaced with personnel recruited directly from the market, mainly from the private sector. This had created two distinct categories of staff, cultures and terms and conditions of employment. The differences are articulated below.

The initial strategy of replacing WAJ employees under the LEMA Management contract and recruiting new staff was sound as it allowed for up to 50% of the original 1,600 WAJ permanent staff to return to WAJ or to be replaced over a four year period. While this is reflected in the current staff figures below, there is still need for a few more non-performers to go, estimated at 50 to 100. Under the current agreement this option cannot be exercised. The current staffing breakdown is as follows:

Table 1 LEMA Table of Staffing November 2005

Status	Salary category			Sub total		Composition %
	I	II	III	No.	%	
LEMA permanent	8	84	299	391	30.3	41
LEMA temporary			134	134	10.4	
WAJ permanent	16	119	403	538	41.7	59
WAJ temporary			226	226	17.5	
Total	24	203	1,062	1,289	100	100

In some departments there was a high percentage of LEMA staff e.g. Finance 80% and IT 100%, while all pumping stations are 100% WAJ working in a very restrictive manner doing only their own job. It would be difficult to revert to a civil service model due to the critical numbers on LEMA contracts and the danger of losing all that has been gained from the operation of the management contract, not to mention the potential loss of LEMA staff to the private sector and Gulf States.

This Consultants are of the view however, that there are plenty of personnel available in the market in terms of being able to project manage and build; but technical and engineering expertise might be difficult to recruit, if there is much uncertainty about the future of the company to manage Amman water and wastewater services.

1.2 Payment system and staff differentials

The differentials in salaries are related to all the allowances received, for example, WAJ personnel have 12 different allowances. Changes to WAJ pay introduced by LEMA to the public service pay are 10% on the basic and 25% bonus payment on performance; averaging out between 20 to 25%.

The view of LEMA is that the current system is the result of six years of continuous ‘compromise’ and is at the breaking point and there is urgent need to address it now once and for all. Currently there are a series of ‘patches’ in place in terms of benefits etc. not unlike the water system, when one issue is addressed it creates another set of problems. There is no question in LEMA’s mind of services going back to a public service model. It needs a company structure where the organization has the ‘freedom to hire and fire’ to ensure that the ‘carrot and stick’ can be used in dealing with workers. This view was also expressed by the HR Unit in the Project Management Unit (PMU) and the General Manager of Aqaba Water Company (AWC) in addition to a number of senior line managers working on the LEMA contract.

Pay levels are low for all workers, with WAJ workers doing better than LEMA workers because of their age profile; while overtime causes a major anomaly. WAJ workers are between 35 and 50 years old, while with LEMA the majority is between 20 to 40 years. This age differential is reflected in the pay. For example, meter readers earn 280JD with WAJ and 200JD with LEMA.

1.3 LEMA HR salary review

LEMA works within the ‘civil service’ pay structures for all WAJ seconded staff. The main difference is the introduction of a bonus structure which has made a significant difference. LEMA recruited staff are paid on a fixed term contract basis with no long-term employment certainty. When an overall analysis of the general operative grades is done, the WAJ seconded staff come out better on every thing but overtime which is a major anomaly and a serious point of grievance with WAJ staff.

Many of the junior grades basic salaries are low before application of a range of 12 possible added allowances. As overtime is calculated on the basic before allowances this creates a major difference in pay between LEMA recruited staff with few allowances and WAJ seconded staff with artificially suppressed basic pay as part of a Government policy to keep the wage figure artificially low.

It will be observed from the AWC exercise that once all the allowances were merged the gap between the old civil service pay rates and the private sector was surprisingly small at the lower end of the general operator end of the pay scales.

Personal increase (ilawa shaksiya). In recognition of the low civil service basic salary levels, the Cabinet will periodically issue a decree which adds a salary supplement across the board; an amount or percentage is set for each grade and step in the position classification system. It is understood as a cost-of-living adjustment. Though applied continuously, it does not change the basic salary of the position and so has no compounding effect on the salary; the same point holds true for all the other types of allowances. The use of various “increases” and “allowances” is a means by which governments in developing countries attempt to make civil service compensation rates more competitive with the private sector without modifying the basic salary scales.

The consultants wish to suggest that no new commercialized company should follow this practice with respect to compensation. In the first place, this approach complicates payroll calculations unnecessarily. More importantly, it renders more difficult the comparisons needed to identify market-level basic salaries for positions. It is better for any new commercialized company to follow more the AWC example to

completely revise its basic salary scale on the basis of systematic position classification with a view to market rates.

1.4 LEMA gross salary includes:

- A 10% fixed bonus to WAJ seconded staff
- Quarterly bonus; up to 25% for WAJ seconded staff and 16% for most of LEMA staff
Currently the quarterly bonus is about 11% on average.
- Allowances and fixed overtime allowances
- Senior Manager Bonus (monthly allowance) paid to 9 WAJ staff
WAJ Senior Managers annual bonuses are about 23% on average.

2. AWC employee compensation

The AWC remuneration report was reviewed and it can form the basis for future consideration with respect to an new organizational framework for the management of ‘the greater Amman area’ water and sewage management. On analysis of the AWC Chemonics Report, the consultants suggest a HR policy formulation and costing exercise be prepared as the data will be critical to deciding a number of critical factors beyond remuneration, that is:

- To consult with LEMA on practicalities; especially on bonus design
- To examine the implication of proposals and affordability
- Possible remuneration budget projections for a three year ‘rolling’ Business Plan
- To review actual organization requirements by skills; numbers and levels
- Seek out additional efficiencies to offset potential salary increases
- Examine the implications for the creation of a more autonomous organization approach moving away from public sector pay structures
- To support the drafting of Human Resources policies and learn from other utilities in transition towards private sector models in Jordan e.g. Electricity; Telecoms; and Transport

The executive summary of the AWC Chemonics Report is summarized below to ascertain the final implementation plan for AWC and what has worked and not worked to date.

2.1 Extract from AWC Chemonics Report

This report presents compensation and benefits structure and cost estimate for the AWC based on near labor market compensation. The AWC design of the structure has three aims:

- To develop compensation and benefits package which will make AWC a competitive employer in an increasingly competitive Aqaba labor market?
- To extend the current selective use of productivity-based pay approaches throughout the organization.
- To design a salary scale which enables merit-based career progression for motivated employees while gradually eliminating the anomalies between job value and actual pay which have arisen in WAJ Aqaba as a result of the compressed civil service salary structure and the dominance of years-in-service factors in salary progression.

The proposed AWC compensation and benefits package consists of four main elements:

- Salaries
- Allowances
- Performance-based bonuses
- Benefits

Salaries.

Table 2 Proposed salary ranges against current Oct 2004 levels

POSITION CLASS	Proposed JD/month	Current AWA JD/month
Top Management	750-3585	362-658
Professional I	450-717	524-1050
Professional II	350-478	260-367
Technical I	300-418	158-397
Clerical I	300-398	185-322
Technical II	250-329	206-342
Clerical II	250-329	186-276
Semi-Skilled	175-269	172-331
Unskilled	150-179	153-208

Note: 5 salary ranges were capped at lower rates, while rest are marginal increases with exception of ‘Top Management’

Allowances. As basic salaries have been designed to compensate for education, experience, etc., the following types of allowance are proposed:

- On-call allowance
- Overtime allowance
- An “incentive allowance” to motivate certain labor categories to accept work locations in rural areas of the Governorate
- A disagreeable work allowance for wastewater staff
- Housing allowances for professional staff domiciled outside the Aqaba Governorate and for professional and skilled staff working in rural areas in which they are not domiciled.

Bonuses. It is suggested that in the initial years of AWC existence, bonuses be allocated fairly extensively throughout the units of the organization based on unit contribution to a small number of key organization-wide business plan objectives. Distribution within units would be based on policies developed within each unit. The report recommends that the target size of the total bonus pool be equivalent to one month’s salaries. Two options for sourcing the bonus pool are presented and costed. The first option, preferred by TAPS, would source the bonus pool from company profits before taxes. The second option would fund the bonus pool out of the personnel budget; this approach entails additional operating expenses while the first does not.

