Electricity & Water Sectors in the Sultanate of Oman

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G.M PROJECTS DELIVERY
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Agenda

- Introduction to PAEW
- Electricity & Water Sector
- Renewable Energy
General Facts:
Population : 2.743 Million
Area : 309,500 Sq Km
GEOGRAPHICAL FEATURES

- Sultanate of Oman lies in the south-eastern part of Arabian peninsula, the total area is about 309.5 square kilometer.
- Physical features Oman comprises variable topographical regions.
- Hydrological Oman located within arid and semi-arid zones where water resources are very scarce.
- Rainfall varies, exceeding 350mm in the mountains, and less than 50mm in the desert in average of 100mm.
- Evaporation varies from 1660mm/yr to 2200mm/yr.
## Water Authorities overview

<table>
<thead>
<tr>
<th>sector</th>
<th>authority</th>
<th>responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water resources</td>
<td>Ministry of regional municipalities &amp; water resources</td>
<td>• Water resources management.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Water resources development.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Water resources monitoring.</td>
</tr>
<tr>
<td>Water supply</td>
<td>Public authority of water and electricity</td>
<td>• Water production.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Water supply.</td>
</tr>
<tr>
<td>Irrigation</td>
<td>Ministry of agriculture</td>
<td>Water irrigation management.</td>
</tr>
<tr>
<td>Waste water</td>
<td>• Oman W.W. Company. HAYA</td>
<td>• Muscat governorate.</td>
</tr>
<tr>
<td></td>
<td>• Salalah W.W. Company.</td>
<td>• Dofar governorate.</td>
</tr>
<tr>
<td></td>
<td>• Ministry of regional municipalities &amp; water resources</td>
<td>• Other regions &amp; governorates.</td>
</tr>
</tbody>
</table>
Water supply services

- **Drinking water sources:**

- **Desalination.**

- **Ground water (wells).**

- **Supply services by :-**

- **Network distribution.**

- **Tanker points (browsers).**
## Desalination plants production

<table>
<thead>
<tr>
<th>Governate / region</th>
<th>Capacity (MG/DAY)</th>
<th>REMARKES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUSCAT</td>
<td>41.077</td>
<td>M S F + R O</td>
</tr>
<tr>
<td>MUSANDAM</td>
<td>0.385</td>
<td>R O</td>
</tr>
<tr>
<td>AL BATINAH</td>
<td>79.40</td>
<td>M S F + RO</td>
</tr>
<tr>
<td>AL DHAKHILIYAH</td>
<td>0.264</td>
<td>R O</td>
</tr>
<tr>
<td>AL SHARQIYAH</td>
<td>18.502</td>
<td>R O</td>
</tr>
<tr>
<td>AL DHHERAH</td>
<td>0.264</td>
<td>R O</td>
</tr>
<tr>
<td>AL WUSTA</td>
<td>0.534</td>
<td>R O</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>140.426</strong></td>
<td></td>
</tr>
</tbody>
</table>
Public Authority for Electricity & Water

PAEW Water Coverage Area

Population: 2,335,000*
Transmission: 1,650 km
Distribution: 5,000 km
Consumer: Approximately 189,000
Accounts: in 2008

* Excluding Dhofar & Sohar Governorates
PAEW Has Dual Roles – Policy & Operational

- Securing the production of potable water in the “Unrelated Water” Sector
- Implementing Government Policy in securing electricity supply
- Implementing Government Policy in the development of the electricity and water sectors
- Encouraging private sector investment in the electricity and water sectors
- Implementing and activating Government Policy in respect of diversification of resources of electric power
Water Demand Continues To Grow Strongly

Driven by “normal demand growth”, industrial projects and tourism development plus ongoing extension of networks to serve more communities.

