LEBANESE REPUBLIC
MINISTRY OF ENERGY AND WATER

LEBANON'S WATER SECTOR 2010 - 2020

Engineer Suzy Hoayek

Advisor to the Minister of Energy and Water

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4. WAY FORWARD
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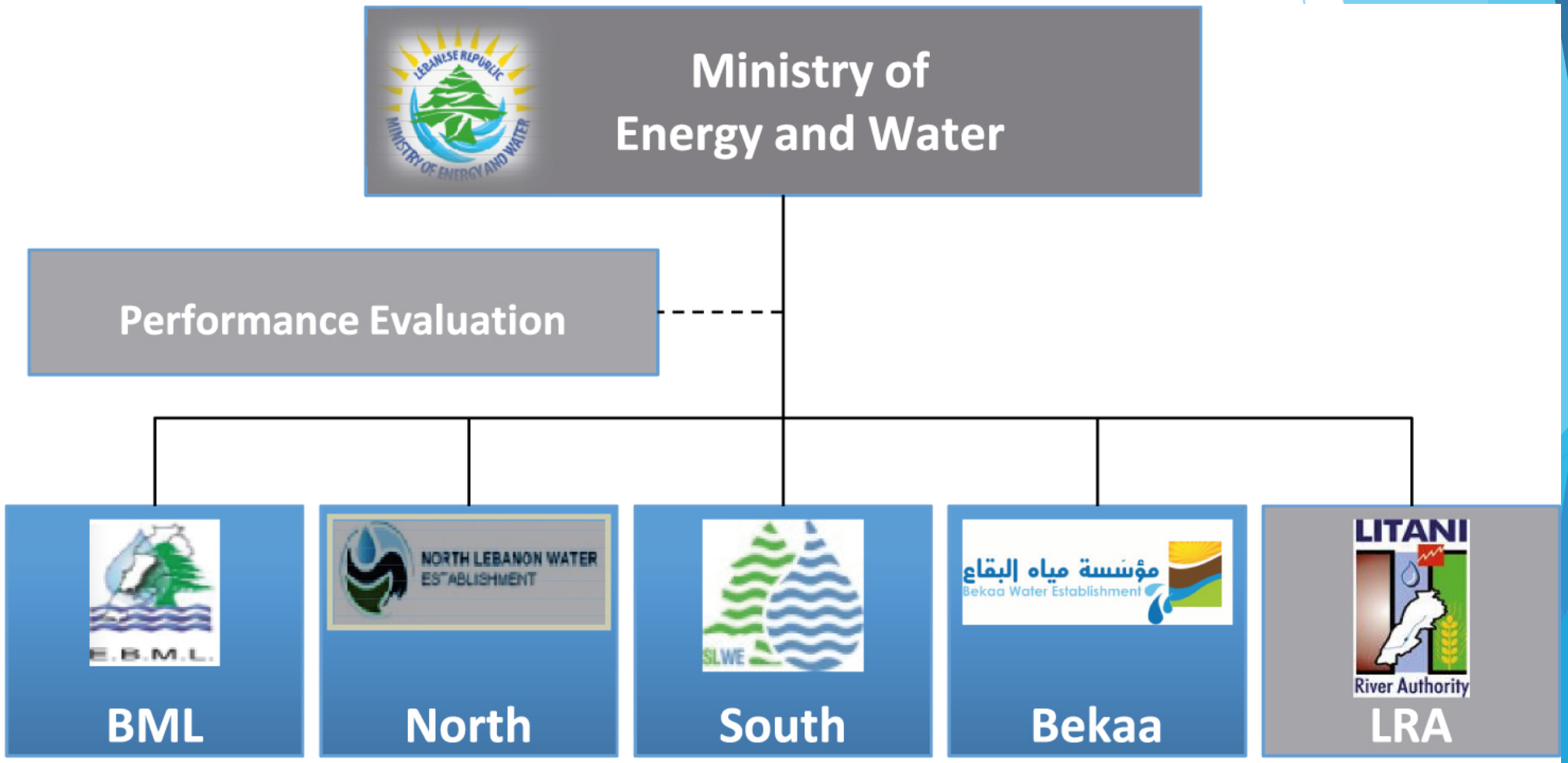
Legal and institutional framework

- Prior to 2000, there were 21 regional water utilities.
- In 2000, Reform Law 221 was ratified, creating 4 WE's and maintaining the LRA.
- The **Litani River Authority (LRA)** is the only water authority to retain special responsibilities and functions that extend beyond its administrative region (the natural boundaries of the Litani Basin). It is responsible for developing and managing irrigation water and associated works in southern Bekaa and South Lebanon.
- In April 2018, Water Code was ratified. Revised version is expected to be approved soon.

Legal and institutional framework



Legal and institutional framework

	Description of Responsibilities	MEW	WEs
Policy Making	▪ Definition of sector policy, institutional roles and sector structure ▪ Enactment of legislation and regulation ▪ Development of investment and subsidy policies	✓	
Planning	▪ Establishment of long term consolidated planning for water, irrigation and wastewater ▪ Evaluation of infrastructure and investment requirements	✓	✓
Conservation/ Resource Management	▪ Allocation of resources across regions e.g., water reuse ▪ Identification and promotion of water conservation campaigns	✓	
Regulation	▪ Issuance of regulations ▪ Enforcement of regulations and standards for cost recovery, service quality, and consumer relations ▪ Review and approval of tariff adjustment in accordance with rules and regulations	✓	
Business Operation	▪ Provision of services including billing and collection ▪ Maintenance and renewal of infrastructure ▪ Funding and execution of investment programs		✓

