

# Waste Water



## Overview of the sector

Until early nineties, wastewater facilities were limited to disparate networks between one region and another. Although main cities are equipped with incomplete wastewater networks, they are still lacking treatment plants. As to small demographic communities, they aren't equipped nor with networks neither with plants. As a result, the issue of water pollution was exacerbating day after day (random sea estuaries polluting the sea and beaches, random sanitation facilities, ground effluents, and streams polluting underground water layers...) therefore threatening the sanitary environment of citizens.

The insufficiency of wastewater services in regions is due to many reasons, most importantly:

- 1) The insufficient spending in the sector, in other terms the lack of investments required to improve, construct and develop facilities up to an appropriate service and environmental level.
- 2) The absence of a convenient administrative and executive structure in the sector to accompany the increasing urgent need for wastewater services, implement new methods followed by the administration and in the field of modern sewage disposal techniques.

In order to face such difficult reality, the CDR has been working since 1992 on different axes:

- 1) Execution of the emergency rehabilitation works of existing wastewater networks and

pumping stations, and resolution of all the recent issues.

- 2) Completion of projects stopped involuntarily and network extension and rehabilitation according to the needs.

- 3) Launching two programs for protecting the Lebanese coasts and water resources from pollution.

In other terms, the objective of this strategy is to address the problem of pollution and wastewater disposal in a radical manner throughout the country, as the Lebanese government worked and is still working on completing and organizing the public service in the wastewater sector.

However, completing the work on the third axe remains the main goal of CDR for the upcoming stage after works have progressed along the two other axes.

At the institutional level, the promulgation of law 221/2000 constituted a primordial step toward the restructuring and modernization of the sectors of water and wastewater, since public water properties were defined (ground and underground), and an integrated water management (potable, irrigation, and wastewater) was entrusted to four public independent investment institutions (except for the Litani River which remained under the administration of the Litani National Authority to invest its water in irrigation in South of

Lebanon, and West Bekaa). Moreover, all water departments have been included in these institutions and subject to the custody of the ministry of Energy and Water.

In 2001, boards of administration for water institutions were formed. In 2005, organizational decrees and new structures thereof were elaborated and enforced in order to achieve many goals, mainly rehabilitating and improving facility services, extending their coverage zone, and maintain the administrative stability and financial balance of institutions.

## Achievements during 1992-2010

The value of projects implemented to date in the wastewater sector reached US\$ 418 million; the main projects are the following:

\*Emergency rehabilitation of wastewater networks (NERP1-first year): This project covered the emergency repair and rehabilitation of wastewater networks in all regions of Lebanon, in addition to the rehabilitation of two wastewater pumping stations in Al Mina-Tripoli and Jounieh, and the construction of about 1000 kilometers of sewage networks.

\*Completion of Al Ghadir wastewater pre-treatment plant: The construction and equipping of the wastewater pre-treatment plant were completed and the relevant sea outfall rehabilitated at a cost of

US\$ 10 million. Such plant will serve the southern part of districts of Baabda and Aley, the west-southern part of Greater Beirut and the northern parts of the Shouf district. The plant was put into service in November 1997.

**\*Beirut master wastewater coastal collector project:** This project aims to protect the coast extending from Metn to the Shouf district. The project aims to eliminate all existing sea outfalls along the mentioned coastal area by collecting and conveying wastewater to the Dora and Ghadir pre-treatment plants. The conveyor line comprises two sections: the northern section and the southern section.

The northern section, covering about 17 kms of collection pipe, includes Dbayeh-Dora - Ras Beirut-Dora coastal areas, in addition to 5 pumping and lifting stations. All works were completed in year 2000 (costing about US\$ 48 million). This section has been designed to serve 1.5 million inhabitants of Dora area by year 2015.

**The southern section covers :**

**\*The Carlton-Al Ghadir sewer collector line,** which is nearly completed (costing about US\$ 13 million), designed to serve the south western part of Beirut city and part of its southern suburb well as part of Baabda district and;  
**\*The Damour-Al Ghadir line,** still under construction (about US\$ 9.5 million), which is designed to serve a major part of Aley district and part of Shouf district (more than 100,000 inhabitants), the length of the collection pipes is of 30 km and the line has 3 pumping

stations.

**\*Execution of the first phase of rehabilitation of Beirut infrastructure,** including the wastewater network (sections 1 and 2) at a cost of US\$ 25 million. The project in all its phases aims to construct a new storm water network independent of the wastewater network.

