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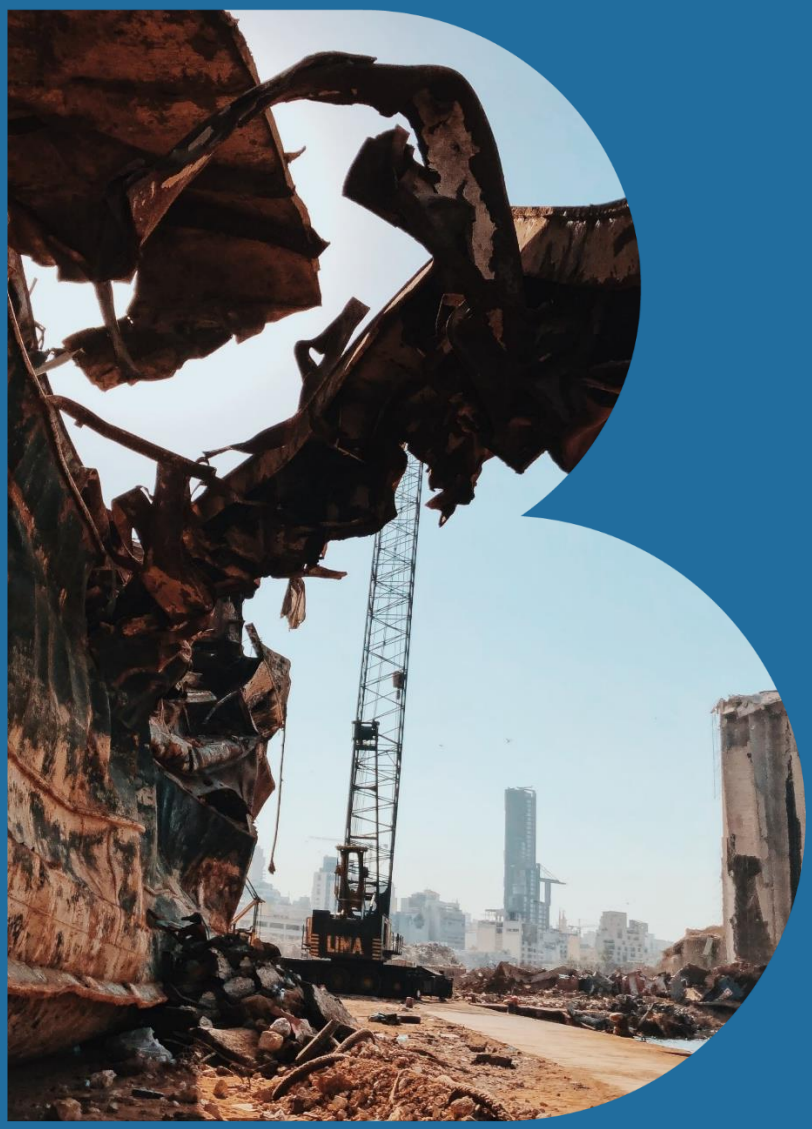

Joining forces for a new Beirut port area

A STRATEGIC STUDY

April 2021

Disclaimer

This study presents the results of a research project that has been partly co-financed by the German Federal Ministry of Economic Cooperation. It shows the findings and content that have been developed by and under the responsibility of Roland Berger, unless otherwise stated. Wherever content has been developed jointly with others (mainly in the strategic options, business development strategy and spatial development strategy sections), this is clearly indicated.

The main project work took place between November 2020 and January 2021. Our analysis builds on data extracted from expert and stakeholder interviews and news sources as well as the Lebanese Customs and Port of Beirut websites, and is thus subject to certain limitations (see Footnote 7).

This study presents our best estimates. However, it is possible that the data that we used may not accurately reflect conditions at the port. It should further be noted that the forecast analysis is only indicative, due to the highly volatile situation in Lebanon. The eventual outcome in future years will depend strongly on political and economic developments in the country and the broader region. In addition, the spatial recommendations for the port are purely indicative and subject to further research, including prefeasibility and (technical) feasibility studies.

Executive summary

The goal of this study is to provide a basis for kick-starting the reforms needed to make the Port of Beirut an efficient economic hub for Lebanon. In line with this objective, we begin by reviewing the current situation as well as future demand and throughput at the port (Chapters 1 and 2). We then develop tangible options and a strategic roadmap for developing the port (Chapters 3 and 4). It is our hope that our recommendations will provide guidance for policymakers and donors alike, as well as raising the interest of international investors.

The Port of Beirut is the main gateway for Lebanon's foreign trade and mainly serves domestic demand. It handles approximately 90 percent of Lebanon's sea trade by value. Overall trade volumes at the port consist of approximately 90 percent imports and 10 percent exports, indicating a significant trade imbalance. Throughput at the port amounts to six to eight million tons of merchandise a year (based on figures for 2015 to 2019) and mainly consists of container cargo, general cargo and dry bulk. The port, catering to domestic demand, is thus a mirror of the Lebanese economy and depends strongly on the economic situation in the country.

The port governance structure does not enforce accountability for performance and development. The current structure entails various challenges:

> The port currently **lacks a clear management structure** laying out the responsibilities of all the parties involved. The port is managed by a "Temporary Committee" and there are various entities with overlapping mandates. Additionally, there is a lack of coordination between the various ports in Lebanon at a national level.

> The port **lacks a proper regulatory framework** and currently gives decision-making control to the Temporary Committee. No financial auditing and performance monitoring or supervision takes place.

> The port **is influenced by various vested interests,** with informal interference and a strong role of political affiliations.

Lebanon is facing challenging times and is looking to an uncertain future. The country is confronted with unprecedented and multiple crises, which will most likely limit economic growth over the next decade and potentially beyond. The current Lebanese national debt and financial crisis has brought the economy to a standstill, a significant devaluation of the currency has taken place and the ongoing COVID-19 pandemic is hindering economic recovery. At the same time, an enduring political crisis polarizes not just government but also the population.

To take account of this uncertainty, we consider two different scenarios for GDP growth. In our **"Continuation of the status quo" scenario** ("Base scenario"), the economy contracts in 2020 (-25 percent) and 2021 (-2.3 percent), then returns to positive real GDP growth in 2022 (+1.3 percent) and 2023 (+2.3 percent), settling at annual growth of around 2.5 percent from 2025 onwards. Our **"Reform and revival" scenario** ("Reform scenario") foresees stronger growth of real GDP following the implementation of comprehensive political and economic reforms. In this scenario, double-digit growth may be possible in 2022 and 2023, followed by a stabilizing growth rate of around 2.5 percent after 2025.

Trade volumes at the Port of Beirut are largely driven by imports based on domestic demand and consumption, and so are closely correlated to GDP. Historical data points to a decrease in trade volumes in 2019 and 2020. This trend is projected to continue into 2021 in our "Base scenario", where trade volumes pick up again only in 2022. However, this recovery is expected to happen at a slow rate; indeed, previous levels of traffic at the port will most likely not be reached in this scenario until 2030 given the current economic state of Lebanon and economic forecasts for its recovery. The "Reform scenario" presents a different outcome: Demand is predicted to increase from 2021 and historical volumes for 2018 and 2019 to be reached within six to seven years. Overall trade in this scenario exhibits a seven percent CAGR over the coming ten-year period, more than double that of the "Base scenario".

The explosion at the Port of Beirut has created major challenges within an already fragile economic situation in the country. It hit the country right in the center of its lively capital. The Port of Beirut's infrastructure was heavily affected, with berths and storage facilities destroyed or rendered inoperable, including the country's grain silos. This, in turn, creates major handling and storage challenges, specifically in general cargo, bulk and free zone areas.

In Chapter 3, we suggest a **development strategy for the Port of Beirut.** This includes strategic options for the port (future role and location), an overall business development strategy, and possible spatial development plans. We also formulate recommendations for the future governance model at the port.

In terms of **strategic options, the main future role of the Port of Beirut will most likely remain that of serving domestic demand.** In addition, the transshipment business at the port could be increased, as the service offering and pricing structure at the port are in line with the strategies of the shipping companies and the geographic benefits from its location on the Eastern Mediterranean. We therefore recommend **right-sizing the port's operations at its current location within Beirut.**

In the area of **business development, we suggest maximizing efficiency and optimizing operations at the port by right-sizing the port through reducing port storage areas and moving dirty bulk outside of the port area.** Our cargo forecast suggests that the main business focus should lie on container and general cargo handling. A clean dry bulk terminal (mostly grains and other food supply) should be maintained at the port to cater to domestic demand. Dirty dry bulk (fertilizers, residues and waste from the food industries and products of the milling industry, ores, earths, and so on), on the other hand, could potentially be moved to a different location. In addition, efficiency could be maximized by streamlining and reducing storage facilities. We suggest building transfer stations at the port, reducing the port storage area while processes are made more efficient.

Various spatial development options are possible, making use of the currently available space and exploring potential expansion options. In the short term, the focus could lie on reconstructing the port in order to ensure its capacity and efficiency. In parallel, however, strategic considerations for a time horizon of more than five years should be considered to already set the course of future development and growth opportunities, including potential plans for expansion. We discuss three options which require detailed pre-feasibility study and further analysis of technical requirements. In addition, any decision will depend on political alignment between the stakeholders on a local and national level.

A revised governance structure allocating responsibilities and ensuring accountability is essential for any reconstruction efforts at the Port of Beirut. We recommend a three-tiered structure:

- **At the national level, a National Port Development Committee and a National Logistics Committee should be set up.** The National Port Development Committee would be responsible for setting regulations at ports and developing national maritime and port development strategies. The National Logistics Committee should be a governmental entity responsible for coordinating the different Port Authorities and other relevant entities in the logistics industry, as well as acting as an advisor on development projects.
- **At a port management level, we recommend setting up a Port Authority using a "landlord model",** to enable increased integration and involvement of both the private and the public sector.
- **At a port operations level, we recommend that cargo handling and other services are carried out with the involvement of the private sector,** using management contracts, concessions, or other PPP models.

Various financing options are possible for the reconstruction of the Port of Beirut. All options require a clear development plan in the form of a prefeasibility study and a technical feasibility study. A thorough due diligence and a credit/investment evaluation are needed to determine funding options for the reconstruction and development of the port.

