

Sector: Transportation
Sub-Sector / Technically Autonomous Unit: Land Transport - Roads

Sector	Sub-sector	Geographic area	Component	Present Situation Sp	Target Situation St	Projects ΔS	Characteristics										Priority		
							Technical Constraints			Cost					Impact	Uncertainty (High, Medium, Low)			
							Description	Min. delay to start (Year)	Min. constr. period (Year)	Investment Million US\$	Land value / expro (a')	Yearly maintenance cost (b) %	Major rehab/replac. cost (c) %	Span for rehab/replc (d)				Yearly operation cost (e) %	Uncertainty
			Physical Stock	<p>Strategic Road Network</p> <ul style="list-style-type: none"> Extensive network of roads (around 22,000km), under the responsibility of MPWT (6,380km) and Municipalities (~15,325km). Classified network comprises International (529km), Primary (1673km), Secondary (1367km), and Local (2811km) Function of roads is not necessarily compatible with classification 	<ul style="list-style-type: none"> Completed classification of the road network, so that the national and local responsibilities are well defined 	<p>Re-classification of the road network (Study)</p>	Lack of data on the currently unclassified network. Also, classification is related to function which is in turn related to uncertain future traffic.	0	1	1	0	0	0	10	0	±20%	Identification of technical, operational and financial responsibilities	L	2
				<ul style="list-style-type: none"> Classified network condition: 17% good, 70% fair, and 13% poor to critical Unclassified network condition: no record available but known to be mostly in reasonably good condition 	<ul style="list-style-type: none"> Classified and rehabilitated road network with regular and periodic maintenance programs, supported by a continuously updated traffic model, Highway Management System (HMS) and Geographical Information System (GIS) 	<p>Rehabilitation and extension of the strategic Lebanese road network (Design/Construction) <i>For a detailed list refer to attachment</i></p>	Dealing with several contractors requires a high level of competence in the administration, which may take some time to achieve.	1	3	300	30	5	15	10	0.1	±30%	Upgraded network. Positive impact on externalities.	M	3
				<ul style="list-style-type: none"> The overall network has some missing strategic links due to the following: <ul style="list-style-type: none"> Beirut northern entrance is witnessing constantly heavy congestions and huge amounts of delay Several penetrators have been constructed in the last 10 years. These penetrators are supposed to be linked to the peripheral road from Khaldeh to Antelias. In the absence of this road, these penetrators will not perform the function of collecting and distributing traffic in a proper way and investment made on them is bound to be lost. The coastal highway through Jounieh has become a bottleneck for traffic along the coast, whereby between Beirut and Jounieh there are at least 3 lanes in each direction, in Jounieh there are 2 lanes and after Jounieh the section up to Jbeil has been upgraded recently to 3 lanes per direction. The eastern entrance to Beirut and eventually the link to the mountainous villages and towns then to the Bekaa and the regional network to the east is weak limited to the existing single 4-lane carriage-way. The access to Tripoli Port is inadequate, especially to/from the northern borders. 	<ul style="list-style-type: none"> High priority missing links constructed as follows: <ul style="list-style-type: none"> Castal Expressway north of Beirut Beirut Périphérique A2 Motorway the Pan Arab Motorway Tripoli-Northern Border Motorway 	<p>Coastal Expressway North of Beirut (Construction)</p>	Requires treatment of the solid waste dump at Borj Hammoud, in addition to reclamation works, which may face difficulties in procuring the fill material.	1	3	130	80	3	15	10	0.1	±15%	Increases road capacity at the congested northern entrance to Beirut.	M	3
						<p>Beirut Périphérique (Design/Construction)</p>	Expropriation of encroachments in heavily populated areas, and inter-related with A2.	2	5	225	350	3	10	10	0.1	±10%	Completion of the Beirut entrances and saving on already made investments. Additional capacity to Beirut road network.	M	3
						<p>A2 Motorway (Design/Construction)</p>	Long tunnels through Harissa Hill and inter-related with Périphérique.	1	5	300	105	3	10	10	1	±10%	Relieving the congestion through Jounieh.	M	3