Benefits. In keeping with standard utility company practice in Jordan, AWC will offer several non-wage personnel benefits:

- Social insurance
- Life insurance
- Health insurance
- Company-provided fund or “savings fund”, which would provide zero-interest loans to qualifying employees and also make short-term investments for annual gains distribution

External parity levels were set by comparisons with comparable organizations (electricity distribution and generation) or by experience with actual labor market conditions from recruitment efforts.

2.2 Overview of Aqaba proposals

The details above were taken from the HR proposals for October 2004 with a start up date for AWC on the 1st January 2005. The consultants' general view of the approach is very positive and very much along the line we would propose for Amman; with one or two modifications to the October 2004 Aqaba proposals.

Salary Scales. There were many abnormalities due to the grading and classification of salaries pre-AWC. The option for a set salary range instead of salary scales is sound.

The current civil service and public sector wage rates place emphasis on time served and qualification, with minimum attention to merit. The current civil service and public sector performance reviews are completed in secret and without sight of the candidate appraised, having regard to the fact that employees files by 'law' are classified as confidential to the employees themselves. This form of non-transparent management of performance reviews needs to be addressed along with changes to the salary scales. It is hereby suggested that more emphasis should be placed on experience (not service), while qualification should only be addressed at recruitment and entry levels into the organization. Thereafter the emphasis should be on merit only, with minor recognition for subsequent qualifications. There is an example of a general accountant with a doctorate in finance; who cannot be left to undertake the general ledgers without close supervision. Therefore, after recruitment progression can be entirely on performance and merit with no automatic movement with the pay range.

Allowances. Allowances need to be kept to a minimum. In the Aqaba proposals the 'call out allowances' were not implemented as they can be abused by supervisors. Instead, staff is paid for actual work with the correct overtime allowance. In addition the proposal to use allowances as incentive for motivation breaks current HR thinking on motivation and incentives. This should not be addressed in allowance design. Incentives should only be addressed through effective bonus structures. If there is an allowance that can act as an incentive it would be possibly a training allowance to be spent by an employee on a course of his/ her choice for development in a work related area.

Bonus. It is hereby suggested that this might be treated differently than the current Aqaba methodology proposed. In Aqaba the bonus pool idea of one months pay represents only 8.3% of monthly salaries, with the possibility of staff getting from 0%, 5% to 10+% if applied in an objective manner for the overall pool. All the Jordan utilities, telecoms and electricity (not the utility regulators), receive two months additional salary automatically bi-annually. If the idea of setting the pool at two months pay for the bonus pool is adopted this would give a pool of 16.7% which is more realistic at least at the lower paid grades where the efficiencies matter. AWC retains a pool of 8.3% based on base salary of 200 JD per month. We are of the view that the basic salary needs to be kept lower than full market basics pay if the potential bonuses of over 15%, are to set high incentives. Lower basic pay has the added benefit of saving on high cost of overtime and allows the organization time to move from a civil service/ public service model with efficiencies and not the promise of delivery at some future date.

There is potential for three levels of bonuses; i) overall organization performance, ii) team/department share out and iii) the individual element. This three-level approach should address overall organization efficiencies and cut out wastage under the watchful eye of others.

This leads us to the view that individual (excluding management grades) or specific team bonuses can be paid for cost saving suggestions which are implemented. This helps eliminate waste and recognizes all levels of personnel have a major contribution to make to the organization. Management should be excluded for the cost saving bonus proposal as it is part of their actual job.

Benefits. The proposals here are satisfactory for the moment, and we have no particular view on the matter.

We are not suggesting that all the salary, bonuses, allowances and benefits be introduced at once. However, we do believe that at the outset it is necessary to state clearly the intent so that as the changes are rolled out they are understood and accepted as establishing the near private sector model. Therefore it is necessary to consider these factors in the design of a HR policy for the new company which can be introduced as the organization proves itself and matures.

2.3 AWC current practices in relation to salary and bonuses

An overview of how the original proposals of October 2004 worked in practice, indicated that there were a number of changes made to the original AWC salary proposals since October 2004, that is:

- In order to benefit from the proposed near market pay and conditions everyone had to resign from the Civil Service (no secondments).
- There can be no reduction of salary even if graded above the range ('red circled' or ring fenced for the duration of that job holders role)
- Increase by merit or promotion

Overall the increase on the remuneration budget was 23%, some staff got 5% and some 50%, based on job benchmarking and job evaluation; with no increase for a first year 'freeze' to see how the overall process worked out; while there were a few adjustment for technical staff within the last 12 months.

There is still a problem with the management grades as in the private sector, remuneration for these groups is much higher and this will need to be addressed again by AWC. There is the issue of two employees' transfer of pension compensation under a Government agreed scheme, but this is expected to be addressed shortly.' Staff is aware of the commitment to near private sector pay levels and is pushing for a review. It is not unexpected or a major concern as the improvement and culture is already established

2.4 AWC allowances

The call out allowance idea was scrapped due to fear of abuse by supervisors who potentially wanted everyone to be 'on call'.

Two allowances are paid

- Remote Location, site allowance of 25% against house; dropped for all others
- Wastewater (sewage work)

Overtime; three categories

- Office staff on 42.5 hours over 5 days
- Operators 8 hours over six days
- Shift workers 4 day rotating shift

Family - the number of children are no longer considered.

AWC can operate effectively as it is small and management knows all its employees. It was expressed that Amman can work like this unless there are managers with delegated power. The creation of an empowered management structure in Amman and the concept of delivering services based on a number of defined districts will be discussed later on. The overall feeling is that poor man-management will cause many difficulties.

2.5 AWC bonus structures

The bonus structure is set by measuring efficiency. The current approach has worked well and is acceptable and transparent.

2.6 Ability to 'Hire & Fire' as a commercialized company

One of the areas that keep coming up again and again both in Aqaba and with LEMA is to have an organization with the capacity to 'hire and fire'. Without this, line management has limited powers to drive performance and offering work to more willing and able employees against those who appear over 'protected by civil service regulation' and are along for the 'easy life'. Without this level of sanction as a fall back position; whatever form of organization structure that is put in place will be weakened and in part from a HR point of view, meaningless. This is less an issue for Aqaba than it is for LEMA at present. It is interesting to note the Aqaba experience in this area to date.

Aqaba went to some lengths to develop many new modern HR practices and policies. Under Law they must seek approval from the Ministry of Labor (MoL). AWC failed in its initial attempts (two meetings) to agree on basic changes to existing civil service procedures. The MoL would appear to apply 'civil service' regulations to the organization regardless of its corporate legal structure. They asked Aqaba to resubmit only HR policies on the basic area of Hours/Overtime, Holidays; and Disciplinary/ 'Punishment' procedures leading to dismissal. The disciplinary procedures they approve are long-winded, nearly impossible to apply and ignore the realities of the situation regarding what the organization is trying to achieve. It appears that the Ministry of Labor is quite out of touch with respect to the status of the organization and the aim to follow more private sector best practices and will only apply procedure in keeping with the civil service. In the end, AWC submitted what the MoL wanted. It is best to give a few examples:

- Corruption: request instant dismissal; MoL only dismisses on 4th offence
- Stealing: MoL - no dismissal, must be given a chance
- Carrying a Gun to Work: MoL - must be given a chance. They must have discharged it first – too late?
- Fighting: MoL - the offence must be noted on 5 occasions before dismissal
- Refusal to Work: MoL says employee must have refused three times

AWC is somewhat frustrated by the disciplinary process and adopted the attitude of doing what it thinks best namely breaching the Labor Law and paying any fines if necessary. This will be a major obstacle for the Amman commercialization strategy from a HR point of view. It was confirmed that not only can the company be fined and compensation paid to the employee but reinstatement can be imposed.