Crises create opportunities – but time is of the essence. Various strategic options for the Port of Beirut are possible and different entities must be mobilized to help in the reconstruction and redevelopment. Structural, economic, social and political reforms will be key. We recommend taking the following actions swiftly:

> At a national and port ecosystem level
  – Agree and implement a new port sector governance structure
  – Reform customs law and related institutions
  – Devise a national maritime strategy and formulate a national logistics strategy
> At the level of the Port of Beirut
  – Set up a Port Authority in the form of a corporatized public entity
  – Prepare for implementation – carry out a tender for a prefeasibility study followed by a technical feasibility study
  – Get ready for construction – set up the reconstruction project implementation body and commence with development

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Glossary of terms and abbreviations

Term	Definition
AIIB	Asian Infrastructure Investment Bank
APIC	Association of Petroleum Importing Companies
BBC	British Broadcasting Corporation
BC	Before Christ
BLT	Build-lease-transfer
Bn	Billion
BOO	Build-own-operate
BOOT	Build-own-operate-transfer
BPA	Beirut Port Authority
BPMU	Beirut Port Monitoring Unit
BTO	Build-transfer-operate
CAGR	Compound annual growth rate
CapEx	Capital expenditure
CAS	Central Administration of Statistics
CMA-CGM	Compagnie Maritime d'Affrètement and Compagnie Générale Maritime
CNN	Cable News Network
COGICO	Consolidated Group for Industry and Commerce
COSCO	China Ocean Shipping Company
DBFO	Design-build-finance-operate
DBOT	Design-build-operate-transfer
DCMF	Design-construct-manage-finance
EFTA	European Free Trade Association
EIB	European Investment Bank
EOOT	Equip-own-operate-transfer
EPC	Engineering, procurement and construction
F&B	Food and beverage
Fraunhofer IMW	Fraunhofer Center for International Management and Knowledge Economy IMW

FTA	Free trade agreement
GAFTA	Greater Arab Free Trade Area
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GEPB	Compagnie de Gestion et d'Exploitation du Port de Beyrouth
GVA	Gross value added
ha	Hectares
HIF (Hodico)	Heavy Industrial Fuels (Heavy Oil Distribution Company)
HPC	Hamburg Port Consulting
HYPCO	Hydrocarbon Products Company
IBM	International Business Machines
IDAL	Investment Development Authority of Lebanon
IFI	International Financial Institution
IMF	International Monetary Fund
IMO	International Maritime Organization
INDEVCO	Industrial Development Company
IPC	Iraq Petroleum Company
IPT	Issa Petrol Trade
km	Kilometer
km^2	Square kilometers
KSA	Kingdom of Saudi Arabia
LCA	Logistics Capacity Assessment
LFZ	Logistics Free Zone
OECD	Organization for Economic Cooperation and Development
MSC	Mediterranean Shipping Company
MRO	Maintenance, repair and operations
m	Meters
m^2	Square meters
m ton	Million tons

N/A	Not applicable
NY Times	New York Times
O&M	Operations and maintenance
OpEx	Operating expenditures
PoB	Port of Beirut
PoT	Port of Tripoli
PPP	Private-public partnership
Ro-Ro	Roll-on/roll-off
RTG cranes	Rubber tired gantry cranes
STS cranes	Ship-to-shore cranes
SEIA	Strategic environmental impact assessment
SPV	Special purpose vehicle
TEU	Twenty-foot equivalent unit
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nation Children's Fund
UNIDO	United Nations Industrial Development Organization
UNODC	United Nations Office on Drugs and Crime
UAE	United Arab Emirates
USA	United States of America
USD	United States Dollar

1. Introduction

1.1 The Port of Beirut

The Port of Beirut has been a center of trade and naval activity since the fifteenth century BC. After developing strongly in the nineteenth and most of the twentieth century, the prolonged civil war in Lebanon (1975-1990) caused a profound division in the country. After the civil war, the government appointed a "Temporary Committee for Management and Investment of the Port of Beirut" to manage the port. Since then, the port has been promoted as a major investment opportunity due to its geographical position and proximity to the Beirut Central District.

Today, the Port of Beirut occupies an area of 120 hectares and has four water basins covering 100 hectares of water surface. It has 16 berths with a total length of 5,155 meters, and the basin at Quay 16 is estimated to be 20 hectares with a 550-meter breakwater. The port comprises a multi-purpose area including a silo area, a container terminal with an annual throughput of approximately 1.23 million TEU in 2019 (BCTC, 2019b), a free zone and a passenger terminal. In addition, it acts as a transshipment hub for the Mediterranean Shipping Company (MSC)[1] and Compagnie Maritime d'Affrètement and Compagnie Générale Maritime (CMA-CGM), the second and third largest container shipping companies in the world.

1.2 Recent events

On August 4, 2020, a devastating blast shook Lebanon's capital Beirut, killing over 200 people, wounding over 6,500 and leaving over 300,000 people displaced (UNICEF, 2020). Large sections of the port and its infrastructure were destroyed, including the silos containing most of the country's grain reserves.

Additional damage estimated to be in the billions of dollars was caused across the city. According to the World Bank's "Beirut Rapid Damage and Needs Assessment" report published towards the end of August 2020, the cost of the physical damage was estimated to be between USD 3.8-4.6 billion, with housing and the cultural sector most severely affected. The economic losses amounted to USD 2.9-3.5 billion, with housing being the hardest hit, followed by transportation (including the port) and culture. In addition, the immediate priority "recovery and reconstruction needs" to the end of 2020 and 2021 were valued at USD 1.8-2.2 billion, with the transportation sector's needs being the highest, followed by culture and housing (World Bank, 2020e).

The explosion was caused by 2,750 tons of ammonium nitrate that had been stored in Hangar 12 at the port for six years, despite the fact that authorities were aware that such dangerous substances should not be stored near residential areas (NY Times, 2020). In the same hangar, jugs of oil, kerosene, hydrochloric acid and 15 tons of fireworks had also been stored in proximity to the ammonium nitrate in violation of international safety rules. It is thought that sparks stemming from repairs being carried out a Hangar 12 may have ignited the cargo. At the time of writing, prosecutors have arrested at least 25 people and charged 33 people connected to the port (Al Jazeera, 2020).

The explosion took place amid the country's worst economic crisis. Since the civil war ended in 1990, tourism, foreign aid and expat remittances had been the main drivers of Lebanon's economy. When regional turmoil began in 2011, remittances from the Lebanese diaspora and foreign direct investments started to shrink and were eventually halted. In October 2019, massive protest movements began in the country. Due to a shortage of USD liquidity in the market, the Lebanese pound began to lose value against the dollar on the parallel exchange rate markets, ultimately losing more than 75-85 percent of its value. Banks closed their doors to depositors for weeks and the government imposed informal capital controls restricting withdrawals of foreign currency. To make matters worse, the global COVID-19

[1] MSC has currently stopped using the Port of Beirut for transshipment due to the COVID-19 pandemic and it is unclear when these activities will restart.

pandemic has caused the economy to shrink further as people have lost their jobs and thousands of small businesses have gone bankrupt. Today, more than half of the Lebanese population lives below the poverty line (Relief Web, 2020).

1.3 Objectives of the study

This study has a number of aims. We begin by taking stock of the current state. This includes an analysis of the connections between the Port of Beirut and the Lebanese economy and an investigation of the current governance structure of the Port of Beirut.

Our hope is that the Port of Beirut will become a safer, more transparent and more efficient economic hub for Lebanon and the region in the future. With this in mind, we present a number of strategic options for a revamped governance model in which all stakeholders at the port are connected in a clear structure, ensuring responsibility and accountability.

We also aim to provide guidance for policymakers and donors, paving the way for financing the reconstruction and development projects. We develop strategic options for the port on several levels, answering both its immediate needs and the future requirements, including potential expansion of the port. Our analysis of the strategic options intends to provide guidance for fact-based and informed decision-making.

In addition, we hope to raise the interest of international investors in the Port of Beirut through this report. This will of course require further detailed prefeasibility and feasibility studies, backed up with careful financial analysis. Our investigation of historical performance and forecast future trade volumes can form a basis for discussions with international investors.

Ultimately, this study is about how the many stakeholders inside and outside Lebanon can join forces to start a new era for the Port of Beirut – and how the long-term potential for the whole country can be leveraged through collective efforts to rebuild it.

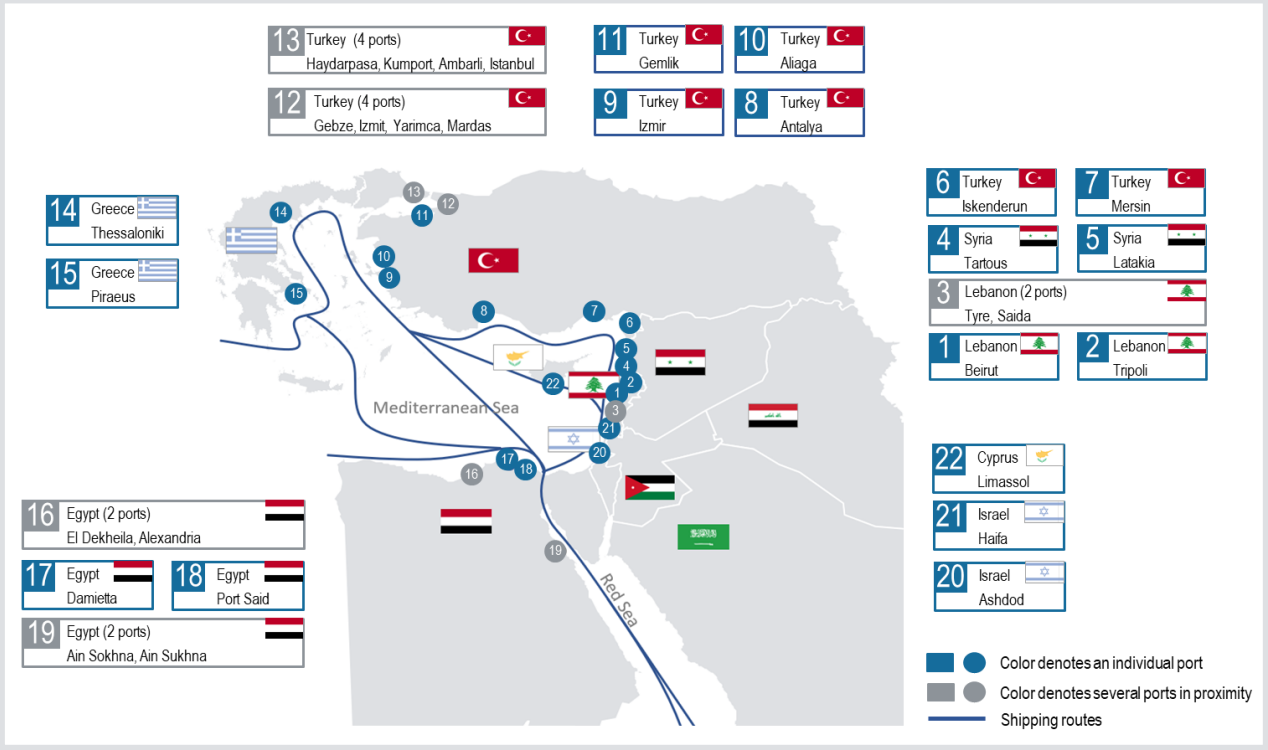
2. Current situation and market outlook

2.1 Overview of the Port of Beirut

2.1.1 Geography of the Eastern Mediterranean

The Mediterranean Sea has a major geographical advantage in that it is bounded by 21 modern states: 11 in Europe, five in Asia and five in Africa. It is home to the world's busiest shipping routes and an estimated one-third of the world's total merchant shipping passes through it, equivalent to 220,000 merchant vessels every year, each carrying more than hundred tons of goods on average (MBW, 2020). It has around 90 ports in total, serving domestic and international trade. Figure 1 shows the 31 main ports located in the Eastern Mediterranean.

