

5th Beirut Water Week

Water and Energy Linkage in the Arab region

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Water is the common denominator across all aspects of green growth and poverty reduction and it is essential to food and energy security. The increased demand for energy will put additional pressure on already constrained water resources. The capacity of water and energy systems to provide reliable and affordable service is crucial for economy-wide growth and poverty reduction,”

says Diego Rodriguez / WB.



Introduction

- **The Middle East is a region of extremes, one of the driest and most water scarce areas of the world.**
- **The region is expected to double its population in the next 40 years.**
- **The effects of climate change are predicted to exacerbate the situation.**
- **While some countries enjoy extreme wealth, others are among the poorest in the world.**
- **Poverty reduction and distribution of wealth are of critical importance for regional development.**



- **Energy inputs, particularly electricity, are essential to create employment and for industrial activity, transportation, commerce and agriculture.**
- **Ensuring available electricity is crucial to provide education, health, gender equality and environmental sustainability services.**
- **Water management and use for agriculture, domestic supply and industry is closely related to reliable access to electricity.**



Water Sector Situation

- **The Middle East and North Africa Region (MENA) is the most water scarce region in the world.**
- **Worldwide, the average water availability per person is close to 7,000 m³/person/year, whereas in the MENA region, only around 1,200 m³/person/year is available.**
- **One half of MENA's population lives under conditions of water stress (135 m³/person/year in Jordan and below 100 m³/person/year in Palestine)**
- **With the population expected to grow from around 300 million today to around 500 million in 2025, per capita availability is expected to halve by 2050.**



Challenges & Constraints

- **Scarce Water Resources**
- **Available Conventional recourses are utilized (Ground water aquifers and surface water)**
- **Impacts of Climate Change**
- **Trans-boundary water issues**
- **Increasing Population Growth**
- **Increasing Water Demand in different sectors (Domestic, Agriculture, Industry, tourism)**
- **Lack of Master Planning for limited water resources**
- **Old Deteriorated Infrastructure**
- **Lack of water allocation policies**
- **Lending/Funding is not always available**
- **Public Sector is not capable for mega funding**
- **Lack of using High Technology**
- **Low attention to Human Resources**



Challenges & Constraints (Utility Level)

- **High % of Non-Revenue Water (Administrative and physical water Losses)**
- **Improper Asset Management**
- **High cost of production of water and wastewater treatment due to high cost of energy needed**
- **Unbalance between resources availability and demand areas**
- **Lack of Energy Efficiency and Low Cost Recovery**
- **Lack of qualified human resources (Brain-Drain)**
- **Centralization**
- **As a result; water utilities didn't give enough attention to Best Practices**



Inefficient Use of Water & Energy

- **Non Revenue Water (NRW), the most important composite performance indicator of a water utility, remains at consistently high levels between 40 and 50% (Germany 5 –10%)**
- **Recent energy audits in a number of WAJ pumping stations (for example) revealed an energy saving potential of between 25 -30%**
- **The electricity distribution companies subsidize the tariff for pumping and even gave WAJ a flat rate tariff of JD 0,043/kWh, thus killing up front any incentive for WAJ to save electricity**

Therefore, the need rise for unconventional solutions



Actions at Utilities Level

Introduce best practices in Utilities to lead to more efficiency and financial sustainability of utilities:

- **Reduce NRW** (implementing Management Maintenance systems, Asset management systems).
- Develop **Energy efficiency plan** (Energy saving devices, pressure control valves, variable speed pumps, replace low efficiency and unsuitable pumps ..etc)
- **Pressure Zoning** in water network to reduce energy.
- **Rehabilitation** of inefficient water carrier lines to avoid direct pumping (supply by gravity).
- Use **low energy technologies** in wastewater treatment plants (decentralized WWTP)



Actions at Utilities level (2)

- Building capacity strategies targeting top and middle management in Utilities.
- Building capacity modules for operators in operation and maintenance departments.
- Develop O&M manuals and guidelines.
- Bring experts in the region to find solutions for different problems in a platform.



Actions at National Level

Develop National Water Master plan, Strategies and Action plans to define:

- Future Demand for different uses (domestic, agriculture, industry and tourism).
- Available conventional water resources.
- Unconventional water resources needed to bridge the gap between water supply and demand (Desalinated water and Reclaimed water) .
- Reallocation of water resources for different uses.
- Integration b/w NWMP and NEMP
- Develop Investment plan including cost estimate for new water resources, power end energy needed.
- Financing strategy for the investment plan.



