USAID | JORDAN
FROM THE AMERICAN PEOPLE

PRICING OF WATER AND WASTEWATER SERVICES IN AMMAN AND SUBSIDY OPTIONS.

CONCEPTUAL FRAMEWORK, RECOMMENDATIONS AND PRICING MODEL

AMMAN WATER MANAGEMENT COMMERCIALIZATION

FINAL REPORT

July 2009

This publication was produced for review by the United States Agency for International Development. It was prepared by SEGURA / IP3 Partners LLC

PRICING OF WATER AND WASTEWATER SERVICES IN AMMAN AND SUBSIDY OPTIONS

CONCEPTUAL FRAMEWORK, RECOMMENDATIONS AND PRICING MODEL

AMMAN WATER MANAGEMENT COMMERCIALIZATION

Contract No. AFP-I-00-03-00035-00, Task Order No. 539
SEGURA / IP3 Partners LLC

ACKNOWLEDGMENTS

The Contractor and consultant team would like to express their thanks and appreciation to the following agencies and 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), MIYAHUNA, and United States Agency for International Development (USAID).

The following individuals, listed alphabetically, comprised the professional team that participated in the preparation of this report: Ibrahim Alqam (Financial Analyst), Paul Cumiskey (CPA), Luz Maria González (Financial Analyst), Loai Hidmi (Water Engineer), Tatiana Prada (Economist and Administrative Assistant), Klas Ringskog (Economist), Guillermo Yepes (Project Lead Technical Advisor), and Jose Valdez (Resident Chief of Party).

ACRONYMS

AIC	Average Incremental Cost (marginal cost)
CAPEX	Capital expenditure program (also referred to as CIP)
CIP	Capital Investment Program
DZ	District zone
EU	European Union
GAM	Greater Amman Municipality
GIS	Geographic Information Systems
JD	Jordanian Dinar
JVA	Jordan Valley Authority
MIYAHUNA	Greater Amman Water and Sewerage Company
MWI	Ministry of Water and Irrigation
NRW	Non-revenue water
NAF	National Aid Fund
OFWAT	Office of Water, United Kingdom
O&M	Operation and maintenance
OPEX	Operation and maintenance expenditure program
USAID	Agency for International Development of the United States
WAJ	Water Authority of Jordan
WHO	World Health Organization

UNITS

km2	square kilometer
kW-h	kilowatt-hour
lcd	liters per capita per day
Mm3	million cubic meters
Mm3/year	million cubic meters per year

CURRENCY EQUIVALENTS (2008)

JD1 = US$1.43

CONTENTS

ANNEXES

TABLES

BOXES

FIGURES

EXECUTIVE SUMMARY

Jordan, with a per capita availability below 250 m3 per year (year 2000), is one of the most water deprived countries in the world. This scarcity has accentuated an acute competition for its use both among different sectors and geographical areas.

From the country's perspective, sustainable development suggest the need to efficiently allocate and price scarce water resources to promote water conservation and its efficient use to contribute to the well being of Jordan's population. Responsive water pricing is also an important water management policy tool as it will help: a) Miyahuna to develop an aggressive and substantive cost-effective program to reduce water loses and to maintain the infrastructure, and b) WAJ to ensure a more reliable delivery of bulk water for Greater Amman and other urban centers in the country. Adequate water pricing, on the other hand, can also help improve health and minimize negative environmental externalities, such as depletion of groundwater sources.

Making users pay for the costs they impose on public water and wastewater services promotes water conservation and helps reduce water wastage, which in turns postpones the need for costly additional water infrastructure. When users do not pay the full cost of services, as is the case in Amman, the national budget and international donors have to provide the shortfall - often with delays as experience has shown - in capital investments and timely maintenance that affect the overall quality of services. In relying on outside subsidies the sector loses some of its independence and can become complacent about the need to improve its efficiency.

There is wide consensus among practitioners and policy makers worldwide that pricing of water and wastewater services should aim at satisfying three main objectives:

- *Financial viability*. To generate sufficient funds to pay for all the costs to operate, maintain and expand the required infrastructure.
- *Economic efficiency*. To ensure that national resources (capital, labor and land) and in particular the country's scarce water resources be used as efficiently as possible to maximize the well being of the country's population.
- *Social welfare. To en*sure that basic services are accessible to the whole population, particularly the poor. This objective raises important policy decisions about the role of subsidies to achieve it.

On many occasions, meeting these objectives requires trade-offs which poses difficult choices for policy makers on how to reconcile them. For instance, economic efficiency pricing does not always guarantee financial viability or affordability by the poor, and pricing based on financial considerations may not satisfy economic efficiency criteria or be affordable by the poor. Therefore, a thorough understanding of these objectives is needed to formulate an efficient, effective and coherent pricing policy.

At present, pricing objectives are not being met: first, financial viability is precarious as current tariffs do not allow Miyahuna and WAJ to recover all their costs and as tariff stability is missing, to confidently plan to meet future development and maintenance needs; second, economic efficiency is not being achieved as large subsidies to Miyahuna and WAJ weaken the signals to operate more efficiently, and in particular

reduce water loses; and thirdly, social goals fall short as subsidies to users extend beyond those needed to protect poor families to financial better off families and some nonresidential users; in addition, these subsidies are not been recovered. These failings suggest the need to develop a comprehensive pricing policy to guide decisions by policy makers and utilities, such as Miyahuna or services providers such as WAJ.

Miyahuna financial position In 2008 Miyahuna's total revenues were JD 76.5 million, including JD 9.3 million sewerage transfer from GAM tax and JD 12.2 million from connection fees. Only JD 50.0 million came from tariffs. These revenues barely cover its basic operating costs of JD 66.4 million. Moreover, Miyahuna's business plan contemplates some JD 24.8 million in investments for expansion and critical improvements; however this plan is under funded which raises concerns about its viability. In addition Miyahuna receives substantial subsidies from WAJ for the supply of bulk water. Therefore pricing of services falls short on cost recovery grounds.

Pricing policy The Ministry of Water and Irrigation has formulated a new pricing policy (Chapter 4). Based on this policy the consultants have developed and recommend a methodology to determine prices and subsidies. This methodology starts with the determination of costs and revenue sources to meet them. One revenue source, non-tariff revenues, includes transfers from Miyahuna, house connections and water sales to other governorates and other minor sources of revenue. The other revenue source is revenues from water and wastewater tariffs to users of these services. This methodology also includes:

The reference price The reference price indicates how close the utility is to recover its costs under an efficient operation, taking into account financial or economic considerations and reflects productivity gains in operations.

- *Reference financial price* reflects the cost of providing services including the need to maintain a sustainable level of investments to expand, maintain and rehabilitate the infrastructure. It also reflects the costs of Miyahuna to timely raise funds to complement its development plans to donor's contributions or loans from banks or financial markets. In addition WAJ needs to recover its cost of delivering bulk water to Miyahuna.

- *Reference economic price* considers all costs imposed on the country to provide good and efficient services to all the population. However, the lack of an updated water and wastewater master plan precludes a detailed calculation of all these costs; in particular, the costs of distributing water (primary and secondary pipes, pumping stations and storage capacity, and commissioning of a centralized water dispatch system to optimize the delivery of water) and of collection of wastewater including investments to reduce illegal flows from and to the drainage system

Therefore, the reference price to be adopted depends on policy decisions by the Government as indicated in the table below:

Reference Price and Policy Decision	Reference cost JD/m3 a/	Equivalent Revenue JD/m3	
		Average W&WW tariff	Other revenues b/
Financial			
1. Current level (2008) (w/o depreciation)	0.66	0.66	0.19
2. Option 1.Operating costs+ improved maintenance	0.97	0.76	0.21
3. Option 2. Option 1 + cash contribution to investments	1.30	1.09	0.21
4. Option 3. Option 2 + reduced subsidies from WAJ to Miyahuna	1.63	1.42	0.21
Economic			
5. Average incremental cost (AIC)	1.65		

a/ In 2008 prices; b/ Other charges and transfers (excluding connection fees)

The consultants recommend, as a first step, the implementation of a financial reference price (Option 3) within a three year period which will place Miyahuna and WAJ on a more sustainable financial position. Once a master plan is available and the DISI water conveyor system is near completion the consultants also recommend reviewing all these calculations and moving towards economic pricing.

Tariff structure. Defines how subsidies are assigned to certain groups of consumers and how these subsidies are recovered from other groups.

- **Targeting of subsidies to poor consumers**

  Based on the recommended reference price (JD 1.42 per m3) all residential consumers are presently benefiting from subsidies. However, these subsidies are not explicitly allocated nor explicitly recovered thus affecting the financial viability of Miyahuna and WAJ.

  The consultants assessed several options to improve targeting subsidies to poor families: 1) using consumption as a proxy for income; 2) considering extending social benefits granted by the National Aid Fund (NAF) to very poor families to a larger cohort of beneficiaries; and 3) using GAM land classification system as a proxy for level of income.

  With the first option the correlation between income and water consumption while important poses targeting issues given that family size increases as income decreases. Therefore it is not recommended as large poor families could be unduly affected. The second option, while attractive as it de-links price of services from cross-subsidy considerations, also poses implementation problems. Therefore it is not recommended as NAF's recipients are families (recertified every six months) while Miyahuna's billing system is based on contracts with property owners. The third option, using GAM land classification data, is attractive because: i) there is a strong correlation between GAM land classification system and socio economic level of the family; ii) using a proxy for poverty indicator from an independent government organization lowers the potential for abusing the system.

  Based on this assessment, the consultants propose targeting subsidies to benefit only poor families living in GAM Category D areas. Nonetheless, this allocation

methodology needs to be flexible to accommodate extreme cases when the beneficiary is clearly not a poor family or when very poor families living in other land categories should be included.

The recommended level of the subsidy to a poor family is based on:

- A maximum consumption of 20 cubic meters per quarter per family
  According to Miyahuna 30% of all domestic users consume less than 20 M3 per quarter. According to GAM land classification, 21% of all buildings are in Category D.
- An explicit subsidy so a poor family payment for services would not exceed 1% of family income at the poverty level (JD 3.47 per month or JD 10.41 per quarter).
  A poor family was paying on average JD 5.1 per quarter or less than 0.5 % of family income at poverty level (2008).
- Based on these criteria some 121,000 families would benefit from a subsidy. The subsidy is estimated at JD 8.4 million/year

- **Recovering the subsidies**

  The consultants also recommend recovering the subsidy to poor families through an explicit "solidarity charge" to be paid by most or all non-subsidized users. For instance, if only all non-residential and non-poor residential users consuming more than 40 m3 per quarter (104,000 users of which 98,000 are non-poor residential) are assessed this charge their contribution would be JD 20.1 per quarter.

Therefore, the recommended tariff-realignment or new tariff system comprises:

- A fixed-charge to cover costs not related to water consumption (cost of the Customer Department no including purchase of meters or connection costs).
- A volumetric charge (equal to the reference price) for any level of consumption.
- An explicit subsidy for residential users classified as poor, and who consume up to 20 m3 per quarter (basic service), to limit their water and wastewater bill to no more than 1% of family income at the poverty line. Consumption by poor families over 20 m3 per quarter will be priced at the reference price.
- An explicit surcharge (solidarity charge), to recover the subsidy. This fixed charge, would be levied on non-poor residential and non-residential users that consume over a certain volume per billing period.

Predictable pricing. It is important to recognize the need for the utility to rely on a predictable stream of revenues to adequate plan its activities. Therefore the consultants recommend:

- Defining the reference price for a period of 3 to 5 years and
- Automatic adjustment of the reference price, at least annually, to compensate for inflation (the last price adjustment took place in 2005) to avoid the deterioration of the purchasing power of Miyahuna and WAJ.

Implementation. The proposed tariff changes should be implemented gradually (three to five years) and take into consideration the following considerations:

- *Informing the public* about the reasons for the increase:
  - Water scarcity and need to conserve water resources
  - Increasing costs to provide water and wastewater services and the need to reflect more closely these to provide Miyahuna and WAJ with additional revenues to improve the quality of services and timely meet a growing demand

- The need to target subsidies to allow poor families to have access to basic water and wastewater services
- The need to recover the subsidies from families with higher income levels and from industrials and commercial users

As a corollary it is also important to monitor and evaluate progress being made during the implementation and take prompt actions if needed.

- *Lowering the psychological impact* and reducing public resistance by:
  - Mitigating the tariff impact by moving to a monthly basis which will also facilitate payment from poor families
  - Informing the public of efforts to improve the quality of service (e.g., reducing non-revenue and increasing the hours of service)
  - Improving the capacity of Customer services to respond to inquires or complaints.

- Before introducing the new tariff system it is very important *to run in parallel* the new pricing system with the old one to iron out existing glitches in the billing system to reduce complaints

Pricing Model. A model has been developed (a detailed description including definitions is presented in Chapter 8 and Annex 6) to help design a tariff for water and wastewater services that meets the policy objectives formulated by MWI. As such, the model helps calculate:

- The total revenue requirements (non-tariff revenues and revenues from tariffs) needed to achieve financial viability
- The reference price or revenues required from tariffs charges. This price applies to all levels of consumption and all users
- The level of subsidies to low income families
  Consumption by a low income family higher than 20 m3 per quarter will be charged at the reference price.
- The recovery of the subsidy through a “solidarity” charge to non-poor residential and non-residential users than consume more than a predetermined volume defined by the user of the model.
- The implementation of new tariff over a predetermined number of years
- Cash flow projections during the implementation period to help verify that the adopted implementation strategy generates enough cash to pay for the financial obligations during this period; and
- Financial indicators

The model structure has three sections:

- *Section 1. Data Entry.* Information of the utility regarding existing tariffs and financial data and options available to the user to apply subsidies and the gradual increase of tariffs
- *Section 2. Process Sheets*. Intermediate calculations (hidden and the user does not need to interact with them)
- *Section 3. Results.* Presents the key outputs of the model

PRICING MODEL STRUCTURE

DATA ENTRY

General Information of the utility

Module 1. **Base year**

Module 2. **Current water and wastewater tariffs**

Module 3. **Billing information**

Module 4. **Financial information**

Module 5. **Cost composition W&WW**

Options for application of subsidy and gradual increase of tariffs

Module 6. **Magnitude of subsidy**

Module 7. **Beneficiaries of subsidy: Low-Income Users**

- Module 7.1 **% of low - income users**
- Module 7.2 **Who pays the Solidarity charge**

Module 8. **Transition period**

PROCESS SHEETS: Intermediate Calculations (hidden)

RESULTS

Module 9. **Reference price**

Module 10. **Pricing structure under transition period**

- Module 10.1 **Pricing structure under transition period Consolidated Water and Wastewater**
- Module 10.2 **Pricing structure under transition period Water**
- Module 10.3 **Pricing structure under transition period Wastewater**

Module 11. **Average bill during transition period**

- Module 11.1 **Monthly bills or quarterly bills**
- Module 11.2 **Bills at the end of the transition period**
- Module 11.3 **Bills during transition period**

Module 12. **Cash flow**

Module 13. **Financial indicators**

CHAPTER 1 - BACKGROUND

1.1 INTRODUCTION

Jordan, with a per capita availability below 250 m3 per year (year 2000), is one of the most water deprived countries in the world. This scarcity has accentuated an acute competition for its use both among different sectors and geographical areas.

From the country's perspective, sustainable development suggest the need to efficiently allocate and price scarce water resources to promote water conservation and its efficient use to contribute to the well being of Jordan's population. Responsive water pricing is also an important water management policy tool as it can help: a) Miyahuna to develop a sustainable and aggressive cost-effective program to substantially reduce water loses and to maintain the infrastructure, and b) WAJ to ensure a more reliable delivery of bulk water for Greater Amman and other urban centers in the country. Adequate water pricing, on the other hand, can also minimize negative environmental externalities, such as depletion of groundwater sources[1].

Making users pay for the costs they impose on public water and wastewater services promotes water conservation and helps reduce water wastage, which in turns postpones the need for costly additional water infrastructure. When users do not pay the full cost of services, as it is the case in Amman, the national budget and international donors have to provide the shortfall often with delays as experience has shown, in capital investments and timely maintenance that affect the overall quality of services. In relying on outside subsidies the sector loses some of its independence and can become complacent about the need to improve its efficiency.

1.2 STRUCTURE OF THE REPORT

This report has been structured as follows:

- Pricing objectives (Chapter 2)
- Cost of water and wastewater services (Chapter 3)
- Current pricing system (Chapter 4)
- Subsidy options and focalization (Chapter 5)
- Strategy to reach pricing objectives (Chapter 6)
- Recommendations and next steps (Chapter 7)
- Pricing Model (Chapter 8)

[1] OECD, The Price of Water; trends in OECD countries, 1999

CHAPTER 2 – PRICING OBJECTIVES

2.1 INTRODUCTION

There is wide consensus among practitioners and policy makers worldwide that pricing of water and wastewater services should aim at satisfying three main objectives[2]:

- *Financial viability*. To generate sufficient funds to pay for all costs to operate, maintain and expand the required infrastructure.
- *Economic efficiency*. To ensure that national resources (capital, labor and land) and in particular the country's scarce water resources be used as efficiently as possible to maximize the well being of the population.
- *Social welfare*. To ensure that basic services are accessible to the whole population, particularly the poor. This objective raises important policy decisions about the role of subsidies to achieve this objective.

As these objectives can produce different outcomes, meeting them requires trade-offs which poses difficult choices for policy makers on how to reconcile them. For instance, economic efficiency pricing does not always guarantee financial viability or affordability by the poor, and pricing based on financial considerations may not satisfy economic efficiency criteria or be affordable by the poor. Therefore, a thorough understanding of these objectives is needed to formulate an efficient, effective and coherent pricing policy.

In addition, a pricing system should be[3]:

- *Politically acceptable*. A successful tariff design should be acceptable to political leaders and the public;
- *Simple and transparent*. Pricing objectives should be in the public domain and be easy to explain and be understood by users, the utility and policy makers;
- *Easy to implement*. It should avoid undue complexity that could exceed administrative capabilities, information requirements and or billing/collection procedures, all of which add costs; and
- *Predictable*. An important dimension of financial viability is predictability on how prices will be adjusted in the future as otherwise, sound financial and investment planning become impossible.

A pricing system therefore entails a consistent policy approach to meet the above objectives and requires the definition of:

- The *reference price* level or average cost which reflects the level of cost recovery from tariffs taking into account revenues from other services and transfers; and

[2] Boland, John J. & Dale Whittington The political economy of increasing block tariffs in developing countries. The World Bank, 1991
[3] Boland (cited)

- The *pricing structure* which determines how prices are allocated to different users and levels of consumption; e.g. definition of users benefiting from subsidies, if any and those who may pay for these subsidies.

A more detailed analysis of different price structures and charges is presented in Annex 2.

2.2 FINANCIAL VIABILITY

From the utility's point of view the main purpose of the tariff is to recover all costs associated with the efficient provision of services. However, it is important to realize that reaching an efficient level requires time and resources. To ensure this objective, prices should cover, among others[4]:

- Operational needs, including adequate maintenance[5] and rehabilitation of the infrastructure
- Development and expansion of services
- Water extraction and discharge fees
- Financial costs (interest and debt service)
- Fair return on capital
- Working capital needs; and
- Taxes

2.3 ECONOMIC EFFICIENCY

In most cities and in Amman in particular, the real cost of services (net of inflation) is increasing due to a combination of factors, which are captured in economic pricing:

- Development of more distant water sources (e.g. DISI aquifer) the costs of which surpass those of existing supply schemes by a wide margin;
- Developing additional water production and storage capacity to offer a more reliable raw water supply and act as a buffer against temporary water restrictions from different sources;
- Treatment of raw waters of lower quality (e.g. desalination at Zara Mee'n) and treatment of wastewaters (e.g. secondary treatment at Al Samra).
- Depletion (mining) of aquifers as observed in the well fields operated by Miyahuna; and
- More stringent water quality norms to protect the environment and the health of the population.

[4] The list is meant to be indicative for both financial and economic pricing

[5] As an example, OFWAT requires "each company to adopt infrastructure renewal charges (IRC), this means that the infrastructure network is treated as a "single asset system to be maintained in perpetuity… The level of IRC should be broadly constant, in real terms, over the medium to long term (more than 15 years) assuming that the network systems are in a steady state as regard operational aspects". OFWAT Setting Price Limits for 2010-1015, October 2007

Economic efficiency pricing entails a forward looking approach to determine the costs of all resources needed to expand and properly operate and maintain services. Economic or efficiency pricing thus provides consumers with a clear signal of these costs to allow them to manage their demand and obtain the largest possible aggregate benefits (e.g. that the benefits – as measured by willingness to pay - are equal or greater than the costs).

Economic efficiency pricing also tries to ensure that scarce resources, and in particular water, are used as efficiently as possible. Efficiency pricing requires that consumers are provided with a clear signal of the total costs of capturing, treating and distributing water and then collect, treat and safely dispose of the wastewater. Its purpose is to signal the total costs of service to consumers to encourage them to ask whether the benefits they derive from water consumption are at least equal to the tariff they are asked to pay. The consumers will thus weight costs against benefits constantly and in the process maximize benefits. The assumption is that consumers will not demand additional water if the associated benefits are not at least equal to the tariff paid which in turns aggregates the costs of service.

Economic efficiency -setting prices equal to the future cost of service - is the marginal cost of providing an additional unit of water. An accepted approximation to marginal cost is the Average Incremental Cost (AIC), which represents the average incremental cost of expanding and operating services over a reasonable period of time (say 15 years)[6]. A summary discussion of economic pricing and cost is presented in Annex 1.In order for consumers to adapt their level of consumption so that the benefits they derive are at least equal to the marginal costs it is necessary to meter consumption.

In a broader context, the financial viability and economic efficiency objectives are relevant not only to Miyahuna but also to WAJ as well, as provider of bulk water and waste treatment facilities throughout Jordan.

2.4 Social Goals and Subsidies

Water and sanitation are a vital necessity and therefore, society – and by extension Governments - consider it necessary to facilitate access to them by the population, in particular the poor, who might otherwise not have the financial means to pay for basic services. In so doing Governments try to ensure that everyone, irrespective of income levels, is given the minimum level of water supply and wastewater services so that their health and well-being not suffer. Environmental protection laws and regulations also reflect social goals.

In establishing social goals the terms *equity* and *fairness*[7] are often used and, at times, interchangeably. Equity requires that equals be treated equally; in utility tariff design this usually means that users pay in proportion to the costs they impose on the utility. On these grounds, in some countries such as France price differentials based on type of user (residential and non-residential) are not allowed. Fairness, on the other hand, is wholly subjective and each person may have a different notion of its meaning; for instance, a marginal cost or financial-based tariff is expected to be equitable, but not necessarily fair

[6] OFWAT The role of marginal cost in the provision and regulation of water services, 2002
[7] Boland (cited)

BOX 1: EXAMPLES OF SUBSIDY SYSTEMS

A: COLOMBIAN PUBLIC SERVICES

Colombia has developed a subsidy system to benefit poor families using water supply, sewerage, solid waste, electricity and gas and telephone services(1). This system is based on the socio-economic stratification of housing units into six categories –strata- ranging from 1 (the poorest) to 6 (the more affluent). In 2004, about 91 % of the population was classified in strata 1 to 3; 6% in stratum 4 and 3% in strata 5 to 6.

Residential units classified in strata 1, 2 and 3 receive a maximum subsidy of 50%, 40% and 15% respectively of the average cost of services (full cost recovery) for a basic consumption not exceeding 20 m3/month/family unit. Stratum 4 receives no subsidy and strata 5 and 6 and non residential users are charged a surcharge of 50% and 60% respectively of the cost of service.

This subsidy system was implemented over a period of 2 years extended to 6 years under special circumstances. The subsidy and overcharges, as defined, do not guarantee that the utility will fully recover all its costs. For instance in 2004, the level of subsidies for water, sewerage and solid waste services nationwide (strata 1 to 3) reached US$ 220 million while contributions (from strata 5 and 6 and non-residential users) were US$ 107 million which resulted in a deficit of US$ 113 million. Legislators were aware of this potential shortfall and therefore the law (footnote 1) created a "municipal solidarity fund" by which municipalities are under the obligation to transfer to the utility the funds needed by the utility to ensure full cost recovery. Municipal solidarity funds are funded from municipal revenues (property taxes and budgetary government transfers).

The economic stratification for urban areas takes into account the physical characteristics of the house and neighborhood. This stratification is defined by the National Administrative Department of Statistics (DANE) and is updated every 5 years. The stratification is implemented by the municipal authorities who may request the central government to review the stratification in the event of local changes.

In spite of such elaborate system a recent evaluation (2) indicated the need for extensive review of the subsidy system as some 54% of water supply domestic users classified as "non-poor" were benefiting from these subsidies (inclusion problems). Moreover, overall inclusion problems increased from 53% in 1993 to 58% in 2004. The same evaluation concluded that subsidies to stratum 3 are "moderately regressive". As a consequence the government is in process of revising the subsidy system (including basic consumption) and assessing the need for complementary legislation.

Sources:

(1) Law 142 of 1994 and complementary legislation

(2) CONPES. Action plan for targeting subsidies for public services, October 2005

Translation by consultants.