Legal and institutional framework

Reform Law 221

Best-Practice Principles, 2000

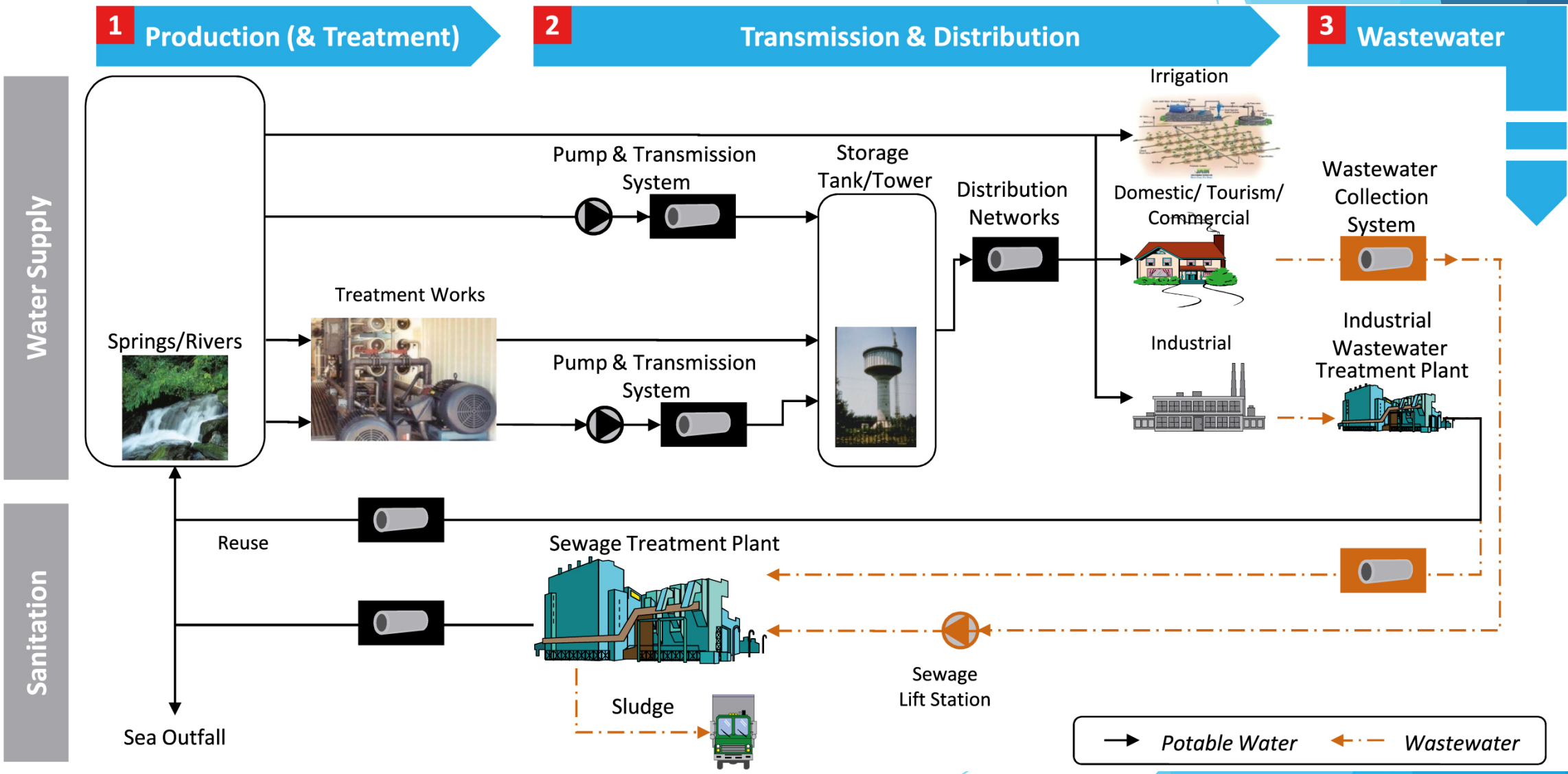
- Separation between policy-making and service provision
- Consolidation of service provision in autonomous regional water establishments (WEs), and policy-making in MEW
- Financial and administrative autonomy of the new WEs

Current Situation, 2010

- The implementation of the reform law has been initiated but not fully concluded
- The transfer of functions to the four WEs has been subject to several delays
- The WEs are not yet empowered to act with full administrative and financial autonomy
- The legal text to organize the work of MEW, has not been developed yet. MEW's efforts are still dedicated to capital projects and O&M.
- WEs suffer from a shortage of funds (*) and technical staff

These discrepancies between legal and *de facto* responsibilities have created institutional uncertainty, and weakened the accountability line between the policy-maker and service providers

Understanding the Value Chain of the Water Sector



The National Water Sector Strategy of 2010

- In 2010, a National Water Sector Strategy was put together by MoEW and approved by CoM 2012.
- Similarly, a complementary National Wastewater Strategy was prepared by MoEW and approved by CoM in the same year.
- This year we finished updating the NWSS of 2010 to reflect what has been implemented and prioritize the projects of the roadmap for the coming 15 years.

