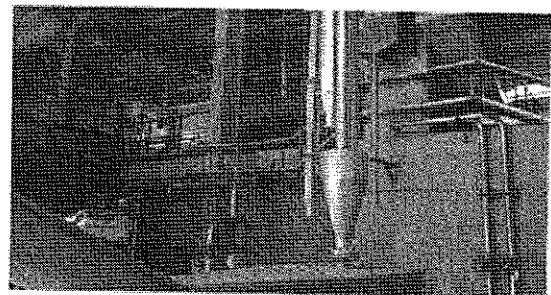
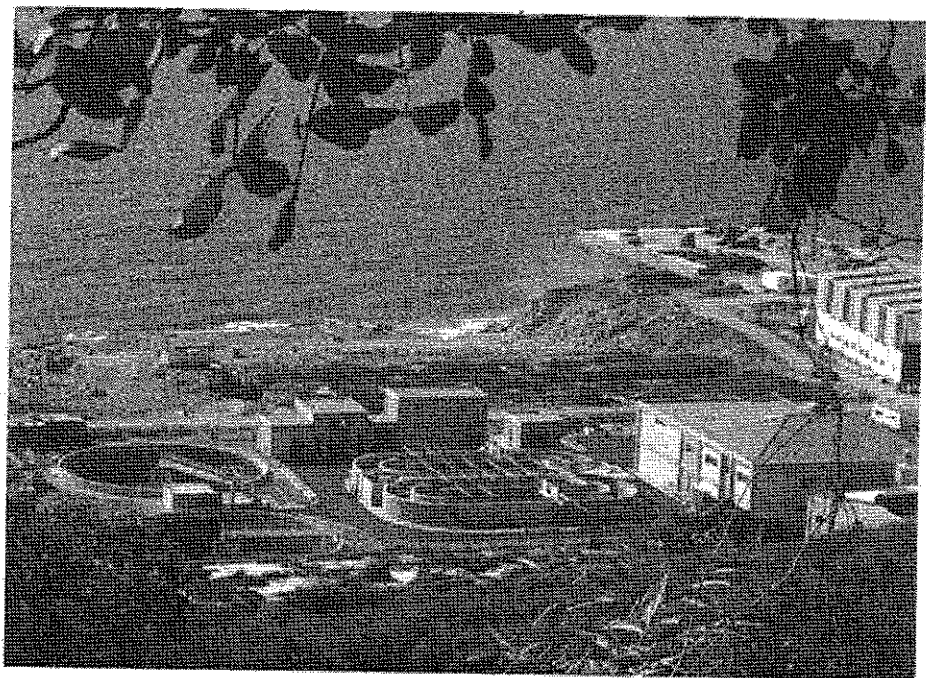




LEBANESE REPUBLIC
**MINISTRY OF ENERGY
AND WATER**

NATIONAL STRATEGY FOR THE WASTEWATER SECTOR



Ministry of Energy and Water
Lebanese Government (Resolution No. 35, Date 17/10/2012)

Not to Waste our Water

Wastewater percolates into the ground or is discharged into the sea, polluting our ground, underground, rivers and beautiful shores,

60% of the population is covered with collection networks without any treatment facilities,

Wastewater treatment plants are scattered along the coast without being connected to collection networks,

More than a billion US Dollars have been invested in the wastewater sector and only 8% of the generated wastewater is treated,

No budget was allocated for the funding of wastewater projects when we took over the Ministry of Energy and Water,

Unclear responsibilities lost between, Municipalities, Organizations, Councils, Water Establishments and Ministry.

With that grim reality at hand, we developed this strategy in coordination with all concerned national and international organizations and bodies and the approval of the council of Ministers, in order for Lebanon to have one policy, and a clear path for the collection and treatment of wastewater, and in implementation of our upheld principle: "polluter pays" for the citizen to honor his financial duties toward the state and, in return, for the state to accomplish its basic mission towards the citizens and spare Lebanon the evil of pollution.

Gebran Bassil
Minister of Energy and Water

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Total Investment Requirements

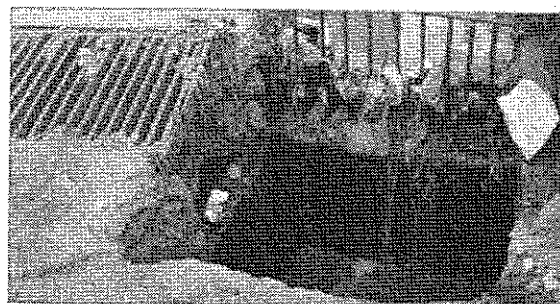
Annex A

Background: Lebanon's water sector and strategy

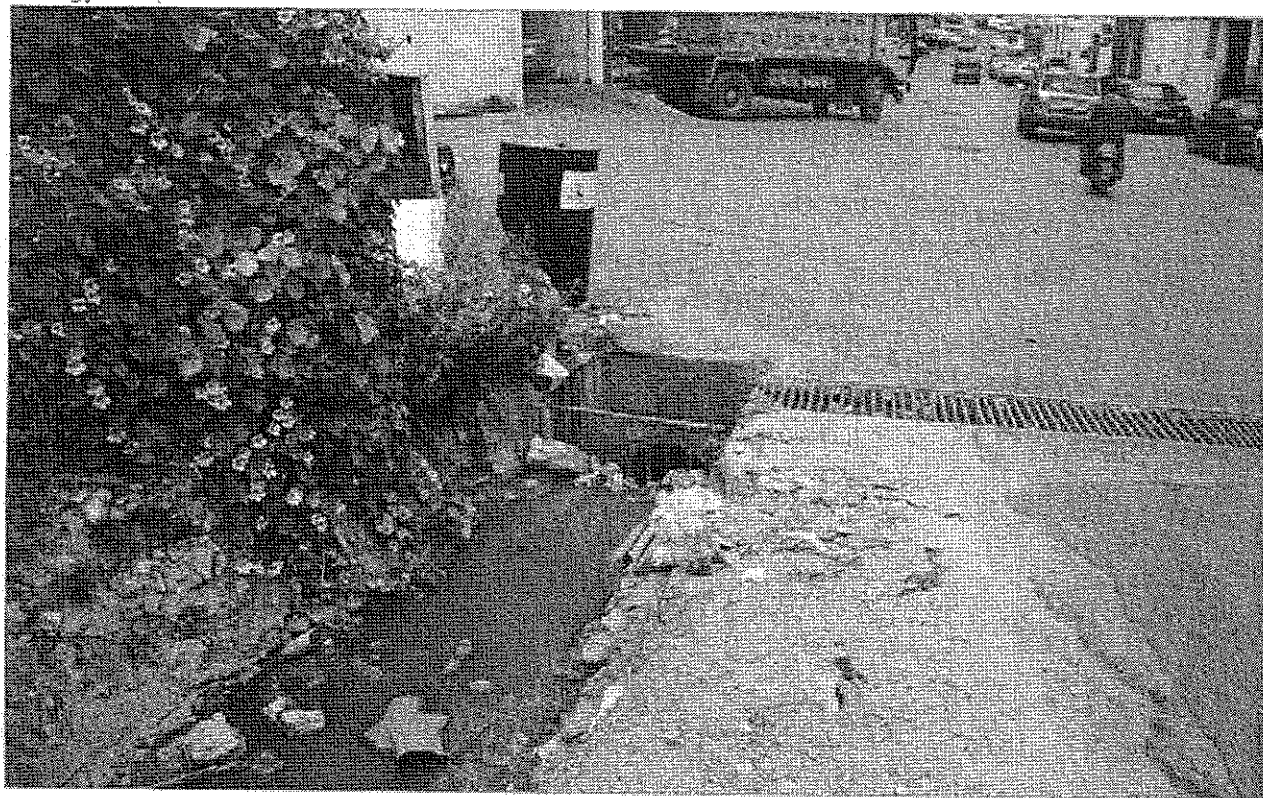
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Lebanon is experiencing critical problems in all parts of its water sector. In water resources, the country is already using three quarters of its available water resources and demand is rising fast. Dry season shortages are emerging and water quality is deteriorating. Institutional capacity for water resources management is weak. Despite institutional reforms and high levels of investment, public network service delivery standards in water supply are poor, and households spend three times more sourcing water from private suppliers than from the utilities. Water Establishments lack the autonomy, technical capacity and financial resources to improve service standards. Despite massive investment, very little wastewater is being treated, causing severe environmental damage. The investment program has been poorly coordinated, and reforms to transfer institutional and financial responsibility for wastewater management to the WEs have been only very partially implemented. The irrigation sector has comparative advantage for high value products in domestic and regional markets, but institutional reforms need to be completed, and investment is required in both infrastructure and product and market development.

