World Bank Water Week 2003
Unaccounted for Water Reduction Session

BEST PRACTICE IN URBAN WATER RESOURCE MANAGEMENT:

CONTRIBUTION OF LYDEC IN CASABLANCA

Fouad Djerrari, Chief Operating Officer, LYDEC
Washington DC, March 4-6, 2003
GENERAL CONTEXT

Water Cycle in Morocco (billion of m$^3$/yr.)

Rainfall : 150
Useful Rain : 30
Mobilizable Hydraulic Potential : 20
Mobilized Hydraulic Potential : 11.7
  out of which Surface Water : 8
  out of which Groundwater : 3.7
Atlantic coast: 450 Millions m$^3$/yr drinking water
LYDEC MISSION IN CASABLANCA

Supply Casablanca urban area with electricity, water, sewerage and drainage services in the most efficient way.

- Population served: 4.5 million inhabitants
- Water supply: 590,000 connections
- Electricity supply: 625,000 connections
SHAREHOLDERS

ONDEO, ELYO & AGBAR are part of the SUEZ group
CONTRACT CHARACTERISTICS

- August 1997 30-year concession
- Investment 30 billion MDh¹ (3 billion US)
- Performance objectives
  - Coverage ratio
  - Unaccounted for water & electricity
  - Poverty alleviation (social connections)
- Employment
  - Former staff maintained

(1): 1 US$ ~ 10 Moroccan Dirhams (MDh)
<table>
<thead>
<tr>
<th>Service</th>
<th>1997</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water connections</td>
<td>440,000</td>
<td>590,000</td>
</tr>
<tr>
<td>Electricity Connections</td>
<td>510,000</td>
<td>625,000</td>
</tr>
<tr>
<td>Sewerage connections</td>
<td>65 %</td>
<td>85 %</td>
</tr>
</tbody>
</table>

Coverage ratio increased significantly during the period
UFW TEND TO INCREASE WHEN NOTHING IS DONE

- Water facilities getting older
  - Increase of physical losses in network
    - NRW Project, Renewal of network
  - Non reliable metering
    - NRW Project, progressive meter park renewal
- Some consumers try to pay less
  - by reducing or by cheating...
    - Actions against direct connections & frauds
UFW TEND TO INCREASE WHEN NOTHING IS DONE

- Lydec’s actions
  - Audit of client files
  - Implementation of a specific project: Commercial Output
  - Rising Awareness
  - Agencies benchmark / performance indicators
  - Quality approach: Group Improvement Process, Procedures, Operating Modes
  - Training and motivation
LYDEC : WATER LOSS REDUCTION

Strong actions:

1. Reliability and quality of bulk water metering
2. Losses reduction in reservoirs
3. Losses reduction in feeders (Ø >=400 mm)
4. Losses reduction in water network (Ø <400 mm)
5. Reliability and quality of customer metering
6. Detection of commercial abnormalities
7. Communication Campaigns
8. Tariff system
RELIABILITY AND QUALITY

Meters Follow up

- Renew all large meters responding to specific policy criteria
- Renewal of 40% of customers’ meters
- Ensuring the replacement of defective large meters (Currently 80% are no more than 5 years old)
LOSSES REDUCTION IN FEEDERS

- **« Sahara » Method:**
  - Leak ratio: 0.46 leak/km
  - Clear improvements:
    - Quick inspection
    - Reliability of inspections
    - Accuracy of leak location (cm)

- **Prelocation Method:**
  - Leak ratio: 0.18 leak/km
  - Improvements:
    - Low cost
    - Accuracy of leak location (10 m)
An Audit pointed out:

- 40,200 connections with no or weak water consumption which represents 8% of active customers
- 17,500 cancelled subscribers out of which 20% still consume water
- 15,300 building meters supplying customers through approximately 17,800 irregular links.
- 5,000 frauds identified

(1) 20% of no consumptions are due to technical abnormalities or defective meter reading.
PROGRAMMED ACTIONS

- Investigations and effective cuts of cancelled water connections.
- Investigations of no or weak consumptions
- Renewal of meters
- Inspections of building meters and marking down meters: detection of irregular links, leaks, changing meter reading
- Investigation of frauds by cross-checking databases.
COMMUNICATION

To inform, to explain and to advise...

- Posters and leaflets.
- TV sketches and quizzes
- Radio spots
## Increasing-Block Water Tariff Structure

<table>
<thead>
<tr>
<th>Section</th>
<th>Consumption per month</th>
<th>Tariff Mdh/m³ (sale price)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st section</td>
<td>0 to 8 m³</td>
<td>2.65</td>
</tr>
<tr>
<td>2nd section</td>
<td>9 to 20 m³</td>
<td>9.16</td>
</tr>
<tr>
<td>3rd section</td>
<td>21 to 40 m³</td>
<td>12.64</td>
</tr>
<tr>
<td>4th section</td>
<td>&gt; 40 m³</td>
<td>12.69</td>
</tr>
</tbody>
</table>

- Purchase price from ONEP: 3.95 Mdh / m³
- 50% of customers pay less than 3 $/month.
<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>2000</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water brought to network (1)</td>
<td>183,140</td>
<td>171,877</td>
<td>159,389</td>
</tr>
<tr>
<td>Consumption (2)</td>
<td>117,484</td>
<td>118,007</td>
<td>115,263</td>
</tr>
<tr>
<td>Network Output (2/1)</td>
<td>64.15 %</td>
<td>68.66 %</td>
<td>72.32 %</td>
</tr>
<tr>
<td>UFW/Yr (1-2)</td>
<td>65,656</td>
<td>53,870</td>
<td>44,126</td>
</tr>
<tr>
<td>Accumulated losses (1000 m³)</td>
<td>65,656</td>
<td>181,997</td>
<td>275,958</td>
</tr>
</tbody>
</table>
**TECHNICAL RATIOS**

- **Loss index in m³/km/day:** (Network Length = 3,800 km)
  - 54 m³/km/day as of 31/12/1998
  - 36 m³/km/day as of 31/12/2001
  - 32 m³/km/day as of 31/12/2002

- **Unavoidable Real Losses (URL):** 10% for 2002

- **Global output:** 72.3% (year 2002)

- **Loss index objective:** 25 m³/km/day by 2004

- **Global output objective:** 80% by 2006
## CONSUMPTION

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplied volumes</td>
<td>117,500,000</td>
<td>115,300,000</td>
</tr>
<tr>
<td>Customers</td>
<td>440,000</td>
<td>590,000</td>
</tr>
<tr>
<td>Consumption Per Connection</td>
<td>268 m³ / yr.</td>
<td>195 m³ / yr</td>
</tr>
</tbody>
</table>

All these actions led to a decrease of consumption per connection of 27% over 4 years.
PERSPECTIVES

Groundwater resources:

- Weak
- Polluted
- To be rehabilitated in the medium term
  
  *with a link to a program of sewage purification*

  *investment: 2.2 billion Dirhams in 5 years (~US$220 M)*

Medium-term potential:

3.5 Millions m³/year  →  4.5 Millions m³/year
PERSPECTIVES

2015 : insufficient resources to respond to the needs

What should be done ?

- Demand management (agricultural and drinking water)
- Efficiency gains
- Strengthen large hydraulic equipments
- Find Alternative solutions
  - desalination
  - re-use of Waste water
KEYS TO SUCCESS

- Awareness and support of all stakeholders
- Adequate equipments
- Staff training and mobilization
- Involvement of all staff
- Communication on wasteful water consumption
- Implementation of project structure
LONG TERM
REUSE OF WASTE WATER