Quick History of Aqaba Water Company Water Projects:
1- 2008 Aqaba Water Company with USAID finish Water Upgrade project contain Water network, Reservoir, PRV’s and SCADA system
2- 2010 Aqaba Water company started to Design of DMZ.
3- 2010 to 2013 NRW % water was still increasing.
4- 2013-2016 AW conduct pilot projects to identify causes of NRW increasing number.
Testing of meters resulted in that 25% of water consumed through meters is unregistered.
NRW Study Results

- **Flow Under 15 l/h** was NOT accounted
- 4% Error reading for New Mechanical Meter at Nominal flow
- 25% Error reading for old Mechanical Meter at Nominal flow
- 60% of NRW Caused by Meters

Meters Shall be Changed
SMART ELECTRONIC METROLOGY INFRASTRUCTURE (SEMI)
Planned Project Main Goals:

1. Reduce NRW by improve metrology concept and devices.
2. Establishing Automatic Water Meter system AMR/AMI.
3. Providing tools able to calculate NRW automatically.
4. Integration with other servers, SCADA, GIS, ERP, X7, etc
Project Overview

- 2 Years, Signed 10-Jan-17 / Completed on Aug-18 ahead of schedule (31-Dec-18)
- Ultrasonic Water Smart Electronic Meters (Neptune MACH 10) with all accessories, strainers and isolating valves, QTY: 7250 Meters
- DMA Design & Implementation
- Smart Metrology Communication Infrastructure
- Smart Meters Software platform
- Electromagnetic Bulk Water Meters at the inlets of the DMAs selected for the Residential Water Meter replacement
- Total Value of: 2,200,000 USD
**MACH 10™ R900 Integrated**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Neptune</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery setup</td>
<td>Battery for meter is separate from communication.</td>
</tr>
<tr>
<td>Body robustness</td>
<td>Robust body that tolerates drops and falls.</td>
</tr>
<tr>
<td>Sensor cable</td>
<td>Robust sensor cables.</td>
</tr>
<tr>
<td>Glass protection</td>
<td>Protective glass over 1mm.</td>
</tr>
<tr>
<td>Sampling rate</td>
<td>4 readings per second precision.</td>
</tr>
<tr>
<td>Low Flow</td>
<td>Accuracy exceeds R250 OIML standards.</td>
</tr>
<tr>
<td>High flow</td>
<td>High flow Q4 at 4.2 m³/h. Cut off at 5 m³/h.</td>
</tr>
<tr>
<td>Storage capacity</td>
<td>Stores 2304 hourly readings.</td>
</tr>
<tr>
<td>Communication equipment</td>
<td>12 Gateways are needed to cover Aqaba City including northern areas. Most or all can be installed on our sites. Solar panel included.</td>
</tr>
<tr>
<td>Communication range</td>
<td>High range. Each meter communicates with 1 (high) Watt communication signal resulting in a large high range.</td>
</tr>
<tr>
<td>Other features</td>
<td>Compatible larger diameter meters.</td>
</tr>
<tr>
<td></td>
<td>Android app broadcasting directly from collector (included).</td>
</tr>
<tr>
<td></td>
<td>Compatible remote shut-off valves.</td>
</tr>
<tr>
<td></td>
<td>Compatible leak detection.</td>
</tr>
<tr>
<td></td>
<td>Compatible irrigation and fire meters.</td>
</tr>
<tr>
<td>Operational reports</td>
<td>Full alarm reports without affecting battery life (20 years guaranteed by free replacement).</td>
</tr>
<tr>
<td>AMI/AMR</td>
<td>Automatic Metering Infrastructure (AMI). True two-way configuration.</td>
</tr>
</tbody>
</table>
1st FARA Results - TCO

- Mechanical Meter
- Neptune Smart Meters
* MACH 10™ R900 Integrated
Remote Meter Reading System

- SMS
- Mobile App
- Consumption Data
- Smart Meter System
- Smart Meter
- Remote Disconnection Valve
- Leakage Detection & Pressure Monitoring
- eService Portal
* Neptune’s RS900 System Architecture

1. MACH T-10
2. R900 RF MIU Wall or Pit versions
3. Leak Spy Acoustic Sensor
4. SETflow™ 100c Remote Shut-Off valve

- AMI Software Suite
- Billing/CIS System
- Intelligent Data and Analytics System
- Customer Web Portal

Hosted by Amazon Web Services
Managed by Neptune
Establish Leak detection and pipe replacement priorities
Results – NRW @ 9th Area

District Metering - Daily

<table>
<thead>
<tr>
<th>Total volume difference for selected period</th>
<th>27,053.93</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Range</td>
<td>01/01/2018 to 01/31/2018</td>
</tr>
</tbody>
</table>

Group: 9th Area 426

Note: The diagram shows the district metering data for the 9th Area, indicating the volume pumped and billed over time. The total volume difference for the selected period is 27,053.93 cubic units.
Results – NRW @ 10th Area

![Graph showing water usage data](graph.png)

| Total volume difference for selected period | 7,101.85 |
| Total volume difference for selected period | 23.48 % |
| Group                                      | 10th Area 170 : Kuwait S.t. |
| Date Range                                 | 05/06/2016 to 29/06/2016 |
## Results – NRW Results

<table>
<thead>
<tr>
<th>Area</th>
<th>Before Interval</th>
<th>After Interval</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th area</td>
<td>Interval (11/9/2017 To 19/10/2017)</td>
<td>Interval (01/5/2018 To 2/9/2018)</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>46.2%</td>
<td>20.56%</td>
<td></td>
</tr>
<tr>
<td>10th area</td>
<td>Interval (9/10/2017 To 29/10/2017)</td>
<td>Interval (15/8/2018 To 29/8/2018)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>66.3%</td>
<td>23.48%</td>
<td></td>
</tr>
</tbody>
</table>
Results

• Acquired Technology from Neptune / First LoRa Approved Meter
• Decrease of NRW
• Increased revenue generation
• Match RFP/Project Results and Study
• Improved Customer Services
• Provided Immediate knowledge of leakages across the new DMA
• Increased visibility on billing data and information – Up to minute consumption Information
Aqaba Water Company SCADA system
* Implementation Approach
* AW IT Architecture Model

- Business Intelligence
  - Collaboration, Mobile, Communication, Email & Workflow Services
  - Operations Management
    - Financial
    - Procurement & Supply Chain
    - Project Management
    - Human Resources
  - CRM
  - Billing

- Smart Electronic Metrology Infrastructure (SEMI) Automatic Meter Reading

- SCADA
  - Water Network
  - Waste Water Network
  - Reuse
  - Quality

- GIS

- 2019 Ready
Thank You