The outlook is poor unless strategic actions are taken. Overall, the water sector is delivering poor services at a high fiscal and household cost. Water sector inefficiencies (particularly low collection of tariffs and high water losses) and environmental damage are costing the economy the equivalent of almost 3% of GDP annually. Looking ahead, on present trends, despite its relatively good endowment of water resources, Lebanon will face chronic year-round water shortages by 2020 unless actions are taken to complete reforms in the water sector.



The Ministry of Energy and Water developed a water sector strategy that aims at improving potable water and wastewater and irrigation services within an integrated water resource management framework. Following best practice in integrated water resources management, the proposed Strategy for the Wastewater Sector is designed to fit within Lebanon's overall water sector strategy. However, wastewater challenges in terms of infrastructure, institutional set-up, financing and cost recovery are specific to the sector, and an integrated approach is required along the chain from wastewater generation through to ultimate reuse or disposal. Therefore, a freestanding wastewater strategy is required.



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Current situation of the wastewater sector

Lebanon is generating large and growing quantities of domestic and industrial wastewater which needs treatment. At present, Lebanon produces about 310 million cubic meters of wastewater annually, of which 250 million cubic meters is municipal/domestic wastewater, and about 60 million cubic meters industrial wastewater.

National policy is to collect and treat all wastewater, in order to prevent pollution of the environment. The wastewater master plan (1982, updated in 1994) provided for coverage of major urban and rural populations, using sizes of plant and technologies appropriate to the scale and nature of settlements. A total of 54 integrated systems (12 coastal and 42 inland) were recommended, including collection, treatment and disposal.

Lebanon has made huge investments in wastewater facilities over the last two decades. Investments in the sector since early 1990s exceed \$1.4 billion and include:

- Council of Development and Reconstruction (CDR) through loans and local funding: \$1265 million:
 - (i) completed projects (mainly rehabilitation of networks): 255, (ii) on-going projects and projects under preparation: 910 investments, and (iii) 100 for maintenance, studies, supervision, etc.
- Ministry of Energy and Water (MoEW): \$60 million spent on networks (1996–2009)
- Ministry of Housing: \$30 million spent on networks up to 1994
- Municipalities: unknown value of works
- Grants from International agencies:
 - USAID: around \$ 25 million (1996 – 2010)
 - Italians, EU, and others: unknown

Along the coast, much of the planned large scale capacity has been constructed, but little of it is operational. Of the twelve large treatment plants planned on the coast to service 65% of the population, seven are completed (Tripoli, Chekka, Batroun, Jbeil, Ghadir, Nabi Younes and Saïda), one is under construction (Sour), three are under preparation (Aabde, Kesrwan, and Bourj Hammoud), and one require funding (Sarafand). However, to date only two plants (Ghadir and Saïda) are operational based on preliminary treatment only and five completed plants lack collection networks (Tripoli, Chekka, Batroun, Jbeil, and Nabi Younes).

Inland, only two medium-sized collection and treatment schemes are operating – and well below capacity. Of the 42 medium sized collection and treatment schemes planned, 23 are funded. However, only two are operating, and way below design capacity (Baalbek 10%, and Yamouneh 50%). Two plants (Nabatiye and West Beqaa) are completed but not operating. Five (Kfarsir, Yahmour, Zawtar, Tibnine and Zahle) are under construction and 14 plants are under design. A further investment of \$255 million is required to bring all 23 plants into operation. The remaining 19 schemes are not funded at all and would require \$325 million. In addition, around 60 small treatment plants have been constructed inland by municipalities through donor funding without coordination with MoEW or CDR. Today, only a few of these plants are operational, and considerable further investment would be needed for them to operate adequately and to cover all rural areas.

As a result of these investments, about two thirds of the population are connected to wastewater collection networks but only 8% of wastewater reaches the four operational plants (Saïda, Ghadir, Baalbeck and Yamouneh) and is treated. Wastewater collection networks have been conceived and executed piecemeal, leading to a major mismatch between collection and treatment capacity.

Considerable installed treatment capacity is lying idle. Seven major plants (Tripoli, Chekka, Batroun, Jbeil, Nabi Younes, West Beqaa and Nabatiye) are not working at all because of lack of networks.

The environmental costs of this situation are severe. Most wastewater collected is discharged raw, without treatment, into watercourses and the sea. Where there is no network, cess pits are used, with considerable seepage into groundwater. Few industries pre-treat their effluent, so that harmful waste is discharged into the collection system or the environment. The negative environmental impacts of poor wastewater collection and treatment contribute to health costs, to pollution of water resources and soil, to loss of amenity and tourism income.

Main causes of the current situation

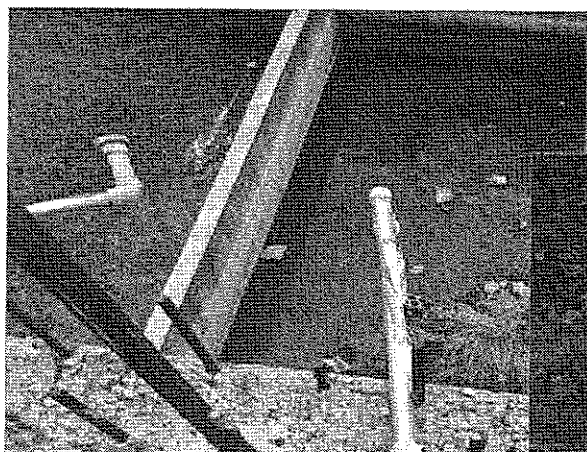
The investment program is not well coordinated. Wastewater collection, treatment and disposal/reuse investments are not implemented as an integrated package. The wastewater master plan is out of date and needs to be revised to reflect actual implementation, and changes in population and rates of wastewater generation. Investments have often been selected from donor, political and regional preferences rather than rational planning. Implementation is slow, with very low disbursement rates. Most projects take at least ten years from inception to completion.

The legal, regulatory and policy frameworks have not established and enforced appropriate standards. Responsibilities for setting and regulating standards are split between Ministry of Environment and MoEW. There is no policy on pre-treatment of industrial wastewater, and no guidelines on the selection of the most cost-effective wastewater treatment techniques. There are no policies for systematic reuse of treated wastewater.

Institutional responsibilities are unclear. Responsibility for planning and implementing projects is lost between CDR, MoEW, Water Establishments (WEs) and municipalities, whereas it should be under the leadership of the MoEW.

There is no workable operational model for service delivery. Although WEs have legal responsibility for operation of the wastewater collection and treatment system, they have no operational framework, no experience and no capacity to do this.

The advantages of partnerships with the private sector have not been explored adequately.



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Sector objectives and targets

The objectives of the wastewater sector are to collect and treat all wastewater according to national standards and regional agreements and, where economic, to reuse treated wastewater for agriculture, industrial, and amenity in line with national health and safety standards. Cost recovery will be based on the 'polluter pays' principle.

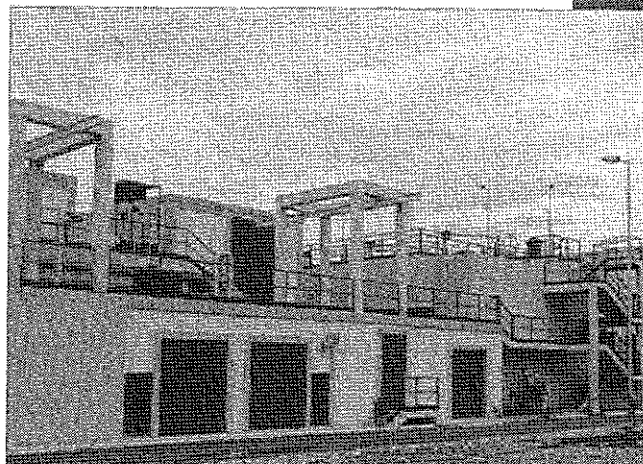
To meet these objectives, sector targets and initiatives were developed for the short-medium term (2011 – 2015) and the long term (2016 – 2020), and to serve the projected population up to 2025 – 2030.