2.7 What worked and what did not work for AWC

The internal HR procedures for disciplinary actions as set out above failed due to the MoL. The Training Center proposal for staff development never got off the ground due to cost and logistics. Involving everyone in the financial management aspects of their job worked very well and is paying benefits. There is no comprehensive 'Management Information System' (MIS) as yet. Basic MIS systems need to be evaluated, designed and implemented now for the organization to get off to a reasonable start. AWC is still struggling with this but it will be addressed in time.

Based on the Aqaba experience some of the key considerations when setting up NEWCO structures, other than training, are IT and MIS systems referred to above.

- **Technical Management Versus Man-Management.** There are many excellent technical personnel available but few with good people management skills.
- **Drive for Financial Results 'eye on the ball.'** Does the staff really understand the finance and do they have enough financial knowledge and access to information to make the day to day decisions effecting their operation.
- **Transfer Plans & Succession Plans.** There is a need to identify early the management personnel to ensure that the details of the transfer are managed in sufficient detail from the LEMA contract to WAJ.
- **Civil Service Regulations & Management.** The civil service rules and regulations are good at telling an employee what he or she cannot do; but they do not tell him or her how to manage. There is a lot that can be done if there are 'local change champions' to identify the management needs and can lead this work before the transition period.
- **Comprehensive Assessment of Skills.** While there was 'job evaluation' in AWC there was no competency/skills evaluation of staff prior to the transfer. This would have been very helpful and benefited the employee and the new organization.

The general knowledge and skills shortfalls based on Aqaba experience are likely to be:

- Overall line-management financial knowledge and skills (outside of LEMA and the financial department) may be poorly understood
- Man-management will be weak compared to technical water management understanding.
- There are good construction/civil engineers but 'good water management engineers' are difficult to find and may be attracted to the Gulf if not secured early during the transfer.
- Information Technology (IT) and general computer skills are generally weak
- Communication skills will be weak including the management and presentation of data
- Decision-making models and strong team management ethos

ANNEX D

Subsidies

Pricing of water and wastewater services in Jordan, and in Amman in particular, is largely characterized by a pervasive and substantial level of subsidies:

- To the operating agencies in the form of grants, loans below market conditions and budget transfers to support investment programs and operating expenditures.
- To final service companies (such as LEMA) in the form of subsidized inputs such as the price of bulk water, wastewater treatment and electricity (transfer prices).
- To most end users, through a tariff structure based on cross subsidies. This structure sets service rates below cost to some consumers and above cost to others.

The rationale for these subsidies, although not explicitly stated, aims to make services affordable to end users. However, the prevailing system of subsidies creates a myriad of problems as they give wrong signals to operating companies and users that weaken efforts to conserve scarce water resources.

The cost picture that emerges from the provision of water and wastewater services (WAJ and LEMA) is rather complex, and the total economic or financial costs associated with the provision of these service and their allocation to each of the main water and sewerage components of the system is not known in detail (Annex A). Limitations on cost information, both forward looking (economic costs) or historic on the development of new infrastructure and operations and adequate maintenance, precludes a more rigorous analysis of the subsidies. Nonetheless, a broad analysis of subsidies (bulk water and retail consumption) helps to illustrate the limitations of the present pricing system and the urgency to develop a more effective policy to the allocation of subsidies. A revised policy could translate into a better utilization of scarce water resources, higher revenues for the operating companies (NEWCO and WAJ) and better targeting of subsidies to reach the poorest families.

1. Pricing policy guidelines

The assessment of subsidies is based on the premise that pricing of water and sanitation services should aim at reconciling four important objectives:

1. Promoting efficient use of all resources (economic objective)
 2. Promoting financial viability of service providers (financial objective)
 3. Ensuring that all the population, particularly the poor, have access to adequate services (social objective); and
 4. Ensuring that pricing policies are clearly stated and easy to understand by both policy makers and users and that they are consistently applied (transparency objective).
- **Economic objective.** Aims to ensure the efficient use of all resources in the country, used in the provision of these services. This objective requires charging users the full economic cost of providing the service, including the impact on water resources and the environment.
The economic cost is often understood as the long-term average incremental cost (AIC) of providing one additional unit of service. By definition AIC is a volumetric charge and compliance with this objective requires metering of consumption.
 - **Financial objective.** Aims to ensure that the service provider is financially viable and therefore is able to charge and collect from users, adequate revenues to cover all the financial costs related to the

provision of services. These include operational, maintenance and capital expansion costs, debt service obligations and taxes. Financial viability is crucial to ensure the long-term sustainability of services under any organizational model.

- **Social objective.** Aims to ensure that water and sanitation services, so vital to the welfare of the population, are accessible to all. The World Health Organization recommends that the very poor should not, in general, expend more than five percent of their income to have access to basic but satisfactory water and wastewater services⁸⁴. One way to achieve this objective is through the use of cross subsidies in the tariff structure that provides below cost services to the very poor but demands higher-than-cost prices from other better-off users. Another possibility, used in various countries, is to provide this subsidy outside the tariff (e.g., Chile – see Box No. 1).
- **Transparency objective.** End users, the utility and the regulator should be able to understand how the pricing of services is defined and applied. Moreover, pricing of services should be simple to implement and not impose a burden on the utility or end user.

Box No. 1 Subsidies in Chile

In Chile, all users served by a water and wastewater company pay the same price per m³ of consumption. This price covers all economic and financial costs associated with the provision of services.

The law No. 18778 of 1989, defined the subsidy policy for water and wastewater services. This law was amended in 1990, 1991 and 1994. As it stands today, the law stipulates that the State, though the local governments (municipalities) will pay the subsidy explicit in the consumer's bill, to the poorest families. Moreover, the Law requires the State to set aside, in its annual budget, the necessary funds to cover this subsidy.

The subsidy applies to both the fix and variable charges for water and wastewater services for consumption up to 20m³ per month. The total subsidy varies between 25 to 85% of the total water and wastewater bill that should exceed 5% of family income. The subsidy is granted to a poor family for a period of three years, after which a new application has to be submitted.

The bill sent by the service company to a poor family, stipulates and deducts the amount of the subsidy the family is entitled to. In turn the municipality pays to the service company the amount of the subsidy.

In 1995, the annual budget assigned US\$ 22.5 million for this subsidy (equivalent to less than 5% of the total water billings in the country).

Source: Ringskog, Klas. Pricing water and wastewater services in Latin America. World Bank. Draft, July 1997

The application of these pricing objectives poses a challenge to policy makers as they often do not work in the same direction:

- Economic and financial objectives encompass different cost concepts and hence provide a different pricing answer. For instance, economists do not consider interests and taxes (transfer payments) as costs, while from a financial point of view they are. Economic costs also include the effects on the environment (externalities), but they are not considered financial costs unless they affect the finances of the utility.
- A tariff based on economic or financial principles could be out of reach to the poorest families and hence, charging these costs would exclude them from services.
- Efforts made to provide subsidies within the tariff, often lead to a very complicated pricing structure, as it the case in Amman (Table No. 1).

⁸⁴ Based on a poverty line of JD 392/family per month (2002), this recommendation would translate into a maximum monthly charge of JD18 per family per month. For a basic consumption of 20 m³/quarter, a poor family in Amman is paying (2004) JD 4.65 per month for water and sewerage services, equivalent to 1.2% of its income.

Therefore, a clear understanding of these principles and priorities is required to define a robust pricing policy.