**\*Completion of the pre-treatment plant in Saida at a cost of US\$ 21 million** funded by Japan Bank for International Cooperation (JIBC) and execution of the first phase of the rehabilitation of wastewater networks in Saida and its suburbs by rehabilitating the existing network and constructing a new network for wastewater transmission to the new treatment plant.

**\*Completion of works in the construction of Tripoli wastewater plant,** at a cost of 92 million euros, in addition to the relevant sea outfall at a cost of 6 million euros, funded by the European Investment Bank (EIB). The project covers Tripoli coastal area, Al Qalamun, some parts of Zgharta and Koura districts, in addition to the coastal areas of Beddawi, Deir Amar and El Minyeh.

**\*Completion of the works mentioned within the Lebanese-French Protocol Agreement for waste water treatment plants at a cost of 56 million euros,** the works include the construction of waste water treatment plants and sea outfalls (for the coastal plants) in the following regions: Shouf coastal area (Ras en Nabi Younes) to serve a large number of villages in the Iqlim al Kharroub region, Nabatiyeh area (Sharqiyeh) to serve the town of Nabatiyeh and

the neighboring villages, Chekka area, Batroun (ongoing implementation of the sea outfall) and Jbeil, the third and fourth plants will serve the coastal towns and villages of Batroun district whereas the fifth will serve the coastal area in Jbeil district.

**\*Completion of a waste water treatment plant in Baalback (Iaat)** at a cost of US\$ 6.35 million funded by the IBRD to serve the city of Baalback and several neighboring villages.

**\*Maintenance and upgrading of wastewater and storm water networks in the main cities:** Starting in 1997 pursuant to the decision of the cabinet, works covered periodical maintenance, repair of wastewater and storm water piping utilities in the main cities, in addition to limiting the overflows and preventing problems emanating from breakdowns in the existing drainage networks. The works included cleaning wastewater and storm water piping networks, in addition to installing piping and other civil works required for improving the efficiency of these systems. The project covered Greater Beirut with its southern and northern suburbs, Tripoli, Zahle, Jounieh, Saida, Sour, Nabatieh and their suburbs and was implemented in coordination with the Ministry of Interior and Municipalities.

**Progress of ongoing projects:**

- Protection of the Lebanese coast against pollution: Lebanon signed several conventions to protect the Mediterranean against pollution, including the Barcelona Convention. The agreements stress on the necessity of treating

wastewater before discharged to the sea in cities and towns with populations exceeding 100 000. Several projects have been prepared for the construction of wastewater collector networks and treatment plants in the coastal areas. In the following, the major achievements to date are outlined:

- Beirut coastal area-southern section of the main wastewater collector, Carlton-Al Ghadir section: This project covers the construction of two wastewater pumping stations and the installation of 9 kilometers of wastewater sewer lines serving a population of 750,000 (US\$ 13 million). The Islamic Development Bank (IDB) financed the Carlton-Al Ghadir collector. Installation of the collector lines is complete and works on the pumping and lifting stations are progressing.

- The second phase of the wastewater collector networks in the coastal district of Saida at a cost of US\$ 19.7 million, funded by the Japanese Bank for International Cooperation (JBIC). These works are prior to linking these networks with the lines of the achieved wastewater plant, the work is 80% completed.

- The construction of wastewater networks for an amount of US\$ 6.5 million and a wastewater treatment plant for the coastal area of Sour for an amount of 31 million euros, funded by the European Investment Bank. The plant will serve around 300,000 persons and 15% of the work is achieved until this date

- The construction of wastewater treatment plants in Chekka, Batroun, Jbeil, Shouf coastal area and Nabatieh was



Wastewater Treatment Plant in Chekka

launched. These projects were funded by the financial Lebanese-French Protocol works were achieved in Chekka, Batroun, Ras-Annabi Youness in Jiyye and Nabatieh.

- Beirut infrastructure project including the sewer network – Phase II is progressing, financed by IDB (US\$ 38.5 million), and so is the first lot of phase III, In Achrafieh and Rmeil at a cost of US\$ 12 million, financed by the Arab Fund for Economic and Social Development (AFESD).