The sector targets 2011-2020 are:

- Increase the present wastewater collection (60%) and treatment (8%) to 80% collection and treatment by 2015, and 95% collection and treatment by 2020.
- Pre-treatment of all industrial wastewater by 2020.
- Increase reuse of treated effluent from zero percent in 2010 to 20% of treated wastewater by 2015, and of 50% by 2020.
- Secondary treatment and reuse of all inland wastewater by 2020, and secondary treatment by 2020 of coastal wastewater where reuse is economically justified.
- Full recovery of all O&M costs by 2020 following the 'polluter pays' principle and full recovery for BOT projects.

In order to reach these objectives, the strategy provides for five strategic initiatives:

- An integrated and prioritized investment program to rapidly increase wastewater collection, treatment and reuse rates.
- Legal, regulatory and policy measures to set and regulate standards.
- Institutional measures to define responsibilities and to create capacity for service delivery.
- Financial measures for viability and affordable services.
- Measures to optimize private sector participation in the wastewater sector.



Strategic initiatives

Strategic initiative # 1: An integrated and prioritized investment program for wastewater collection, treatment and reuse

The strategy targets increases in wastewater collection, treatment and re-use rates. To reach these targets, MoEW will take the lead in working with CDR, WEs, the municipalities and the private sector to prepare and obtain financing for an integrated investment program. Top priority will be completing existing treatment plants and rapidly increasing the effective connection network to bring treatment rates to the level of installed treatment capacity.

1.1 An integrated and prioritized immediate investment program will aim at rapid increases in wastewater collection and treatment rates to 30% by end of 2012 through completing the networks of the seven completed treatment plants, and 80% by end 2015 through efficient planning and implementation of investments.

In order to move rapidly on sector targets, MoEW will work with CDR, WEs, the municipalities and the private sector to implement an integrated and prioritized immediate investment program. Priorities for the investment program will be:

a. Implementing the funded networks of the seven completed treatment plants (Tripoli, Chekka, Batroun, Jbel Nabi Younes, West Beqaa and Nabatiye) so as to put them in operation by end of 2012 alongside the two coastal plants already operational (Saida and Ghadir).

b. Completing projects for which funding is already available (23 inland schemes and all coastal schemes except Sarafand).

c. Rapid programming and execution of investments needed to complete existing schemes through completing the collection networks of already constructed or under construction schemes where additional funds are needed (23 inland schemes and all coastal schemes except Sarafand).

1.2 Regional wastewater master plans: each WE, with MoEW support, will work with the municipalities to prepare a regional wastewater master plan. Planning will be for integral systems (not just components) comprising collection and conveyance networks, treatment and reuse.

1.3 Integrated medium to long term national investment program 2013-2020.

a. Based on the master plans, MoEW (in coordination with CDR and the municipalities) will develop an integrated national investment program 2013-2020, which shall include the 19 unfunded inland schemes, the required schemes for the inland areas that are not covered by the already identified 42 schemes and Sarafand wastewater scheme. MoEW, CDR and the municipalities will be responsible for mobilizing investment from financing institutions and the private sector.

b. MoEW will hold responsibility for budget execution and project implementation. CDR will continue execution of projects for which resources are already mobilized. Staff and capacity for procurement and contract management will be recruited and capacity built.

1.4 Economic reuse of treated wastewater and sludge:

The strategy targets increases in reuse of treated effluent from zero percent in 2010 to 20% of treated wastewater by 2015, and of 50% by 2020. Preliminary estimates indicate that at least 20 and 150 million cubic meters per year could be reused for irrigation purposes by 2015 and 2020, respectively.

a. Specific studies of existing plants and of plants under implementation will be undertaken to assess technical and economical reuse potential for each plant. The studies will evaluate infrastructure requirements and propose the appropriate investments and institutional arrangements.

b. Implementation of required infrastructure for re-use of treated wastewater (storage capacities, pumping stations, networks, etc.) will be undertaken.

Wastewater Strategy: Action plan and budget (US\$ millions) Strategic initiative # 1: An integrated and prioritized investment program for wastewater collection, treatment and reuse

Action	Lead responsibility	Financed by	Budget 2011-2015	Implementation	
				From Year	To Year
1.1 An integrated and prioritized immediate investment: (a) Funded networks for the seven completed wastewater plants and the two operational plants along the coast	<i>MoEW, with CDR, and municipalities</i>	GoL, financial institutions, municipalities	190	1	2
(b) Completion of already funded projects			490	1	5
(c) Additional networks for completion of already funded projects (23 inland and 11 coastal plants)			880	1	5
1.3 Integrated national investment program 2013 - 2020	<i>MoEW with CDR, municipalities and the private sector</i>	GoL, donors, private sector			
(a) Preparation and initiating implementation			200*	3	5
(b) MoEW responsibility for budget execution and project implementation, with staff recruitment and capacity building			20	1	5
1.4 Economic reuse of treated wastewater and sludge: (a) studies; (b) investment	<i>WEs, MoEW and Ministry of Agriculture, with CDR</i>	GoL, donors, municipalities	3(a)	1	2
			28(b)	3	5
Total Initiative # 1			1,815		

(*) The 200 million USD represent around 20 of the integrated investment program 2013 2015. The remaining 80% will be implemented 2016 2020.

Strategic initiative # 2: Legal, regulatory and policy measures

In order to set and regulate national standards for wastewater treatment and reuse, MoEW will work with other concerned agencies to put in place the needed legal, regulatory and policy measures.

2.1 Legal and regulatory framework: by-laws will be issued, specifying: (i) responsibilities for setting and regulating standards for wastewater treatment and reuse; (ii) the implementation of the 'polluter pays' principle; (iii) responsibility for pre-treatment by polluting industries; and (iv) responsibilities for monitoring and enforcement.

2.2 Institutional responsibilities: by-laws to Laws 221 and 241 will be issued specifying the roles of the WEs, MoEW, CDR, the municipalities and the private sector with respect to planning, investment programming and implementation.

2.3 National wastewater treatment and reuse standards and options:

- National guidelines and criteria for wastewater treatment and reuse will be reviewed and issued jointly by an inter-ministerial committee.
- Guidelines for small scale plants employing simple techniques will be developed by MoEW.

Wastewater Strategy: Action plan and budget (US\$ millions) Strategic initiative # 2: Legal, regulatory and policy measures

Action	Lead responsibility	Financed by	Budget 2011-2012	Implementation	
				From Year	To Year
2.1 Code de l'eau passed into law and by - laws related to wastewater issued	MoEW	GoL	1	0	1
2.2 By - laws to Laws 221 and 241 prepared and issued	MoEW with concerned ministries	GoL	1	0	1
2.3 National wastewater treatment and reuse standards and options:	MoEW with Ministry of Environment, Ministry of Agriculture, and Ministry of Health	GoL	3	1	2
(a) National guidelines reviewed and reissued					
(b) Guidelines for small scale treatment plants					
Total Initiative # 2			5		

Strategic initiative # 3: Institutional measures to define responsibilities and to create capacity for service delivery

WEs will progressively take over responsibility for service delivery. WE capacity will be developed, and the private sector will be used where appropriate. On a case by case basis, WEs may agree with municipalities that the municipalities operate facilities by delegation. MoEW will build its capacity for sector oversight and support.

3.1 Asset evaluation: WEs will have ownership of all collection and treatment assets, and will have responsibility for their O&M. The process of transfer will begin with a comprehensive asset evaluation.