B: CHILE

In the late 1980s, Chile began an overhaul of the legal, economic and institutional structure of its water and sanitation sector. An important part of this reform was a new tariff setting and subsidy methodology. By law, water pricing reflects the marginal costs of services and subsidies can cover between 25-85 percent of a household's water and sewerage bill for up to 15 m3/month (originally 20 m3 per month). All consumption above the subsidized limit is charged a tariff that recovers the full economic cost of services.

An eligibility scoring system (CAS-Community Assistance Committee) is the main targeting instrument for distributing mean-tested subsidies. This scoring system takes into account household size, living and crowding conditions, occupation and family income. Besides the water subsidy, eligibility for pension benefits, health benefits and other subsidies are also determined on the basis of the CAS scoring system. In 2005, some 570,000 families (18% of households) received the subsidy.

Nationwide the subsidy was US 51million representing 5% of total national utility revenues.

The subsidy scheme is funded entirely by the central government's budget and its size is determined annually by the Ministry of Planning.

The utility calculates the subsidy that each family is entitled to and reduces the user's bill accordingly. The utility then send the invoice to the municipality for the total subsidies granted and payment is received promptly as the utility can disconnect services if subsidies are not timely paid.

The subsidy scheme has several incentive-based features:

1. *The subsidy accrues to the family not the utility; therefore the utility fully recovers all its costs from all users and thus has the same incentives to provide efficient services to all.*
2. *The amount of the subsidy depends on consumption; the higher the consumption the lesser the subsidy.*
3. *The family must pay the full tariff for consumption above 15 m3/month limit.*
4. *The municipality is intimately involved in the process. It can be charged interest and the service to beneficiaries can be disconnected (in the next payment the utility can charge the beneficiary household the full cost of the service) for non payment to the utility.*

Source: World Bank. Incentive-based Subsidies. View Point No. 232

2.5 PREDICTABILITY

Most regulators (i.e. OFWAT –Office of Water- in England and Wales) and government agencies recognize the need for the utility to rely on a predictable stream of revenues which includes: a mandatory price review every 3 to 5 years and in the interim automatic adjustments to compensate for inflation[8]. A well known adjustment procedure (known as the K-factor) is the one applied by OFWAT See Box 2.

BOX 2: AUTOMATIC PRICE ADJUSTMENT; THE UK EXPERIENCE

The price cap model, the centerpiece of the regulatory system in England, is a dynamic process that has evolved since its inception in the late 1980's.

The basic concept is simple: set the outputs to be achieved over a period of time (5 years) and determine the cap on prices that the utility could charge to allow it to generate the necessary resources to achieve the desired outputs. In addition, annual efficiency gains by the utility are also expected, to put a downward pressure in prices.

To capture these two forces, the price cap uses an annual price adjustment formula that limits the price increase to no more than RPI + K, where RPI is the retail price index and K is a factor set to enable funding the investment needed to meet the outputs and reflect savings through operating and capital efficiency gains to be achieved by the utility. The K factor is established for each utility after technical (asset management plan) and financial studies are undertaken on behalf of the water company and the government.

The initial K factor in 1989 averaged 5.6%, i.e. prices could increase annually at 5.6% above general inflation. This K factor was set for ten years.

The next review in 1999 saw an evolution of the RPI + K formula. This time K=Q+V+S+ X. Where X (negative value or efficiency gain), Q, price increase needed to meet new quality standards, V, the cost of water resource development to maintain and adequate supply-demand balance that is fair to current and future customers and meets economic efficiency criteria, and S focuses on specific investments to improve services to customers and in particular reduce risks of flooding by sewage and low pressure problems. When presenting their business plans to OFWAT utilities need to justify each of these values.

Source: World Bank. W&S Econ Review, Number 17, May, 2000

[8] In lieu of inflation a price index that reflects the costs of the company could be used. Adjustments can be made more frequently, e.g. monthly or quarterly if deemed necessary

CHAPTER 3 – COST OF PROVIDING SERVICES

Estimates of financial and economic costs for Amman need to be taken with caution due to the absence of updated master plans for water distribution and wastewater collection needed to provide a firm estimate of development and expansion costs. Prices are also affected by assumptions related to the cost of rehabilitation to bring the infrastructure of both services to an acceptable level of reliability and the urgent need to significantly lower the level of non revenue water (NRW). Moreover, prices will also be affected by Government decisions on existing subsidies in the provision of bulk water, water extractions and electricity.

3.1 COST OF SERVICES

FINANCIAL

Miyahuna 2009 -2012 business plan calls total investments of some JD 200 million in critical projects and strategic investments. However, at present tariff levels Miyahuna's cash flow from operations will be close to zero after 2009. In addition it has very limited sources of financing as the only known sources of financing are the JD 12.5 million KfW loan proceeds and USAID indication of its willingness to support, on concessionary terms, some components of its rehabilitation program, likely to start in 2009. Therefore, efforts should begin immediately to search and secure donor grants and long term low interest loans. As it is unlikely that donor grants will be available to finance all of the needed capital investments, a strategic and comprehensive financing plan should consider not only donor's contributions but also additional debt financing and tariff adjustments to generate needed counterpart funds (cash contribution to investments).

Miyahuna's revenues include (Table 1):

1. Operating revenues from water and wastewater services; i.e.:
   - Revenues from tariffs from residential and non residential users through tariffs for water and wastewater services, and
   - Non-tariff revenues from other parties, such as: sales to Governorates and tomato factory, revenues from penalties on illegal connections, interests and connection fees.
2. Non-operating revenues not directly related to the provision of water and wastewater services such as the 3% contribution from GAM's billed property taxes, connection fees and interest on deposits and other sources.

Table 1: MIYAHUNA REVENUES IN 2008 (JD000)

CONCEPT	Actual Billing
OPERATING REVENUE	
• Water charges (variable)	31,826
• Wastewater charges (variable)	10,914
Subtotal (variable charges)	42,740
• Meter charges and surcharges	7,286
• Total W&W charges including meter and surcharges	50,026
• Other Operating Revenues	
Sales to Governorates, tankers, tomato factory, illegal connections	2,625
Subtotal operating revenues	**52,651**
NON OPERATING REVENUE	
• 3% GAM (sewerage tax)	9,331
• Connections fees	12,181
• Interest and other revenue	2,357
Sub total non operating revenue	**23,869**
TOTAL REVENUE	**76,520**

For the purpose of the tariff analysis, the consultants have focused their recommendations on the component of operating revenue related to billed revenue for water and wastewater services provided to residential and non residential consumers. The analysis of other revenues (operating –sales to governorates and others- and non-operating) is outside of the scope of the present study. The analysis of revenues from connection fees is also not be included in the recommended tariff, as connection costs are also excluded in the calculation of the reference cost, as approximately these two concepts cancel out. Therefore, the recommended tariff (level and structure) would only affect the first component of revenues, which in 2008, represents 65% of total revenues.

As a consequence in 2008, and based on a total volume sold of 75.3 million m3 (Annex 3), the equivalent resulting average tariff for residential and non-residential consumer is presented in Table 2.

Table 2: AVERAGE TARIFF IN 2008

CONCEPT	REVENUE (000) JD	Equivalent JD/m3
TOTAL REVENUE (w/o connection revenues)	64,339	0.85
OPERATING REVENUE		
Water and Wastewater billed to residential and non-residential consumers	50,026	0.66
NON OPERATING REVENUE	14,313	0.19

Reference financial cost A recapitulation of reference financial costs is presented in Table 3

Table 3: REFERENCE FINANCIAL COSTS

Cost Recovery Objective and Policy decision	Reference price JD/m3 a/
1. Current level (2008 w/o depreciation)	0.66+(0.19) = 0.85
2. Option 1. Current level + improved maintenance	0.76+(0.21) = 0.97
3. Option 2. Option 1 + cash contribution to investments (20%)	1.09+(0.21) = 1.30
4. Option 3. Option 2 + reduced subsidies from WAJ to Miyahuna	1.42+ (0.21)= 1.63

a/ In 2008 prices; in parenthesis non tariff revenues

Any significant adjustment to the level of operating (for instance the transfer of Zara Mee'n operation to Miyahuna) costs and non-operating revenues, in particular the transfer from GAM to Miyahuna would have an effect on Miyahuna's total net revenues and therefore if and when this happen the reference cost would need to be recalculated.

Economic

A recapitulation of estimated economic costs (Annex 1) is presented in Table 4:

Table 4: REFERENCE ECONOMIC COSTS

Concept	Cost JD/ m3	Comments
Water supply and treatment	0.54	Using Zara Mee'n as a proxy for medium term supply costs
Water distribution	0.63	Consultant's estimates
Wastewater Collection	0.21	
Wastewater treatment	0.27	Using As Samra as a proxy for medium term wastewater treatment costs
Total	1.65	

These costs have been estimated on the basis of the production flows and of the volumes distributed, collected and treated. They represent the total supply costs to consumers that should be signaled through a combination of fixed charges and, above all, volumetric charges.

However the level of non revenue water (NRW) in the system, estimated at about 41% (2008) is high and should be of concern, particularly when water resources are scarce and delivery costs are high. This level is due to a number of factors such as leakage in the distribution system, under registered consumption by old or improperly installed meters and unregistered connections (Figure 1).

Figure 1: COMPONENTS OF NON REVENUE WATER

<table>
<tr><td rowspan="8">System input volume (corrected for known errors)</td><td rowspan="4">Authorized Consumption</td><td rowspan="2">Billed authorized consumption</td><td>Billed metered consumption</td></tr>
<tr><td>Billed unmetered consumption</td></tr>
<tr><td rowspan="2">Unbilled authorized consumption</td><td>Unbilled metered consumption</td></tr>
<tr><td>Unbilled unmetered consumption</td></tr>
<tr><td rowspan="4">Water Loses</td><td rowspan="3">Commercial (apparent) losses</td><td>Unauthorized consumption</td></tr>
<tr><td>Customer meter inaccuracies and data handling errors</td></tr>
<tr><td>Customer meter inaccuracies and data handling errors</td></tr>
<tr><td rowspan="3">Physical (real) loses</td><td>Leakage on transmission and distribution mains</td></tr>
<tr><td>Leakage and overflows at storage tanks</td></tr>
<tr><td>Leakage on service connections up to the point of customer meter</td></tr>
</table>

The implications of the present high levels of NRW on the level of the tariff required to signal the total economic or financial costs of water should be obvious. As the bulk water costs have been calculated on the basis of the production flows (before water loses) the necessary tariff must be increased by a factor of 1/ (1-NRW) or about 1.7 under present conditions to pass water production costs to users.

3.2 SUBSIDIES TO MIYAHUNA

Bulk water WAJ bulk water provision and water extractions[9] in 2007 are shown in Table 5

Table 5: BULK WATER SOURCES AND PAYMENTS

Water Source	Volume mm3/year	Payments JD	
		Total million	Per m3
EXTRACTIONS	**76.4**	0.72	0.01
• King Abdullah Canal	(39.5)	--	--
• Wells and springs	(36.9)	0.72	0.02
WAJ SUPPLIES	**56.6**	3.72	0.07
• *Abu Zeighan*	(6.7)	0.23	0.03
• *Khaw*	(7.7)	1.07	0.14
• *Wala-Hidan*	(5.0)	0.71	0.14
• *Lajoun*	(6.0)	0.84	0.14
• *Zara Mee'n a/*	(31.2)	0.89	0.03
TOTAL	**133.0**	4.44	0.03

Source: Miyahuna Annual Report, 2007
a/ Miyahuna pays for electricity (213 MkW-hr)
Total may not add because of rounding

Taking the economic cost of Zara Mee'n of about JD 0.54 per m3 (Annex 1) as the indicator of short term economic costs (before DISI becomes operational) There is a subsidy of about JD 27 million per year in the provision of bulk water (56.6 x 0.54 – 3.72).

Electricity consumption In 2007 Miyahuna used 644 million kw-hr (493 - production) + 151 m kw-hr – operations)

Taking the average electricity price of about JD 0.05 per kw-hr as reference, this subsidy represents about JD 5 million per year

Under funding of maintenance of water and wastewater collection systems while not a subsidy to Miyahuna, affects the quality of the service and increases the final costs to users. Users have to pay for high levels of NRW and for indoor pumping stations and storage tanks in their premises to compensate for a deficient service:

Lower maintenance costs show up as a lower cost in Miyahuna's financial statements; however:

- The length of galvanized water pipes in the tertiary distribution system is about 1,600 kms[10] most of which are in poor condition however only a small fraction (less than 1% per year[11]) is being replaced.
- In 2007, repairs in the wastewater network were about JD 0.1 million, also substantially less than required.

[9] The cost of aquifer's mining needs to be documented in detail, as this practice is not sustainable in the long run. Moreover, this analysis needs to consider also water extractions from all users.
[10] Miyahuna Annual Report 2007 (page 22)
[11] Miyahuna, Annual Report 2007 (page 22)

- If pipes in the tertiary distribution system are replaced in 10 years (10%) the corresponding cost is about JD 8 million per year.
- A more realistic rehabilitation effort of the waste water collection system is about JD 4 million per year.

These subsidies (JD 32 millions/year) are undesirable as they weaken the price signal to Miyahuna and therefore its efforts to conserve water by adopting a more and aggressive sustainable NRW reduction program (Figure 1). Bulk water subsidies also weaken WAJ financial position and therefore its ability to develop new water sources and operate water and wastewater services in other cities more efficiently. Subsidies to most final users also weaken efforts to conserve water.

Under funding of maintenance costs (at least JD 12 million/year) also compromises the ability of Miyahuna to improve the quality of services and reduce water losses.

3.3 COST RECOVERY

At present revenue barely covers current operating costs; however these costs do not reflect the real situation of the service as maintenance is deficient and CAPEX investments are under funded as shown in Table 6.

Table 6: COST RECOVERY WITH CURRENT TARIFFS (2008)

CONCEPT	JD/m3	Cost recovery	
		Total revenue a/	W&WW Tariff
CURRENT REVENUES (2008) – equivalent per m3			
• From tariffs	0.66		
• Non-tariff revenues	0.19		
• **Total**	0.85		
COST RECOVERY WITH CURRENT TARIFFS b/			
a. Current operating cost (w/o depreciation)		119%	92%
b. Option 1. Operating cost + improved maintenance		88%	69%
c. Option 2. Option 1 + 20 % contribution to investments		66%	51%
d. Option 3. Option 2 + reduction of bulk water subsidies		52%	41%

a/ Total revenue = Non tariff + Tariff revenues
b/ From Table 3

From Table 6 it is clear that significant tariff realignment is urgently needed to provide Miyahuna with adequate resources and to send a clear signal that bulk water supply is expensive and thus that a greater effort to reduce NRW is needed.

CHAPTER 4 – CURRENT PRICING SYSTEM

4.1 BACKGROUND

Water and wastewater tariffs in Jordan are approved by the Council of Ministers based on requests by the Ministry of Water and Irrigation (MWI). Traditionally, tariff adjustments are discussed by the development Committee integrated by the Ministers of Finance, Planning, Industry, Water and Irrigation and a representative from GAM. Tariffs in Miyahuna were last adjusted in October 2006; this adjustment left intact the volumetric charges but raised fixed fees for all consumer categories.

The pricing system in Miyahuna is based on increasing block rates for residential users and a constant price per cubic meter consumed for non-residential users (Table 7A and 7B and Annex 3).Moreover, Miyahuna's system differentiates between water and sewerage services and levies three charges: (i) several surcharges that vary among residential and non residential users and (ii) a quarterly minimum charge (fixed charge), for residential consumption of less than 20 cubic meters. The volumetric charge varies with consumption and is based on a complex formula (Annex 3) set for each consumption block.

4.2 ANALYSIS

The following table shows the resulting charges obtained when applying the formula and an overview of the current pricing system and its effect on residential and non-residential users:

Table 7A: WATER TARIFFS PER QUARTER - 2008

TYPE OF CUSTOMER	CONSUMPTION BRACKET m3 per quarter				
	0-20	21-40	41-100	101-130	> 130
Residential consumers					
• Fixed charge (JD/user/quarter)	2.00	2.00	2.00	2.00	2.00
• Surcharge (JD/user/quarter)	2.15	4.15	5.15	5.15	5.15
• Meter charge (JD/user/quarter)	0.30	0.30	0.30	0.30	0.30
• Total fixed charges	4.45	6.45	7.45	7.45	7.45
• Ave volumetric charge (JD/ m^3)	-	0.14*	0.71*	1.06*	0.84*
Non Residential consumers					
• Fixed charge (JD/user/quarter)	-	-	-	-	-
• Surcharge (JD/user/quarter)	4.15	5.15	5.15	5.15	5.15
• Meter charge (JD/user/quarter)	0.30	0.30	0.30	0.30	0.30
• Total fixed charges	5.45	5.45	5.45	5.45	5.45
• Volumetric charge (JD/ m^3)	1.00	1.00	1.00	1.00	1.00

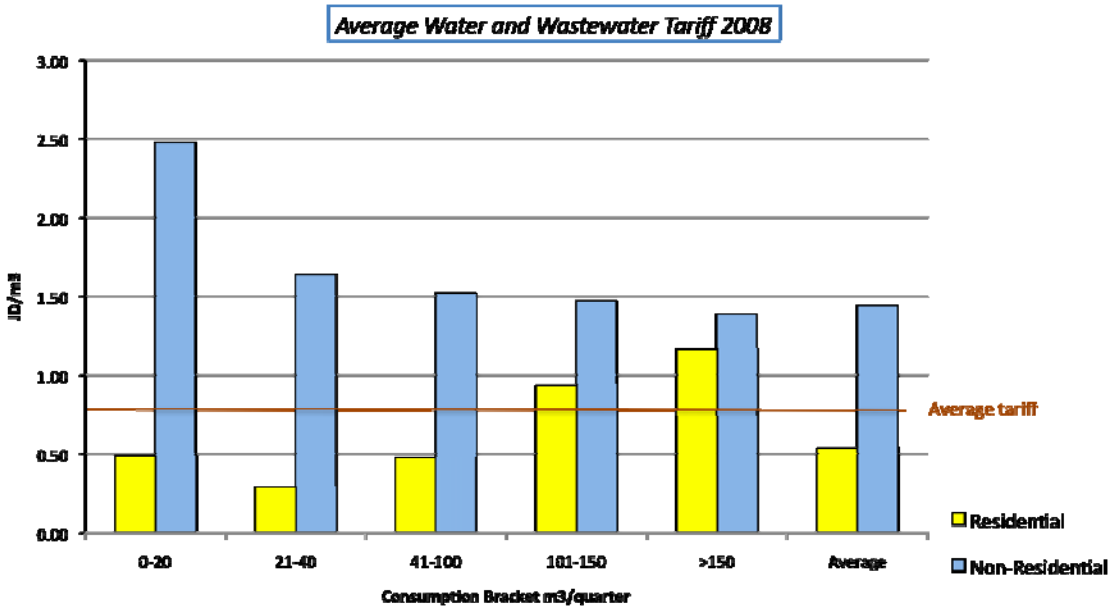
In the tariff formula, the volumetric charge varies with consumption within each block greater than 40 m3.
* Average tariff obtained from the actual billing in each block.

Table 7B: WASTEWATER TARIFFS PER QUARTER- 2008

TYPE OF CUSTOMER	CONSUMPTION BRACKET m3 per quarter				
	0-20 m^3	21-40 m^3	41-100 m^3	101-130 m^3	> 130 m^3
Residential consumers					
• Fixed charge per consumer per quarter (JD/user/quarter)	0.67	0.67	0.67	0.67	0.67
• Surcharge (JD/user/quarter)	-	-	-	-	-
• Total fixed charges	0.67	0.67	0.67	0.67	0.67
• Ave volumetric charge (JD/ m^3)	-	0.04*	0.25*	0.71*	0.26*
Non Residential consumers					
• Fixed charges					
• Volumetric charge (JD/ m^3)	0.56	0.56	0.56	0.56	0.56

When applying the formula, the volumetric charge varies in each block with consumption greater than 40 m3.
* Average tariff obtained from the actual billing in each block.

Figure 2: AVERAGE TOTAL CHARGES PER M3 – 2008



The average tariff per m3 for residential users in the 0-20 m3 bracket is higher than for the 20-40 m3 and 41-100 m3 brackets as all charges in the 0-20 m3 bracket are fixed based on 20 m3 consumption.(average consumption in this bracket is about 10 m3 per quarter). For the non-residential users there is downward trend in the average tariff as the effect of fixed charges (surcharges) increases as consumption decreases (all charges in the 0-5 m3 per quarter bracket are fixed).

CHAPTER 5 – SUBSIDY OPTIONS AND FOCALIZATION

5.1 OPTIONS

To facilitate access to the poor for basic services, it might be necessary to subsidize them. However, the need for a subsidy should not be a forgone conclusion[12] . In practice, subsidies can be allocated in different ways:

- *Outside the tariff*
    - As a direct payment by the government to poor families to subsidize their income, a practice followed in many industrialized countries [13]. Therefore, every user pays the same unit price per volume of water used.
    - As subsidies to the utility for electricity, bulk water supply or other inputs, as is the case in Amman. These subsidies in turn are passed on by the utility to the users, albeit to different degrees.
- *Within the tariff*, through a cross-subsidy from some group of consumers to other groups.
    - Subsidies based on consumption and classification of users (practice followed in Amman or Colombia, see Box 1A).
    - Subsidies limited to poor residential users. Volumetric charges are the same for all users but poor families receive a subsidy through a discount which it is paid directly by the government to the utility (as practiced in Chile, see Box 1B) or by other users.

Subsidies within the tariff often lead to the use of many pricing categories (rising tariffs per consumption block and group of consumers), as it is the case in Amman. This pricing system has several drawbacks: 1) obscures the allocation and magnitude of the subsidy and thus the transparency of the subsidy received by each group of consumers and 2) as observed in some utilities, the potential for erroneous classification of users and collusion between consumers and utility staff.

While most practitioners agree that subsidies outside the tariff are the preferred option, this practice demands a reasonably efficient public sector to administer the subsidy including timely payment to beneficiaries or the utility and of course, adequate budgetary resources.

There is no widely accepted benchmark to help define who is considered poor and the level of subsidy (consumption and payment effort) that a poor family should receive. In

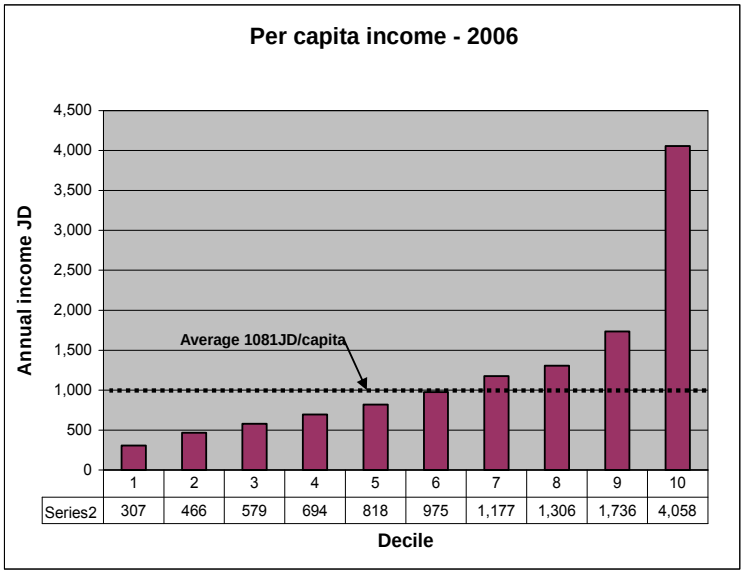
[12] For instance in Chile, after the new subsidy system was implemented many poor families did not apply for it which raises questions about the payment that such a family considers affordable; utilities had to take a proactive role to identify these families.

[13] In Jordan the National Aid Fund (NAF) supplements the income of very poor families. NAF, established by Law 36 of 1986, is an administratively and financially autonomous institution with branches throughout the Kingdom. In 2006, NAF provided JD 50 million in assistance to some 65,600 families (about 7% of the total) in Jordan, and JD 10 million to some 13,300 families in Amman. Financial assistance to a family is provided for 6 months after which it has to be revalidated.

2007, the poverty line in Amman was JD 347 per family per month[14] which is based on: (i) the poverty line for 2006 of JD556 per capita per year adjusted for inflation rate; and (ii) an average family size of 7.1 persons.

The Ministry of Planning estimates that13% of the population in urban areas was below the poverty line. If the whole of Jordan is considered, 21% of the population is below the poverty line as the income distribution in 2006 suggests (Table 8).

Table 8: INCOME DISTRIBUTION IN JORDAN, 2006



Decile	Income JD/year Family	Per capita	Family size
1	2,340	307	7.6
2	3,154	466	6.8
3	3,817	579	6.6
4	4,192	694	6.0
5	4,892	818	6.0
6	5,541	975	5.7
7	6,313	1,177	5.4
8	7,101	1,306	5.4
9	8,754	1,736	5.0
10	16,133	4,058	4.0
Average	**6,223**	1,081	5.8

Source: Poverty Division of Department of Statistics, 2006

In reference to the level of subsidy, the World Health Organization (WHO) has developed some basic guidelines:

- A reasonable per capita allowance of about 20 to 50 liters per day (translates into 13 to 32 m3 per quarter for a family of 7 in Amman[15])
- Total cost of water and wastewater services for a poor family should not exceed 5% of family income (about 3% for water and 2% for wastewater services). Similarly the European Union (EU) has suggested that total charges for both services should not exceed 2% of family income.