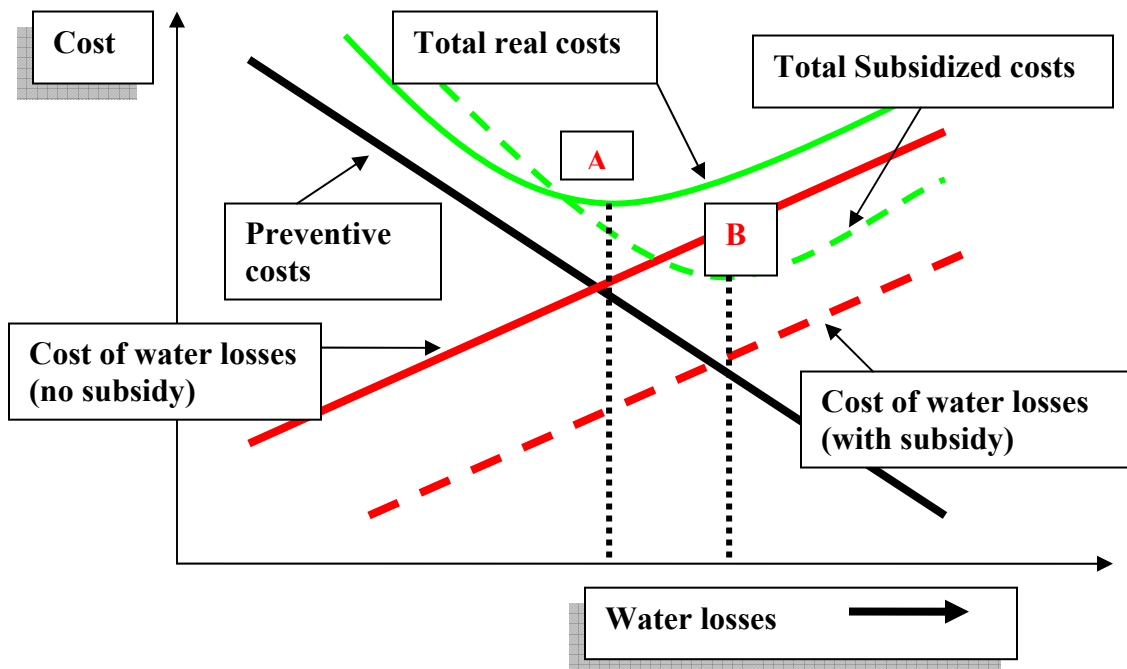
2. Transfer prices

The geographical location of Greater Amman coupled with scarce water resources in the country and the over exploitation of most of its aquifers, all signal rising costs in the provision of raw bulk water to the metropolitan area. To meet future demand, it will be necessary to develop more distant sources and therefore, the unit cost of future bulk water projects, in constant prices, will steadily increase over time.

For instance, the new bulk water project under development (Zara Ma'in system) has a total capacity of 47mm³/year) of which about 35 mm³/year would be allocated to Amman. This project has a total cost of JD 84 million (plus JD 3.5 million to cover operations during the first two years). USAID helped finance 85% of these costs and the rest were provided by the government. This project entails desalination of brackish water and several pumping stations to reach Amman. The next bulk water supply project in the pipeline is Disi; the total capital cost is likely to exceed JD 350 million⁸⁵ with operating costs estimated around JD 0.60 to 0.90 per m³. Disi's cost is indicative of raising average incremental costs (AIC); by way of contrast, in 2004 WAJ was selling bulk water to LEMA at JD 0.09 per m³ supplied. The difference is a measure of the subsidies associated with the provision of bulk water. Taking the lower figure this subsidy amounts to about JD 64 million in 2004.

The effect of these subsidies, in the efforts to reduce water losses, is illustrated in Figure No.1.

Figure No 1 Effect of subsidies on water losses



⁸⁵ Cost estimates vary from JD 385 million (MWI National Water master Plan-May 2004 to over JD 450 million

The above figure helps to illustrate that the effort that an operator will make to reduce water losses is, to a large extent, a function of the costs relevant to him: a) the [subsidized] price of the water he receives and b) the costs he allocates to reduce losses. A rational operator will try to minimize the sum of these costs (points A or B). **Therefore, the higher the subsidy (dotted lines) the lesser incentives it has to reduce water losses.** Figure 1 also serves to illustrate why the optimal level of water losses (perceived lowest total costs; points A or B) is different for WAJ and LEMA.

A similar cost concept curve could be drawn to illustrate the effort that an operator would make in reducing commercial losses. The preventive costs, in this case, are associated with meter reading and maintenance and identification of illegal users, while the benefits the operator receives is the tariff users pay. The conclusion is that the lower the tariff is (more subsidized) the less incentives the operator has to reduce these losses.

In summary, *the aggregate effect of subsidized bulk water rates and consumption rates is that they lower the incentives of the operator to reduce losses.*

3. Current tariffs in Amman

The current (2004) structure and level of tariffs applied in Amman is presented in Table No. 1

Table1 Amman, tariff structure (2004)

User category and consumption blocks (m3/quarter)	Tariff JD/m3		Comments
	Water	Wastewater	
Residential			
0 - 20 m3 (minimum)	2.00+0.50(a)+0.30(b)	0.672	Fixed charge for q <5 m3 per month
21- 40	(0.14q) - 0.80 +1.50(c) + 0.30(b)	(0.04q- 0.20)1.12	
41- 130	0.0066q ² - 0.0029q +1.50(c) + 0.30(b)	(0.0029 q ² -0.076q) x1.12	
131 and more	0.85q + 1.50(c) + 0.30(b)	(0.35q)1.12	
Non-residential			
0 or more	1.00q + 1.50(c) + 0.30(b)	(0.5q)1.12	

Source: WAJ and LEMA

Notes: (a) & (c) Electricity surcharge; (b) meter surcharge; q -consumption in m3.

The application of this tariff structure results in the average charges shown on Table No. 2

Table No. 2 Amman, Average charges per quarter- 2004

Bracket m3/quarter	Residential users				Non residential users			
	No.	Volume m3	Average rate JDs		No.	Volume m3	Average rate JDs	
			Per quarter	Per m3			Per quarter	Per m3
0-20	60,769	16.7	18.60	0.28	15,156	6.4	12.27	1.90
21-40	99,717	32.6	6.33	0.19	6,746	13.5	20.61	1.52
41-130	111,572	68.3	31.67	0.46	4,739	50.5	74.69	1.48
131-more	6,855	325	376	1.16	660	1885	2699	1.43
Total	278,912	50.6	25.18	0.50	77,300	21.6	31.80	1.47

4. Subsidies to consumers

A preliminary assessment of the level of subsidies to consumers can be made by considering the financial costs associated with the operation and development of the water distribution and wastewater collection systems (services now provided by LEMA). The financial model developed earlier in the report indicates an average cost of water and wastewater services of JD 0.70 per m3 sold which covers all costs associated with services provided by LEMA. Table No. 3 provides a snapshot of the level of subsidies to residential consumers based on this cost. Table No. 5 provides similar information for Aqaba.

Table No. 3 Amman, subsidies received and transfers made (2004)

Block m3 per quarter	Water bills No.	%	Consump. mill m3/year	Total charges mill JD/year	Average charge per user per quarter	Aver. tariff JD/m3	Subsidy JD/m3	Total Subsidy Million JD/year
0 – 20	85,769	26.2	4.06	1.13	13.2	0.28	-0.42	-1.7
21- 40	99,717	30.1	13.02	2.53	25.3	0.19	-0.51	-6.6
41- 130	111,572	33.7	30.46	14.13	126.7	0.46	-0.24	-7.3
Sub total	297,058	89.7	47.54					-15.6
131-more	6,855	2.1	8.91	10.31	1,504.0	1.16	0.46	4.1
Non residential	27,300	6.7	6.69	9.83		1.47	0.77	5.2
Total	331,212	100.0	63.14	37.92		0.60	0.10	6.3

Note: A negative quantity (red) denotes a subsidy and a plus (black) a transfer to pay for the subsidy. Totals may not add because of rounding.