3.2 Asset transfer and preparing plans: Existing assets and responsibility for O&M will be transferred to the WEs progressively. Where it is more efficient for municipalities to continue to operate assets, WEs will pass contracts for delegated management to municipalities.

3.3 Capacity building for WEs: To build capacity for wastewater management, operation and maintenance, each WE will conduct a capacity needs assessment and propose a phased staffing and training program.

3.4 Capacity building for MoEW: To strengthen capacity for oversight and support of the wastewater sector, MoEW will define the capacity required, and will develop this capacity. It is expected that a core team of 3-5 experts may be required for strategy, investment programming, standards and regulation, and monitoring and reporting.

Wastewater Strategy: Action plan and budget (US\$ millions)

Strategic initiative # 3: Institutional measures to define responsibilities and to create capacity for service delivery

Action	Lead responsibility	Financed by	Budget 2011-2015	Implementation	
				From Year	To Year
3.1 Asset evaluation	MoEW with WEs, municipalities, and the private sector	GoL, donors	5	1	4
3.2 Asset transfer and operating plans	WEs with MoEW	GoL, donors	4	1	4
3.3 Capacity building for WEs: (a) needs assessment; (b) capacity building; (c) extra staff recruitment.	WEs and municipalities with MoEW	GoL, donors	2 (a) 8 (b) 4 (c)	1	5
3.4 Capacity building for MoEW	MoEW	GoL, donors	5	1	5
Total Initiative # 3			28		

Strategic initiative # 4: Financial measures for viability and affordable services

Following the 'polluter pays' principle, full recovery of O&M costs will be introduced progressively to generate revenues and the conditions of financial viability, and transparent operating subsidies will be paid during the transition period until WEs can cover their costs.

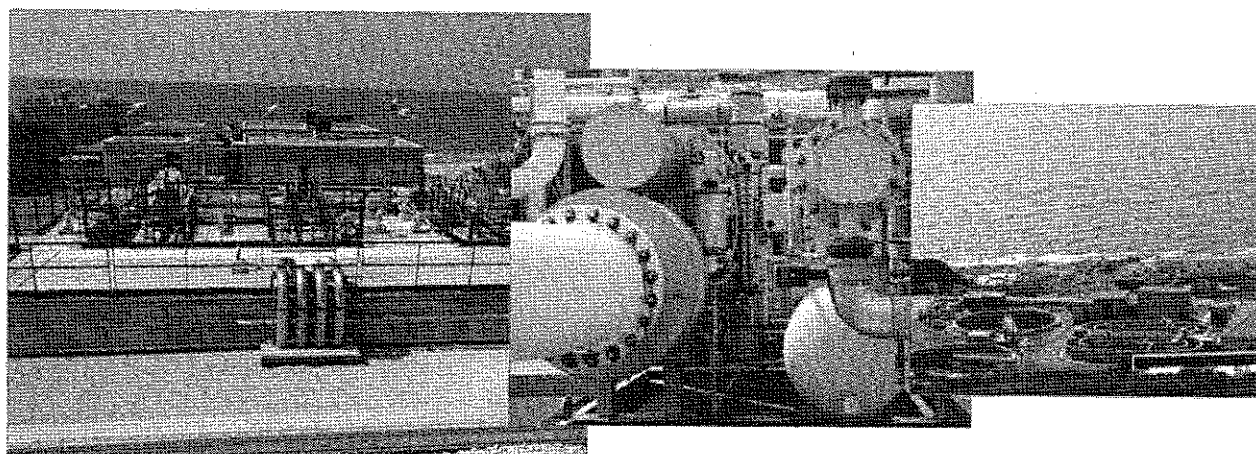
4.1 Cost recovery: Following the 'polluter pays' principle, measures will be introduced progressively to recover from users the full costs of O&M of wastewater services. As volumetric billing for water supply is introduced, wastewater charges will be billed on a volumetric basis together with water charges. Municipalities will continue to handle operation until assets and O&M responsibilities are handed over, after which WEs will collect the fees through water bills. Fees will be increased progressively to reach 100% cost recovery by 2020.

4.2 Transitional subsidy: During the transition period and until adequate levels of cost recovery can be achieved, WE and government will agree on principles of subsidy to cover WEs deficits on O&M of wastewater services, and an annual subsidy will be negotiated according to clear criteria.

Wastewater Strategy: Action plan and budget (US\$ millions)

Strategic initiative # 4: Financial measures for viability and affordable services

Action	Lead responsibility	Financed by	Budget 2011 - 2015	Implementation	
				From Year	To Year
3.1 Asset evaluation	MoEW with WEs, municipalities, and the private sector	GoL, donors	5	1	4
3.2 Asset transfer and operating plans	WEs with MoEW	GoL, donors	4	1	4
3.3 Capacity building for WEs: (a) needs assessment; (b) capacity building; (c) extra staff recruitment.	WEs and municipalities with MoEW	GoL, donors	2 (a) 8 (b) 4 (c)	1	5
3.4 Capacity building for MoEW	MoEW	GoL, donors	5	1	5
Total Initiative # 3			28		



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Strategic initiative # 5: Measures to optimize private sector participation in the wastewater sector.

The advantages of partnerships with the private sector will be explored and private enterprises will be increasingly involved through partnership approaches, including the financing and implementation of investments, and the conclusion of management contracts and possible BoT arrangements.

5.1 Study of options for private sector participation: Options for involving private sector participation in the financing, execution and operation of investments will be considered, including BOT. Municipalities and/or WEs may contract works, particularly inland treatment plants, on a BOT basis, with the assets transferred to the WEs at the term of the arrangement.

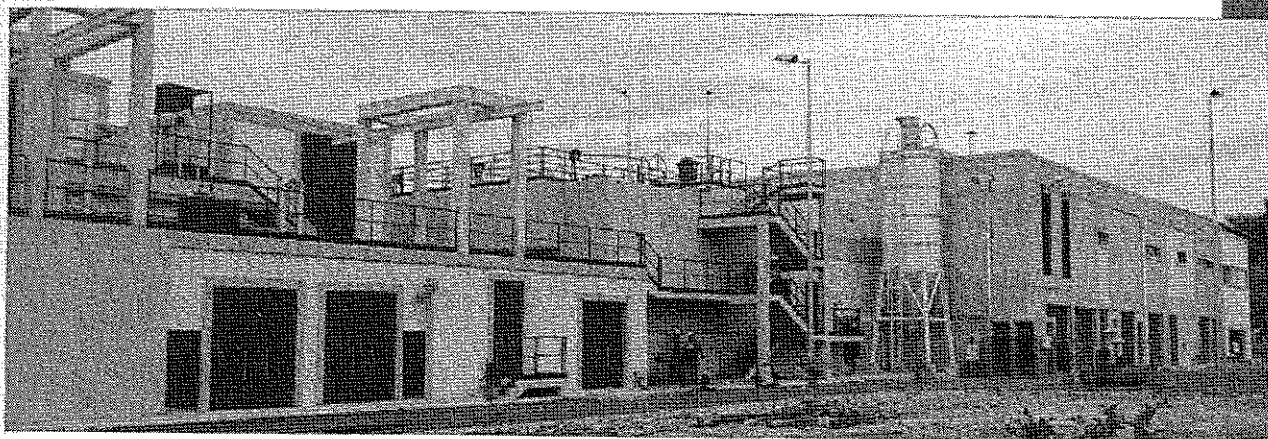
5.2 Test models for private sector participation: One or more pilot projects will be launched for private sector participation. Likely models are BOT contracts for inland treatment plants, and O&M contracts for treatment plants. MoEW will allocate seed money for the preparation and negotiation of these pilot contracts.

5.3 Strengthening WEs capacity to prepare and oversee contracts. Where contracting with the private sector is employed, WE capacity to prepare contracts and oversee their execution will be strengthened.