Based on the poverty line and applying the WHO guideline, total charges for both services to a poor family should not exceed JD 29.25 per quarter (JD 17.55 for water and JD 11.70 for wastewater). Application of the EU guideline would suggest that the total charges to the same family should not exceed JD 11.70 per quarter for both services. As a way of comparison, in 2008 the average family in the 0-20 m3/quarter

[14] Ministry of Planning and International Cooperation (website:http/www.mop.gov.jo). Main Economic Indicators. The latest poverty line value published corresponds to 2006 (JD 556 per capita per year). This value has been adjusted with inflation and transformed from per capita per year to per household-month, assuming 7.1 people per household.
[15] Average family size in the lowest two family income deciles is 7.1 persons

group was consuming about 10 m3 per quarter and paying JD 5.10 per quarter for both services (Annex 3) which represents about 0.5 % of family income at the poverty line)[16].

5.2 FOCALIZATION OF SUBSIDIES

Several alternatives were analyzed to help define the level of subsidies and beneficiaries:

- Using the National Aid Fund (NAF) as an instrument to supplement the income of poor families.

  While this approach remains of interest, its immediate application remains uncertain. First, NAF uses a narrower definition of families in need. In essence NAF helps household were unemployment is an issue and the family has no other source of income. The subsidy is also extended to families with disabled persons and to widows in distress. Families benefiting from NAF programs should have an income below the poverty line. Therefore if NAF is to be considered as an alternative its resources would need to be significantly increased to reach poor families in the 0 -20 cubic meters per quarter bracket.

  Another alternative is for NAF to pay the subsidy directly to Miyahuna (as it is in Chile – Box 1). However, Miyahuna would have to change its customer policy to identify the subsidy recipients as responsibility for payment rests on the owner of the property and not the tenant.

- Using water consumption as a proxy for family income

  Income-consumption studies in many countries[17] have found a correlation between family income[18] and consumption. However, this correlation (using land classification as a proxy for income level) was found to be weak in Amman. This could be explained in part by the significant difference in family size among income deciles (Table 7). In addition, some senior government officials have expressed concern about the fairness of a subsidy system based solely on consumption.

- Miyahuna has done some preliminary work to improve the current subsidy scheme. As such, it has considered the possibility of assigning subsidies based on consumption and also on the economic condition of the family. This work however, has not been developed to the level necessary to identify the subsidy beneficiaries and therefore to define a clear subsidy policy.

- Using land the classification system utilized by GAM to charge property tax (see Annex 5A). The consultants analyzed a sample over 4,700 housing units in all four categories (A, B, C, D) of GAM's system and correlated it with Miyahuna's billing information system. From this analysis the consultants have found that most families

[16] In 2008, residential consumers in Amman, in the 0-20 m3 per quarter bracket represents about 30 % of residential customers (28 % of all users) and 6.5 % of all consumption.
[17] Cesti Rita, G.Yepes and Augusta Dianderas. Determinants of Urban Water Demand. World Bank,1996.
[18] Income elasticity is defined as the relative change in consumption due to a relative change in family income (average values of income elasticity range from 0.3 to 0.6 indicating that a 10% increase in income increases consumption by 3 to 6 percent).

living on category D can be considered low income users. Details of this analysis are presented in Annex 5B.

It is important to recognize that no system is perfect to identify poor families, as there are practical problems of inclusion (non-poor families included) and exclusion (some poor families left out), that would be very expensive to correct. However, GAM's system can be improved over time (e.g. during the transition period for tariff implementation). The GAM classification system offers additional advantages to target water and wastewater subsidies to poor families as:

1. Most of the properties in the Greater Amman Metropolitan Area are registered in GAM's database and GAM has in place an adequate mechanism to update the classification of properties.

2. The population is familiar with GAM system and know very well the category they are assigned to, and

3. All the properties are geo-referenced and the database is shared with Miyahuna's data base.

4. There are some residential users outside the GAM area served by Miyahuna (about 40,000 residences, which corresponds to less than 10% of the total) that need to be classified. Most of these users (particularly in South Amman) are poor and could be, on a temporary basis, be classified as such. We estimate that about 90% of the families outside GAM would fall into this group.

In conclusion the consultants recommend using the GAM land classification D to target the subsidy to poor families (for location of D properties, see Annex 5). It is estimated that some 121,000 families would benefit with the subsidy (32,000 outside GAM and 89,000 in the GAM area), would benefit from this subsidy and the total subsidy to these families would amount to about JD 8.4 million per year.

The consultants also recommend that Miyahuna be given the flexibility to determine the right of some residential users to the subsidy. This flexibility is desirable in order to correct gross inequities that could favor non-poor residential users (as they affect Miyahuna) or exclude poor families (below the poverty line). As the new poverty classification system is implemented the classification of these users and other users can be fine tuned.

CHAPTER 6 – STRATEGY TO REACH PRICING OBJECTIVES

6.1 INTRODUCTION

The Ministry of Water and Irrigation (MWI) and the Water Authority of Jordan (WAJ) have adopted a new pricing policy that aims to achieve economic efficiency, financial sustainability of the utility providing water and wastewater services and social welfare concerns to make services affordable to the low income population (Box 3).

BOX 3. MWI & WAJ, PRICING POLICY

WAJ and its affiliated water companies' financial obligations, as indicated in Business Plans and operational programs demand substantially higher revenues to be able to meet the demand to expand services and maintain the infrastructure. WAJ's financial situation on the other hand requires the reduction of subsidies in the provision of bulk water to allocate them to improve water and wastewater services throughout the Kingdom. The current tariff system has reached a point where further adjustments through surcharges would be counterproductive as they would be regressive against low income customers and will not promote water conservation.
The Tariff Committee taking into account the report of the consultant and reviewing it in detail recommends the following tariff actions for Amman as a pilot with the possibility of extending them, with some adjustments, to other governorates:

1. *A new tariff system should meet the following objectives:*
   - *I. Allow a sustainable operation of water and wastewater services*
   - *II. Be fair, transparent and easily to be explained to the population*
   - *III. Help preserve the water resources and induce their rational use*
   - *IV. Allow access to low income population at an affordable price*
   - *V. In addition, the tariff should be dynamic and easy to implement*
2. *The new tariff should cover the full costs of the services and therefore providing additional resources to fund: i) better maintenance of the network; ii) reduction of bulk water subsidies and iii) contribution to the long term capital investment plans (for replacement and improvement of networks, and expansion of the system to satisfy growing demand).*
3. *The new tariff system should be applied to residential and non residential customers with two components: i) a Fixed Charge to cover costs not related to consumption (costs associated with billing and revenue collection) and ii) a Variable Charge to be applied to consumption (operation & maintenance costs and contribution to investments).*

Tariff	=	Fixed Charge per bill: (Costs associated with billing and collections)	+	Variable Charge per m^3: (Operation & maintenance costs and contribution to investments)

4. *The new tariffs should be calculated taking into account plans to improve operational and investment efficiency.*
5. *The new tariff should introduce a subsidy for making the service accessible for low income families. This subsidy will be for the first 20 m^3 per quarter for low income families*
6. *To recover the subsidy for low income groups, there will be an additional charge for high consumption customers.*
7. *The new tariff system can be introduced gradually*
8. *The new tariff system should be set for 5 years and reviewed thereafter. In the interim years it will be adjusted yearly only for inflation. However, a tariff review could take place earlier if a Master Plan or a major project is decided.*
9. The tariff system should be flexible to move readily to monthly billing.

6.2 PRICING STRATEGY

A pricing strategy to reach this pricing policy needs to consider three basic policy aspects:

Reference price Based on the analysis presented in Chapters 3 and 4, the consultants have developed several pricing alternatives to improve cost recovery. Due to uncertainties in determining the economic cost, the consultants recommend, at this stage, to opt for a reference price based on financial objectives.

To be able to compare the effort needed it is important to consider that the average tariff in Miyahuna, in 2008 was JD 0.85 per m3 (all revenues included -Table 9). However, the ability of Miyahuna to carry out its 2009 -2012 business plan is still uncertain as most of this plan is not funded; therefore the current reference price is inadequate to provide the funds to improve maintenance and rehabilitation of old pipes in both the water distribution and wastewater collections systems unless Miyahuna's business plan is fully funded by grant financing sources. On the other hand, WAJ subsidies to the supply of bulk water to Miyahuna are compromising its ability to maintain these sources and to expand water production and quality of services throughout the Kingdom; therefore the consultants recommend the payment of about JD 30 million per year from Miyahuna to WAJ. It is therefore vital to develop a strategy to help improve the financial capabilities of both Miyahuna and WAJ. With this objective in mind, the consultants have develop three pricing alternatives to help the government define a sound pricing policy to benefit all the population able to enjoy better and more reliable services.

Table 9: PRICE OBJECTIVE AND POLICY DECISION

Financial Cost Recovery Objective and Policy Decision	Equivalent Revenue JD/m3 a/		
	Total	From tariffs	Other revenues
1. Current level	0.85	0.66	0.19
2. Option1. Operating costs + improved maintenance	0.97	0.76	0.21
3. Option 2. Option 1 + cash contribution to investments (20%)	1.30	1.09	0.21
4. Option 3. Option 2 + reduced subsidies from WAJ to Miyahuna	1.63	1.42	0.21

a/ Variable charge in 2008 prices; other revenues include other charges and transfers

Social Objectives. GAM's land classification (A, B, C, D) is a good proxy for the economic condition of the household (Annex 5B). As explained earlier (par. 5.2), there are other advantages of using this classification to target subsidies. Therefore we recommend using GAM's land classification system and focus the subsidies on poor families which by far live in properties in the D category and for consumption less than 20 cubic meters per quarter. There are a few residential users outside GAM served by Miyahuna (less than 10% of the total) that need to be classified but most of these users (particularly in South Amman) are poor and could be classified as such, on a temporary basis, as Category D.

Recovering the subsidy. The level of the subsidy is a function of two variables: 1) the reference price and 2) the maximum amount that a poor family should pay for water and wastewater services. The level of the solidarity charge, in turn, depends on the number of users from which the subsidy is to be recovered. Considering the cost recovery Option 3, the solidarity charge is shown in Table 10.

Table 10: OPTIONS FOR SOLIDARITY CHARGE

USERS (ACCORDING TO CONSUMPTION) – 2008-	SOLIDARITY CHARGE AS FUNCTION OF CONSUMPTION Per user per quarter			
	All	>20 m3	>40 m3	>100 m3
Residential consumers	403,715	284,600	157,909	19,113
• Poor consumers	121,115	99,314	59,346	2,422
• Non Poor consumers	282,601	185,286	98,563	16,691
Non-residential consumers	20,442	8,815	5,841	2,898
Total users to cover the solidarity charge	303,043	194,101	104,403	19,588
Solidarity charge/ quarter JD	6.94	10.83	20.13	107.31

6.3 RECOMMENDED TARIFF[19]

The consultants have recommended Option 3 (i.e. a variable charge of JD$1.42/m3 for any level of consumption plus a fixed-charge of JD 1.90 per user per quarter to cover billing and collections costs). This recommended tariff would allow Miyahuna to:

1. Cover its operating costs;
2. Improve maintenance;
3. Contribute from internally funds to cover 20% of investment costs; and
4. Pay JD 30 million per year to WAJ to reduce the level of bulk water subsidies (which would benefit WAJ)

The distribution between water and wastewater volumetric tariff will be 75/25, reflecting current cost estimates by service in 2008. Therefore, the reference cost will be JD 1.07 per m3 for water and JD 0.35 per m3 for wastewater.

The subsidy will be applied only to poor families that consume up to 20 m3.

The solidarity charge of JD 20.1 per quarter applied to all other users that consume more than 40 m3 per quarter (Table 10).

The resulting tariff structure, without taking into account the subsidy and the solidarity charge, is presented in Table 11.

[19] At the request of WAJ Secretary General (meeting on May 6, 2009); the option suggested by the Tariff Committee of subsidizing the first 20 m3/quarter is not recommended however is analyzed in Annex 7

Table 11: PROPOSED WATER AND WASTEWATER TARIFFS (BEFORE SUBSIDIES AND SOLIDARITY CHARGE)

USERS	0-20 m^3	21-40 m^3	41-100 m^3	101-130 m^3	> 130 m^3
Residential consumers					
• Fixed charge (billing charge) (JD/user/quarter)	1.90	1.90	1.90	1.90	1.90
• Water Volumetric charge (JD/ m^3)	1.07	1.07	1.07	1.07	1.07
• Wastewater Volumetric charge (JD/ m^3)	0.35	0.35	0.35	0.35	0.35
Non Residential consumers					
• Fixed charge (billing charge) (JD/user/quarter)	1.90	1.90	1.90	1.90	1.90
• Volumetric charge (JD/ m^3)	1.07	1.07	1.07	1.07	1.07
• Wastewater Volumetric charge (JD/ m^3)	0.35	0.35	0.35	0.35	0.35

The effect of the proposed new tariff without taking into account the subsidy and the solidarity charge is presented in Table 12.

Table 12: EFFECT OF NEW TARIFF ON DIFFERENT USERS

USER	Quarterly bill with proposed tariffs (w/o subsidy) (JD$/user/quarter)			Current W&WW bill per quarter JD$/user/quarter	Increase (decrease)
	Water	WW	W&WW		
Residential					
• 0 - 20	12.5	3.8	15.8	5.1	10.7
• 21 - 40	32.2	11.1	42.8	8.7	34.1
• 41 - 100	63.9	20.6	81.9	28.3	53.5
• >100	217.7	65.5	274.7	157.7	117.0
• Average	47.6	15.4	60.9	21.4	39.5
Non residential					
• 0 - 20	9.2	2.3	11.5	14.9	(3.4)
• 21 - 40	32.9	9.2	42.1	49.0	(6.9)
• 41 - 100	74.9	20.6	95.5	106.4	(10.9)
• >100	849.2	259.2	1,108.4	1,208.0	(99.6)
• Average	141.2	42.3	183.5	202.2	(18.6)
Total Miyahuna	49.3	13.8	63.1	30.1	(33.0)

Even though the volumetric tariff is uniform for all consumption and for all users, the quarterly bills for residential and non-residential users vary in each bracket as average consumption varies.

As seen from Table 12, if the solidarity charge is not factored in, most non-residential users would see a reduction in their quarterly bills. However, the consultants recommend not making a downward adjustment in real terms but rather adjusting their current rates for inflation until the reference price is reached. For instance, assuming an inflation rate of 7% per year the reference price for a non-residential user in the 0-20 m3/quarter bracket (the largest reduction in relative terms) would be reached in about 4 years.

CHAPTER 7 – RECOMMENDATIONS AND NEXT STEPS

7.1 OVERVIEW

Current charges and tariff practices (Table 8 and Annex 3) indicate that an extensive revision of the pricing system is needed, as presented in Table 13.

Table 13: CURRENT PRACTICES AND RECOMMENDED ACTIONS

Concept	Existing Limitations	Recommended actions
1. **Pricing policy**	• Not explicit	• Develop explicit policy
2. **Cost recovery**	• Neither financial nor economic costs are being recovered.	• Develop strategy to narrow price recovery gap • Develop strategy to reduce subsidies from WAJ to Miyahuna • Need for Miyahuna to accelerate rehabilitation programs
3. **Increasing block rates a/**	• Rationale for size of consumption blocks and how price increases in each block not defined.	• Move to uniform volumetric rates for all consumers
4. **Cross-subsidies**	• Based only on consumption • Beneficiaries not explicitly defined • Size (amount) of subsidy not explicitly defined • Recovery of subsidy not explicit	• Define rationale for determining subsidy and beneficiaries • Do not subsidize non-residential consumption • Define rationale for recovering subsidies
5. **Pricing of minimum consumption block (20 m3/quarter – residential & 5 m3/q non-residential)**	• Considered as a fixed charge. Unduly affects those that consume less than the minimum (Table 9)	• Abolish minimum consumption and associated fixed charge. • Charge according to consumption
6. **Fixed charges**	• Represent 18% of total billing • Lower volumetric pricing signal to consumers weakens water conservation efforts	• Limit fixed charges to reflect costs not related to consumption (e.g. billing costs)
7. **Predictability**	• Absence of comprehensive periodic reviews • No automatic adjustments	• Establish criteria for comprehensive reviews every 3 to 5 years • Consider interim automatic adjustments for inflation with desired productivity gains

a/ A discussion of why increasing block rates are not recommended is presented in Annex 7

7.2 RECOMMENDATIONS

Based on the findings of this report the consultants recommend an extensive revision of present pricing system.

RECOMMENDATION 1: DEFINING A PRICING POLICY

Adopt the pricing policy as developed by MWI (Box 3) to:

- Achieve full cost recovery (reference price);
- Reduce or abolish subsidies to utilities (bulk water supplies, electricity, operations). If some of these subsidies remain make them explicit to the utility.
- Define explicit eligibility criteria for subsidies to poor families;
- Establish the explicit recovery of the subsidies either from other users or from the government.
- Consider explicit mechanisms for periodic and comprehensive review of the reference price and interim adjustments to maintain the purchasing power.

The reference price should be fully reviewed every three to five years to reflect productivity gains and significant and justifiable costs variations (See Box 2- UK experience).

Interim adjustments should be automatically adjusted at least once a year[20] to maintain the purchasing power. Interim adjustments could be linked to the variation in the consumer price index and based on projections made by an independent agency such as the Ministry of Finance or the Central Bank.

RECOMMENDATION 2: TARIFF LEVEL AND STRUCTURE

The recommended tariff structure to final users should reconcile economic efficiency, financial viability and social objectives in particular. Therefore a revised pricing policy should consider adjusting the tariff level (reference price) and structure according to the following recommendations (based on 2008 costs):

TARIFF STRUCTURE

1. Create an explicit subsidy to benefit poor families that live in D areas (or equivalent for non-GAM residents) and eliminate subsidies to all users outside this category. The subsidy should be set at a level such that a poor family should not expend more than one percent of the poverty line income level (JD 347 per month per family) on water and wastewater services. Therefore the level of the subsidy will depend of the reference price adopted.

   Subsidies to poor residential consumers should be limited to a consumption of less than 20 m3 per quarter; all consumption beyond this limit should not be subsidized and therefore should be billed at the reference price.

   There should be flexibility in determining the right of residential users to the subsidy. This flexibility is desirable to be able to correct gross inequities that could favor non-

[20] Many countries allow monthly increases when inflation exceeds, say 10% per year.

poor residential users (as they affect Miyahuna) or exclude poor families (below the poverty line).

2. Create a "solidarity charge" to explicitly cover the subsidy to poor residential consumers. The level of this charge will depend on the reference price and the decision by the Government as to which users should pay for it.

TARIFF LEVEL

1. Based on the tariff structure defined above, the new tariff include:

    a. A fixed-charge of JD 1.90 per quarter to all users to cover costs not related to consumption (e.g. billing and collection);
    This fixed-charge replaces all existing fixed-charges (revenues from these fixed-charges have been factored in the calculation of the reference price); and

    b. A variable charge of JD 1.42 per m3 to all consumption and all users;
    The variable charge should be allocated to water and wastewater services in the proportion 75/25 reflecting current costs estimates by service; and

    c. A solidarity charge of JD 20.10 per quarter to all users than consume (excluding poor families) more than 40 m3 per quarter

RECOMMENDATION 3: REDUCTION OF SUBSIDIES TO MIYAHUNA

WAJ provides a substantial part of the bulk water and treatment of wastewater services used by Miyahuna at highly subsidized prices. Economic theory and financial viability (of WAJ) objectives prescribe that these subsidies to Miyahuna should be removed or at least reduced substantially. Only then, Miyahuna will be fully aware of the economic costs of water and thus receive a clear signal and incentive to invest, operate and maintain the infrastructure in optimal condition. In addition, WAJ will benefit from increased revenues which could be allocated to the development of additional water sources and maintenance of exiting water and wastewater infrastructure in other cities throughout the Kingdom.

Following economic costing principles a bulk water tariff of JD 0.54 (cost of Sara Mee'n) per cubic meter should be charged for all bulk supplies, irrespective of the source of the bulk water. If this adjustment is implemented WAJ would receive about JD 30 million per year (compared with total water sales of JD 79 million in 2006). Applying the same logic, it would be optimal to price wastewater treatment services to reflect, as an initial benchmark, the unit cost of treatment at As-Samra and to consider removing subsidies for electricity.

Miyahuna should pass all costs of services to the final users. However, this passing-through needs to take into account the level of NRW. Assuming that Miyahuna is able to reduce the level of NWR from the present 41 percent to about 30% in the short term (next 5 years) it would have to apply a cost multiplier of 1.43 to all costs related to production of water to compensate for these loses. The value of the multiplier is quite sensitive to the level of NRW as show in Table 14.

Table14: EFFECT OF NON REVENUE WATER ON AVERAGE PRICE TO CONSUMERS

Non Revenue Water %	Tariff multiplier
50	2.00
40	1.67
30	1.43
20	1.25
15	1.18
0	1.00

Multiplier = 1/ (1-NRW)

RECOMMENDATION 4: GRADUAL IMPLEMENTATION

This initial tariff adjustment should be implemented gradually, perhaps over a period of no more than three years and coincide, to the extent possible, with improvements in the provision of services and before the DISI water augmentation project becomes operational.

Tariff implementation should be preceded and accompanied by an extensive public campaign to educate the public about the high costs associated with the provision of potable water and wastewater collection services in an extreme arid region and the need to conserve water resources.

It is also recommended to move towards monthly billing as from a psychological point of view users will see a lower bill for services and in addition will help improve Miyahuna's cash flow[21].

7.3 IMPLEMENTATION STRATEGY AND NEXT STEPS

The tariff realignment should be accompanied by monitoring indicators and benchmarks to assess progress and the need for adjustments if needed.

Based on these recommendations the consultants have developed a pricing model (presented in Chapter 8) to facilitate future price calculations or revision to the consultant's recommendations. The consultants are also ready to work closely with WAJ and Miyahuna staff to train them in the use of the model and work with them in the implementation details and detailed simulations (dry runs) once the government makes a decision on the desired bulk price and tariff adjustments.

[21] Many studies have shown that the poor have fewer problems paying their bills when the billing period is reduced.

CHAPTER 8 – PRICING MODEL

8.1 DESCRIPTION

A pricing model has been developed to help the user design a tariff for water and wastewater services that meets the policy objectives (Chapter 2). As such, the model helps calculate:

1. The total revenue requirements needed to recover all costs to achieve financial viability over the time horizon selected (three to five years). These include:
   a. Revenues from non-tariff charges, such as connections fees, the transfer of GAM's sewerage tax, and other revenues(water sales to other governorates and interest on deposits); and
   b. Revenues from tariffs charges.
2. The reference price or revenues from tariffs charges divided by consumption at the end of the projection period.
3. All users will be charged at the reference price and for all levels of consumption; however identified poor families, would receive an explicit subsidy in the form of a fixed negative charge for consumption less than 20 m3 per quarter. Consumption by low income families higher than 20 m3 per quarter should be charged at the reference price.
4. Targeting the subsidy to low income families as identified by GAM land classification system (category D) or equivalent in non-GAM areas.
   These beneficiaries would pay a maximum bill not exceeding a predetermined percentage as defined by the user (suggested 1 %) of the poverty line (estimated as JD 347 per family per month in Amman in 2008);
5. The "solidarity charge" to explicitly recover the subsidy. This charge would be levied on non-poor residential and other users than consume more than a predetermined volume defined by the user of the model (recommended consumption over 40 m3 per quarter)
6. The implementation of new tariff over a predetermined number of year or transition period
   The user can adjust the transition period for different users
7. Cash flow projection over the implementation period to help verify that the adopted implementation strategy generates acceptable cash surpluses during this period; and
8. Financial indicators

The pricing model gives the user the flexibility to modify the basic assumptions:

1. The cost data and estimates of non-tariff revenues that define the revenue requirements and reference price;
2. The poverty line threshold or level of income
3. The maximum amount that a poor family has to pay for water and wastewater services as a percentage of the poverty line; and therefore the level of subsidy that poor families receive;
4. The number of years to reach the desired tariff level for different groups of users;

Through an iterative process the user can modify these assumptions until he/she are satisfied that the cash flow generated during the transition period is acceptable.

8.2 STRUCTURE OF THE MODEL

The tariff model consists of three sections.

- *Section 1. Data Entry:* 1) information of the utility regarding tariffs and financial data; and 2) options available to the user to apply subsidies and the gradual increase of tariffs
- *Section 2. Process Sheets*. Intermediate calculations (hidden and the user does not need to interact with them)
- *Section 3. Results.* Presents the key outputs of the model, including: revenue requirements, reference price, beneficiaries of the subsidy solidarity charge, cash flow and financial indicators.

Each of these three sections and their modules are presented and explained in Annex 6.

8.3 WORKING WITH THE MODEL

The application of the model, based on recent data (2008) for Miyahuna and the Northern Governorates gives the following results.

8.3.1 MIYAHUNA

Revenue Requirements and Reference Price

Revenue requirements and the Reference price are presented in Table 15.