						<p>the Pan Arab Motorway (remaining sections from Beirut to Sofar - Design/Construction)</p>	Alignment and Expropriation in populated areas. Also, its viability depends on regional schemes.	0	4	150	150	3	15	10	0.1	±20%	Provides enhanced access to Beirut Port. Strong regional role.	M	3
						<p>Tripoli-Northern Border Motorway (Re-design/Construction)</p>	Related to the future role of Tripoli Port and regional schemes. Existing design needs to be revisited to avoid cutting through the agricultural plane of Akkar (SDATL recommendation)	0	4	100	20	3	15	10	0.1	±15%	Links Tripoli Port to regional network.	H	3
				<ul style="list-style-type: none"> The urban road network inside Beirut consists of generally narrow streets witnessing traffic gridlocks on a daily basis 	<ul style="list-style-type: none"> All UTDP proposals in place, namely: <ul style="list-style-type: none"> Grade separation for junctions in Beirut Parking regulations Traffic Management physical measures (Traffic signals, cameras, radars, signs, marking) 	<p>Grade separation for junctions in Beirut (UTDP)</p>	Traffic interruption during construction.	0	3	50	10	3	5	10	0.1	±10%	Relieves congestion in Beirut. High impact on externalities.	L	1
						<p>Organization of on-street parking (UTDP)</p>	Requires enforcement, which cannot be achieved with the current setting.	0	2	10	0	0	0	10	0	±15%	Improves streets capacities and encourages shift to public transport	L	1
						<p>Establishment of traffic control center, installation of Traffic control devices in major urban centers, and police training (UTDP)</p>	This should be coupled with public and police awareness campaigns and depends on their cooperation.	0	5	25	0	0	0	0	0.1	±10%	Relieves congestion in urban areas. High impact on externalities.	L	1
			Physical Stock	<p>Road Passenger Transport Modes:</p> <ul style="list-style-type: none"> High numbers of vehicles leading to poor level of transport service: <ul style="list-style-type: none"> Congestion on Beirut entrances Congestion within the urban areas 	<ul style="list-style-type: none"> Revitalized public transport industry inducing a shift from private small cars to public mass transport modes (ongoing study) Busway from Beirut to Jounieh in operation in a dedicated right-of-way Dedicated lanes for public transport 	<p>Bus Rapid Transit between Beirut and Jounieh (Design/Construction of stations and roadway)</p>	Shift towards public transport is uncertain.	0	2	40	10	3	15	10	0.1	±10%	Promotes better mobility and has positive impacts on externalities in terms of encouraging shift to public transport and relieving congestion on roads.	L	1
						<p>Bus routing in dedicated lanes/ROW (Study)</p>	Existing roads in Lebanon are generally narrow and do not allow spare space for dedicated lanes. Also, shift towards public transport is uncertain.	0	0.5	1	0	0	0	0	0	±20%	Promotes shift to public transport and hence relieves congestion...	L	1
						<p>Establish a dedicated bus lane network in Beirut (Design/Construction)</p>		1	2	20	5	0	0	0	1	±50%		L	1
				<ul style="list-style-type: none"> OCFTC buses operating in a poor manner covering only few lines 	<ul style="list-style-type: none"> National transport company to operate a bus network 	<p>(ongoing study by DGLMT)</p>													

Sector: Transportation
Sub-Sector / Technically Autonomous Unit: Land Transport - Roads

Sector	Sub-sector	Geographic area	Component	Present Situation Sp	Target Situation St	Projects ΔS	Characteristics										Priority				
							Technical Constraints			Cost				Impact	Uncertainty (High, Medium, Low)						
							Description	Min. delay to start (Year)	Min. constr. period (Year)	Investment Million US\$	Land value / expro (a')	Yearly maintenance cost (b) %	Major rehab/replac. cost (c) %			Span for rehab/replc (d)		Yearly operation cost (e) %	Uncertainty		
				Privately operated buses on high demand lines	Clear definition of privately operated buses in terms of routes and mode of operation	(ongoing study by DGLMT)															
				Minibuses and vans operating in a disorganized manner	Proper termini for public transport modes constructed in all regions, including an additional terminus in Beirut next to Charles Helou terminal	Bus stations and terminals for operating company(ies) (Design/Construction)			2	2	20	10	1	10	10	5	±50%	Enhances bus operations and promotes public transport.	M	1	
				Taxi-services in high numbers	The number of public license plates restricted to need	(ongoing study by DGLMT)												Optimization of the vehicle fleet which reflects on the traffic operations with great impacts on externalities. Also promotes shift towards public transport.			
