Wastewater Treatment Plant Privatization initiatives in Saudi Arabia

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Deputy Minister for Planning & Development
Ministry of Water & Electricity (MOWE)
Kingdom of Saudi Arabia
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Global issues of wastewater

- About 90% of sewage and 70% of industrial wastes in developing countries are discharged without treatment.
- At present, only 10% of the domestic wastewater in developing countries is collected.
- Only 10% of existing wastewater treatment plants operate reliably and efficiently.
- Beginning of year 2000, 40% of world population (2.4 billion people) will have no access to sanitation.

Sewerage coverage - MENA Region

Source: water market middle east by Global water Intelligence – Jan 2005
Treated Effluent Reuse (% of treated volume)


Source: A. BAHRI, National Research Institute for Agricultural Engineering, Water, and Forestry, Tunisia
Reuse applications

- Industries - process, refineries, power plants
- Districts cooling systems – big commercial buildings, multi-story apartments, large housing units
- Agriculture – farms irrigation
- Public parks – landscaping, public fountains
- Groundwater and aquifer recharge
- Non-potable use – fire hydrants, toilet flushing, car washing, gardening Industries.
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**Key Challenges In the Kingdom**

- Saudi Arabia is listed under “absolute water scarcity category” (i.e. will NOT be able to meet needs in 2025)
- Due to growing population, and rapid economic growth water demand in the kingdom is increasing rapidly by 6% annually
- Water production & transportation costs are the world’s highest
- The Kingdom’s sewage collection coverage is only 45%
- Treated effluent reuse is very limited (6 % of potable water supply)
- Wastewater treatment plants and networks requires huge investments (85 billion SR for next 20 years)
Wastewater Statistics in KSA

REUSE – 337,000 m3/day = 6% of potable supply  18% of treated water
# Current coverage versus a 100% coverage

## Water Distribution, Sewage Collection and Waste Water Treatment
### Current and Under Construction Coverage by City

<table>
<thead>
<tr>
<th>City</th>
<th>Water Coverage</th>
<th>Sewage Coverage</th>
<th>Treatment Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riyadh</td>
<td>99%</td>
<td>80%</td>
<td>45%</td>
</tr>
<tr>
<td>Jeddah</td>
<td>90%</td>
<td>69%</td>
<td>55%</td>
</tr>
<tr>
<td>Madinah</td>
<td>100%</td>
<td>92%</td>
<td>11%</td>
</tr>
<tr>
<td>Dammam/Khobar</td>
<td>100%</td>
<td>95%</td>
<td>42%</td>
</tr>
<tr>
<td>Kharj</td>
<td>100%</td>
<td>56%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Target 100%
Requirement for 100% coverage in KSA for next 20 years

**Total CAPEX (Billion SR)**

- Water Distribution: 52 Billion SR (38%)
- Sewage Collection and Treatment: 85 Billion SR (62%)

**Total OPEX**

- Water Distribution: 26 Billion SR (40%)
- Sewage Collection and Treatment: 39 Billion SR (60%)
Why Privatization?
Why privatization?

- Adopting international best practices
- Improved operating efficiency and reduce costs
- Helps in better management of CAPEX and OPEX
- Create enabling environment for private sector participation
- Build Commercially Viable Organization
- Attract International Investors/ Operators
- Manpower training, knowledge transfer and capacity building
- Technology applications like ERP, GIS, SCADA, CRM Asset Management etc.
- World Class Customer Services
Between 1990 and 2003, 120 developing countries carried out nearly 8,000 privatization transactions, raising US$410 billion in privatization proceeds.

Regional distribution of privatization proceeds, 1990-2003

Source: The World Bank Group Private Sector Development Vice Presidency - Feb 2006
Privatization trend

Investment in infrastructure projects with private participation in developing countries, by region, 1990-2004

Project Database
Source: Private Participation in Infrastructure (PPI)
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MOWE’s Vision:

Vision :-

To build World-Class Water Utility

Targeted areas for Restructuring

- Demand Management
- Commercial Orientation
- Culture Change
- HR Development
- Restructuring Plan
- IT Strategy
Identify Opportunities for Improvement

Management /O&M contracts (5 years transition)

Concession/ total privatization

- Operational Audit
- Organisational Diagnostics
- Benchmarking
- Develop action plan

- Establish NWC
- Boost sector performance
- Make water sector more attractive

- Tariff restructuring
- Transfer asset & employees

- Early PPP successful paving the way for complex contract
- Move to Concession/ total privatization
MoWE’s Privatization Model / Scheme
Public Private Partnership chosen models