Table No. 4 Amman, subsidy transfers by non-residential users (2004)

Block m3/quarter	Water bills No.	Consump. m3/year	Average tariff JD/m3	Transfer JD/m3	Total transfer mill JD
0-20	15,156	0.39	1.90	1.20	0.5
21-40	3,119	0.36	1.52	0.82	0.3
41-130	3,352	0.96	1.48	0.78	0.8
131 more	1,723	4.97	1.43	0.73	3.6
Totals		6.69	1.47	0.80	5.2

Table No. 5 Aqaba (AWC), subsidies received and transfers made (2004)

Block m3 per quarter	Water bills No.	%	Consump. mill m3/year	Total charges mill JD/year	Average charge per user per quarter	Aver. tariff JD/m3	Subsidy JD/m3	Total Subsidy Million JD/year
0-20	6,616	32.1	241,896	59,386	8.98	0.25	-0.65	-158,321
20-40	4,788	23.2	569,132	72,765	15.20	0.13	-0.77	-439,454
41-130	5,703	27.6	1,507,708	461,510	80.92	0.31	-0.59	-895,427
131-more	541	2.6	993,690	1,059,098	1,957.67	1.07	0.17	164,777
Sub total	17,648	85.5	3,312,426	1,652,759	93.65	0.50	-0.40	1,328,424
Non residential	2,986	14.5	11,517,252	11,709,100	3,921.66	1.02	0.12	1,343,573
Total	20,634	100.0	14,829,678	13,361,859	4,015	0.90	0.00	0

It is clear that the vast majority of the residential users (90% of the total in Amman and 86% in Aqaba) and their consumption (75% of the total in Amman and 16% in Aqaba) are being subsidized, albeit at different levels. The absolute level of subsidies (number of users and consumption), based on full economic or financial costs including the provision of bulk water and real costs of wastewater treatment will likely be substantially higher, particularly in Amman⁸⁶. These subsidies are covered, for the most part, by transfers from the government (e.g., Jordan society) and by postponing urgent maintenance needs.

As shown in Table No. 3, poor families (mostly those in the 0-20 m3/quarter bracket) receive a lower subsidy per m3 than users in the 21-40 m3 bracket; this outcome is the result of treating most of the consumption in the 0-20 bracket as a fix fee. Moreover, the total annual subsidy per user shows an upward trend indicating that better off families receive a larger subsidy.⁸⁷

From this analysis it can be concluded that the current practice in the pricing of services is not fully consistent with sound pricing objectives:

- **Economic objective.** Tariffs levels are below economic cost and, therefore, do not promote the efficient use of resources and water conservation in particular.
- **Financial objective.** The high level of subsidies (Table 3) weakens the capacity of the operating agency to recover all its costs. For instance, if the subsidy transfer to residential users that consume over 20 m3/quarter were to be removed the company would receive an additional JD 14 million per year, equivalent to tariff increase of JD 0.22 /m3. Moreover, the “tax” imposed on other consumers (subsidy transfer- Table 4), gives them an incentive to procure water from other sources (tankers) thus lowering the billing base of the company.
- **Social objective.** Substantial subsidies to most users deprive the sector of needed resources to improve and expand services to cover the whole population and improve quality of services. For instance, some 400,000 people in Amman (about 22% of the population) do not have access to the sewerage system, and the water service is intermittent which poses a health risk to the entire population.

⁸⁶ Considering the proposed Disi supply to Amman, and its estimated AIC cost, the economic cost of water and wastewater services in Amman is likely to exceed JD 1.30 per m3. Based on this benchmark all residential users are being subsidized.

⁸⁷ There is a strong correlation between family income and consumption (many studies indicate an income elasticity of about +0.6m which indicates that a 10 percent increase in income translates into a 6% increase in consumption).

Moreover, as the level of subsidy to residential users tends to increase with consumption⁸⁸ (up to 130 m³/quarter) subsidies are not well targeted as they tend to benefit more economic better off residential consumers.

- **Transparency.** The rationale of the present pricing and subsidy policy for different users is not explicit and it is difficult to understand. Predictability is also weak, as there are not at present, clear trigger mechanisms for reviewing tariffs.

In conclusion, the extended level of subsidies in Amman should be substantially revised to provide better pricing signals to sector agencies and to focus more the subsidy on the poor. This revision will help efforts to conserve scarce water resources and to solidify the long term financial viability of operating agencies.

5. Recommendations

There is ample room for improvement of the existing tariff structure for water and sanitation services in Amman. Pricing objectives can be reconciled to a large extent, by applying the following recommendations:

- The desired pricing objectives should be clearly stated.
- The average tariff should be set, at least equal, to the financial costs that the service company in Amman faces. Towards this end, a variable charge should be applied to all consumption should cover all variable costs (AIC variable cost) and applied to all customers, and a fixed charge set at a level necessary to ensure financial viability of the service provider.
- The transfer price of bulk water should consider rates that promote the financial viability of the supplier. Targeted rebates to the operating company can be introduced to provide incentives to the operating company to reach even lower levels of water losses.
- Eliminate the fixed charge associated with residential minimum consumption.
- Ensure that the poor have access to a basic service by providing a subsidy to a basic consumption (20 m³/quarter equivalent to about 40 lcd), at a subsidized rate as it is now the case. Politically, it could be desirable to maintain the exiting tariff (subsidy) to this group.
- Gradually remove (say in 3-4 years) the subsidies to all residential users that consume more than 20 m³/quarter. Higher family income, likely to have a consumption in excess of 20 m³/quarter, can easily afford to pay higher rates.
- Implement a fix charge to non-subsidized users equal to the subsidy given to residential users in the 0-20 m³/quarter bracket to maintain a desirable level of cost recovery.

⁸⁸ Many studies have shown a close correlation between family income and consumption (income elasticity of 0.6; a 10% increase in income increase consumption by 6 percent)

ANNEX E
SELECTED FINANCIAL SCENARIOS
(Full Version in a Separate Excel file)

NEWCO

SCENARIO 3:

INCREASING TARIFFS TO COMPENSATE FOR INFLATION

Table 1
 NEWCO - Income Statement 1/
 Scenario 3. Increasing Tariffs to Compensate for Inflation
 (JD Thousands Current Prices)

Item	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	Actual	Projected																				
Total revenues (A) (Table 6)	41,333	40,998	48,931	55,436	63,027	72,478	78,035	84,139	95,358	114,214	112,806	113,597	121,206	129,276	137,832	144,085	150,622	157,458	164,607	172,082	179,899	188,072
Less personnel and operating costs, without depr. (B) (Table 6)	34,359	37,620	46,413	49,499	54,639	59,690	64,630	70,008	75,896	81,928	88,425	95,226	102,393	107,778	115,785	122,508	127,091	131,883	136,894	142,135	147,617	153,353
Operating Income (C=A-B)	6,974	3,378	2,518	5,937	8,387	12,788	13,405	14,131	19,462	32,285	24,381	18,371	18,813	21,497	22,047	21,576	23,531	25,575	27,713	29,947	32,281	34,720
Less depreciation charges (D) (Table 10)	14,842	14,842	14,842	14,987	15,318	15,741	16,187	16,597	17,051	17,742	18,491	19,027	19,485	19,964	20,466	20,990	21,539	22,112	22,712	23,340	23,996	24,683
Income before interest and income tax (F=C-D-E)	-7,868	-11,464	-12,324	-9,049	-6,931	-2,952	-2,782	-2,467	2,411	14,543	5,890	-656	-672	1,533	1,581	586	1,992	3,463	5,000	6,607	8,285	10,037
Less interest and other financial charges	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Income before taxes (G)	-7,868	-11,464	-12,324	-9,049	-6,931	-2,952	-2,782	-2,467	2,411	14,543	5,890	-656	-672	1,533	1,581	586	1,992	3,463	5,000	6,607	8,285	10,037
Less income tax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net income	-7,868	-11,464	-12,324	-9,049	-6,931	-2,952	-2,782	-2,467	2,411	14,543	5,890	-656	-672	1,533	1,581	586	1,992	3,463	5,000	6,607	8,285	10,037

1/ Newco starts in 2007. The figures for 2005 and 2006 correspond to estimates for LEMA.

File: Amman Scen. 3. Increasing tariffs.