Table 15: REVENUE REQUIREMENTS AND REFERENCE PRICE, MIYAHUNA

Cost Concept	2009	2010	2011
TOTAL REVENUE REQUIREMENTS		**JD (000)**	
1. OPEX	79,000	87,000	91,000
2. + Increased network maintenance	-	5,000	10,000
3. + CAPEX	10,000	28,000	30,000
4. + Transfers to WAJ	-	15,000	30,000
TOTAL	89,000	135,000	161,000
NON-TARIFF REVENUES			
5. - 3% GAM sewer tax	-12,000	-13,000	-13,000
6. - Connections fees & other revenues	-18,000	-19,000	-20,000
TARIFF REVENUE REQUIREMENTS	59,000	103,000	128,000
7. Estimated billed water use in (000)m3 per year	85,000	88,000	90,000
8. REFERENCE PRICE (line 6 divided by line 7)	JD/m3		1.42

The OPEX amounts in the above table are based on Miyahuna's 2009 budget and business plan for 2009 to 2011. The indicative amounts for 2010 and 2011 have been increased by JD 4.0 million to reflect the additional cost Miyahuna will incur when the full operation of the Zara Meen water plant is transferred from a contract operator to Miyahuna. The increase in network maintenance is a best estimate of the additional amount of money needed annually to replace old and deteriorating water and sewer mains on a fast track (within 10 years and before DISI). The CAPEX amount (line 3) is intended to provide Miyahuna with funds to finance recurring capital expenditures related to renewal and replacement of assets and main extensions within the current service area. Ultimately the CAPEX amounts can be based on a utility approach that includes depreciation[22] and financing costs factors. Experience in other countries has shown that it works best to express CAPEX requirements as a simple percentage of OPEX until such time that the utility has matured and developed an effective asset management system.

The transfers to WAJ are intended to reimburse WAJ for the real cost of bulk water delivered to Miyahuna. Therefore the Reference Price is contingent on Government's decisions on bulk water subsidies and methods used to finance major capital improvements beyond the recurring CAPEX financed by Miyahuna.

The estimated OPEX costs assume that NRW will be reduced from about 40% in 2008 to about 33% in 2011.

[22] The largest component of fixed assets (water distribution and wastewater collection systems) is not in Miyahuna's books.

Table 16: TARIFF STRUCTURE, MIYAHUNA

Parameter	Units	Value
Cost of water as percentage of water and wastewater reference price	Percentage	75
Cost of Sewerage as percentage of water and wastewater reference price	Percentage	25
Reference price –volumetric charge (applies to all consumption)	JD/m3	1.42
Fixed-charge	User/quarter	1.90
Poverty line	JD/family/month	347
o Maximum payment as % of poverty line	Percentage	1
o Maximum payment by a poor family	JD/quarter	10.41
Recovery of subsidy through "solidarity charge"		
o Applied to consumption higher than a/	m3/user/quarter	40
o Solidarity charge	JD/quarter	20.1

a/ This value can be changed

Table 17: RESULTING BILLS IN MIYAHUNA (JD PER QUARTER)

User	Consumption m3 per quarter	Bill per quarter	
		Current tariffs	Proposed tariffs
Residential	8	5.1	10.4
Residential (non-poor)	8	5.1	13.3
Non-residential	8	16.9	13.3
Residential	20	5.1	10.4
Residential (non-poor)	20	5.1	30.3
Non-residential	20	35.7	30.3
Residential	45	16.0	46.0
Residential (non-poor)	45	16.0	86.0 a/
Non-residential	45	75.7	86.0 a/

a/ Solidarity charge applies for consumption over 40 m3 per quarter

Table 18: CASH FLOW 2009-2012

CASH FLOW	JD (million) Base year	Four years Projection (JD million)			
	2008	2009	2010	2011	2012
Billed Revenue from tariffs water and wastewater	50.0	51.0	115.0	123.7	127.6
Other revenues	26.5	30.1	32.9	33.0	33.0
Total Revenues	76.5	81.1	147.9	156.7	160.6
Oprating expenses	66.4	78.0	92.0	91.0	91.0
Improving in maintenance	-	-	-	10.0	10.0
Total OPEX and maintenance	66.4	78.0	92.0	101.0	101.0
Net Income	10.2	3.1	55.9	55.7	59.6
Bulk water and investment paid by WAJ	-	-	15.0	30.0	30.0
CAPEX net of grants (pay as you go)	24.8	10.0	28.0	30.0	30.0
Net Cashflow before financing	(14.6)	(6.9)	12.9	(4.3)	(0.4)
Required debt financing		18.7	-	-	-
Net Cashflow after financing	(14.6)	11.8	12.9	(4.3)	(0.4)
Cash at the beginning of the period	15.8	1.2	13.0	25.9	21.6
Cash at the end of the period	1.2	13.0	25.9	21.6	21.2

Table 19: FINANCIAL INDICATORS

FINANCIAL INDICATORS	2008	2009	2010	2011	2012
Average water and wastewater tariff (JD/m3)	0.66	0.66	1.35	1.41	1.42
Operating ratio	0.87	0.96	0.62	0.64	0.63
Net Margin	13%	4%	38%	36%	37%
Composition of Revenues:					
Revenues from tariffs	65%	63%	78%	79%	79%
Revenues from other sources (property tax, connection fees, etc)	35%	37%	22%	21%	21%
Composition of Operating expenses:					
Electricity	38%	34%	31%	29%	29%
Wages and Salaries	14%	16%	15%	14%	14%
Wastewater treatment	16%	13%	17%	15%	15%
Water network and improved maintenance	11%	15%	19%	23%	23%
Purchased water with current tariffs	5%	4%	4%	4%	4%
Others	17%	17%	15%	15%	15%
	100%	100%	100%	100%	100%
Number of Users	424,157				
Volume of water billed:					
Direct Users	75,350	77,261	85,000	88,000	90,000
Governorates and others					

8.3.2 NORTHERN GOVERNORATES

Table 20: REVENUE REQUIREMENTS AND REFERENCE PRICE

Cost Concept a /	2007	2008
TOTAL REVENUE REQUIREMENTS	**JD (000)**	
1. OPEX	19,700	21,400
2. + Increased network maintenance (transfer to WAJ)	0	5,000
3. + CAPEX	0	0
NON TARIFF REVENUES		
4. – 3% sewerage tax	0	0
5. – Connection fees & other revenues	-3,600	-3,000
TARIFF REVENUE REQUIREMENTS	16,100	23,400
6. Estimated billed water use in mm3	34,600	39,100
7 **REFERENCE PRICE** (line 6 divided by line 7)	JD/M3	0.60

The reference price for Miyahuna and Northern Governorates are not readily comparable due to:

- Differences in service standards between the two organizations.
- Ground water is the primary water source in the NGWA service area while Miyahuna relays on a combination of ground water and more expensive surface water sources. Thus no additional transfers from the Northern Governorates to WAJ are included to reflect the real cost of bulk water as done in the calculation for Miyahuna.
- No CAPEX amounts for the Northern Governorates have been included because these costs are currently being financed through rehabilitation and repair program co-financed by KfW and WAJ.
  It is estimated that over 4,000 km of water and sewer main need to be replaced in NGWA's service area. Assuming the replacements occur over a twenty year period the annual replacement cost would approximate JD 5 million. Since this type of program would most likely be financed and managed by WAJ the JD 5 million has been shown as a transfer to WAJ (line 2 in the above table).
- Unlike Miyahuna, NGWA does not receive any sewerage tax revenues.

Information needed to calculate the tariff structure and the implementation period was not available and therefore this information as well as cash flow and financial indicators is not included.

ANNEX 1 - ECONOMIC PRICING AND COSTS

ECONOMIC PRICING OF SERVICES

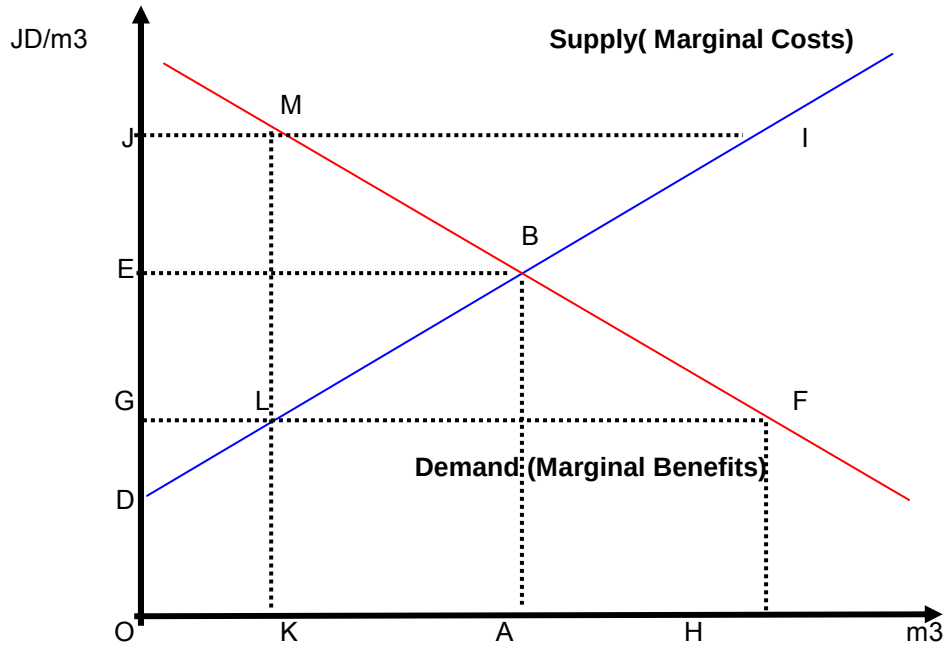
Economics and finance are disciplines that are frequently confused because they both attempt to measure benefits and costs and because they use money as the measurement of the value. Yet their respective objectives are fundamentally different. Economics aims at maximizing the welfare of an entire nation, or even of mankind by using scarce resources in the optimal way. In contrast, finance aims at optimizing the value of firms.

In the context of pricing of water both economics and finance prescribe that the producer should charge for the services or providing potable water and for collecting, treating and safely dispose of the wastewater. However, the perspective of the two disciplines is different. Economic pricing analysis looks to the future value of resources (including water itself) that are necessary to provide the services. Financial pricing is more concerned with the meeting of financial commitments that the utility may have taken, such as servicing debt, paying takes and dividends and to pay for the operations and investment necessary to provide water and wastewater services. To the extent that such financial costs

Refer to future use of scarce resources they are also economic costs. However, if they are merely arbitrary or negotiated such as interest or maturity of financing of past investments, they are only financial and not economic.

Economic pricing is then about what price to charge for water and wastewater services which is important since it will have a bearing on how much water consumers will demand and the utilities will provide. Given its focus on looking ahead economics attempt to anticipate the cost of services in future years. For instance, if it is anticipated that energy will become scarcer in the coming years economics will prescribe signaling to present consumers such prices to enable them to reduce wastage and invest in energy efficient technologies. By the same token, if it is anticipated that water will become scarcer in the future, economic pricing will recommend the expected higher prices to be charge ahead of the actual event to encourage consumers to cut down on wastage, to reduce leakage, and to invest in water-efficient technologies.

It is a fact that water resources in Jordan are becoming scarcer in relation to the size of the population and the economic activities. Utilities that in the past could satisfy the demand of its service area from the production of near by wells find that these will have to be supplemented by even more expensive supplies that are located further away (such as the DISI conveyor), or use more expensive technologies (such as the desalination plant in Zara Mee'n). As demand grows, the cost of each successive water source grows ever more expensive per cubic meter. The inexorable rise in unit costs of supply is illustrated in the graph below.



The supply line is sloping upward and illustrates the fact that unit production costs are increasing steadily over time as production needs to grow to meet the growing demand for water from the population and from many economic activities. In Jordan there is ample proof that water costs have steadily increased over time (see below). For instance, the economic cost of water from the Lajjoun supply scheme has been estimated at JD 0.28 per cubic meter (at the delivery point in Amman), that for Zara Mee'n desalination plant at JD 0.53 per cubic meter, while the bulk water from DISI is estimated to costs at least JD 0.90 per cubic meter.

Economic pricing principles will recommend that the economic price should steadily increase year by year in line with the rising supply costs of additional (marginal) water to give consumers time to adapt their consumption habits and technologies to such higher prices. If not consumers may find themselves in the difficult situation of finding themselves with insufficient water to satisfy heir inefficient consumption habits.

Economics will also indicate what the likely level of consumption and production will be at the tariff charged. In order to understand the optimal consumption and production level the behavior of consumers must be considered. Such behavior is illustrated by the downward-slopping demand curve. This curve shows what consumers are willing to pay for each additional (marginal) cubic meter of water. When they are completely deprived of water their survival is threatened and they are willing to pay a very high price for water measured by the distance OA. As consumers are offered ever more water they will satisfy their demand such as food preparation, hygiene and comfort, all of which may be important but not as vital as the first cubic meters of water. At one level of water supply offered more water offered may become a nuisance and consumers will assign no value to it.

The optimal level of water production and consumption levels should be OA cubic meters. The level is given by the intersection of the demand and supply curves. At the point of intersection the benefit of the last (marginal) water consumed is precisely equal to the costs of pricing (and supplying) that marginal cost of water. Economic pricing

principles will not explicitly prescribe this level in advance but will let customers show their demanded level of consumption when the last cubic meter of water demanded equals the costs of production.

In summary then, optimal consumption and production are determined by calculating the future costs of water supply and wastewater services and then signaling such costs through the tariff charged. A necessary condition for the optimum results is that consumption is reliably metered.

The most advance countries in pricing water and wastewater services (such as Chile and Colombia) will estimate future costs of services through calculating the Average Incremental Cost (AIC) of supply. The AIC is the ration of the discounted future incremental costs of water divided by the discounted future incremental quantities of water supplied. Both incremental costs and water quantities are discounted since future economic resources are worth less than the same amount at the present time. The discount rate is chosen to be the opportunity costs of capital, usually set at 10% in constant prices (where inflation changes have been eliminated).

ECONOMIC COSTS

BULK WATER SUPPLY COSTS[23]

The economic and financial costs of the different schemes are detailed in Table A.1 below. The economic costs are the original costs of each scheme, where the total capital investment costs (CAPEX) have then been annuitized.

[23] Extracted and updated from Feasibility Report, January 2006

Table A1: BULK WATER SUPPLY SCHEMES FOR AMMAN AND COSTS

Supply Scheme	Capacity m3/year	Economic costs of bulk supply				Financial Costs to Miyahuna JD/m3		
		CAPEX JD m	Annuitized CAPEX, JD/m3	OPEX. JD/m3	Total JD/m3	E.F.	OPEX	Total
Zai-KAC	55	60	0.130	0.200	0.330	0.055	0.230	0.285
Khaw	16	NA	0.170	0.110	0.280			0.138
Lajjoun	13	18.5	0.170	0.110	0.280			0.110
Walla	7	NA	0.170	0.110	0.280			0.110
Own wells	36	NA	0.170	0.140	0.310			0.140
Sub-total present sources	127				0.310			0.198
Zara Mee'n	47	121	0.302	0.233	0.535	Miyahuna pays for electricity;		
Disi	~100	NA	NA	NA	0.90			

Source: WAJ
NA Not available; E.F. Extraction Fee, CAPEX=Capital Investment Expenditure
OPEX=Operations and Maintenance Expenditure in JD millions

The economic costs represent the total cost to the economy of Jordan, at the time of the investment, or at a future date when the installations will have to be replaced due to wear and tear. The financial costs are those that LEMA (Miyahuna) has actually has been paying WAJ for bulk water delivered at the agreed supply points.

With the entry of the Zara Mee'n scheme costs will escalate rapidly from the historical average economic cost of JD 0.310/m3 to around JD 0.540/m3. Economic supply costs will spike again when the Disi scheme enters, possibly in 2012.

Costs Of Water Distribution And Wastewater Collection Services

The associated distribution, storage and pumping as well as wastewater collection costs are uncertain since a reliable long term expansion master plan for both services is not available. They are estimated at about JD 0.63 per cubic meter for water distribution and JD 0.21 per cubic meter for wastewater collection, based on similar experiences in other cities similar to Amman.

The cost to address the maintenance backlog over the medium term, say 10 years, are also significant since maintenance of the present infrastructure has been deferred for a long time. These costs have been estimated as follows:

- Water distribution. Assuming that 10 % of the galvanized pipes should be replaced per year (160 kms), the total cost of these replacements is about JD 8 million per year.
- Wastewater collection. On the basis of a notional rehabilitation cost of JD 0.2 per km and the rehabilitation of 20 kms per year (about 1% of the system), the cost would be about JD 4 million per year.

COST OF WASTEWATER TREATMENT AND FINAL DISPOSAL

In addition to the costs of bulk water and of water distribution and wastewater collection the costs of wastewater treatment and final disposal should be charged to those retail users who are connected to the sewerage system and where the wastewater is then treated. The wastewater treatment economic costs can be estimated based on the costs of the As-Samra wastewater treatment plant completed under a BOT contract. The total As-Samra CAPEX quoted by the BOT-operator is US$ 170 million for a flow of 267,000 m3 per day. Applying the same capital recovery factor of 0.117 the resulting economic cost of wastewater treatment can be estimated at JD 0.14/m3[24]. In addition to the annuitized CAPEX operating and maintenance costs of JD 0.05 per cubic meter and energy costs should be added resulting in an economic cost of treating wastewater in As-Samra of about JD 0.0.27 per cubic meter.

In practice the costs will be higher per m3 because the As Samra plant will possibly not be treating water at full capacity throughout the year because some 20% of potential users do not have access to wastewater collection services. An allowance should also be made for water infiltrating into the wastewater collection system during the rainy season due to cross-connections where rainwater is drained through the sanitary sewerage system, but lack of information does not allow us to make an estimate.

[24] The financial cost to Miyahuna is lower because the CAPEX of US$ 170 million has been partially funded with a grant of US$ 14 million from the MWI and a USAID grant of US$ 78 million.

ANNEX 2 – TARIFF STRUCTURE ALTERNATIVES

TARIFF RATES

The application of the pricing objectives in terms of pricing levels and structures worldwide shows a wide range of alternatives. The differences reflect not only the particular situation of services in a given city but also social concerns and compromises reached by policy makers to pricing reconcile these objectives. Pricing practices and experiences from other countries might not necessarily be transferable to Amman; however, the concepts that stem from them, if properly adapted, can be useful and relevant.

A tariff system contains several elements which determine a customer's total water and wastewater bill. These charges are therefore a combination of some or all of the following elements:

- *Connection and developers charges*; Normally an upfront payment to access the system. Economic efficiency criterion suggests that this charge should not be used to recover development costs as they are affected, in the long-run, by average and peak demand and captured in the marginal price (AIC).

  However, large urban developments can strain, at least in the short term, parts of the distribution and collections systems that can affect the quality of service to other users. In such cases, many utilities impose special connection charges to developers to offset associated costs.

  Many utilities offer financing of connection charges and some dispense all together with this charge as the cost of the connection is internalized in volumetric rate.

- *Volumetric charges;* The volume consumed times the volumetric rate. Economic and environmental efficiency both suggest that the volumetric charge should recover all costs (marginal costs) which vary with average or peak demand.

  Sewage volumetric charges are often levied on large industrial users to reflect the costs imposed on wastewater treatment systems by the characteristics of the sewage discharges (e.g. BOD –Biochemical Oxygen Demand and SS -Suspended Solids-).

- *Fixed charges;* Also known as standing charges or flat fees. In a metered environment as in Miyahuna and on efficiency criterion grounds, this charge should recover only the costs not directly linked to the volume of water used (for instance, meter reading, billing and collection costs).

  Fixed charges, when significant in comparison to volumetric charges, tend to weaken the price signal to promote conservation.

- *Access charges;* Many utilities, particularly in the USA impose special charges to developers to coverall or part of investments related to capacity. In this case, such costs are not included in the calculation of the variable charges.

  This practice weakens the price signal to consumers and hence water conservation efforts.

Another form of access charges is the one imposed on customers that do not consume water over a given billing period(s). This concern is of particular importance in tourism/resort areas where the floating population often exceeds the permanent one by an order of magnitude or more, but nonetheless expect full service at a moments notice. In response to the needs of this floating population, the utility needs to develop a larger capacity. Therefore, on fairness grounds this access charge could be justified.

- *Minimum charge;* Often associated with a minimum volume of consumption to be paid for each billing period. This charge penalizes users that consume less than the minimum and does not promote water conservation (this is the case in Miyahuna for residential users consuming less than 20 m3 per quarter).
- *Taxes;* Central and local government often allocate taxes to enhance the financial viability of the utility or to finance specific service components:
  - Earmarked to promote the development of a service (this is the case of the 3% municipal sewerage tax levied in Amman).
  - A discretionary portion of general revenues to provide supplemental financing of services (in Ireland, for instance, since 1997 all domestic charges have been consolidated into general taxation).
  - Governments often also add taxes and levies to consumption (e.g. value added tax, in Austria, France, Norway; abstraction charges, in France and Germany to help fund, among others, river basin authorities or services in rural areas)

The combination of all or some of these charges or pricing elements constitutes the tariff schedule, which defines the allocation of costs to different consumers. Ideally, the tariff structure should be formulated to enhance the pricing objectives defined by the policymakers.

TARIFF STRUCTURES

The application of volumetric, fixed charges and taxes translates into different tariff structures. Among the most often used:

- *Uniform volumetric rate;* Often reflecting the marginal cost of services and applied to all users and to all levels of consumption.
- *Block charges;* Defined by lower and upper volumes of consumption and different volumetric charges attached to each block for different type of users (residential, non residential). If rates rise or fall consistently as more water is consumed, the schedule is referred as increasing or decreasing block rates.
- *Increasing block rates*[25]*;* their primary objective is to reduce water consumption, particularly from large-volume customers. For this reason is often characterized as a "conservation" rate. Increasing block structures (existing practice in Miyahuna) are found in many countries (e.g. Belgium, Spain, Sweden) but countries such as France and the United Kingdom have banned their use. However, from an economic efficiency point of view the conservation argument is debatable[26]; in addition, there

[25] Olmstead, Sheila M. & Robert N. Stavins. "Managing Water Demand. Price vs. Non-Price Conservation Programs". A pioneer Institute White Paper No. 39. July 2007

[26] Rates higher or lower than marginal cost create welfare losses (Boland, cited).

are non-transparent subsidies to users with lower consumption as they are charged less. Increasing block structures may also affect income stability for the utility depending on the price elasticity[27] of large users, which could lead to eventual higher rate increases.

An inherent weakness of increasing and decreasing block rates is that there is no accepted methodology to help define either the size of the different consumption blocks or the change in price for the different blocks. In practice both parameters (block size and price differential) are arbitrary and therefore fall short on transparency grounds.

- *Decreasing block rates;* this practice stems from a purely financial approach to reflect possible lower costs associated with large consumption volumes, particularly by industry.

  Decreasing block structures are still used by many utilities, particularly in the United States, but their popularity is declining as they go contrary to water conservation and economic objectives and because the implicit cross-subsidies can be regressive.

- *Life line tariff;* Designed to provide basic services below cost to poor residential customers, who otherwise would find it difficult to afford these services.

  Many practitioners question the effectiveness of the life line block structure and point out that this objective can be better achieved by direct payments (subsidies) from the government to these beneficiaries. For this reason, many countries, such as France, England and Chile have abolished this practice.

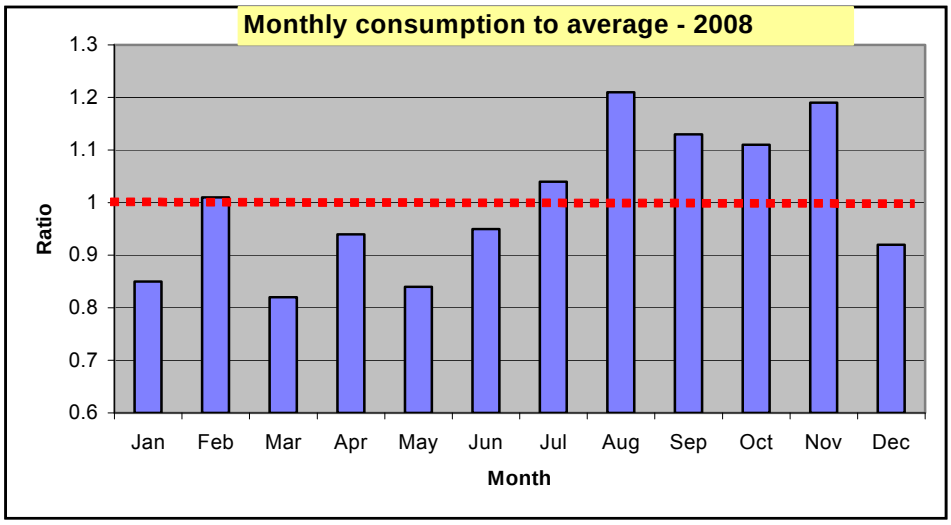
  In a variation of the life line block, some utilities, provide free of charge, a minimum consumption allowance to satisfy basic needs (e.g. Belgium, were 15 m3/year per capita [~ 40 liters/capita per day] are provided free of charge to each household)

- *Seasonal rates;* Water demand, particularly for households and some industries, exhibits seasonal variations. Non-climatic and consumer habits also affect peak demand over short time periods.

  Utilities face large costs if supply systems need to be constructed, maintained and operated at a scale which can satisfy whatever peak flows may ultimately be demanded[28]. Therefore, the primary objective of seasonal rates is to reduce demand during peak hours or season when water availability is critical. The use of seasonal and hourly pricing in electricity is well practiced in many countries, including Jordan, and well documented in the literature. Countries such as Chile have introduced seasonal water rates and others like France, seasonal extraction fees. On the other hand, some utilities encourage large industrial consumers to draw water at times other than peak demand. However, the effectiveness of seasonal water rates has not been fully documented and in the case of Amman, consumption patterns do not show significant seasonal variations as shown in the next graph and in addition, quarterly billing would weaken the effect of a seasonal rate.