				Road Freight Transport																	
				Poor logistics, with 1400 trucks operating between the ports and local regions, in addition to neighboring countries	Viability of inland ports and logistic centers at Tripoli, Zahle and Zahrani established	Inland port near Beirut and logistics centers in Tripoli, Zahle and Zahrani (feasibility study)			2	0.5	2	0	0	0	0	0	±15%		L	2	
						Inland port near Beirut (Design/Construction)			3	2.5	50	100	3	0	0	0	±50%	Faster time for handling cargo at the port hence increase in the port's capacity.	H	2	
						Logistic centers in Tripoli, Zahle and Zahrani (Design/Construction)			3	2.5	75	80	3	0	0	0	±50%	Facilitates and organizes the trucking industry.	H	2	
				Institutional Setup																	
				Complex institutional structure leading to conflict of responsibilities. Currently, the authorities responsible for regulating/funding/maintaining/operating the transport services are: MPWT, MOIM, Municipalities, MOF, and CDR.	Function and road standards used to determine road classification which in turn identifies the strategic and/or tactical responsibility.	Establish LTA and TAVMA with proper staffing and equipment			0	2	5	0	0	0	0	25	±20%	Better control of the regulations in the sector.	L	1	
				Lack of proper enforcement.	Proposed transport authorities should be established and operational, in a manner that separates regulatory and operational responsibilities. These authorities are: Land Transport Authority (LTA), Traffic and Vehicle Management Authority (TAVMA).	Establish operating company for public transport			2	0.5	2	0	0	0	0	50	±20%	Better control of the operations of the public transport.	L	1	
					Metropolitan traffic agency established for Beirut as per UTDP recommendation.	Establish metropolitan traffic agency for Beirut			2	1	2	0	0	0	0	50	±20%	Better management of traffic operations in Beirut.	L	1	
				Economic values:																	
				Investment (a) million US\$	1,000	2,200						950									
				Land value / expropriation (a') million US\$	12,800	13,750															
				Yearly maintenance cost % (b)	4%	5%															
				Major rehab/replac. cost % (c)	35%	15%															
				Span for rehab/replc in years (d)	5	10															
				Yearly operation cost % (e)	0.10%	0.10%															
				Performance Indicators:																	
				Results																	
				<ul style="list-style-type: none"> Roads in good condition (%): Currently 17%, target to have 0% in critical condition and increase the percentage in good condition to 100% Travel time delays (minutes per vehicle): Delay is the time spent over and above the normal time of travel. Currently very high on the entrances to Beirut and inside urban areas. The result should be to minimize this time. Congestion levels at northern Beirut entrance (Volume to capacity ratio): Currently close to and exceeding unity on the entrances to Beirut and inside urban areas. Target to decrease below 1. Number of accidents (No.): Target to decrease to the lowest possible. Urban public transport ridership (%): Currently around 40%. Target to increase in relation with decrease of congestion levels. Goods transported over distance (ton-km): Target to establish a growth rate related to market demand. 																	
