

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



Waste Water treatment Plant - Saghbine

(* the amount includes a number of contracts still not moneywise closed)

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 1992-2012

The value of projects implemented to date in the wastewater sector reached US\$ 540* 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 to Dora and Ras Beirut to 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 covering Carlton-Al Ghadir collector line, which is under completion costing about US\$ 14 million, designed to serve the south western part of Beirut and part of its southern suburb, as well as part of Baabda district and the Damour-Al Ghadir line, executed and amounting to about US\$ 9.5 million, through funding by the Islamic Bank, 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 about US\$ 25 million. The project in all its phases aims mainly to construct a new storm water network independent of the wastewater network.

- **Execution of the second phase**

of the infrastructure, among which the wastewater network of Beirut city, through funding from the Islamic Bank for Development, amounting to about US\$38.5 million; and the execution of first works of phase two in Ashrafieh and Rmeil regions, amounting to about US\$10 million, funded by the Arab Fund for Economic and Social Development.

- **Completion of the pre-treatment plant in Saida** at a cost of about 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, as well as phase 2 of wastewater collection network in the coastal caza of Saida, amounting to about US\$22 million, funded by Japan Bank for International Cooperation (JIBC) as a pre-step in connecting with the lines reaching the achieved treatment plant.

- **Completion of works in the construction of Tripoli for wastewater treatment**, 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 Koura and Zgharta 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 about 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), Nabatiyeh area (Sharqiyeh), Chekka area, Batroun (ongoing implementation of the sea outfall) and Jbeil. The first plant is designed to serve a big number of villages and cities of the coastal rea of Iqlim el Kharoub; the 2nd serves the town of Nabatiyeh and neighboring vollages, the third and fourth plants serve the coastal towns and villages of Batroun district, whereas the fifth serves the coastal area in Jbeil district.

- **Completion of a waste water treatment plant** in Baalback (Iaat) at a cost of about 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 necessary works required for

improving the efficiency of these networks. The project covered Greater Beirut with its southern and northern suburbs, Tripoli, Zahle, Jounieh, Saida, Sour, Nabatieh and their suburbs. This project was implemented in coordination with the Ministry of Interior and Municipalities.

Progress of ongoing projects:

- **Protection of the coast against pollution:** Lebanon signed several conventions to protect the Mediterranean waters against pollution, the most important being the Barcelona Convention. The agreements stressed on the necessity of treating wastewater before discharged to the sea in cities and towns with populations exceeding 100 000. Accordingly several projects have been prepared for the construction of wastewater collector networks and treatment plants in the coastal areas of Lebanon. Until now, execution of treatment plants have been carried out with their related collector networks as previously described and currently works are being carried out in:

- 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, the execution amounts to US\$ 14 million. The Islamic Development Bank (IDB) financed the Carlton-Al Ghadir collector. Installation of the collector lines is complete and works on connecting electricity to

the pumping and lifting stations are progressing in order to put it into service.

- 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 32 million euros, funded by the European Investment Bank. The plant will serve around 300,000 persons and 50% of the work is achieved until this date.
- Execution project of wastewater networks and pumping stations for villages in Chekka region, amounting to about US\$ 8 million, funded by AFD, execution of about 60% of project has been achieved until date.
- Execution project of wastewater networks and pumping stations for villages in Batroun region, amounting to about US\$ 8.5 million, funded by AFD, execution of about 70% of project has been achieved until date.
- Execution project of wastewater networks and pumping stations for villages in Koura region – phase 1 of project, amounting to about US\$ 8 million, funded by AFD, execution of about 50% of project has been achieved until date.
- Southern coastal part of main wastewater collection network for Tripoli coastal region, serving regions and parts of Koura, Qalamoun, Bohsas and Tripoli, and that thanks to a loan by the European Bank for Investment, amounting to US\$ 10 million, 85% of works are achieved until today.
- The northern coast of main

wastewater line collector of Tripoli coastal project (Bared-Beddaoui section) including the main collector line and lifting stations and main, secondary and related networks, thus serving more than 100000 people and that through the grant given by the German government and amounting to 12 million euros; the grantor, in coordination with the CDR is managing and executing the project.

- Execution project of wastewater networks and pumping stations for villages in Chouf region, amounting to about US\$ 12.5 million, funded by the Arab Fund for Economic and Social Development, execution of about 40% of project has been achieved until date.
- **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; in addition the execution of works on wastewater collection and purification in Jebb Jannine, Saghbine regions and neighboring villages are being carried out, amounting to about US\$ 39 million, funded by the Islamic Bank for Development.