Figure 1: Ports in the Eastern Mediterranean



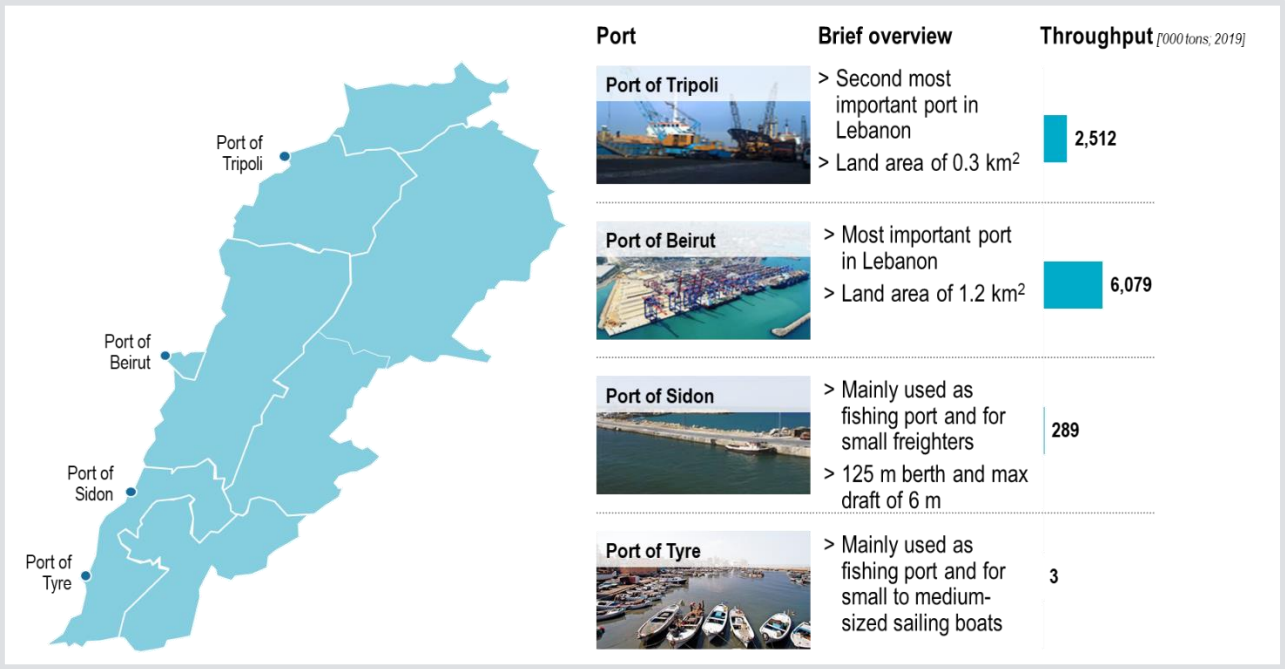
Source: Desk research, Roland Berger

The Suez Canal provides the shortest maritime route between Europe and the lands lying around the Indian and western Pacific oceans (Britannica, 2020). Today, an average of 50 ships navigate the canal daily, carrying more than 300 million tons of goods per year (History, 2020).

Overview of the ports in Lebanon

Four main ports are found on the coast of Lebanon, with an average distance of around 50 km between them (Figure 2).

Figure 2: Overview of ports in Lebanon and total throughput



Source: Lebanese Customs[2]

Port of Beirut

The Port of Beirut lies on the Eastern Mediterranean, in the center of Lebanon's densely populated capital Beirut. It is situated in an area of prime real estate, on land valued at USD 5-10 billion (Al Khaleej Today, 2020). This distinctive location makes it one of the most important and busiest ports in the region. It connects Lebanon to its neighboring countries in the Eastern Mediterranean as well as to other continents, with direct links to 56 ports around the world. It is the main seaport in Lebanon.

Port of Tripoli

The Port of Tripoli is the second most important in Lebanon, with a land area of 300,000 m^2. The port has 14 warehouses and nine yards for storage. It has a capacity of five million tons per year. Some 509,000 tons of goods passed through the port during the first four months of 2020, compared to more than 1.4 million tons at the Port of Beirut. Its free zone is slightly larger (150,000 m^2) than the one in Beirut. Moreover, an adjacent landfill area of 450,000 m^2 is reserved for future container and free zone areas, while plans to develop the quay area are being prepared to enlarge and rehabilitate the port.

The container terminal at the Port of Tripoli is operated through a concession by Gulftainer, a privately owned UAE company. In 2019, the Russian energy company Rosneft signed a 20-year agreement to manage the liquid bulk oil products storage terminal at the port, while the Chinese shipping company COSCO launched a shipping service between the port and China.

Port of Sidon

The Port of Sidon has traditionally been used mainly as a fishing port and for accommodating small freighters. It has been undergoing new construction since 2011. Phase I was completed in 2017,

[2] Throughput data at the ports does not include mineral fuels; see Footnote 7.

including the construction of a 150-meter-long dock, a one-kilometer-long jetty and a quay. Phase II of the development will cover enlarging the berth at the port to be 450 meters long and 310 meters deep; however, a lack of funds currently hinders the completion of the second phase. Shortly after the explosion in Beirut, the Port of Sidon was able to receive two grain ships carrying 11,500 tons of wheat.

Port of Tyre

The Port of Tyre is a small port located in the south of Lebanon. It only operates during the daytime and Customs are available on request only. The harbor is mainly used for fishing and small to medium-sized sailing boats. The port has two operational berths, primarily used to import vehicles. Having no cargo-handling equipment apart from the open storage area, which is limited to vehicles, the port attracts only two to three incoming vessels (mainly small Ro-Ro) a month. In 2008 a plan was announced to develop all the ports along the Lebanese coast, including the Port of Tyre, but so far, no changes have occurred.

2.1.2 Spatial analysis of the Port of Beirut

The Port of Beirut lies in the heart of Lebanon's capital city, bordered by densely populated residential areas on its southern side. As shown in Figure 3, three main regions exist around the port: downtown Beirut, the country's economic, commercial and administrative center; Gemayze and Mar Mikhael, the city's cultural, historical and entertainment center and home to its most fashionable shops, restaurants, bars and cafes; and Karantina, a multipurpose, low-income residential and semi-industrial area that includes a waste disposal center and industrial sites.

Figure 3: Port of Beirut and surrounding area

Source: Desk research, Roland Berger | Image: Google Maps

The west side of the port is directly connected to the Beirut Naval Base, which is the larger of the country's two naval bases (the other is in Jounieh, 20 km from Beirut). Ownership of this land is a matter of dispute between the Lebanese Army and certain private entities.

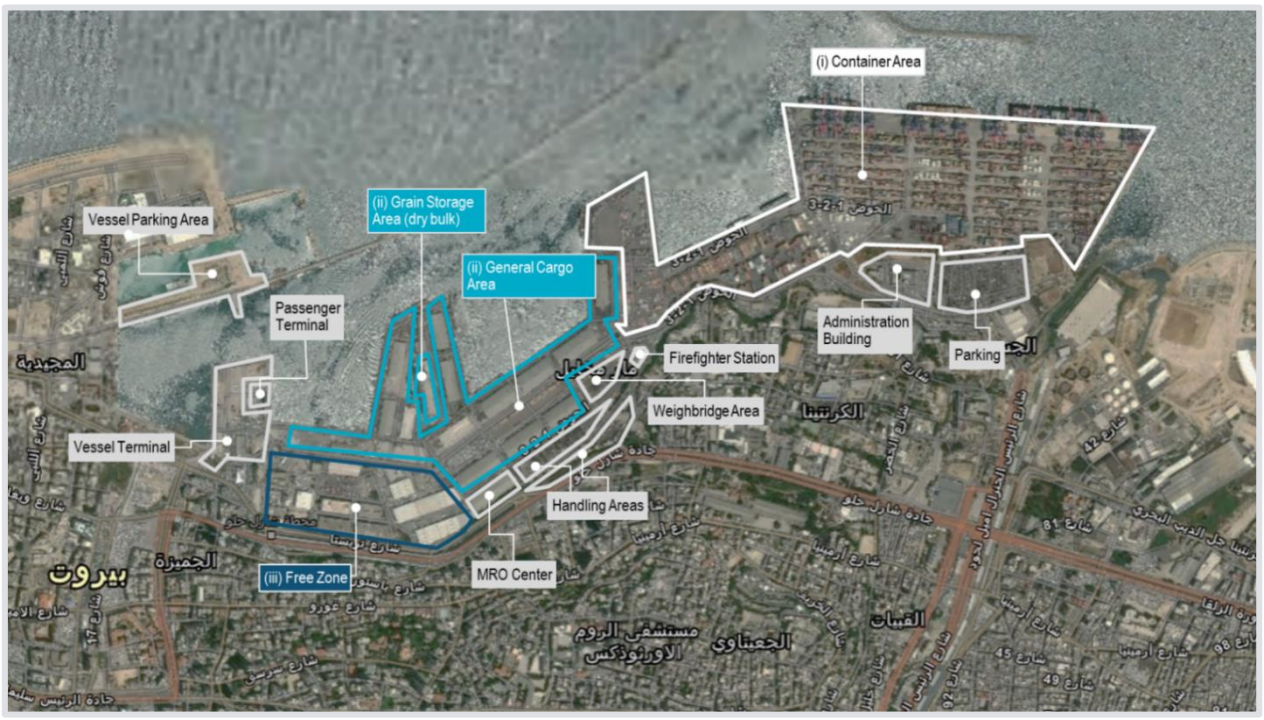
Two landfills and an industrial zone border the port on its eastern side, in Karantina. The disposal area directly bordering the port has reached maximum capacity, while the second one, further to the east, is a multipurpose zone partially used for dumping waste. Plans existed to repurpose these two areas and

expand the port, but this has been halted for political reasons as the areas belong to the Mount Lebanon administrative region.