Wastewater Strategy: Action plan and budget (US\$ millions)

Strategic initiative # 5: Measures to optimize private sector participation in the wastewater sector

Action	Lead responsibility	Financed by	Budget 2011-2015	Implementation	
				From Year	To Year
5.1 Study of options for private sector participation	MoEW and WEs, with CDR	GoL	1	1	2
5.2 Test models for private sector participation	MoEW and WEs, with CDR	GoL	4	2	5
5.3 Strengthening WE capacity to prepare and oversee contracts	WEs with MoEW	GoL, donors	4	2	5
Total Initiative # 5			9		



Investment Program

1. Coastal wastewater systems

	Equivalent Population (000s)	Already funded (Million USD)	Not yet funded (Million USD)			Development period for remaining investments	Annual O&M cost of treatment plants at full operation (US\$ millions)
			Treatment	Networks	Total		
1. Aabde	185	21.5	2	95	97.0	2011 - 2015	1.5
2. Tripoli	1,000	160.0	0	90	90.0	2011 - 2015	7.0
3. Chekka	24	20.0	0	8	8.0	2011 - 2012	0.6
4. Batroun	30	22.0	0	15	15.0	2011 - 2012	0.6
5. Jbeil	50	32.0	6	30	36.0	2011 - 2012	0.75
6. Kessrwan	505	140.0	0	45	45.0	2011 - 2015	3.1
7. Bourj Hammoud	2,200	75.0	205	130	335.0	2012-2015 (pre-treatment) 2015-2020 (secondary)	0.5 (pre-treatment)
8. Ghadir	800	61.0	25	35	60.0	2015-2020 (secondary)	0.2 (pre-treatment)
9. Ras Nabi Younes	88	33.0	0	22	22.0	2011 - 2015	1.1
10. Saïda	390	33.0	42	105	147.0	2015-2020 (secondary)	0.20 (pretreatment)
11. Sarafand	325	-	45	165	210.0	2015 - 2020	2.5
12. Tyr	200	50.5	0	50	50.0	2011 - 2015	1.35
TOTAL	5,597	648.0*	325	790	1115		19.40

(*) 191.0 already disbursed.

2. Inland wastewater systems

WE Zone	Number of Plants		Equivalent Population (000s)		Funds required to complete partly funded schemes (in US\$ millions)		Requirements for unfunded schemes (in US\$ millions)	O&M costs of treatment (US\$ millions)
	Partly funded	Unfunded	Partly funded	Unfunded	Already funded	Not yet funded	Not yet funded	Annual average at full operation (per scheme)
North Lebanon	4		141		37.00	25.38		0.24
		6		210			98.13	
Total North Leb.	10		351		37.00	123.51		
BML	6		116		39.40	22.88		0.28
		5		153			79.91	
Total BML	11		269		39.40	102.79		
South Lebanon	6		260		42.50	53.65		0.52
		6		176			93.47	
Total South Leb.	12		436		42.50	147.12		
Beqaa	7		803		141.71	153.39		0.13
		2		118			51.00	
Total Beqaa	9		921		141.71	204.39		
TOTAL	23		1,320		260.61	255.30		0.29 for treatment + 0.20 for networks
		19		657			322.51	
GRAND TOTAL	42		1977		260.61	577.81		

Note: For budget purposes, it is assumed that: (1) all schemes that are currently partly funded will be funded and completed and will become operational by 2015. (2) all schemes that are currently unfunded will be implemented 2013 - 2020. (3) It is estimated that remaining areas not covered by the identified schemes would require around 500 million US\$ and will be implemented 2013 - 2020. (4) Out of the available 260.61 million US\$ funds, 39.0 million US\$ are already disbursed.

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Total Investment Requirements

Short and Medium Term (2011 to 2015)

Strategic Initiative	Short Term 2011 – 2012 (Million US\$)	Medium Term 2013 – 2015 (Million US\$)	Total Budget 2011 – 2015 (Million US\$)
Strategic initiative # 1: An integrated and prioritized investment program for wastewater collection, treatment and reuse	692	1,123	1,815
Strategic initiative # 2: Legal, regulatory and policy measures to set and regulate standards	5	-	5
Strategic initiative # 3: Institutional measures to define responsibilities and to create capacity for service delivery	11	17	28
Strategic initiative # 4: Financial measures for viability and affordable services	8	30	38
Strategic initiative # 5: Measures to optimize private sector participation in the wastewater sector	3	6	9
Total	719	1,176	1,895
Funds already available at CDR	380	300	680
Funds to be made available	339	876	1,215

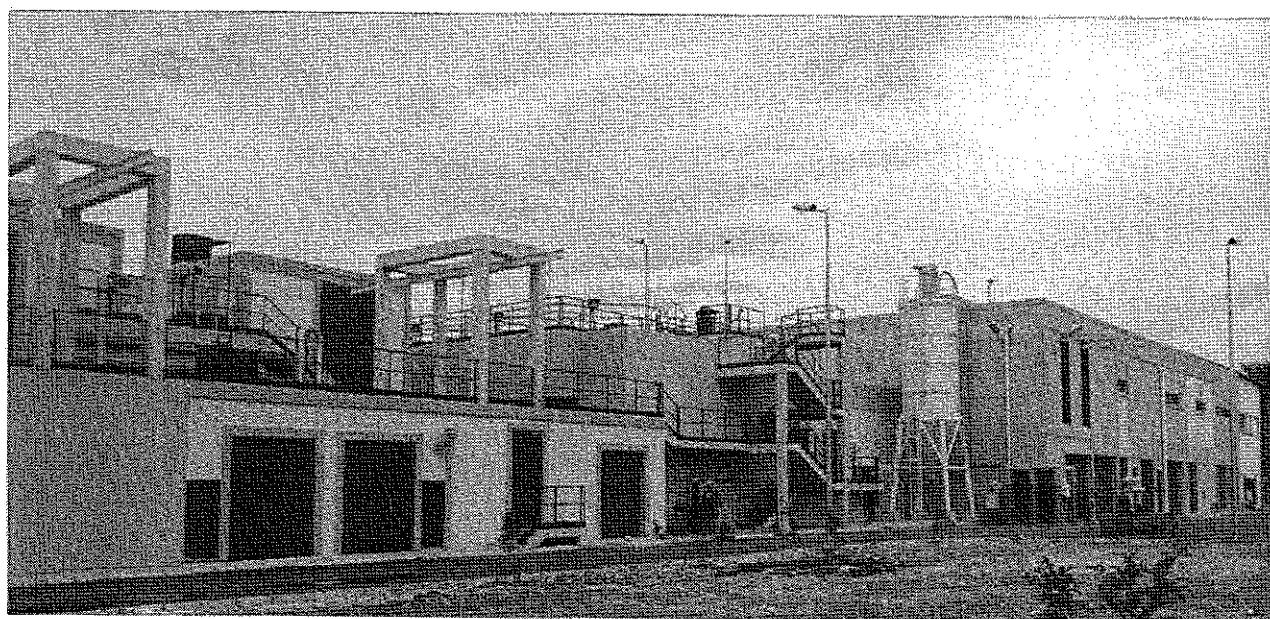
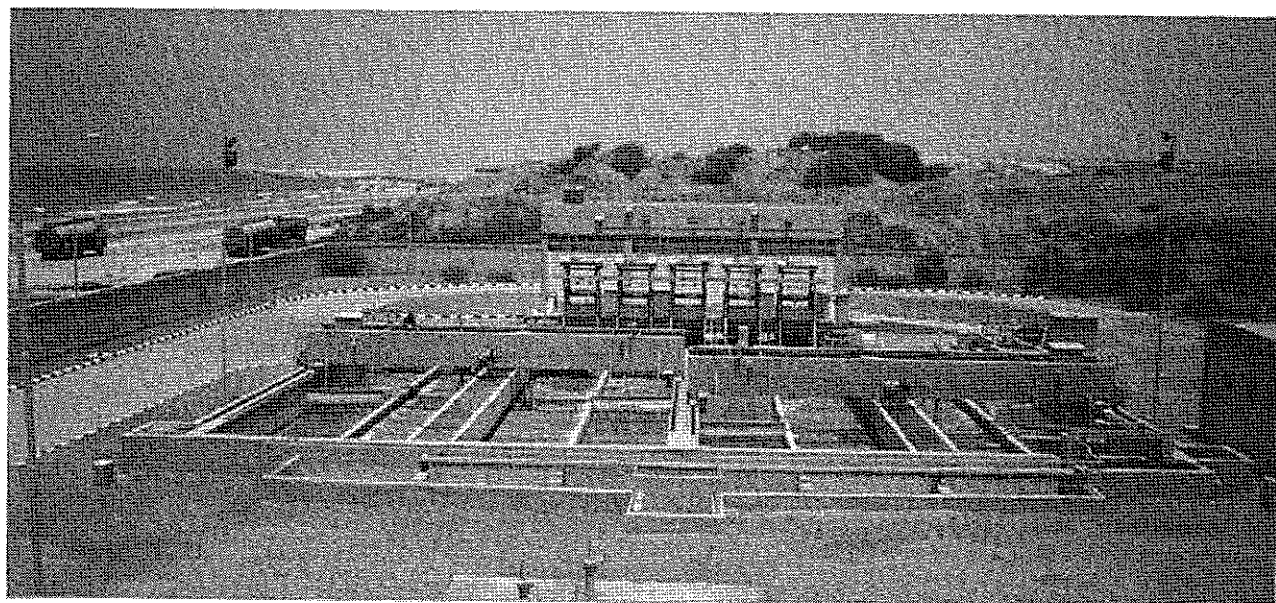
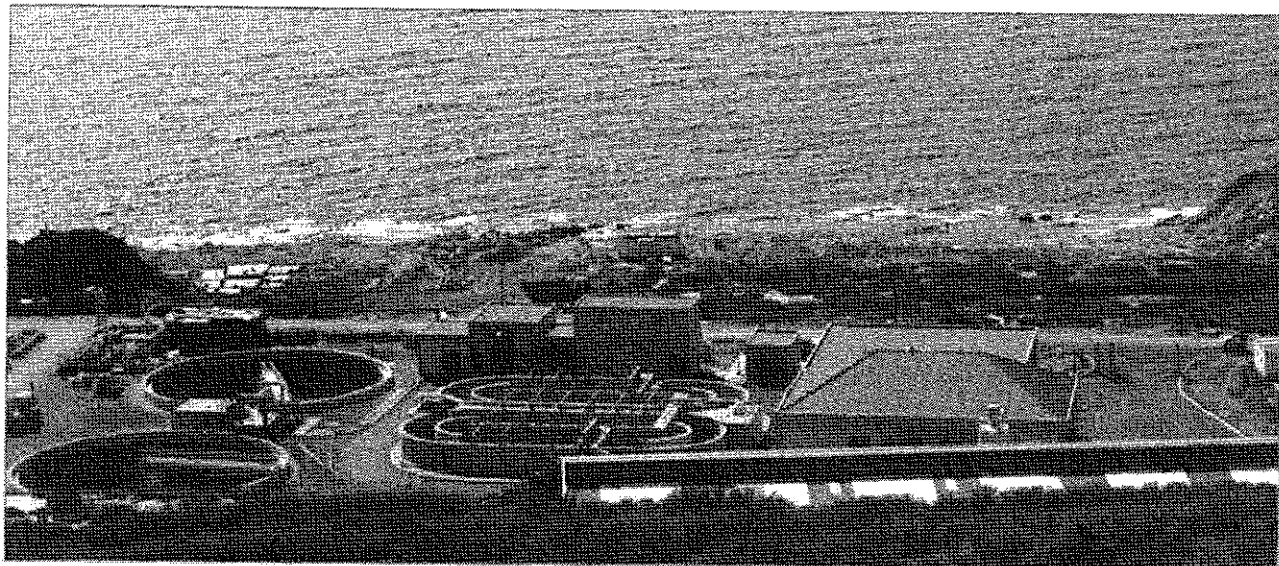
Long Term (2016-2020)