- **Wastewater Treatment Plants**
  - Concession
  - BOT / BOO
  - Lease

- **Network management**
  - O & M Contract
  - Management Contract

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1-2</td>
</tr>
<tr>
<td>2</td>
<td>3-5</td>
</tr>
<tr>
<td>3</td>
<td>6-10</td>
</tr>
<tr>
<td>5</td>
<td>11-25</td>
</tr>
<tr>
<td>10</td>
<td>26-50</td>
</tr>
<tr>
<td>25</td>
<td>51-100</td>
</tr>
<tr>
<td>50</td>
<td>101-200</td>
</tr>
<tr>
<td>100</td>
<td>201-500</td>
</tr>
</tbody>
</table>
Why unbundling?

- Reduces risk and better management
- To provide equal focus and enhanced services in both water and wastewater
- Helps in addressing the immediate customer needs
- Reduces risk and easy to manage
- To improve and build new infrastructure rapidly
- Helps in quicker full sewage coverage, collection and treatment
- Improve level of treatment and disposal methods
- Involve specialized companies with wastewater treatment as core activity
- Improve in technical and efficiency of WWTPs
- Increase reuse of Treated effluent on commercial basis
MOWE preferred Option of sector unbundling

Water distribution and wastewater collection

Management Contract

Wastewater treatment and Reuse

Concession / BOO

Reuse locations

Wells
Water Treatment Plants
Reservoirs
Households

Pumping, Treatment and O & M

Existing Wastewater Treatment Plants

Future WWTP based on BOO basis

Agriculture
District cooling
Industries
Public Parks
Aquifer recharge
Non-potable use

Pumping, Treatment, Transmission, Storage, Distribution and Sewage Collection
Current/ Future PPP Projects
### MOWE Privatization Roadmap

**Potable water & sewage collection**

<table>
<thead>
<tr>
<th>Main Streams</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td></td>
<td>Q1</td>
<td>Q1</td>
</tr>
<tr>
<td>Q2</td>
<td></td>
<td>Q2</td>
<td>Q2</td>
</tr>
<tr>
<td>Q3</td>
<td></td>
<td>Q3</td>
<td>Q3</td>
</tr>
<tr>
<td>Q4</td>
<td></td>
<td>Q4</td>
<td>Q4</td>
</tr>
</tbody>
</table>

#### Policies & Institutional Setup
- National Water Company (NWC) incorporation

#### PPP Implementation
- Riyadh PPP Contract Tendering Process
- Jeddah PPP Contracts Tendering Process
- Dammam / Khohbar Full Audit & UFW
- Madinah Full Audit & UFW
- Dammam/Khobar PPP Contracts Preparation Process
- Madinah PPP Contract Preparation Process

Today
**MOWE Privatization Roadmap (Wastewater Treatment Plants)**

<table>
<thead>
<tr>
<th>Main Streams</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
<td>Q1</td>
</tr>
<tr>
<td>Tendering process</td>
<td>Contract Signed</td>
<td>Tendering process</td>
<td>Contract Signed</td>
<td></td>
</tr>
</tbody>
</table>

- **Riyadh wastewater treatment plants on Concession / BOO basis**: Contract Signed
- **Jeddah wastewater treatment plants on Concession / BOO basis**: Contract Signed

Today
Formation of NWC
Formation of NWC

- Supreme Economic Council has already approved the setting up of National Water Company (NWC) and the Royal Decree is expected soon.

- NWC will be formed as a Joint Stock Company.

- Initially NWC’s authorized capital will be around SR 22 billions.

- All the existing water and wastewater assets will be transferred to NWC. Expected total capital (4 major cities only) will be around SR 70 Billions.

- NWC will be responsible for the privatization of the urban water and sewage sector in the Kingdom.

