



PALESTINIAN WATER AUTHORITY



GAZA STRIP:

Desalination Facility Project:  
Necessity, Politics and Energy

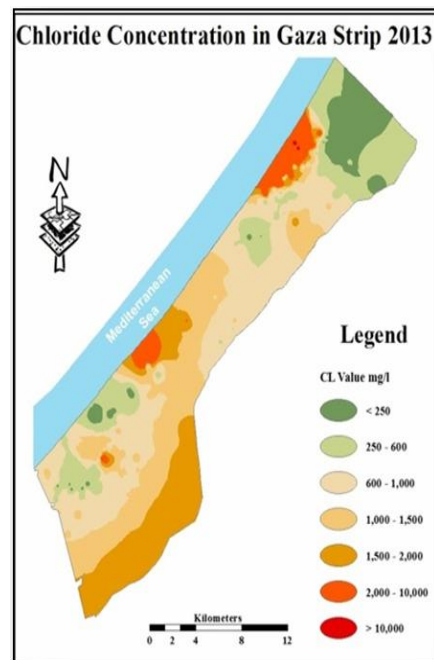
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### Background and Rationale:

The availability of fresh water in Palestine is amongst the lowest in the world. In the Gaza Strip the only available water source is groundwater from the deteriorating Coastal Aquifer underlying the Gaza Strip, as well as Israel and Egypt. The sustainable yield of the aquifer in the Gaza Strip is around 55 million cubic meters (MCM)/year. However, more than 1.8 million Palestinians in Gaza consume in excess of 200 MCM/y from the aquifer - thus taking approximately four times as much as the aquifer can sustainably recharge each year. The over-pumping of groundwater has led to damage of the trans-boundary aquifer due in part to a large increase in groundwater salinity following from seawater intrusion into the aquifer from the Mediterranean. Levels of salinity found in the aquifer under Gaza have risen continuously over the last two decades, and are now far in excess of the World Health Organization standards for drinking water. The UN report "Gaza in 2020: a livable place?" indicates that Gaza aquifer shall be completely unusable by 2016 and shall be irreversibly damaged by 2020 should there be no interventions to save the aquifer. PWA's assessment report on water quality, issued in January, 2015 confirms that 96.5% of the aquifer water is yielding water that fails all drinking water quality standards.



#### \* Historic Identification of a Large Desalination Plant for the Gaza Strip:

A desalination project with a capacity of 55 MCM/y has been confirmed in a number of international studies:

- 1- The Master Plan for Gaza Water Supply in 1995.
- 2- Coastal Aquifer Management Program (CAMP), PWA/USAID, 1999-2004.
- 3- Water Sector Strategy Planning Study (WSSPS), PECDAR/Denmark, 2000.
- 4- Gaza Seawater Desalination Plant Feasibility Study, PWA/USAID 2003.



5- Environmental Assessment of the Gaza Strip following Escalations of Hostilities December, 2008- January, 2009, United Nations Environment Program (UNEP) September 2009.

6- Comparative Study of Water Supply Options for the Gaza Strip (CSO-G), PWA/Norway, July 2011.

7- Water Supply to Gaza, Preparatory Studies for a Sea Seawater Desalination Plant, Project Information Memorandum, PWA/EIB, June 2012.

8- The Concept Design report for Gaza Desalination Project, October 2014, EIB (funded by EU).

\*In 2003, the project tender for the desalination plant project has been launched by USAID and was frozen for political reasons. Subsequently, the USAID also froze the construction on the North-South water carrier project in 2005 for political reasons.

**\* Water Supply Strategy for the Gaza Strip:**

In response to this worsening water crisis, the Government of Norway funded the Comparative Study of Water Supply Options for the Gaza Strip (CSO-G) led by international consultants and validated by consultations with the main stakeholders in the Palestinian Water Sector leading to a consensus water supply strategy. The CSO-G strategy has become the Government of Palestine's strategic framework for addressing the water crisis through a "rolling schedule of interventions... involving nine projects that are inter-linked and in combination form a coherent program to address the critical issues in the water sector in Gaza." Indeed, the CSO-G highlights that large-scale desalination is the priority project stating:

"The major intervention driving the most important changes . . . involves high-volume regional desalination. If this is not introduced - and on the assumption that other high-volume options remain elusive due to the political environment and/or their technical difficulty - the groundwater will not be protected adequately and the aquifer will fail totally. The high-volume desalination is therefore altogether critical as a driver of the overall CSO-G strategy, and there is no room for parties to believe





that the STLV [Short-Term Low-Volume] desalination . . . can solve the existing problems."