Initiative	Budget (Million US\$)
Continuation of the integrated national investment program (19 unfunded inland schemes, the schemes of the inland areas not covered by the already identified 42 inland schemes, and Sarafand wastewater scheme).	835
Upgrading preliminary treatment plants (Bourj Hammoud, Ghadir and Saidia) to secondary treatment, and extension of Jbeil treatment plant	278
Investments for re-use of treated wastewater for irrigation	100
Total	1,213

Investment Summary

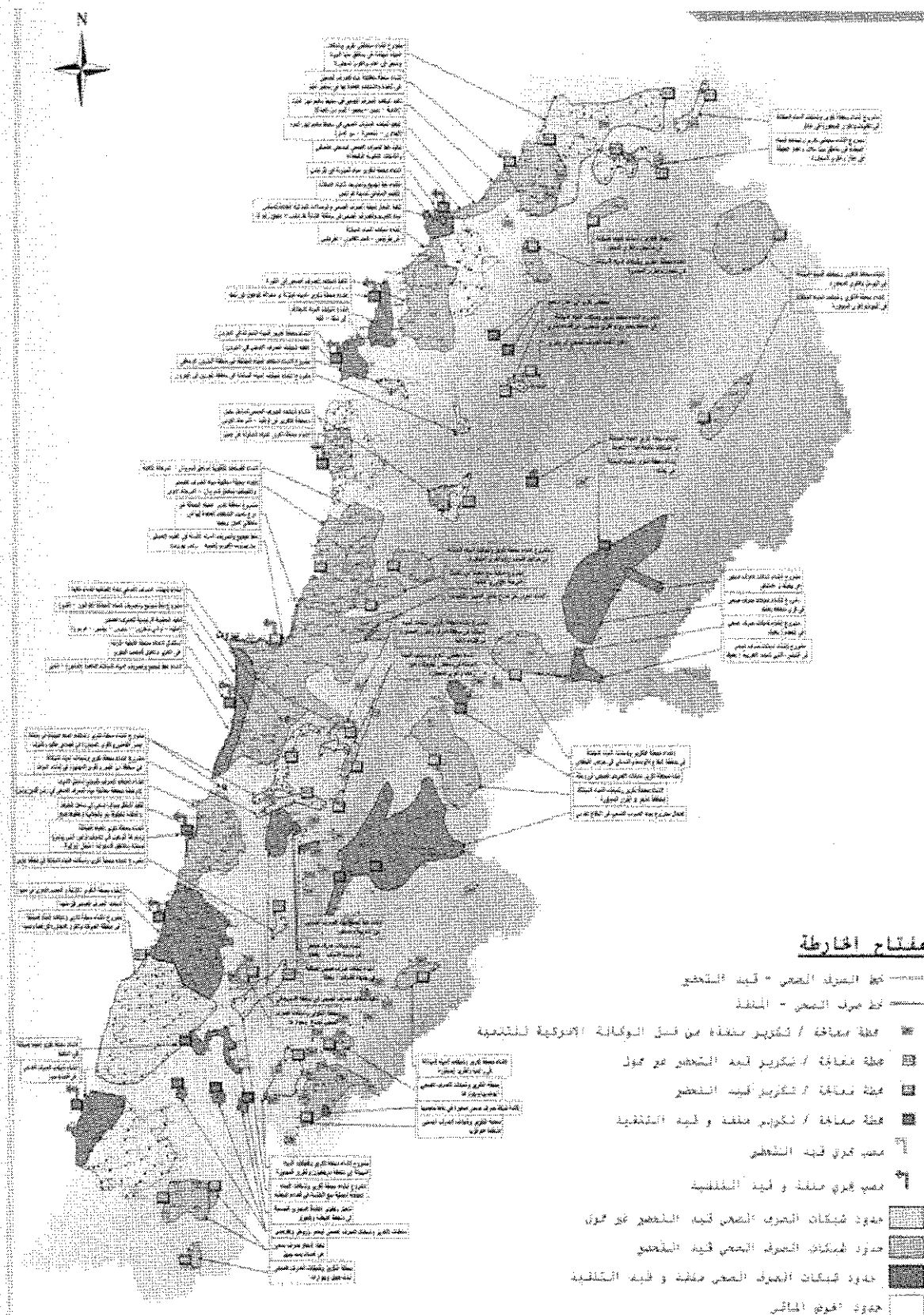
	Short – Medium Term (Million US\$)	Long Term (Million US\$)	Total (Million US\$)
Government of Lebanon	115	113	228
Donors	250	250	500
Private Sector	200	350	550
Municipalities	650	500	1150*
Available at CDR	680	-	680
Total	1,895	1,213	3,108

