

ADEME



Agence de l'Environnement
et de la Maîtrise de l'Energie

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EWA
هيئة الكهرباء والماء
Electricity & Water Authority



Kingdom of Bahrain



Intervention time

2020, after a previous
project in 2006



Total cost

60 000 €



Engaged workforce

1,5 man-months,
1 NRW expert

Thematic



Prestations provided

Services
Engineering

Electricity and Water Authority (EWA)

Audit of Non-Revenue Water (NRW) management within Bahrain's Electricity and Water Authority

Altereo was first consulted in 2006 by the Ministry of Electricity and Water for an expert evaluation mission of the performance of the Electricity and Water Authority (EWA) regarding leakage reduction. The project included an assessment of the network, a simplified technical and methodological audit of the Waste Control Unit, a feasibility study for GSM-based remote network monitoring system, benchmarking of different leak detection methods in the local context, including tracer gas. The mission and report provided full satisfaction to the EWA and is still a reference document to this day. Based on Altereo's recommendations in 2006, a number of measures have since been implemented: (i) Implementing GIS (ii) Traceability/reporting (iii) Replacement of mechanical meters by electromagnetic meters (iv) Permanent monitoring/DMA (v) Restricted area consumption (vi) Failure capitalization

In 2019, the EWA is summoned Altereo to verify the implementations and observed improvements and validate indicators and identify further improvements in non-revenue water management.

Water distribution over the whole country is ensured by the same network which comprises about 3,700 km of mains in 2006 and grows to 4,180 km in 2020. The network is characterized by low pressures which rarely exceed 2 bars.

Bahrain is a country where potable water mainly comes from desalination and is hence costly to produce. Non-Revenue Water is therefore of prime importance from the financial point of view on top of the usual technical issues.

Moreover, during the desalination process, drinking water is produced alongside brine. The brine is returned to the sea and increases its salinity especially in the inland seas. The consequence is a progressive reduction of the drinking water production capacity as desalination becomes more and more difficult and the marine environment concentrates in salt.

Post-realization results

The first project consists of the following phases :

- Technical and methodological audit of the waste control unit
- Feasibility study for remote network monitoring
- Benchmarking of different leak detection technologies including tracer gas

This project produces a series of strategic recommendations for EWA.

The second project consists of evaluating the actions undertaken by EWA and the stages reached in order to continue to improve performances.

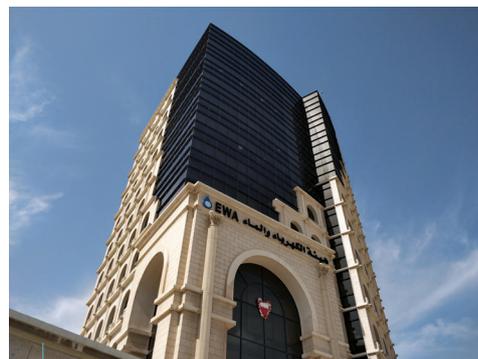
It consists of the following phases :

Activity 1: Preliminary audit of EWA's achievements and performance since 2006

- Assessment of current performance
- Network characteristics
- Non-Revenue Water
- Linear leakage index
- Analysis of network failures
- Average age of leaks
- Traceability, reporting and analytics
- State of progress and areas of improvement
- Conclusion and first recommendations

Activity 2: Non-Revenue Water deeper audit to investigate the previous findings

- Present NRW status
- System input volume accuracy
- Restricted area consumption / illegal connections
- Stabilization and simplification of NRW calculation
- Progress of advanced metering infrastructure (AMI)
- Detailed investigation on meter inaccuracy
- IT workflow improvement
- Clarification on pipe diameters and EWA nomenclature
- Focus on installations dates for all service connections
- Analysis of spatial distribution of leaks
- Water production costs
- Alternate bottom-up approaches for NRW/UFW evaluation
- Summary of findings and recommended NRW calculation



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- Improving leak detection efficiency through metering issue solving, real-time UFW monitoring at DMA level, leak detection team sizing and organization, analytics and leak pre-targeting with HpO® artificial intelligence, pilot tests for technology upgrade
- Summary of recommended NRW strategy for EWA
- Cost analysis and return on investment (ROI)

Repercussions for France

Future potential markets for French technological solutions recommended by Altereo. Potential for the first application of the HpO® IA in the Middle East.

Repercussions for Bahrein

Operational quick-result strategy to reduce Non-Revenue Water, cut down water production costs through desalinations, cut down repair costs and implement strategic infrastructure asset management for sustained performance.



Environmental impact



The project aims to significantly reduce the loss of drinking water from the supply pipe and the urban network. The ecological impact is undeniable, both in terms of marine environment preservation (by reducing the desalinated volume and brine rejects) and energy savings on desalination processes and pumping. The approach of intelligent network renewal via HpO® is virtuous in the sense that it should improve the efficiency of the drinking water supply network in a sustainable manner.



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With more than 130 members, the Club ADEME International assists the SMEs in its network in the development of innovative projects and international partnerships. The objective is to participate in the dissemination of French knowledge, by supporting the private and public sector in the ecological and energy transition sector in order to meet global environmental and climate challenges.

More information : www.clubinternational.ademe.fr