Phasing-in of higher levels of sea water desalination through the construction of a regional seawater desalination facility within four year period will be a key driver to reduce the present levels of over-abstraction of the groundwater in Gaza, and is therefore critical to the program as a whole (as well as to the long-term protection of human health in Gaza). In addition, the CSO-G has highlighted the need of coordinated improvements to electricity supply to provide power for desalination and wastewater treatment as an essential requirement for program success.

\* Government of Palestine 's Prioritization of Desalination Project for Gaza:

The Palestinian Water Authority has consistently emphasized the Desalination project as a priority infrastructure project in all recent Water Sector Strategies submitted to the National Plans, including The State of Palestine: National Development Plan 2014-2016. It has further been featured in priority infrastructure projects before the Ad Hoc Liaison Committee, notably in March 2013 report "Palestine: A State Under Occupation", and often highlighted by the reports of the Office of the Quartet Representative including specific inclusion of the Desalination Facility for the Gaza Strip project in the OQR's Initiative for a Palestinian Economy.



On 25 September 2013, in its report to the AHLC meeting in New York, the Office of the United Nations Special Coordinator reiterated the full support of the United Nations to the project noting "Large-scale desalination has been identified as the only viable alternative for drinking water supply in the Gaza Strip".

In June 2011, the 43 Member States of the Union for the Mediterranean labelled the Desalination Facility for the Gaza Strip Project

\* PROJECT OBJECTIVES:

The main objective is to alleviate the health crises threatening Gaza people



through the improvement of water supplies from quality and quantity prospective.

Specific objectives can be outlined in the followings:

- 1- Creating additional high quality water and improvement of its distribution to a better safe quality and fair allocations through the National Water Carrier.
- 2- Rehabilitation of the coastal aquifer through reducing pumping rates.
- 3- Job creation opportunities through building and operating the project.

**\* PROJECT COMPONENTS AND COST ESTIMATES:**

European Investment Bank/ European Commission	€ 4.0 million for TA for preparation and for support to the PWA for constructing the desalination plant.
Arab Gulf Donors through ISDB	Saudi Arabia, Kuwait, and GCC countries have indicated a pledge of approximately 10 – 12% of their Sharm El-Sheikh commitments, which could amount to an approximate USD 225 million. ISDB has repeated that 50% of the total project's cost are available through a trust fund financed by the Arab Gulf countries.
Government of France	€10 million pledged by French Prime Minister on occasion of the Opening of the 6th World Water Forum, March 2012 in Marseille.)

The European Investment Bank has undertaken an extensive power supply study which presents a number of options and scenarios. The study highlights that increased investment in renewable energy infrastructure could reduce annual raw fuel costs by as much as 45% each year against a baseline dedicated power plant operating on diesel fuel as is the situation of the Gaza Power Plant.

**\* FUNDRAISING:**

To date, donor commitments in principle for the desalination project are as follows:

Description	Cost Estimate \$ million
Reverse Osmosis Desalination Facility of 55 MCM/y Capacity, including Project Implementation Consultant (PIC1).	240
<b>Associated Projects</b>	
2.1 North – South Water Carrier including Project Implementation Consultant (PIC2)	140
2.2 Non-Revenue Water Reduction Investments	35
Operation Subsidy for Three Years	20
4. Power Plant /Energy Supply Infrastructure	(10-75)*
<b>Total Investment Cost</b>	<b>435 (plus 10-75)</b>

**\* POLITICAL SUPPORT:**

– In June 2011, the 43 Member States politically endorsed the Desalination Project as the 1st project of the new Union for the Mediterranean (UfM).



– Subsequently, the UfM Secretariat has secured a number of political support letters from UNEP Executive Director Achim Steiner and Lady Catherine Ashton High Representative of the EU in 2012, as well as from UN Special Representative to the Peace Process Robert Serry in 2013.

– The Council of Arab Water Ministers in the League of Arab States iterated its support to the project, and following the Council decision, the Palestinian Ministry of Foreign Affairs issued a letter in September 2013 to all Arab countries inviting them to concretize this support and participate in any future pledging event related to the project.