The Port of Beirut prior to the explosion

The Beirut seaport covers 1.2 km^2 of land and has a total water basin area of 1,202,000 m^2 (including the container terminal), a main breakwater of 3,190 meters and a detached breakwater of 550 meters. It can be sub-divided into three main areas, as shown in Figure 4: (i) the container terminal, outlined in white in the figure, (ii) a multi-purpose area (general cargo, dry bulk and storage areas, including grain silos), outlined in light blue and (iii) the free zone, outlined in dark blue. Other port areas are outlined in grey.

Figure 4: Port of Beirut prior to the explosion – Satellite view



Source: Port of Beirut, desk research, Roland Berger | Image: Google Maps

Container terminal

The container terminal is situated in the east of the port and covers approximately 600,000 m^2, with a total capacity of 1.5 million TEU per year. This zone is used for shipping container storage, container loading/unloading, and container equipment maintenance and repair. The Port of Beirut can accommodate some of the world's biggest container vessels (maximum vessel capacity: around 20,000 TEU) at Quay 16, the longest (1,100 meters) and deepest (16.5 meters) quay in the port. This is where most of the traffic is handled. According to experts, the capacity of the current container terminal (quay length and existing superstructures) could be increased to between 2.4 and 3 million TEU by carrying out operational improvements and expanding the container backyard.

Since 2005, container terminal operations at the Port of Beirut have been subcontracted, through a management contract, to the private Beirut Container Terminal Consortium (BCTC), consisting of Lebanon's International Port Management Beirut SAL, the UK's Portia Peel Ports Limited and the US's Logistics and Port Management Americas LLC. Although the contract with BCTC ended in early 2020, the consortium currently still manages the container terminal on a rolling three-month basis, as the new

tender has been halted due to COVID-19 and the explosion. Additionally, the Port of Beirut has partnership contracts for the transshipment of containers with both MSC and CMA-CGM (MSC has currently stopped its transshipments calling at the Port of Beirut due to the COVID-19 pandemic and it is still unclear whether this activity will resume).

Multi-purpose and storage areas

The general cargo terminal and storage areas are situated on the west side of the port, covering an area of over 250,000 m^2. Prior to the explosion, this area of the port handled all the non-containerized cargoes, with more than 12 warehouses available for storage. Some of these storage areas are reserved for cars and trucks, while space for refrigerated cargo is available upon request. The Port of Beirut also had three industrial buildings with 18,000 m^2 capacity for storage. More than 150 vehicles were available for cargo transport, in addition to 37 mobile cranes.

Another vital cargo handling and storage area housed the grain silos, located in the center of the general cargo area. The silo area was built in 1969 and is managed by the Ministry of Economy. Some 85 percent of the cereals arriving in Lebanon pass through Beirut's port silos, which had a storage capacity of 120,000 tons. The other 15 percent are imported by private companies. The grain is received directly from the vessel at the quay and vacuumed into the silo. When grain is to be distributed, it is loaded directly from the silos into open-top trucks.

Free zone

The free zone was inaugurated in 2005 and covers more than 127,000 m^2 of warehouse and market area. Part of it is used to prepare cargo for hinterland movement or export services in the Logistics Free Zone (LFZ). In addition, the free zone area had a duty-free market, including a 2,800 m^2 retail area with more than 46 shops.

The LFZ was inaugurated in 2007. The logistics warehouses receive foreign cargoes and offer a variety of services to prepare cargo for export or distribution within Lebanon. Several large companies have leased space and built modern warehouses within the LFZ. The LFZ is open to companies in the transportation, export, transit and international trade sectors.

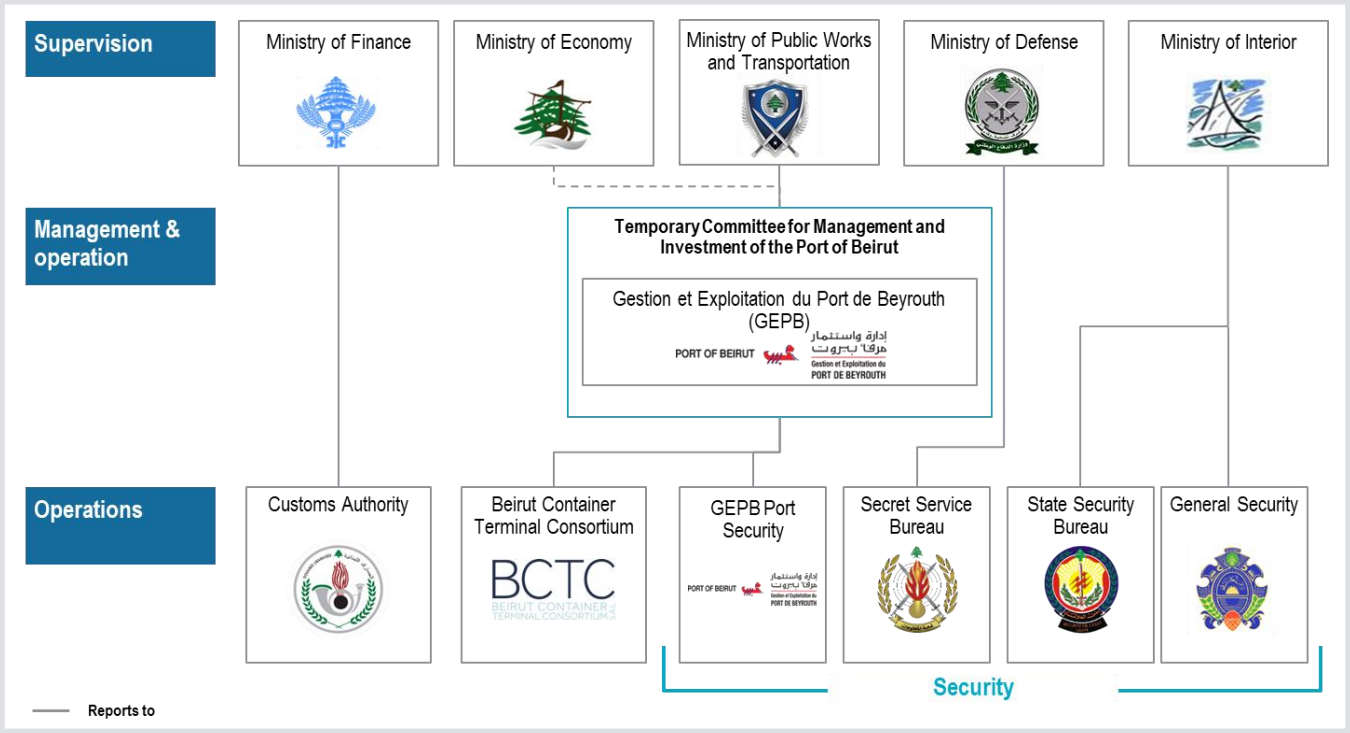
According to interviews carried out with stakeholders, there were plans to use part of the free zone to build an industrial manufacturing area. However, this was never implemented due to differences in the aspirations of various parties involved.

Further development of the LFZ and its proper utilization, including revamping its price structure, could be a key to unlocking the potential of the Port of Beirut and the Lebanese economy as a whole.

2.1.3 Governance structure of the Port of Beirut

The current governance structure of the Port of Beirut is complex, involving various different entities and committees. Figure 5 presents an overview of the different key bodies involved and the relationships between them.

Figure 5: Port of Beirut governance structure



Source: Port of Beirut, stakeholder interviews, desk research, Roland Berger

Gestion et Exploitation du Port de Beyrouth (GEPB) and the Temporary Committee for Management and Investment of the Port of Beirut

The port has been operated since 1961 by "Gestion et Exploitation du Port de Beyrouth" (GEPB), a Lebanese company, under a concession agreement ratified into law on May 31, 1960. The company is majority owned by Intra for Investments, which is itself owned by the Central Bank of Lebanon and the Lebanese Government. The concession ended on December 31, 1990. In 1990 the Council of Ministers decided to hand over the management of the port to a temporary committee, whose mission was to provisionally run the port. This was called the "Temporary Committee for Management and Investment of the Port of Beirut".

Since the beginning of the 1990s, four such temporary committees have managed the Port of Beirut, the last appointed in 2001. The current committee is composed of the Chairman of the Board, the General Manager of the GEPB, GEPB's Board of Directors and senior management personnel. While GEPB's concession ended in 1990, its employees still handle the day-do-day operations of the port, while the Temporary Committee fulfills the role of Port Authority, landlord and caretaker of the Port of Beirut and its assets. The contractual or legal relationship between GEPB and the Temporary Committee for Management and Investment of the Port of Beirut is unknown. Jointly, the Temporary Committee and GEPB are responsible for developing the Port of Beirut's infrastructure and facilities, establishing the rules of operation at all cargo berths and within the port, establishing port tariffs, collecting port dues, leasing port facilities and providing services to the port's customers within the port.

From a legal perspective, questions exist about the public accountability of the Temporary Committee. The Temporary Committee is not a public institution since its appointment by the government was not institutionalized and does not establish the necessary legal frameworks. Currently, the Port of Beirut is subject neither to financial and operational audits by the Audit Bureau, nor to supervision by the Central

Inspection Unit. The head of the Temporary Committee reports to the Minister of Public Works and Transportation, but the Port of Beirut is seen as an independent administration under the authority of the Minister of Public Works and Transportation's guidance, with its own budget that is independent from the budget of the Ministry of Public Works and Transportation (Maharat News, 2020).

BCTC

The Beirut Container Terminal Consortium (BCTC) is a consortium made up of Portia Peel Ports Limited, International Port Management Beirut SAL, and Logistics and Port Management Americas LLC. BCTC has a management contract with "Gestion et Exploitation du Port de Beyrouth" (GEPB) that allows it to operate the container terminal. BCTC has run the terminal since 2005 and the management contract officially ended on January 31, 2020. However, it currently still manages the container on a rolling three-month basis.

The Ministry of Public Works and Transportation issued a tender for the management contract of the port's container terminal with applications due March 17, 2020. The tender has been delayed to at least 2021 due to the COVID-19 pandemic and the explosion.