(*) The 650 million USD will be obtained from the mobile revenues of the municipalities

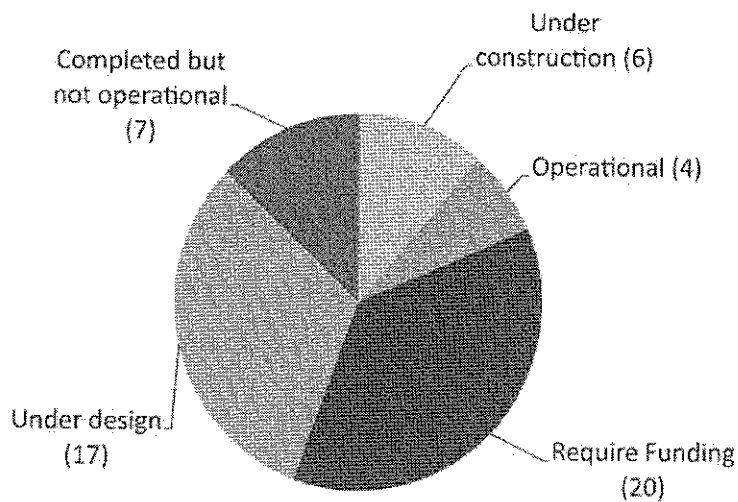


ANNEX A





Status of the 54 Planned Treatment a Plants



Additional Funds Required for the 54 Planned Schemes

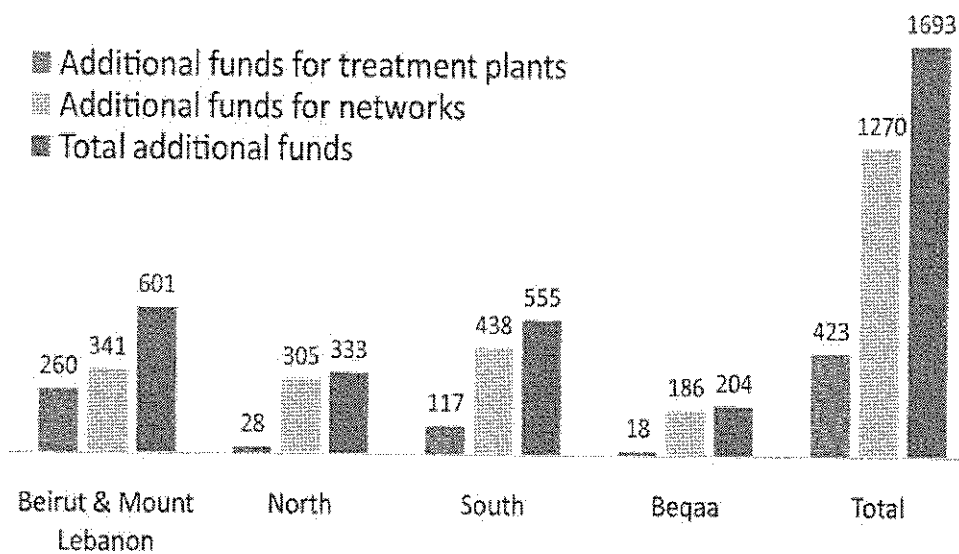


Table A.1: Coastal Wastewater Treatment Plants

Treatment Plant	Equivalent Population	Status			Cost of executed, on going or under preparation - funds available (million USD)			Remaining Works - no funds available (million USD)			Cost of O&M (million \$/year)	Expected Operation Date
		Treatment Plant	Outfall	Collection Networks	WWTP + sea outfall	Networks	Total	Treatment Plant	Networks	Total		
Isola	185,000	Under preparation	Under preparation	156 km for Sahel 1, 115 km for Sahel 2 and 80 km for Sahel 3 - under preparation	21.5	0	21.5	2	95	97	1.5	2015
Tripoli	1,000,000	Completed 2010-not operational	1.5 km, 1500 mm diam - completed	3.4 km coastal collector under implementation, 123 km under implementation (from Koura to Tripoli, primary + secondary + lateral connections), 270 km under preparation	220	40	160	0	90	90	7 @ 10%	2013
Cyrena	24,000	Completed 2006-not operational	0.7 km, 300 mm diam - completed	50 km (primary + secondary networks) under implementation, 5 km lateral connections under preparation	10	10	20	0	8	8	0.6	2012 - 2013
Bombay	20,000	Completed 2010-not operational	0.25 km, 450 mm diam - completed	50 km (primary + secondary networks) under implementation, 5 km lateral connections under preparation	12	10	22	0	15	15	0.6	2012 - 2013

Treatment Plant	Equivalent Population	Status			Cost of executed, on going or under preparation - funds available (million USD)			Remaining Works - no funds available (million USD)			Cost of O&M (million \$/year)	Expected Operation Date
		Treatment Plant	Outfall	Collection Networks	WWTP + sea outfall	Networks	Total	Treatment Plant	Networks	Total		
Beit	50,000	Completed 2010-not operational	0.50 km, 500 mm diam - under construction	90 km (main + primary + secondary + tertiary + house connections) - awaiting Italian approval, 215 km (coastal main + primary + secondary + tertiary + house connections) under preparation	13	21	32	0	30	30	0.75 @ 20%	2012
Reswan	505,000	Under preparation	1.4 km, 1000 mm diam - under preparation	170 km collectors and secondary pipelines under preparation	105	25	140	0	45	45	1.1	
Beit Ramouse	2,000,000	Under preparation only pre-treatment	2.5 km, 1700 mm diam to be rehabilitated	125 km collectors under preparation	25	60	75	205	130	135	0.5 for the O&M of the pre-treatment WWTP	
Qader	800,000	Rehabilitated & partly operational (only pre-treatment)	2.25 km, 1200 mm diam - rehabilitated	20 km executed, 61 km under implementation, 30 km under preparation	26	45	61	25	35	60	0.2 for the O&M of the pre-treatment WWTP	operational

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	52
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Grasshopper
North
Bakhou
Behave
Mechin
Street
Adenint
Bachuk
Nabba
Mrauel
Kartaba
Jeitang
Street
South
Karsy
NabaSe
Tanning
Aarkou
Street

Tiebing
Bequa
Basilbeck
Yamison
Zahle
West
Sophina
Aahyan
Libious
Tenome
Street
20

Table A.2: Funded Inland Treatment Plants Requiring Additional Funds

Treatment plant	Population Equivalent	Status			Available Funds (Million USD)	Actual Cost (Million USD)			Additional Funds Required (Million USD)
		Operational	Under construction	Under design		Treatment Plant	Networks + house connections	Total	
North Lebanon									
Bakhoun	48,000			X	19.80	8.25	14.05	22.30	2.50
Beharre & Al Arz (2 TPs)	25,000			X	6.90	4.83	3.75	8.58	1.68
Mechnech	68,000			X	10.30	6.80	24.70	31.50	21.20
4 treatment plants in North	141,000	0	0	4	37.00	19.88	42.50	62.38	25.38
Mount Lebanon									
Barouk & Fraidis	8,000			X	6.1	1.60	2.90	4.50	9.66
Nabha Safa & Ain Zhalta	20,000			X		4.00	7.26	11.26	
Hraji	40,000			X	9.30	6.00	14.52	20.52	11.22
Karabza	13,000			X	5.00	3.00	4.00	7.00	2.00
Jetta and Kherzibiane (2 TPs)	35,000			X	19.00	6.30	12.70	19.00	0.00
6 treatment plants in Mt. Leb.	116,000	0	0	6	39.40	20.90	41.38	62.28	22.88
South Lebanon									
Klarsa, Yalimour & Zawtar	35,000		X		9.50	4.80	9.70	14.50	5.00
Wabstieh	100,000		X		13.80	8.90	9.90	18.80	5.00
Tibnine & Chakra	100,000		X		14.00	8.40	41.60	50.00	36.00
Azraqut	25,000			X	5.20	3.75	9.10	12.85	7.65
6 treatment plants in South	260,000	0	5	1	42.50	25.85	70.30	96.15	53.65

