GCC Interconnector

3rd Power Trade Forum

September 28 and 29, 2014
Abu Dhabi
OPWP’s Role – Areas/Systems

- Created as part of the electricity sector restructuring
- Government owned with statutory functions and duties
- Regulated by licence from AER
- “Single Buyer” of power and desalinated water
- OPWP’s rating:
  - S&P - A Stable
  - Moody’s - A1
- Turnover (revenue) - forecasted for 2014
  - 546 million OMR
Functions and Duties of OPWP

- To secure sufficient production capacity to meet all reasonable demands for electricity (LOLH of 24 hrs) and economically procured related water.

- Forecast and plan to meet reasonable demands for electricity.

- To meet the requirement for New Capacity through financing, ownership and operation by local and foreign private sector investors;

- To procure through fair and transparent competition and not to discriminate.

- To support policy in respect of fuel use and pricing.

- To procure on the basis of Economic Purchase;

- To provide consultation and technical support to the Public Authority for Electricity and Water on its request in relation to the future forecasts with respect to the demand for potable water.
New Market Structure and Regulatory Framework

Direction of payments

**Oman Power & Water Procurement Company SAOC**
- PWP pays Production Facilities for:
  - Capacity and Output in accordance with terms of PPA/PWPA
  - Ancillary Services
- Discos pay PWP for:
  - bulk purchases of electricity charged at a cost reflective Bulk Supply Tariff (BST);
  - Electricity BST includes PWP’s costs of electricity procurement activities
- Water Departments pay PWP for:
  - bulk purchases of desalinated water charged at a cost reflective Bulk Supply Tariff (BST);
  - Water BST includes the PWP’s costs of water procurement activities

**Oman Electricity Transmission Company SAOC**
- Production Facilities & Others pay OETC for:
  - Connection to Transmission System
- Discos pay OETC for:
  - Connection to OETC’s Transmission System (Distribution business)
  - Use of OETC’s Transmission System (Supply business)

**Muscat Electricity Distribution Company SAOC**
**Majan Electricity Company SAOC**
**Mazoon Electricity Company SAOC**
**DPC SAOC**

Subsidy

Water Departments

All intra sector transactions: (i) regulated & (ii) cost reflective (no direct subsidy)
Current status (ownership structure)

Ministry of Finance

100%

Electricity Holding Company SAOC

100%

0.01%

Oman Power & Water Procurement Company SAOC

Rural Area Electricity Company SAOC

Ghubrah Power & Desalination Company

Wadi Jizzi Power Company

Muscat Electricity Company

Mazoon Electricity Company

Majan Electricity Company

Oman Elec. Transmission Company SAOC

Private Investors

Public Shareholding

ACWA Power Barka SAOG

Al Kamil Power Company SAOG

United Power Company SAOG

Sohar Power Company SAOG

Rusail Power Company SAOC

SMN Barka Power Company SAOC

SEMCORP SAOC

Al Batinah Power Company SAOC

Al Suwadi Power Company SAOC

Phoenix Power Company SAOC

Muscat Disalination/Ghub IWP SAOC

35%

35%

40%

35%

35%

35%

35%

35%

IPO Apr 2014

IPO Apr 2015

IPO Apr 2017
Capacity Growth Trend (Private Sector Involvement)

2.6 Billion Omani Rials (6.7 Billion USD)
100 per cent

Private Sector Investment
Private Sector Ownership
### MIS ELECTRICITY DEMAND: 3 SCENARIOS

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Peak Demand growth (%)</th>
<th>Historical 2007-2012</th>
<th>Projection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low Case Demand</td>
<td>Expected Demand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10%</td>
<td>7.6%</td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td>7190 MW</td>
<td>8106 MW</td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td>7190 MW</td>
<td>8106 MW</td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td>7190 MW</td>
<td>8106 MW</td>
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<tr>
<td>2015</td>
<td></td>
<td>7190 MW</td>
<td>8106 MW</td>
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<tr>
<td>2016</td>
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<td>7190 MW</td>
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<tr>
<td>2017</td>
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<tr>
<td>2018</td>
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<td>8106 MW</td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td>7190 MW</td>
<td>8106 MW</td>
</tr>
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</table>
SALALAH ELECTRICITY DEMAND: 3 SCENARIOS*

Historical 2007-2012

Average Peak Demand growth:
10%

Projection

<table>
<thead>
<tr>
<th></th>
<th>&quot;Low Case&quot; Demand</th>
<th>Expected Demand</th>
<th>&quot;High Case&quot; Demand</th>
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</thead>
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<tr>
<td>Historical 2007-2012</td>
<td>7%</td>
<td>10%</td>
<td>12%</td>
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</table>

* Under review and final approval
Growth in Water Demand and Supply

Water Capacity Growth Trend

Year


(Thousands m3 per day)