BCTC submitted a proposal for the renewal of its contract, and other companies are also showing interest. The French company CMA-CGM and Geneva-based MSC are looking to collaborate in a bid. Gulftainer, a privately owned UAE company, has indicated its interest, too, as it currently operates the container terminal of the Port of Tripoli. Other companies such as Hutchison (Hong Kong) and China Merchants Ports (China) are also interested in submitting proposals (PortsEurope, 2020).

It was noted during stakeholder interviews that numerous service providers are active in the general cargo and dry bulk area, mostly small and medium-sized enterprises. These operate under various services contracts; however, no details are publicly available online.

Lebanese Customs Authority

The Lebanese Customs Authority is a public body composed of two entities: (i) the Higher Council for Customs, responsible for policy setting and (ii) the Customs Directorate, responsible for customs control and clearance. The Lebanese Customs Authority is primarily responsible for collecting customs duties and taxes that may be imposed on goods imported to Lebanon. Additionally, it is responsible for border control and security, including that of the Port of Beirut. It reports to the Minister of Finance.

Other entities

The Ministry of Public Works and Transportation is the authority responsible for Lebanese ports. The operating company and the committee operating the Port of Beirut report to the Minister.

General Security is a public body responsible among other things for the surveillance of territorial, maritime and aerial borders, delivering transit permits and issuing entry visas. It is present at the Port of Beirut to check merchandise and individuals.

The State Security Bureau is a public body responsible among other things for the surveillance of territorial, maritime and aerial borders. It is present at the Port of Beirut to control and prevent any matter that might affect state security.

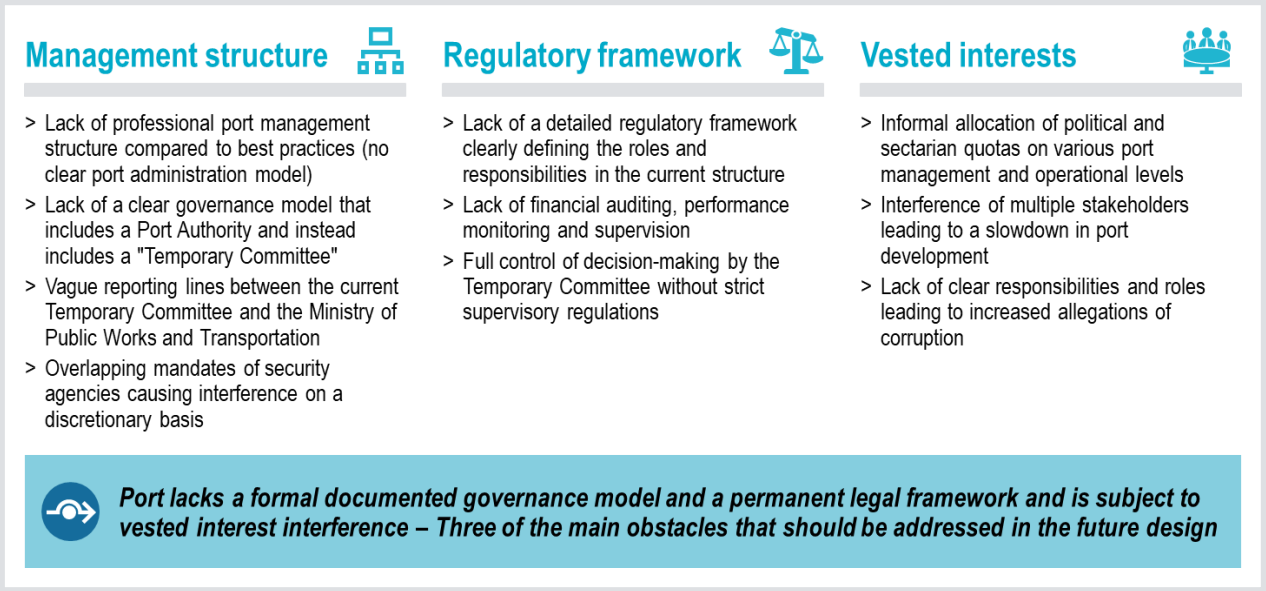
The Secret Service Bureau at the Beirut Port is a unit of the Lebanese Army, reporting to the Ministry of Defense. It is responsible among other things for the surveillance of territorial, maritime and aerial borders.

Governance model challenges

The management of the Port of Beirut is handled by a wide variety of governmental and non-governmental entities. No proper legal framework or formally documented governance model exists. This creates challenges with regard to the supervision of the port, which may have contributed to the series of

events that led to the explosion. Having analyzed the current governance structure, we identify three main challenges that should be addressed in designing the future governance model (Figure 6).

Figure 6: Governance model challenges



Source: Stakeholder interviews, Roland Berger

Lack of a clear port management structure: The port currently lacks a clear management structure that outlines the responsibilities of all entities involved.

On a national level, the port is currently seen as an independent administration under the guidance of the Minister of Public Works and Transportation's guidance, with its own budget, separate from the budget of the Ministry. Accordingly, there are no supervisory or audit bodies overseeing port operations. For example, there is no national audit board responsible for ensuring compliance with rules and regulations, no Port Authority responsible for coordinating port strategies and activities, and no security committee responsible for overseeing port safety, inspections and patrols.

In addition, no coordination takes place on a national level between the different ports and Port Authorities. All of Lebanon's ports are close to each other (on average only around 50 km apart), but they are currently treated as separate entities with minimal coordination.

On a port management level, the Temporary Committee for Management and Investment of the Port of Beirut is neither a public body nor a company owned by the government. Moreover, various entities and ministries are involved in the operation and security management of the port. The overlapping mandates of these different security agencies opens the door to interference in the cargo clearance process.

Lack of regulations and regulatory framework: The port lacks a proper regulatory framework stipulating the different rules and guidelines to be followed by the various entities. The current regulatory framework gives complete decision-making control to the Temporary Committee and does not specify a proper supervisory authority. For example, Article 82 of the Financial Regulations of the Port of Beirut allows the Temporary Committee to conclude agreements by mutual consent, regardless of their value, and requires the approval of the Director General only. In addition, Article 52 stipulates that supplies, works and services are to be procured through public tender; however, it is possible to conduct tenders through a variety of procedures, for example, a restricted bidding method, by inviting bids, or through mutual agreements, which do not always guarantee the maximum transparency.

Furthermore, the current regulatory framework does not enforce the type of government supervision that would be normal at a port. For example, financial reports are not supervised by an audit court or the Ministry of Finance, despite the port being a public facility spending public funds. Around 25 percent of the port's profits (total revenues less operating expenditure, less capital expenditure budget) are transferred to the Lebanese Treasury, while 75 percent are spent on renovation and development projects, assessed and carried out solely at the discretion of the Temporary Committee (Maharat News, 2020).

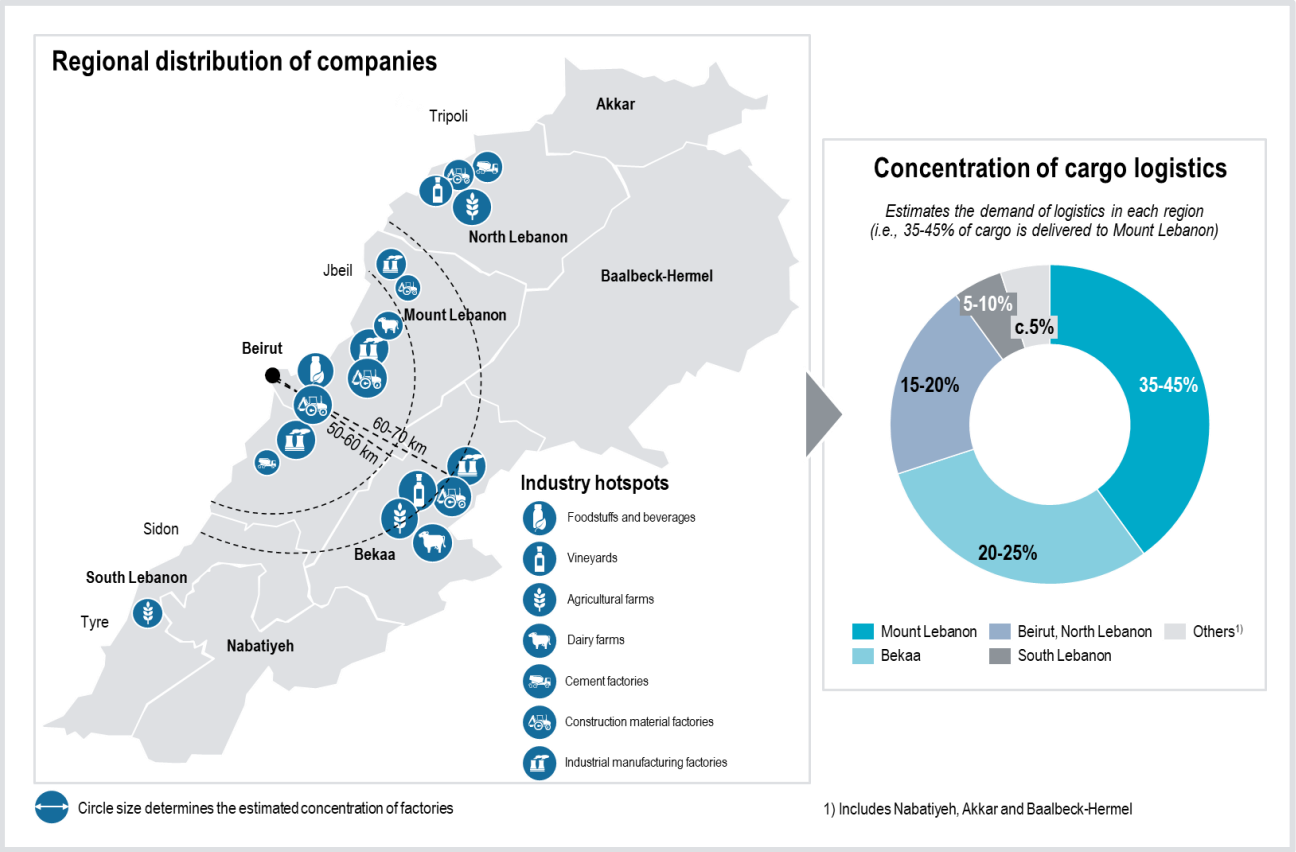
Interference of vested interests in port operations: "Clientelism", with informal interference and a strong role of political affiliations, lies at the core of the port's operations. This creates a system without clear roles and responsibilities. It also leads to continuous political interference in key infrastructure development, and increased allegations of corruption. Interventions by multiple stakeholders also have a negative effect on the development of the port, as the conflicts that arise usually put an end to projects and slow down decision-making processes.