				Means																	
				<ul style="list-style-type: none"> Maintenance and rehabilitation programs following reclassification of the road network Traffic management measures New authorities: LTA, TAVMA, public transport company, Beirut metropolitan traffic agency Studies on the public transport in Lebanon Establishment of freight demand patterns Feasibility studies for inland port and logistic centers 																	

Sector: Transportation
Sub-Sector / Technically Autonomous Unit: Land Transport - Rail

Sector	Sub-sector	Geographic area	Component	Present Situation Sp	Target Situation St	Projects ΔS	Characteristics										Priority		
							Technical Constraints			Cost					Impact	Uncertainty (High, Medium, Low)			
							Description	Min. delay to start (Year)	Min. constr. period (Year)	Investment Million US\$	Land value / expro (a')	Yearly maintenance cost (b) %	Major rehab/replac. cost (c) %	Span for rehab/replc (d)				Yearly operation cost (e) %	Uncertainty
			Physical Stock	<ul style="list-style-type: none"> Many parts of ROW encroached upon Service non existent Network largely defunct Three routes were operating in the past, for which a reserved right-of-way exists: <ul style="list-style-type: none"> o Naqoura-Beirut-Tripoli o Beirut-Damascus o Riyaq-Homs 	<ul style="list-style-type: none"> The right of way cleared of any encroachments. The rail right-of-way used as public transport corridor (for buses in the first stage then for light rail if proven feasible), the suggested sections for these corridors, in addition to the BRT between Beirut and Jounieh (mentioned under "Roads"), are: Beirut-Saida; Beirut-Sofar, and Jounieh-Tripoli Viability of link to the north of Tripoli established and link operational Viability of rail operations for passengers and goods within Lebanon determined 	<ul style="list-style-type: none"> Clearing the rail right-of-way of encroachments Turning rail right-of-way sections into public transport corridors, including provision of facilities such as terminals and stations. These sections are: Beirut-Saida, Beirut-Sofar, and Jounieh-Tripoli (Feasibility Study) Turning rail right-of-way into public transport corridor, for the following sections: Beirut-Saida, Beirut-Sofar, and Jounieh-Tripoli (Design/Construction) Rehabilitate Tripoli-Syrian Border link (Construction - Infrastructure only) Feasibility study for rail operations in Lebanon (Study) 	<ul style="list-style-type: none"> Encroachments can be very hard to remove involving political and social aspects. This project depends on the outcome of the ongoing study on the revitalization of the public transport industry. Also, rail may be viable only when linked to the regional network, depending on the schemes on this network. Depends on regional schemes. Generally, short distances, such as the case of trips inside Lebanon, do not warrant heavy rail operations. Study has to incorporate regional rail operations. Also, light rail in urban areas is constrained by the narrow streets in those areas. Establishing laws should be carefully studied Depends on viability of rail operations. 	0	3	20	0	0	0	0	0	±30%	Provides opportunities to use the right-of-way in a beneficial manner.	L	1
								0	0.5	1.5	0	0	0	0	0	±20%	Increased chances of mass transport, bus or rail, to compete against private cars.	L	1
								1	2	150	50	3	15	10	0.1	±50%		H	1
								0	2	10	2	5	20	10	2	±30%	Enhances Tripoli Port accessibility to regional transport networks	M	3
								0	1.5	3	0	0	0	0	0	±20%	Establishment of the best way to use the existing rail right-of-way and benefits obtained from such use.	L	2
			Institutional Setup	Responsibility of MPWT through DGLMT and OCFTC. The latter is in charge of managing and operating the rail network	<ul style="list-style-type: none"> Proposed General Authority for Land Transport (LTA) should be established and operational, in a manner that separates regulatory and operational responsibilities. Operating rail company 	<ul style="list-style-type: none"> Establish LTA with proper staffing and equipment <i>Already considered under Passenger Transport in Roads Sub-Sector</i> Establish rail operating company 	<ul style="list-style-type: none"> Establishing laws should be carefully studied Depends on viability of rail operations. 	0	0	0	0	0	0	0	0	±20%	Better control of the regulations in the sub-sector.	L	2
