Energy Efficiency in Water Pumping - Triple Win for Jordan

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Outline

- Background
- Institutional Concepts & Operational Models
- Energy Performance Contracting
- DPP piloting EPC
- Multiplication and Scaling-up
- Energy Efficiency in the Water Sector: Triple Win for Jordan
The IEE Programme
“Improvement of Energy Efficiency of WAJ” (IEE)

- **Budget**: total volume 2.25 Mio. Euro
- **Funding**: BMU, based on an initiative within the Joint Steering Committee of Jordanian Ministry of Environment and BMU
- **Objective**: Improve Energy Efficiency of WAJ (in the MG)
  - reduce (specific) electricity consumption
  - Enhance efficiency in water utility
- **Main Stakeholders**: WAJ, GIZ, Private sector, MoEnv
- **The IEE Programme**: implement change and achieve energy efficiency improvements in the water sector in Jordan, focusing on both mitigation and adaptation with regard to strategic infrastructure
The IEE Programme
Major Challenges

- **The Water Authority of Jordan (WAJ):** is the largest electricity consumer in the country, using about 14% of Jordan’s national electricity production.

- **To reach the big cities:** fresh water needs to be lifted 1,400 meters from the Jordan Valley.

- **High energy costs:** imply also an enormous carbon footprint of the Jordanian water sector.
The IEE Programme
Results and findings of the Energy Audit

- **Life Cycle Costing**: is not applied for procurement of pumping equipment
- **Operational patterns** do not follow efficiency principles, but based on water availability.
- **Fragmented organisation structure** in WAJ leads to sub-optimal efficiency
  
  - Institutional changes needed, beside investments
  
  - Energy Performance Contracting (EPC) and other operational models
The IEE Programme
Institutional Concepts & Operation Contracts

- **Improvement of Energy Efficiency (IEE) Project**: Tackle energy inefficiencies through the engagement of Private Sector Companies in form of Micro PSP contracts.

- **Micro-PSP**: engaging local or international companies to take over identified tasks in the operation and management of water utilities within a performance oriented contract.

- Starting point: Regional conference on ESCo’s in Amman

- create incentive for sustainable efficiency improvement approach
  (investment in technology, operational aspects, capacity development)

- Micro-PSP via so-called “Energy Service Performance Contracting” (ESPC) is seen as a promising way due to the substantial energy saving potential

Institutional Models specifically developed for the needs and requirements of WAJ
The IEE Programme
Institutional Concepts & Operation Contracts

1. Performance Based Energy Saving Guarantee Contract
   - Full innovative strength of the private sector
   - ESCo bears all project costs

2. Performance Based Energy Saving Guarantee Contract (Shared Investment)
   - Full innovative strength of the private sector
   - ESCo bears a substantial part of the project costs

3. Performance Based Energy Saving Operation & Maintenance Contract
   - Third party or ODA financed investment
   - ESCo has to achieve targeted energy savings
   - ESM are linked with maintenance service contracts

4. External Investment with Extended Maintenance
   - Third party or ODA financed investment

- The savings in energy costs are used to pay back the capital investment of the ESCo
- Innovative tool to overcome finance and operation problems
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Energy Performance Contracting: A Service Innovation

Institutional Concepts & Operational Models

Baseline assessment, status-quo analysis, energy audit

- ESPC comprises different forms of energy services addressing energy saving procedures and energy efficient technologies
- It does not consist of a predetermined technical solution or a single method for achieving energy savings but rather of a service innovation.
- Contractual relation between an Energy Service Company (ESCo) and a facility owner (WAJ)

Energy Saving Guarantee
Development Partnership with the Private Sector (DPP) “Piloting EPC” Approach

- Experience with and openness for private sector participation given in Jordan, but: **No experience with Energy Performance Contracting → Exposure to risk for private sector and WAJ** with lack of knowledge about critical issues

- **Pilot project:** DPP Contract with 50% of costs paid by GIZ, 50% by private partners

- Since December 2009: **staff training**, in March 2010 **equipment** was installed, since then also **O&M** (until July 2011)

- Regular **stakeholder meetings**
DPP “Piloting EPC”
Results, impacts, visibility

- **March 2010 – December 2011**: average 30% energy savings in Ebquoreyyeh
- 12% additional water pumped with 25% less electricity used
- **Energy cost savings of 60,000 JOD p.a.**: water purchasing cost reduced by 60‘000 JODp.a.
- **CO2 reduction** by approx. 1‘100 t/a
- **Lessons learned** about critical issues (which staff to be seconded, operation of pipeline, etc.) to be included in full EPC approach
Multiplication and other activities within the IEE

- **Tender for EPC** in Khaw pumping station has started;
- **EPC tenders planned** for more pumping stations
- **Investments** from the IEE also in other pumping stations, savings up to 60%.
- **Focus on life-cycle costing:** Development of procurement specification focussing on high quality pumps
- **New DPP** with Stulz Planaqua, WILO and VAG planned with EPC approach (WAJ to fund 25% of investments via energy cost savings
- **Regional outreach:** dissemination in regional fora and technical study tours from regional water professionals
Multiplication and Scaling-up

KfW and GIZ: Joint efforts, joint success

- **IEE as base for country-wide roll-out**

- **Energy Efficiency Programme (EEP):** Joint Programme with KfW Development Bank
  - Total volume: 32 Mio. €, of which KfW-share 26 Mio. €
  - Expected GHG reduction: approx. 40 000 t CO₂/a

- **Phase 1:** Joint Energy Assessments in the Jordanian Water Supply System (Wellfields, booster station, pumping stations, transmission pipelines)

- **Phase 2:** Sector wide implementation
  - **GIZ:** Development of EPC models and contracts
  - **KfW:** Technical concept development, provision of funds and consulting services

- **Next idea for cooperation:** CO₂-efficient operation of Wastewater Treatment Plants
Success Factors

- **Pilot project approach** via DPP to generate lessons learnt

- **Financial incentive**: reduction of electricity subsidies

- **Decision makers support** to PSP/outsourcing and readiness for innovative concepts

- **Capacity of WAJ/PMU** to develop contracts and monitor them
Triple Win
Replication on other countries

1. Improve electricity network reliability through reduced electricity demand of the water sector
2. Reduce financial deficit of the water sector through reduced electricity bill (GHG emission reduction)
3. New business opportunity for local private sector

→ attractive mix in many countries?
   - Yes, since problems often similar in many developing countries
   - But basic requirement: real energy costs charged to water utilities, energy subsidies provide wrong incentives
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