



**USAID** | **JORDAN**  
FROM THE AMERICAN PEOPLE

# IDARA (INSTITUTING WATER DEMAND MANAGEMENT IN JORDAN)

Sub-Task 1.5.3 Capacity-Building for Private Sector: Assessment of Barriers and Opportunities to Increase Participation in Water-Efficient Markets

Final Draft – March, 2011

This publication was produced for review by the United States Agency for International Development. It was prepared by DAI, Bethesda, MD.

# IDARA (INSTITUTING WATER DEMAND MANAGEMENT IN JORDAN)

Sub-task 1.5.3 Capacity-building for the Private Sector:  
Assessment of Barriers and Opportunities to Increase  
Participation in Water-Efficient Markets

## DISCLAIMER

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

## ACKNOWLEDGEMENT

This report was prepared by Mr. Patrick Doyle, Ms. Dana Kenney, Eng. Louis Qaqish, and Ms. Lara Shahin.

USAID-IDARA wishes to thank and acknowledge the following entities for their contribution and support in this assessment:

- Water Demand Management Unit at the Ministry of Water and Irrigation.
- Jordan Forum for Business and Professional Women (JFBPW).
- Water utilities: Miyahuna- Jordan Water Company, Yarmouk Water Company, Aqaba Water.
- Ministry of Public Works and Housing (MPWH).
- Ministry of Tourism and Antiquities (MOTA).
- Housing and Urban Development Corporation (HUDC).
- Jordan Standards and Metrology Organization (JSMO).
- Royal Scientific Society (RSS).
- Greater Amman Municipality (GAM).
- Customs Department.
- Jordan Green Building Council.
- Water/Energy Service Companies (W/ESCOs): ECO Engineering and Energy Solutions, Green Tech Sustainable Environment, Terra Vertis, Energy Management Services Int., Nur Energy and Water Management, Ramz Engineering Est., Arabian Environment Technology.
- Manufacturers, importers, and retailers of plumbing products: Sayegh Group, Middle East Complex for Eng., Electronics and Heavy Industries, Bashiti stores, Nabils and Amed, Izzat Marji Group, Grohe, Zuhair Essa Murad, Ahmed Essa Murad, Ahmed Nabil Ashour- SINGER, Diyab Qawasmi Co. Bosch, National Star, Kayali stores.
- Cairo Amman Bank and Arab Bank.
- Vocational Training Corporation (VTC).
- Jordan Engineer Association, Jordan Hotels Association, Hospital Association, Jordan Rivers Association (JRA), Plumbing Products and Ceramic Association.
- Center of Accreditation and Quality Assurance (CAQA).
- Decent Housing for Decent Living Initiative.
- USAID projects: PAP, SABEQ, and RAIL II.

## Table of Contents

Abbreviations and Acronyms .....	6
1. Executive Summary .....	7
2. Introduction and Background .....	9
2.1. Objective .....	9
2.2. Approach and Methodology.....	9
3. Market Assessment for Water Efficient Plumbing Products.....	11
3.1. Current Situation .....	11
3.2. Roles of Key Stakeholders .....	11
3.3. Barriers and Challenges.....	12
3.4. Relevant International Experience and Findings .....	16
3.5. Opportunities and Strategies .....	23
4. Market Assessment for Water Efficiency Services.....	30
4.1. W/ESCO Savings and Performance Guarantee Contract Models.....	32
4.2. Financing Programs .....	41
4.3. Facility Operations and Maintenance (O&M) Services.....	43
4.4. Green Building Design and Certification Services .....	44
4.5. Wastewater Re-use Services.....	44
4.6. Leak Detection Services .....	44
4.7. Training and Awareness .....	44
5. Summary and Conclusions .....	46
Appendix A: Recommended First Steps to Strengthen the W/ESCO Market in Jordan .....	48
Appendix B: Workshop Water Efficiency Marketplace Questionnaire/Survey .....	50
Appendix C: Workshop Water Efficiency Marketplace Questionnaire/Survey Results .....	50

## List of Figures

Figure 1: Average quarterly total water bills vs. consumption .....	13
Figure 2: Water demand by customer class categories .....	14
Figure 3: MENA water tariff operating cost coverage ratio* .....	17
Figure 4: Average water tariffs for eight water-deficient cities .....	19
Figure 5: Payback periods for water efficient plumbing products for various savings and cost assumptions - California .....	20
Figure 6: Notional impact of a rebate for water efficient products along the value chain .....	21
Figure 7: Payback periods for WSDs and water efficient toilets at existing and increased residential tariffs .....	24
Figure 8: End use analysis: residential indoor end uses by percent, Amman-Jordan.....	28
Figure 9: Office building end uses in Jordan.....	28
Figure 10: Preliminary market size and market growth potential for water efficiency services in Jordan.....	30
Figure 11: W/ESCO contracting and project finance models.....	33
Figure 12: US ESCO industry ownership .....	38
Figure 13: Estimated size of W/ESCO industries by country .....	39
Figure 14: Innovative financing models for residential and small commercial customers .....	42

## ABBREVIATIONS AND ACRONYMS

ACC	Amman Chamber of Commerce
ACI	Amman Chamber of Industry
DSM	Demand-Side Management
AW	Aqaba Water
AWE	Alliance for Water Efficiency
ESCOs	Energy Services Companies
GAM	Greater Amman Municipality
JD	Jordanian Dinar
JVA	Jordan Valley Authority
JEA	Jordan Engineers Association
JSMO	Jordan Standards and Metrology Organization
M	Million
MCM	Million cubic meters
MOA	Ministry of Agriculture
MPWH	Ministry of Public Works and Housing
MWI	Ministry of Water and Irrigation
NWMP	National Water Master Plan
O&M	Services Operations and Maintenance Services
PMU	Programme Management Unit
RSS	Royal Scientific Society
TDS	Total Dissolved Solids
WAJ	Water Authority of Jordan
WASCOs	Water Services Companies
WDM	Water Demand Management
WDMU	Water Demand Management Unit
WEPIA	Water Efficiency and Public Information for Action
W/ESCOs	Water/Energy Services Companies
WIS	Water Information System
WSD	Water Saving Device
WUE	Water Use Efficiency

## 1. EXECUTIVE SUMMARY

Although the constraints on Jordan's water resources is often considered a burden, they could become an asset - forcing Jordan to become an early adopter of advanced technologies and business models that propel Jordanian businesses to market leadership. Jordan has significant assets, including strong legal and intellectual property protections, a market-friendly economy, and a skilled workforce.

The private sector can play an important role in helping Jordan reduce its water demand through efficient plumbing products and water efficiency services. However, there are well-recognized and nearly universal barriers to the growth of water efficiency markets-primarily financial, institutional and informational. There are numerous business strategy frameworks that can be used to evaluate the potential size and profitability of a market. Key factors include:

- Market size and expected market growth
- Investment requirements and cost of capital
- Competition in the market and barriers to market entry
- Influence and certainty of government regulations
- Cost of customer acquisition and the threat of substitutes
- Importance of economies of scale and scope

This assessment provides an overview of both the market for water efficient products as well as water efficiency services. This market analysis focuses on toilets, showerheads, faucets, and clothes washers, which account for the vast majority of residential and commercial water use in Jordan. The local plumbing products marketplace includes product manufacturing and assembly factories, product importers and exporters, as well as the wholesale and retail business sectors that distribute and sell these products.

The market assessment for water efficiency services focuses on Water/Energy Service Companies (W/ESCOs) but also considers other services such as utilities service providers, operations and maintenance, and green building design and related services. W/ESCOs play an important role in facilitating investment in efficiency. Some industrial operators and building managers do not have the technical capacity to undertake energy and water efficiency improvements independently. Clients working on their own often select the lowest cost approach which can be quickly executed, rather than considering the long-term savings of investing in efficiency. Overcoming the "first cost hurdle" requires long-term finance that will pay back the high initial capital costs of energy and water savings over a period of years. W/ESCOs can help address these barriers by providing upfront value-added engineering/green building design advice, but more commonly they are engaged in retrofitting existing buildings and reducing the risks to entities investing in water and energy efficiency by providing savings guarantees. Access to finance is critical for all enterprises, but more so for W/ESCOs. They generally must finance the project during construction, and sometimes under the "shared savings" model, they also provide long term financing for the projects.

This report includes numerous potential actions that the Government of Jordan, as well as donors and the private sector, can take to promote development of the markets for water

efficiency products, technologies and services. Many Government and donor activities are helping to reduce market barriers and increase private sector participation. Continued support for utility demand side management plans, public education and plumbing code updates are critical to market expansion. Other potential actions identified during this task include:

- Promoting and supporting water utility demand management plans.
- Supporting the outsourcing of technical services in water efficiency by government and utilities.
- Establishing aggressive goals for water and energy efficiency in government facilities and increasing the use of W/ESCO and Operation and Maintenance (O&M) services in government buildings through energy/water performance contracting and financing.
- Expanding customs and tax exemptions on water efficient products.
- Increasing awareness of water and energy efficient plumbing products through retailers, manufactures, W/ESCO's, Ministry of Water and Irrigation and water utilities.
- Providing technical and financial assistance in establishing a targeted retail rebate program for selected water efficient products.
- Evaluating the potential for utility facilitated on-bill financing of water efficient products by consumers.
- Enhancing water-focused training for architects, engineers, consultants, plumbers and contractors.
- Developing a concept paper for working with selected banks, USAID and other donors to use the Development Credit Authority to provide loan guarantees for water and energy efficiency retrofits.
- Working with the Jordanian Loan Guarantee Corporation and a particular sector to develop guarantees for water/energy efficiency loans.
- Supporting the public recognition and demand for "Green Building" certifications.
- Providing training and tools for engineering design firms/consultants that allow quick savings calculations of water efficient plumbing products.

## **2. INTRODUCTION AND BACKGROUND**

Jordan is the fourth water poorest country on earth. Demand for water already exceeds Jordan's available water resources. Annual per capita water availability has declined from 3,600 cubic meters per year in 1946 to around 150 cubic meters per year in 2008. Water demand is currently estimated at around 1,530 MCM versus 870 MCM of water resources. The demand is projected to increase to around 1,670 MCM by 2022. The high water shortage has caused a drastic over-abstraction of the groundwater aquifers that are pumped at two folds the safe yield. On the other hand, Jordan's stability, tourism attraction, quality of business and health services make it as a prime regional hub for investment. This challenging situation provides a great opportunity for utilities to shift from water supply management to an integrated water supply-demand management approach where Water Demand Management (WDM) is an integral component of water resources management, as stipulated in the 2009 National Water Strategy. WDM refers to the implementation of policies and institutional, legal, technical, economic, public educational tools to promote water use efficiency and water savings through using of efficient plumbing products and services.

### **2.1.OBJECTIVE**

The objective of this task is to assess the barriers and opportunities for key industrial and commercial associations, manufacturers and retailers, engineering firms and tradespersons to increase their participation in water-efficient markets. In particular, this report focuses on the water efficient products and services. Since the majority of water-using products also use energy, and because the provision of water efficiency services is closely linked with energy efficiency services, this report integrates and often refers to energy efficiency as well as water efficiency.

### **2.2.APPROACH AND METHODOLOGY**

Below is the methodology that was adopted when conducting the market assessment of barriers and opportunities in the water efficient market:

- Nineteen interviews with major stakeholders were conducted in Jordan from October 3 to 14, 2010. Stakeholders in the water efficient products and services market include plumbing products manufacturers, importers and distributors/retailers, W/ESCOs and other architectural, engineering (A&E) and construction companies as well as other service providers (including women-owned businesses), industrial and commercial associations, Government-owned utilities, Government organizations, and financing institutions. Government organizations include the Ministry of Water and Irrigation (MWI), water utilities including: Miyahuna- Jordan Water Company, Yarmouk Water Company and Aqaba Water, the Ministry of Public Works and Housing (MPWH), the Housing and Urban Development Corporation (HUDC), Greater Amman Municipality (GAM), the Royal Scientific Society (RSS), and Jordan Standards and Metrology Organization (JSMO). Industrial and Commercial Associations include Hotels, Restaurants and Hospitals Associations, the Plumbing Products and Ceramic Association,

the Amman Chamber of Industry (ACI), the Jordan Engineers Association (JEA), and the Jordan Forum for Business and Professional Women (JFBPW).

- A workshop was conducted on October 12, 2010 to discuss the barriers and opportunities in water efficient markets. Approximately 40 stakeholders attended this workshop, and presented their views through group exercises and individual questionnaires (Results of the questionnaire are in Appendix C).
- Telephone interviews were conducted with six international water and energy services companies (W/ESCOs).
- A review of reports and data from the following organizations were conducted: World Bank, Global Water Intelligence, Water Resources Research, Organization for Economic Cooperation and Development (OECD), the US Foreign Commercial Service, the International Development Research Center (IDRC), the WaterReuse Association, and Institute for International Development (IISD). In addition, the following reports were reviewed: Assessment of the Water-Saving Devices (WSDs) Sector Final Report, USAID-WEPIA Project (2000), a Market Survey Report for Labeling of Water-Using Products, USAID-IDARA Project (July 2009), a Work Plan to Implement a Labeling Program for Water-Efficient Products, USAID-IDARA project (July 2009), and An Analysis of the Plumbing Product Marketplace in Jordan, USAID-IDARA project (September 2010).

### **3. MARKET ASSESSMENT FOR WATER EFFICIENT PLUMBING PRODUCTS**

#### **3.1.CURRENT SITUATION**

The term plumbing products, refers to those water using products and appliances typically found in residential and small commercial applications, e.g. toilets, showerheads, faucets, and clothes washers. The water consumption of these four products account for the vast majority of residential and commercial water use in Jordan. The local plumbing products marketplace includes product manufacturing and assembly factories, product importers and exporters, as well as the wholesale and retail business sectors that distribute and sell these products. The plumbing product marketplace has a major influence on water use in Jordan. It will be likely that the water efficiency of the plumbing products in Jordan will improve if efficient products are available in the marketplace, i.e., manufactured, imported, or sold in Jordan. Manufacture of water-efficient plumbing products in Jordan has decreased in recent years. Most plumbing products in Jordan are imported. While only a few years ago there were three separate and distinct toilet manufacturers operating in Jordan. There is currently a sole faucet manufacturing facility in Jordan, operating at only 40% capacity serving the domestic market and exports.

A study conducted in 2010 for the analysis of the plumbing products marketplace in Jordan<sup>1</sup> concluded that, in general, wholesalers/retailers are somewhat frustrated with the current situation in the marketplace, especially concerning the importation of low cost, low quality, and often non-compliant products into Jordan. These same views were expressed in general terms by all interviewees for this task.

#### **3.2.ROLES OF KEY STAKEHOLDERS**

There are different key stakeholders in the water efficient market such as: The Ministry of Public Works and Housing (MPWH) which is responsible for the development of a new plumbing code under the oversight of a committee consisting of MPWH, JSMO, RSS, the private sector (contractors and consultants), Miyahuna, and the MWI Water Demand Management Unit (WDMU). JSMO is responsible, according to the Standards and Metrology Law No. 22 (2000), to ensure that products available in the market are compliant with the adopted technical regulations. JSMO is also responsible for accreditation of testing and calibration laboratories and certification bodies, including the RSS. JSMO is currently in the process of updating standards for water using appliances and plumbing products. Jordan Engineers Association is responsible for inspection and licensing of electromechanical works. The Customs Department is currently reviewing tax exemptions for efficient plumbing products. The Greater Amman Municipality (GAM) reviews and stamps building plans and issues a city license. Their coordinating role is not only administrative; they also provide incentives linked to certain water and energy measures. GAM is planning a new zoning law that incorporates water supply issues. GAM is in the process of developing a Green Building Guide to be presented to Department of Public works. Implementation of the Green Building standards is expected to begin in June 2011 with a plan to incorporate it in the code after two years.

---

<sup>1</sup> IDARA, An Analysis of the Plumbing Products Marketplace in Jordan (September, 2010)

### 3.3.BARRIERS AND CHALLENGES

#### Price of water

There are numerous water-efficiency technologies installed in Jordan, though few manufacturers—most technologies are imported. The market for water-efficiency technologies is smaller than for energy-efficiency technologies, primarily because the cost of electricity and fuel is higher than water. Governments worldwide are reluctant to price water at its true cost, instead subsidizing water for all users, regardless of their ability to pay; therefore, there is less profit in the water efficiency business than in the energy efficiency business.