0 200 400 600 800 1000 1200

Growth in Water Demand and Supply

Growth in Water Demand and Supply
## Future Projects

<table>
<thead>
<tr>
<th></th>
<th>Sur IWP</th>
<th>Barka1 IWP Ph2</th>
<th>Musan dam IPP</th>
<th>Salalah 2nd IPP</th>
<th>Qurayy at IWP</th>
<th>Suwayq IPP(s)</th>
<th>Suwayq IWP</th>
<th>Khasab IWP</th>
<th>Duqm IWP</th>
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</thead>
<tbody>
<tr>
<td><strong>Capacity</strong></td>
<td>10.6 MIGD</td>
<td>10 MIGD</td>
<td>100-200 MW</td>
<td>300-400 MW</td>
<td>44 MIGD</td>
<td>2500-3500 MW</td>
<td>50 MIGD</td>
<td>3 MIGD</td>
<td>6 MIGD</td>
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<tr>
<td><strong>Technology</strong></td>
<td>IWP</td>
<td>IWP</td>
<td>IPP</td>
<td>IPP</td>
<td>IWP</td>
<td>IPP</td>
<td>IWP</td>
<td>IWP</td>
<td>IWP</td>
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<tr>
<td><strong>RFQ</strong></td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>Q4 2012</td>
<td>Q3 2013</td>
<td>Q1 2014</td>
<td>Q2 2014</td>
<td>Q2 2014</td>
<td>Q3 2014</td>
</tr>
<tr>
<td><strong>Award Anticipated</strong></td>
<td>Q1 2014</td>
<td>Q2 2014</td>
<td>Q3 2014</td>
<td>Q4 2014</td>
<td>Q3 2014</td>
<td>Q1 2015</td>
<td>Q1 2015</td>
<td>Q2 2015</td>
<td>Q3 2015</td>
</tr>
<tr>
<td><strong>COD</strong></td>
<td>Q4 2015</td>
<td>Q2 2015</td>
<td>Q4 2015</td>
<td>Q1 2018</td>
<td>Q3 2016</td>
<td>Q1 2017 &amp; Q1 2018</td>
<td>Q2 2018</td>
<td>Q4 2015</td>
<td>Q4 2017</td>
</tr>
</tbody>
</table>
Long-Term Strategic Issues

• OPWP is working closely with the Government on key longer-term issues:
  
  – Fuel sources, diversity and security
  – The role of renewables as potential long-term supply alternatives
  – The role of conservation and demand side management
  – The role of regional interconnects

• To support the above, OPWP will implement a Spot Market for Electricity Pricing
Introduction of a Spot Market for Electricity Pricing

- OPWP anticipates immediate benefits from the introduction of the Spot Market
  - Provides a mechanism to access “uncontracted” capacity
    - capacity that is no longer subject to a contract, for example through expiry
    - “above contract” capacity that may be available from time to time at contracted facilities
  - Improved time of day/year capacity availability incentives
  - Objective basis for OPWP to evaluate contract renewal, life extension and plant configuration options
- Objectives basis for Government to evaluate strategies for
  - Renewable energy policies
  - Energy efficiency policies
  - Enables further market liberalization as and when considered appropriate by competent authorities
  - Prepares Oman for participation in other markets throughout the GCC
Introduction of a Spot Market for Electricity Pricing

• The key features of the proposed Spot Market for Electricity Pricing include
  – Economic merit order dispatch is maintained
  – All capacity connected to the system will participate in setting the Market Price, however
    • Contracted capacity would be remunerated on the basis of contract tariffs
    • Uncontracted capacity would be remunerated based on the spot price
  – OPWP would remain the single buyer for electricity in Oman
    • Procuring contracted capacity through PPAs
    • Through participation in the market as the off taker for electricity traded at spot prices
  – OPWP will undertake a new, additional role of Market Operator
Introduction of a Spot Market for Electricity Pricing

• Key strategic issues to address in implementing the Spot Market include
  – Fuel diversity and treatment of subsidies
  – Treatment of interconnectors
    • Within Oman (for example with PDO)
    • International interconnections
  – Transmission congestion
  – Ancillary Services
  – Participation of “Demand Response”
  – Market Power mitigation
  – Governance
Introduction of a Spot Market for Electricity Pricing

• Whilst many “templates” for a Spot Market exist, each jurisdiction has its own unique requirements and challenges

• Implementing a Spot Market in Oman is a significant undertaking

• The Spot Market will provide significant benefits to Oman in the short, medium and long term

• The Spot Market will assist in economic trading of energy and capacity within the GCC

• Oman will be well positioned to participate in a broader GCC market
Feedback / Further Information

• Questions and comments welcomed

• Please contact OPWP office or email: info@omanpwp.com

• Further information available at: www.omanpwp.com
Thank you
## Contracted Generation Capacity

