

# MEDITERRANEAN SEA to DEAD SEA WATER ENERGY CONDUIT (MD-WEC) PRE-FEASIBILITY STUDY

Prepared for



*Center for Environmental Diplomacy - Palestine  
Ramallah*



Prepared by



The demise of the Dead Sea presents a unique opportunity for environmental restoration, as well as economic prosperity. Since the 1970's the Dead Sea has lost a third of its surface area and it continues to drop in depth by over a meter on average every year. This is a man-made problem due primarily to upstream water diversion exacerbated by evaporation. **Jordan, Israel and the Palestinian Authority have all identified "Saving the Dead Sea" as an issue of national priority<sup>1</sup>.**

**Government studies and current public opinion surveys show the time is right for a unique plan that will not only save the Dead Sea but provide power, water and jobs creation for the Palestinian Authority.**

The Mediterranean Sea to Dead Sea – Water and Energy Conduit (MD-WEC) will benefit Palestinians by providing:

- 1) A new water supply for both drinking and irrigation;
- 2) A new electrical power supply;
- 3) Infrastructure (roads, dams, and wastewater disposal);
- 4) New job opportunities;
- 5) Natural resource protection; and
- 6) Restoration of the historic seawater levels in the Dead Sea.

MD-WEC will also provide mutual long-term benefits for Israelis and Jordanians with increased eco-tourism, cultural heritage site preservation and water and power for households, industry and agriculture. MD-WEC will provide abundant benefits to the entire bioregion.

CED is proposing this unique project to renew and revitalize the deteriorating Dead Sea Region while fulfilling the critical needs of water & renewable energy.

**The governments of Israel, Jordan and the Palestinian Authority have now:**

1. Clarified the environmental, economic and social implications of the Dead Sea,
2. Recommended the required measures to stabilize development processes, and
3. Prioritized the initial steps to harness the potential of the region.

**CED has analyzed and evaluated their four "Possible Development Scenarios":**

1. Default - continuation of lowering of the Dead Sea Level: Do nothing;
2. Conservation of freshwater source, reduce water diversion of the Jordan River: an unattainable goal;
3. Peace Conduit (Red sea to Dead sea): Essentially a Jordanian program which provides minimal power and water benefit to Israel and the Palestinian Authority;
4. **Med-Dead Water & Energy Conduit (MD-WEC): Sustainable Development for Palestinians while benefiting Israel and Jordan, and incorporating the means to rapidly restore the Dead Sea.**

**CED concludes that all three stakeholders – Israel, Jordan and the Palestinian Authority – benefit most from Option 4: MD-WEC. It alone will provide sustainable economic development and the water and power necessary for Palestinian Authority national viability and security.**

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<sup>1</sup> Sharp, J.M., 2008. The Red-Dead Canal: Israeli-Arab efforts to Restore the Dead Sea. Congressional Research Service, Library of Congress, May 13, 2008.

## **1. MD-WEC GOALS AND OBJECTIVES**

### **1.1. Continue Clean Up / Remediation of the Jordan River Watershed**

Clean up, remediation, and restoration of the contaminated Jordan River watershed is essential to sustainable development on both the East and West Banks. MD-WEC will compliment these efforts while providing the resources (water, energy, and infrastructure) to bring the Region into full compliance with sustainability.

### **1.2. Restore Water Levels in the Dead Sea**

Through the MD-WEC, restoring the Dead Sea water levels could be implemented within ten (10) years, possibly sooner. Filling the Dead Sea to historic levels just below Route 90 on the West Bank and Route 65 on the East Bank (i.e., to EL -390 m) is estimated to require just over 20,000 MCM of seawater as shown in Table 1. Filling to a lower elevation of -400 meters is estimated to require some 12,500 MCM of seawater.

### **1.3. Provide Renewable Power to Produce Water (Desalination) and to Create Jobs**

MD-WEC is the only proposed alternative that creates adequate levels of inexpensive, fossil free, green power that will be used to drive desalination plants, power factories, and create jobs. A combination of pumped storage and hydropower generation technologies will provide up to 1,600 MW of peak power generation, more than the entire power supply for the country of Jordan.