- NWC will attract international investments and know-how.
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Details of Wastewater Treatment Plants projects
The Project transaction (treatment capacity) is of significant scale compared to other tendered / planned GCC offers:

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Design Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riyadh (Saudi Arabia)</td>
<td>1,700,000 m³/day *</td>
</tr>
<tr>
<td>Jeddah (Saudi Arabia)</td>
<td>1,300,000 m³/day</td>
</tr>
<tr>
<td>Wathba/Saad (Abu Dhabi)</td>
<td>365,000 m³/day</td>
</tr>
<tr>
<td>Sulaibiya, Kuwait</td>
<td>375,000 m³/day</td>
</tr>
<tr>
<td>Samra, Jordan</td>
<td>270,000 m³/day</td>
</tr>
<tr>
<td>Muharraq (Bahrain)</td>
<td>170,000 m³/d</td>
</tr>
<tr>
<td>Ajman</td>
<td>90,000 m³/day</td>
</tr>
</tbody>
</table>

* - (Existing : 5 plants (700,000 M³/day) + 2 under construction (500,000 M³/day) + 2 future (500,000 M³/day)
## WWTP Riyadh city Project

The Project comprises a mix of “Brownfield” and “Greenfield” WTP assets:

<table>
<thead>
<tr>
<th>Location</th>
<th>Plant name</th>
<th>Year of commission</th>
<th>Design Capacity (M3/Day)</th>
<th>Current Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manfouha</td>
<td>South plant C2</td>
<td>1975</td>
<td>80,000</td>
<td>Existing plants (Brownfield)</td>
</tr>
<tr>
<td></td>
<td>South plant C3</td>
<td>1981</td>
<td>120,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>North Plant</td>
<td>1994</td>
<td>200,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>East Plant</td>
<td>2005</td>
<td>200,000</td>
<td></td>
</tr>
<tr>
<td>Al-Kharj</td>
<td>Phase-1</td>
<td>2007</td>
<td>100,000</td>
<td>Under Construction (EPC)</td>
</tr>
<tr>
<td></td>
<td>Phase-2</td>
<td>2008 / 2009</td>
<td>100,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Future Expansions</td>
<td></td>
<td>200,000</td>
<td>BOO (Greenfield)</td>
</tr>
<tr>
<td>Hayer</td>
<td>Phase-1</td>
<td>2011/2012</td>
<td>400,000</td>
<td>Under Construction (EPC)</td>
</tr>
<tr>
<td></td>
<td>Phase-2</td>
<td></td>
<td>400,000 – 800,000</td>
<td>BOO (Greenfield)</td>
</tr>
</tbody>
</table>

**Total Number of WWTPS = 9**

**Total design Capacity = 1.7 Million M3/day**
### Jeddah city WWTP Project:

<table>
<thead>
<tr>
<th>Plant Location</th>
<th>Design Capacity (M3/Day)</th>
<th>Year of Commissioning</th>
<th>Current Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khumra 1</td>
<td>40,000</td>
<td>1977</td>
<td></td>
</tr>
<tr>
<td>Khumra 2</td>
<td>60,000</td>
<td>1997</td>
<td></td>
</tr>
<tr>
<td>Khumra 3</td>
<td>140,000</td>
<td>2005</td>
<td></td>
</tr>
<tr>
<td>Other Small Plants</td>
<td>60,000</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Khumra 4</td>
<td>250,000</td>
<td>EPC Contract awarded</td>
<td>Existing plants (Brownfield)</td>
</tr>
<tr>
<td>Airport 1</td>
<td>250,000</td>
<td>EPC Contract awarded</td>
<td>Under Construction (EPC)</td>
</tr>
<tr>
<td>Khumra 5</td>
<td>250,000</td>
<td>Under study</td>
<td>BOO (Greenfield)</td>
</tr>
<tr>
<td>Airport 2</td>
<td>250,000</td>
<td>Under study</td>
<td></td>
</tr>
</tbody>
</table>

Total Number of WWTPS = 8  
Total design Capacity = 1.3 Million M3/day
Commercial Contracts Matrix:

- Construction Investor
- Facilities Management Investor
- NWC
- Sponsors
- Lenders
- Local Banks
- Foreign Banks
- Financial institutions
- O&M Company
- EPC Contract (Engineering, Procurement & Construction)
- Special Purpose Vehicle (owner of assets during period of contract)
- Off take and Supply agreements
- National Water Company-NWC
- Customers
- Reuse water investor
Potential Reuse of Treated water in Riyadh City
Different scenario for treated effluent sales
In Riyadh city

Calculations based on assumption of:
70% of treated water could be used during next 25 years
NWC sells at 1.5 SR / M3 to private investors
**Examples of potential customers for waste water effluent in Riyadh City**