\* MAJOR CONCERNS:

– **Technical:** The preeminent concern raised by the international community is a guaranteed supply of power required to operate the desalination plant. Building a new power plant to service this facility will not alone solve the issue as the raw fuel imports needed to run the energy plant are extremely expensive and supplies are often interrupted by imposed border restrictions. It is essential that arrangements for the access of materials negotiated by the United Nations are able to ensure the entry of equipment needed to upgrade Gaza's energy producing capacity and equally important the provision of fuel. The European Investment Bank (EIB) consultant; Fichtner Company has issued in October 2014 a comprehensive Energy Supply Report assessing all possible options for the provision of power supply to the desalination plant. The Government of Palestine is taking steps towards arranging additional power supplies dedicated to the desalination plant.



– **Governance:** Given the technical and managerial complexity of constructing and operating a large desalination plant, the Palestinian Water Authority has taken steps to answer such concerns. According to the revised water law (June, 2014), a Regulatory Water Council will oversee the performance of service providers including the operator of the plant. According to the new law, the National Water Company is entitled to manage such bulk water supplies. In the meantime, the Palestinian Water Authority is temporarily assuming the responsibility of project



management until the Regulatory Water Council and the National Water Company are mature enough to absorb these significant responsibilities. As the Coastal Municipalities Water Utility is to be developed as a regional service provider it will be a beneficiary who will purchase this desalinated water from the National Water Company and distribute water to customers.

– **Sustainability:** Donors are very concerned with the long term cost recovery of the plant and its operations. The international community generally accepts that the desalinated plant will require an operational subsidy for the initial three years. Recognizing that additional safe quality water cannot be obtained from the coastal aquifer, previous discussions with the Government of Israeli focused on the pricing of additional water supplies result in the understanding that such prices will not be less than the cost of desalinated water within the Gaza Strip (assuming the energy costs are not exceptionally high).

The Palestinian Water Authority's strategy to blend the desalinated water with an equal quantity of brackish aquifer water will result in lower unit costs for volumes of drinkable water provided to the end users in the Gaza Strip. Further, the associated projects to desalination plant include the improvement of a high percentage of non-revenue water and low collections, and also the north-south carrier shall drastically reduce leakage of drinkable water working towards the overall financial sustainability of the UfM labelled Desalination Facility for the Gaza Strip project. Additional law enforcement should also be considered, but this would require the enhanced cooperation with local authorities.

– **Financing:** The institutional financing mechanism is complex given the involvement of three development banks (EIB, ISDB and the World Bank) and the statements of specific interested donors who have various preferences for contributing to group funding. For example, the European Commission has indicated that it will not put funds under the management of the World Bank, whereas the Government of France's Agence Française de Développement (AfD) indicated a preference for parallel financing. The World Bank already has a trust fund in place with a specific window for water and sanitation infrastructure. There does exist the possibility of directing certain donor contributions to discrete components, for example:

- i) Funding construction and operation of the desalination plant itself;
- ii) Funding construction of the north-south water carrier including related distribution infrastructure of pipelines, transmission lines, etc.
- iii) The non-revenue water reduction components;
- iv) Funding construction of energy capacity and transmission infrastructure;





- v) Subsidies for water;
- iv) Funding for energy/fuel component.

Following the convening of a coordination meeting focused developing a consensus financial mechanism in March 2013, and also a financial mechanism presentation made during a coordination meeting in June 2014, the Palestinian Water Authority supported by the UfM Secretariat in consultation with the Ministry of Finance have drafted an initial non-paper financial mechanism to advance discussions and secure a consensus financial mechanism. The non-paper has been issued by the Minister and still waiting a reaction from Trust funds administrators.

– **Security:** The Islamic Development Bank among others has expressed concerns about the future security of the project requesting all efforts be made to secure guarantees with regard to the infrastructure. Beyond the political endorsement of the project by the 43 UfM Member States including Israel, and the secured political support letters, the UfM Secretariat asserts that enhanced political risk mitigation is achieved by having the largest number of financial commitments from countries and member states. Moreover, the UfM Secretariat has worked to engage in the project advancement the UN Office of the Special



Coordinator to the Middle East Peace Process and the Office of the Quartet Representative who has an established working relationship with Government of Israel officials as a channel of communication and coordination to mitigate political risk. Indeed, representatives of the PWA and the UfM have accompanied the OQR to meetings with the Ministry of Defense representatives of the Government of Israel.