Prior to the National Water Sector Strategy

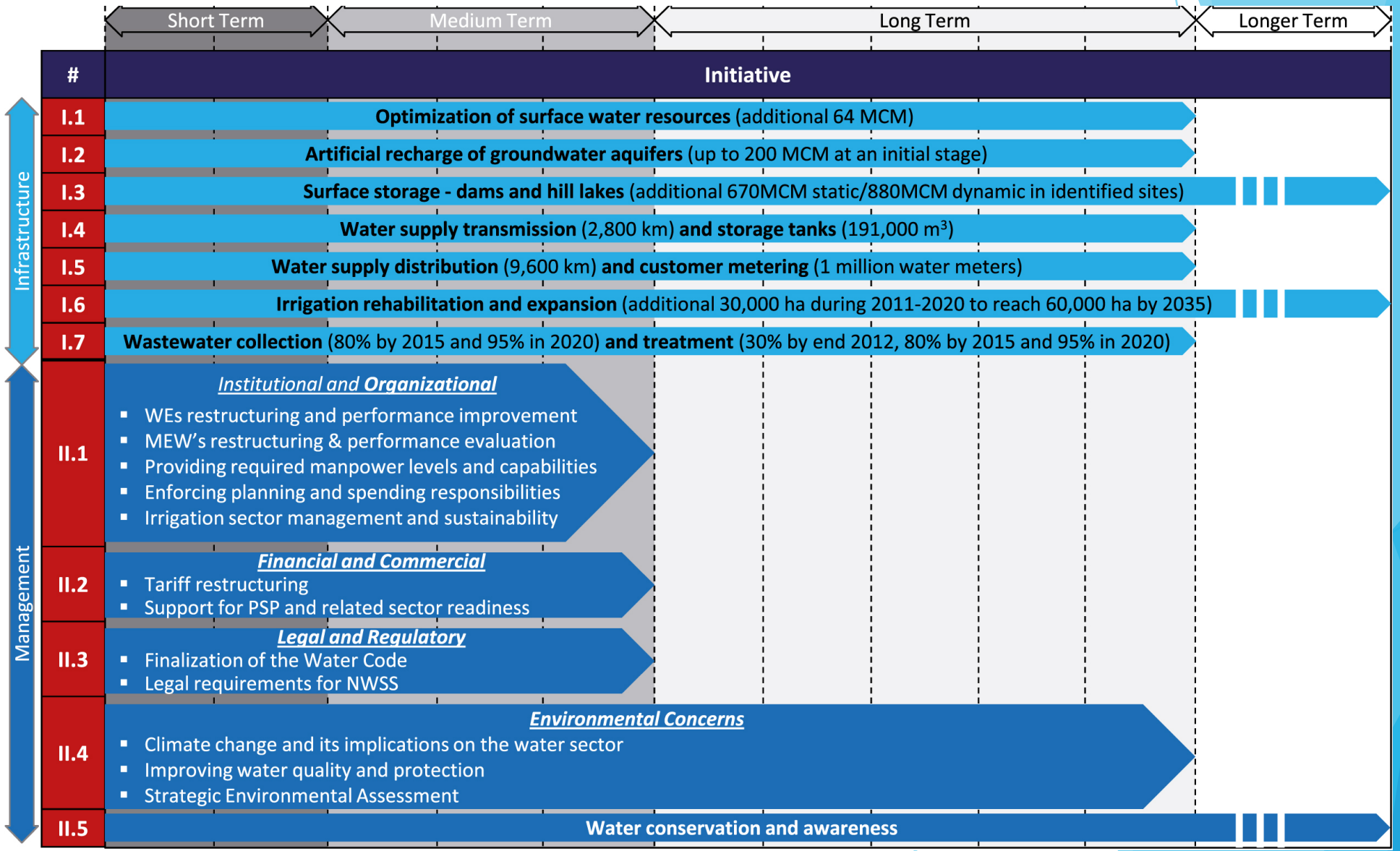
Water Sector Infrastructure

1	Production	▪ Constrained resources with suboptimal exploitation, coupled with significant demand growth
2	Transmission & Distribution	▪ Inefficient and poorly maintained systems and networks, leading to high losses and supply interruptions, with a limited focus on demand management
3	Wastewater	▪ Low coverage of wastewater networks and severe shortage in treatment efficiency

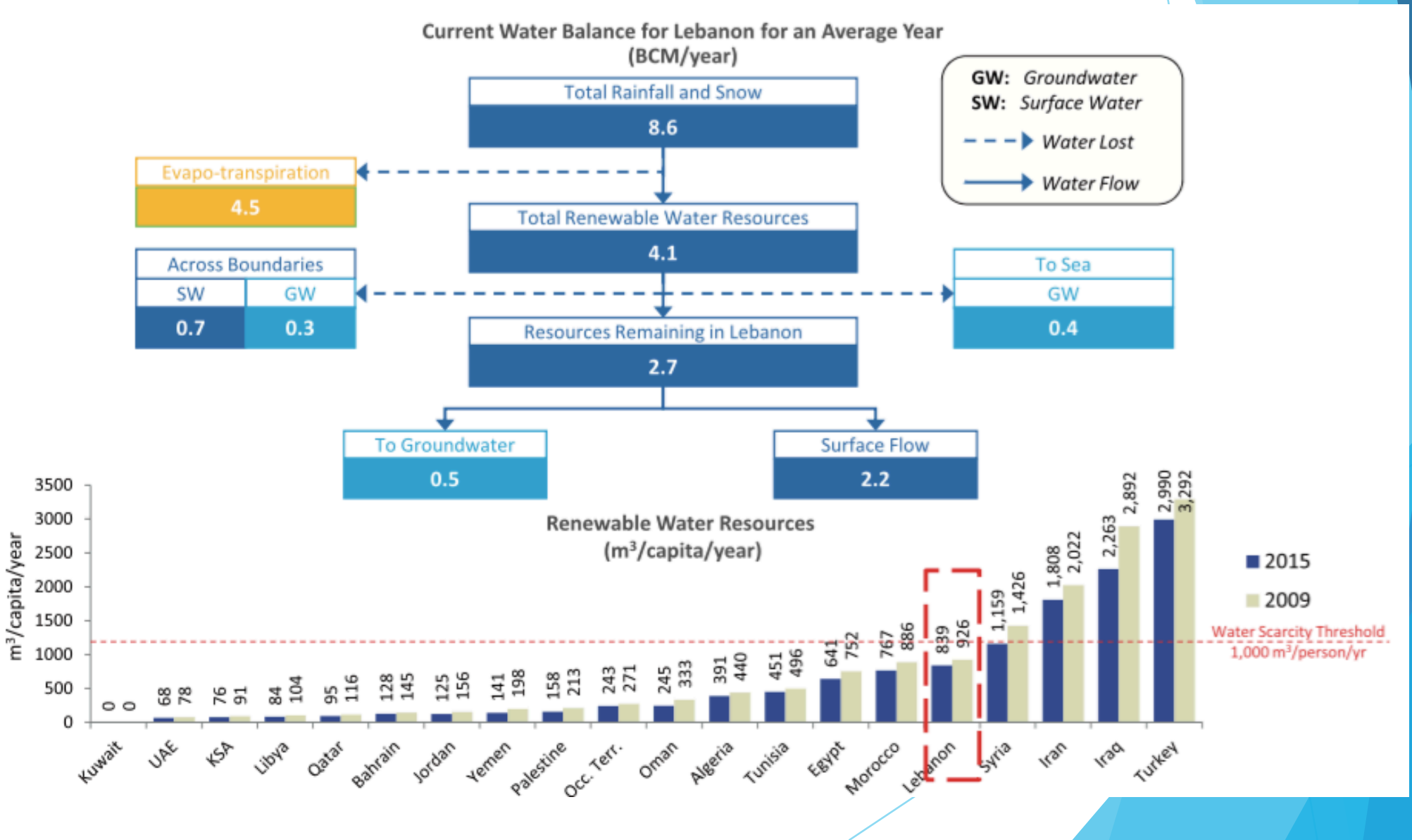
Water Sector Management

I	Institutional	▪ Incomplete implementation of reform law and weak interagency coordination
II	Financial & Commercial	▪ Inefficient water supply and irrigation tariffs with low collection rates, and no wastewater tariff yet, increasing pollution and limiting conservation
III	Legal & Regulatory	▪ Gaps in legal framework delaying private sector participation, water users associations, etc.
IV	Environmental Concerns	▪ Climate change negatively impacting water resources
V	Awareness and Conservation	▪ Limited conservation activities and high loss percentages