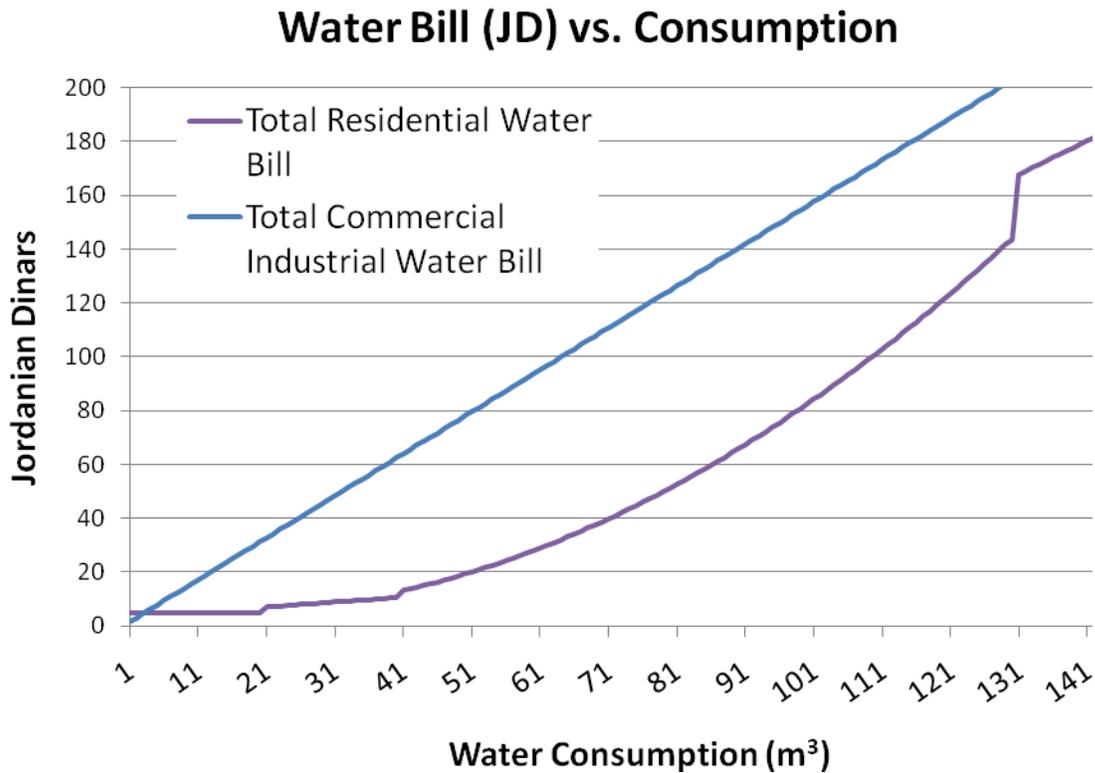
Fortunately, according to MWI, the most recent increase in tariffs in Jordan has ensured that revenue covers operating costs. However, despite the fact that Jordan is one of the poorest countries in the world in terms of water availability current retail rates do not cover capital costs.<sup>2</sup> Importantly, raising tariffs is not the only way to reduce the gap between costs and collections; reducing non-revenue water is also a key factor. The survey results from the October 12, 2010 stakeholder workshop identified the price of water as sixth out of a list of thirteen barriers to adoption of water-saving technologies.

Tariff design is also important in terms of promoting water conservation. In Jordan, domestic water and sanitation tariffs are progressive, rising with each "block" of consumption. As in other countries, this system is intended to protect the poor and induce water conservation. It keeps prices relatively low for small consumers connected to the network. The water agency offsets this shortfall by charging a fairly high price for successive blocks. Thus there is cross-subsidization between consumers. Figure 1 demonstrates how total water bills for Miyahuna residential customers increase as water use increases under the increasing block tariff established in 2006.

---

<sup>2</sup> Jordan Ministry of Water and Irrigation, Programme Management Unit Monitoring Report of Miyahuna, 2007

Figure 1: Average quarterly total water bills vs. consumption



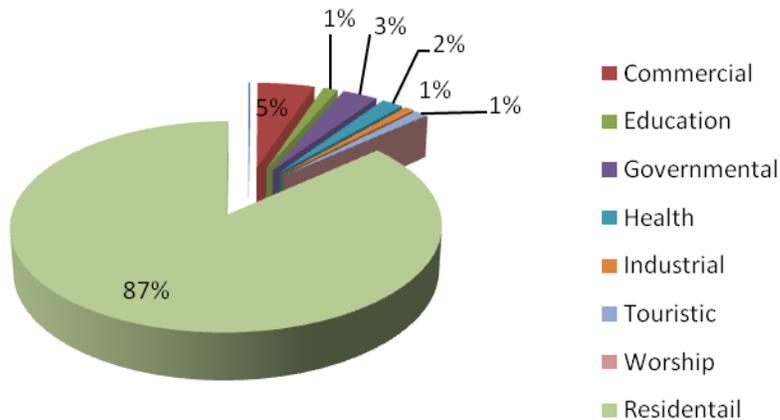
Note: Amman and Zarqa Tariffs -2010

### Consumer and retailer awareness

Though economists promote tariffs which cover the economic or scarcity value of water as the key to reducing water demand, other barriers to the adoption of water efficient technologies exist in the Jordanian marketplace. Since the residential and the commercial sectors constitute the majority of billed water use in Amman (see Figure 2), it is essential to understand the barriers to purchase and install water efficient products in this segment of the market. Stakeholders surveyed identified lack of availability of water efficient products, lack of customer and retailers' awareness of technologies and where to find them and inability to distinguish efficient products from non-efficient products as the top challenges to water efficiency product sales. A market survey of Jordanian plumbing product sales conducted in July 2009 concluded that water efficiency is considered to be an important factor in product selection, however around 50% of consumers are able to distinguish high water efficient products from less water-efficient products.<sup>3</sup>

<sup>3</sup> IDARA, Market Survey Report for labeling of Water using Products, July 2009 (survey of consumers in stores)

**Figure 2: Water demand by customer class categories**



Source: Water Use Efficiency Plan draft for Jordan Water Company (Miyahuna) June, 2010

### **Plumbing product labeling**

The market survey conducted in July 2009 clearly identified the need for an improved product labeling program to raise awareness of water-saving devices and water-saving features of plumbing products. The majority of plumbing products do not have water efficiency labels. Labels either do not exist or are not simple or easy for consumers (and retailers) to comprehend, and the labels which do exist are not always exposed to customers. Several plumbing products retailers visited under the scope of this task mentioned the need and opportunity to raise their customers' awareness of water efficiency.

### **Products cost and availability**

Stakeholders identified the cost of products among the three most important factors for the purchase of plumbing products. Most water efficient technologies are imported from outside Jordan. As mentioned above, there are no factories producing toilets in the country. There is currently only a single faucet manufacturing facility in Jordan and there are several washing machine factories, though the water usage levels of their product are unknown. The Jordanian toilet manufacturing sector faces huge barriers both in terms of developing/producing leading edge products and being able to offer competitive pricing. Toilets produced in developing nations, such as India and China, are often less expensive and of lower quality than locally produced products.

Faucet manufacturing has also seen a decline in Jordan. According to the September, 2010 Marketplace report<sup>4</sup>, the faucet factory present in Jordan is now profitable and even growing

---

<sup>4</sup> IDARA, An Analysis of the Plumbing Products Marketplace in Jordan (September, 2010)

slowly, mainly due to exports to Yemen, Sudan, Oman, UAE, Egypt, and Palestine which constitutes around 40% of their current sales. It would be difficult for a new faucet-manufacturing factory to emerge in the current Jordanian marketplace because of the high capital and operations cost, which includes the costs associated with construction or rental of factory, labor fees, materials costs, and financial losses during initial start-up years. In addition, among the challenges that face local manufacturers is the presence of low cost inferior imports, and the relatively small market size in Jordan, which makes exporting products a necessity to survive in the market.

Similar to other countries, there are several aspects of the Jordanian marketplace that may negatively impact the development and growth of the local plumbing product manufacturing and assembly sector. It is difficult for local manufacturers that produce high-quality products and pay suitable wages to compete with low quality, 'cheap' products imported from other countries where wages and production costs are much lower, and/or energy costs are subsidized either directly or indirectly. The high price of land outside of Development Zones is an impediment to the construction of new factories and/or research and development centers. The high cost of borrowing money from the banks in Jordan is an impediment to the construction of new factories or the development of new technologies.

On another note, it has been indicated in the July 2009 Market Survey Report that salespersons are not encouraged to sell water-saving devices such as flow restrictors, aerators and toilet dams in their stores due to low profit margins or perceived lack of sufficient demand. However, stores which carry these devices have seen demand for these products steadily increase over the past two years.

### **Inspection and products quality**

Lack of quality control of imports may also be a challenge. Reportedly, some low cost, low quality products (esp. faucets) imported into Jordan are made from zinc instead of brass and, therefore, fail to meet the "made from" requirements of Jordan's standards, yet they are available in the Jordanian market. There are also many low cost product forgeries imported into the Jordanian marketplace, some of which are reportedly virtually exact "knock-offs" of legitimate products, including all branding and labeling. Sometimes forged labels are affixed to non-compliant products, making them appear to be legitimate, high quality products.

JSMO requests product samples after the shipment has been admitted to Jordan. Importers of non-compliant products often provide JSMO with samples of compliant products, but sometimes the samples submitted to JSMO for inspection may not reflect the true quality of the entire shipment.

### **Customs duties**

Due to the higher cost of products from Europe and the relatively low cost of Chinese products, customs taxes play a large role in determining the final price of imported products in the marketplace. A combined 50% customs and import tax plus shipping doubles the price of products. For example a low-cost faucet imported for \$60 would sell for \$120 retail and a \$200

high-cost faucet for about \$400 retail. <sup>5</sup>The Customs Department currently exempts only “add-on” water-saving devices such as toilet dams, faucet aerators and showerhead control devices. A customs tax of 20% is applied to most mixers but customs taxes for other products vary by country of origin.

### **Standards**

Most of those interviewed for the Marketplace report expressed a strong commitment to supporting more stringent plumbing product standards in Jordan, and even a performance or efficiency rating system for plumbing fixtures – but only if such standards could be and would be effectively enforced. Unfortunately, it was clear from the responses received during interviews that most wholesalers/retailers feel that JSMO should improve their current level of enforcement. These views were repeated during the interviews conducted under this task.

Though JEA is responsible for inspection and licensing, GAM is responsible for the building envelope. MOPW is also developing a guide for Green building, to be presented to stakeholders. Implementation is expected to begin in June 2011 with the guidelines becoming a code after two years. GAM currently has no role in enforcing building codes, though it issues building licenses. This is a challenge to effective enforcement. GAM also plans to develop a new zoning law in 2011, taking into account the supply of water in specific locations.

### **Water quality and availability**

Water quality varies throughout Jordan and the existing of scale and sediments has a major impact on the performance of plumbing products particularly water saving flow restrictors in showers and faucets. In a survey audit of plumbing devices under the WEPIA project in 2000, many of the toilets leaked due to scale and sediment in the water.

Water pressure varies greatly, but is often very low. Sporadic water availability (e.g. water supply only one day per week) and low water pressure has coerced Jordanians to conserve and store water.

## **3.4.RELEVANT INTERNATIONAL EXPERIENCE AND FINDINGS**

### **Price of water**

As of 2002, many water utilities in MENA region countries were not covering operational costs. Figure 3 illustrates the ratios of water operating cost coverage in the MENA region (all but Rabat data is from 2000 and 2002). However, this phenomenon is far from unique to the MENA region. A 2004 survey of utilities around the world indicate that 39 percent operate with tariffs that do not cover operations and maintenance (O&M) costs,<sup>6</sup> though recovery of O&M costs of providing services is a stated goal of water utilities throughout the world. The majority of African water utilities have adopted policies to cover O&M costs for urban water (91%) and

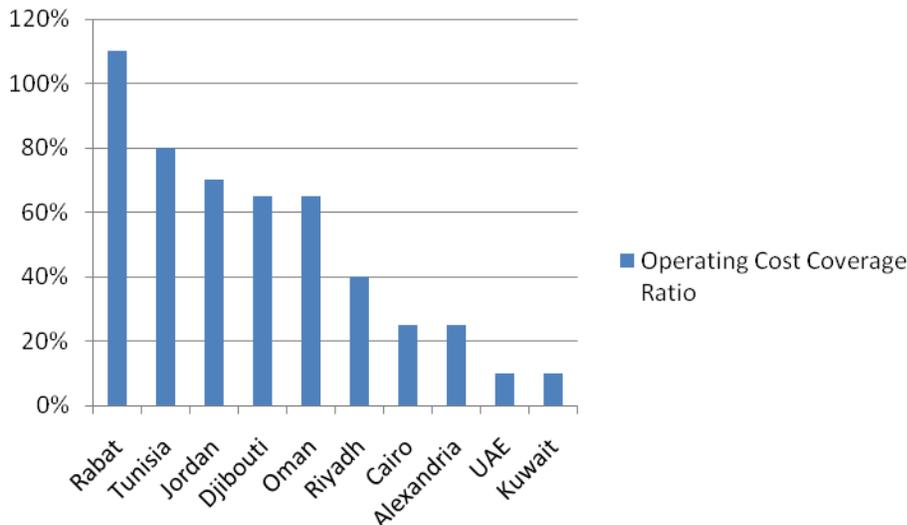
---

<sup>5</sup> 30% for customs taxes, 16% for VAT and 2% for shipping costs plus a 30% profit margin, in some cases

<sup>6</sup> Global Water Intelligence Vol. 5, Issue 9, September 2004

wastewater (55%). Though these utilities have been successful in implementing the policies to recover O&M costs, few utilities can recover even a small part of their capital costs.<sup>7</sup>

**Figure 3: MENA water tariff operating cost coverage ratio\*<sup>8</sup>**



Source: “Making the Most of Scarcity” World Bank MENA Development Report 2007

\*Except for Rabat, all percentages based on data from 2000 or 2002.

The World Bank’s “Making the Most of Scarcity” MENA Development Report 2007 identified the low price of water, and particularly the fact that tariffs do not cover operating costs, as a major barrier to allocating scarce water supplies in the Middle East and North Africa. In Morocco and Tunisia, as in Jordan, domestic water and sanitation tariffs are progressive, rising with each "block" of consumption. This system is intended to protect the poor and induce water conservation. It keeps prices relatively low for small consumers connected to the network. The water agency offsets this shortfall by charging a fairly high price for successive blocks. Thus there is cross-subsidization between consumers. The block tariff formula has drawbacks; in some cases, the artificially low price for the first or "social" consumption block may not really benefit the target population. Progressive pricing is also supposed to induce bulk consumers to save water, and to encourage the rational use of water in peak demand seasons. Case studies in Tunisia and Morocco by the International Development Research Center show that customers have shifted from the higher to the lower consumption blocks based on this pricing scheme.

Studies have shown that consumers in the US become more sensitive to water prices as they increase, and are more sensitive to prices in the long run than the short run due to investments over time in reducing water use. Price elasticity may also increase under increasing block tariffs

<sup>7</sup> Banerjee, S., Foster, V., Ying, Y., Skilling, S., Wodon, Q., Cost Recovery, Equity and Efficiency in Water Tariffs: Evidence from African Utilities, *World Bank Report #5384*, July, 2010

<sup>8</sup> The MWI determined in 2007 that Jordan’s tariffs cover operating costs; this was not the case in 2002, the year of the data used in Figure 8

(as in Jordan where the marginal volumetric water price increases with consumption for residential customers) and when more price information is available to consumers, though high income households are less sensitive to price increases than low income consumers.<sup>9</sup> This pattern of price elasticity is seen in other countries as well.

However, the price of water alone is generally not sufficient to motivate all sectors to conserve. Payback periods depend not only on price but also on usage. The impact of water prices on plumbing product sales will depend on the sector, customer usage, income levels and other motivating factors. For example, some individuals and organizations are motivated by the impact of dwindling water reserves on the planet. Others may be motivated by the potential impact of increased long run marginal costs of water (due to expensive new supply) on economic development.

Interestingly, water tariffs worldwide rose by an average of 6.7% from 2007 - 2008 at constant exchange rates, primarily due to the increasing long-run marginal costs of providing water supply and distribution. The average combined water and wastewater tariff in the 276 major cities represented in the Global Water Intelligence 2008 Water Tariff Survey was \$1.81/ m<sup>3</sup>, compared to \$0.49/m<sup>3</sup> for Amman.<sup>10</sup> Figure 4 shows average water prices for eight cities in water-deficient countries, including Jordan. US studies from 1994 to 2007 demonstrate how raising prices, rather than implementing non-price policies, can substantially reduce the economic cost of achieving water consumption reductions. However, raising water prices to fully cover long-term marginal costs is considered politically impossible in most US Cities,<sup>11</sup> and this is certainly true in other countries as well.