Source – PAEW analysis

Source – “Demand forecast study for areas served by PAEW”, MM Project no.59030, November 2009
Expected Power and Energy Demand - MIS

Public Authority for Electricity & Water

Ad Duqm area development
New tourism projects
New industrial projects
“Normal” growth
Energy GWh

Maximum Demand MW


Energy GWh

20000 15000 10000 5000 0

25000 20000 15000 10000 5000 0

0 5000 10000 15000 20000 25000

Normal” growth
Opportunities

New Power & Desalination plants under consideration:

Salalh, Ghobrah, Sohar, Barka, Sur, Qurayat
Non Revenue Water situation

Is a very series issue
Outline of actions taken on NRW

- **Improve NRW calculation:** data availability & quality
- **Launch renewal of faulty meters**

**Opportunities**

New meter type

leakage detection System
INVESTMENT ON WATER PROJECT
<table>
<thead>
<tr>
<th>TYPE OF THE WORK</th>
<th>AMOUNTS (MILLION US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESALINATION PLANTS, PIPE LINE</td>
<td>1820</td>
</tr>
<tr>
<td>NETWORK EXPANSION &amp; DRILLING</td>
<td>26</td>
</tr>
<tr>
<td>FEASIBILITY STUDIES</td>
<td>10.4</td>
</tr>
<tr>
<td>TOTAL INVESTMENT</td>
<td>1856.4</td>
</tr>
</tbody>
</table>
# Projects Under Construction

<table>
<thead>
<tr>
<th>Number</th>
<th>Cost</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>62 projects</td>
<td>236 Million OR = 613.6 Million US $</td>
<td>transmission main, ground reservoir, pump station and scada system</td>
</tr>
</tbody>
</table>
## Projects under engineering

<table>
<thead>
<tr>
<th>Number of contracts</th>
<th>cost</th>
<th>type</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 PROJECTS</td>
<td>WORTH 300 m. OR = 780 m. us $</td>
<td>Water main transmission, ground reservoir, pump station and scada system. Desalination plants</td>
</tr>
</tbody>
</table>
Challenges / Opportunities

- Consultants
- Contractors
- Suppliers
PAEW Future
Management Contract with Veolia EAU
Renewable Energy
The Government of Oman has clearly stated its support for the implementation of renewable energy initiatives in Oman.

A ministerial committee has been established to oversee and coordinate efforts – chaired by Ministry of National Economy.

A technical committee has been formed chaired by Public Authority for Electricity & Water.

The Authority for Electricity Regulation (AER) commissioned a study to investigate the potential for renewable energy projects in the electricity sector. The full study is available on AER website [www.aer-oman.org](http://www.aer-oman.org).

The Public Authority for Electricity and Water is taking steps to implement solar and wind energy projects, to coordinate efforts to identify the need for research and development and to identify the need for policy and other support mechanisms.
Study on Renewable Energy Resources - 2008

Objectives:

• To provide an overview of renewable sources of energy in Oman & the potential use of renewable energy for electricity production
• To provide a platform for developing renewable energy policies for Oman

Findings:

• Significant potential from: Solar & Wind
• Limited potential from: Biogas, Geothermal & Wave
Renewable Energy Projects

Pilot Projects (2009-2012)

- Six projects with total capacity of max. 8 MW
- Conducted in RAECO (Targeting replacement of diesel generation)
- A mix of PV, hybrid wind plus PV technologies
- PAEW is planning to use renewable energy for desalination of water where ever power grid is not available (study on Musandam area).

Large Scale Solar Project (2011-2014)

- Feasibility Study (Capacity up to 200 MW)
- Selection of optimum location & Capacity
- Review Market structure and regulatory framework
- Competitive Tendering process/award BOO
Renewable Energy Strategy - way forward

**Policy & Strategy**

1. Developing Policy for R.E development
2. Regulatory review

**Project Implementation**

1. Pilot Projects (RAECO)
2. 100 – 200 MW Solar Plant (Grid Connected)
3. Wind Monitoring Program then Wind farm
4. Energy Conservation
5. R.E Database

**Capacity Building**

**R & D**

1. R.E Desalination
2. Hybrid Solutions
3. Solar Cooling
4. Focused research on specific technologies

**Industrial**

1. Raw material extractions
2. Manufacturing
3. Added value services

**Human Resources**

1. University Programs
2. Engineering and O & M Skills
3. Research & Development
4. Utilities experience

**Benchmark/ Monitoring / Feedback**
THANK YOU FOR YOUR ATTENTION