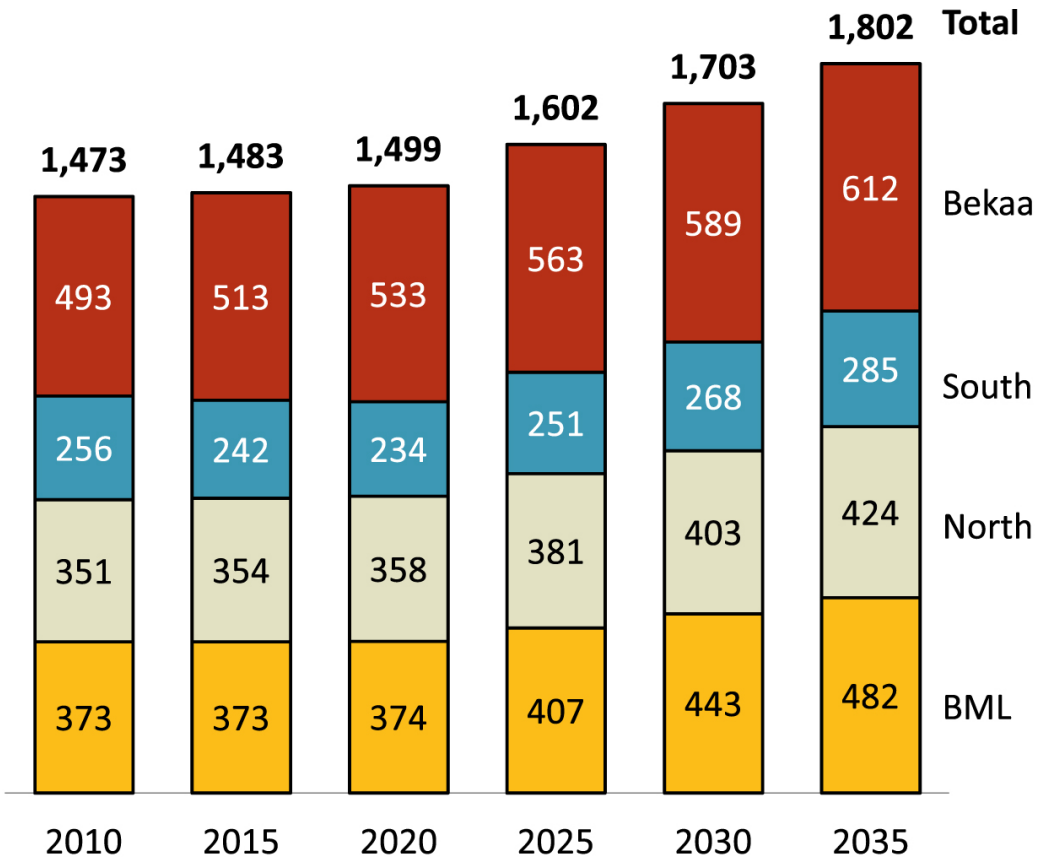
Strategic Objectives of NWSS

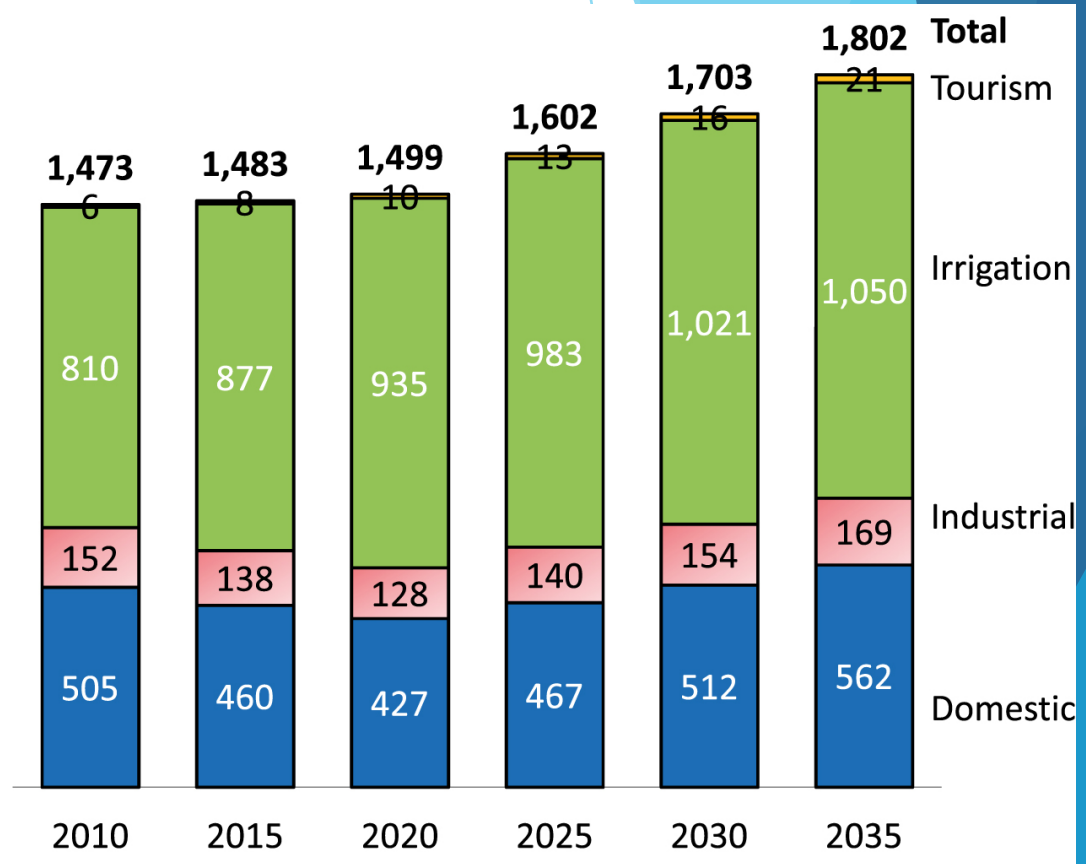


Renewable Water Resources in Lebanon



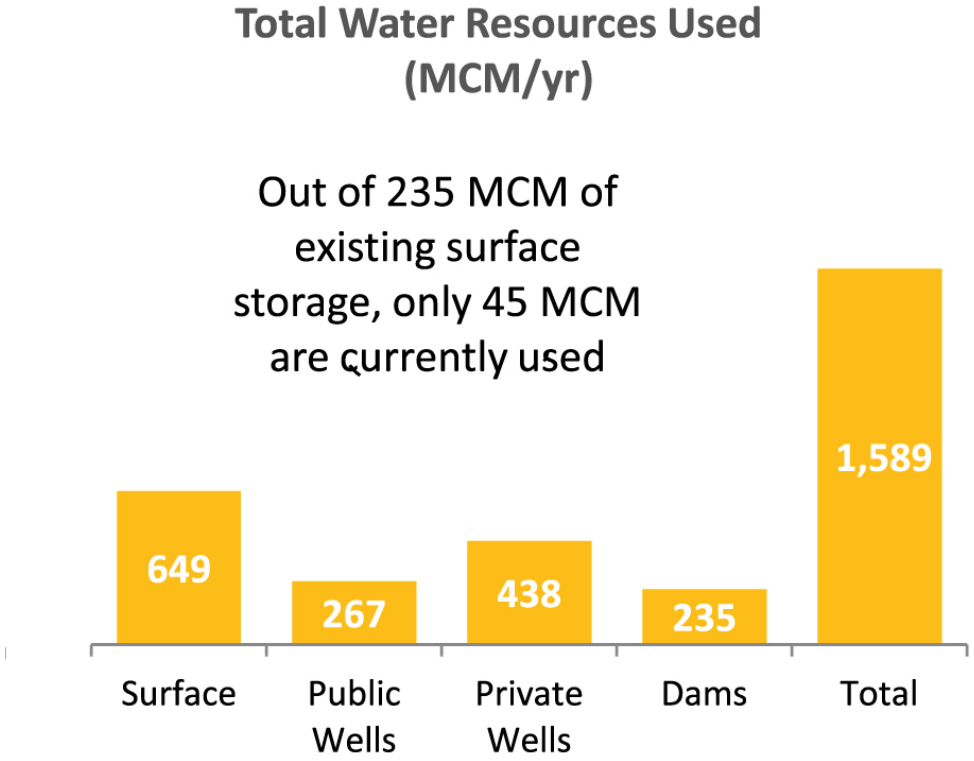
Water Demand in Lebanon

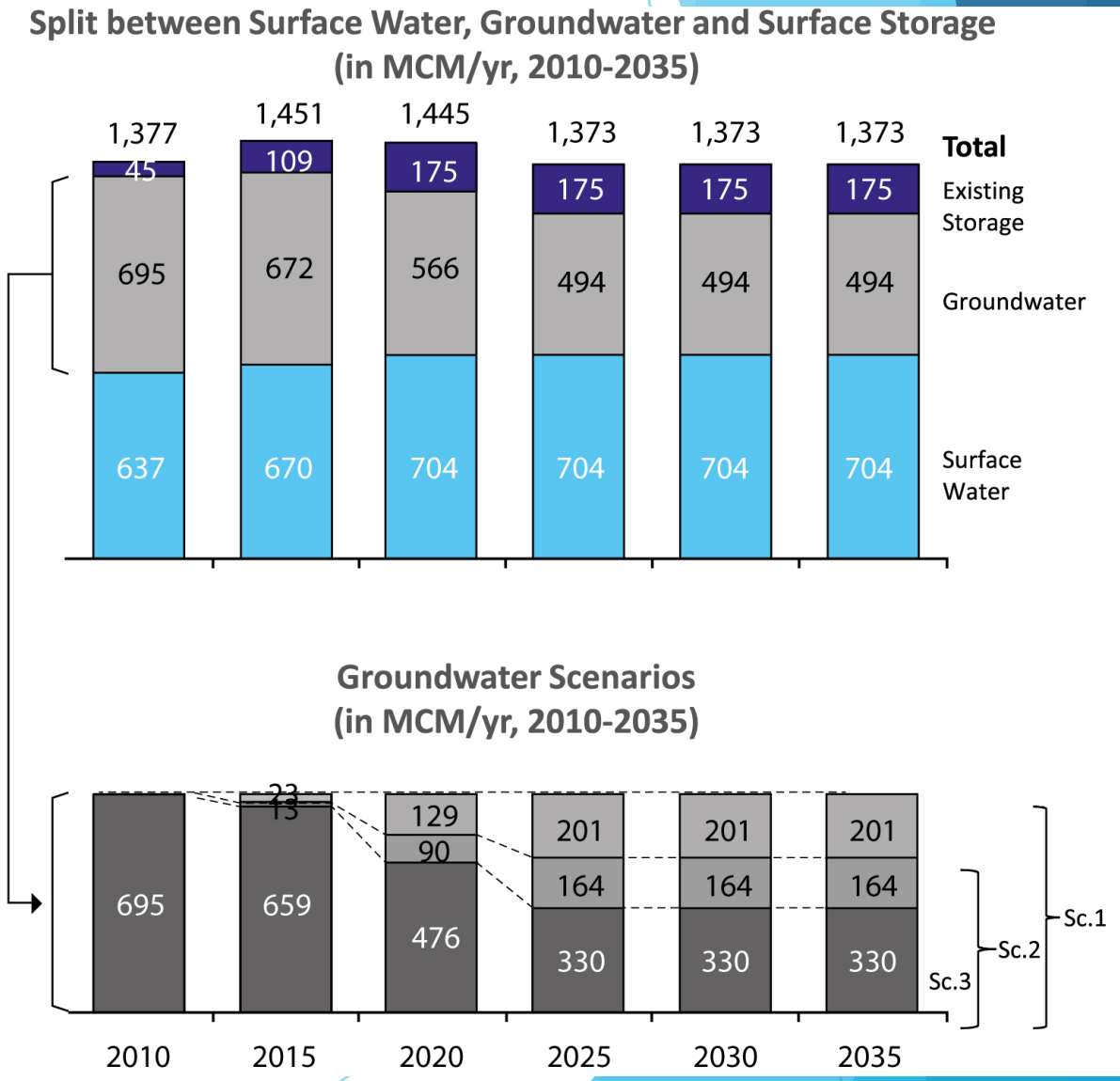




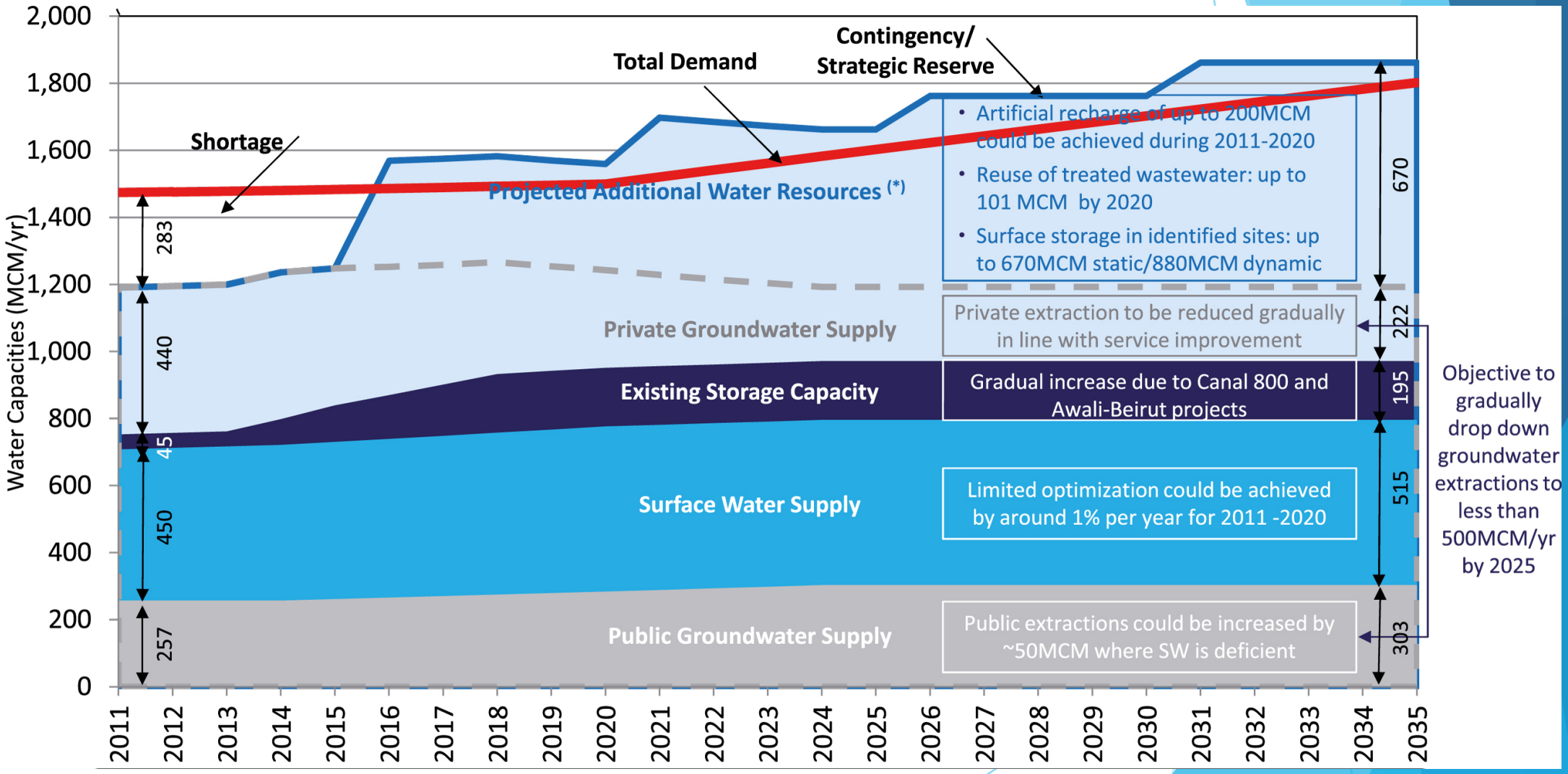
lcd (Urban)	180	174	167	176	185	194
Pop (M)	4.43	4.83	5.26	5.74	6.37	6.82
Irr ('000 ha)	90	105	120	130	140	150

Water Supply in Lebanon





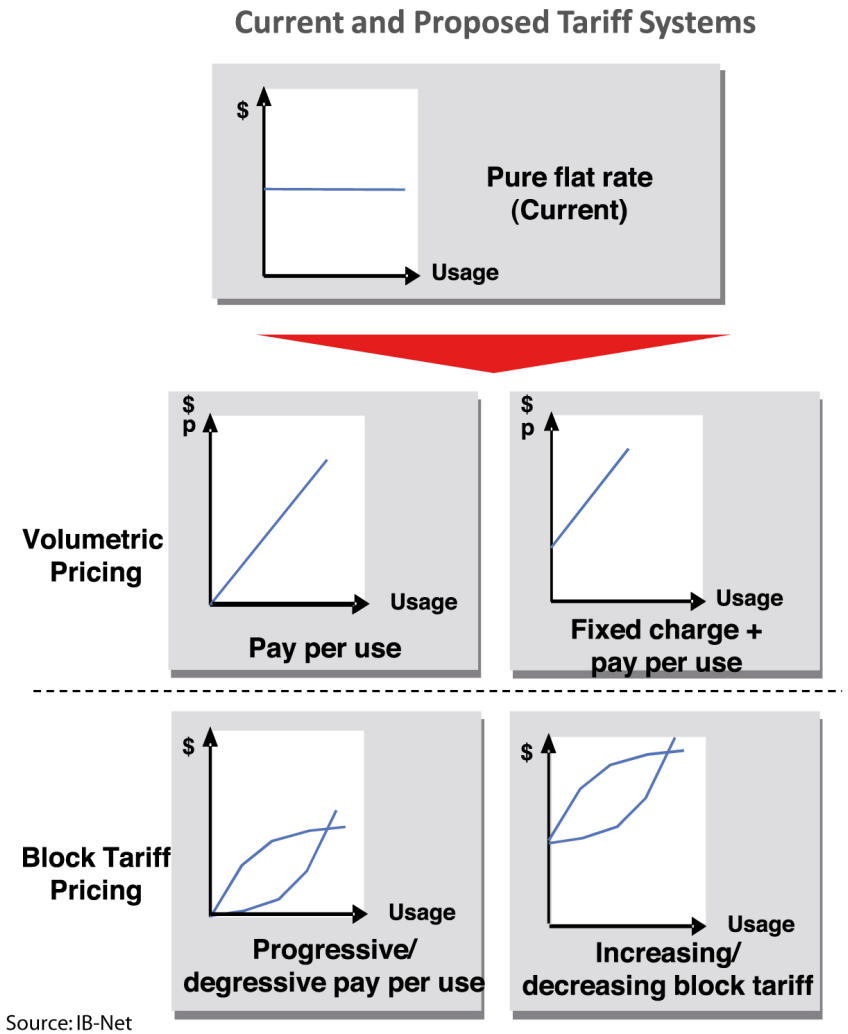
Water Balance = Supply v/s Demand



Current Tariff Structure

	Current Tariff Structures	Comments