<table>
<thead>
<tr>
<th>Plant Owner</th>
<th>Type</th>
<th>Status</th>
<th>Contract Start</th>
<th>Contract Expiry</th>
<th>Power Capacity (net MW)</th>
<th>Water (MIGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al Ghubrah Power and Desalination Co.</td>
<td>PWPA</td>
<td>Operational</td>
<td>2005</td>
<td>2018</td>
<td>475</td>
<td>40</td>
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<tr>
<td>Rusail Power Co.</td>
<td>PPA</td>
<td>Operational</td>
<td>2005</td>
<td>2022</td>
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<td>Wadi Al-Jizzi Power Co.</td>
<td>PPA</td>
<td>Operational</td>
<td>2005</td>
<td>2020</td>
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<td>United Power Co.</td>
<td>PPA</td>
<td>Operational</td>
<td>1996</td>
<td>2020</td>
<td>273</td>
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<td>Al Kamil Power Co.</td>
<td>PPA</td>
<td>Operational</td>
<td>2002</td>
<td>2017</td>
<td>297</td>
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<td>ACWA Power Barka</td>
<td>PWPA</td>
<td>Operational</td>
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<td>2018</td>
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<tr>
<td>Sohar Power Co.</td>
<td>PWPA</td>
<td>Operational</td>
<td>2007</td>
<td>2022</td>
<td>590</td>
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<tr>
<td>SMN Barka Power Co.</td>
<td>PWPA</td>
<td>Operational</td>
<td>2009</td>
<td>2024</td>
<td>710</td>
<td>33</td>
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<td>SembCorp Salalah Power and Water Company</td>
<td>PWPA</td>
<td>Operational</td>
<td>2012</td>
<td>2027</td>
<td>445</td>
<td>15</td>
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<tr>
<td>Al Batinah Power Co.</td>
<td>PPA</td>
<td>Operational</td>
<td>2013</td>
<td>2028</td>
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<td>Al Suwadi Power Co.</td>
<td>PPA</td>
<td>Operational</td>
<td>2013</td>
<td>2028</td>
<td>744</td>
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<tr>
<td>Phoenix Power Co.</td>
<td>PPA</td>
<td>Under Construction</td>
<td>2014</td>
<td>2029</td>
<td>2000</td>
<td></td>
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<tr>
<td>MCT Desal. Co.</td>
<td>PPA</td>
<td>Under Construction</td>
<td>2014</td>
<td>2029</td>
<td>42</td>
<td></td>
</tr>
</tbody>
</table>

*10 MIGD Under construction

**Total by 2014**

|                             | 7660 | 186 |
DESALINATED WATER REQUIREMENTS
“Ad Duqm Zone”

- **PAEW Activities**
  - Ad Duqm desalination plant (RAECO) provides 6,000 m$^3$/d (1 MIGD)
  - extension of 4,000 m$^3$/d (1 MIGD) in 2013,
  - temporary plant of 5,000 m$^3$/d (1 MIGD) in 2014,
  - re-located temporary plant of 10,000 m$^3$/d (2 MIGD) in 2015 (from Ghubrah site)
- **OPWP Activities**
  - New IWP of 30,000 m$^3$/d (7 MIGD) in 2018.
The main developments include completion of Salalah IWPP plant in 2012 and the planned addition of a second IPP by 2018 (300-400 MW).

Third Salalah IPP may be required between 2019-2021
• Salalah IWPP has sufficient capacity to meet current requirements for desalinated water
• Water demand projection is under review and verification, toward confirming when additional capacity may be required. Groundwater resources are available to meet contingencies.
• Salalah IWP is expected later in the forecast period
MIS POWER GENERATION RESOURCES

Principle developments:
(1) addition of Sur (2000 MW) in 2014
(2) addition of solar projects (200 MW) in 2018, subject to government approval
(3) out-of contract capacity: Al Kamil (282 MW) in 2017, Al Ghubrah (235 MW) and Barka I (435 MW) in 2018
(4) addition of major new IPP(s) in 2017/2018
The principle developments include:
(1) addition of the Ghubrah IWP (191,000 m$^3$/d) (42 MIGD) in 2014;
(2) addition by MISC of a desalination plant that will meet their water supply needs from 2013 onwards
(3) capacity upgrade of 45,000 m$^3$/d (10 MIGD) at Barka I
(4) expiration of PWPAs at the Barka I and Ghubrah desalination plants in 2018
(5) Qurayyat plant is considered at about 200,000 m$^3$/d (44 MIGD), to be in service in 2016
(6) Suwayq plant of up to 225,000 m$^3$/d (50 MIGD) to be in service in 2018
DESALINATED WATER REQUIREMENTS
“Sur Zone”

- PAEW forecast increase by 25% relative to previous forecast, due to rapid expansion and absorption of private networks
- Additional capacity of 40,000 m³/d to be provided in 2015, as expansion of existing RO plant
PROCUREMENT STRATEGY

- **2013 Initiatives:**
  - Ad Duqm Study
  - Coastal Study for evaluation of prospective plant sites
  - Strategic study toward management of expiring PPAs and PWPAs
  - Resource Options study

- **2013 tenders:**
  - Sur IWP: addition of 40,000 m³/day desalination capacity by 2015
  - Qurayyat IWP (200,000 m³/day) by 2016
  - Salalah 2 IPP and DGC Privatization
    - Sale of existing NPS (273 MW)
    - Salalah 2 IPP (Minimum 300 MW) at Raysut, COD 2018

- **2014 tenders:**
  - MIS IPP(s) of around 2250-3000 MW in aggregate for 2017/2018 service
  - Suwayq IWP (up to 225,000 m³/day) for 2018 service
  - Duqm New IWP of about 30,000 m³/d (7 MIGD) and IPP for 2018 service.
  - Qurayat IWP