5-Feb-06

Table 2
NEWCO - Sources and Application of Funds 1/
Scenario 3. Increasing Tariffs to Compensate for Inflation
(JD Thousands Current Prices)

Item	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	Actual	Projected																				
Income before interest and income tax	-7,868	-11,464	-12,324	-9,049	-6,931	-2,952	-2,782	-2,467	2,411	14,543	5,890	-656	-672	1,533	1,581	586	1,992	3,463	5,000	6,607	8,285	10,037
Plus depreciation charges	14,842	14,842	14,842	14,987	15,318	15,741	16,187	16,597	17,051	17,742	18,491	19,027	19,485	19,964	20,466	20,990	21,539	22,112	22,712	23,340	23,996	24,683
Gross internal cash generation (A)	6,974	3,378	2,518	5,937	8,387	12,788	13,405	14,131	19,462	32,285	24,381	18,371	18,813	21,497	22,047	21,576	23,531	25,575	27,713	29,947	32,281	34,720
Less debt service; principal and interest (Table 8)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Less increase (decrease) working capital without cash and banks (Table 11) 2/	6,093	-2,737	-2,135	1,845	128	-4,419	2,940	1,308	1,098	3,255	-760	-446	490	439	532	389	323	331	339	348	356	365
Less income tax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net internal cash generation (B)	881	6,115	4,653	4,092	8,260	17,208	10,465	12,823	18,364	29,030	25,141	18,817	18,323	21,058	21,515	21,187	23,208	25,245	27,374	29,599	31,925	34,354
Financing activities																						
Loans received	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-reimbursable contributions (Table 8)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Funds from financing activities (C)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Funds available for investment (D=B+C)	881	6,115	4,653	4,092	8,260	17,208	10,465	12,823	18,364	29,030	25,141	18,817	18,323	21,058	21,515	21,187	23,208	25,245	27,374	29,599	31,925	34,354
Less investments (D) (Table 7)	0	0	0	9,654	12,437	15,739	14,034	13,290	16,993	29,075	20,798	14,935	15,621	16,338	17,088	17,873	18,693	19,551	20,449	21,388	22,369	23,396
Net increase (decrease) in cash and banks (E=C-D)	881	6,115	4,653	-5,561	-4,177	1,469	-3,569	-467	1,371	-45	4,343	3,881	2,702	4,720	4,427	3,315	4,515	5,693	6,925	8,212	9,555	10,958
Cash and banks at the beginning of the period	791	1,672	7,787	12,441	6,879	2,702	4,171	602	135	1,506	1,461	5,804	9,686	12,388	17,108	21,536	24,850	29,365	35,059	41,983	50,195	59,750
Cash and banks at the end of the period	1,672	7,787	12,441	6,879	2,702	4,171	602	135	1,506	1,461	5,804	9,686	12,388	17,108	21,536	24,850	29,365	35,059	41,983	50,195	59,750	70,708

1/ Newco starts in 2007. The figures for 2005 and 2006 correspond to estimates for LEMA.

2/ As there is no information readily available for preparing the 2004 Sources and Application of Funds according to the format of the projections, we used this line to include all items no identified.

File: Amman Scen. 3. Increasing tariffs.

5-Feb-06

Table 3
NEWCO - Statement of Assets and Liabilities 1/
Scenario 3. Increasing Tariffs to Compensate for Inflation
(JD Thousands Current Prices)

Item	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
	Actual	Projected																					
ASSETS																							
Cash and banks	1,672	7,787	12,441	6,879	2,702	4,171	602	135	1,506	1,461	5,804	9,686	12,388	17,108	21,536	24,850	29,365	35,059	41,983	50,195	59,750	70,708	
Accounts receivable and accrued revenues (less provisions) (Table 11)	15,834	14,349	15,417	15,827	14,701	11,052	11,666	12,331	13,702	16,089	15,579	15,381	16,089	16,824	17,586	18,023	18,471	18,931	19,403	19,886	20,382	20,890	
Inventories (Table 11)	2,669	2,917	2,422	2,213	2,128	2,398	2,633	1,945	2,250	2,643	3,067	3,492	3,926	4,031	4,498	4,965	5,078	5,197	5,320	5,449	5,584	5,724	
Other (Table 11)	979	691	714	722	673	538	572	571	638	749	746	755	801	834	883	920	942	965	989	1,013	1,039	1,065	
Total current assets (A)	21,154	25,744	30,994	25,641	20,204	18,159	15,472	14,982	18,096	20,942	25,196	29,313	33,204	38,797	44,503	48,758	53,857	60,152	67,695	76,544	86,754	98,387	
Gross fixed assets (Table 10)	494,733	494,733	494,733	504,387	516,824	532,562	546,596	559,886	576,879	605,954	626,752	641,687	657,308	673,646	690,735	708,607	727,300	746,852	767,300	788,688	811,058	834,454	
Less accumulated depreciation (Table 10)	235,064	249,906	264,748	279,735	295,053	310,794	326,981	343,579	360,630	378,373	396,863	415,890	435,375	455,339	475,805	496,795	518,334	540,446	563,158	586,498	610,494	635,177	
Total net fixed assets (B)	259,669	244,827	229,985	224,652	221,771	221,768	219,615	216,308	216,249	227,581	229,889	225,798	221,934	218,307	214,930	211,812	208,967	206,406	204,142	202,190	200,563	199,277	
TOTAL ASSETS (A+B)	280,823	270,571	260,979	250,293	241,975	239,927	235,087	231,289	234,345	248,524	255,085	255,111	255,137	257,104	259,432	260,570	262,824	266,557	271,838	278,734	287,318	297,664	
LIABILITIES AND NET WORTH																							
Accounts payable (Table 11)	12,145	13,037	15,768	14,132	12,744	13,650	11,592	10,260	10,905	11,541	12,212	12,893	13,592	14,026	14,773	15,324	15,586	15,856	16,136	16,425	16,724	17,033	
Other (Table 11)	4,680	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	
Current portion of long-term debt (Table 11)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total current liabilities (C)	16,825	18,037	20,768	19,132	17,744	18,650	16,592	15,260	15,905	15,541	16,212	16,893	17,592	18,026	18,773	19,324	19,586	19,856	20,136	20,425	20,724	21,033	
Medium-term liabilities (Table 9) (D)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Capital and accumulated profit (losses) until 2004	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	263,998	
Accumulated profits (losses) projection period	0	-11,464	-23,787	-32,837	-39,768	-42,720	-45,502	-47,969	-45,558	-31,015	-25,125	-25,781	-26,453	-24,920	-23,338	-22,752	-20,760	-17,297	-12,296	-5,689	2,596	12,633	
Non-reimbursable contributions projection period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total net worth (E)	263,998	252,534	240,211	231,161	224,230	221,278	218,496	216,029	218,440	232,983	238,873	238,217	237,545	239,078	240,660	241,246	243,238	246,701	251,702	258,309	266,594	276,631	
TOTAL LIABILITIES AND NET WORTH (C+D+E)	280,823	270,571	260,979	250,293	241,975	239,928	235,087	231,290	234,345	248,524	255,085	255,111	255,137	257,105	259,433	260,570	262,824	266,558	271,838	278,734	287,318	297,664	

1/ Newco starts in 2007. The figures for 2005 and 2006 correspond to estimates for LEMA.

File: Amman Scen. 3. Increasing tariffs.