- Protection of water sources against pollution: A study was prepared in 1994 to update the instructional plan of the wastewater sector elaborated in 1982. This study defined water basins and priority areas for construction of new wastewater treatment plants to protect water

resources against pollution. For such purpose, appropriate financing was secured to construct collector lines and treatment plants in main inland cities (Zahleh, Baalbeck, Nabatieh, and others); and also in villages/towns close to water sources and springs (Labweh, Qaraoun Lake, Anjar, Hermel, Mechmech, Becharre, Bakhoun, Chabaa, Jbaa, Hasbaya, Chakra, Hrajel and Kartaba).

The Construction of the Baalback wastewater treatment plant, financed by the World Bank, was completed in the summer of the year 2000. Zahle wastewater treatment plant, funded through the Italian Protocol, was initiated in the first half of the year 2006 (US\$ 21 million). Similarly, the wastewater collection and treatment project in Jeb Jannine, Soghbine and neighboring villages (US\$ 32 million), financed by IDB

have been initiated along with the wastewater collection and treatment project in Labweh, Baalbeck district (US\$ 4.5 million) funded through the Iranian protocol.

#### **Main contracts awarded in 2010**

- The implementation of a wastewater collection and treatment projects in Yohmor, Zawtar and Kfarsir villages in Nabatieh District funded by a grant of 7 million euro from the EU
- The implementation of the works to construct sewer networks and a waste water treatment plant in Sour coastal area at a cost of 36 million euro financed by the EIB designed to serve 300.000 persons.
- The construction of additional sewer and potable water networks in Baalback and neighboring villages of Al Khodr, Nabi Sheet, Al Khraybeh at a cost of US\$ 3.5 million financed by the IBRD.

#### **Main Projects under Preparation (2010-2012)**

Protection of the coastline against pollution: The Ministry of Energy and Water prepared a comprehensive study for the district of Akkar recommending the elaboration of a general instructional plan for wastewater collection and treatment, including the construction of networks and plants for such purpose along the Abdeh coast. In implementation of such project, CDR obtained a loan from the Arab Fund and it is now in negotiation stage with EIB to secure the financing of the Keserwan wastewater treatment construction. Moreover, CDR is currently updating the relevant detailed studies and tender



Wastewater installations in the coastal city of Tripoli

documents, and is preparing for bidding tenders related to the construction of Sour Wastewater Treatment Plant - Phase II and networks funded by EIB.

CDR is currently preparing the tender documents for the Dora Wastewater Treatment Plant (north Beirut) and the associated networks, after securing the necessary financing from EIB (60 million euro).

- The feasibility study for the extension of Al Ghadir wastewater pre-treatment plant (south Beirut) is complete. CDR is contacting several funding sources in order to secure funding for the works.