<table>
<thead>
<tr>
<th>Company</th>
<th>Utilization of Recycled Wastewater</th>
<th>Expected future daily Demand (M3/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prince Turkey Bin Saud Al-Kabeer</td>
<td>Irrigation</td>
<td>50,000</td>
</tr>
<tr>
<td>Tabreed</td>
<td>Cooling Water</td>
<td>50,000</td>
</tr>
<tr>
<td>Current Manfouha reuse</td>
<td>Irrigation Cooling Water</td>
<td>179,000</td>
</tr>
<tr>
<td>Muzaimiya and Dirab</td>
<td>Irrigation</td>
<td>280,000</td>
</tr>
<tr>
<td>Dareiya and Hebilla</td>
<td>Irrigation</td>
<td>120,000</td>
</tr>
<tr>
<td>Other farms</td>
<td>Irrigation</td>
<td>25,000</td>
</tr>
<tr>
<td><strong>Total Future daily Demand Expected Currently</strong></td>
<td></td>
<td><strong>704,000</strong></td>
</tr>
</tbody>
</table>

**Other potential customers:**
- ADA – Al-Riyadh Development Authority.
- SEC - Saudi Electricity Company.
- Yamama Cement Factory.
- Mansouria Farm.
- Rajhi Cement Factory.
Awards
Best privatization award by Arabian Business Magazine June 2007
GLOBAL WATER AWARDS 2007
as the best public water agency of the year 2006
IDA award for water conservation campaign

INTERNATIONAL DESALINATION ASSOCIATION

Presidential Award

IDA is pleased to present this award to the Ministry of Water and Electricity, Kingdom of Saudi Arabia for the success they have accomplished in demand management which resulted in a 30% reduction in the consumption of water.

ABDULHAMID AL MANSOUR
IDA President, 2005
Recognition letters from UNDP for the water conservation efforts

United Nations Development Programme
Kingdom of Saudi Arabia

Ref.: SAU/000000

Date: 2019-02-01

Chairman

Honorable:

Dear Sir,

I am writing to congratulate the Water Conservation Program of the Kingdom of Saudi Arabia for its efforts in promoting water conservation. The program has been successful in implementing various initiatives to conserve water resources. The program has been recognized by UNDP for its efforts in promoting water conservation.

I am enclosing a letter of congratulations from UNDP, which was presented to the program representatives during the recent meeting. The letter highlights the importance of water conservation and commends the program for its efforts in promoting sustainable water management.

I hope you will find this information useful and I look forward to hearing from you soon.

Sincerely,

[Your Name]

[Your Title]

UNDP

[UNDP Address]

[Contact Information]
Recognition letters from UNU for the water conservation efforts

19 January 2007

H.E. Engineer Abdullah Al Hussayen
Minister of Water and Electricity
King Fahd Road
Riyadh, 11233
Kingdom of Saudi Arabia

Subject: Letter of Appreciation for the Saudi Water Conservation Campaign

Your Excellency,

It is my pleasure to write to you and congratulate you on the remarkable success of the Saudi Water Conservation Campaign. The Campaign has demonstrated some outstanding results in reducing the urban water usage. Through the 30 million retrofits provided to the communities by your ministry, the daily savings in domestic water use are estimated to be about 30% or 524,000 cubic meters of water; this is roughly equal to the production of four large desalination plants. This approach of water conservation and demand management is crucial for water-scarce countries like the Kingdom of Saudi Arabia.

The core concern of UNU-INWEH’s mission is the global water crisis. Our organization specifically focuses on the efforts to meet this global crisis, through capacity development and directed, policy-relevant research. For many years, UNU-INWEH has been focusing its work on water management and conservation in dryland countries. We strongly believe that integrated water resources management is the key to achieving sustainable development, and that demand management must be an essential element in water-scarce settings. Therefore, the campaign by your Ministry is a remarkable success in this direction, and sets an example for other dryland countries. We hope that we can partner with your Ministry to bring the results of this achievement to the attention of the other water-scarce countries in the region.

On behalf of UNU-INWEH, I take advantage of this occasion to address to Your Excellency the assurance of our highest consideration.

Sincerely,

Dr. Zafar Adee
Director, UNU-INWEH
**Lessons learnt**

- **Choosing the right PPP option**—contract should clearly address objectives, level of risks and responsibilities.

- **Establish the enabling environment** in terms of government approvals, institutional, legal, and financial framework.

- Well defined responsibilities & obligations of both parties (NWC & the private sector).

- **The PPP contracts should be tailored to meet the local objectives** and provided the risk sharing, ROI, incentives, flexible payment mechanism, etc.

- **Gradual privatization** (Do-lean-Do approach).

- **Avoid erroneous KPI’s baseline**. Targets / KPIs need to be realistic / achievable.

- Fair, transparent and competitive bidding process.
Thank You For Your Attention