[27] Price elasticity = relative change in consumption due to a relative change in price.
[28] OECD (cited)

AMMAN MONTHLY WATER CONSUMPTION



- *Subsidies;* In most cases, the utility and policy makers do no know or make explicit the magnitude of the subsidy and its recipients and how to recover this subsidy. Nonetheless, the need remains to develop a robust mechanism to close the financial gap created by the subsidy.

The effect of different pricing systems on the pricing goals is shown in Table below:

Table A2: TARIFF STRUCTURES AND PRICING GOALS

Tariff structure		Pricing goals				
		Economic	***Financial***	***Social***	***Transparency***	***Simplicity***
Non-metered charges	Taxes	**No**	**Yes**	**U** a/	**No**	**U** b/
	Flat charge	**No**	**Yes**	**U**	**No**	**Yes**
Metered charges	Uniform rate	**Yes**	**Yes**	**U** c/	**Yes**	**Yes**
	Increasing rates	**No**	**U** d/	**U** c/	**No**	**No**
	Marginal pricing	**Yes** c/	**U** f/	**U** c/	**Yes**	**Yes**

U – Outcome uncertain
a/. Difficult to assess, depends on how taxes are levied.
b/. Tax system might be complex to administer
c/. Price might not be affordable by the poor
d/. High prices to industrial and commercial users may create price instability
f/. If marginal cost is below average cost, utility will not recover its financial costs

ANNEX 3 - CURRENT TARIFF RATES AND FEES, MIYAHUNA

(As of December 31, 2008)

Consumption per Quarter (m3)	Water charges	Sewerage charges	Meter fees	Extra fees
Residential				
0 - 20	2	0.67	0.3	2.15
21 - 40	(0.14xVol)-0.8	(0.0448xVol)-0.224	0.3	4.15
41 - 130	(.006556xVol^2)-(.12224xVol)	(.003236xVol^2)-(0.084627xVol)	0.3	5.15
131and above	(0.85xVol)	(0.392xVol)	0.3	5.15
Non-Residential				
0 - 5	5	2.8	0.3	4.15
20- 40	1.0xVol	0.56xVol	0.3	4.15
41 and above	1.0xVol	0.56xVol	0.3	5.15

Notes: Vol= Consumption
Extra fees: Electricity surcharges
Source: Miyahuna

OTHER CHARGES

Contribution to water network cost	Area of premise	Contribution
Non-domestic	greater than 100m2	275
Non-domestic	less than 100 m2	150
Domestic	less than 150 m2	180
Domestic	more than 150 m2	1JD/m2

Source: WAJ

MIYAHUNA 2008 Billing Information									
Consumption Bracket	Customers [1]	Consumption (m3)		Charges and Billing (JD)					Total Billing (JD)
		Water	WW	Water				Sewerage	
Residential				Variable	Meters	Other fixed	Total W	Variable	
0 - 20	119,115	4,884,791	4,577,310	946,691	142,937	1,024,385	2,114,012	270,104	2,384,116
21- 40	126,691	15,349,633	14,246,017	1,734,366	152,029	2,103,071	3,989,465	471,806	4,461,272
41-100	138,796	33,345,252	29,019,163	9,867,377	166,555	2,859,192	12,893,124	3,049,233	15,942,357
101 - 150	13,357	6,342,329	4,817,370	4,307,366	16,029	275,159	4,598,554	1,330,867	5,929,422
> 150	5,756	6,891,922	5,561,756	5,864,717	6,905	118,568	5,990,191	2,022,607	8,012,798
Sub total	403,714	66,813,927	58,221,616	22,720,517	484,455	6,380,376	29,585,347	7,144,617	36,729,964
Cancelled bills[2]		-2,141,664	-1,977,789	-1,511,551	-8,728		-1,520,278	-602,315	-2,122,593
Net Residential		64,672,263	56,243,827	21,208,966	475,727	6,380,376	28,065,069	6,542,302	34,607,371
Non Residential									
0-20	12,334	331,293	308,329	397,884	14,795	204,740	617,419	203,010	820,429
21- 40	3,067	359,099	318,534	353,424	3,680	63,185	420,290	167,441	587,731
41- 100	3,253	835,532	707,161	826,163	3,901	67,002	897,066	374,027	1,271,093
101 - 150	1,032	506,834	411,917	504,948	1,235	21,259	527,442	219,150	746,592
> 150	2,362	9,041,986	8,328,116	8,935,317	2,603	48,647	8,986,567	3,550,616	12,537,183
Sub total	22,047	11,074,744	10,074,057	11,017,736	26,214	404,833	11,448,783	4,514,244	15,963,027
Cancelled bills[2]		-397,366	-335,401	-401,126	-1,266		-402,392	-142,322	-544,714
Net Non Residential		10,677,378	9,738,656	10,616,609	24,949	404,833	11,046,391	4,371,922	15,418,313
Total	425,761	75,349,641	65,982,483	31,825,575	500,676	6,785,209	39,111,460	10,914,224	50,025,684

Notes

[1] Active customers: total distributed bills divided by 4 quarters.

[2] Cancelled bills include errors and omissions.

ANNEX 4 – FINANCIAL COSTS MIYAHUNA (2008-2012)

REVENUE REQUIREMENTS AND REFERENCE PRICE CALCULATIONS

CONCEPT	2008	2012
	(000) JD	
1. Operating expenses (OPEX)	66,355	91,000
2. CAPEX, net of grants	24,767	30,000
3. Increase in capital maintenance	0	10,000
4. Water connection fees	-4,872	-6,500
4. Sewer connection fees	-7,309	-7,500
5. 3% sewer tax	-9,331	-13,000
6. Sales to other governorates	-2,625	-2,798
7. Other revenues	-2,357	-3,202
8. Utility revenue requirements	64,628	98,000
9. Transfers to WAJ:	0	30,000
10. Total revenue requirements	64,628	128,000
11. Billed water use in MM3	75,350	90,000
12. Volumetric Reference price (11/12)		1.42
13. Reference price of Billing per connection (OPEX 6/# customers/4)	1.90	1.90
Average tariff	0.66	1.42

Source; Miyahuna Annual Report 2008 and Miyahuna Business Plan

Allocation of costs between water and waste water is about 75/25 and this ratio is proposed to be reflected in the tariff structure.

MIYAHUNA PROJECTED CASH FLOWS- 2009 -2012

Cash Flow (thousand JD)	Base year	Projection	Projection	Projection	Projection
Revenues:	**2008**	**2009**	**2010**	**2011**	**2012**
Average water and WW tariff (JD/m3)	0.66	0.66	1.35	1.41	1.42
Water & sewer billings	50,026	51,043	114,610	123,824	127,676
GAM 3% sewerage participation	9,331	12,000	13,000	13,000	13,000
Water connection fees	4,872	6,500	6,500	6,500	6,500
Sewer connection fees	7,309	7,500	7,500	7,500	7,500
Other revenues	4,982	4,099	5,905	6,000	6,000
Total revenues	76,520	81,142	147,515	156,824	160,676
Expenses:					
Electricity	25,527	26,400	28,260	29,673	29,673
Salaries and benefits	9,029	12,778	13,417	14,088	14,088
Water network	7,163	11,985	12,584	13,213	13,213
Purchased water	3,106	3,335	3,502	3,677	3,677
Wastewater treatment	10,536	10,040	15,542	15,069	15,069
Increase in capital maintenance	0	0	5,000	10,000	10,000
Others	10,994	13,495	13,695	15,280	15,280
Total Expenses	66,355	78,033	92,000	101,000	101,000
Operating Income:	***10,165***	***3,109***	***55,515***	***55,824***	***59,676***
Net Income before interest and taxes	10,165	3,109	55,515	55,824	59,676
Net income before income tax	10,165	3,109	55,515	55,824	59,676
Income tax	0	0	0	0	0
Net income	***10,165***	***3,109***	***55,515***	***55,824***	***59,676***
Bulk water subsidy & investment made by WAJ	0	0	15,000	30,000	30,000
CAPEX net of grants	24,767	10,000	28,000	30,000	30,000
Cash flow before financing	***-14,602***	***-6,891***	***12,882***	***-4,301***	***-425***
Anticipated debt financing		***18,699***	***0***	***0***	***0***
Cash flow after financing	***-14,602***	***11,808***	***12,882***	***-4,301***	***-425***
Cash at beginning of the year	15,800	1,198	13,006	25,888	21,587
Cash at end of the year	***1,198***	***13,006***	***25,888***	***21,587***	***21,162***

Note: Based on Miyahuna's 2009-2012 Business Plan and discussions with Miyahuna staff.

ANNEX 5A – LAND CLASSIFICATION IN AMMAN AND ITS APPLICATION FOR TAX PROPERTY PURPOSES

BACKGROUND

The Ministry of Finance, through its Department of Land and Taxation, assess a property tax based on the annual rental value of the property. The rental value is based on location and physical characteristics of the property, such as, construction materials and available amenities such as air conditioning or central heating.

The Greater Amman Municipality (GAM) through the Department of Assessment & Building Land Tax Department follows the guidelines established by National Government to apply property taxes on all properties located at Great Amman and Amman Governorate. The guidelines were set in 1954 by the Tax Law of Building and Lands in the municipalities (No 11/54).

The procedure for classification is as follows:

1. Municipalities are divided in four categories: first, second, third, and forth. The Law defines the categories in each municipality; for Greater Amman, municipalities are in the first and second categories;
2. Buildings in each municipality are divided according to their use: residential, commercial e industrial;
3. Residential neighborhoods in each municipality are classified in four classes: A, B, C, and D. Category D groups the poorest neighborhoods and accounts for 28% of total residential properties (21% of total properties).
4. Criteria for this classification are defined by a permanent committee headed by the appraisal's investigator of the governorate and two members appointed by the Ministry of Finance.
    - In turn, each neighborhood is divided in four classes: excellent, first, second, and third, based on construction materials and availability of air conditioning and central heating. For instance, *excellent class* corresponds to the highest level and uses stone or marble as a construction materials, and air conditioning and central heating; second class: has cement or brick as construction materials, and all the other materials used are of good quality, it also has central heating.
    - Residential buildings are classified according to their type (villa or luxurious residences, floor, apartments);
5. The committee assigns a rental price per square meter per year for each property based on the above, municipal, neighborhood and residential criteria. Then the annual rental value for the properties is calculated based on the area of the property. The appraisal committee has the authority to reassess the rental price of a property at any time, and can ask for certification of any information. Summary of the current values per square meter for municipalities at Greater Amman are presented in Attachment 1.
6. The property tax is charged annually to all properties and it is calculated as a percentage of the annual rental value of the property, which is estimated as follows:
    - For empty lots: the market sale price of the property times 2%;
    - For buildings: the area of the property times the rental value per square meter, based on the neighborhood, type of building, and materials of construction.
    - If the property is for rent, and it is non-furnished, the annual rental value is reduced by 10%

GAM CLASSIFICATION OF RESIDENTIAL BUILDINGS

1. The practice of classifying properties according to their construction materials and location is a good proxy for family income (wealth). Moreover:
   - The classification is transparent and follows straightforward criteria that limit subjectivity. It is based on a very comprehensive geo-referenced data.
   - Starting in 2009, the committees will have modern handheld computers (PDA - Personal Digital Assistant), equipped with GPS (Global Position System) and GPRS (General Packet Radio Service) connected to an Oracle ERP (Enterprise Resource Planning) system. This will ensure updated detailed information for each house to assess any possible changes in use or upgrades. Additionally, the GPS analysis will be able to detect any changes by comparison of current images with last year's. According to GAM, a 60% increase in collected revenue from property tax is expected when this system is in place.
   - An up to date GAM system facilitates updating the allocation of a subsidy.
2. Out of the 456,000 properties assessed by GAM every year about 1% files a complain and request a reassessment. The process resolution process is at two levels: (i) the committee reviews with the owner the property and if agreed with changes, the case is closed; and (ii) if non agreement is reached, a higher committee decides on the final assessment which can not be contested. Only 0.06% of cases reach to this level.
3. The geo-reference data of all properties in Greater Amman can be shared by Greater Amman Municipality (GAM) and Miyahuna. This is a great advantage for using GAM information to define and update the subsidy for water and wastewater services. Both entities have an interest in keeping an updated database especially once the new technology is fully implemented and complemented with digital surveys Miyahuna has started implementing in the South of Amman and in one of the Distribution Zones in Amman.
4. Attachment 2 shows the areas of coverage for both GAM and Miyahuna. The two do not totally coincide as according to information provided by GAM, total properties assessed are about 456,000 while Miyahuna's customers are about 430,000.

	GAM information			Miyahuna
	No of Buildings	%	No of household units*	No of customers 2007
Residential				
Class A	22,814	12	53,157	n.a.
Class B	39,106	26	91,117	n.a.
Class C	44,781	23	104,340	n.a.
Class D	41,267	21	96,152	n.a.
Sub Total	147,968		344,765	373,508
Non-Residential				
Commercial	18,837	10	43,890	
Industrial	9,580	5	22,321	
Gov housing	5575	3	12,990	
Miscellaneous	12,489	6	29,099	
Sub Total	12,489		108,301	20,442
Total	194,449		453,066	393,950

* For estimating the number of household units information from 1994 Census was used; on average in Amman there are 2.33 household units per building.

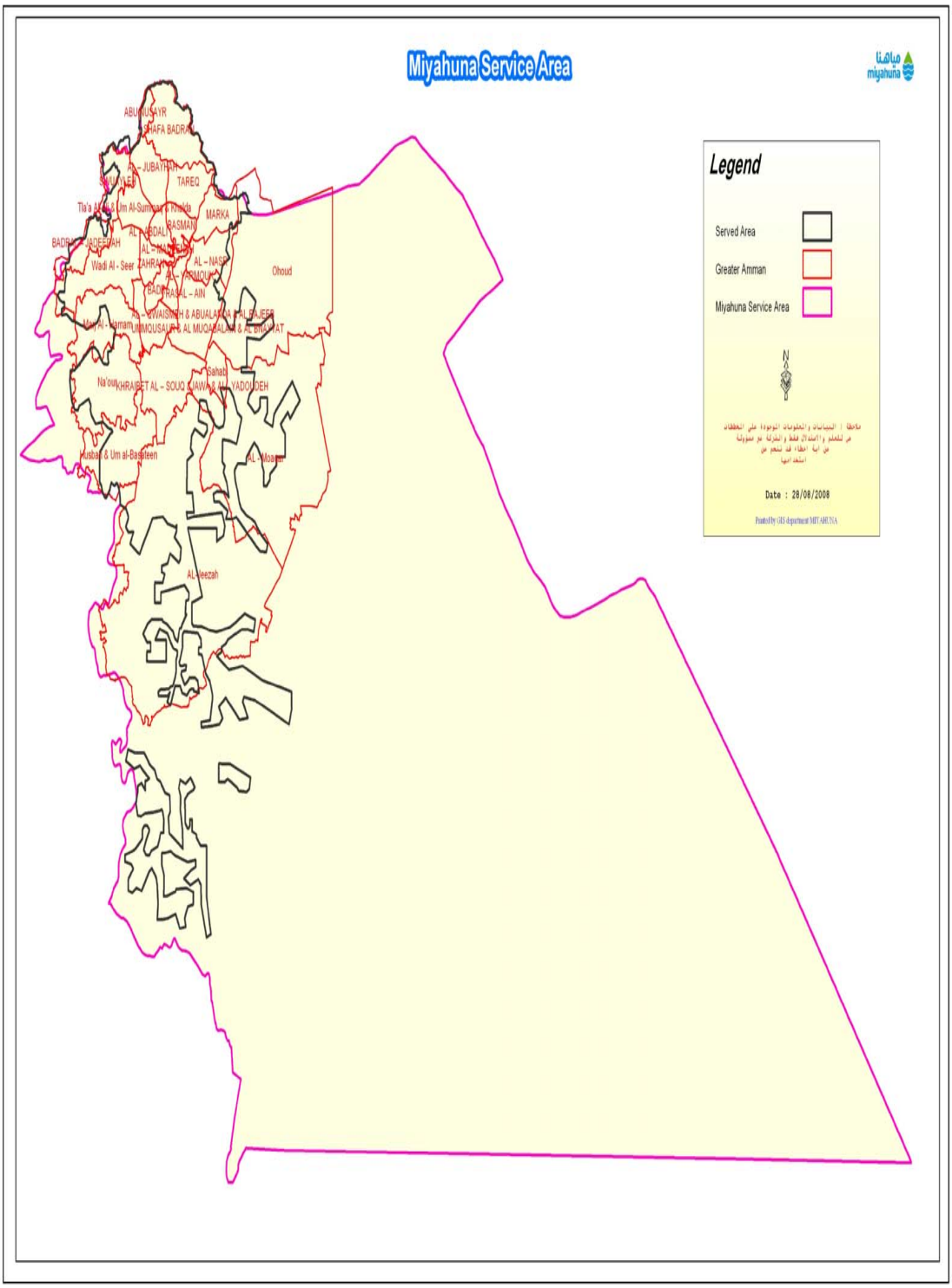
5. Therefore it is very important that Miyahuna works closely with GAM to determine residential properties by type of neighborhood (A, B, C, D) with Miyahuna residential customers for the same neighborhoods.

6. The current GAM classification, however, is complex as there are a total of 96 categories which poses a challenge to use GAM land classification as a proxy for family income. Therefore the Consultants recommend:
    - To simplify the system for determining residences to eligible for a subsidy;
    - To maintain some flexibility in the classification to correct obvious inequities in the classification such removing non-poor families benefiting from the subsidy or incorporating poor families not benefiting from the subsidy.

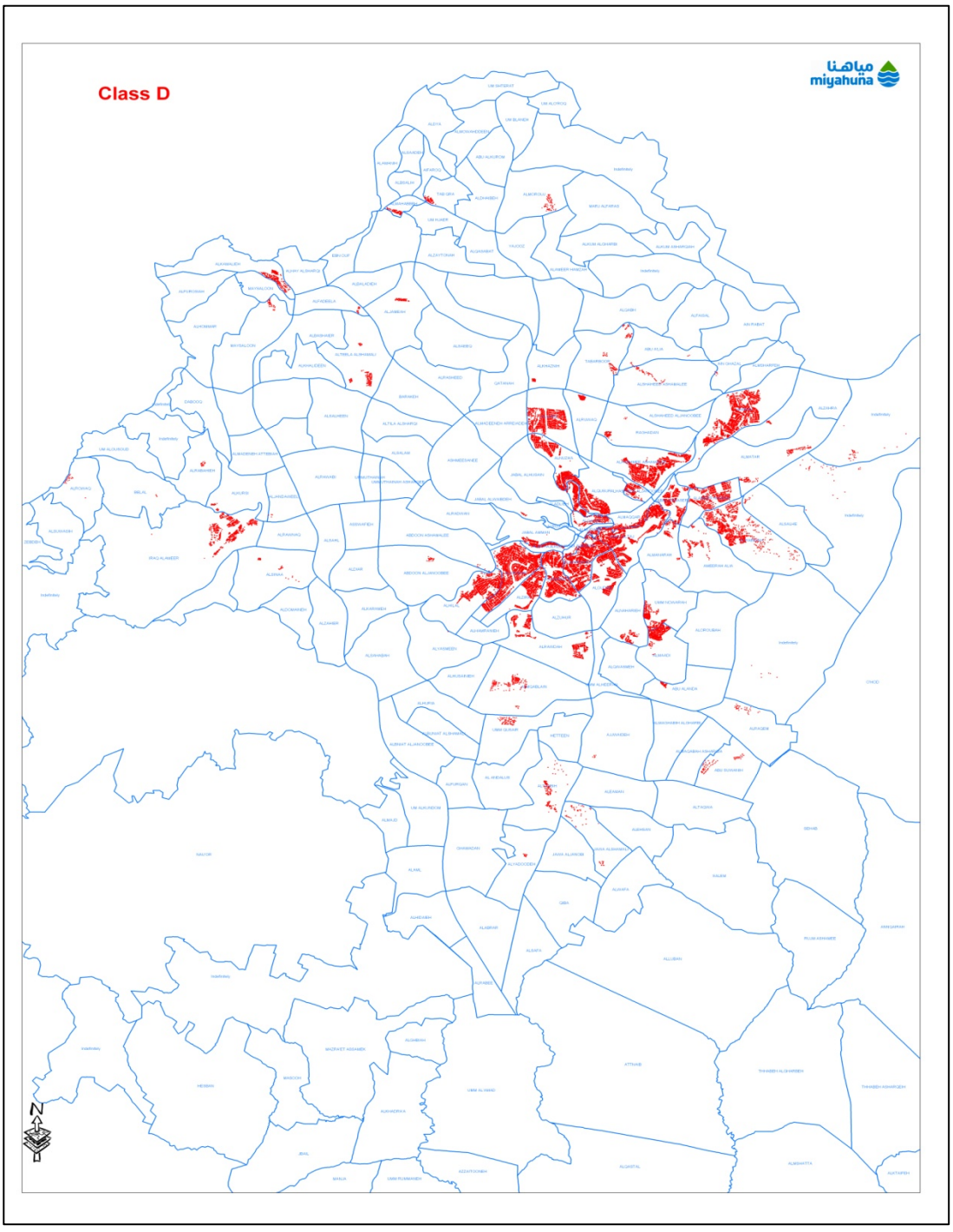
Rental value per m2 according to neighborhood and type of building (2008)

Neighborhoods inside municipality	Classes into the neighborhood	Type of building	First class municipalities Rental value (JD/m^2)	Second class municipalities Rental value (JD/m^2)
Neighborhood A	Excellent Class	Villa	9	6
		Floor	8	5
		Apartment	7	4
	First class	Villa	8	5
		Floor	7	4
		Apartment	6	3
	Second class	Villa	7	4
		Floor	6	3
		Apartment	5	2
	Third class	Villa	6	3
		Floor	5	2
		Apartment	4	1.5
Neighborhood B	Excellent Class	Villa	8	5
		Floor	7	4
		Apartment	6	3
	First class	Villa	7	4
		Floor	6	3
		Apartment	5	2
	Second class	Villa	6	3
		Floor	5	2.5
		Apartment	4	1.75
	Third class	Villa	5	2.5
		Floor	4	1.75
		Apartment	3	1.25
Neighborhood C	Excellent Class	Villa	7	4
		Floor	6	3
		Apartment	5	2.5
	First class	Villa	6	3
		Floor	5	2.5
		Apartment	4	1.75
	Second class	Villa	4.5	2.5
		Floor	3.5	2
		Apartment	2.5	1.5
	Third class	Villa	3	2
		Floor	2	1.5
		Apartment		1
Neighborhood D	Excellent Class	Villa	6	3
		Floor	5	2.5
		Apartment	4	2
	First class	Villa	5	2.5
		Floor	4	2
		Apartment	3	1.5
	Second class	Villa	4	2
		Floor	3	1.5
		Apartment	2	1
	Third class	Villa	4	1.5
		Floor	3	1
		Apartment	2	0.75

MIYAHUNA SERVICE AREA



LOCATION OF ZONE D PROPERTIES



ANNEX 5B – CORRELATION BETWEEN LAND CLASSIFICATION AND POVERTY

This assessment is based on the sample of some 4,700 properties in Amman as follows:

Residential Properties in the sample	CATEGORY				
	A	B	C	D	Total
Total	1,682	1,428	1,188	478	4,776
Percentage	35%	30%	25%	10%	100%

The rental value is related to market value and is also associated with some attributes that add or lower value to the building such as: location, size, material of construction, facilities available in the property, access to public transportation, public infrastructure in the vicinity, etc. The property value is therefore a good approach of the socio-economic condition of a family. In a free real state market, it is expected that a property with high value will be occupied by a high income family; while the lower the income family the lower the price that it can pay for its living property.

Correlations were made between the category of the neighborhood and the socio-economic level, using the following variables: (i) area of the property, (i) rental annual value of the property; (iii) quarterly consumption per household unit. The analysis indicates a low correlation between the category of the neighborhood with the area of the property, as well as with water consumption. However, correlation of the rental value of the property was very good with the category of the neighborhood, which implies a high relationship with the property market value.

Regarding the area of the property, it was found that more than 70% of properties located in categories B, C, and D have an area lower than 200 square meters and 90% below 300 square meters. In category A even though the distribution is more uniform with areas, 54% of properties fall below 300 square meters as well.

AREA OF THE PROPERTY AND CATEGORY OF THE NEIGHBORHOOD

Property area Square meters	Category A	Category B	Category C	Category D
<200	28%	70%	79%	83%
200 <A <300	26%	20%	18%	16%
30 0 <A <500	38%	9%	2%	1%
500 <A <750	6%	2%	0%	0%
>750	2%	0%	0%	0%
Total	100%	100%	100%	100%

Regarding the annual rental value of the property a very good correlation was found with the category level. Below 2JD/square meter as annual rental value there were no household units in Categories A and B, only 1% in category C and 56% in category D. Between 2 and 4 JD/square meter there were no properties in category A, while 48% were in category B, 97% in category C, and the remaining 44% of properties in category D. The annual rental value is directly related with the property value, and so, the categories in the neighborhood are very close related with the property market value.