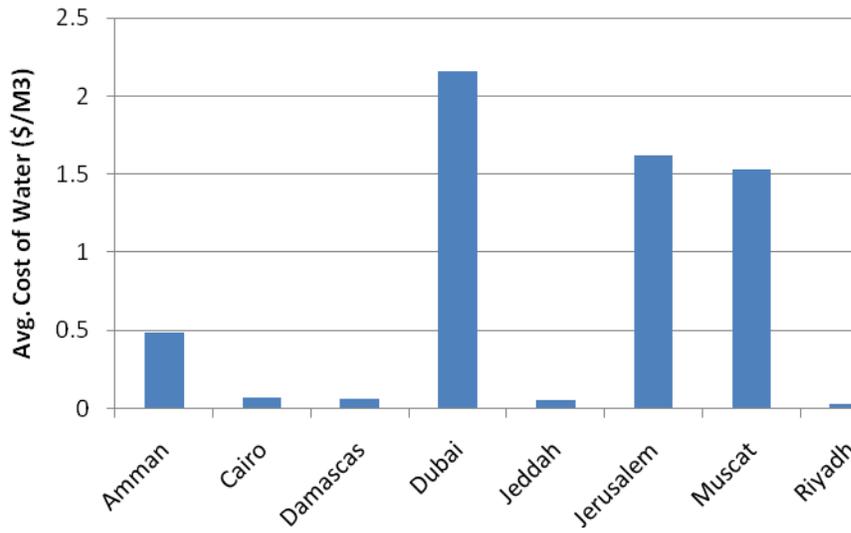
---

<sup>9</sup> Olmstead, S.M. and R. N. Stavins, Comparing price and non-price approaches to urban water conservation, *Water Resources Research*, 45, W04301, doi:10.1029, 2009

<sup>10</sup> Global Water Intelligence Vol 11, Issue 9, September 2009

<sup>11</sup> Reference: Olmstead, S.M. and R. N. Stavins (2009)

**Figure 4: Average water tariffs for eight water-deficient cities**



Source: Global Water Intelligence Vol. 11, Issue 9, September, 2009

### **Paybacks for water-efficient plumbing products**

Figure 5 demonstrates that increasing tariffs will improve the paybacks for water efficient products, though paybacks will vary depending on the cost of the efficient technology compared to the standard as well as the customers' baseline water usage. As incremental equipment costs (the difference between the standard and high efficiency product) decrease and savings increase, payback periods improve. The calculated paybacks are based on usage in California in 2005, at current water tariffs for the city of Los Angeles for two sets of assumptions: one with low incremental cost of the device and low annual consumption/savings with the device and the other for a high incremental cost of the device and high annual consumption/savings with the device. The paybacks for washing machines and showerheads are highly variable because of the wide range of the costs of standard and high efficiency products.

### **Incentives and rebates**

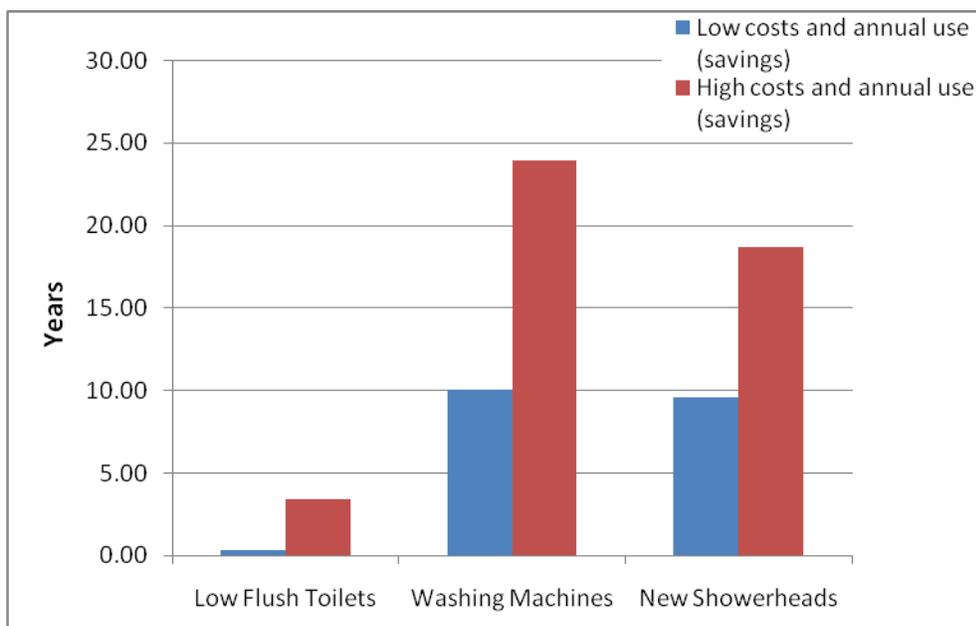
In a number of cities across the United States that recognize that water efficiency can reduce the need for future water supply projects, local governments and water utilities have implemented various incentive programs for efficient water- using products with a great degree of success. Incentives and rebates are common tools to encourage customers to purchase low-flush toilets and low-flow showerheads and faucets, as well as water-efficient washing machines. Approximately 20 US states have water utilities which offer toilet rebate programs.<sup>12</sup> Some utilities also offer showerhead and faucet rebates.<sup>13</sup> Some water utilities and many energy utilities offer rebates for efficient washing machines, particularly in "dry" states (energy and

<sup>12</sup> [www.us.kohler.com/savewater/rebates.htm](http://www.us.kohler.com/savewater/rebates.htm)

<sup>13</sup> Water Sense Rebate Finder, [www.epa.gov/watersense](http://www.epa.gov/watersense)

water utilities in California and some water utilities in Texas and New Mexico). State rebate programs also exist to promote efficient plumbing products and electronic appliances, including washing machines.<sup>14</sup> Water companies often work with the regional water authority to coordinate program implementation. A very effective program was New York City's replacement of 1.3 million inefficient toilets with high-efficiency toilets by offering landlords \$290 million worth of grants, decreasing water use in some buildings by up to 37 percent. Another illustrative example is the ultra-low flush (ULF) toilet program in Santa Monica, California which offered a rebate to cover most of the ULF toilet costs and imposed a surcharge on the water bill of customers who did not retrofit.

**Figure 5: Payback periods for water efficient plumbing products for various savings and cost assumptions - California**



Source: DAI analysis, savings and washing machine costs (inflated to 2010 costs) from a draft 2005 California Urban Water Conservation Council BMP Costs & Savings Study.<sup>15</sup> Product costs for dual flow/low flush toilets, and showerheads from Consumer Reports Magazine Water Product Report, August 2009. Tariffs based on 2010 City of Los Angeles average tariffs of \$2.49/m<sup>3</sup>.<sup>16</sup>

The purpose of incentives and rebates is to influence the sales of water-efficient and energy-efficient products throughout the supply chain, from manufacturing, to distribution to retail sales. They are provided to different parts of the supply chain, depending on where an intervention point will have the greatest impact on the supplier or consumer behavior. For

<sup>14</sup> [www.dsireusa.org](http://www.dsireusa.org), [www.water-savinghero.com](http://www.water-savinghero.com), [www.gswater.com](http://www.gswater.com), [www.ebmvd.com](http://www.ebmvd.com), [www.cuwcc.org](http://www.cuwcc.org), [www.ci.austin.tx.us/watercon](http://www.ci.austin.tx.us/watercon), [www.abcwua.org](http://www.abcwua.org)

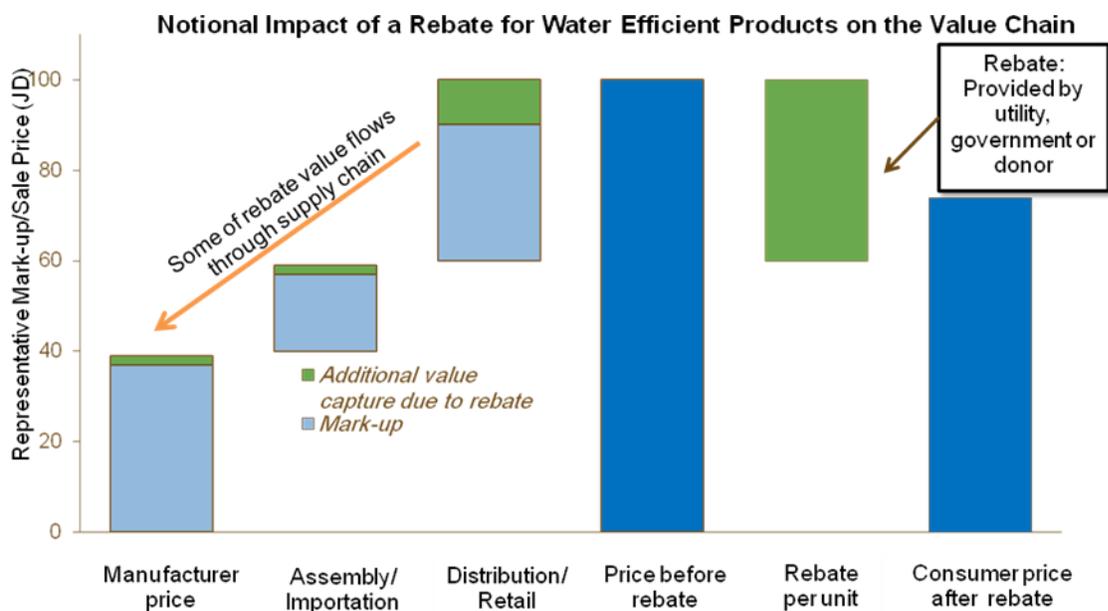
<sup>15</sup> A&N Technical Services, Draft Revision BMP Costs & Savings Study, prepared for the California Urban Water Conservation Council, March 2005

<sup>16</sup> Water Market USA, Global Water Intelligence/OECD 2008 Global Water Survey summary [www.globalwaterintel.com](http://www.globalwaterintel.com)

example, efficient lighting, plumbing products and appliance programs have been implemented through consumer rebates (redeemed at purchase or through mail-in). Incentives have been provided to manufacturers to lower retail prices of efficient lighting and other products. Incentives to contractors have been provided to encourage adding air conditioning efficiency tune-ups to their normal maintenance service.

As shown in Figure 6 below, if a rebate is provided to the consumer, the ultimate price reduction will not likely be equal to the entire value of the rebate, as some of the value of the rebate would be captured by other companies in the supply chain.<sup>17</sup> This provides motivation to the other entities in the supply chain to market the more efficient products. However, most of the value of the rebate reduces the cost of the water efficient product for consumers.

**Figure 6: Notional impact of a rebate for water efficient products along the value chain<sup>18</sup>**



### **Building codes and product standards and testing**

The US Department of Energy (USDOE) establishes the standards for water and energy-using products and appliances (including plumbing products) manufactured and sold in the US; these standards are developed by the American Society of Mechanical Engineers/American National Standards Institute (ASME/ANSI). USDOE then develops sampling plans used to determine compliance with existing standards. These plans include compliance statements/certification reports submitted to USDOE by manufacturers. USDOE can implement enforcement actions for improper certification or upon a determination of non-compliance. State and local governments

<sup>17</sup> The amount captured depends on the competitive dynamics between companies in the supply chain

<sup>18</sup> The “value chain” is the value created at different parts of the supply chain, i.e. the difference between costs of production and sale price from each member of the supply chain to the next.

adopt one of the major plumbing codes into their building codes, with the ASME/ANSI standard as the minimum requirement. These governments are then responsible for enforcing the standard during their building permitting process.

According to the Alliance for Water Efficiency, US consumer concerns about the functioning of low flow/high water efficiency products meeting the minimum standards developed in the 1990s was so strong that many manufacturers provided packaging directions on how to remove flow restrictors from the products. A greater emphasis on enforcement beginning in 2009 has also raised concerns by manufacturers about the limited range of products available, particularly those considered “luxury” products. The Department of Energy has provided ample time for manufacturers to adjust in order to develop compliant products which provide the benefits consumers desire.

Both mandatory and voluntary standards have an important role in promoting water and energy-efficient products and practices. Though most US state and city building code standards apply only to new construction, some cities have passed laws applying minimum standards to existing buildings, thus requiring retrofitting of equipment or fixtures. Los Angeles, California applies its water-using technology standards to all existing buildings, with responsibility for compliance given to the building owner. San Diego, California passed laws requiring the replacement of inefficient toilets upon sale of a house. Houses retrofitted use about 20% less water than households with no low-flow toilets and 9% less for low-flow showerheads.<sup>19</sup>

Leadership in Energy and Environmental Design (LEED) is an internationally recognized green building certification system developed by the U.S. Green Building Council (USGBC). LEED provides third-party verification that a building or community was designed and built using strategies aimed at improving performance across several environmental metrics including water and energy efficiency. Several U.S. municipalities, Washington DC, New York and Chicago, have adopted LEED as a mandatory standard for new or rehabilitated public buildings or buildings using public funds.<sup>20</sup>

Industry Associations have also adopted voluntary standards which can help educate institutions and provide recognition which has value as a marketing tool to environmentally-conscious consumers. One example is Green Key®, a worldwide available eco-label awarded to leisure organizations, such as hotels, youth hostels, conference- and holiday-centers, etc. To obtain the Green Key the company must fulfill a list of environmental requirements (such as controlling the production of waste, the efficient use of water and electricity, etc.) as well as developing “green” policies, action plans, and education and communications programs. Some hotels in Jordan are working towards obtaining Green Key certification.

### **Product labeling**

The US 1992 Energy Policy Act established uniform water efficiency standards for virtually all plumbing products manufactured after January 1994. This Act also mandated that plumbing products be clearly labeled so that suppliers and consumers can see that the products comply

---

<sup>19</sup> Olmstead, S.M. and R. N. Stavins (2009)

<sup>20</sup> [www.CityofChicago.org/content/dam/city/depts./zlup/sustainable\\_development/Publications/GreenMatrix2011DHED.pdf](http://www.CityofChicago.org/content/dam/city/depts./zlup/sustainable_development/Publications/GreenMatrix2011DHED.pdf), [www.nyc.gov/html/ddc/html/design/sustainable\\_home.shtml](http://www.nyc.gov/html/ddc/html/design/sustainable_home.shtml)

with the new standards. The Act recommended incentive programs for state and local governments to accelerate voluntary replacement of old inefficient products in buildings constructed prior to 1994. In addition, a voluntary labeling program has also been developed by the US Environmental Protection Agency (USEPA) to transform the market, i.e. make water efficient products the preferred choice among consumers and businesses of all types. The program provides customers with information about the water efficiency of these products. USEPA selects products for evaluation, develops product specifications, and determines label use, develops partnerships with the private sector and supports them with recognition and marketing efforts. Use of the USDOE Energy Star model (used for energy-using appliances and buildings) and coordination with the private sector have contributed to its success. Though labeling programs exist in Australia and the EU, they are either too new or have not been as successful as the USEPA Water sense program, primarily due to a lack of independent testing.<sup>21</sup>

### **Combining standards, incentives and labeling**

While labeling and incentive programs are often seen as a way to promote efficiency until codes are updated, US entities are updating their voluntary program requirements as codes are updated, so customers are continually offered greater levels of efficiency. Notably, several utilities in the most water-deficient parts of the US (California, Nevada and Texas) have developed a three-pronged approach to promoting water efficiency by adopting standards into their codes which are above minimum Federal requirements and providing rebates for water-efficient products (which are above their own standards) that bear the water sense label. The labels provide consumers “brand recognition” of efficient products. A coherent approach for promoting sustainable consumption, through initiatives across sectors (water and energy) and among methods (e.g. standards, labels and incentives/rebates) reduces the potential for inconsistencies or significant gaps.<sup>22</sup>

## **3.5.OPPORTUNITIES AND STRATEGIES**

### **Increasing water prices**

Increased prices will have an impact on investment in water-saving technologies. If water prices in Jordan are raised to levels of a city in another country such as Muscat, Oman (\$1.53 or 1.07 JD/m<sup>3</sup>) or Dubai (\$2.16 or 1.52 JD/m<sup>3</sup>), paybacks for water efficient technologies will improve. The Oman tariff is approximately triple the current average residential tariff in Jordan and the Dubai tariff is close to the current commercial tariff in Jordan (1.56 JD/m<sup>3</sup>). Paybacks will vary depending on the costs of the efficient technologies compared to the minimum standard as well as baseline water usage. Higher water usage increases the expected savings whereas lower water usage reduces the expected savings. Figure 7 demonstrates the impact of a price increase from 0.34JD/m<sup>3</sup> to 1.07/JD/m<sup>3</sup> based on estimated average savings and average incremental costs of efficient products and appliances compared to the standard products and appliances.<sup>23</sup>