5-Feb-06

Table 4
NEWCO - Demand and Tariffs 1/
Scenario 3. Increasing Tariffs to Compensate for Inflation
(JD Current Prices)

Item	Unit	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
		Actual	Projected																					
Municipalities and population																								
Rate of growth of urban population	Percentage	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Districts served	Number	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Urban population in municipalities served by the system	Thousands	1,939	1,988	2,039	2,091	2,144	2,198	2,254	2,311	2,370	2,430	2,492	2,555	2,620	2,687	2,755	2,825	2,896	2,970	3,045	3,123	3,202	3,284	
Water																								
Coverage with connection	Percentage	97.3	98.0	98.0	98.0	99	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0
Serviced by others	Percentage	2.7	2.0	2.0	2.0	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total	Percentage	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Persons per consumer	Number	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Water consumers (average year)	Thousands	348	361	370	379	391	403	413	424	434	446	457	468	480	493	505	518	531	545	558	573	587	602	
With meter	Thousands	348	361	370	379	391	403	413	424	434	446	457	468	480	493	505	518	531	545	558	573	587	602	
Without meter	Thousands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Metered consumers	Percentage	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Average consumption																								
Metered consumers	m3/month/cons.	14	14	15	15	16	17	18	19	20	21	21	22	22	23	23	23	23	23	23	23	23	23	23
Non-metered consumers	m3/month/cons.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total consumption	Million m3/year	66	69	75	76	83	90	97	105	112	118	123	129	135	141	147	151	155	158	162	166	170	174	
Metered	Million m3/year	58	61	67	68	75	82	89	97	104	110	115	121	127	133	139	143	147	150	154	158	162	166	
Non-metered consumers	Million m3/year	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Water sales to other governorates	Million m3/year	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
Water tankers	Million m3/year	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Non-billed water	% production	43	45	43	43	43	42	41	40	38	37	36	35	34	33	32	31	30	29	28	27	26	25	
Water production 2/	Million m3/year	114	125	131	134	146	156	165	174	181	187	192	198	204	210	217	219	221	223	225	227	230	232	
Sewerage																								
Coverage with connection	Percentage	78	78	78	78	79	80	81	82	83	88	90	90	90	90	90	90	90	90	90	90	90	90	90
Consumers (average/year)	Thousands	282	287	294	302	312	326	338	349	364	396	415	426	437	448	459	471	483	495	508	520	534	547	
Sewerage consum. as a proportion of total water consum.	Proportion	0.81	0.80	0.80	0.80	0.80	0.81	0.82	0.82	0.84	0.89	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Wastewater treatment	Million m3/year	48	50	54	55	60	66	72	78	85	95	102	106	111	116	122	125	128	131	134	137	140	144	
Tariffs (2004 prices)																								
Water (average year)	JD/m3	0.42	0.43	0.46	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	
Water (year-end)	JD/m3	0.42	0.45	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	
Water sales to other governorates (average year)	JD/m3	0.22	0.23	0.25	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	
Water sales to other governorates (year-end)	JD/m3	0.22	0.24	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	
Sewer (average year)	JD/m3	0.17	0.17	0.18	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	
Sewer (year-end)	JD/m3	0.17	0.18	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	
Water suscription and conn. appl. fees (average year) 3/	JD/new conex.	254	130	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	
Water suscription and conn. appl. fees (year-end) 3/	JD/new conex.	254	130	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	133	
Sewerage connection fees (average year)	JD/new conex.	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	
Sewerage connection fees (year end)	JD/new conex.	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	588	

1/ Newco starts in 2007. The figures for 2005 and 2006 correspond to estimates for LEMA.

2/ Includes water produced by LEMA (32 million m3 in 2004) and water from other governorates (82 million m3 in 2004).

3/ The figures for 2005 and following years are based on LEMA's experience after the new fees went into effect in June 2005.

File: Amman Scen. 3. Increasing tariffs.

5-Feb-06

AQABA WATER COMPANY

SCENARIO 1:

CONSTANT PRICES

Aqaba Water Company - Income Statement
Scenario 1 A. Constant Prices
(JD Thousands 2004 Prices)

Item	2004 1/	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	Actual	Projected																				
Total revenues (A) (Table 6)	4,503	10,212	11,089	12,254	12,611	12,978	13,355	13,743	14,142	14,552	14,617	14,975	15,342	15,718	16,103	16,498	16,902	17,316	17,740	18,175	18,620	19,076
Less personel and operating costs, without depr. (B) (Tabla 7)	2,745	6,873	7,004	7,117	7,391	7,668	7,758	7,875	8,037	8,202	8,292	8,432	8,575	8,720	8,927	9,135	9,294	9,451	9,623	9,786	9,926	10,099
Operating Income (C=A-B)	1,758	3,338	4,085	5,137	5,220	5,309	5,597	5,868	6,105	6,350	6,325	6,543	6,767	6,998	7,177	7,362	7,608	7,865	8,117	8,388	8,694	8,977
Less depreciation charges (D) (Table 11)	803	790	777	799	913	1,117	1,231	1,257	1,308	1,383	1,430	1,450	1,470	1,491	1,545	1,632	1,690	1,715	1,738	1,762	1,786	1,814
Income before interest and income tax (F=C-D-E)	956	2,549	3,309	4,338	4,307	4,193	4,365	4,611	4,797	4,967	4,895	5,093	5,297	5,507	5,632	5,730	5,918	6,150	6,378	6,626	6,907	7,163
Less interest and other financial charges	0	0	0	0	0	0	0	0	-35	-105	-140	-350	-630	-770	-910	-980	-980	-1,050	-1,225	-1,400	-1,505	-1,540
Income before taxes (G)	956	2,549	3,309	4,338	4,307	4,193	4,365	4,611	4,832	5,072	5,035	5,443	5,927	6,277	6,542	6,710	6,898	7,200	7,603	8,026	8,412	8,703
Less income tax (5%)	55	127	165	217	215	210	218	231	242	254	252	272	296	314	327	335	345	360	380	401	421	435
Net income	901	2,421	3,143	4,121	4,092	3,983	4,147	4,380	4,591	4,819	4,783	5,171	5,631	5,963	6,215	6,374	6,553	6,840	7,223	7,625	7,992	8,268

1/ August to December 2004.

File: Aqaba Scen. 1A. Constant Prices

7-Feb-06

Table 2
Aqaba Water Company - Sources and Application of Funds
Scenario 1 A. Constant Prices
(JD Thousands 2004 Prices)

Item	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	Actual	Projected																				
Income before interest and income tax	956	2,549	3,309	4,338	4,307	4,193	4,365	4,611	4,797	4,967	4,895	5,093	5,297	5,507	5,632	5,730	5,918	6,150	6,378	6,626	6,907	7,163
Plus depreciation charges	803	790	777	799	913	1,117	1,231	1,257	1,308	1,383	1,430	1,450	1,470	1,491	1,545	1,632	1,690	1,715	1,738	1,762	1,786	1,814
Gross internal cash generation (A)	1,758	3,338	4,085	5,137	5,220	5,309	5,597	5,868	6,105	6,350	6,325	6,543	6,767	6,998	7,177	7,362	7,608	7,865	8,117	8,388	8,694	8,977
Less debt service; principal and interest (Table 9)	0	0	0	0	0	0	0	0	965	895	-140	5,650	1,370	1,230	1,090	-980	-980	950	1,775	600	-505	-1,540
Less increase (decrease) working capital without cash and banks (Table 12)	(476)	564	-533	-845	-170	164	136	49	50	52	-2	39	40	41	42	43	44	45	46	47	48	50
Provision for doubtful debts 1/	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Less income tax	55	127	165	217	215	210	218	231	242	254	252	272	296	314	327	335	345	360	380	401	421	435
Net internal cash generation (B)	1,227	2,647	4,453	5,765	5,174	4,936	5,242	5,588	4,848	5,150	6,216	582	5,061	5,413	5,718	7,964	8,199	6,510	5,916	7,340	8,730	10,032
Financing activities																						
Loans received	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-reimbursable contributions (Table 9)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Increase (decrease) in partners' account	(422)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Funds from financing activities (C)	(422)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Funds available for investment (D=B+C)	805	2,647	4,453	5,765	5,174	4,936	5,242	5,588	4,848	5,150	6,216	582	5,061	5,413	5,718	7,964	8,199	6,510	5,916	7,340	8,730	10,032
Less investments (D) (Table 8)	232	1,212	738	763	6,788	6,814	840	868	2,496	2,526	645	660	677	693	2,910	2,928	920	764	782	802	821	1,016
Net increase (decrease) in cash and banks (E=C-D)	573	1,435	3,714	5,002	-1,614	-1,878	4,402	4,720	2,352	2,624	5,571	-78	4,384	4,720	2,807	5,036	7,279	5,746	5,133	6,538	7,909	9,016
Cash and banks at the beginning of the period	515	1,088	2,522	6,237	11,239	9,625	7,747	12,149	16,869	19,221	21,845	27,416	27,338	31,722	36,442	39,249	44,285	51,564	57,310	62,444	68,982	76,891
Cash and banks at the end of the period	1,088	2,522	6,237	11,239	9,625	7,747	12,149	16,869	19,221	21,845	27,416	27,338	31,722	36,442	39,249	44,285	51,564	57,310	62,444	68,982	76,891	85,906

1/ No provision made as the billing includes already a deduction for non-collectible bills.