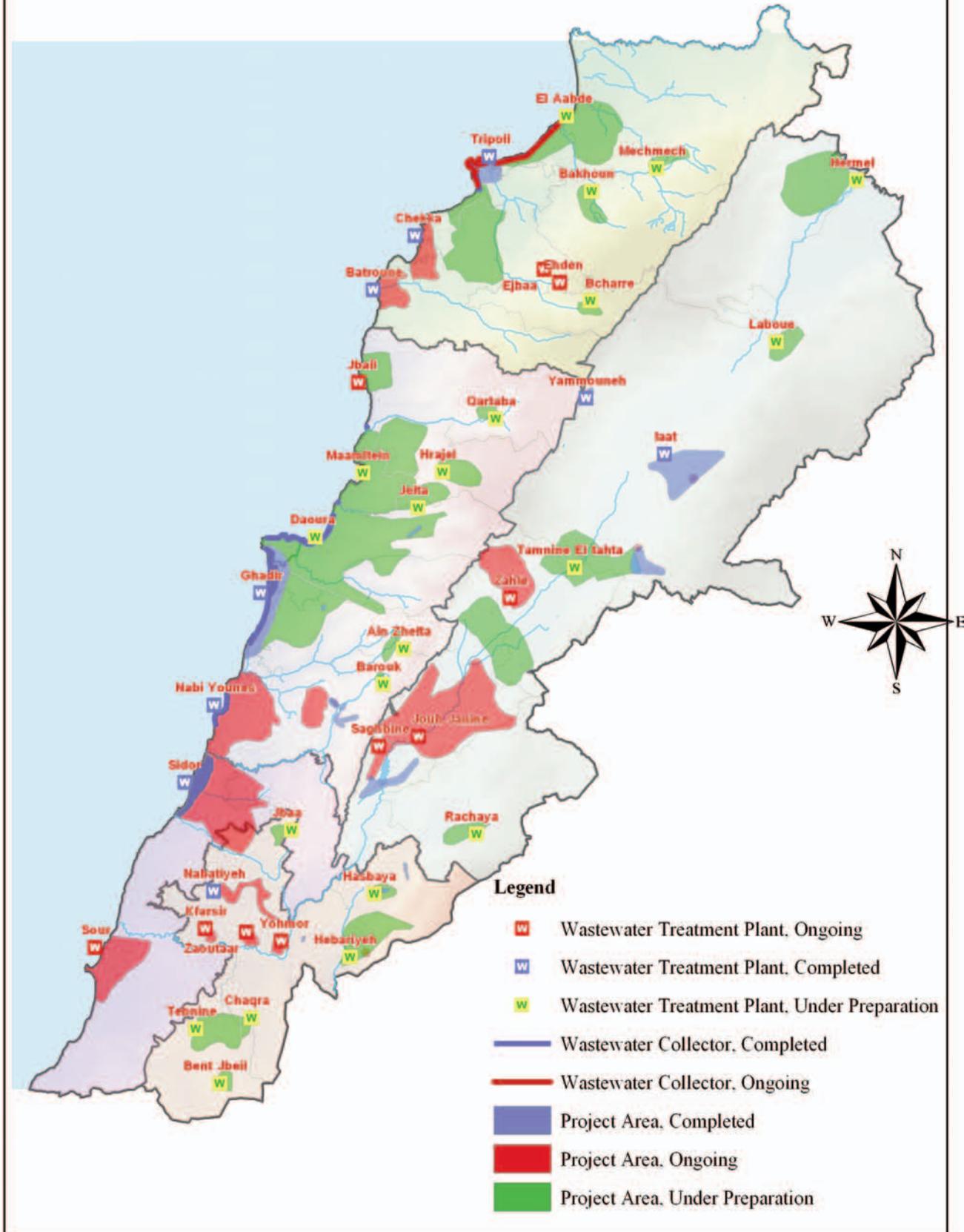
- The CDR has also secured the funding for the Greater Beirut wastewater treatment project from the German development agency (KfW) (16 million euro) and prepared the required detailed studies. This project involves the

construction of wastewater collection and transmission networks from district of Aley and the South western part of Beirut city and south Beirut to the Al Ghadir wastewater pre-treatment plants.

- On the other hand, CDR recently secured financing from AFESD amounting to US\$ 85 million to finance wastewater systems in a number of Lebanese regions, including Akkar coastal area, where the cost of the project and wastewater collection and treatment is estimated around US\$ 25 million, and the Chouf coastal area, where the cost of installation of wastewater networks is estimated around US\$ 15 million.

- Funding was secured for the wastewater collector project (Barid – Beddawi section) in the northern coastal section of Tripoli, including the main collector line, lifting stations and main and secondary related networks. This

# Wastewater Completed, Ongoing & Under Preparation Projects



project, financed through the 12 million euro grant provided by Germany, will serve 100,000 inhabitants and its implementation is expected to start at the end of 2009.

**Protection of water sources against pollution:**

The Ministry of Energy and Water along with CDR have identified approximately 20 wastewater projects near to water sources (springs, rivers, lakes, etc.) in inland Lebanese areas. Detailed studies are complete for many of these projects that mostly fall within the framework of existing financing agreements (Italian Protocol and IDB). Special importance is given to the western Bekaa area, Qaraoun Lake and the Litani River, where the high level of water pollution requires urgent intervention to install wastewater collection and treatment facilities. The CDR secured funding for the study and implementation of the wastewater project in the upper

basin of the Litani River (about US\$ 10 million) through a loan agreement with the Arab Fund for Economic and Social Development (AFESD); in addition to projects including Bcharre (US\$ 8 million), Shebaa and neighboring areas (US\$ 6 million), and As Safa and Barouk areas (US\$ 7 million).

Finally, as part of the Baalback water supply and wastewater treatment project, the construction of 160 additional kilometers of water and wastewater networks in Baalback and the surrounding areas is underway. The cost is estimated to be around US\$ 14 million.

CDR also received a grant of 6 million euro to implement the project of protection of Jeita grotto against pollution, and a grant of US\$ 15 million from KFAED to implement the wastewater collection and treatment project in Tibnine-Bint Jbeil.