### **1.4. Provide Benefits to the People Living in the West Bank, Jordan, and Israel**

A significant number of well-paying jobs will be created in Israel and the West Bank during construction of the sea intake, conveyance tunnels and shafts, surface impoundments, powerhouse structures, tailrace tunnels, spillways and canal and maintenance and operation of the completed facility will create sustainable employment opportunities.

Sixteen hundred (1600) megawatts of peak generating power will be made available along with a relatively unlimited supply of seawater which, when desalinated, can be used for drinking and irrigation. Additional provisions are included in the design to deliver seawater for desalination to locations immediately east of Ramallah and southwest of Amman at an elevation of between -40 and -80 meters.

## **2. COMPARISON OF THE MD-WEC IN HISTORICAL PERSPECTIVE**

A technical and economic analytical comparison of Dead Sea remediation and potable water generation concepts is presented in the pre-Feasibility Study, to demonstrate the unique benefits and advantages of the MD-WEC in historical perspective.

## **3. MD-WEC BENEFITS**

In 2002, The Israel Ministry of Foreign Affairs presented an analysis of the benefits and costs of a northern Med-Dead route entering the Jordan River just south of the Sea of Galilee, a 1984 Quatif Med-Dead route, and a Red Sea Dead Sea Canal (RSDSC), concluding that the RSDSC was “the most expensive alternative between the three alignments also comparing to desalinated plants along the Mediterranean coast”.

The IMFA's 2002 review did not consider the MD-WEC tunnel route proposed by CED possibly due to concerns over aquifer contamination. These historic Israeli concerns regarding aquifer contamination are now eliminated by precast concrete segment technology that will ensure the water tightness of a tunnel conveyance structure throughout its length. This technology has been demonstrated on numerous projects around the world, as noted in this report.

The following other benefits of the MD-WEC are also detailed in the MD-WEC pre-Feasibility Study, in sections:

- 1.3.1 Shorter Delivery Schedule
- 1.3.2 Lower Costs and Higher Benefits
- 1.3.3 Higher Technical feasibility
- 1.3.4 Lower Environmental Impacts
- 1.3.5 Lower Seismic Risk
- 1.3.6 More Widespread Economic Benefits

#### **4. CENTER FOR ENVIRONMENTAL DIPLOMACY (CED)**

CED is a 501(c)3 nonprofit organization based in Washington, DC. Our Middle East Region projects and programs are implemented through CED-Palestine (CEDP) located in Ramallah, which is registered as an NGO with the Palestinian Authority.

CEDP has a strong track record of implementing cross-border cooperative initiatives to promote environmental services, regional planning to protect the environment, and innovative programs to improve efficient usage of natural resources, including renewable water and energy. MD-WEC is the most recent initiative to be recommended by CED.

In 2007, CED began work on environmental management and planning as a tool for promoting local sustainability in a 3-year program funded by the EU. In this endeavor CED coordinates with the Palestinian Ministry of Local Government's Department of Joint Councils for Services, Planning & Development (DJCspd) to conduct projects and capacity building programs that enhance and improve the delivery of environmental services.

##### **4.1. CED Methodology: What is Environmental Diplomacy?**

CED only works in the areas where it has been invited and our programs are designed and implemented with the support and input of local stakeholders and beneficiaries as appropriate. CED recognizes that access to water and natural resources is a basic human right, and that degradation of the environment is a significant externality that must be taken into account when considering actual economic prosperity. This is the basis of CED's approach for developing sustainable environmental programs and services to improve living conditions and public health while protecting the environment and natural resources.

CED also recognizes that Pollution Knows No Borders. CED's cross-border cooperative initiatives take a bioregional or ecosystem perspective and approach to resolving environmental problems in Israel, Jordan and the Palestinian Territories. As such, CED programs bring communities together regardless of political borders to solve their shared environmental problems.