File: Aqaba Scen. 1A. Constant Prices

7-Feb-06

Table 3
7
Scenario 1 A. Constant Prices
(JD Thousands 2004 Prices)

Item	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
	Actual	Projected																					
ASSETS																							
Cash and banks (Table 12)	1,088	2,522	6,237	11,239	9,625	7,747	12,149	16,869	19,221	21,845	27,416	27,338	31,722	36,442	39,249	44,285	51,564	57,310	62,444	68,982	76,891	85,906	
Accounts receivable and accrued revenues (less provisions) (Table 12)	2,661	3,063	2,772	2,451	2,102	2,163	2,226	2,291	2,357	2,426	2,437	2,496	2,558	2,620	2,684	2,750	2,818	2,887	2,957	3,030	3,104	3,180	
Inventories (Table 12)	658	529	533	537	476	504	508	512	522	533	536	539	542	545	557	569	573	577	580	584	587	592	
Other (Table 12)	2,024	2,000	1,500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	
Total current assets (A)	6,431	8,114	11,041	15,226	13,203	11,415	15,883	20,672	23,100	25,804	31,388	31,373	35,821	40,607	43,491	48,605	55,955	61,774	66,981	73,595	81,582	90,678	
Gross fixed assets (Table 11)	24,313	25,526	26,264	27,027	33,815	40,629	41,469	42,337	44,833	47,359	48,004	48,664	49,341	50,034	52,944	55,871	56,792	57,556	58,338	59,139	59,961	60,977	
Less accumulated depreciation (Table 11)	803	1,592	2,369	3,169	4,081	5,198	6,429	7,686	8,994	10,377	11,807	13,257	14,727	16,218	17,763	19,395	21,085	22,800	24,538	26,301	28,087	29,901	
Total net fixed assets (B)	23,511	23,933	23,895	23,858	29,734	35,431	35,040	34,651	35,839	36,982	36,196	35,407	34,613	33,816	35,181	36,477	35,707	34,755	33,799	32,839	31,873	31,076	
TOTAL ASSETS (A+B)	29,942	32,048	34,936	39,084	42,937	46,846	50,923	55,322	58,940	62,786	67,585	66,779	70,434	74,422	78,672	85,082	91,662	96,529	100,780	106,434	113,455	121,754	
LIABILITIES AND NET WORTH																							
Accounts payable (Table 12)	2,004	1,688	1,434	1,461	1,222	1,148	1,078	1,097	1,124	1,151	1,167	1,190	1,215	1,239	1,274	1,309	1,337	1,364	1,392	1,421	1,450	1,481	
Current portion of long-term debt (Table 12)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total current liabilities (C)	2,004	1,688	1,434	1,461	1,222	1,148	1,078	1,097	1,124	1,151	1,167	1,190	1,215	1,239	1,274	1,309	1,337	1,364	1,392	1,421	1,450	1,481	
Medium-term liabilities (Table 10) (D)	0	0	0	0	0	0	0	0	-1,000	-2,000	-2,000	-8,000	-10,000	-12,000	-14,000	-14,000	-14,000	-16,000	-19,000	-21,000	-22,000	-22,000	
Capital and accumulated profit (losses) until 2004 1/	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	27,938	
Accumulated profits (losses) projection period	0	2,421	5,564	9,685	13,777	17,760	21,907	26,287	30,877	35,696	40,480	45,651	51,282	57,245	63,460	69,834	76,387	83,227	90,450	98,075	106,067	114,334	
Non-reimbursable contributions projection period	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Government subsidies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total net worth (E)	27,938	30,359	33,503	37,623	41,715	45,698	49,845	54,225	58,816	63,635	68,418	73,589	79,220	85,183	91,398	97,772	104,325	111,165	118,388	126,013	134,005	142,273	
TOTAL LIABILITIES AND NET WORTH (C+D+E)	29,942	32,048	34,936	39,084	42,937	46,846	50,923	55,322	58,940	62,786	67,585	66,779	70,434	74,422	78,672	85,082	91,662	96,529	100,780	106,434	113,455	121,754	

1/ The figure for 2004 was slightly adjusted to compensate for approximations in the income statement.

File: Aqaba Scen. 1A. Constant Prices

7-Feb-06

Table 4
Aqaba Water Company - Demand and Tariffs
Scenario 1 A. Constant Prices
(JD 2004 Prices)

Item	Unit	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
		Actual	Projected																					
Municipalities and population																								
Rate of growth of urban population	Percentage	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Districts served	Number																							
Urban population in municipalities served by the system	Thousands	102	104	107	109	112	115	118	121	123	126	130	133	136	139	143	146	150	154	157	161	165	169	
Water																								
Coverage with connection	Percentage	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Without service by the system	Percentage	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	Percentage	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Persons per customer	Number	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Water consumers billed (average year)	Thousands	19.6	20.8	21.4	21.9	22.4	23.0	23.5	24.1	24.7	25.3	25.9	26.6	27.2	27.9	28.6	29.3	30.0	30.7	31.5	32.2	33.0	33.8	
With meter	Thousands	19.6	20.8	21.4	21.9	22.4	23.0	23.5	24.1	24.7	25.3	25.9	26.6	27.2	27.9	28.6	29.3	30.0	30.7	31.5	32.2	33.0	33.8	
Without meter	Thousands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Non-billed water customers	Thousands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Metered connections	Percentage	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Average consumption																								
Metered customers	m3/month/cust.	42	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51
Non-metered customers	m3/month/cust.	0																						
Total consumption 2/	Million m3/year	4.9	12.8	13.1	13.4	13.7	14.1	14.4	14.8	15.1	15.5	15.9	16.3	16.6	17.1	17.5	17.9	18.3	18.8	19.3	19.7	20.2	20.7	
Metered	Million m3/year	4.9	12.8	13.1	13.4	13.7	14.1	14.4	14.8	15.1	15.5	15.9	16.3	16.6	17.1	17.5	17.9	18.3	18.8	19.3	19.7	20.2	20.7	
Non-metered customers	Million m3/year	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Non-billed water	% production	37	24	23	22	21	20	19	18	17	16	15	15	15	15	15	15	15	15	15	15	15	15	15
Water production 2/	Million m3/year	7.8	16.8	17.0	17.2	17.4	17.6	17.8	18.0	18.2	18.4	18.7	19.1	19.6	20.1	20.6	21.1	21.6	22.1	22.6	23.2	23.8	24.4	
Sewerage																								
Coverage with connection	Percentage	73	74	76	78	80	82	84	86	88	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Customers (average/year)	Thousands	14.4	15.4	16.2	17.1	17.9	18.8	19.8	20.7	21.7	22.8	23.3	23.9	24.5	25.1	25.7	26.3	27.0	27.6	28.3	29.0	29.7	30.4	
Sewerage cust. as a proportion of total water	Proportion	0.74	0.74	0.76	0.78	0.80	0.82	0.84	0.86	0.88	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Wastewater treatment	Million m3/year	2.5	6.6	7.0	7.3	7.7	8.1	8.5	8.9	9.3	9.8	10.0	10.2	10.5	10.7	11.0	11.3	11.6	11.8	12.1	12.4	12.7	13.0	
Tariffs																								
Water (average year)	JD/m3	0.64	0.65	0.70	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Water (year-end)	JD/m3	0.64	0.69	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Sewerage (average year)	JD/m3	0.22	0.22	0.22	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Sewerage (year-end)	JD/m3	0.22	0.23	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Water suscription and conn. application fee	JD/new cust.		130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00
Sewer suscription and conn. application fee	JD/new cust.		588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00	588.00

1/ Revenue per sewerage connection as percentage of revenue per water connection.

2/ Six months in 2004 and full year starting in 2005.

File: Aqaba Scen. 1A. Constant Prices

7-Feb-06