ANNUAL RENTAL VALUE OF THE PROPERTY AND CATEGORY OF THE NEIGHBORHOOD

Annual Rental Value of the property (JD/m2)	Category A	Category B	Category C	Category D
<=2	0%	0%	1%	56%
2<P<=4	0%	48%	97%	44%
4<P<=6	66%	47%	1%	0%
P>6	34%	5%	0%	0%
Total	100%	100%	100%	100%

The consultants did not find a correlation between land category and water consumption. Up to 20 m3 per quarter there are more households in category A, B, and C, than in category D. This could be explained by the fact that water consumption has a high relationship with number of people living in the same household and much less with income level, especially for the basic consumption (up to 20 cubic meters). For higher consumption level there is a better relationship with income level, as residences with higher property values have more amenities such as: gardens, plumbing facilities and pools that are conducive to higher water consumption, etc.

Consumption per quarter (m^3/hh)	Category A	Category B	Category C	Category D
0-20 m3	22%	29%	27%	18%
21-40 m3	26%	35%	33%	33%
41-60 m3	21%	22%	24%	29%
>60 m3	31%	15%	17%	21%
Total	100%	100%	100%	100%

In conclusion, the consultants found that land classification (A, B, etc) and property value are highly correlated with the annual rental price which in turn could be used as a good proxy for economic conditions of the household. In addition, there are other advantages of using this variable as a proxy to target subsidies: (i) most of the properties in the Greater Amman Metropolitan Area are registered in GAM's database; (ii) the population is familiar with GAM system for property tax and know very well the category they are assigned to; (iii) all the properties are geo-referenced and the database is shared with Miyahuna's data base; and (iv) GAM system has in place an adequate mechanism to update the properties' annual rental value. There are a few residential users outside GAM served by Miyahuna (less than 10% of the total) that need to be classified but most of these users (particularly in South Amman) are poor and can be classified as such, on a temporary basis, using GAM methodology.

ANNEX 6 – PRICING MODEL AND USER'S MANUAL

A detailed explanation of the model is presented in this Annex, as well as a practical application based on Miyahuna's information (costs, users and consumption). The case of the Northern Governorates (NGWA) is also presented; however the model was built with information provided but not validated by the Consultants. The results of the two are not directly comparable as costs related to investments and rehabilitation in NGWA are WAJ's responsibility.

1. INTRODUCTION

Pricing of water and wastewater services aims to satisfy three main objectives:

- *Financial viability*. To generate sufficient funds to pay for all costs to operate, maintain and expand the required infrastructure.
- *Economic efficiency*. To ensure that national resources (capital, labor and land) and in particular the country's scarce water resources be used as efficiently as possible to maximize the well being of the country's population.
- *Social welfare*. To ensure that basic services are accessible to the whole population, particularly the poor. This objective raises important policy decisions about the role of subsidies to achieve this objective.

The tariff model allows the user of the model or the water and wastewater utility to determine the tariffs that would meet these objectives.

2. SCOPE OF THE MODEL

The model calculates:

1. The total revenue requirements or cost of providing services (revenues from non-tariff charges and revenues from tariffs);
2. The reference price for water and wastewater; which corresponds to the revenue required from tariffs divided by the total consumption. This price corresponds to the volumetric tariff to be reached at the end of the transition period and to be applied to all blocks of consumption and to all categories of users.
3. The required increase in tariffs to reach the reference price for each category and block of consumption, based on the transition period[29] defined by the user. The tariff equals the reference price at the end of the transition period.
4. The subsidies to be applied to low-income residential users for consumption up to 20 m3 per quarter. The user has to make decisions regarding: (i) the magnitude of subsidy based on a percentage of the poverty line to be used for paying water and wastewater bill; and (ii) who will be paying for the solidarity charge to compensate the subsidy granted to low-income families.
5. The tariff for each category of users and for each block of consumption during the transition period as defined by the user of the model.
6. The Utility's annual revenue which depend on assumption on the transition period;
7. Projected cash flow of the utility for up to a five-year period; and

The model is based on constant prices (base year), therefore the resulting tariffs should be automatically adjusted annually by inflation (retail price index) or by an index that reflects the cost of services.

[29] Years deemed necessary to reach the reference price

The data required by the model should be entered into the corresponding modules to obtain the key outputs, as explained below. The cells that require data entry are highlighted.

3. STRUCTURE OF THE MODEL

The tariff model consists of three sections.

- *Section 1. Data Entry.* Comprises two blocks of required information: 1) information of the utility regarding tariffs and financial data; and 2) options available to the user to apply subsidies and the gradual increase of tariffs
- *Section 2. Process Sheets*. Intermediate calculations (hidden and that the user does not need to interact with them)
- *Section 3. Results.* Presents the key outputs of the model.

A schematic diagram of the model is presented below:

PRICING MODEL STRUCTURE

DATA ENTRY

General Information of the utility	
Module 1. **Base year**	
Module 2. **Current water and wastewater tariffs**	
Module 3. **Billing information**	
Module 4. **Financial information**	
Module 5. **Cost composition W&WW**	
Options for application of subsidy and gradual increase of tariffs	
Module 6. **Magnitude of subsidy**	
Module 7. **Beneficiaries of subsidy: Low-Income Users**	Module 7.1 **% of low - income users**
	Module 7.2 **Who pays the Solidarity charge**
Module 8. **Transition period**	

PROCESS SHEETS: Intermediate Calculations (hidden)

RESULTS

Module 9. **Reference price**	
Module 10. **Pricing structure under transition period**	Module 10.1 **Pricing structure under transition period Consolidated Water and Wastewater**
	Module 10.2 **Pricing structure under transition period Water**
	Module 10.3 **Pricing structure under transition period Wastewater**
Module 11. **Average bill during transition period**	Module 11.1 **Monthly bills or quarterly bills**
	Module 11.2 **Bills at the end of the transition period**
	Module 11.3 **Bills during transition period**
Module 12. **Cash flow**	
Module 13. **Financial indicators**	

Section 1: Data Entry

The data entry includes eight modules: five corresponding to general information of the utility; two corresponding to the application of the subsidy; and one for the transition period.

A. General Information of the Utility

- ***Module 1***. *Base Year*, which corresponds to the most recent year for which financial and billing data are available.

Module 1. BASE YEAR		
Base year	Year	1

- ***Module 2***. *Current Water and Wastewater Tariff,* includes the pricing structure and the tariff levels currently applied for water and for wastewater service. The model asks for tariffs charged to residential and non-residential users, both: fixed and volumetric charges.

  The fixed charges should be entered in JD$ per user per quarter for the following items: fixed, surcharge, and meter charge.

  The volumetric tariff should be entered in JD$/$m^3$ for the following blocks of consumption per quarter: 0 - 20 m^3; 21 - 40 m^3; 41 - 100 m^3; 101 - 150 m^3; and higher than 150 m^3.

Module 2. CURRENT WATER AND WASTEWATER TARIFFS

WATER						
Residential users	m3/quarter	0-20	21-40	41-100	101-150	> 150
Fixed charges						
Fixed charge per user per quarter	JD/user/quarter	0.00	0.00	0.00	0.00	0.00
Surcharge	JD/user/quarter					
Meter charge	JD/user/quarter					
Volumetric charge	*JD/m3*	0.00	0.00	0.00	0.00	0.00
Non Residential users		0-20	21-40	41-100	101-150	> 150
Fixed charges		-	-	-	-	-
Fixed charge per user per quarter (JD/user/quarter)	JD/user/quarter	0.00	0.00	0.00	0.00	0.00
Surcharge (JD/user/quarter)	JD/user/quarter					
Meter charge (JD/user/quarter)	JD/user/quarter					
Volumetric charge	*JD/m3*	0.00	0.00	0.00	0.00	0.00

WASTEWATER						
Residential users	m3/quarter	0-20	21-40	41-100	101-150	> 150
Fixed charges						
Fixed charge per user per quarter	JD/user/quarter	0.00	0.00	0.00	0.00	0.00
Surcharge	JD/user/quarter					
Meter charge	JD/user/quarter					
Volumetric charge	*JD/m3*	0.00	0.00	0.00	0.00	0.00
Non Residential users		0-20	21-40	41-100	101-150	> 150
Fixed charges						
Fixed charge per user per quarter	JD/user/quarter	0.00	0.00	0.00	0.00	0.00
Surcharge	JD/user/quarter					
Meter charge	JD/user/quarter					
Volumetric charge	*JD/m3*	0.00	0.00	0.00	0.00	0.00

- ***Module 3***. *Billing Information* includes: average number of residential users per quarter, average number of non-residential users per quarter; volume of water billed during the base year; volume of wastewater billed during the base year; ratio of wastewater residential users to water residential users; ratio of wastewater non-residential users to water non-residential users.

  In this module the average number of users, as well as the volume of water and wastewater bill by block of consumption per quarter, should be entered (if the utility has the information as number of bills issued in the base year, the user should divide this number by four to obtain the average number of users per quarter).

Module 3. BILLING INFORMATION			
Consumption Bracket m3/quarter	Averge users per quarter	Volume billed (m3/year)	
		Water	WW
Residential			
0 - 20	1	1	1
21- 40	1	500	500
41-100	1	1	1
101 - 150	1	1	1
> 150	1	1	1
Sub total	5	504	504
Cancelled bills (enter as a negative value)		(1)	(1)
Net Residential		503	503
Non Residential			
0-20	1	1	1
21- 40	1	1	1
41- 100	1	1	1
101 - 150	1	1	1
> 150	1	1	1
Sub total	5	5	5
Cancelled bills		(1)	(1)
Net Non Residential		4	4
Total	10	507	507
Wastewater users/water users Residential sector	100%		
Wastewater users/water users Non-Residential sector	100%		

- ***Module 4***. *Financial Data* consisting of:

o Operating expenses: electricity, wages and salaries, sewerage transfers; water network, purchased water, consumer service department, others;

  o Estimated increased investments to improve current maintenance levels;

  o Investments related to renewal and replacement of assets and main extensions within the utility's service area;

  o Revenues others than tariffs, such as: connection fees, percentage of sewerage tax, sales to Governorates, etc;

  o Transfer to WAJ to pay for the bulk water plus any service fee for the use by the utility of assets owned or to be financed by WAJ;

The user should input the financial data for the base year and project it for a three to five year period. In this module, the user should also enter information on the volume of water billed to users, as well as to Governorates and others; both for the base year and projected.

The financial data yields the required revenue to be recovered through tariffs and then the reference price. The methodology for this calculation is as follows:

a. *Total Revenue Requirements (TRR)* = Operating costs + Increase network Maintenance + Capital expenditures + Transfers to WAJ.

b. TRR is also equal to Non Tariff Revenues (Connection fees + sewerage tax transferred from WAJ + other sales to Governorates and other revenues) + Revenue from tariffs

c. *Reference Price* = Required revenue from tariffs / volume of water billed

Module 4. FINANCIAL INFORMATION						
Miyahuna Revenue Requirements (Thousand JD$)		**1**	**2**	**3**	**4**	**5**
1. Operating expenses (OPEX)		0	0	0	0	0
2. CAPEX, net of grants		1	0	0	0	0
3. Increase in capital maintenance						
4. Water connection fees						
4. Sewer connection fees						
5. 3% sewer tax						
6. Sales to other governorates						
7. Other revenues						
8. Total Utility revenue requirements		1	0	0	0	0
9. Transfers to WAJ:						
10. NET revenue requirements FROM TARIFFS		1	0	0	0	0
11. Billed water use in MM3		1	1	1	1	1
12. Billed water to Governorates and others in MM3						

13. Billed Revenue to Direct Users in base year (Thousand JD)	1	1	1	

Notes:
a. CAPEX, net of grants, is for normal capital expenditures to be financed directly by the utility.
b. Transfers to WAJ is for bulk water supply and recover of capital assets owned by WAJ but used by the utility

OPEX						
1. Electricity		0	0	0	0	0
2. Wages & salaries		0	0	0	0	0
3. Wastewater treatment						
4. Water network						
5. Purchased water						
6. CS Department cost (w/o connection costs or bad debt provision)						
7. All other						

CAPEX, net of grants & loans						
1. General mgt.						
2. Operations						
3. Production						
4. Technical services						
5. Customer services						
6. Finance						
7. HR						
8. IT						
9. Contingencies						
TOTAL		0	0	0	0	0

- ***Module 5***. *Cost Component or allocation of costs between Water and Wastewater services.* The user should enter the percentage of the cost corresponding to water and waste water services expressed as a percentage. The sum must equal to one hundred percent.

Module 5. COST COMPOSITION	
Cost Composition (%)	%
Water	100%
Wastewater	

B. Application of Subsidies

- ***Module 6***. *Magnitude of Subsidies.* To determine the magnitude of subsidy to be granted, the user should enter the following information:
  - Poverty line per family per month. Poverty line is the minimum income required to achieve an adequate standard of living. The Ministry of Planning and International Cooperation of Jordan publishes the poverty line per person per year. To input this

information into the model, the user should transform it to poverty line per family per month; for doing this, the poverty line per person per year should be divided by 12 (months of the year) and multiplied by average persons per family (about 6 to 7).

- Maximum percentage of the poverty line income for a family to spend on water and wastewater services and for consumption up to 20 m^3 per quarter. The user should input this percentage.

  The user can use some guidance to help define this percentage: the World Health Organization (WHO) recommends that the total cost of water and wastewater services for a poor family should not exceed 5% of family income (about 3% for water and 2% for wastewater services) or the European Union (EU) that recommends that total charges for both services should not exceed 2% of family income.

  With the poverty line and the maximum percentage to be spent in the water and wastewater bill, the model calculates the magnitude of subsidy to be granted to beneficiaries.

  Example of maximum monthly bill for a poor family:

  If the poverty line is JD$ 347 per family per month, and the percentage set as the maximum to be spent in water and wastewater bill is 1%, then the maximum monthly bill will JD$ 10.41 per quarter (3.47x3) for a basic consumption up to 20m^3 per quarter.

Module 6. MAGNITUDE OF SUBSIDY		
Household income at poverty line (JD/month/household)	JD	347
Maximum % of income to be used for W&WW bill for basic consumption	%	1%

- ***Module 7***. *Beneficiaries of the Subsidies.*

  The subsidy is to be applied to low-income residential users for consumption up to 20 m^3 per quarter even if their consumption is higher than 20 m^3 (the volumetric tariff is equal to the reference price for all users and consumption).

  The discount is given for the first 20 m^3 per quarter and corresponds to the difference between the bill calculated with the uniform tariff and the maximum bill obtained from Module 6.

  Some examples are presented to illustrate how the subsidy is calculated. The following assumptions are used: (a) Reference price: JD$1.42/m3; (b) Fixed charge: JD$ 1.90 per user per quarter; (c) Maximum monthly bill to be charged to a low-income user for consumption up to 20 m3: JD$ 10.41 per user per quarter (Results from example in Module 6)

  - Example 1. A low-income user consumes 5 m^3 during the billing period:

    Gross Bill = Fixed charge plus volumetric tariff multiply by usage = 1.90 + 5*1.42 =9.00 JD

    Maximum bill for low-income users up to 20 m^3: 10.41

    As the bill is lower than the allowed maximum payment (JD 10.41) there is no need for a subsidy

Net bill to be paid by this low-income user: JD$ 9.00

- Example 2. A low-income user consumes 20 m^3 during the billing period:
  Gross Bill = 1.90 + 20*1.42 = 30.30
  Maximum bill for low-income users up to 20 m^3: 10.41
  Subsidy = 30.30 – 10.41 = JD$ 19.89/user/quarter
  Bill to be paid by this low-income user: JD$ 10.41

- Example 3. A low-income user consumes 30 m^3 during the billing period:
  Maximum bill for low-income users up to 20 m^3: 10.41

  As this user consumes more than 20 m^3, however the subsidy is given only for the 20 m^3, the remaining consumption is to be paid at the reference price without subsidy.

  Additional payment for 10 m3 = 10 x 1.42 = JD 14.20

  Net Bill to be paid by this low-income user = 10.41 + 14.20 =JD 28.61

➢ ***Module 7.1.*** Percentage of residential users to be classified as low income users

➢ ***Module 7.2***. Options for applying the "solidarity charge" to selected users. The "solidarity charge" is used to compensate the subsidy granted to low-income users. It is set as a fixed charge per user per billing period. The level of this charge will depend on: the reference price, the magnitude of the subsidy, and the decision of which users should pay for it.

The model gives the option of selecting the category of users that will pay the solidarity charge according to their consumption. For instance, the user of the model can decide that all users (but no low-income ones) will pay for the solidarity charge no matter what their consumption is; or that all users (but no low-income ones) will pay for the solidarity charge when their consumption is higher than say 40 m^3 per quarter The lower the number of users selected to pay for the solidarity charge, the higher this charge will be.

The model also gives the option to apply this charge gradually during a transition period. For instance, it could start with the users that consume more than 40 m^3 and the following year to apply for the users that consume more than 20 m^3 and so on.

Module 7. BENEFICIARIES OF THE SUBSIDY							
Module 7.1. Percentage of low-income population							
Population to be beneficiary of subsidy(% of low-income users)	%	30%					
Module 7.2. Who pays for the Solidarity Charge		TRANSITION PERIOD (if previous year was "yes" it has to be yes thereafter)					
Solidarity charge to be applied to residential users without subsidy and non residential users:		Year 1	Year 2	Year 3	Year 4	Year 5	
Up to 20 m3	*yes/no*	no	no	no	no	no	
From 21 to 40 m3	*yes/no*	no	no	no	no	no	
More than 40 m3	*yes/no*	yes	yes	yes	yes	yes	

C. Gradual Increase of tariffs (transition period)

➢ ***Module 8***. *Transition Period.* The user should input the number of years to gradually apply the increase of tariffs. The model allows a period from one to five years; it also allows to set different transition periods between category of users (residential with subsidy, residential with no subsidies, and non-residential), and between blocks of consumption (up to 20m^3 per quarter, from 21-40 m^3, and higher than 40 m^3).

Module 8. TRANSITION PERIOD		
		Number of years transition period up to 5
Transition period for Residential users with subsdiy		
Up to 20 m3 per quarter	#	5
From 20 to 40 m3 per quarter	#	4
More than 40 m3 per quarter	#	1
Transition period for Residential users without subsdiy		
Up to 20 m3 per quarter	#	3
From 20 to 40 m3 per quarter	#	2
More than 40 m3 per quarter	#	1
Transition period for Non residential sector		
If current tariffs are > than reference price, is it wanted to leave them at their current level during transition period?	*yes/no*	yes
Up to 20 m3 per quarter	#	3
Up to 40 m3 per quarter	#	3
More than 40 m3 per quarter	#	1

Section 2: Process Sheets

There are several process sheets with intermediate calculations that are hidden and the user does not need to interact with them.

PROCESS SHEETS: Intermediate Calculations (hidden)

Section 3: Results

This section presents the key outputs of the model. It consists of the following modules:

- ***Module 9***. *Reference Price*. The reference price is the revenue required to be recovered from tariffs, divided by the consumption. The revenue required takes into account revenues from other services and transfers. This reference price corresponds to the volumetric tariff that will be achieved at the end of the transition period. The pricing model allocates this price to water and wastewater services according to the data provided by the user in Module 5. The Module 9 also presents the reference price for the fixed charge, which recovers the billing and collection costs.

Module 9. REFERENCE PRICE				
		W & WW	Water	Wastewater
Reference Price for Volumetric Tariff	JD/m3	0.00	0.00	-
Reference price for fixed charge per user	JD/user/quarter	-	-	-

- ***Module 10***. *Pricing Structure under Transition Period.* The *Pricing structure* determines how prices are allocated to different users and levels of consumption. This module comprises three parts: the first one presents the pricing structure and corresponding levels for water and wastewater services; the second presents the same information for water service alone; and the third one for wastewater service.

  The pricing structure consists of a fixed charge and a volumetric charge. The model gradually adjusts the current tariffs to the reference price. The gradual increase depends on the information provided by the user in Module 8. Given that current tariffs and transition period differ between category of users and consumption, the tariffs during the transition period will differ as well, until they reach a uniform value at the end of the period.

  In this module tariffs for each category of user and for each block of consumption are presented for every year during the transition period.

Module 10.1 Water and Wastewater

Module 10. PRICING STRUCTURE UNDER TRANSITION PERIOD

Module 10.1. PRICING STRUCTURE UNDER TRANSITION PERIOD

CONSOLIDATED WATER AND WASTEWATER		TRANSITION PERIOD				
		Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Residential users with subsidies (low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	-	-	-	-	-
Water & Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.00	(0.00)	0.00	(0.00)	0.00
21-40 m3	JD/m3	(0.00)	0.00	(0.00)	0.00	0.00
>40 m3	JD/m3	0.00	0.00	0.00	0.00	0.00
Average Subsidies 0-20 m3 (JD/user per quarter)	JD/user/quarter	-	10.41	-	10.41	-
Residential users without subsidies (non-low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	-	-	-	-	-
Water & Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.00	(0.00)	0.00	0.00	0.00
21-40 m3	JD/m3	(0.00)	0.00	0.00	0.00	0.00
>40 m3	JD/m3	0.00	0.00	0.00	0.00	0.00
Solidarity Charge (JD/user per quarter)	JD/user/quarter	-	(0.53)	-	(0.53)	-
Non Residential users						
Fixed charges (JD/user per quarter)	JD/user/quarter	-	-	-	-	-
Water & Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.00	(0.00)	0.00	0.00	0.00
21-40 m3	JD/m3	0.00	(0.00)	0.00	0.00	0.00
>40 m3	JD/m3	0.00	0.00	0.00	0.00	0.00
Solidarity Charge (JD/user per quarter)	JD/user/quarter	-	(0.53)	-	(0.53)	-

Module: 10.2 Water Pricing Structure

Module 10.2. PRICING STRUCTURE UNDER TRANSITION PERIOD

WATER		TRANSITION PERIOD				
		Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Residential users with subsidies (low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	-	-	-	-	-
Water Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.00	(0.00)	0.00	(0.00)	0.00
21-40 m3	JD/m3	(0.00)	0.00	(0.00)	0.00	0.00
>40 m3	JD/m3	0.00	0.00	0.00	0.00	0.00
Residential users without subsidies (non-low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	-	-	-	-	-
Water Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.00	(0.00)	0.00	0.00	0.00
21-40 m3	JD/m3	(0.00)	0.00	0.00	0.00	0.00
>40 m3	JD/m3	0.00	0.00	0.00	0.00	0.00

Module: 10.3 Wastewater Pricing Structure

Module 10.3. PRICING STRUCTURE UNDER TRANSITION PERIOD

WASTEWATER		TRANSITION PERIOD				
		Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Residential users with subsidies (low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	-	-	-	-	-
Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	-	-	-	-	-
21-40 m3	JD/m3	-	-	-	-	-
>40 m3	JD/m3	-	-	-	-	-
Residential users without subsidies (non-low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	-	-	-	-	-
Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	-	-	-	-	-
21-40 m3	JD/m3	-	-	-	-	-
>40 m3	JD/m3	-	-	-	-	-

- ***Module 11***. *Average bill for residential users during transition period.* It presents average bills of water and wastewater services for different volumes of consumption. The bills are shown for residential as well as for non-residential customers. The user can enter the consumption and the model automatically calculates the bill during the transition period. The user can also decide the billing period either quarterly or monthly and the bills are calculated accordingly. The model also calculates for all consumptions their respective bills during the transition period and compares them with current ones.

MONTHLY OR QUARTERLY BILLS		**BILLING PERIOD**
Do you want monthly or quarterly bills?	%	QUARTER

Module 11.1 Average Bill during Transition Period

Module 11. RESULTING BILLS DURING TRANSITION PERIOD

Module 11.1 AVERAGE BILL DURING TRANSITION PERIOD

Water and Wastewater bills per quarter (JD/connection/billing period)	CONSUMPTON QUARTER		CURRENT	TRANSITION PERIOD				
				Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Residential users with subsidies (low income residential users)								
Bill before subsidy	8	JD/user	5.1	0.0	(0.0)	0.0	(0.0)	0.0
Subsidy		JD/user	-	-	-	-	-	-
Bill with subsidy		JD/user	5.1	0.0	(0.0)	0.0	(0.0)	0.0
Bill before subsidy	20	JD/user	5.1	0.0	(0.0)	0.0	(0.0)	0.0
Subsidy		JD/user	-	-	-	-	-	-
Bill with subsidy		JD/user	5.1	0.0	(0.0)	0.0	(0.0)	0.0
Bill before subsidy	45	JD/user	16.0	0.0	0.0	0.0	0.0	0.0
Subsidy		JD/user	-	-	-	-	-	-
Bill with subsidy		JD/user	16.0	0.0	0.0	0.0	0.0	0.0
Residential users without subsidies (non-low income residential users)								
Bill before solidarity charge	8	JD/user	5.1	0.0	(0.0)	0.0	0.0	0.0
Solidarity charge		JD/user	-	-	-	-	-	-
Bill with solidarity charge		JD/user	5.1	0.0	(0.0)	0.0	0.0	0.0
Bill before solidarity charge	20	JD/user	5.1	0.0	(0.0)	0.0	0.0	0.0
Solidarity charge		JD/user	-	-	-	-	-	-
Bill with solidarity charge		JD/user	5.1	0.0	(0.0)	0.0	0.0	0.0
Bill before solidarity charge	45	JD/user	16.0	0.0	0.0	0.0	0.0	0.0
Solidarity charge		JD/user	-	-	(0.5)	-	(0.5)	-
Bill with solidarity charge		JD/user	16.0	0.0	(0.5)	0.0	(0.5)	0.0
Non Residential								
Bill before solidarity charge	8	JD/user	0.0	0.0	(0.0)	0.0	0.0	0.0
Solidarity charge		JD/user	-	-	-	-	-	-
Bill with solidarity charge		JD/user	0.0	0.0	(0.0)	0.0	0.0	0.0
Bill before solidarity charge	20	JD/user	0.0	0.0	(0.0)	0.0	0.0	0.0
Solidarity charge		JD/user	-	-	-	-	-	-
Bill with solidarity charge		JD/user	0.0	0.0	(0.0)	0.0	0.0	0.0
Bill before solidarity charge	45	JD/user	0.1	0.0	(0.0)	0.0	0.0	0.0
Solidarity charge		JD/user	-	-	(0.5)	-	(0.5)	-
Bill with solidarity charge		JD/user	0.1	0.0	(0.6)	0.0	(0.5)	0.0

- ***Module 12***. *Cash Flow.* Based on financial information provided in Module 4, the model shows the projected cash flow for up to a four-year period. The model calculates annual revenue obtained with the gradual increase on tariffs and includes it in the cash flow. The user should analyze the projected cash flow, and then adjust the transition period for different users to reach an acceptable cash flow.