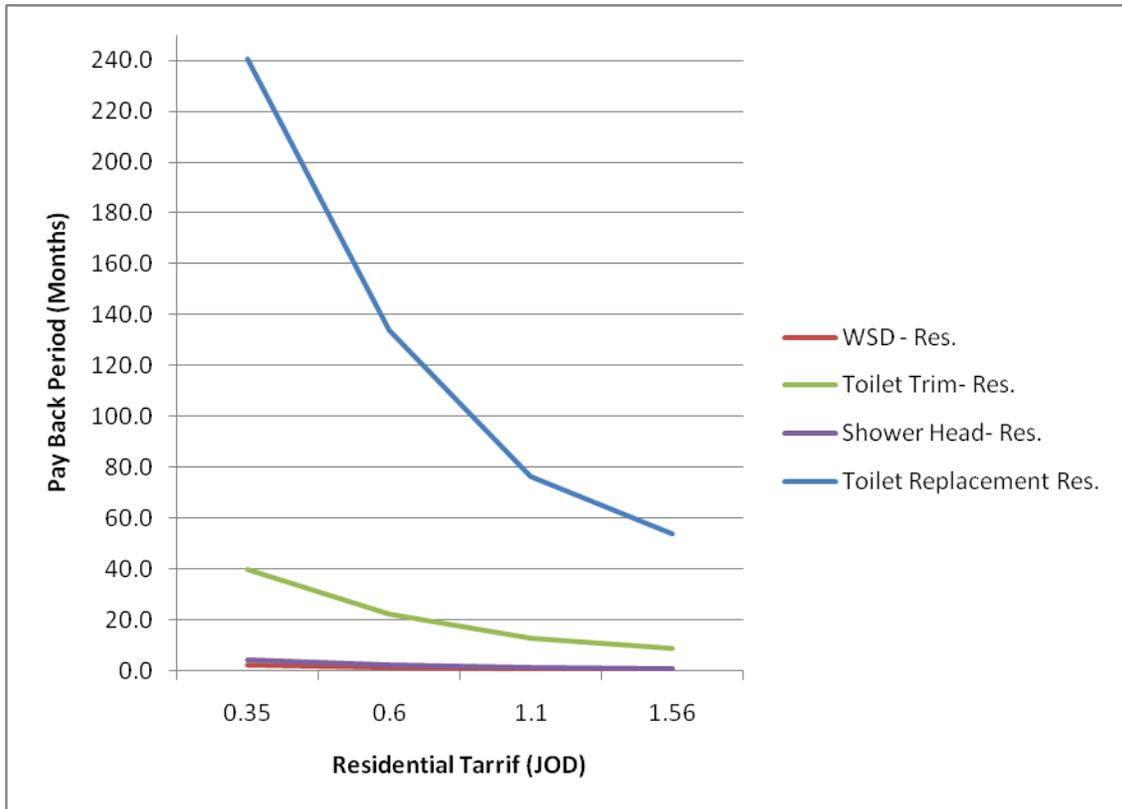
---

<sup>21</sup> IDARA Work Plan to Implement a Labeling Program for Water Efficient Products (July 2009)

<sup>22</sup> OECD Publishing (2008)

<sup>23</sup> Estimated average savings per unit and costs were derived from the Miyahuna water efficiency plan. Actual product costs will be lower since the Miyahuna plan includes program costs for the planned Miyahuna water efficiency programs.

**Figure 7: Payback periods for WSDs and water efficient toilets at existing and increased residential tariffs**



Source: DAI analysis. Savings and incremental costs per unit were derived from the Water Use Efficiency Plan for Jordan Water Company (Miyahuna) June, 2010

Residential and some commercial consumers may be less willing to invest in saving water as prices increase when water is sporadically delivered, though many have compensated by investing in storage capacity. Many areas of Jordan receive water only once per week. Higher income consumers have invested in larger water tanks which are either filled when utility-providing water is available or by purchasing water from private or utility owned tankers. In addition, due to low water use compared to other countries (e.g. 80 liters/capita/day in 2008 compared to 575 liters/capita/day in the US), on average residential water demand is expected to be relatively inelastic. In industry, water price is likely to be a more significant factor in decisions to focus on conservation and efficiency, especially for high volume users. However in some cases the industries may pay flat fees with water and energy costs included in their lease payments.

### **Products cost and availability**

In order to promote manufacturing of water-efficient products in Jordan, Government tenders for plumbing products provide an additional 10% “bonus” score for products produced in Jordan (products can either be manufactured or assembled in Jordan but at least 50% of the

product 'value' must be from Jordan). Industrial parks established by the Development Zones Commission (DZC) offer competitive real estate prices, all necessary infrastructure (e.g., roads, water, wastewater, electricity, telecommunications, etc.), as well as amenities such as supermarkets, banks, medical facilities, accommodations for workers, etc., to investors interested in establishing an industrial presence in Jordan. It is expected that the DZC will help foster the growth of the water products manufacturing/assembly sector in Jordan.

### **Standards and codes**

The process of code enforcement for products manufactured and sold in Jordan requires attention if the new plumbing standards are to have an impact on water usage. Market surveillance capacity to ensure that products meet standards is still being developed. A newly established specialized RSS lab to test plumbing products' technical performance will aid in this process.

GAM and other local government entities, through their permitting function, can ensure that plumbing products installed in buildings meet the new standards. GAM's responsibility includes not only new construction but also permitting floor additions and major building rehabilitation. Ensuring the plumbing code is enforced for both new and existing buildings is critical to reducing water usage in Jordan.

Standards are being developed and will be adopted by governments, it is important to consider how consumers will accept the products in order to ensure that water savings materialize and are sustained over time. The products must perform well under the Jordanian conditions such as low water pressure and scale build-up.

### **Labeling**

The July 2009 market survey indicated most retailers are willing to participate in a voluntary labeling program. The great majority of consumers surveyed indicated that a label indicating water saving would assist their purchasing decision, particularly for electric appliances. Since water use is the third most important criteria in the majority of plumbing products and electrical appliance purchase decisions, a labeling program will make a significant contribution to expanding the market for water efficient products in Jordan.

Labeling is extremely important in order to enable consumers to weigh the relative benefits against the initial cost of different products. Labels also provide a tool for retailers to promote higher efficiency, often higher margin water-efficient products. Without a clear understanding of the difference between the quality and water (and energy)-saving benefits of products, residential consumers will be unable to make a decision whether to purchase the product with lower life-cycle costs (including both the initial cost and the operating costs over time). For commercial customers, the difference in initial price is reportedly too high to meet their required payback thresholds or cost limits.<sup>24</sup>

When new standards are negotiated for adoption, it is rare that the standards will be set as high as the most efficient products on the market. As in the US, there will be a selection of products in the market that exceed these standards. The value of a labeling program would be to provide

---

<sup>24</sup> Interview with a plumbing retail store, October 6, 2010

consumers with information on products that exceed the technical standards. Since labeling of both water and energy products would follow almost identical program implementation procedures, it is highly desirable for Jordan to implement combined water and energy labeling program since the consumption of energy is associated with the use of hot water. Based on criteria identified in developing the labeling workplan, toilets and clothes washers are considered first priority products for labeling, with showerheads, faucets and dishwashers to be second priority products.<sup>25</sup>

### **Utility water use efficiency plans**

Jordan's utility water use efficiency plans, developed with assistance from the Ministry of Water and Irrigation and USAID-IDARA Project, are designed to institutionalize water demand management as an integral part of utility service. The cost of reducing demand is much lower than the cost of expanding water supply, especially since the long-run marginal cost of expanding supply is increasing.

The Utilities' Water Use Efficiency (WUE) plans include outreach and other programs for all customer classes, including direct installation of plumbing fixtures (faucets, showerheads and toilets), ESCO performance contracts for hotels, water-wise landscaping, code enforcement and public awareness and education. Customers' initial experience with utility programs and new technologies can have a significant impact on adoption of these technologies by other customers. Therefore, the implementation of these programs will not only build water demand management services into the utility business model, it will also play an important role in transforming the market for water saving technologies.

Implementing water efficiency programs is a new area of business for Jordan's water utilities. The early years require significant capacity-building including training and supporting staff, developing the required public information and marketing outreach, and supporting measurement and evaluation to document effective Water Use Efficiency program delivery before rolling out larger programs. The utilities' water-use efficiency plans propose the establishment of a Water Demand Management and Public Information Directorate that will provide planning for the utilities' WUE Programs, implementation of the programs, public information and awareness, reporting, monitoring and evaluation, and finally fundraising. Significant capacity-building support is recommended to prepare existing and new staff in all three water utilities (Miyahuna, Yarmouk Water Company (NGWA previously), and Aqaba Water) to take on this new role.

Water utilities are currently focused on outreach, with the imminent launch of a social marketing program, which provides a comparison to the average customer usage on each customer's bill.

### **Taxes, rebates and incentives**

While price signals with tariffs that reflect the true cost of water are the most economically efficient method to encourage conservation, lowering the cost differential between efficient and standard products through reducing taxes or providing incentives can also drive consumer

---

<sup>25</sup> Work Plan to Implement a Labeling Program for Water Efficient Products

demand and transform markets. Many stakeholders identified the elimination of high customs taxes and VAT as key to increasing sales of water efficient plumbing products. An alternative is the promotion of plumbing products already benefitting from free trade agreements, including the US-Jordan Free Trade Agreement which came into full effect in January 2010. This agreement creates advantages for US exporters to provide high quality products at more attractive prices. The Department of Commerce, and the US Government-wide National Export Initiative, supports trade missions and financing tools for American businesses that look to expand exports.

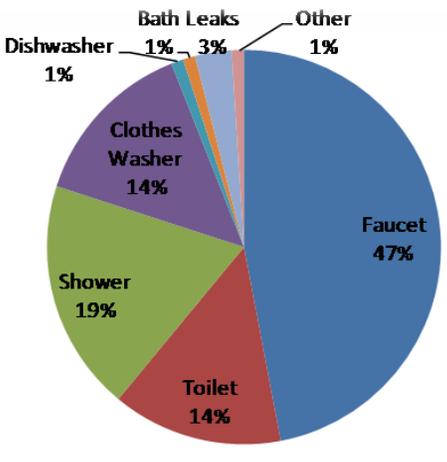
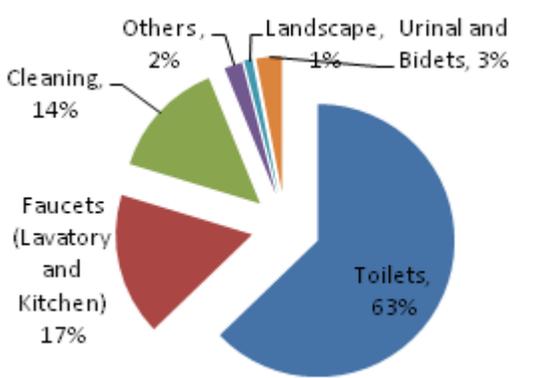
Tax reductions or incentives, provided to retailers or consumers, only work if they close the price gap significantly.<sup>26</sup> Thus, additional incentives beyond tax reductions may be required to influence retailer sales behavior or consumer purchasing behavior. Though rebates to consumers purchasing plumbing products and appliances help accelerate the uptake of efficient products. They recommended that Jordan should rely on the enforcement of applicable codes and standards to help expedite the update of efficient products, though doubts about the ease of enforcing codes and standards were also clearly expressed. Interestingly, retailers and dealers interviewed for this task stated that a rebate available to consumers for purchase of efficient products would influence their sales practices. A pilot rebate program is recommended which takes into account the plans for a new plumbing code, supports the implementation of the planned voluntary Green Building Guides, and is adapted to the unique conditions in Jordan, including intermittent water supply.

Rebate programs must strike a delicate balance to ensure cost-effectiveness, maintaining reasonable administrative costs while establishing an appropriate subsidy to establish enough of a price difference between high efficiency and standard products to “move the market”. Careful design of rebate programs is critical to their successful implementation. Though the process must be simple enough to ensure retailer participation, it must also be robust enough to capturing adequate data to evaluate the program. Lastly, training and marketing support for participants in the market, often called “trade allies” (e.g. retailers, plumbers, and contractors) is critical to the success of these programs.

A rebate or incentive program in Jordan should, over time, target all plumbing products, clothes washers and dishwashers. Distribution of water usage among end uses for both the residential and commercial sectors is dominated by faucets/bidets, toilets and showers (see Figures 8 and 9). Plumbing products in aggregate have a much greater impact on water use than electric appliances, though clothes washers are also a significant portion of water use in residences.

---

<sup>26</sup>OECD Publishing, *Promoting Sustainable Consumption: Good Practices in OECD countries*, 2008 [www.oecd.org/dataoecd/1/59/40317373.pdf](http://www.oecd.org/dataoecd/1/59/40317373.pdf)

<p><b>Figure 8: End use analysis: residential indoor end uses by percent, Amman-Jordan</b></p>	<p><b>Figure 9: Office building end uses in Jordan</b></p>																														
 <table border="1"> <caption>Data for Figure 8: Residential indoor end uses by percent, Amman-Jordan</caption> <thead> <tr> <th>End Use</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Faucet</td> <td>47%</td> </tr> <tr> <td>Shower</td> <td>19%</td> </tr> <tr> <td>Toilet</td> <td>14%</td> </tr> <tr> <td>Clothes Washer</td> <td>14%</td> </tr> <tr> <td>Dishwasher</td> <td>1%</td> </tr> <tr> <td>Bath Leaks</td> <td>3%</td> </tr> <tr> <td>Other</td> <td>1%</td> </tr> </tbody> </table>	End Use	Percentage	Faucet	47%	Shower	19%	Toilet	14%	Clothes Washer	14%	Dishwasher	1%	Bath Leaks	3%	Other	1%	 <table border="1"> <caption>Data for Figure 9: Office building end uses in Jordan</caption> <thead> <tr> <th>End Use</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Toilets</td> <td>63%</td> </tr> <tr> <td>Faucets (Lavatory and Kitchen)</td> <td>17%</td> </tr> <tr> <td>Cleaning</td> <td>14%</td> </tr> <tr> <td>Bidets</td> <td>3%</td> </tr> <tr> <td>Others</td> <td>2%</td> </tr> <tr> <td>Landscape, Urinal and</td> <td>1%</td> </tr> </tbody> </table>	End Use	Percentage	Toilets	63%	Faucets (Lavatory and Kitchen)	17%	Cleaning	14%	Bidets	3%	Others	2%	Landscape, Urinal and	1%
End Use	Percentage																														
Faucet	47%																														
Shower	19%																														
Toilet	14%																														
Clothes Washer	14%																														
Dishwasher	1%																														
Bath Leaks	3%																														
Other	1%																														
End Use	Percentage																														
Toilets	63%																														
Faucets (Lavatory and Kitchen)	17%																														
Cleaning	14%																														
Bidets	3%																														
Others	2%																														
Landscape, Urinal and	1%																														
<p>Source: Residential End Use Analysis Report, IDARA Project</p>	<p>Source: IC Report, IDARA Project</p>																														

Rebates and other incentives will be applicable during new construction, major rehabilitation projects and for other product or appliance replacements (often purchased through contractors, plumbers or at retail). Though it is expected that new plumbing standards will be adopted, and this is crucial for reducing water demand, many existing households or building owners will not be impacted by the new standards since they will maintain their products and appliances and not replace them unless they are damaged. Therefore, sale of WSDs such as toilet dams, faucet aerators and showerhead control devices will be the only real opportunity to reduce their water demand, in addition to reducing leaks.

A growing demand for new buildings also provides a market for efficient plumbing products, though most should be built at least to (the new) standard. Though there is an oversupply in the real estate market, over the medium term this is expected to be taken up, given Jordan’s demand rising from 50,000 to 60,000 new homes per year. This is driven partly by the new rent law, allowing a choice between rent or a down payment on a house. Large high density/high rise projects are also being planned.<sup>27</sup>

Just as with direct installation of water saving technologies and devices, product features and performance have been key to the success of rebate programs. An important issue to address in Jordan is sporadic water delivery and low water pressure. A pilot rebate/incentive program should be implemented with selected technologies to test customer acceptance and technology success, initially focused in an area of good water supply. A decision to expand the program should be made after evaluating the pilot program. The implementation of full-scale rebate and incentive programs should be coordinated with utilities’ plans to improve water supply and

<sup>27</sup> US Department of Commerce, *Doing Business in Jordan:2010 Country Commercial Guide for US Companies*”, U.S. Foreign Commercial Service and US Department of State, 2010

availability and targeted to geographic areas with improved supply, in order to improve customer acceptance and good performance of the technologies included in the programs.