Water Supply	▪ Same tariff structure is applied in all four WEs, with slightly different rates; (0.40 $/m3), ▪ Lump-sum flat tariff based on contracted volumes of water, disconnected from real consumption ▪ Although around 10% of the connections in Lebanon are metered, volumetric tariffs based on real consumption are still not applied ▪ Customers' registers are not regularly updated ▪ Low collection rates, variable between WEs	▪ Volumetric charges prevented by the lack of meters ▪ Lebanon is one of the very few countries in the world still adopting this tariff structure ▪ Lack of volumetric charges limiting conservation incentives at the consumer level, and production incentive at the WE level ▪ Lack of incentive for WEs to reduce losses or increase availability ▪ Increased reliance on expensive private providers
Irrigation	▪ Two tariffs are generally used: • Area Charges: lump sums periodic charges based on area irrigated (from 140 to 650 $/ha/yr) • Volumetric Charges: used in case of pressurized networks, ▪ Very low collection rates	▪ Irrigation is the largest water consumer, with very limited metering, preventing volumetric charges ▪ Lack of awareness on water consumption and conservation ▪ High reliance on undeclared groundwater ▪ Collection not performed effectively b WEs
Wastewater	▪ No wastewater tariff applied so far	▪ Does not provide incentive for limiting pollution