2.1.4 Assessment of hinterland

Local hinterland

Services, agriculture, construction and manufacturing form the pillars of the Lebanese economy. Manufacturing companies are concentrated in certain regions, with more than 55 percent based in Mount Lebanon and Beirut, as shown in Figure 7 (UNIDO & MoI, 2018). The leading pharmaceutical companies in Lebanon are Pharmaline, Benta Pharmaceuticals and Algorithm, all located in Mount Lebanon (IDAL, 2020). In the plastics industry, the main player, INDEVCO, has two factories, both in Mount Lebanon, and Pandaplast is based in the Bekaa region.

Figure 7: Assessment of local hinterland



Source: Desk research, Roland Berger

Cement production for the domestic construction sector is led by three key players: Ciment de Sibline (in Mount Lebanon), Cimenterie Nationale and Lafarge-Holcim (both in North Lebanon). As Lebanon has placed an import ban on cement and clinker, the geographical location of these companies is not so important for cargo transportation demand (Ecocentra, 2016). In fact, a large share of the main traders in building materials (iron, steel, brick, stone and cement) – such as DEMCO and Moussawi Trading Company, which are estimated to import around 50 percent of total steel volumes (IFP, 2015) – are based in Beirut and Mount Lebanon, while others, notably Dalal Steel and UNITech, are based in the Bekaa region.

Agriculture contributes around five percent to total GDP. The sector includes fruits and vegetables, dairy farms, wheat mills, irrigation, landscaping and winemaking (World Bank, 2019a). Agricultural holdings in Lebanon are found particularly in North Lebanon, which accounts for 30 percent of total activity, and the Bekaa region, which accounts for 20 percent (IDAL, 2017a). Bioland, Amazonia SAL and Agritec are all located in the North, while Agrifresh, Choueiry Fruit Farm and Smaha Plants are located in the Bekaa region. There is also a minor concentration of holdings in the south of Lebanon, accounting for 14 percent of total agricultural activity, including companies such as JAYA Hydroponic Farms.

Lebanon has four main players in its dairy industry. Three are located in the Bekaa region and one is in Mount Lebanon. Taanayel Les Fermes leads the market, with almost 50 percent of total market share, followed by Khoury, LibanLait and finally Dairiday. These companies have their own farms and livestock, and manufacture their own produce (Executive, 2014).

The wheat industry in Lebanon is subject to agricultural limitations, such as a lack of space and the type of wheat grown, making the country dependent on imports. Some 13 mills plant and harvest wheat in the country, with the highest concentration found in Mount Lebanon (six are situated in Mount Lebanon, three in Beirut, two in the Bekaa region, one in the south and one in the north). More than half of the market is accounted for by three main players: Crown Flour Mills, with an estimated market share of 24 percent, Bakalian with 18 percent and Modern Mills with around 13 percent (Blominvest, 2016b).

Lebanon is one of the oldest sites of wine production in the world. There are around 46 wineries in Lebanon, concentrated in the Bekaa region and North Lebanon. Ksara (Bekaa region) leads the market, with an approximately 35-40 percent market share, followed by Kefraya, with a 20-25 percent market share. Ixir, which has an approximately six percent market share, is located in Bezbina in North Lebanon (Blominvest, 2019)

The services and tourism sector is the largest contributor to domestic GDP, accounting for approximately 75 percent (World Bank, 2019d). This sector has a strong impact on the development of the food and beverages (F&B) industry, which accounts for around 22 percent of all industrial enterprises in Lebanon (IDAL, 2017b). F&B manufacturers are mostly located in the Bekaa and Mount Lebanon regions. Kassatly Chtaura, located in the Bekaa region, offers a wide variety of products, such as jams, juices, beer and wine. In Mount Lebanon, the famous Lebanese Ghandour factory produces local sweets and confectionery. Al Wadi Al Akhdar, located in Dora, Mount Lebanon, produces traditional Lebanese hummus and baba ganoush, tomato paste and other canned foods. Food trading companies are mainly located in Beirut and the Mount Lebanon region: Three large players in the market are George R. Fattouh, Suhail Fakhran Foods SAL and Moussallem Group.

To estimate the demand arising from the local hinterland, and thus the need for national logistics, we need to understand the relationship between the regional distribution of companies (and their market shares) and the commodity groups that they import and export.[3] We estimate that 35-45 percent of port traffic is routed to Mount Lebanon, 15-25 percent to the Bekaa region, 10-15 percent to Beirut and North Lebanon, five to ten percent to South Lebanon, and less than five percent each to Baalbeck-Hermel, Nabatiyeh and Akkar.

Regional hinterland

Lebanon and Syria share a 394 km border that connects the Mediterranean coast in the north to the tripoint with Israel in the south. There are three official border crossings between the two countries, one reached from the east and two from the north of Lebanon (Figure 8). The Al Masna'a-Al Jdeidah border crossing connects Beirut to the capital of Syria, Damascus, by means of the Beirut-Damascus International Highway, and passes through the Bekaa valley. Using this highway, it takes approximately five to six hours by truck to reach Damascus from Beirut. From the north, Latakia and Tartous in Syria can be reached from the border crossing of Al Arida-Tartous via the Minieh-Arida Highway. The route to Latakia by truck takes around five to six hours from Tripoli and seven to eight hours from Beirut. Lastly, the Al Abboudiyeh-Al Dabouseyah border entry point connects Lebanon to the Homs Governorate via the Mqaitaa-Aabboudiye Road. The duration of this route by truck is around six to seven hours from Beirut and four to five hours from Tripoli.

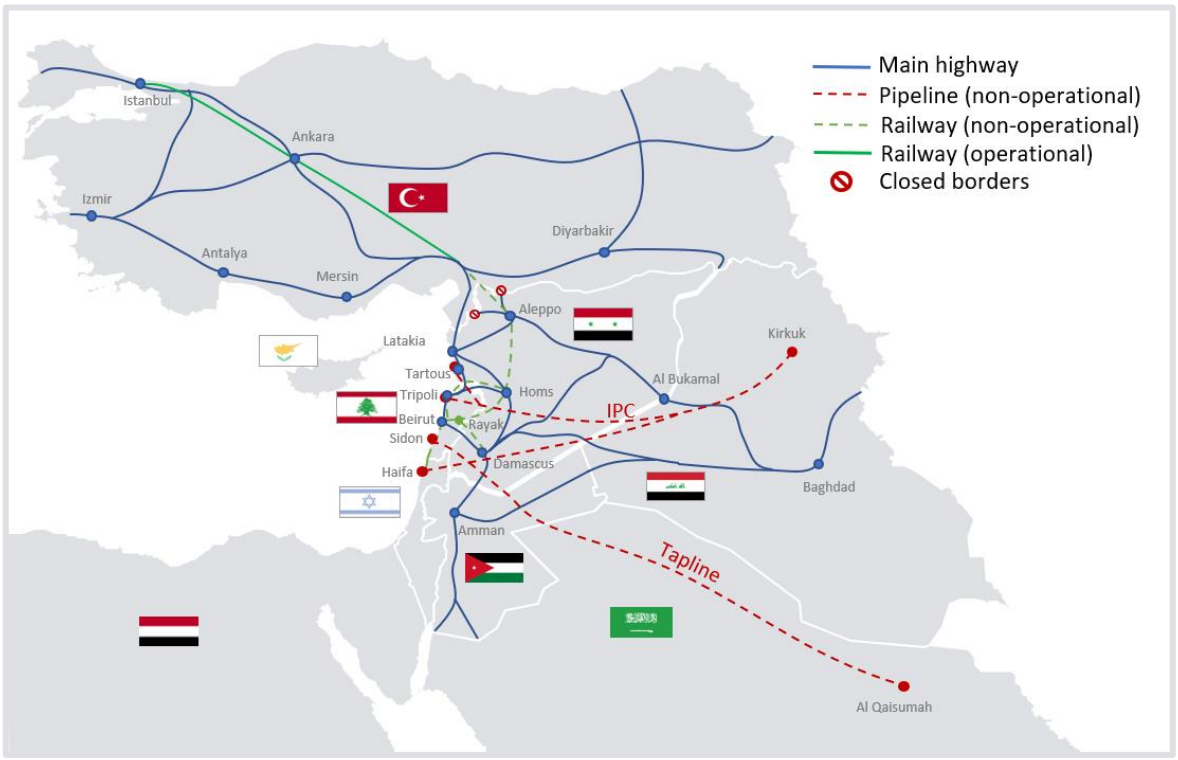
In the mid-1990s, Lebanon had two oil pipelines (shown as dotted red lines in Figure 8). The Trans-Arabian Pipeline (Tapline, demolished in 1956) transported oil from Al Qaisumah in Saudi Arabia to the

[3] Methodology: Commodity groups were first assigned to their potential different importers (companies importing the products). Then, the regional distribution hotspots were allocated for each commodity based on the location of those customers (including their factories) and based on various sources, taking into account their respective market shares. The share of each commodity in total imports and exports was then multiplied by the relevant regional market shares of the companies. The estimated percentage distribution of imported and exported goods for each commodity was then added in the different administrative regions of Lebanon.

terminal of Zahrani in Sidon, which functioned as a refinery at the time. Lebanon then shipped refined oil to different international markets, such as Europe and the United States. The IPC pipeline (destroyed in the Second Arab-Israeli War) from Kirkuk in Iraq to Tripoli, Haifa and Baniyas was mainly used to meet domestic demand, and the refinery met one third of Lebanon's gasoline needs and around half of other fuel requirements.

Lebanon had around 408 km of railroad at one point, including connections to Syria, Palestine and Turkey. Services finally ended during the Lebanese civil war in 1976. Trains formerly moved around 1,000 tons of fuel a day from the refinery in Zahrani to the electricity plants in Beirut (Al Mashriq, 2018). Cement was also transported daily from Chekka to Beirut and passenger trains ran between Beirut and Aleppo, and between Beirut and Damascus. During 1965 approximately 250,000 tons of freight were transported between Beirut and Damascus. Today, all this traffic goes by road.