To set the rebate level for each product, detailed analysis is required. Generally the subsidy is based on some market surveys and comparisons with non-efficient product prices. To aid coordination with the recommended labeling program, initial targets would be washing machines and toilets. The incentive or rebate levels for utility funded programs are usually based on avoided capital and operating costs, though environmental or societal costs are sometimes incorporated.<sup>28</sup>

It is worth mentioning here that the Jordanian central bank has provided incentives to private banks to offer subsidized interest for HUDC-built projects. A similar incentive could be provided to private developers to promote installation of high efficiency plumbing products.

### **Training programs**

Stakeholders identified a shortage of plumbers to install and maintain water-efficient technologies. A “master plumber” program is currently under development to ensure installation of products and fixtures according to the requirements of the Water and Sanitation Plumbing Code. Training of women plumbers could also be included to enable expansion of services during the day in more conservative areas of Jordan.

There is also a need for government agencies to receive training regarding the costs and benefits of water-saving technologies and the requirements of the new plumbing code.

---

<sup>28</sup> National Action Plan for Energy Efficiency (2008). *Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*. Energy and Environmental Economics, Inc. and Regulatory Assistance Project. <[www.epa.gov/eeactionplan](http://www.epa.gov/eeactionplan)>

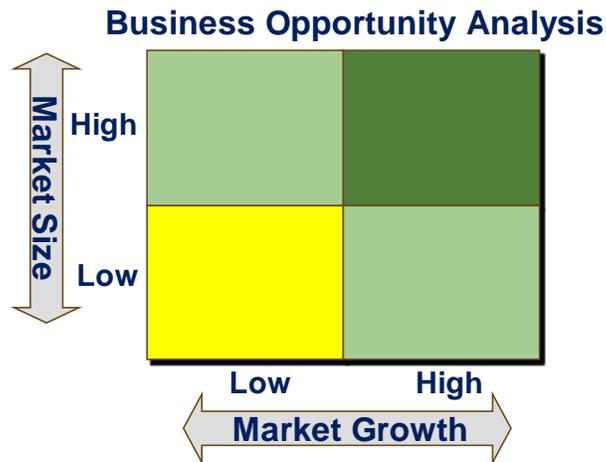
#### 4. MARKET ASSESSMENT FOR WATER EFFICIENCY SERVICES

The following potential business opportunities for companies to provide water efficiency services in Jordan were identified under this task (see Figure 10):

- Auditing and saving strategy advice and performance contracting for energy/water
- Financing efficiency projects
- Facility operations and maintenance
- Green building design/value added consulting –establishing procurement specifications, representing owners, managing construction
- Wastewater reuse system design
- Green building certification
- Leak detection
- Training in water efficiency
- Awareness campaigns

Analysis and stakeholder interviews confirm that green building design and value added consulting are the top current markets for water efficiency services in Jordan. Both specialized W/ESCOs and traditional engineering firms are active in this market. In general, the current market for water efficiency services is limited, however particular sectors are growing.

Figure 10: Preliminary market size and market growth potential for water efficiency services in Jordan



Service offering	Current Jordanian Market Size	Potential Jordanian Market Growth
Auditing and saving strategy advice and performance contracting for energy/water		
Financing efficiency projects		
Facility operations and maintenance		
Green building design/value added consulting –establishing procurement specifications, representing owners, managing construction		
Green building certification		
Leak detection		
Training in water efficiency		
Wastewater reuse system design		
Awareness campaigns		

There are almost no specialized water efficiency services companies that provide performance guarantees and access to finance for efficiency projects; rather, water efficiency services are provided as part of energy efficiency saving contracts. There are currently several companies in Jordan that are considered W/ESCOs, and offer water efficiency services as an add on to energy efficiency services (none offer only water efficiency services). The market for these companies is primarily commercial and industrial clients. The residential sector can be challenging markets for W/ESCOs given the smaller total water and energy savings and higher transaction costs, especially when dealing with significant challenges related to multiple owners or landlord/tenant issues in multi-family and commercial buildings.

In addition to performance contracting, architects and engineering firms, consultants and construction contractors provide other services including green building design, facilities management and leak detection and wastewater re-use services to housing and commercial property developers and building owners.

#### 4.1.W/ESCO SAVINGS AND PERFORMANCE GUARANTEE CONTRACT MODELS

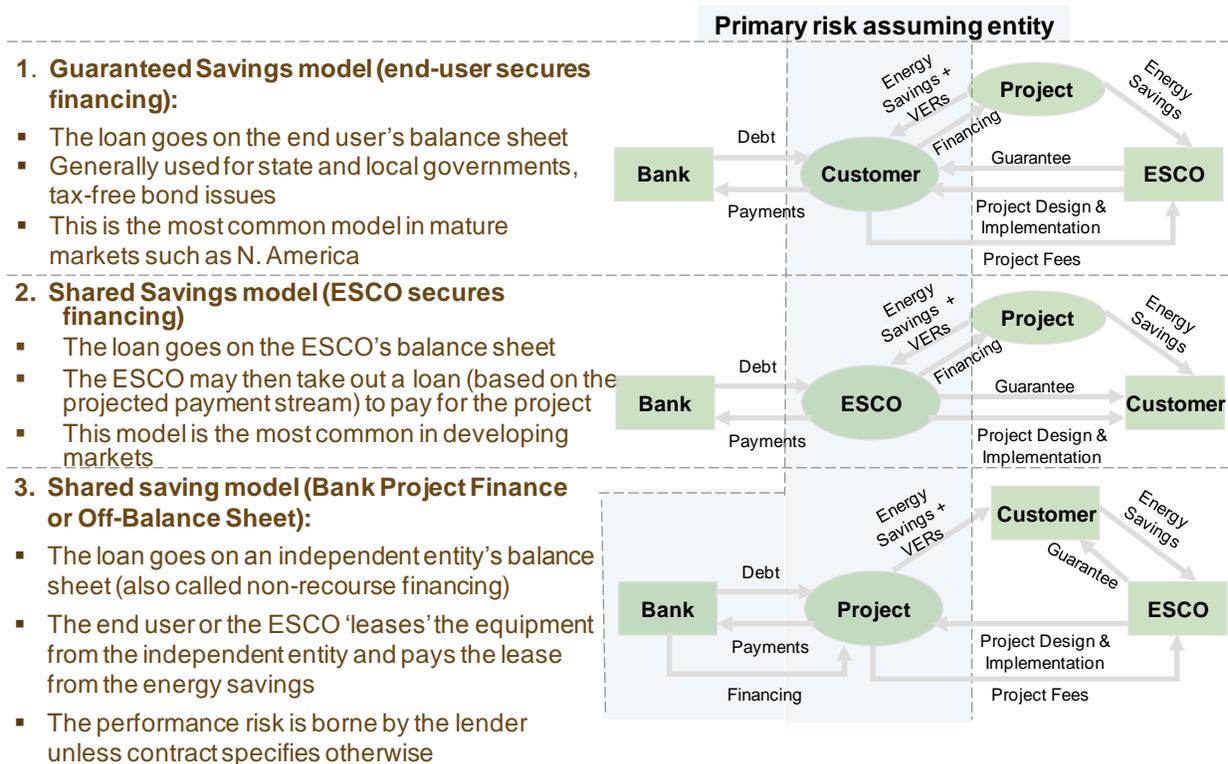
The design, finance and implementation of water and energy efficiency projects, particularly for public and larger commercial and industrial customers, generally require specialized skills - which create a market for services companies. By generally accepted definition, Water Service Companies (WASCOs) and Energy Services Companies (ESCOs) are companies that provide these services and receive some or all of the payment for their services based on the achievement of water and energy efficiency savings or other performance criteria (called performance contracting). WASCOs and ESCOs offer both technical and financial services to implement water and efficiency projects, and often guarantee that the savings associated with the project will be sufficient to cover the costs of the project over a certain period of time. The term W/ESCO is used throughout this report. Some companies do specialize in utilities management, collection and savings globally.

Water (and Energy) Savings Performance Contracting (W/ESPC) or Water (and Energy) Performance Contracting (W/EPC), which might refer to Water (and Energy) Supply Contracts without savings, are designed to overcome the barriers to investment in large water and energy efficiency projects and reduce the risks to the end consumer. There are several elements of risk in a water (and energy) efficiency project: construction cost uncertainty; technology/equipment performance (and savings) uncertainty; measurement and verification dispute potential; and client and W/ESCO credit risks. There are various ways to allocate these risks via ESPC contracts, which are complex but contain two key elements - the savings/performance contract and the financial contract. Figure 11 illustrates the relationship between the Banks (financial institutions), customers and W/ESCOs under various financing models.

There are several models for the savings contract; the savings may be:

- “guaranteed” where the W/ESCO guarantees the savings to the customer;
- “shared” where W/ESCO compensation is based on a percentage of savings achieved;
- “stipulated” where there is little monitoring and the W/ESCO is paid a fee for services (resulting in higher net financial returns due to reduced contract costs); or
- a combination of these models.

**Figure 11: W/ESCO contracting and project finance models**



The financial contract is often linked to the savings contract. By standard definition, under the ESPC “guaranteed savings model”, the client generally makes the upfront investment, either from its own balance sheet or through a loan from a financial institution. The W/ESCO provides design, procurement and construction services and receives a service fee in exchange. If the savings fall short of the W/ESCO forecast, the W/ESCO is obligated under the contract to compensate for this. This is often the model that results in the lowest interest rate but generally involves higher risk to the consumer. This is the most common model in the US, particularly with institutional consumers, such as state and local governments, schools and public housing authorities, who typically finance their projects themselves through either tax-exempt leases or municipal bonds. W/ESCOs may help arrange this financing. This is not common outside of the US.

Under the “shared savings model”, the W/ESCO normally finances the project on its own balance sheet or establishes a “special purpose vehicle” (SPV) to finance the project. The W/ESCO provides the funding to implement all necessary water and energy upgrades based on the W/ESCO’s study and proposal. The client provides a bank guarantee for the cost of the investment in case of bankruptcy. Thus, the W/ESCO generally assumes both the credit and the technological risk, and therefore often receives a higher share of the project savings. The W/ESCO typically requires the client to sign an operating and maintenance contract as well to ensure the savings appear.

The shared savings, off-balance sheet model is common in the US for federal entities, and has been used in China for state owned enterprises but is not common elsewhere (such as Europe).

Under this model, the federal agency has an obligation to continue payments for energy savings over the life of the contract, and as there is such a low risk of a federal agency defaulting, financial institutions lend against these payments (and may resell the payment stream). During construction, the W/ESCO is advanced the funds needed for the project but the project is removed from the W/ESCO's balance sheet upon project completion.<sup>29</sup>

The shared savings model may involve the establishment of a special purpose vehicle (SPV) that owns the equipment. An SPV is a company created to isolate financial and project risk. It is common in large-scale power plant development, also referred to as "project finance", "non-recourse finance" or "off-balance sheet" finance. This model is often referred to as the European W/ESCO model, and usually involves an on-site energy supply contract (typically from cogeneration or renewable energy equipment) rather than a water and energy savings contract (though water and energy savings may be incorporated in the project). In the case of the SPV Energy Performance Contracting model, the W/ESCO buys the equipment and sells it to the SPV, who extends an operating lease for the equipment. The client pays water and energy savings to the W/ESCO or SPV as well as operating and maintenance costs.

The performance guarantee provided by the W/ESCO is linked to the Measurement and Verification (M&V) system established. M&V costs can be significant, thus a balance must be struck between minimizing administrative contract (M&V) costs and ensuring that the savings are real. The performance guarantee may be at three levels, pre-agreed/stipulated, equipment-level and whole building-level. For a whole-building guaranteed savings contract, normally water (and energy) savings are computed using measurements taken before (the baseline) and after the project. However, these measurements must be adjusted to take into account any changes in water (and energy) use due to weather or occupancy for example. Depending on the project, the measurement and demonstration may be required only once, upon installation, based on an analysis of one or more sample installations, or may be required to be repeated at agreed upon intervals generally over up to 20 years. Under a pre-agreed performance guarantee, once the customer has accepted that the equipment has been installed and is operating as promised, the savings are paid based on the expected savings without additional monitoring (also called "deemed", "stipulated" or "EPC light"). This is the least risky performance guarantee for the W/ESCO, but places more risk on the consumer that the savings will continue. An equipment-level performance guarantee involves isolating the measures and monitoring them individually. Typically the equipment manufacturer also bears some of the

---

<sup>29</sup> The Energy Savings Performance Contracting (ESPC) model is described by AMERESCO, a US ESCO, in their public financial statements: To finance projects with federal governmental agencies, we typically sell to the lenders our right to receive a portion of the long-term payments from the customer arising out of the project for a purchase price reflecting a discount to the aggregate amount due from the customer. The purchase price is generally advanced to us over the implementation period based on completed work or a schedule predetermined to coincide with the construction of the project. Under the terms of these financing arrangements, we are required to complete the construction or installation of the project in accordance with the contract with our customer, and the debt remains on our consolidated balance sheet until the completed project is accepted by the customer. Once the completed project is accepted by the customer, the financing is treated as a true sale and the related receivable and financing liability are removed from our consolidated balance sheet.

performance risk. For more on measurement and verification protocols, see the International Performance Measurement and Verification Protocol.<sup>30</sup>

#### **4.1.1.BARRIERS AND CHALLENGES**

Interviews with multinational and Jordanian W/ESCOs, banks and stakeholders as well as the survey and discussions at the October 12, 2010 workshop (see Appendix C for survey results) identified the barriers to W/ESCOs' success in Jordan. Some are common globally to a varying degree. Specific examples are provided below:

##### **Financial**

- Jordanian banks have little experience in financing W/ESCO projects. As in other developing countries, banks continue to provide loans based on collateral requirements of 100-120% for SMEs such as W/ESCOs.
- Jordanian banks lack experience with EPC contracting and technical know-how in water and energy efficiency.
- Initial capital investment – The first cost of a project - may be a barrier to investment, either because the landlord has competing priorities or the building owner does not have access to capital.
- The risk of customer bankruptcy or contract default can make bank or W/ESCO financing difficult for industrial, commercial and residential efficiency projects; if there is a risk how long they will be in business, financing is very difficult to obtain.

##### **Administrative/transaction costs**

- Costs to prepare complicated bids are too high for the size of projects available.
- The time and effort required to get enough information to make a decision, apply for financing, and arrange for the work to be done may outweigh perceived benefits.

##### **Government policy disincentives**

- Low price of water compared to the other commodities.
- The Government has not yet engaged W/ESCOs in addressing water and energy efficiency.

##### **Limited knowledge of W/ESCOs and client reliability concerns**

- Lack of awareness that W/ESCO services exist was identified as the number one barrier to increasing W/ESCO services in Jordan.
- Lack of understanding of performance contracting and confidence in financial returns. Decisions are based on price as they do not understand the risk mitigation benefit of the performance guarantee.

---

<sup>30</sup> International Energy Efficiency Financing Protocol, Standardized Concepts, *Efficiency Valuation Organization, April 2009.*

- Lack of defined baselines for water (and energy) consumption for establishing customer savings due to poor historical data collection. Many bills for public facilities are centrally paid and difficult to obtain and sometimes appear inaccurate. Long-term data is required to clarify true baseline usage.
- Building owners and residents often do not believe in results of water and energy audits. Client priorities and preferences for in-house solutions.
- Certain industries in Jordan use large amounts of water and energy, particularly the marble & stone in addition to chemical and cement industries, without being aware of this issue and the efficiency measures that they could take to reduce their consumption.
- Companies sometimes are biased against W/ESCOs, and believe if the W/ESCO profits, they must be losing or vice versa; the concept of win-win is foreign.
- Uncertainty of savings which can never be perfectly predicted for individual buildings.
- Split incentives – Split incentives occur when the decision-maker does not receive many of the benefits of the investments, such as rental property owners (commercial or multi-family) who lack incentives to invest in water and energy efficiency because the tenant pays the utility bill.

#### **Lack of human resources**

- Lack of human resources within W/ESCOs and water (and energy) management staff in prospective clients. The W/ESCO and client must have water and energy efficiency, contracting, financing and project management skills.  
Lack of expertise in performance contracting (technical, financial), including water and energy-efficiency measures, and design and negotiation of the contracts. Some stakeholders noted that there are few qualified personnel to provide water efficiency auditing and low water use design services, with monitoring and verification of savings.
- Specifically, there is a lack of engineering skills in both water and energy efficiency, including grey-water and water recycling.
- Small institutions do not have the human resources available to evaluate water or energy saving opportunities.