								2	0.5	2	0	0	0	0	50	±20%	Better control of the operations in the sub-sector.	L	3
			Economic values:																
			Investment (a) million US\$	10	200														
			Land value / expropriation (a') million US\$	600	650														
			Yearly maintenance cost % (b)	0%	3%														
			Major rehab/replac. cost % (c)	0%	15%														
			Span for rehab/replc in years (d)	0	10														
			Yearly operation cost % (e)	0.00%	1.00%														
			Performance Indicators:																
			Results	<ul style="list-style-type: none"> Optimized use of available rail right-of-way Minimized travel time Effective contribution to Inter-urban public transport ridership Effective contribution to freight transport 															
			Means	<ul style="list-style-type: none"> Establishment of LTA, rail company Studies on the public transport in Lebanon Feasibility study for using rail right-of-way as public transport corridor Feasibility study for rail operations in Lebanon 															

Sector: Transportation
Sub-Sector / Technically Autonomous Unit: Maritime Transport

Sector	Sub-sector	Geographic area	Component	Present Situation Sp	Target Situation St	Projects ΔS	Characteristics										Priority		
							Technical Constraints			Cost					Impact	Uncertainty (High, Medium, Low)			
							Description	Min. delay to start (Year)	Min. constr. period (Year)	Investment Million US\$	Land value / expro (a')	Yearly maintenance cost (b) %	Major rehab/replac. cost (c) %	Span for rehab/replc (d)				Yearly operation cost (e) %	Uncertainty
			Physical Stock	<ul style="list-style-type: none"> Four commercial ports: Beirut, Tripoli, Saida, Tyr Beirut Port operations are around 5 million tons/year Tripoli Port operations are around 600,000 tons/year Saida and Tyr operations are lower than 200,000 tons/year Twenty-four other ports, mainly for fishing and leisure purposes 	<ul style="list-style-type: none"> Two main ports, in Beirut and Tripoli Master Plan completed for Beirut Port extension to Nahr Beirut for a second container terminal/ trans-shipment traffic Tripoli Port improvements complete (ongoing project) 	<ul style="list-style-type: none"> Master Plan for Extension of Beirut Port to Nahr Beirut (Study) Extension of Beirut Port to Nahr Beirut (Design/Construction) 	Depends on regional schemes. The transshipment trends currently favour the successful operations of the container terminal. International development, both political or economical, may affect these trends.	0	1	1	0	0	0	0	0	±20%	Improvement of transshipment potentials	L	2
								2	3	150	0	0	0	0	0	±20%		H	3
			Institutional Setup	<ul style="list-style-type: none"> « Commission Provisoire de Gestion et d'Exploitation du Port de Beyrouth » (GEPB) responsible for managing and operating Beirut Port. Other ports are public enterprises 	<ul style="list-style-type: none"> General Authority for Maritime Transport (MTA) operational A Ports Act in operation and Port agency operational in Beirut and Tripoli 	<ul style="list-style-type: none"> Establishment of Maritime Transport Authority with proper staffing and equipment Establishment of port agencies for Beirut and Tripoli 	Reallocation of responsibilities could be faced with resistance.	0	2	5	0	0	0	0	25	±20%	Enhances control over the regulations in the sub-sector	L	2
								2	0.5	2	0	0	0	0	25	±20%	Enhances control over the ports operations	L	2
			Economic values:																
			Investment (a) million US\$	600	670														
			Land value / expropriation (a') million US\$	800	950														
			Yearly maintenance cost % (b)	3%	3%														
			Major rehab/replac. cost % (c)	10%	10%														
			Span for rehab/replc in years (d)	25	25														
			Yearly operation cost % (e)	3%	3%														
			Performance Indicators:																
			Results	<ul style="list-style-type: none"> Regular growth in Port traffic which is currently at 5000 tons per year Container Terminal achieving capacity (700,000 TEU per year). 															