Figure 8: Assessment of regional hinterland



Source: Desk research, Roland Berger

2.2 Port traffic and volume analysis

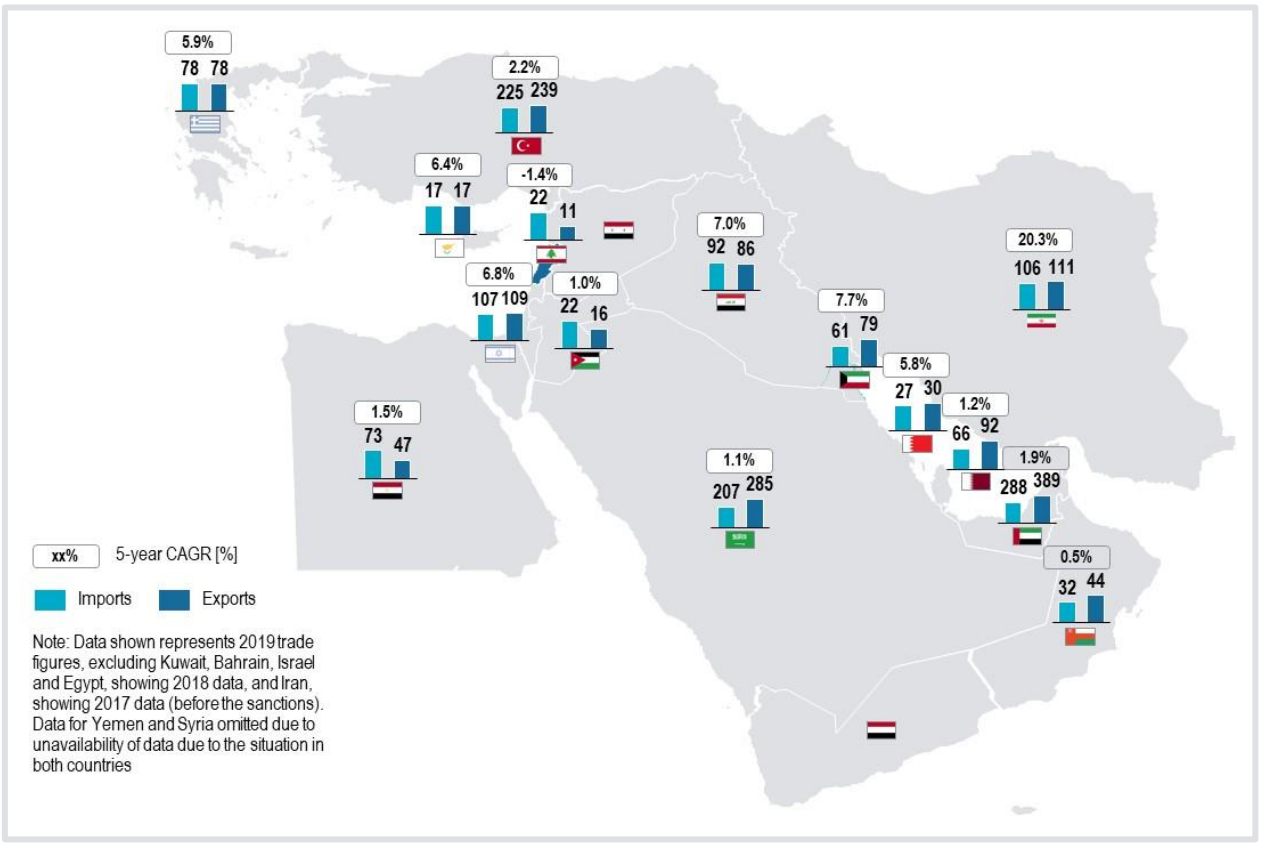
2.2.1 Traffic development – Historical analysis

Trade development in the region

The Middle East (including in a wider sense Egypt, Turkey, Cyprus and Greece) is a heterogeneous region encompassing countries with highly diverse economic conditions. The UAE and Saudi Arabia, due to their oil and gas reserves, channel more than 37 percent of imports and 44 percent of exports in the region. At the opposite end of the spectrum are countries such as Lebanon, which are in the midst of economic and political crises that curb their potential for development.

After a period of growing trade, activity in the Middle East recorded a decline over the last two years, including a 0.6 percent decrease in the value of total imports and a 9.4 percent decrease in the value of total exports from 2018 to 2019 (World Bank, 2019e). This can be attributed to global and regional trade tensions, as well as the increasing volatility of the oil and gas market (IMF, 2019b).

Figure 9: Import and export value in the Middle East, Turkey, Cyprus and Greece [USD bn; 2019]



Source: World Bank, Roland Berger | Note: CAGR is for total trade and is calculated for 5 years from the last year of available information for each country

The biggest importing and exporting countries in the region by value are the UAE, Saudi Arabia and Turkey. The UAE is known for its open economy as a dynamic hub for foreign trade: The total value of its imports and exports was 161 percent of its GDP in 2019 (World Bank, 2019b). It is among the top importers and exporters in the world and the largest trading nation in the Middle East (Santander, 2020).

The presence of free zones in the UAE, such as the Jebel Ali Free Zone for trade and the Port of Jebel Ali, has played a key role in enhancing trade activities in the country (Middle East Institute, 2013).

In Saudi Arabia, foreign trade represents 67 percent of GDP. The country is the twentieth biggest exporter of goods and the thirty-second biggest import market in the world (Nordea Trade, 2020b). Petroleum and petrochemical products make up a substantial part of its exports and the historical rise in oil prices has helped it maintain a surplus in its trade balance. Looking forward, Saudi Arabia is working on diversifying its economy through its "Vision 2030" by spurring private sector growth and attracting new foreign investments to the country (ITA, 2020). As a member of the GCC, the country is party to several free trade agreements (FTAs), including those with Singapore and the European Free Trade Association (EFTA), which have expanded its trading activities and potential.

Kuwait and Iraq have experienced very strong growth in trade over the past couple of years. Foreign trade in Kuwait was 100 percent of GDP in 2018, indicating its importance in the economy (World Bank, 2018). Most export earnings come from oil, as in Iraq. Iraq has minimal trade barriers and has put in place a new trade policy that serves to incorporate it into regional and global trade markets (Nordea Trade, 2020a).

While some countries benefit from a positive trade balance, others, specifically Egypt, Iraq, Lebanon and Jordan, show a major trade deficit. The OECD considers poor market access, inadequate infrastructure and the absence of trade facilitation to be key trade disablers (OECD, 2018). The continuing conflict in Syria and economic hardships in other countries have had a significant effect on trade flows. As a neighboring country, Lebanon has experienced an influx of refugees, while itself already facing an economic downturn (World Bank, 2020d).

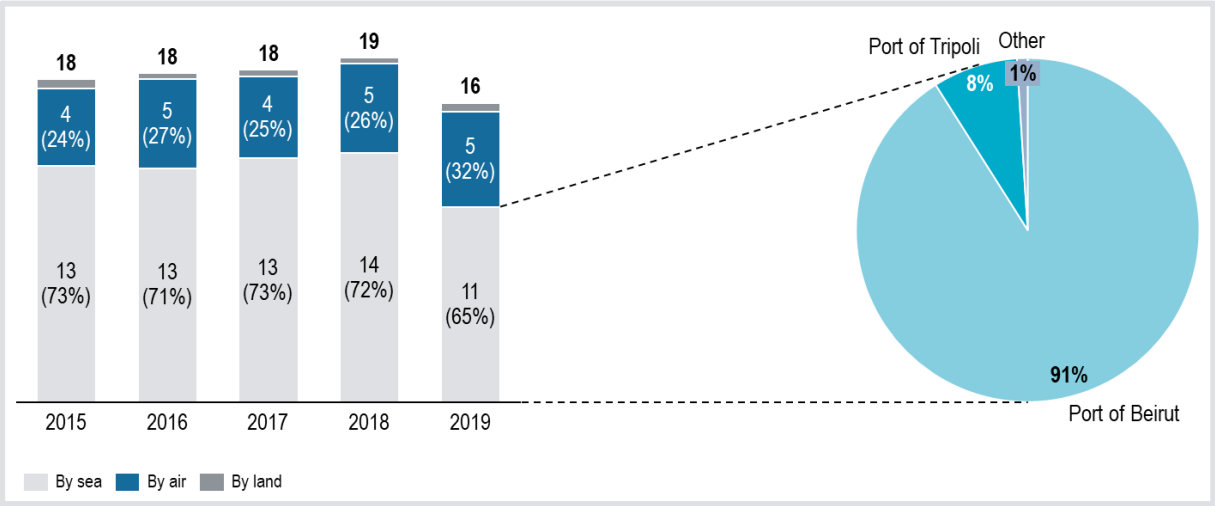
Most recently, the COVID-19 pandemic has led to less trade, with imports and exports of goods and services decreasing even further. Oil prices have plummeted and export commodity-dependent countries in the Middle East, such as Saudi Arabia, have suffered a contraction in overall trade development as a result (IMF, 2020). However, political activities and negotiations, such as the UAE-Israel peace deal, raise hopes for more prosperous future trading activities in the region.

In countries such as Lebanon, by contrast, the shortage of resources induced by the economic crisis and global pandemic has worsened. Lebanon's main trading activities occur by sea, air and land. The Port of Beirut and Port of Tripoli in the north account for more than 95 percent of total maritime trade (Lebanese Customs, 2020). Trading by air occurs through the country's sole airport, Rafic Hariri International Airport located in Beirut. The border crossings between Lebanon and Syria have been severely affected by the Syrian conflict, which makes imports and exports to and through the country difficult.

Trade development in Lebanon

Lebanon's liberal trade regime has been the main driver of inter-regional and intra-regional trade. According to the Investment Development Authority of Lebanon (IDAL), imports to Lebanon benefit from the country's low tariffs, as well as its multiple trade treaties, such as the Greater Arab Free Trade Area (GAFTA) and the European Free Trade Association (EFTA) (IDAL, 2019). Nevertheless, both imports and exports have suffered a decline since 2012 as a result of the Syrian conflict, and since 2018 also due to the Lebanese economic crisis (World Bank, 2019c).

Figure 10: Value of total trade (import and export) in Lebanon [USD bn; 2015-2019 total]



Source: Lebanese Customs[4]

For the past five years, close to 75 percent of Lebanon's trade activities by value were by sea. The Port of Beirut was responsible for around 90 percent of these activities, while eight percent went through the Port of Tripoli and the remainder through other, smaller ports.[5] Since the explosion at the Port of Beirut, the Port of Tripoli has been playing a significant role in the nation's import and export of goods, with multiple cargo flows rerouted there. In terms of other channels, around 25-30 percent of trade value went through Rafic Hariri International Airport, while the remaining three percent or so went by land via the border crossings with Syria[6] (Lebanese Customs, 2020).

Main origins of imports

Lebanon's main import sources reflect a mixed picture over time. Demand for goods has changed greatly in recent years due to the economic situation. As such, the analysis of trade flows shows that the top trade partners vary. For example, in 2017, Lebanon's top import partners by trade value were China for machinery and mechanical equipment, followed by Italy and the United States for mineral fuels and oils. In terms of volume, Greece, Russia and Italy were ranked the highest for imports of mineral fuels. In 2019, however, the top three import partners by trade value were the United States and Greece for mineral fuels and oils, and China for electrical equipment and machinery. In terms of metric tons, imports from Greece were the highest, followed by Russia and the United States.