\* PROGRESS TO DATE:

1. The Desalination Plant in Central Gaza

An area of land equivalent to 80 dunums has been allocated to build Gaza central desalination plant, an area will be sufficient to build the first phase of 55 MCM/y capacity with the potential to expand the capacity later, and also to include allow



the construction of a dedicated power plant or some other infrastructure relevant for selected power supply options. During the 12 July 2012 FEMIP-ECOFIN Ministerial Meeting in Brussels, the EIB was requested and accepted to support a landmark project aiming to improve water supply in Gaza. In particular, the EIB accepted to commission and to manage a technical assistance operation aimed at developing the conceptual design and the tendering documents for the Gaza Central Desalination Plant. The Promoter is the Palestinian Water Authority (PWA). The corresponding consultancy services have been contracted to a consortium composed of Fichtner GmbH & Co. and Madar Consulting Engineers led and represented by Fichtner. The technical assistance operation is financed under the support from the FEMIP Fund. This fund utilizes non-repayable aid granted by the European Commission in support of EIB investment activities in the eastern and southern Mediterranean countries, assisting promoters during different stages of the project cycle.

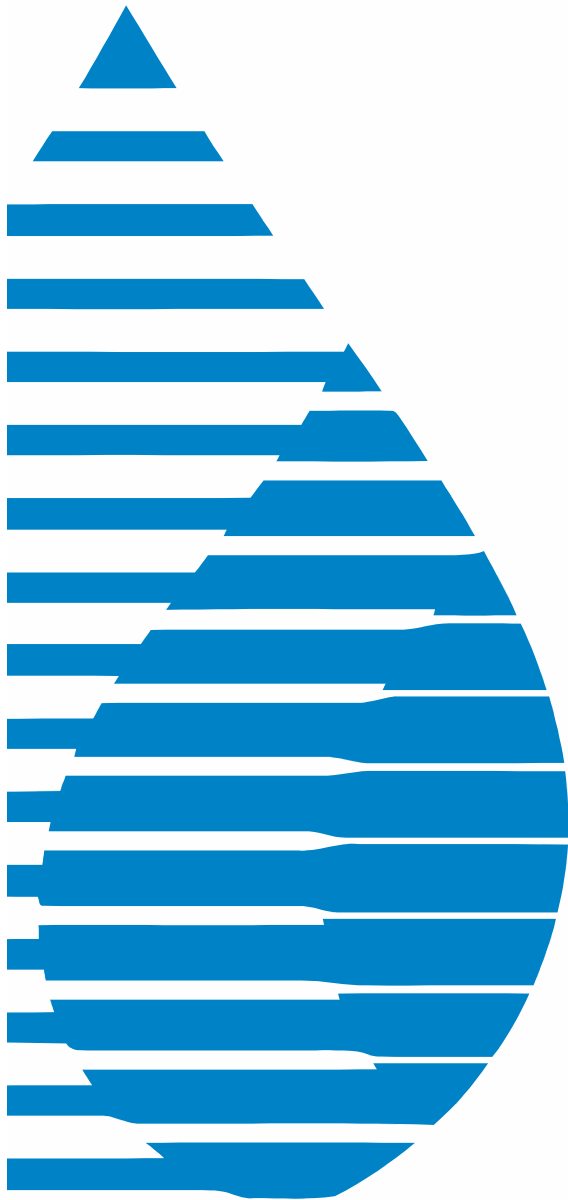
**Achievements so far can be summarized in the followings:**

- Concept design report which confirmed the capacity of 55 MCM/y with two RO passes in the first phase.
- Topographic Survey
- Ongoing Bathymetric Survey
- Ongoing Marine Survey
- Energy Supply Report assessing the different options for Energy supplies. The desalination plant's needs 25 MW installed power. About 10% of this power can be generated by Photovoltaic cells (peak load) as a source for renewable energy on site, and additional renewable energy sources could be secured from offsite interventions. The report recommends grid connection with additional Energy Supplies from neighboring countries or expanding Gaza Power Generation Plant capacity. In addition, a 100% back up onsite reciprocating dual fuel fired engines that can be operated in the future on Gas supplies.

2- The Associated Works to Desalination Plant

The North-South Water Carrier component and the Non- Revenue Water component constitute the "Associated works" to the Desalination Plant component. The World Bank has stated its intention to allocate an estimated 2.2 MUSD to be utilized from the Multi-Donor Trust Fund towards the technical preparation of the associated works projects. Terms of Reference and Request for Proposal for the technical study and engineering design are prepared. PWA finalized the prequalification ("shortlisting") of 16 respondent consultants companies. Six international companies have been shortlisted which have been approved by the World Bank.





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