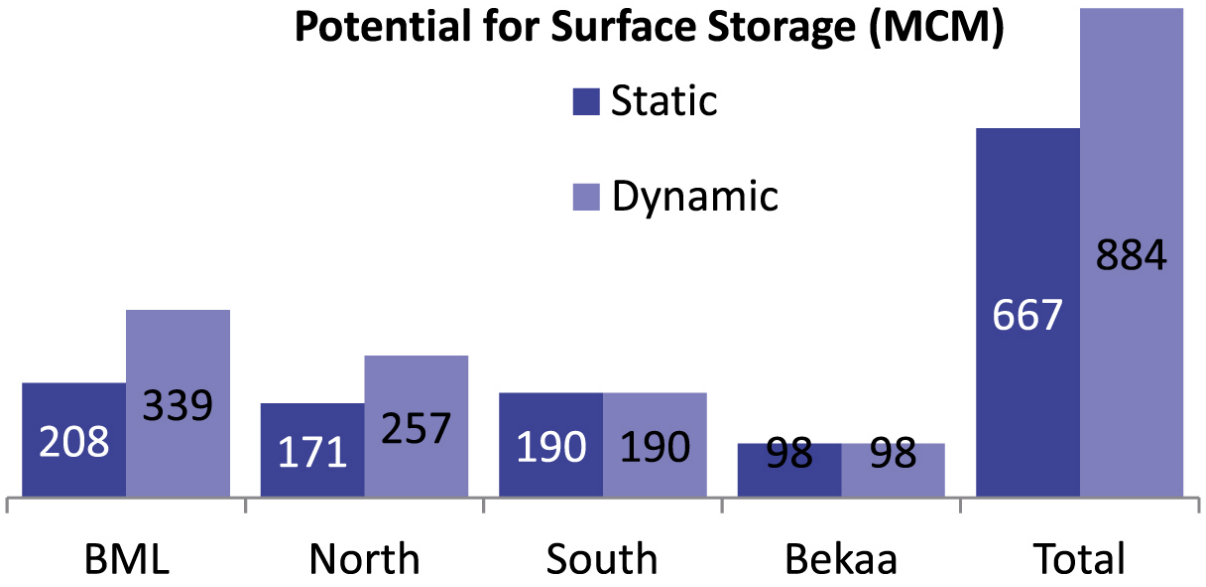
Optimal Tariff Structure

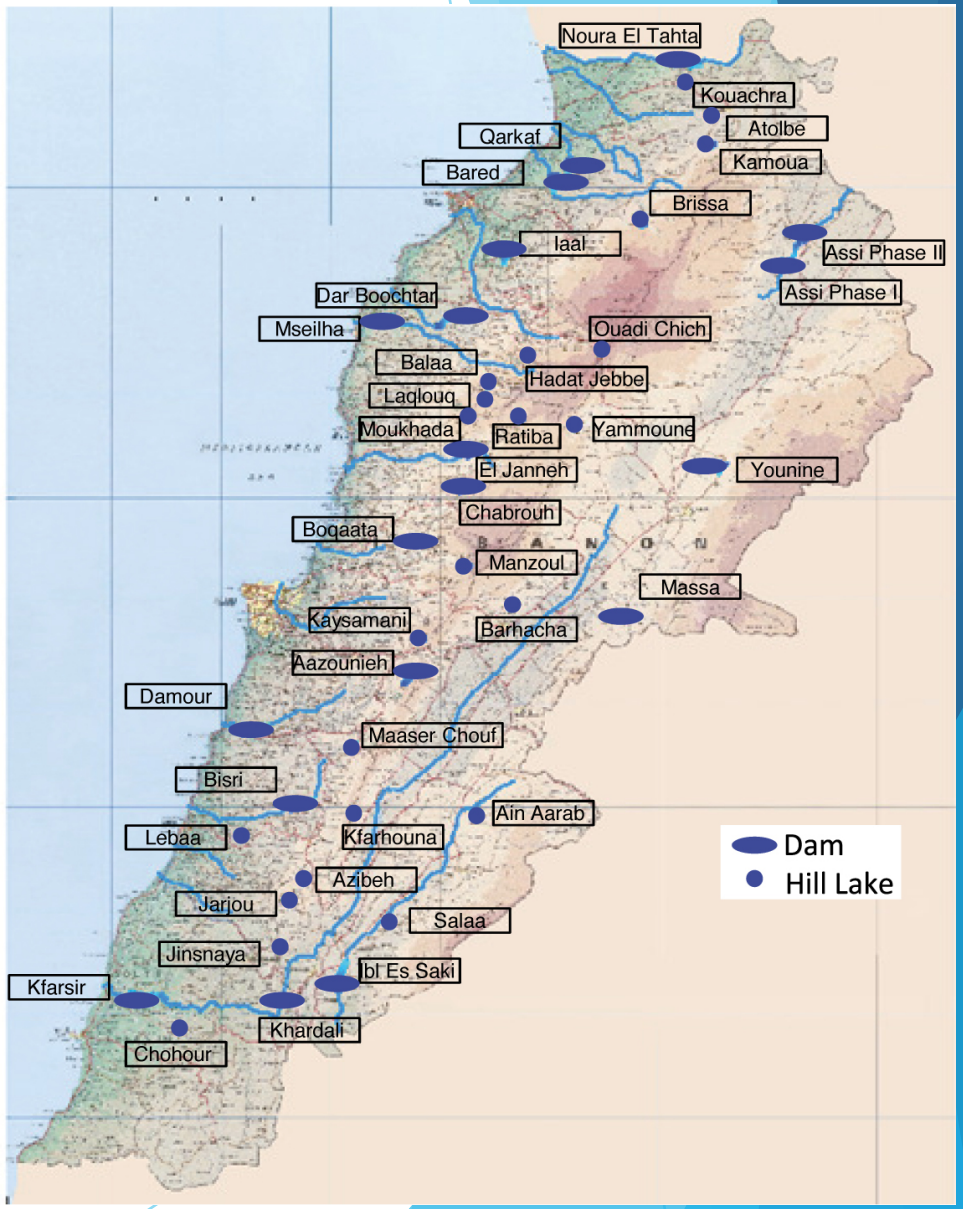


Source: IB-Net

	Tariffs shall be affordable	Tariffs shall cover costs	Clients able to choose consumption	Predictability for revenues
Pure flat tariff	✗	✗	✗	✓
Pure volumetric tariff	✗	✗	✓	✗
Progressive volumetric tariff	✓	✓	✓	✗
Fixed charge plus volumetric tarif	✗	✓	✓	✓
Fixed charge plus progressive volumetric tariff	✓	✓	✓	✓