#### **Challenges of the performance contracting model**

- The shared savings model is the predominant model for performance contracting in Jordan. Due to the lack of available financing, this requires W/ESCOs to self-fund projects, which increases risk and limits the number of projects which can be implemented.
- Lack of a legal and institutional framework for W/ESCO services. The majority of survey respondents stated that there are either some, significant or very significant legal hurdles to the performance guarantee contract process in Jordan.
- Systems are poorly maintained, increasing energy use over time, thus complicating monitoring and verification.

#### 4.1.2.RELEVANT INTERNATIONAL EXPERIENCE AND FINDINGS

Because energy costs are higher than water costs almost uniformly throughout the world, energy efficiency services markets are larger than water services markets. Globally there are very few companies that are specialized WASCOs, providing water efficiency services only. W/ESCOs usually address water efficiency as an add-on to energy efficiency in their performance contracting projects; water savings projects may make up around 20% of a facilities' total efficiency savings. WASCOs offer special water management expertise and are normally involved from the audits to Monitoring and Verification (M&V), and only occasionally provide a guarantee. Technologies include pumping systems, metering, water conservation technologies and weather-based irrigation (e.g. for universities). Water supply or distribution companies sometimes offer water efficiency services as well.

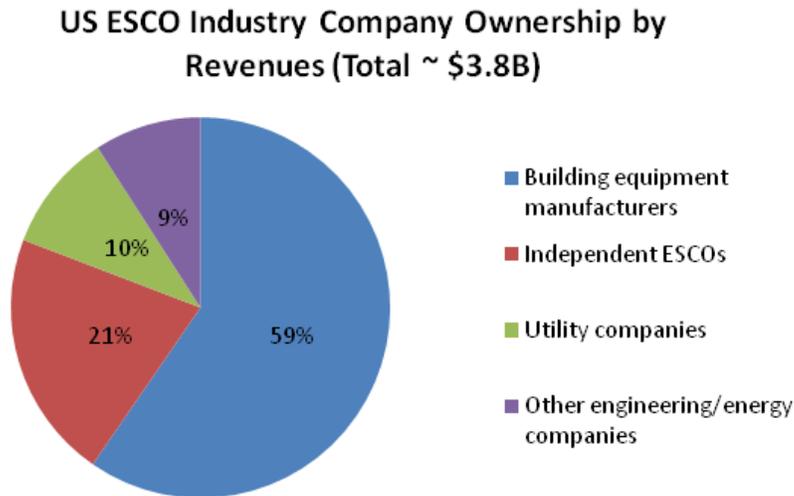
Large W/ESCO industries have been successfully operating in most developed countries in North America and Western Europe for many years. However, W/ESCOs have yet to gain a significant market share in most developing countries.<sup>31</sup> The commitment of federal and municipal authorities to use W/ESCOs for their water and energy efficiency projects, along with supportive policies and public-private partnerships, has been crucial to the successful engagement of W/ESCOs in the US market. In some cases, energy utilities, driven by obligations imposed on them to meet efficiency goals, have fostered the development of the market. For example, in Brazil, power utilities are required to invest 1% of their net operating revenues in energy efficiency. These has not been the case for water utilities, since they are usually municipally owned and regulated, and therefore have much more independent decision-making compared to energy utilities.

US and European based W/ESCOs may provide auditing, project identification and design, financing (or acquiring the financing), engineering, procurement and installation of energy and water efficiency equipment or construction management, and measurement, monitoring and verification of energy savings in their service offerings. Most companies also sell operations and maintenance (O&M) services which ensure that the equipment is maintained and produces the savings, and can be a significant portion of contract revenues. The financial crisis has led to higher borrowing costs, and a corresponding downturn in new investment in energy efficiency equipment in the residential and commercial sector in many countries, but O&M services have continued to grow. Many W/ESCOs are affiliated with utilities or equipment companies though there are "independent" W/ESCOs who represent a significant portion of the market in the US (see Figure 12 below).

---

<sup>31</sup> Ellis, J., Energy Service Companies (ESCOs) in Developing Countries, *International Institute for Sustainable Development (IISD)*, May 2010.

Figure 12: US ESCO industry ownership



Notes: As of 2006 based on estimates by Lawrence Berkeley National Laboratory (Hopper et al., A Survey of the U.S. ESCO Industry: Market Growth and Development from 2000 to 2006, May 2007)

The US W/ESCO market is considered the most advanced in the world and the government has driven the creation of the market. US Federal and municipal governments and public universities, schools and hospitals are the primary customers for US W/ESCOs. The commercial, residential and industrial sectors made up less than 10% of the market in recent years. These sectors continue to be a challenge for a variety of reasons, including short payback period requirements, competing investments and customer default risks.

In Europe and Asia, W/ESCOs have more industrial and commercial markets, though the market sizes are much smaller as shown in Figure 13 below. Some W/ESCOs are also providing residential energy efficiency services, generally through contracts to manage or implement utility residential efficiency programs.<sup>32</sup>

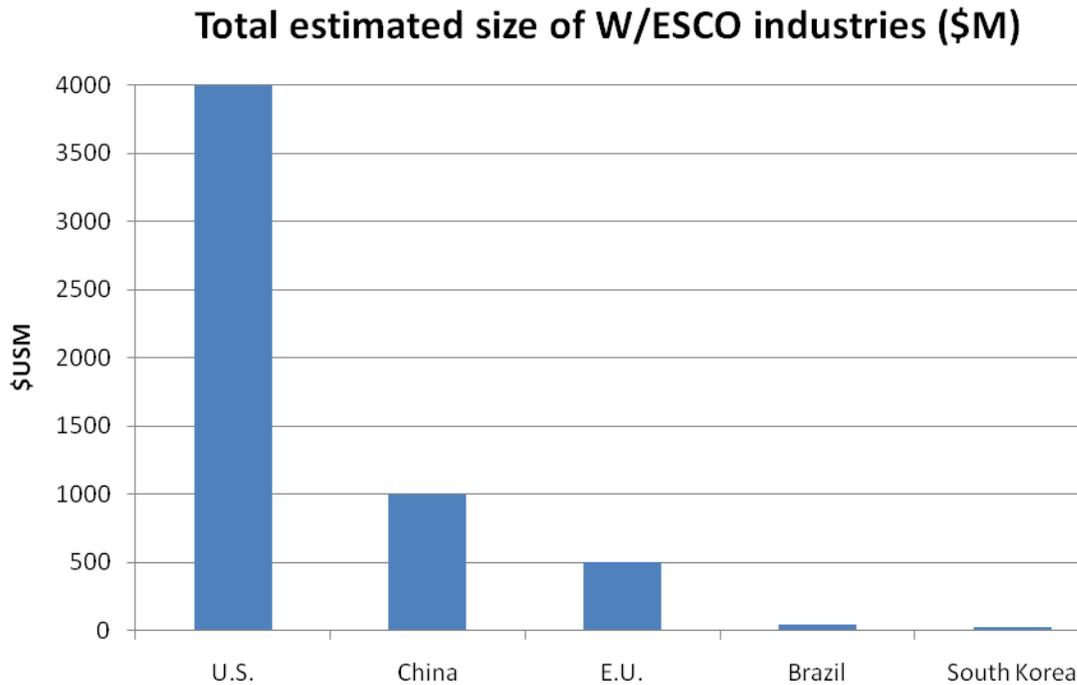
In the US, a typical water and energy project cost might be \$700,000 although there is high variability in project size.<sup>33</sup> The contract length for an ESPC contract is typically 5-10 years. In all models, once the contract term ends the client owns the equipment.

---

<sup>32</sup> Satchwell, et al. A Survey of the US ESCO Industry: Market Growth and Development from 2008 to 2011, LBNL, June 2010

<sup>33</sup> Osborn J., Assessing U.S. ESCO Industry: Results from the NAESCO Database Project, LBNL, August 2002.

Figure 13: Estimated size of W/ESCO industries by country



Note: Includes water savings contracts. Data on total W/ESCO industry revenues is highly uncertain, and industry revenue growth in India, S. Africa, Thailand and Eastern European countries may be significant. Estimates based on data from Ellis, J. ESCOs in Developing Countries, IISD, May 2010 and Satchwell, A, et al, A Survey of the US ESCO Industry, 2008 to 2011, LBNL, June 2010.

#### 4.1.3. OPPORTUNITIES AND STRATEGIES

##### Performance contracting services

There are numerous actions that the Jordanian government, utilities and donors can take to help expand the markets for W/ESCO services, both by directly contracting for these services and by implementing policies that will create demand. In addition, working with the Jordanian financial sector to increase access to finance for the initial capital costs of water (and energy) savings projects is essential.

##### **Financial**

- Identify donor funding to support Water (and Energy) Savings Performance Contracting. This may include loan guarantees to encourage domestic banks to loan to W/ESCOs, equipment providers or W/ESCO customers for efficiency projects. KFW has proposed a lending facility to the Jordanian government to support W/ESCO projects in the public sector. USAID's Development Credit Authority (DCA) could also be used.

### **Administrative/transaction costs**

- Consider innovative W/ESCO models including geographic, technological or industrial bundling of smaller projects by either banks or W/ESCOs to increase the viability of small projects.

### **Government policies**

- Eliminate or reduce water (and energy) price subsidies.
- Create water efficiency obligations and incentives. Incentives in Jordan are just beginning to be developed and implemented.
- Create a public sector program to reduce water (and energy) consumption in public buildings. Buildings might be selected based on water (and energy) consumption or other criteria. Target water (and energy) reduction goals might be set for Ministries.

### **Limited knowledge of W/ESCOs and clients' reliability concerns**

- Engage in ongoing information dissemination to potential clients with regard to water and energy efficiency and W/ESCOs, with a focus on building partnerships and providing a "one stop shop" source of information.
- Develop public and private sector demonstration programs.
- Establish pre-qualification or accreditation programs for W/ESCOs.

### **Building human resource capacity**

- Build capacity of W/ESCOs and banks on EPC financing, contracting approaches, and best practices through networking opportunities and training courses.
- Encourage joint ventures with multi-national W/ESCOs to improve domestic W/ESCO capacity, increase their knowledge of new technologies, improve their ability to manage engineering risk, and help them undertake large projects.
- Provide training and certification programs, including development of a water module in Jordan, to supplement the Certified Energy Managers (CEM) training. Provide funds to support engineers committed to water (and energy) savings to participate in CEM, and any water module and training.
- Establish a "water center of excellence" and select engineers for training in water efficiency who are enthusiastic about water (and energy) efficiency.
- Educate and build the capacity of the public and private sector entities through King Abdullah II Award for Excellence.

### **Facilitate use of the performance contracting model**

- Develop standardized contracts and ensure there is a proven legal framework for performance contracting.

- Support “EPC light” programs based on simplified audits and deemed savings rather than legally enforceable performance guarantees; this type of water (and energy) efficiency program has been successfully introduced W/ESCOs in Croatia.<sup>34</sup>

## 4.2.FINANCING PROGRAMS

Small/medium commercial and residential buildings have tremendous potential for water and energy savings. However, many programs designed to increase investment have often met with disappointing results. In fact, over the last 30 years there has been a debate in the US and other countries over why consumers and businesses forego “cost-effective” water and energy efficiency products and practices, and what role policies and enabling programs (including financing and other services) should play in influencing these decisions.

The initial capital cost of projects and “split incentives” are two of the major barriers to residential and small/medium commercial enterprises’ investments in water and energy efficiency measures and products. Traditional bank financing has done little to address these barriers, particularly the financial barriers faced by those with the highest water and energy cost burdens and few recognize expected savings as increasing the ability to pay.

There are several types of innovative financing developed in the US in partnership with energy utilities or municipalities to address first cost for energy efficiency products and measures (some of which are water-using plumbing products). These types of financing programs have not yet been implemented for products which do not use energy (e.g. toilets) (see Figure 14):<sup>35</sup>

1. Utility on-bill financing programs (On-bill) - With on-bill programs, utilities provide loan funds for energy efficiency measures with the customer repaying the loan on the utility bill. The source of funds may be banks or other financing institutions, funds collected from utility rate-payers specifically for energy-efficiency (a so-called public benefits charge), or other public sources of funds. Credit requirements are usually less stringent than for traditional bank financing, often based on bill payment history only. This allows qualification of borrowers who may not qualify for traditional bank loans, though they must demonstrate some ability to take on debt. Utility incentives, which buy down the loan interest rate, are often provided in lieu of or in addition to rebates which may be available. Utilities forward loan payments to the third party lender or a revolving loan fund is established.
2. Tariffed Installation Program (TIP) - TIPS use a utility’s billing system to collect a charge that has been attached to the meter as a special tariff to repay the cost of energy improvements on utility bills. Because the payment is tied to the meter, not the borrower, these programs allow for the current occupant (owner or tenant) to move, with the next occupant responsible for repayment, thus overcoming the split incentive problem. The monthly charge is usually less than the expected savings and the measure is paid for before the end of its useful life. These programs are particularly attractive for municipal customers that need voter or City Council (the regulator) approvals to take on debt or low-income customers who have a limited ability to take on debt.

---

<sup>34</sup> Interview with Pierre Langlois, President, Econoler International, Inc., Quebec, Canada, October 27, 2010

<sup>35</sup> Brown, M., State Energy Efficiency Policies: Options and Lessons Learned Brief #3, *Alliance to Save Energy* (2009)

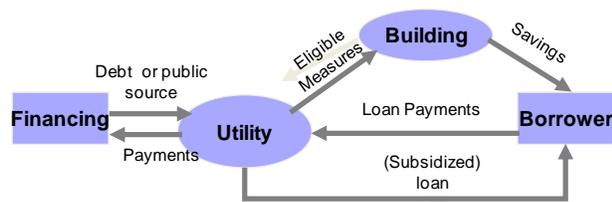
- Clean Energy Municipal Financing (CEMF) –CEMF uses a special municipal tax to fund energy efficiency improvements. The municipality provides funding for the program through issuing bonds that are repaid through building owners’ property tax bills. When a property is sold, the new owner takes over the remaining payment for the improvements as part of their annual tax bill.

Traditional lenders have developed some innovative products, which enable borrowers to include repayment of the first cost of efficiency measures with the payment of the mortgage loan rather than taking on an additional loan. Often the added cost is small and can easily be added onto the mortgage loan. These products help those with the ability to borrow additional funds; loan rates are typically lower than consumer loans:

**Figure 14: Innovative financing models for residential and small commercial customers**

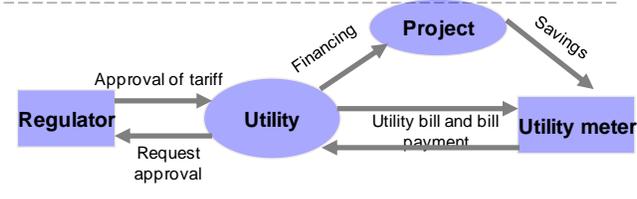
**1. On-bill Financing:**

- Loan funds from a financial institution or a public source. Subsidies often provided.
- Credit criteria determined by financing institution
- Loan obligation remains after sale or lease



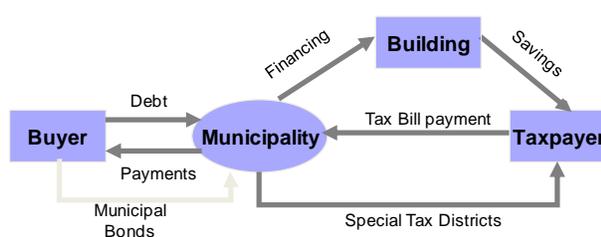
**2. Tariff Installation Program (TIP):**

- The utility established a special tariff charged to each “borrower”; requires approval of regulator
- When the building is sold or rented, the new owner or tenant pays this tariff on their utility bill and also enjoys the savings



**3. Clean Energy Municipal Financing (CEMF):**

- The municipality issues bonds to raise funds for lending
- The building owner borrows funds for project(s)
- When the building is sold, the new owner takes over the tax bill and also enjoys the savings



- Water and Energy Efficiency Re-financing – These efficiency mortgages are specifically designed to allow the building owner to re-finance their mortgage loan and use the funds to pay for the costs of rehabilitating or retrofitting their building with more efficient products or measures.
- Water and Energy Improvement Mortgage (EIM) – An EIM allows a new buyer to obtain additional financing to cover the cost of planned water and energy improvements to the building they are purchasing.

To facilitate investments in water efficiency by residential and smaller commercial building owners not typically served by W/ESCOs, a concessional loan from the government or donor which would otherwise be destined to finance a mega supply project, could be made to the utility to finance an on-bill loan program. Alternatively, a Development Credit Authority (DCA)

guarantee program could be developed to encourage banks to lend their own funds, either directly to customers or through a utility on-bill financing program. For funding of Government projects, including those serving low-income households, as well as for building owners who will lease their buildings, a tariff installation program (TIP) might be considered by the utility.