On the other hand, the ongoing execution project of wastewater networks and treatment in Zahlé, amounting to about US\$ 25 million, funded by the Italian Protocol (about 55% of project has been achieved); and the execution of sewages and additional distribution lines for potable water in Khodr, Khribé, Nabi Chit, Baalbek, amounting to US\$ 5.3 million funded by the World Bank (90% executed); constitution of wastewater networks and pumping stations for Barouk, Freidis, Ain Zhalta, Nabaa el Safa, Al Aazouniye and Ain Dara, amounting to about US\$ 5.5 million, funded by the Arab fund for Economic and Social Development (45% executed); as well as the execution of a wastewater treatment station in Nabaa el Safa amounting to about US\$ 5 million funded by the Arab Fund for Economic and Social Development (10% executed). Furthermore, works are continuing on the execution of wastewater networks and pumping station in Kfar Katra region in the Chouf, amounting to about US\$ 1 million, locally funded (60% executed). Whereas in South Lebanon, works are progressing on execution projects of 3 treatment stations and wastewater networks in Yohmor, Kfar Sir and Zoutor,

amounting to about US\$ 12 million, funded by the European Commission and 30% of project has been executed

Main contracts signed during 2012

- Execution of sample project for wastewater treatment in Becharré, in the North, through purification techniques relying on bamboo filters, amounting to US\$ 600 million, funded by the French Agency for Development.
- Execution of construction project of wastewater networks for Kfar Katra - Chouf region, amounting to about US\$ 362 thousand, locally funded.
- Execution of works in wastewater treatment station in Nabaa el Safa in Chouf district, amounting to about US\$ 5 million, funded by the Arab Fund for Economic and Social Development.
- Completion of works in wastewater treatment stations in Couf-Sweyjani municipalities, including operation and maintenance works, amounting to US\$ 1.4 million, locally funded.

Main Projects under Preparation (2013-2015)

- **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 to execute this project, and tenders are being prepared.

CDR obtained the necessary funding amounting to 70 million euros to build two wastewater treatment stations on the Keserouan coast from the European Investment Bank, and 70 million other euros from the French Agency for Development to execute the networks. The CDR is going to update tender files of this project.

Also CDR is currently preparing the tender documents of potable water and wastewater networks in the coastal region of Jbeil through Italian funding amounting to 38 million euros, among which 19 million euros for wastewater.

Furthermore, CDR is preparing the project of wastewater in Qarantina and Dora (northern Beirut) and the related networks after funding has been ensured through the European Investment bank amounting to 60 million euros.

- The feasibility study for the extension of Al Ghadir wastewater pre-treatment plant (south Beirut) is being updated. CDR is contacting several funding sources in order to secure funding for the works (European Investment Bank and others)

- The CDR has also secured the funding for the Greater Beirut wastewater treatment project Ghadir Basiin from the German development agency (KfW) amounting to 16 million euro and the execution of the required tender documents. This project involves the construction of

wastewater collection and transmission networks from Al Ghadir basin region (south east Greater Beirut) to the wastewater treatment plant in Ghadir.

- On the other hand, CDR recently secured financing from AFESD amounting to about 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 currently tenders are being prepared.

- **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, IDB and AFESD). 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 amounting to about US\$ 10 million through a loan agreement with the Arab Fund for Economic and Social Development (AFESD); in addition to projects including Shebaa and neighboring areas (US\$ 6 million), Becharre

region where wastewater networks amounts are evaluated to up to US\$ 8 million and As Safa and Barouk areas (US\$ 13 million) and launching of related works. The CDR will also receive an additional grant amounting to US\$ 27 million from the Islamic Bank for Development to complete the wastewater project in West Bekaa.

CDR also received a grant of 6 million euro and signed two other grant agreements of 14 million euros with KFW to implement the

project of protection of Jeita spring against pollution, and currently execution of the required studies is carried out. The project is divided into two phases aiming at collecting and treating wastewater emitted from cities and villages falling within the water basin of Daraya, Kleiat, Bekaata, Bkaatouta, Kfardebian and neighboring cities in Keserwan district.

The CDR is following the required studies before launching both projects of wastewater collection

and treatment in Mechmech – Akkar and Hrajel – Keserwan, amounting to about US\$55 million, funded by the Italian Protocol.

Furthermore, the CDR is receiving a grant of approximately US\$ 46 million from the Kuwaiti Fund for Arab Economic Development to execute the collection and treatment of wastewater in numerous neighboring villages in Marjeyoun and Bint Jbeil, in Nabatiyeh Mohafazat.