Treatment plant	Population Equivalent	Status			Available Funds (Million USD)	Actual Cost (Million USD)			Additional Funds Required (Million USD)
		Operational	Under construction	Under design		Treatment Plant	Networks + house connections	Total	
Beqaa									
Basbeck	100,000	X			17.00	6.30	19.70	26.00	9.00
Yamhounch	6,000	X			2.60	1.05	2.55	3.60	1.00
Zafle	150,000		X		35.40	32.00	20.50	52.50	17.10
Wasi Beqaa (Jib Jenine + Sagbine)	100,000		X		37.00	12.00	35.00	47.00	10.00
Anjar	300,000			X	36.25	30.00	66.00	96.00	59.75
Laboue	47,000			X	4.56	7.00	17.00	24.00	19.44
Timnine El Tahita	100,000			X	8.90	10.00	36.00	46.00	37.10
7 treatment plants in Beqaa	803,000	2	2	3	141.71	98.35	196.75	295.1	153.39
27 Plants in total	1,820,000	2	7	14	260.61	164.93	350.93	515.91	255.30

Table A.3: Inland Treatment Plants Requiring Complete Funding

Treatment Plant	Population Equivalent	Funds available (million USD)	Actual Cost of Works (million USD)		Cost to finalize all works (MUSD)
			Treatment Plant	Networks + house connections	
North Lebanon					
Al Bira and Manjaz	52,500	0.00	5.50	20.00	25.50
Beit Mellat and Akkar El Aatika	75,000	0.00	7.50	27.23	34.73
Hasroun	4,800	0.00	0.96	1.74	2.70
Kferhelda	30,000	0.00	4.50	5.50	10.00
Tannourine	10,200	0.00	2.00	3.70	5.70
Qobayet	38,000	0.00	5.70	13.80	19.50
6 treatment plants in North	210,500	0.00	26.16	71.97	98.13
Mount Lebanon					
Aakoura	16,250	0.00	3.25	5.90	9.15
Deir El Kamar	42,000	0.00	6.30	15.25	21.55
Jisr El Kadi	40,000	0.00	6.00	15.00	21.00
Khinshara	20,000	0.00	3.00	7.26	10.26
Sawfar	35,000	0.00	5.25	12.70	17.95
5 treatment plants in Mt. Leb.	153,250	0.00	23.80	56.11	79.91
South Lebanon					
Bent Jbeyl	25,000	0.00	3.75	9.10	12.85
Jbaa	10,500	0.00	2.10	3.80	5.90
Jezzine	30,000	0.00	4.50	11.00	15.50
Hassbaya	26,500	0.00	4.00	9.62	13.62
Nabaa El Tasseh - Nabatieh	54,000	0.00	8.10	19.60	27.70
Marjeyoun	30,000	0.00	7.00	10.90	17.90
6 treatment plants in South	176,000	0.00	29.45	64.02	93.47
Beqaa					
Hermel	96,000	0.00	9.60	21.00	30.60
Rachaya	22,000	0.00	8.00	12.40	20.40
2 treatment plants in Beqaa	118,000	0.00	17.60	33.40	51.00
19 Treatment Plants	657,750	0	97.01	225.50	322.51

Table A.4: Inland Treatment Plants Funded by USAID

No.	Treatment Plant	Region	Population Served	Capacity (cum/day)	Completion Date	USAID Investment (USD)
South Lebanon						
1	Haytoura	Jezzine	1000	100	2006	64,500
2	Snayya	Jezzine	600	60	2004	62,000
3	Aychieh	Jezzine	1500	150	2005	119,000
4	Ghobbatieh	Jezzine	2800	250	2006	183,000
5	Wadi Jezzine	Jezzine	1500	150	2005	78,000
6	Barteh	Jezzine	1300	195	2002	88,000
7	El Rihane	Jezzine	4500	820	2002	NA
8	Jibaa 1&2	Nabatieh	1000	150	2002	95,000
9	Kfarkila	Hasbaya	3500	525	2002	93,000
10	Chebaa	Hasbaya	6000	900	2002	100,000
11	Hasbaya/Ain Qenya	Hasbaya	14000	2100	2002	108,000
12	Ain Qenya 2 &3	Hasbaya	7500	1125	2002	NA
13	Ain Qenya 4	Hasbaya	olive press	8	2002	NA
14	Khiam	Hasbaya	6000	600	2002	90,000
15	Ouazzani	Hasbaya	175	26	2001	45,000
16	Ain Jarfa 1	Hasbaya	2500	375	2002	49,000
17	Ain Jarfa 2	Hasbaya	Olive press	8	NA	NA
18	Abou Qamha	Hasbaya	600	90	2002	14,000
19	Kfeir	Hasbaya	3000	450	2002	180,000
20	Klaya 1	Marjeyoun	4000	600	2002	208,000
21	Klayaa 2	Marjeyoun	1300	200	2002	NA
22	Deir Mimes	Marjeyoun	1300	200	2002	NA
23	Marj el Zouhour	Hasbaya	1200	120	2000	133,000
23	Total South Lebanon		65,275	9,202		1,709,500
North Lebanon						
1	Bqerzla	Akkar	1,800	NA	1998	177,000
2	Hmaira	Akkar	600	40	2002	65,000
3	Charbila	Akkar	1,152	NA	1999	80,000
4	Kaws Akkar	Akkar Atika	1,000	100	2000	120,000
5	Maakouda	Akkar Atika	1,000	100	2002	65,000
6	El Mrahet	Akkar Atika	550	60	2000	80,000
7	Andeq	Qoubayat	9,000	1350	2001	299,000
8	Markibta	Dennieh	1,300	195	1999	89,000
8	Total North Lebanon		16,402			975,000

No.	Treatment Plant	Region	Population Served	Capacity (cum/day)	Completion Date	USAID Investment (USD)
Bekaa						
1	Bakka 1	Bekaa	1,000	160	1998	87,000
2	Bakka 2	Bekaa	6,000	160	2002	55,000
3	Rachaya	Bekaa	6,000	600	2005	240,000
4	El Housh	Bekaa	1,000	100	2005	126,000
5	Aitanit	Bekaa (Aitanit, Baaloula, Machghara & Qaroun)	35,700	5000	2009	6,000,000
6	Forzol	Bekaa	7,500	1000	2009	4,000,000
7	Ablah	Bekaa	15,000	2000	2012	4,000,000
8	Jabbouleh	Bekaa	1,000	80	2001	39,900
9	Deir El Ahmar	Bekaa	3,000	300	2002	93,000
10	Chouaia	Rachaya	700	50	2007	117,000
11	Al Fardis	Rachaya	1,200	120	2007	414,500
12	Hebbaria	Rachaya	9,200	920	2007	350,000
13	Kfar Hamam	Rachaya	1,700	115	2007	128,000
14	El Mari	Rachaya	1,300	220	2007	131,000
15	Kawkaba	Rachaya	2,000	135	2007	225,000
16	Yanta 1 & 2	Rachaya	3,000	300	2002	160,000
17	Mimes 1 & 2	Rachaya	3,000	120	2002	160,000
18	Ain Harcha	Rachaya	1,200	120	2002	145,000
18	Total Bekaa		99,500	11,500		16,471,400
Mount Lebanon						
1	Ammatour	Chouf	6000	900	2007	876,000
2	Maasser El Chouf, Ammatour, Ain Qani, Baadaran, Haret Jandal	Chouf	3000	450	2007	518,000
3	Bater	Chouf	6000	900	2007	1,228,000
4	Moukhtara	Chouf	3000	450	2007	530,000
5	Mrosti	Chouf	1500	225	2007	267,000
6	Khraibeh	Chouf	3000	450	2007	880,000
7	Jbaa	Chouf	2000	300	2007	241,000
8	Hammana	Baabda	7000	1050	2000	166,000
9	Kornayel	Baabda	6000	900	2002	183,000
9	Total Mount Lebanon		37,500	5,625		4,889,000
58	Grand Total		218,677			24,044,900