MODULE 12. CASH FLOW

CASH FLOW	JD (million) Base year	Four years Projection (JD million)			
	1	2	3	4	5
Billed Revenue from tariffs water and wastewater	0.0	0.0	0.0	0.0	0.0
Other revenues	-	-	-	-	-
Total Revenues	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Oprating expenses	0.0	0.0	0.0	0.0	0.0
Improving in maintenance	-	-	-	-	-
Total OPEX and maintenance	0.0	0.0	0.0	0.0	0.0
Net Income	0.0	0.0	0.0	0.0	0.0
Bulk water and investment paid by WAJ	-	-	-	-	-
CAPEX net of grants (pay as you go)	0.0	0.0	0.0	0.0	0.0
Net Cashflow before financing	**(0.0)**	**0.0**	**0.0**	**0.0**	**0.0**
Required debt financing		-	-	-	-
Net Cashflow after financing	**(0.0)**	**0.0**	**0.0**	**0.0**	**0.0**
Cash at the beginning of the period	-	(0.0)	0.0	0.0	0.0
Cash at the end of the period	**(0.0)**	**0.0**	**0.0**	**0.0**	**0.0**

➢ **Module 13**. *Financial Indicators.* Some selected key indicators are presented in this module.

Module 13. FINANCIAL INDICATORS					
FINANCIAL INDICATORS	**1**	**2**	**3**	**4**	**5**
Average water and wastewater tariff (JD/m3)	1.00	1.00	1.97	3.97	5.92
Operating ratio	0.00	0.00	0.00	0.00	0.00
Net Margin	100%	100%	100%	100%	100%
Composition of Revenues:					
Revenues from tariffs	100%	100%	100%	100%	100%
Revenues from other sources (sewerage tax, connection fees, etc)	0%	0%	0%	0%	0%
Composition of Operating expenses:					
Electricity	50%	50%	50%	50%	50%
Wages and Salaries	50%	50%	50%	50%	50%
Wastewater treatment	0%	0%	0%	0%	0%
Water network and improved maintenance	0%	0%	0%	0%	0%
Purchased water with current tariffs	0%	0%	0%	0%	0%
Others	0%	0%	0%	0%	0%
	100%	100%	100%	100%	100%
Number of Users	10				
Volume of water billed:					
Direct Users	1	1	1	1	1
Governorates and others	-	-	-	-	-

4. DEFINITIONS

- *User.* A customer who receives water or wastewater services and receives a water or wastewater bill;
- *Total revenue*: Revenue required by the utility to meet all its costs. There are two sources: Revenues from tariffs and other revenues other services and transfers;
- *Reference price* which reflects the revenues recovered from tariffs and equal to revenues from tariffs divided by total consumption;
- *Pricing structure* determines how prices are allocated to different users and levels of consumption.
- *CAPEX* Capital Expenditures net of grants. It corresponds to the capital expenditures to be financed directly by the utility
- *Transfer to WAJ.* Corresponds to the cost of bulk water supply and fees to reflect the use by the utility of capital assets owned by WAJ.

5. APPLICATION OF THE MODEL TO MIYAHUNA

Section 1: Data Entry

Module 1: Base Year

Module 1. BASE YEAR

Base year	Year	2008

Module 2: Current water and wastewater tariffs

Module 2. CURRENT WATER AND WASTEWATER TARIFFS

WATER						
Residential users	m3/quarter	0-20	21-40	41-100	101-150	> 150
Fixed charges						
Fixed charge per user per quarter	JD/user/quarter	2.00	2.00	2.00	2.00	2.00
Surcharge	JD/user/quarter	2.15	4.15	5.15	5.15	5.15
Meter charge	JD/user/quarter	0.30	0.30	0.30	0.30	0.30
Volumetric charge	*JD/m3*	-	0.14	0.71	1.06	0.84
Non Residential users		0-20	21-40	41-100	101-150	> 150
Fixed charges		-	-	-	-	-
Fixed charge per user per quarter (JD/user/quarter)	JD/user/quarter	-	-	-	-	-
Surcharge (JD/user/quarter)	JD/user/quarter	4.15	5.15	5.15	5.15	5.15
Meter charge (JD/user/quarter)	JD/user/quarter	0.30	0.30	0.30	0.30	0.30
Volumetric charge	*JD/m3*	1.00	1.00	1.00	1.00	1.00

WASTEWATER						
Residential users	m3/quarter	0-20	21-40	41-100	101-150	> 150
Fixed charges						
Fixed charge per user per quarter	JD/user/quarter	0.67	0.67	0.67	0.67	0.67
Surcharge	JD/user/quarter	-	-	-	-	-
Meter charge	JD/user/quarter	-	-	-	-	-
Volumetric charge	*JD/m3*	-	0.04	0.25	0.71	0.26
Non Residential users		0-20	21-40	41-100	101-150	> 150
Fixed charges						
Fixed charge per user per quarter	JD/user/quarter	-	-	-	-	-
Surcharge	JD/user/quarter	-	-	-	-	-
Meter charge	JD/user/quarter	-	-	-	-	-
Volumetric charge	*JD/m3*	0.56	0.56	0.56	0.56	0.56

Module 3: Billing Information

Module 3. BILLING INFORMATION

Consumption Bracket m3/quarter	Averge users per quarter	Volume billed (m3/year)	
		Water	WW
Residential			
0 - 20	119,115	4,884,791	4,577,310
21- 40	126,691	15,349,633	14,246,017
41-100	138,796	33,345,252	29,019,163
101 - 150	13,357	6,342,329	4,817,370
> 150	5,756	6,891,922	5,561,756
Sub total	403,715	66,813,927	58,221,616
Cancelled bills (enter as a negative value)		(2,141,664)	(1,977,789)
Net Residential		64,672,263	56,243,827
Non Residential			
0-20	11,627	331,293	308,329
21- 40	2,975	359,099	318,534
41- 100	2,943	835,532	707,161
101 - 150	941	506,834	411,917
> 150	1,957	9,041,986	8,328,116
Sub total	20,442	11,074,744	10,074,057
Cancelled bills		(397,366)	(335,401)
Net Non Residential		10,677,378	9,738,656
Total	424,157	75,349,641	65,982,483
Wastewater users/water users Residential sector	87%		
Wastewater users/water users Non-Residential sector	87%		

Module 4: Financial Information

Module 4. FINANCIAL INFORMATION						
Miyahuna Revenue Requirements (Thousand JD)		**2008**	**2009**	**2010**	**2011**	**2012**
1. Operating expenses (OPEX)		66,355	78,033	87,000	91,000	91,000
2. CAPEX, net of grants		24,767	10,000	28,000	30,000	30,000
3. Increase in capital maintenance		0	0	5,000	10,000	10,000
4. Water connection fees		-4,872	-6,500	-6,500	-6,500	-6,500
4. Sewer connection fees		-7,309	-7,500	-7,500	-7,500	-7,500
5. 3% sewer tax		-9,331	-12,000	-13,000	-13,000	-13,000
6. Sales to other governorates		-2,625	-2,674	-2,703	-2,798	-2,798
7. Other revenues		-2,357	-1,425	-3,202	-3,202	-3,202
8. Total Utility revenue requirements		64,628	57,934	87,095	98,000	98,000
9. Transfers to WAJ:		0	0	15,000	30,000	30,000
10. NET revenue requirements FROM TARIFFS		64,628	57,934	102,095	128,000	128,000
11. Billed water use in MM3		75,350	77,261	85,000	88,000	90,000
12. Billed water to Governorates and others in MM3						

13. Billed Revenue to Direct Users in base year (Thousand JD)	50,026	51,043	57,292

Notes:
a. CAPEX, net of grants, is for normal capital expenditures to be financed directly by the utility.
b. Transfers to WAJ is for bulk water supply and recover of capital assets owned by WAJ but used by the utility

OPEX						
1. Electricity		25,527	26,400	28,260	29,673	29,673
2. Wages & salaries		9,029	12,778	13,417	14,088	14,088
3. Wastewater treatment		10,536	10,040	15,542	15,069	15,069
4. Water network		7,163	11,985	12,584	13,213	13,213
5. Purchased water		3,106	3,335	3,502	3,677	3,677
6. CS Department cost (w/o connection costs or bad debt provision)		3,224			0	0
7. All other		7,770	13,495	13,695	15,280	15,280

CAPEX, net of grants & loans						
1. General mgt.		358	100	100	100	100
2. Operations		2,923	5,505	7,276	7,276	7,276
3. Production		3,127	4,874	3,885	3,885	3,885
4. Technical services		17,626	13,432	11,399	11,399	11,399
5. Customer services		224	357	430	430	430
6. Finance		0	30	0	0	0
7. HR		39	221	200	200	200
8. IT		470	854	710	710	710
9. Contingencies		0	1,000	1,000	1,000	1,000
TOTAL		24,767	26,373	25,000	25,000	25,000

Module 5: Cost Composition

Module 5. COST COMPOSITION	
Cost Composition (%)	%
Water	75%
Wastewater	25%

Module 6: Magnitude of the subsidy

Module 6. MAGNITUDE OF SUBSIDY		
Household income at poverty line (JD/month/household)	JD	347
Maximum % of income to be used for W&WW bill for basic consumption	%	1%

Module 7: Beneficiaries of the subsidy

Module 7. BENEFICIARIES OF THE SUBSIDY							
Module 7.1. Percentage of low-income population							
Population to be beneficiary of subsidy(% of low-income users)	%	30%					
Module 7.2. Who pays for the Solidarity Charge		TRANSITION PERIOD (if previous year was "yes" it has to be yes thereafter)					
Solidarity charge to be applied to residential users without subsidy and non residential users:		Year 1	Year 2	Year 3	Year 4	Year 5	
Up to 20 m3	*yes/no*	no	no	no	no	no	
From 21 to 40 m3	*yes/no*	no	no	no	no	no	
More than 40 m3	*yes/no*	yes	yes	yes	yes	yes	

Module 8: Transition Period

Module 8. TRANSITION PERIOD		
		Number of years transition period up to 5
Transition period for Residential users with subsdiy		
Up to 20 m3 per quarter	#	5
From 20 to 40 m3 per quarter	#	4
More than 40 m3 per quarter	#	1
Transition period for Residential users without subsdiy		
Up to 20 m3 per quarter	#	3
From 20 to 40 m3 per quarter	#	2
More than 40 m3 per quarter	#	1
Transition period for Non residential sector		
If current tariffs are > than reference price, is it wanted to leave them at their current level during transition period?	*yes/no*	yes
Up to 20 m3 per quarter	#	3
Up to 40 m3 per quarter	#	3
More than 40 m3 per quarter	#	1

Section 2*:* Process Sheets (the user does not have to interact with them)

P R O C E S S S H E E T S: Intermediate Calculations (hidden)

Section 3: **Results**

Module 9: Reference Price

Module 9. REFERENCE PRICE				
		W & WW	Water	Wastewater
Reference Price for Volumetric Tariff	JD/m3	1.42	1.07	0.36
Reference price for fixed charge per user	JD/user/quarter	1.90	1.90	-

***Module* 10**: Pricing Structure.

Module 10.1 Water and Wastewater

Module 10. PRICING STRUCTURE UNDER TRANSITION PERIOD

Module 10.1. PRICING STRUCTURE UNDER TRANSITION PERIOD

CONSOLIDATED WATER AND WASTEWATER		TRANSITION PERIOD				
		Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Residential users with subsidies (low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	1.90	1.90	1.90	1.90	1.90
Water & Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.79	0.91	1.06	1.23	1.42
21-40 m3	JD/m3	0.91	1.06	1.23	1.42	1.42
>40 m3	JD/m3	1.42	1.42	1.42	1.42	1.42
Average Subsidies 0-20 m3 (JD/user per quarter)	JD/user/quarter	-	(0.54)	(1.99)	(3.66)	(5.60)
Residential users without subsidies (non-low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	1.90	1.90	1.90	1.90	1.90
Water & Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	1.06	1.23	1.42	1.42	1.42
21-40 m3	JD/m3	1.23	1.42	1.42	1.42	1.42
>40 m3	JD/m3	1.42	1.42	1.42	1.42	1.42
Solidarity Charge (JD/user per quarter)	JD/user/quarter	6.88	9.38	12.45	16.01	20.13
Non Residential users						
Fixed charges (JD/user per quarter)	JD/user/quarter	1.90	1.90	1.90	1.90	1.90
Water & Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	1.56	1.56	1.42	1.42	1.42
21-40 m3	JD/m3	1.56	1.56	1.42	1.42	1.42
>40 m3	JD/m3	1.56	1.42	1.42	1.42	1.42
Solidarity Charge (JD/user per quarter)	JD/user/quarter	6.88	9.38	12.45	16.01	20.13

Module 10.2: Water Pricing Structure;

Module 10.2. PRICING STRUCTURE UNDER TRANSITION PERIOD

WATER		TRANSITION PERIOD				
		Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Residential users with subsidies (low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	1.90	1.90	1.90	1.90	1.90
Water Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.59	0.68	0.79	0.92	1.07
21-40 m3	JD/m3	0.68	0.79	0.92	1.07	1.07
>40 m3	JD/m3	1.07	1.07	1.07	1.07	1.07
Residential users without subsidies (non-low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	1.90	1.90	1.90	1.90	1.90
Water Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.79	0.92	1.07	1.07	1.07
21-40 m3	JD/m3	0.92	1.07	1.07	1.07	1.07
>40 m3	JD/m3	1.07	1.07	1.07	1.07	1.07

Module 10.3: Wastewater Pricing Structure

Module 10.3. PRICING STRUCTURE UNDER TRANSITION PERIOD

WASTEWATER		TRANSITION PERIOD				
		Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Residential users with subsidies (low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	-	-	-	-	-
Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.20	0.23	0.26	0.31	0.36
21-40 m3	JD/m3	0.23	0.26	0.31	0.36	0.36
>40 m3	JD/m3	0.36	0.36	0.36	0.36	0.36
Residential users without subsidies (non-low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	-	-	-	-	-
Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.26	0.31	0.36	0.36	0.36
21-40 m3	JD/m3	0.31	0.36	0.36	0.36	0.36
>40 m3	JD/m3	0.36	0.36	0.36	0.36	0.36

Module 11: Resulting Bills during Transition Period

MONTHLY OR QUARTERLY BILLS		**BILLING PERIOD**
Do you want monthly or quarterly bills?	%	QUARTER

Module 11. RESULTING BILLS DURING TRANSITION PERIOD

Module 11.1 AVERAGE BILL DURING TRANSITION PERIOD

Water and Wastewater bills per quarter (JD/connection/billing period)	CONSUMPTON QUARTER		CURRENT	TRANSITION PERIOD				
				Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Residential users with subsidies (low income residential users)								
Bill before subsidy	8	JD/user	5.1	8.2	9.2	10.4	11.7	13.3
Subsidy		JD/user	-	-	-	-	(1.3)	(2.9)
Bill with subsidy		JD/user	5.1	8.2	9.2	10.4	10.4	10.4
Bill before subsidy	20	JD/user	5.1	17.6	20.1	23.1	26.4	30.3
Subsidy		JD/user	-	(7.2)	(9.7)	(12.6)	(16.0)	(19.9)
Bill with subsidy		JD/user	5.1	10.4	10.4	10.4	10.4	10.4
Bill before subsidy	45	JD/user	16.0	43.0	48.4	54.7	62.0	65.9
Subsidy		JD/user	-	(7.2)	(9.7)	(12.6)	(16.0)	(19.9)
Bill with subsidy		JD/user	16.0	35.8	38.7	42.1	46.0	46.0
Residential users without subsidies (non-low income residential users)								
Bill before solidarity charge	8	JD/user	5.1	10.4	11.7	13.3	13.3	13.3
Solidarity charge		JD/user	-	-	-	-	-	-
Bill with solidarity charge		JD/user	5.1	10.4	11.7	13.3	13.3	13.3
Bill before solidarity charge	20	JD/user	5.1	23.1	26.4	30.3	30.3	30.3
Solidarity charge		JD/user	-	-	-	-	-	-
Bill with solidarity charge		JD/user	5.1	23.1	26.4	30.3	30.3	30.3
Bill before solidarity charge	45	JD/user	16.0	54.7	62.0	65.9	65.9	65.9
Solidarity charge		JD/user	-	6.9	9.4	12.4	16.0	20.1
Bill with solidarity charge		JD/user	16.0	61.6	71.4	78.3	81.9	86.0
Non Residential								
Bill before solidarity charge	8	JD/user	16.9	14.4	14.4	13.3	13.3	13.3
Solidarity charge		JD/user	-	-	-	-	-	-
Bill with solidarity charge		JD/user	16.9	14.4	14.4	13.3	13.3	13.3
Bill before solidarity charge	20	JD/user	35.7	33.1	33.1	30.3	30.3	30.3
Solidarity charge		JD/user	-	-	-	-	-	-
Bill with solidarity charge		JD/user	35.7	33.1	33.1	30.3	30.3	30.3
Bill before solidarity charge	45	JD/user	75.7	72.1	71.4	65.9	65.9	65.9
Solidarity charge		JD/user	-	6.9	9.4	12.4	16.0	20.1
Bill with solidarity charge		JD/user	75.7	79.0	80.8	78.3	81.9	86.0

Module 12: Cash flow

MODULE 12. CASH FLOW

CASH FLOW	JD (million) Base year	Four years Projection (JD million)			
	2008	2009	2010	2011	2012
Billed Revenue from tariffs water and wastewater	50.0	51.0	115.0	123.7	127.6
Other revenues	26.5	30.1	32.9	33.0	33.0
Total Revenues	**76.5**	**81.1**	**147.9**	**156.7**	**160.6**
Oprating expenses	66.4	78.0	92.0	91.0	91.0
Improving in maintenance	-	-	-	10.0	10.0
Total OPEX and maintenance	66.4	78.0	92.0	101.0	101.0
Net Income	10.2	3.1	55.9	55.7	59.6
Bulk water and investment paid by WAJ	-	-	15.0	30.0	30.0
CAPEX net of grants (pay as you go)	24.8	10.0	28.0	30.0	30.0
Net Cashflow before financing	**(14.6)**	**(6.9)**	**12.9**	**(4.3)**	**(0.4)**
Required debt financing		18.7	-	-	-
Net Cashflow after financing	**(14.6)**	**11.8**	**12.9**	**(4.3)**	**(0.4)**
Cash at the beginning of the period	15.8	1.2	13.0	25.9	21.6
Cash at the end of the period	**1.2**	**13.0**	**25.9**	**21.6**	**21.2**

Module 13: Financial Indicators

Module 13. FINANCIAL INDICATORS

FINANCIAL INDICATORS	2008	2009	2010	2011	2012
Average water and wastewater tariff (JD/m3)	0.66	0.66	1.35	1.41	1.42
Operating ratio	0.87	0.96	0.62	0.64	0.63
Net Margin	13%	4%	38%	36%	37%
Composition of Revenues:					
Revenues from tariffs	65%	63%	78%	79%	79%
Revenues from other sources (sewerage tax, connection fees, etc)	35%	37%	22%	21%	21%
Composition of Operating expenses:					
Electricity	38%	34%	31%	29%	29%
Wages and Salaries	14%	16%	15%	14%	14%
Wastewater treatment	16%	13%	17%	15%	15%
Water network and improved maintenance	11%	15%	19%	23%	23%
Purchased water with current tariffs	5%	4%	4%	4%	4%
Others	17%	17%	15%	15%	15%
	100%	100%	100%	100%	100%
Number of Users	424,157				
Volume of water billed:					
Direct Users	75,350	77,261	85,000	88,000	90,000
Governorates and others	-	-	-	-	-

6. APPLICATION OF THE MODEL TO NORTHERN GOVERNORATES

Section 1: Data Entry

Module 1: Base Year;

Module 1. BASE YEAR

Base year	Year	2007

Module 2: Current water and wastewater tariffs

Module 2. CURRENT WATER AND WASTEWATER TARIFFS

WATER						
Residential users	m3/quarter	0-20	21-40	41-100	101-150	> 150
Fixed charges						
Fixed charge per user per quarter	JD/user/quarter	4.50	4.50	4.50	4.50	4.50
Surcharge	JD/user/quarter					
Meter charge	JD/user/quarter					
Volumetric charge	*JD/m3*	-	0.26	0.28	0.60	0.60
Non Residential users		0-20	21-40	41-100	101-150	> 150
Fixed charges						
Fixed charge per user per quarter (JD/user/quarter)	JD/user/quarter	1.00	1.00	1.00	1.00	1.00
Surcharge (JD/user/quarter)	JD/user/quarter					
Meter charge (JD/user/quarter)	JD/user/quarter					
Volumetric charge	*JD/m3*	1.50	1.50	1.50	1.50	1.50

WASTEWATER						
Residential users	m3/quarter	0-20	21-40	41-100	101-150	> 150
Fixed charges						
Fixed charge per user per quarter	JD/user/quarter	0.00	0.00	0.00	0.00	0.00
Surcharge	JD/user/quarter					
Meter charge	JD/user/quarter					
Volumetric charge	*JD/m3*	-	0.04	0.04	0.09	0.09
Non Residential users		0-20	21-40	41-100	101-150	> 150
Fixed charges						
Fixed charge per user per quarter	JD/user/quarter	0.00	0.00	0.00	0.00	0.00
Surcharge	JD/user/quarter					
Meter charge	JD/user/quarter					
Volumetric charge	*JD/m3*	0.23	0.23	0.23	0.23	0.23

Module 3: Billing Information

Module 3. BILLING INFORMATION

Consumption Bracket m3/quarter	Averge users per quarter	Volume billed (m3/year)	
		Water	WW
Residential			
0 - 20	49,115	2,164,578	701,323
21- 40	71,895	8,403,648	2,722,782
41-100	82,137	18,207,904	5,899,361
101 - 150	4,765	2,069,080	670,382
> 150	1,087	986,792	319,721
Sub total	208,999	31,832,002	10,313,569
Cancelled bills (enter as a negative value)		-	(1)
Net Residential		31,832,002	10,313,568
Non Residential			
0-20	6,600	193,760	62,972
21- 40	1,760	207,600	67,470
41- 100	1,430	376,448	122,346
101 - 150	550	193,760	62,972
> 150	660	1,796,432	583,840
Sub total	11,000	2,768,000	899,600
Cancelled bills		-	-
Net Non Residential		2,768,000	899,600
Total	219,999	34,600,002	11,213,168
Wastewater users/water users Residential sector	22%		
Wastewater users/water users Non-Residential sector	22%		

Module 4: Financial Information

Module 4. FINANCIAL INFORMATION						
Miyahuna Revenue Requirements (Thousand JD)		**2007**	**2008**	**2009**	**2010**	**2011**
1. Operating expenses (OPEX)		20,900	21,400	21,400	21,400	21,400
2. CAPEX, net of grants		1	0	0	0	0
3. Increase in capital maintenance						
4. Water connection fees		-3,600	-3,000	-3,000	-3,000	-3,000
4. Sewer connection fees						
5. 3% sewer tax						
6. Sales to other governorates						
7. Other revenues						
8. Total Utility revenue requirements		17,301	18,400	18,400	18,400	18,400
9. Transfers to WAJ:		0	0	15,000	30,000	30,000
10. NET revenue requirements FROM TARIFFS		17,301	18,400	33,400	48,400	48,400
11. Billed water use in MM3		75,350	77,261	85,000	88,000	90,000
12. Billed water to Governorates and others in MM3						

13. Billed Revenue to Direct Users in base year (Thousand JD)	13,200	14,917

Notes:
a. CAPEX, net of grants, is for normal capital expenditures to be financed directly by the utility.
b. Transfers to WAJ is for bulk water supply and recover of capital assets owned by WAJ but used by the utility

OPEX						
1. Electricity		6,300	7,700	7,700	7,700	7,700
2. Wages & salaries		8,900	9,200	9,200	9,200	9,200
3. Wastewater treatment		4,500	4,500	4,500	4,500	4,500
4. Water network						
5. Purchased water						
6. CS Department cost (w/o connection costs or bad debt provision)		1,200				
7. All other						

CAPEX, net of grants & loans						
1. General mgt.						
2. Operations						
3. Production						
4. Technical services						
5. Customer services						
6. Finance						
7. HR						
8. IT						
9. Contingencies						
TOTAL		0	0	0	0	0

Module 5: Cost Composition

Module 5. COST COMPOSITION	
Cost Composition (%)	%
Water	75%
Wastewater	25%

Module 6: Magnitude of the subsidy

Module 6. MAGNITUDE OF SUBSIDY		
Household income at poverty line (JD/month/household)	JD	250
Maximum % of income to be used for W&WW bill for basic consumption	%	1%

Module 7: Beneficiaries of the subsidy

Module 7. BENEFICIARIES OF THE SUBSIDY							
Module 7.1. Percentage of low-income population							
Population to be beneficiary of subsidy(% of low-income users)	%	30%					
Module 7.2. Who pays for the Solidarity Charge		TRANSITION PERIOD (if previous year was "yes" it has to be yes thereafter)					
Solidarity charge to be applied to residential users without subsidy and non residential users:		**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	
Up to 20 m3	*yes/no*	no	no	no	no	no	
From 21 to 40 m3	*yes/no*	no	no	no	no	no	
More than 40 m3	*yes/no*	yes	yes	yes	yes	yes	

Module 8: Transition Period

Module 8. TRANSITION PERIOD		
		Number of years transition period up to 5
Transition period for Residential users with subsdiy		
Up to 20 m3 per quarter	#	1
From 20 to 40 m3 per quarter	#	1
More than 40 m3 per quarter	#	1
Transition period for Residential users without subsdiy		
Up to 20 m3 per quarter	#	1
From 20 to 40 m3 per quarter	#	1
More than 40 m3 per quarter	#	1
Transition period for Non residential sector		
If current tariffs are > than reference price, is it wanted to leave them at their current level during transition period?	*yes/no*	yes
Up to 20 m3 per quarter	#	3
Up to 40 m3 per quarter	#	3
More than 40 m3 per quarter	#	1

Section 2*:* Process Sheets (the user does not have to interact with them)

PROCESS SHEETS: Intermediate Calculations (hidden)

Section 3*:* **Results**

Module 9: Reference Price

Module 9. REFERENCE PRICE				
		W & WW	**Water**	**Wastewater**
Reference Price for Volumetric Tariff	JD/m3	0.54	0.40	0.13
Reference price for fixed charge per user	JD/user/quarter	1.36	1.36	-

Module **10**: Pricing Structure.