			Means	<ul style="list-style-type: none"> MTA, port agencies for Beirut and Tripoli Study for extension of Beirut Port to Nahr Beirut 															

Sector: Transportation
Sub-Sector / Technically Autonomous Unit: Air Transport

Sector	Sub-sector	Geographic area	Component	Present Situation Sp	Target Situation St	Projects ΔS	Characteristics										Priority		
							Technical Constraints		Cost					Impact	Uncertainty (High, Medium, Low)				
							Description	Min. delay to start (Year)	Min. constr. period (Year)	Investment Million US\$	Land value / expro (a')	Yearly maintenance cost (b) %	Major rehab/replac. cost (c) %			Span for rehab/replc (d)		Yearly operation cost (e) %	Uncertainty
			Physical Stock	<ul style="list-style-type: none"> Beirut Rafic Hariri International Airport (BRHIA), recently upgraded to provide a capacity of 6 Million passengers/year Currently the airport is handling about 3.2 million passengers/year Other runways - at Rayak in the Beqaa, Golley'at in the north, and other less important runways, none in operation 	<ul style="list-style-type: none"> Updated Master Plan recommendations for BRHIA completed, and planning controls around airport enforced to protect air traffic operations The incorporation of New Large Aircraft (NLA) considerations established Need for one of the other runways to be dedicated for emergency use (as a backup for BRHIA) identified 	Rehabilitation and development of Rafic Hariri Beirut Airport (Construction)	Existing capacity should be sufficient for traffic in the coming 15 years, but accurate predictions are very hard to make relating to the political developments in Lebanon and the region.	0	1	7.5	0	5	15	10	0	±10%	To keep the airport operating in a safe and efficient mode.	L	2
						Feasibility study for New Large Aircrafts (NLA) and a backup runway (Study)	the parameters involved in the feasibility cannot be obtained with a high level of accuracy.	0	1	1	0	0	0	0	0	±20%	Provides a backup runway that has a connection with Beirut free from international borders.	L	2
			Institutional Setup	<ul style="list-style-type: none"> Directorate General of Civil Aviation (DGCA) in charge of managing the airport and supervising the air transport activities Law to create Civil Aviation Authority (CAA - Law No. 481 dated 12/12/2002) awaiting implementation Some airport activities are subcontracted for private operators under 15 years concession contracts 	<ul style="list-style-type: none"> CAA fully operational in regulating and supervising airport operations Beirut International Airport Company (BIAC) created and fully operational in providing services with participation of private sector 	Establishment of Civil Aviation Authority (CAA)	Reallocation of responsibilities could be faced with resistance.	0	1	2	0	0	0	0	25	±20%	Enhances control over the airport regulations	L	2
						Establishment of Beirut International Airport Company (BIAC)	Reallocation of responsibilities could be faced with resistance.	1	1	5	0	0	0	0	50	±20%	Enhances control over the airport operations	M	2
			Economic values:																
				Investment (a) million US\$ 500	Investment (a) million US\$ 510														
				Land value / expropriation (a') million US\$ 1,000	Land value / expropriation (a') million US\$ 1,000														
				Yearly maintenance cost % (b) 5%	Yearly maintenance cost % (b) 5%														
				Major rehab/replac. cost % (c) 10%	Major rehab/replac. cost % (c) 10%														
				Span for rehab/replc in years (d) 10	Span for rehab/replc in years (d) 10														
				Yearly operation cost % (e) 5%	Yearly operation cost % (e) 5%														
			Performance Indicators:																
			Results	<ul style="list-style-type: none"> Passenger movement annual growth should be at least equal the rate in the past few years (4.5 to 7%) Number of deflections towards other airports per year: to be determined Airport capable to handle NLA when need arises 															
			Means	<ul style="list-style-type: none"> Establishment of CAA, BIAC Study on backup airport and NLA 															