Institutional Reform

- Institutional and legal Reform in water sector to face the challenges.
- Expand the use of Renewable energy in water and WWT plants.
- More **Involvement of Private Sector** in water activities at different levels in the region.



Private sector involvement

- Institutional and legal Reform in water sector
- Introduction of innovative products and approaches
- Focus on design & construction of water systems, marginal engagement in operations management & investments
- Promoting private sector engagement in operations
- Performance-based contracting to be used for improving internal efficiency
- Subsidies on water & electricity tariffs limiting factor in private sector engagement for water loss reduction and energy efficiency



Typical Intervention Areas for private sector engagement:

- Reduction of water losses through performance based contracting:
 - Reducing energy usage,
 - Improving the financial performance of a water utility to cover the required investments.
- Improving the energy efficiency in water pumping through investment in pumping equipment and operation of pumping stations.
- Generating energy in water supply and wastewater systems like:
 - Installing power generating devices in high pressure pipelines to reduce operating pressure (Disi –Aqaba transmission pipeline), or
 - Producing gas in wastewater treatment plants; (As Samra WWTP is producing more than 90% of the needed energy in the plant itself)
- Investment in renewable power generation like solar and wind farms in suitable areas like Disi (about 40 MW needed for pumping).

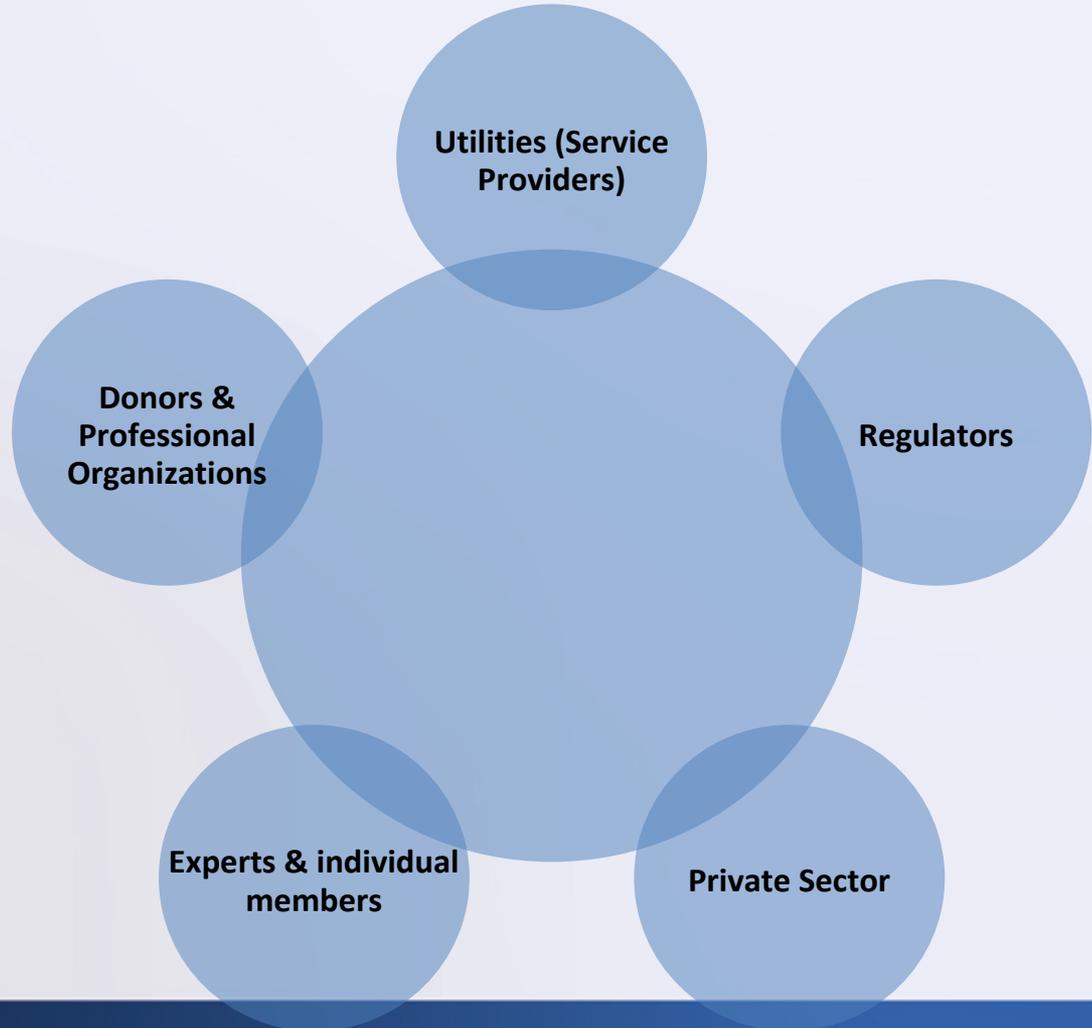


ACWUA ROLE: Vision & Mission:

- ❖ **ACWUA**, as a regional center of excellence, will partner with water supply and wastewater utilities in Arab countries to provide best practice service.
- Serve as a regional platform for exchange of knowledge and best practice amongst member experts and professionals.
- Develop resources, facilitate training programs and advocate for professional certification to enable member utility staff to perform their duties in a professional, reliable and cost-effective manner.
- **Promote standards of performance for the governance, management, operation and maintenance of water supply and wastewater utilities.**
- Support the interests of ACWUA members Including the provision of advice and consultation in water legislation, policies, and sector management and reform.
- Develop, promote and disseminate publications and other knowledge products to meet the needs of members and other regional professionals.



ACWUA as Exchange Platform for Water & Wastewater Utilities in the Arab World





Teaming up with Arab water & wastewater utilities for a better service delivery for all users...

ACWUA members

Water Utilities	106
Associated (Private Sector Companies)	14
Associated (NGOs and Academic Institutions)	8
Individual	200
Arab Countries Members	1



- 8 International Conferences
- 8 Regional Projects
- 8 Technical Working Groups
- More than 30 Training programs
- Publications



ACWUA's approach as a tool for capacity building in water and wastewater utilities

Knowledge Management Plan

- **Technical Working Groups**
- Training Courses
- Best Practice Manuals and Operational Guides
- Specialty Best Practice Conferences
- Annual Conference and Exhibition
- Member Data Base Network and Knowledge Sharing Systems

Communications Plan

- Membership Newsletter
- Technical Journal
- Policy and Position White Papers
- ACWUA Website
- Press Releases



ACWUA Technical Working Groups (TWG)

Management of Utilities

- Cost Recovery
 - Non Revenue Water
 - Water for the Poor
 - **Energy Efficiency**
- Asset Management

Management of Water Resources

- Governance
- Master Planning
- Protection of Resources
- Adaptation to Climate
Change
- IWRM

Utilities Reform

- Autonomy/
Commercialization
- Public-Public
Partnership
- Private-Public
Partnership

Capacity Building & Training

- Training Strategy
- Certification

Water & Health

- Domestic Water Supply
- Waste Water Treatment
and Re-use

Benchmarking

Public Awareness



Key Messages and Conclusion

- Access to water and energy are crucial for development and improved livelihoods in the Middle East, the supply of electricity can trigger development and pave the way towards industrialization and other services.
- Rapid population growth and economic development will increase the demands for electricity and the pressure on the freshwater resources in the region.
- Reliable supply of electricity to water supply and sanitation systems will be increasingly important as the resources will most likely be pumped long distances, from aquifers or produced through other means, such as energy intensive desalination processes.
- Water availability is decreasing, partly resulting from climate change, and adding urgency to reform in the agriculture sector.



- Successful countries in the region are diversifying their economies away from agriculture and are putting in place water demand management systems to save water for high value use.
- The development of hydropower, including irrigation and flood control, in multipurpose schemes that employ best available practice will provide benefits that can be shared at the regional level.
- Hydropower provides future price security and, for countries with indigenous supply, reduces foreign exchange requirements for fuel purchases. The environmental benefits from pollution reduction and lowering greenhouse gas emissions have been well established.
- Adoption of new technologies; (energy efficiency plans, renewable energy)
- Develop Capacity building strategy
- ACWUA will be the regional platform for exchange of knowledge and best practices amongst member experts and professionals.



Steps to promote regional integration through transboundary water management and cooperation over electricity.

- The transboundary nature of the water resources in the Middle East makes cooperative management of these resources critical.
- The same is relevant for energy, where co management of electricity networks will increase the possibilities for each individual country to get access to a larger set of cost-effective energy sources.
- An integrated regional cooperative approach based on water and energy is needed to tackle the development challenges that lie ahead.
- Many countries in the Middle East already share electricity grids and plan to connect them to regional networks, for example, the Gulf Cooperation Council.
- Benefit sharing schemes based on water and energy can promote regional integration that brings stability, provides more opportunities for the small and isolated economies and stimulates growth in larger economies



- **Strengthening cooperation on both the management of transboundary waters and regional electricity networks within the Middle East provide good opportunities to reduce poverty and stimulate sustainable development in the region.**



Thank You!

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