Module 10.1 Water and Wastewater

Module 10. PRICING STRUCTURE UNDER TRANSITION PERIOD

Module 10.1. PRICING STRUCTURE UNDER TRANSITION PERIOD

CONSOLIDATED WATER AND WASTEWATER		TRANSITION PERIOD				
		Year 1	***Year 2***	***Year 3***	***Year 4***	***Year 5***
Residential users with subsidies (low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	1.36	1.36	1.36	1.36	1.36
Water & Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.54	0.54	0.54	0.54	0.54
21-40 m3	JD/m3	0.54	0.54	0.54	0.54	0.54
>40 m3	JD/m3	0.54	0.54	0.54	0.54	0.54
Average Subsidies 0-20 m3 (JD/user per quarter)	JD/user/quarter	-	-	-	-	-
Residential users without subsidies (non-low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	1.36	1.36	1.36	1.36	1.36
Water & Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.54	0.54	0.54	0.54	0.54
21-40 m3	JD/m3	0.54	0.54	0.54	0.54	0.54
>40 m3	JD/m3	0.54	0.54	0.54	0.54	0.54
Solidarity Charge (JD/user per quarter)	JD/user/quarter	3.96	3.96	3.96	3.96	3.96
Non Residential users						
Fixed charges (JD/user per quarter)	JD/user/quarter	1.36	1.36	1.36	1.36	1.36
Water & Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	1.73	1.73	0.54	0.54	0.54
21-40 m3	JD/m3	1.73	1.73	0.54	0.54	0.54
>40 m3	JD/m3	1.73	0.54	0.54	0.54	0.54
Solidarity Charge (JD/user per quarter)	JD/user/quarter	3.96	3.96	3.96	3.96	3.96

Module: 10.2 Water Pricing Structure;

Module 10.2. PRICING STRUCTURE UNDER TRANSITION PERIOD

WATER		TRANSITION PERIOD				
		Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Residential users with subsidies (low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	1.36	1.36	1.36	1.36	1.36
Water Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.40	0.40	0.40	0.40	0.40
21-40 m3	JD/m3	0.40	0.40	0.40	0.40	0.40
>40 m3	JD/m3	0.40	0.40	0.40	0.40	0.40
Residential users without subsidies (non-low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	1.36	1.36	1.36	1.36	1.36
Water Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.40	0.40	0.40	0.40	0.40
21-40 m3	JD/m3	0.40	0.40	0.40	0.40	0.40
>40 m3	JD/m3	0.40	0.40	0.40	0.40	0.40

Module: 10.3 Wastewater Pricing Structure

Module 10.3. PRICING STRUCTURE UNDER TRANSITION PERIOD

WASTEWATER		TRANSITION PERIOD				
		Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Residential users with subsidies (low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	-	-	-	-	-
Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.13	0.13	0.13	0.13	0.13
21-40 m3	JD/m3	0.13	0.13	0.13	0.13	0.13
>40 m3	JD/m3	0.13	0.13	0.13	0.13	0.13
Residential users without subsidies (non-low income residential users)						
Fixed charges (JD/user per quarter)	JD/user/quarter	-	-	-	-	-
Wastewater Volumetric charge (JD/m3)						
0-20 m3	JD/m3	0.13	0.13	0.13	0.13	0.13
21-40 m3	JD/m3	0.13	0.13	0.13	0.13	0.13
>40 m3	JD/m3	0.13	0.13	0.13	0.13	0.13

Module 11: Resulting Bills during Transition Period

MONTHLY OR QUARTERLY BILLS		**BILLING PERIOD**
Do you want monthly or quarterly bills?	%	QUARTER

Module 11.1 AVERAGE BILL DURING TRANSITION PERIOD

Water and Wastewater bills per quarter (JD/connection/billing period)	CONSUMPTON QUARTER		CURRENT	TRANSITION PERIOD				
				Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Residential users with subsidies (low income residential users)								
Bill before subsidy	8	JD/user	4.5	5.7	5.7	5.7	5.7	5.7
Subsidy		JD/user	-	-	-	-	-	-
Bill with subsidy		JD/user	4.5	5.7	5.7	5.7	5.7	5.7
Bill before subsidy	20	JD/user	4.5	12.1	12.1	12.1	12.1	12.1
Subsidy		JD/user	-	(4.6)	(4.6)	(4.6)	(4.6)	(4.6)
Bill with subsidy		JD/user	4.5	7.5	7.5	7.5	7.5	7.5
Bill before subsidy	45	JD/user	12.1	25.6	25.6	25.6	25.6	25.6
Subsidy		JD/user	-	(4.6)	(4.6)	(4.6)	(4.6)	(4.6)
Bill with subsidy		JD/user	12.1	20.9	20.9	20.9	20.9	20.9
Residential users without subsidies (non-low income residential users)								
Bill before solidarity charge	8	JD/user	7.0	5.7	5.7	5.7	5.7	5.7
Solidarity charge		JD/user	-	-	-	-	-	-
Bill with solidarity charge		JD/user	7.0	5.7	5.7	5.7	5.7	5.7
Bill before solidarity charge	20	JD/user	7.0	12.1	12.1	12.1	12.1	12.1
Solidarity charge		JD/user	-	-	-	-	-	-
Bill with solidarity charge		JD/user	4.5	12.1	12.1	12.1	12.1	12.1
Bill before solidarity charge	45	JD/user	17.6	25.6	25.6	25.6	25.6	25.6
Solidarity charge		JD/user	-	4.0	4.0	4.0	4.0	4.0
Bill with solidarity charge		JD/user	17.6	29.5	29.5	29.5	29.5	29.5
Non Residential								
Bill before solidarity charge	8	JD/user	14.8	15.2	15.2	5.7	5.7	5.7
Solidarity charge		JD/user	-	-	-	-	-	-
Bill with solidarity charge		JD/user	14.8	15.2	15.2	5.7	5.7	5.7
Bill before solidarity charge	20	JD/user	35.6	36.0	36.0	12.1	12.1	12.1
Solidarity charge		JD/user	-	-	-	-	-	-
Bill with solidarity charge		JD/user	35.6	36.0	36.0	12.1	12.1	12.1
Bill before solidarity charge	45	JD/user	78.9	79.2	73.3	25.6	25.6	25.6
Solidarity charge		JD/user	-	4.0	4.0	4.0	4.0	4.0
Bill with solidarity charge		JD/user	78.9	83.2	77.2	29.5	29.5	29.5

Module 12: Cash flow

MODULE 12. CASH FLOW					
CASH FLOW	JD (million) Base year	Four years Projection (JD million)			
	2007	2008	2009	2010	2011
Billed Revenue from tariffs water and wastewater	13.2	14.9	41.9	43.4	43.4
Other revenues	3.6	3.0	3.0	3.0	3.0
Total Revenues	**16.8**	**17.9**	**44.9**	**46.4**	**46.4**
Oprating expenses	20.9	21.4	21.4	21.4	21.4
Improving in maintenance	-	-	-	-	-
Total OPEX and maintenance	20.9	21.4	21.4	21.4	21.4
Net Income	(4.1)	(3.5)	23.5	25.0	25.0
Bulk water and investment paid by WAJ	-	-	15.0	30.0	30.0
CAPEX net of grants (pay as you go)	0.0	0.0	0.0	0.0	0.0
Net Cashflow before financing	**(4.1)**	**(3.5)**	**8.5**	**(5.0)**	**(5.0)**
Required debt financing		-	-	-	-
Net Cashflow after financing	**(4.1)**	**(3.5)**	**8.5**	**(5.0)**	**(5.0)**
Cash at the beginning of the period	15.8	11.7	8.2	16.7	11.7
Cash at the end of the period	**11.7**	**8.2**	**16.7**	**11.7**	**6.7**

Module 13: Financial Indicators

Module 13. FINANCIAL INDICATORS					
FINANCIAL INDICATORS	2007	2008	2009	2010	2011
Average water and wastewater tariff (JD/m3)	0.18	0.19	0.49	0.49	0.48
Operating ratio	1.24	1.19	0.48	0.46	0.46
Net Margin	-24%	-19%	52%	54%	54%
Composition of Revenues:					
Revenues from tariffs	79%	83%	93%	94%	94%
Revenues from other sources (sewerage tax, connection fees, etc)	21%	17%	7%	6%	6%
Composition of Operating expenses:					
Electricity	30%	36%	36%	36%	36%
Wages and Salaries	43%	43%	43%	43%	43%
Wastewater treatment	22%	21%	21%	21%	21%
Water network and improved maintenance	0%	0%	0%	0%	0%
Purchased water with current tariffs	0%	0%	0%	0%	0%
Others	6%	0%	0%	0%	0%
	100%	100%	100%	100%	100%
Number of Users	219,999				
Volume of water billed:					
Direct Users	75,350	77,261	85,000	88,000	90,000
Governorates and others	-	-	-	-	-

ANNEX 7: SUB-OPTIMAL WATER PRICING FOR MIYAHUNA

At the request of the tariff Committee the consultants present the analysis of two pricing alternatives: a) increasing block rates and b) specific subsidy for domestic consumption and pertinent recommendations.

1. BACKGROUND

The Kingdom of Jordan is preparing to meet the challenge of coping with much greater water scarcity. It is becoming clear that the country's economic growth, ecological balance and the population's welfare depend on safe and sustainable water supply and wastewater services. The challenge will be particularly acute for Greater Amman where the cost of additional water is escalating rapidly. Cognizant of the need to anticipate the looming water crisis the Government is acting on two fronts: (i) investing in additional supplies, such as the Disi conveyor and in the reduction of NRW; and (ii) through reforms, such as tariff restructuring, that will give producers the incentives to optimize water production and distribution and consumers the motivation to consume with a keen sense of the scarcity of water.

An Inter-ministerial Tariff Committee has been given the task of preparing for the consideration of the Cabinet of Ministers an updated water tariff policy for the whole Kingdom. The Consultants, supported by USAID, have been providing assistance to the Tariff Committee using for this analysis the situation in Amman (Miyahuna)[30]. The Tariff Committee has considered four requirements of a future water tariff policy:

1. The tariff should be *economically efficient*, i.e. it should inform producers and consumers of the future costs to capture, treat, and distribute water and subsequently collect, treat, and restore the treated wastewater to the environment[31]. Only when the tariff is allowed to reflect the complete economic costs will consumers be able to adapt their consumption to level where benefits from consuming the last cubic meter of water equal the costs of supplying it – the definition of economic efficiency;

2. The tariff should be *financially sufficient*, i.e. the financial revenue from water sales should be sufficient to pay for all financial costs associated with supplying water and managing the wastewater in an environmentally sustainable fashion. Financial self-sufficiency alleviates the Government budget from the burden of subsidizing the water supply and wastewater sector. It is obvious that it is wasteful to subsidize the consumption of the scarcest resource –water- by deliberately pricing it much below replacement cost. The budget savings resulting from discontinued subsidies can instead be redirected to meet other pressing social needs, for instance in the education, health and social sectors, where the principle of charging the full costs of services is socially unacceptable and unfair;

3. The tariff should be *socially equitable*, i.e. the entire population should afford to pay for and receive safe water and wastewater services irrespective of their levels of income; and

[30] Based on consumption and billing statistics for 2008.

[31] An important subsidy is WAJ's provision of bulk water to Miyahuna (estimated at JD 30 million per year). This subsidy is transferred to the final users, and therefore it has two undesirable outcomes: 1) lowers the price signal to Miyahuna and therefore its understanding of the real cost of water losses or Non Revenue Water; and 2) significantly reduce WAJ revenues impairing its capacity to improve maintenance throughout the Kingdom.

4. The tariff should be *simple* to understand and administer, i.e. consumers should be able to predict what the total bill of a given level of consumption will be, and it should be possible for producers to administer the tariff cheaply and reliably.

In considering the four requirements the Tariff Committee has recommended for ratification of the Cabinet of Ministers a tariff that would comprise three parts (Box 3):

1. A fixed-charge per quarter to cover costs not related to consumption (e.g. billing and collection);
2. A volumetric charge per m3 (reflecting the cost of services –Reference Price-) applied to all consumption and all users;
3. An explicit subsidy for those classified as poor residential consumers and the parallel elimination of subsidies to all users outside this category. The subsidy to those classified as poor should be financed by a "solidarity charge" that would be levied on remaining unsubsidized consumers.

A. Increasing Block Rates

1. Uniform or Increasing Block Rates[32]

A major concern of any future tariff is to encourage consumers and producers to conserve water. Some observers believe that water conservation would be promoted through the application of a structure of increasing block tariffs (IBT) where the average tariff progressively increases with higher levels of consumption. Such IBT structures have long been applied in many developing and some industrialized countries (USA for instance) in the belief that they are politically expedient to apply since higher average consumption levels are associated with higher household income levels. However, most developed and some developing countries are rapidly moving away from IBT in favor of uniform volumetric charges.[33]

A closer examination of the actual application of IBT structures reveals a number of their shortcomings as compared to structures with uniform volumetric charges.

In terms of *economic efficiency* an IBT tariff is inferior to a uniform volumetric charge because it will force a large number of users (residential and non-residential) to pay tariffs that are well above the economic cost of providing water. Such a situation is sub-optimal because these users will restrict their consumption and will lose the net benefits associated from the "saved" cubic meters of water where the benefits of water will be above the costs of supplying them. While such a retrenchment of water consumption will directly affect high income individual households, it is interesting to observe that it will often affect low-income households just as much or even more. The explanation is that low-income households often share a connection with other households or with an extended family (as is the case in Amman) which results in a higher aggregate consumption per household[34]. The application of IBT structures will have the effect of bumping aggregate low-income households into the higher consumption brackets with considerably higher average tariffs than they would pay under tariff structures with uniform

[32] Olmstead, Sheila M & Robert N. Stavins "Comparing Price and Non-Price Approaches to Urban Water Conservation". Water Resources Research, 2009

[33] See for instance "Pros and Cons of Alternative Tariff Designs", Water and Sewer Pricing Practice in the US; Experience with Marginal Cost Pricing, by Professor John J. Boland, Johns Hopkins University, Baltimore, MD

[34] For instance, in Amman household size is the lowest income decile (1) is 7.8 persons while in the upper income decile (10) is 3.8

volumetric charges. One empirical study concluded that low-income households ended up paying double of what they would have paid with uniform volumetric tariff structures.[35]

The comparison between IBT structures and uniform volumetric charges shows then that:

- Economic efficiency is less under IBT structures than under uniform volumetric charges;
- Social equity suffers since low-income households without individual meters or with a large family end up paying more per cubic meter of water consumed than they would under uniform volumetric charges;
- The simplicity (and understanding) and the administration of the tariff are reduced under IBT structures as compared to uniform volumetric charges. The latter are arguably the easiest to understand and reduce the temptation to tamper with meters and/or colluding with water meters in order to be classified within a lower consumption bracket that has a lower volumetric charge under IBT structures[36].

2. Effect on Water Conservancy from Increasing Block Tariff Structures

It is sometimes argued that IBT structures encourage high consumers to conserve water. This observation is correct but forgets the fact that IBT structures typically overcharge high-bracket households but undercharge low-bracket households (to reach a revenue neutral outcome). Although high-bracket consuming households may conserve more water than they would under uniform volumetric charges the low-bracket consuming households will tend to consume more water than they would under uniform volumetric charges. Attachment 1 presents a hypothetical case based on total consumption levels of Miyahuna customers under an illustrative IBT structure as compared to uniform volumetric charges[37]. This simple analysis that compares what total consumption and revenues will be under two scenarios of differential IBT structures and with different levels of price elasticities[38] of water demand with respect to average price/tariff concludes that the net effect on the total level of consumption would be nil under the scenario of constant price elasticities and negligible under the scenario of differential price elasticities.

3. Conclusion

The comparison between two alternative tariff structures, Increasing Block Tariffs (IBT) and Uniform Volumetric Charges (UVC) shown in Attachment 1, indicates that IBT structures result in (i) likely revenue losses;(2) losses in economic efficiency; (iii) impaired social equity: and (iv) loss in simplicity and ease of tariff administration as compared to the proposed UVC tariff structure. Therefore, the consultants strongly recommended implementing a UVC tariff to replace the present opaque system of Increasing Block Rates.

---

[35] "Possible Adverse Effects of Increasing Block Water Tariffs in Developing Countries" , Dale Whittington, The University of Chicago, 1992

[36] One drawback of IBT is that there is no methodology to help design the size of the volumetric blocks and the price differential for each block. Therefore, this system is capricious and not easy to explain particularly if different differentials are applied throughout the Kingdom.

[37] Residential water consumption is low in Jordan but varies significantly among Governorates. For instance, in Amman, 30% of households consume less than 20 m3 per quarter while in the Northern Governorates the percentage of households in about 55%. This difference creates problems for the Government in creating (and explaining) different consumption blocks throughout the Kingdom and the price differentials for each block and in each Governorate.

[38] There is no information on price elasticities in Amman; the values adopted reflect average values from different studies.

While the consultants have proposed a uniform volumetric rate that reflects economic and financial costs the change to a new structure will take several years – likely three to five- as the implementation as an abrupt tariff change is likely to create unrest in the population. Therefore, during this transition period the actual tariff structure will continue to be an IBT structure evolving towards a uniform rate. During this period, changes in consumption in different groups can be monitored to ascertain the impact on total consumption and revenues.

Given that Non Revenue Water is about 54 million m3 per year (1.5 m3 per second) -42% of production - a significantly higher impact on water savings would be accomplished by and aggressive program to reduce these losses. Removing the bulk water subsidies from WAJ to Miyahuna would likely have a more significant and lasting effect than IBT.

B. Subsidy Based Only On Consumption

The Tariff Committee requested an assessment of the option of allocating the subsidy to residential users based on consumption and limited to the first 20 m3 per quarter.

Based on consumption data for 2008 (Annex 3), some 119,000 residential users in the 0-20 m3 per quarter bracket would benefit from the subsidy. This group used 4.9 mm3 in 2008 (6.4% of total consumption). However families that consume over 20 m3 per quarter would not receive a subsidy for any level of consumption.

Accepting the recommendation that a poor family does not pay more than 1% of the poverty line (JD 10.41 per quarter) and that a fixed-charge to cover billing and collections costs (JD 1.90 per user per quarter) is applied, the volumetric rate for this group would be JD 0.426 per m3 ([10.41 – 1.90]/20).

Taking the reference price as JD 1.42 per m3 volumetric, to recover the subsidy from those residential consumers that consume more than 20m3 and all non-residential users that volumetric rate to these users would be:

(1.42 – [0.43*0.064])/(1-0.064) = 1.488 per m3

It all residential users would receive a subsidy for the first 20 m3 the total subsidized consumption would be some 33 mm3/year or 44% of total consumption and the non subsidized tariff would be JD 2.20 per m3.

Under these assumptions the effect on different users is presented in the table below:

TARIFFS UNDER ALTERNATIVE SUBSIDY OPTION (JD PER QUARTER)

User	Consumption m3 per quarter	Payment JD/q
Residential	10	6.16
Residential	20	10.41 a/
Residential	21	32.14
Residential	40	61.40
Non-residential	10	16.78
Non-Residential	20	31.65
Non-Residential	21	32.14
Non-Residential	40	61.40

a/ Due to rounding

Under this subsidy option a substantive increase in the bill occurs when a residential user consumes over the subsidized threshold limit of 20 m3 per quarter (from JD 10.41 to JD

32.14) which is likely to raise complaints from users that consume over but close to the subsidy limit.

The design of a smother price transition under this option would lead to the return to the present system of many block rates and to the loss of transparency in the allocation and recovery of subsidies.

For these and other reasons, in particular the loss of transparency as to the level of subsidy and how to recover it (previously explained in the main report) the consultants do not recommend this option.

ATTACHMENT 1

ESTIMATING THE EFFECT OF INCREASING BLOCK RATES ON TOTAL WATER CONSUMPTION AND REVENUES IN MIYAHUNA

1. Basic data for Calendar Year 2008

- Production to the distribution system 127 million m3
- Consumption 75 million m3
- NRW 52 mm3
- Total Consumption in bracket
    - Lower consumption bracket: 0 - 40 m3/quarter = 21 million m3
    - Higher consumption bracket: > 40 m3/quarter = 54 million m3
- Reference price (Pr) = 1.42 JD/m3 (cover all costs)
- Finance Revenue from Uniform Volumetric charge
  = 75x1.42 = JD 106.5 million

2. Assumed Differential IBT Tariffs to Maintain Constant Financial Revenue

Estimated base price (Bp) for differential tariffs [to reach same revenue]

- > 40 bracket:
    - Assume Base price (Bp) = 1.42 x 1.25 = 1.78 JD/m3;
    - (Overpricing with respect to Pr (ΔP) = 0. 36 /m3
    - Expected Revenue = 1.78 x 55 = JD 97.9 million
- < 40 bracket Bp = 0.30 JD/m3
    - Base price = (106.5 -97.9)/20 = 0.41/m3
    - (Under pricing with respect to Pr (ΔP) = JD 1.01 /m3 or 70%)
    - Expected Revenue= 0.41 x 21 = JD 8.6 million
- Expected total (neutral) = 97.9 + 8.6 = JD 106.5 million

2.1 Scenario 1: Effect from uniform price elasticity on consumption in each bracket:

- Price elasticity (assumed constant = - 0.03)[39]
- Consumption (0-40) = 21 (1 + (-0.3).(0.41 -1.42)/1.42) = 25.4 million m3
- Consumption (> 40) = 54 (1 + (-0.3).(1.78 -1.42)/1.42)) = 49.9 million m3
- Total consumption =75.3 million m3
- Net Effect on Total Consumption = +0.2 **million m3 (0%)**
- Net revenues = 25.4x0.41 + 49.9x1.78 = 99.2 JD million

- Net effect on revenues = 99.2 – 106.5= **- 7.3 JD million (-7%)**

[39] Many studies have found that price elasticity for high consumers is higher (more negative) than for low consumers (scenario 2).
Price elasticity e = (ΔQ/Q)/(ΔP/P) ; ΔQ = e.Q. /(ΔP/P); where ΔQ is the change in consumption due to a change in price (ΔP).

2.2 Scenario 2: Effect from different price elasticities on consumption in each bracket

Assuming an elasticity of -0.4 for consumption higher than 40m3, and -0.2 for consumption below 40 m3 per quarter the net effect on total consumption will be:
Taking into account the effect of different price elasticities

- Consumption (0 - 40) = 21 (1 + (-0.2).(-1.01/1.42)) = 25.4 million m3
- Consumption (> 40) = 54 (1 – (0.4).(0.36/1.42)) = 48.5 million m3
- Total consumption = 73.9 million m3
- Net Effect on Total Consumption = **- 1.1 million m3 (- 1.5% of production)**
- Net revenues = 25.4x0.41 + 48.5x1.78 = 96.7
- Net effect on revenues = 96.7 – 106.5 = **- 9.8 (9.2%)**