Schedule of main contracts signed in the wastewater sector during 2011

Project	Estimated Value (US\$)	Funding Source	Starting	Expected completion
Execution of sample project for wastewater treatment in Becharré, in the North, through purification techniques relying on bamboo filters	599,015	French Agency for Development	11/1/2012	31/10/2014
Execution of works in wastewater treatment station in Nabaa el Safa in Chouf district	4,736,516	Arab Fund for Economic and Social Development	27/11/2012	27/11/2014
Construction project of wastewater networks and pumping stations for Kfar Katra in Chouf	361,647	locally	1/5/2012	31/5/2013
Completion of works in wastewater treatment stations in Couf-Sweyjani municipalities, including operation and maintenance works	1,401,025	locally	1/4/2012	30/9/2013

Schedule of main projects under preparation in the wastewater sector (2013-2015)

Project	Estimated Value million (US\$)	Funding Source	Date expected to initiate work	Expected completion
<i>Program of Protection of the Lebanese Coast against pollution</i>				
Construction of Akkar coast collector networks and purification stations	26	AFESD	December 2013	November 2016
Construction of secondary wastewater networks in Koura coastal region	3	locally	September 2013	September 2014
Wastewater networks for Koura – Phases 1 and 2	21.5	locally	September 2014	December 2014
Execution of additional works in Anfeh and creation of secondary wastewater networks linked to the purification station in Chekka	10	locally	September 2013	
Execution of additional and secondary works related to Batroun purification of wastewater	6.5	locally	September 2013	September 2014
Construction of wastewater for Jbeil coast	25	Italian Protocol	May 2013	November 2016
Construction of collector networks and 2 pre-treatment plants in the coastal area of Keserwan	185	EIB	December 2014	December 2017
Execution of collection networks and pre-treatment stations in Nahr Beirut	85	EIB	May 2014	May 2017
Completion of execution of wastewater networks in Greater Beirut – Al Ghadir Bassin	22	German Agency	May 2013	May 2014

Schedule of main projects under preparation in the wastewater sector (2013-2015) - continue

Project	Estimated Value million (US\$)	Funding Source	Date expected to initiate work	Expected completion
Sea outfalls for treatment plant in coastal Sour district	12.5	EIB	June 2013	May 2014
<i>Program of Protection of water sources against pollution</i>	12.5	EIB	June 2013	May 2014
Execution of collector networks and purification stations in Mechmech in Akkar	31	Italian Protocol	December 2013	December 2014
Construction of collector networks and treatment plant in Bakhun-Denniyeh	19	Italian Protocol	December 2015	December 2017
Construction of collector networks and treatment plant in Bcharre	8	AFESD	September 2013	September 2015
Construction of collector networks and treatment plant in Qartaba-Jbeil	6	Italian Protocol	May 2013	November 2015
Construction of collector networks and treatment plant in Hrajel-Keserwan	24	Italian Protocol	December 2013	December 2014
Construction of collector networks and treatment plant in Jeita-Keserwan (Sections 1, 2 and 3)	28	German Agency KFW	December 2014	June 2017
Construction of treatment plant and wastewater networks in Bint Jbeil and neighboring areas	11	Italian Protocol	December 2015	December 2017

Schedule of main projects under preparation in the wastewater sector (2013-2015) - continue

Project	Estimated Value million (US\$)	Funding Source	Date expected to initiate work	Expected completion
Construction of treatment plant and wastewater networks in Hasbaya and neighboring areas	8	Italian Protocol	December 2015	December 2017
Construction of treatment plant and wastewater networks in Arqub	6.50	AFESD	September 2014	July 2015
Construction of treatment plant and wastewater networks in Jbaa and neighboring areas in Nbatiyeh	7	Italian Protocol	December 2015	December 2017
Construction of treatment plant and collector networks in Hermel and neighboring areas	20	Italian Protocol	December 2015	December 2017
Construction of treatment plant and wastewater networks in central and northern Bekaa in the Litani basin	30	AFESD	October 2014	December 2016
Construction of treatment plant and wastewater networks in Anjar, Majdal Anjar, Bar Elias, Mraijet, Marj, Chtoura and neighboring areas	41	Italian Protocol	December 2015	December 2018
Completion of wastewater project in West Bekaa region	27	Islamic Bank for Development	December 2013	December 2015
Collection of wastewater treatment stations in numerous neighboring municipalities in Marjeyoun, Bint Jbeil districts in Nabatiyeh	58	Kuwait Fund	March 2014	December 2018
Construction of treatment plant and wastewater networks in Rachayya and neighboring areas	30	Kuwait Fund	May 2015	December 2018