#### **4.3.FACILITY OPERATIONS AND MAINTENANCE (O&M) SERVICES**

Internationally, there is a large market for providing facility operations and maintenance services (O&M). A significant portion of W/ESCO revenues comes from these contracts, which are linked (and sometimes required) for Energy Savings Performance Contracts. In Jordan, many stakeholders reported the lack of maintenance of water (and energy) consuming equipment in the country both in the public sector and in the private sector. There are several reasons for this. In some cases, maintenance staff may not exist or lack specialized skills in some complex equipment, or they may lack incentives to maximize water savings, or access to funding for repairs. Also, low flow water saving devices may fail due to scaling within a few months if they are not carefully maintained. While poor O&M complicates performance contracting, particularly monitoring and verification, it does provide a strong market for facility O&M management services. There is an opportunity for performance based payment for preventive maintenance and operation. As mentioned earlier, the Government can be the driver of W/ESCO services, and can also help create the market for O&M services for their own properties. Outsourcing of services from water utilities is becoming more common.

One idea proposed has been that a “water management company” provides central management of the entire water cycle for a large facility or group of facilities. This could include supply of potable water, wastewater, and recycled water services for the planned buildings and tenants in the development. The company would enforce implementation of water efficiency requirements on all buildings constructed, provide meter reading and billing for water, wastewater and recycled water services, manage the storm-water system, establish an education and monitoring program, and perform other related functions, funded by appropriate user fees. There are some legal and regulatory challenges to this model as it overlaps with current utility services. However, the model could provide a greater incentive to ensure water is used efficiently.

#### **4.4.GREEN BUILDING DESIGN AND CERTIFICATION SERVICES**

To create the most efficient buildings possible, the environmental goals should be included in the building siting and architectural plans from the earliest conceptual stages. Helping building owners provide the documentation for green building certification, or working for the certifying agency to conduct audits, can be a profitable business. Government regulations requiring certification can drive this market. However, green building design or “value added consulting” is increasingly requested voluntarily by building owners and developers in Jordan. Engineering design firms or “consultants” design buildings and write the equipment specifications, and represent owners during construction to ensure compliance with the specifications. W/ESCOs are providing these services to building owners and in some cases to engineering “consultants”, or architect and engineering firms. However the value added engineering market will likely be an extension of existing architect and engineering firms services as they increase their expertise in water and energy efficiency. The market for green building design could be assisted by donors providing training and tools for engineering design firms that will allow them to quickly calculate potential cost savings of water efficient options.

The significant number of new hotels and resorts under construction in Aqaba provides a strong opportunity for construction and funding of efficient greywater, water recycling and wastewater management projects. Green Key, a graduated rating system designed to recognize tourism facilities’ commitments to improving their environmental performance, as a marketing tool for hotels in Jordan, due to the growing interest of clients in climate change mitigation and environmental sustainability. It was identified that there is a need for assistance in understanding how to meet the requirements. Engineering consulting companies, including W/ESCOs, can provide this service, and other more stringent green hotel brands exist.

#### **4.5.WASTEWATER RE-USE SERVICES**

There is still a need for expanding the wastewater treatment capacity and quality throughout Jordan. Wastewater reuse systems are becoming more common especially in new high-rise and high-density developments that propose on-site wastewater treatment and reuse systems.

#### **4.6.LEAK DETECTION SERVICES**

Leak detection services generally require specialized technology and training. Some plumbers and technicians provide these services for exterior leaks. The market for leak detection is primarily serving water utilities. Leaks up to the customer meter are generally the responsibility of the water provider. Utilities provide some leak detection services, generally when customers complain about above-average water bills.

#### **4.7.TRAINING AND AWARENESS**

Providing training courses in water and energy efficiency has been a profitable business, particularly in the past five years as global awareness and government action on water shortage and climate change has increased. Universities and training institutions are including more

water and energy efficiency in their curricula. Private companies and non-profits have also had considerable success in providing relevant short, tailored, and adult learning courses.

Generating consumer action through awareness campaigns can also be a profitable business. Often public relations consultancies or advocacy non-profits develop expertise in these services. Governments and utilities worldwide are increasingly contracting for awareness campaigns to reduce water and energy use.

## 5. SUMMARY AND CONCLUSIONS

Based on research and interviews conducted, it is clear there is growing demand for water efficient products and services in Jordan. Jordan is already moving forward with several actions which will impact this market, including raising water tariffs, establishing an updated efficient plumbing code, and improved testing facilities and procedures. However, there are many barriers to promoting water efficient products and services in Jordan including the price of water (tariffs), minimal consumer awareness about the water efficiency of plumbing products and services in the marketplace, and a lack of financing options for various customer sectors.

Engaging all private sector actors, including distributors, retailers, plumbers, contractors, engineering consultants, architects, builders/developers, and financing institutions, will make a significant impact on reducing Jordan's water demand.

Below are the findings of the market assessment for efficient plumbing products and water and energy efficiency services:

### **Water efficient plumbing products**

A coherent approach to various initiatives is required to promote water-efficient products market.<sup>36</sup> With the new plumbing products standards, and a labeling program under consideration, there is an opportunity in Jordan to build a coordinated standards, labeling, and incentives program for maximum impact.

Implementing customs tax reform and a pilot rebate and financing program concurrent with a labeling program ensures that there is an objective method of choosing products to rebate/finance, provides a method to engage the plumbing product distributors and retailers in promoting water efficient products, aids in communicating product efficiency to consumers and overcomes first cost barriers to consumers investing in water efficiency products. W/ESCOs can also use the incentives to market water efficient products to the sectors they serve. The following actions are recommended to enable maximum impact of all initiatives:

- Continue developing efficient standards for all plumbing products.
- Support new standards for labeling of washing machines; concurrently develop labels to support the new standards for plumbing products.
- Eliminate customs taxes for efficient plumbing products and electrical appliances or promote sales of products already covered under the free trade agreement.
- Design a voluntary labeling program focusing initially on clothes washers and toilets, with second priority given to showerheads, faucets and dishwashers. Implement water utility plans for direct installation of plumbing products and provide capacity-building and training. Pilot rebate programs to reduce incremental costs of water efficient products to 10-20%. Promote maintenance of systems to reduce leaks resulting in increased water use. Coordinate and co-deliver with utility rebate programs as appropriate. An evaluation of the pilot program, including a market demand study, would be conducted prior to expanding programs beyond the initial pilot stage.

---

<sup>36</sup> OECD Publishing (2008)

- Investigate the possibility of developing an “on-bill” water utility financing program for residential retrofit and rehabilitation projects to enable use of credit requirements based on bill payment.
- Establish incentive programs including rebates and financing to support all key players involved in the production, distribution and retail of plumbing products to assist them promote water efficiency.
- Consider a TIP program to finance water efficient product retrofits in multi-family and commercial buildings for sale or lease, to overcome the split incentive problem.
- Tie incentives for housing projects constructed by the Government to water efficiency (expand to private developers only if they will have a role in specifying water-using features of buildings as this is often left to the new owner).
- A pilot rebate/incentive program (including marketing support, training and financing tools) combined with a water and energy labeling program will provide information to consumers on product choices and benefits and provide tools to product retailers, W/ESCOs and other market players (including contractors and plumbers) to promote water efficient products and water efficiency services. Government and donor support for such a pilot program will promote private sector involvement in the water efficiency market and supplement utility direct installation and other program plans.

### **Water and energy efficiency services**

The W/ESCO market is in its infancy in Jordan. Though there is clearly a need for various design, engineering and facility management services, a lack of understanding of the technical and financial risks has hindered its development. A focus on capacity-building of the various firms which already provide these services, combined with education for potential clients and development of financing tools, will promote the growth of this market.

Strengthening W/ESCOs in Jordan will encourage public and large private sector commercial/industrial clients to invest in water efficient products and systems and reduce water use through improved maintenance. Since a nascent W/ESCO industry already exists, initial efforts should focus on addressing the foundational issues and developing the strongest potential markets. Appendix A includes initial steps recommended to strengthen the W/ESCO services market in Jordan.

## **APPENDIX A: RECOMMENDED FIRST STEPS TO STRENGTHEN THE W/ESCO MARKET IN JORDAN**

1. Focus on Government projects: Aggressive goals for water and energy efficiency in government facilities should be established, increasing the use of W/ESCO and O&M services in government buildings through energy/water performance contracting and financing. The first step should include a study of the public entities' procurement system to determine if there are any barriers to address.
2. Link W/ESCOs to large commercial/industrial projects: The Jordan Business and Women's Association (JBWA) is implementing a water efficiency project. The project is initially focusing on sectors which have the highest water use and negative environmental impact. Beginning with the stone and marble industry this year, and following with the chemicals and cement industries, they have identified water efficiency projects. Linking this project with existing W/ESCOs to identify opportunities and interest in performance contracting and other services is a good first step in moving beyond grant financing to facilitate private sector investment in commercial/industrial sector energy efficiency.
3. Develop new sources of financing: A DCA project to support private financing for government and commercial/industrial energy efficiency projects can overcome current barriers to moving away from W/ESCO self-financing of shared savings projects, which limits the number of projects which can be developed. The first step should be a concept paper for working with selected banks and donors to use the Development Credit Authority to provide loan guarantees for is a good first step.
4. Capacity-building for W/ESCO service providers: Enhancing water-focused training for architects, engineers, consultants, plumbers and contractors can begin with development of a water module to be added to the Certified Energy Managers (CEM) curriculum. Training and support should be provided for engineers to obtain the CEM/water focus certification. Tools and training engineering design firms/consultants that allow quick savings calculations of water efficient plumbing products should supplement the certification program. A clear first step would be to scope out development of the water module for the CEM curriculum.
5. Tourism sector water efficiency: The Utilities water efficiency plan includes working with W/ESCOs to provide services to hotels. A guarantee loan program for water (and energy) efficiency loans, provided by the Jordanian Loan Guarantee Corporation would support this effort. Green certification and facilities management services, in high demand by this sector, should be included in the services provided. A strong initial step would be development of a concept paper to present to this corporation.
6. Support the public recognition and demand for "Green Building" certifications: this can be done either through support to the Jordanian Green Building Council/LEED program, or the MPWH planned green building guide that was recently drafted. An assessment

should be completed initially to determine the best way forward to support Green Building in Jordan.

7. Waste-water re-use and grey-water/recycling: Support of regulations and business models for water recycling, grey-water and resale of treated wastewater by private enterprises should be developed. A strong initial step would be a roundtable among stakeholders to discuss the proposal for central water management for Abdali as well as other models to promote water re-use and recycling.
8. Tourism sector water efficiency: Miyahuna water efficiency plan includes working with W/ESCOs to provide services to hotels. A guarantee loan program for water (and energy) efficiency loans, provided by the Jordanian Loan Guarantee Corporation would support this effort. Green certification and facilities management services, in high demand by this sector, should be included in the services provided.

## APPENDIX B: WORKSHOP WATER EFFICIENCY MARKETPLACE QUESTIONNAIRE/SURVEY

1. What type of organization do you represent?
  - a. \_\_\_ Government ministry or agency
  - b. \_\_\_ Water utility
  - c. \_\_\_ Product manufacturer
  - d. \_\_\_ Product importer, distributor or retailer
  - e. \_\_\_ Contractor/construction manager
  - f. \_\_\_ Engineering consultant/ Architect and Engineering firm
  - g. \_\_\_ Water and/or Energy Service Company
  - h. \_\_\_ Bank or financial Institution
  - i. \_\_\_ NGO
  - j. \_\_\_ Other
  
2. What is the biggest challenge to selling water efficiency services? (Mark the top 3 challenges from the list below)
  - a. \_\_\_ Price of water is low
  - b. \_\_\_ Customers are unaware of water efficiency services
  - c. \_\_\_ Customers are not interested in saving water
  - d. \_\_\_ No minimum codes or standards for water efficiency
  - e. \_\_\_ No feasible, established, and cost effective green certification/brand
  - f. \_\_\_ Little or no access to finance for initial costs of water efficiency
  - g. \_\_\_ High cost of water efficiency service
  - h. \_\_\_ Relatively high cost of water efficient products due to customs and other taxes
  - i. \_\_\_ Belief that government must solve the water problem
  - j. \_\_\_ Lack of incentives for facility engineers (more risk in disrupting operations than the reward for reducing costs)
  - k. \_\_\_ Utilities not paid by the building owner or occupant cannot make facilities upgrades (split incentives)
  - l. \_\_\_ Customer lack of understanding of performance contracting and confidence in the financial returns
  - m. \_\_\_ Lack of qualified personnel
  
3. What is the biggest challenge to water efficiency product sales? (Mark the top 3 challenges from the list below)
  - a. \_\_\_ Price of water is too low
  - b. \_\_\_ Lack of availability of water efficient products
  - c. \_\_\_ Consumers unaware of where to find products

- d. \_\_\_Customers are unaware of water efficient technologies
  - e. \_\_\_Customers are unable to recognize whether the products is water efficient
  - f. \_\_\_Retailers/Salespeople are unaware of the presence of water efficient technologies
  - g. \_\_\_Customers are not interested in saving water
  - h. \_\_\_No minimum codes or standards for water efficiency
  - i. \_\_\_No feasible, established, and cost effective green certification/brand
  - j. \_\_\_Little or no access to finance for initial costs of water efficiency
  - k. \_\_\_High cost of products due to customs and other taxes
  - l. \_\_\_Belief that government must solve the water problem
  - m. \_\_\_Utilities not paid by the building owner or occupant cannot make facilities upgrades  
(split incentives)
  - n. \_\_\_Lack of incentives for suppliers (distributors/retailers)
4. Are water saving devices available to interested customers?
- 1 - No
  - 2 - Rarely
  - 3 - Sometimes
  - 4 - Yes
  - 5 - I don't know
5. Are there sufficient qualified personnel in Jordan to provide water efficiency auditing and low water use design services?
- 1 - no qualified personnel
  - 2 - few qualified personnel
  - 3 - some qualified personnel
  - 4 - high number of qualified personnel
  - 5 - I don't know
6. Do building owners/residents believe the results of water and energy audits?
- 1 - No
  - 2 - Sometimes
  - 3- Yes
  - 4- I don't know
7. Are there legal or contractual barriers to the performance guarantee contract process in Jordan?
- 1 - none
  - 2 - minimal
  - 3 - some
  - 4 - significant
  - 5 - very significant