Planned Dam Projects





Planned Dam Projects

Designation of Dam	Static-Dynamic Cap. (MCM)			CAPEX (MUSD)	OPEX (MUSD/yr)
	Total	WS	Irrig.		
Boqaata	6-12	6-12	0.0	69.0	2.3
El Manzoul	0.35	0.35	0.0	15.0	0.2
Bisri	120	120	0.0	265.0	26.4
Kaysamani	1.0	1.0	0.0	25.0	0.3
Aazounieh	4.1-5.0	4.1-5.0	0.0	65.0	1.1
Maaser Chouf	2.2	2.2	0.0	53.0	0.5
Damour	42-106	34-94	8-12	150.0	7.3
El Janneh	30-90	25-75	5-15	300.0	13.2
Moukhada	2.0	2.0	0.0	9.0	0.6
Ratiba	0.3	0.15	0.15	9.0	0.1
Total BML	**208-339**	**195-312**	**13-27**	**960.0**	**52.0**
Bared	37-90	37-90	0.0	144.0	14
Qarkaf	20-25	0.0	20.0-25	81.0	0.5
Kouachra	0.35	0.0	0.35	3.0	0.0
Noura El Tahta	35-50	0.0	35-50	69.0	0.9
Kamoua	1.2	0.0	1.2	25.0	0.1
Atolbe	0.70	0.70	0.0	18.0	0.3
Mseilha	6-12	5-10	1-2	55.0	2.0
Balaa	1.2-2.2	1.2-2.2	0.0	26.0	0.4
Iaal	12-18	9.5-14	2.5-4	69.0	3.2
Brissa	0.8	0.0	0.8	20.0	0.1
Dar Boochtar	55.0	20.0	35.0	150.0	3.0
Ouadi Chich	1.0	0.9	0.1	13.0	0.3
Hadat ElJebbe	0.4	0.4	0.0	9.0	0.1
Total North	**171-257**	**75-138**	**96-119**	**682.0**	**25.0**

Designation of Dam	Static-Dynamic Cap. (MCM)			CAPEX (MUSD)	OPEX (MUSD/yr)
	Total	WS	Irrig.		
Kfarhouna	1.2	0.0	1.2	17.0	0.1
Lebaa	0.8	0.0	0.8	15.0	0.1
Azibeh	0.6	0.0	0.6	13.0	0.1
Jarjou	0.5	0.5	0.0	19.0	0.3
Chohour	0.56	0.56	0.0	22.0	0.3
Jinsnaya	0.95	0.95	0.0	15.0	0.2
Ibl Es Saki	50	15.0	35.0	200.0	3.9
Khardali	120	20.0	100.0	280.0	6.4
Kfarsir	15	3.0	12.0	45.0	1.8
Total South	**189.6**	**40.0**	**149.6**	**626.0**	**13.1**
Yammouneh	1.5	0.0	1.5	Under construction	0.1
Younine	5.8	5.8	0.0	66.0	1.5
Assi Phase I	63	0.0	63.0	50.0	1.3
Assi Phase II	15	0.0	15.0	141.0	0.8
Barhacha	0.55	0.55	0.0	37.0	0.6
Ain Aarab	2.0	2.0	0.0	21.0	0.5
Salaa	2.5	2.5	0.0	36.0	0.6
Massa	8.0	1.5	6.5	35.0	0.8
Total Bekaa	**98.4**	**12.4**	**86.0**	**386.0**	**6.0**

Current Dam Projects

Dam Location	Static – Dynamic Capacity (MCM)	Status	Hydropower ?
Chabrouh (Kesserwan)	8 - 15	Operational	No
Boqaata (Kesserwan)	6 - 12	Under Construction	No
Qaysamani (Baabda)	1 - 1	Executed	No
Janneh (Jbeil)	30 - 90	Under Construction	40 MW
Mseilha (Batroun)	6 - 12	Under Construction	No
Balaa (Batroun)	1.2 – 2.2	Under Construction	No
Bissri (Jezzine)	120 - 120	Under Construction	
Qaraoun (West Bekaa)	220 - 330	Operational	185 MW
Yammouneh (Baalbek)	1.5 – 1.5	Under Construction	No
Quechra (Akkar)	0.35 – 0.35	Under Construction	No
Total	**394 - 554**		**225**

Wastewater Projects

- Total number of **Planned** Coastal and Inland TP's is 54 to cover an equivalent population of 5.6 and 1.9 Million population equivalent respectively
- Total additional funds required to complete existing and additional WWTP's and networks = 1.1 BUSD for coastal systems and 0.6 BUSD for inland systems

Area	Nr. Of Completed WWTP	Population served (Millions)
North	4	1.1
South	3	0.85
Bekaa	4	0.2
BML	4	1.7
Total	**15**	**3.85**

Coastal WW Systems`	Equivalent Population (000s)	Already funded (Million USD)	Not yet funded (Million USD)
Aabde	185	21.5	**97.0**
Tripoli	1,000	160.0	**90.0**
Chekka	24	20.0	**8.0**
Batroun	30	22.0	**15.0**
Jbeil	50	32.0	**36.0**
Kessrwan	505	140.0	**45.0**
Bourj Hammoud	2,200	75.0	**335.0**
Ghadir	800	61.0	**60.0**
Ras Nabi Younes	88	33.0	**22.0**
Saida	390	33.0	**147.0**
Sarafand	325	-	**210.0**
Tyr	200	50.5	**50.0**
TOTAL	5,597	648	1,115

- **Completed** WWTP operate at a very low capacity
- Networks of operational TP's are not completed
- Most of treated quantities undergo only preliminary treatment before discharge
- Not more than 8% of generated WW is treated

Way Forward

- Updating the Water and Wastewater Strategies to account for changes and set priorities
- Preparation of Executive decrees of the Water Code to make it implementable
- Speeding up Dam projects and complete the corresponding upstream and downstream Water and Wastewater systems to preserve our water wealth
- Speeding up Wastewater projects through completing WW networks and finalizing treatment plants to alleviate pollution
- Upgrading of the irrigation infrastructure to conserve our water resources
- Enforcing the law on illegally exploited private wells and other illegal activities in the water sector
- Reforming the administrative framework through supporting the WE's and LRA
- Shifting to volumetric meters and restructuring the tariff to include wastewater fees.

Thank You!