**Schedule of main contracts signed in the wastewater sector during 2010**

<b>Project</b>	<b>Estimated value US\$</b>	<b>Source of Funding</b>	<b>Starting</b>	<b>Expected completion</b>
Construction project of wastewater networks and pumping stations for Chekka-Anfe regions in Batroun	6,902,159	French Agency for Development	1/10/2010	30/10/2012
Construction project of wastewater networks and pumping stations for Batroun villages	7,455,961	French Agency for Development	8/11/2010	7/10/2012
Construction project of wastewater networks and pumping stations for Chouf coastal area	9,912,103	AFSED	1/10/2010	30/9/2012

**Schedule of main projects under preparation in the wastewater sector (2011-2013)**

<b>Project</b>	<b>Estimated value million US\$</b>	<b>Source of Funding</b>	<b>Date expected to initiate work</b>	<b>Expected completion</b>
<i>Program of Protection of the Lebanese Coast against pollution</i>				
Construction of Akkar coast collector networks and pre-treatment plants	26	AFESD	August 2012	June 2015
Construction of main wastewater line between Koura and Tripoli (Ras Maska)	8	EIB	March 2012	September 2013
Construction of wastewater for Jbeil coast	18	Italian Protocol	July 2012	October 2015

Construction of collector networks and 2 pre-treatment plants in the coastal area of Keserwan	100	EIB	July 2013	July 2016
Construction of collector networks and 2 pre-treatment plants in Dora and Qarantina	85	EIB	May 2012	November 2014
Wastewater networks for Koura – Phase 1	12	French Agency for Development	May 2011	October 2013
Completion of execution of wastewater networks in Greater Beirut – Al Ghadir Bassin	22	German Agency	May 2012	May 2015
Sea outfalls for treatment plant in coastal Sour district	12.5	EIB	March 2012	September 2013
<i>Program of Protection of water sources against pollution</i>				
Construction of collector networks and treatment plant in Bakhun-Denniyeh	19	Italian Protocol	December 2013	December 2016
Construction of collector networks and treatment plant in Bcharre	8	AFESD	October 2012	December 2016
Construction of collector networks and treatment plant in Qartaba-Jbeil	6	Italian Protocol	February 2012	February 2014
Construction of main and secondary additional wastewater networks in Koura – Sections 1 and 2	10	EIB	February 2012	February 2013
Construction of collector networks and	12	Italian Protocol	July 2012	November 2014

treatment plant in Hrajel-Keserwan				
Construction of collector networks and treatment plant in Jeita-Keserwan (Sections 1 and 2)	17	German Agency KFW	December 2012	June 2016
Construction of treatment plant and wastewater networks in both areas Baruk and Safa	13	AFESD	June 2011	December 2013
Construction of treatment plant and wastewater networks in Chakra and its neighboring areas in Bint Jbeil	4.50	Kuwait Fund	(Implementation and management entrusted to the donor)	
Construction of treatment plant and wastewater networks in Bint Jbeil and neighboring areas	11	Italian Protocol	December 2012	December 2014
Construction of treatment plant and wastewater networks in Tibnine and its neighboring areas in Bint Jbeil	10	Kuwait Fund	(Implementation and management entrusted to the donor)	
Construction of treatment plant and wastewater networks in Hasbaya and neighboring areas	8	Italian Protocol	December 2013	December 2015
Construction of treatment plant and wastewater networks in Arqub	6.50	AFESD	July 2013	December 2015
Construction of treatment plant and wastewater networks in Jbaa and neighboring areas in Nbatiyeh	7	Italian Protocol	November 2013	December 2015
Construction of	20	Italian	December 2013	June 2016

treatment plant and collector networks in Hermel and neighboring areas		Protocol		
Construction of treatment plant and wastewater networks in Labweh and neighboring areas	4.50	Iranian Protocol	January 2012	August 2014
Construction of treatment plant and wastewater networks in central and northern Bekaa in the Litani basin	10.50	AFESD	July 2013	December 2015
Construction of treatment plant and wastewater networks in Anjar, Majdal Anjar, Bar Elias, Mraijet, Marj, Chtoura and neighboring areas	41	Italian Protocol	December 2013	December 2016
Completion of wastewater project in West Bekaa region	27	Islamic Bank for Development	December 2012	December 2015
Construction of treatment plant and wastewater networks in Rachayya and neighboring areas	8	Kuwait Fund	May 2015	December 2016