If yes, please specify

8. Are there legal or contractual barriers to facilities operations and maintenance contracts in Jordan?

- 1 - none
- 2 - minimal
- 3 - some
- 4 - significant
- 5 - very significant

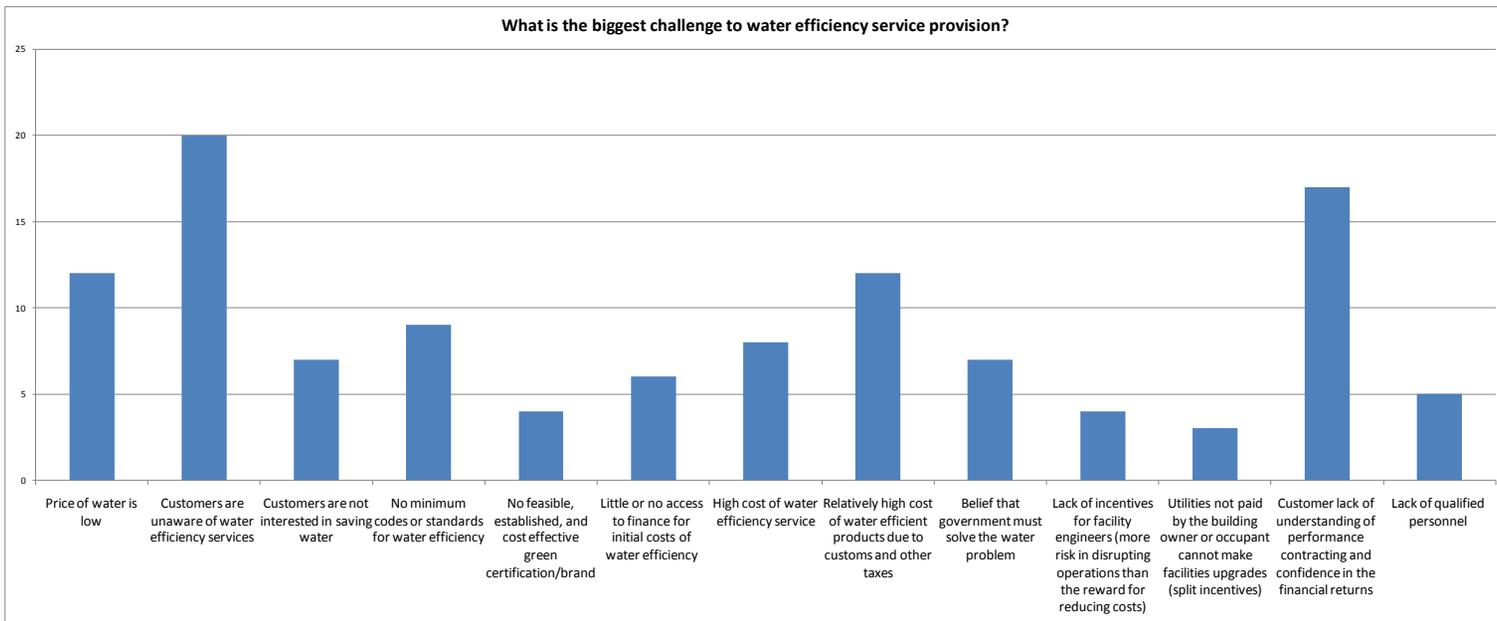
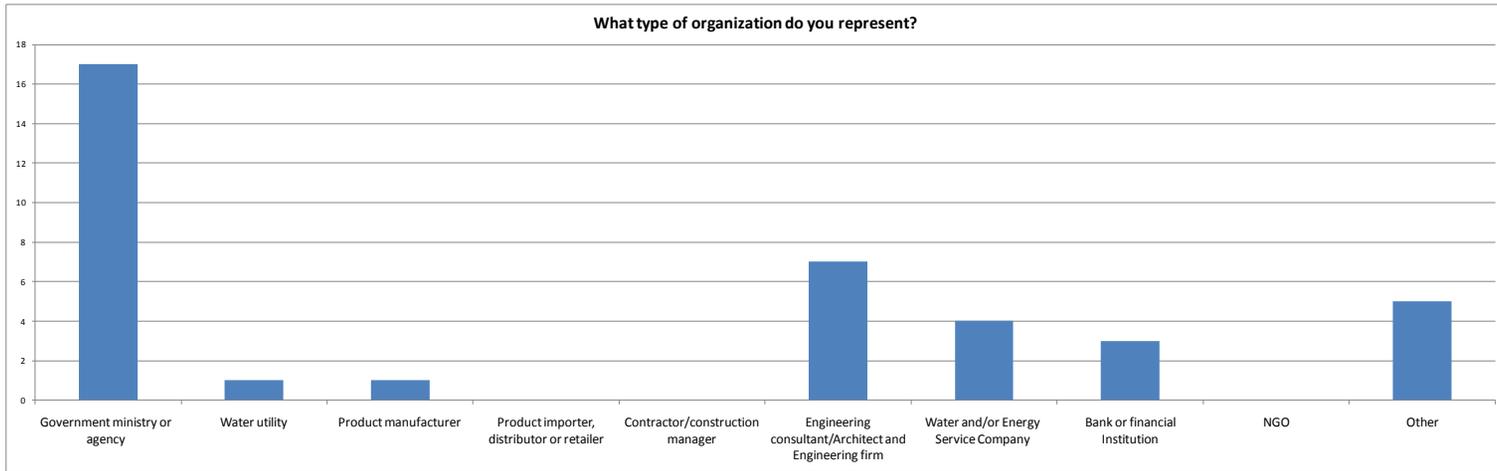
If yes, please specify

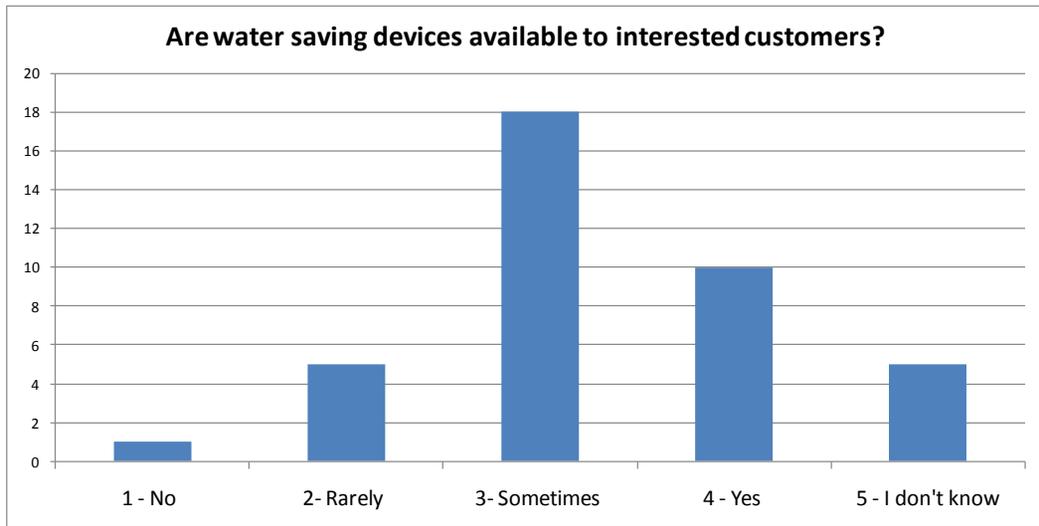
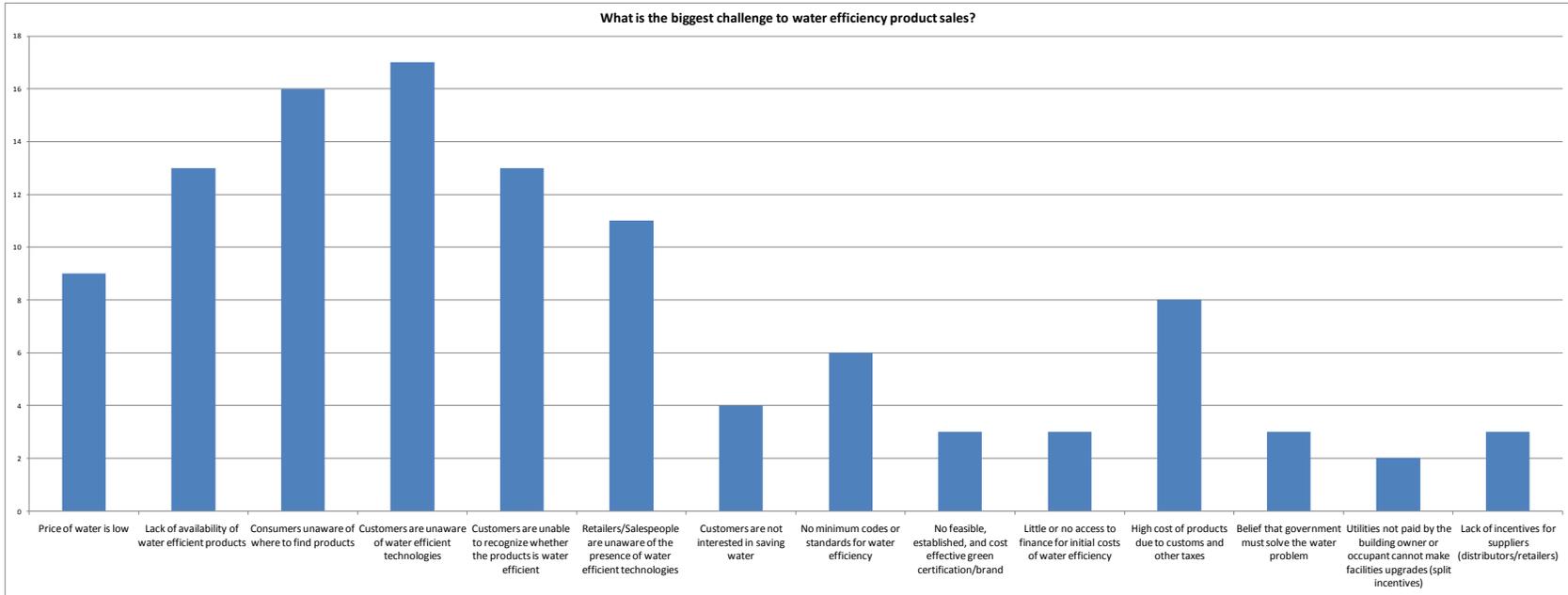
9. What are the top two opportunities for water efficiency services in Jordan? (Mark the top 2 in the list below).

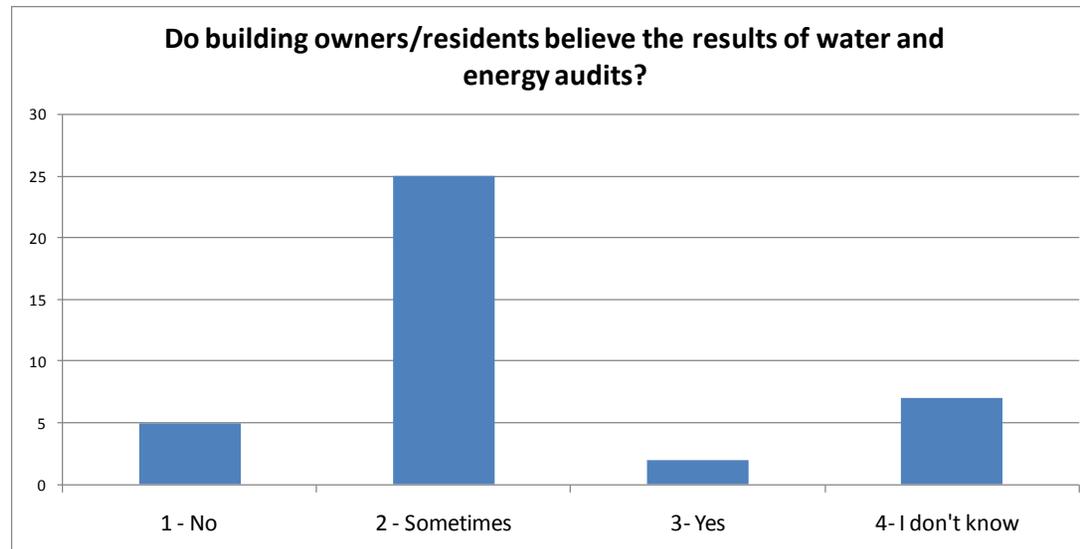
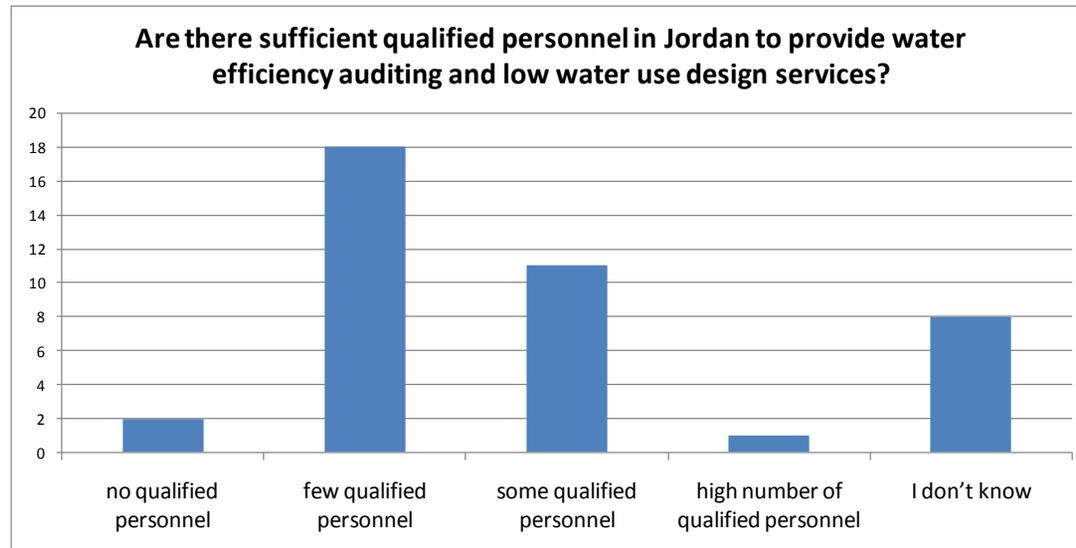
- a. \_\_\_ Auditing and saving strategy recommendations for energy/water
- b. \_\_\_ Financing efficiency projects
- c. \_\_\_ Facility operations and management
- d. \_\_\_ Green building design/value added consulting
- e. \_\_\_ Green building certification
- f. \_\_\_ Leak detection
- g. \_\_\_ Training
- h. \_\_\_ Wastewater reuse system design
- i. \_\_\_ Awareness campaigns

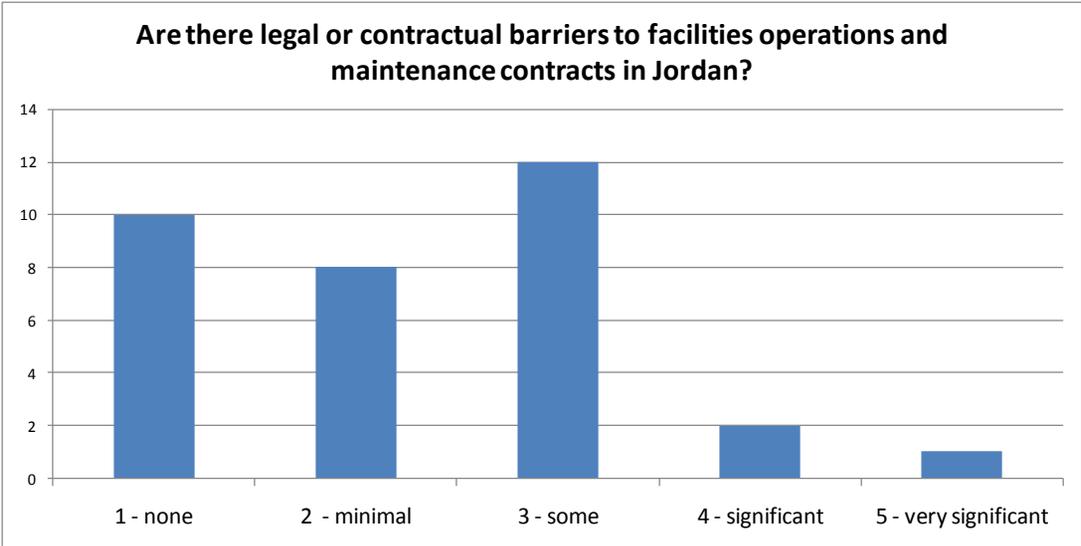
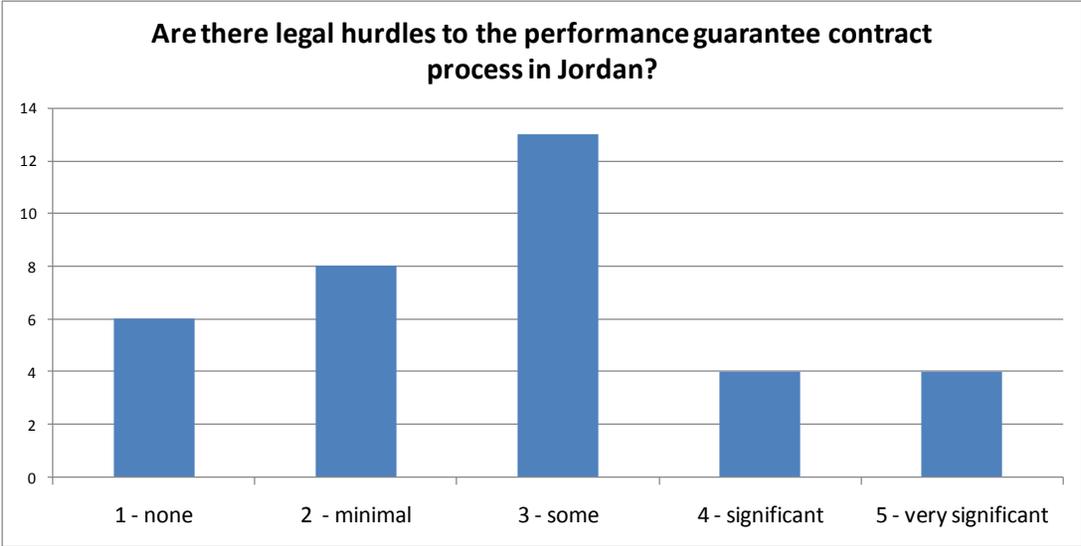
10. What can the Jordanian Government or Donors do in the short-term to build a water efficiency market?

## APPENDIX C: WORKSHOP WATER EFFICIENCY MARKETPLACE QUESTIONNAIRE/SURVEY RESULTS









**What are the top two opportunities for water efficiency services in Jordan?**