[4] Data does not include mineral fuels, see Footnote 7.

[5] Port of Sidon and Port of Tyre in the South of Lebanon.

[6] The Masna'a, Abboudieh and Arida border crossings.

Main destinations for exports

As with imports, Lebanon's leading export destinations vary across the years. This can be attributed to Lebanon's overall limited level of exports. In terms of value, top export partners in 2017 were South Africa and the UAE, mainly for pearls and precious stones, and Syria for sugar, sugar confectionery and plastics. However, in terms of volumes in 2017, Turkey ranked first (iron and steel), Syria second (sugar and sugar confectionery) and Saudi Arabia third (mainly edible fruits and nuts). In 2019, Switzerland and the UAE ranked first and second as top export countries, respectively (pearls and precious stones), followed by Saudi Arabia (prepared vegetables and edible fruits and nuts). In terms of metric tons – and hence traffic at the ports – the picture is quite different again: Syria was the main export destination (mineral fuels and oils), followed by Greece and Egypt (mainly cast iron and steel) (Lebanese Customs, 2020).

Trade at the Port of Beirut

We performed an analysis of volumes at the Port of Beirut over the past five years.[7] About six to eight million tons of merchandise were handled at the port each year, mainly consisting of container cargo, general cargo and dry bulk (not considering transit and transshipment volumes).

[7] Methodology: The analysis of the five-year historical volume development is based on a triangulation of data sources for the years 2015-2019. As a first step, publicly available data was retrieved from the Port of Beirut website, offering a new and old model of statistical accounting (Port of Beirut statistics section: "Goods movement"). In this step, irregularities between the accounting sets and further inconsistencies in the port's data were found (missing trade figures for certain years, misalignment between Port of Beirut data and customs data, presence of different commodity group coding types across the years). The available data was compared with input from the Lebanese Customs Administration office. As both international trade analytics and local interview partners rely mostly on the Lebanese Customs Office data, this approach was followed in this study, too. However, as the share of container and non-container cargo is not reported in the Customs dataset, this share was integrated using Port of Beirut information and validated with industry experts. Selected manual adjustments were carried out as discrepancies in the share of cargo groups were noticed in Port of Beirut data. Overall, the approach allows us to develop a comparable view in line with international trade analytics. In addition, it provides a basis for analyzing the data across trade volumes, cargo types and commodities. Expert interviews showed that the accounting of fuels at the Port of Beirut must be differentiated from that of other commodities. In Lebanon, mineral fuels (mainly gasoline and diesel) are mainly imported to the ports of Tripoli and Saida, as well as to specific private ports along the coastline that are operated by fuel companies. These ports provide liquid bulk tanks for fuel tankers. For these private fuel ports, the Customs Authority linked to the Port of Beirut serves as the official supervisory body. Therefore, these imports are accounted for as if they were part of the imports arriving at the premises of the Port of Beirut. For the purpose of this study, which analyzes throughput at the Port of Beirut, mineral fuel figures were therefore separated out, as no involvement or operational requirements are needed from the Port of Beirut.

The overall trade volumes by weight consist of approximately 90 percent imports and ten percent exports, indicating a considerable trade imbalance. This ratio has not changed significantly over the years. From 2015 to 2017, container and non-container cargo operations displayed two trends: Imports increased from 2015 to 2016 and then started to decrease from 2016 onwards, while exports remained at a steady level overall. In 2019, however, total trade volumes recorded a significant decrease, with a drop of about 20 percent. Along with the whole country, operations at the Port of Beirut were affected by the increasing downturn in the economy. Port activities and revenues decreased, reflecting the lower trade volumes handled by the port. Figure 11 illustrates the development of total trade volumes since 2015.

Figure 11: Total volumes of traded goods (imports & exports) at PoB [m ton; 2015-2019]

Source: Lebanese Customs, Port of Beirut, Roland Berger

Full-year volumes for 2020 are not available at the time of writing. However, the most recent estimates suggest a negative outlook for the year. Up to the end of August, around 2.7 million tons of cargo movement had taken place. The explosion in August severely damaged the port and brought practically all operations linked to the non-container cargo terminals to a sudden standstill. While the container terminal remains operational, trade flows have fallen below those of previous years.

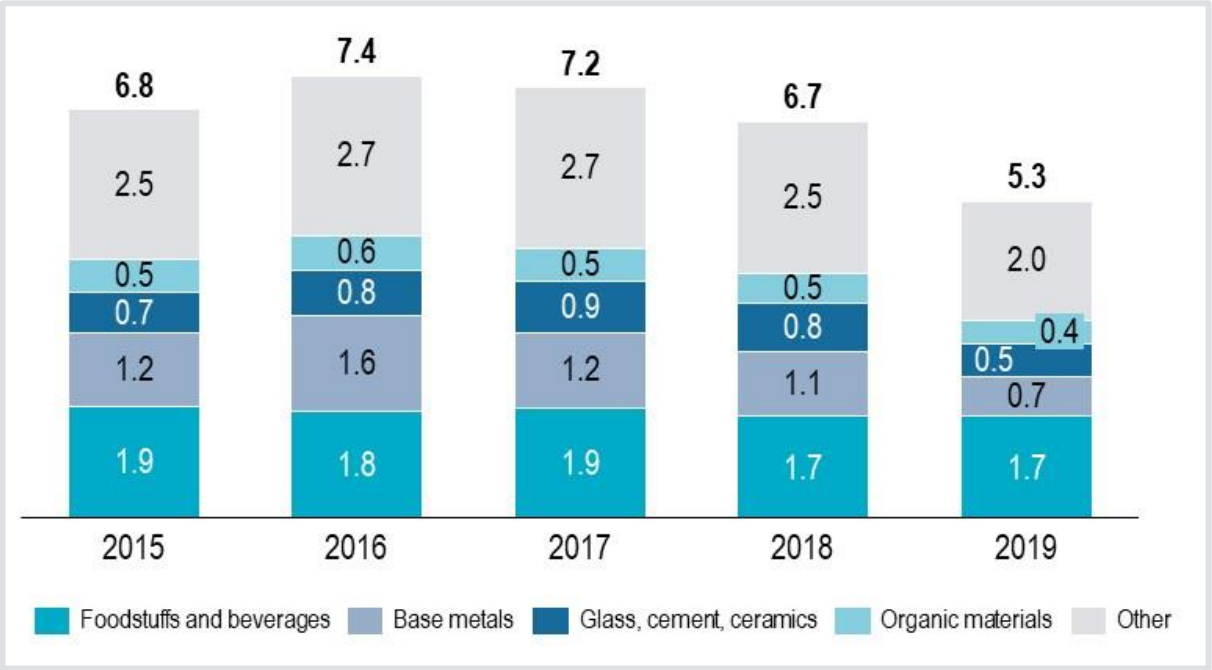
Maritime trade also suffered due to the COVID-19 pandemic and the economic crisis, with limited vessel movements and trade flows, especially in the first half of 2020. While the overall industry currently paints a more positive picture for the final months of 2020, it is clear that the combined impact of the events of 2020 on trade through the Port of Beirut has been dramatic. The outlook for cargo is highly negative, as not even half of the trade volumes seen in previous years were reached by November 2020 (Lebanese Customs, 2020).

2.2.1.1 Local demand (import and export)

Import assessment

Imports at the Port of Beirut constitute approximately 90 percent of all trade volume by weight, of which about 65 percent is container cargo and 35 percent general cargo and dry bulk. The main commodities brought into the country via the Port of Beirut are foodstuffs (mainly grains) and beverages, base metals (including iron and steel), glass, cement and ceramics, and organic materials (Figure 12).

Figure 12: Total volumes of main import commodities at PoB [m ton; 2015-2019]

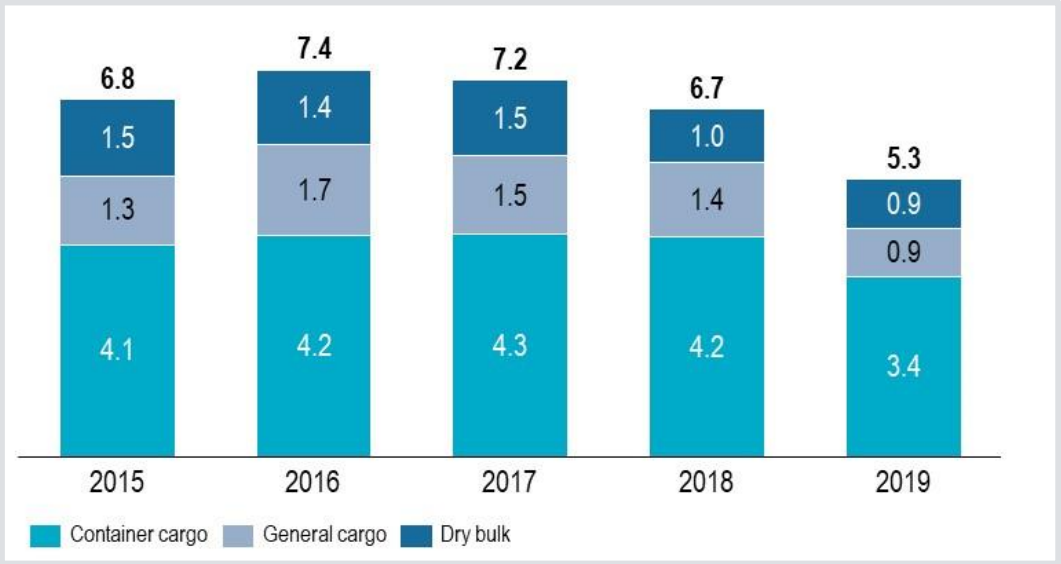


Source: Lebanese Customs, Port of Beirut, Roland Berger

As shown in Figure 13, container volumes remained relatively stable from 2015 to 2018, then fell in 2019. Around this time, Lebanon entered a full-blown economic crisis the likes of which had never been seen before. This led to a downward trend in both GDP and consumption figures.

Non-container volumes of general cargo and dry bulk have been declining since 2016. General cargo (including Ro-Ro) and dry bulk account for a similar share of total volumes, at around 18 percent each on average. Both types of cargo saw a similar trend, with volumes increasing in 2016 but decreasing until 2019, indicating a slowdown in the economy.

Figure 13: Total volumes of imported goods by cargo type at PoB [m ton; 2015-2019]

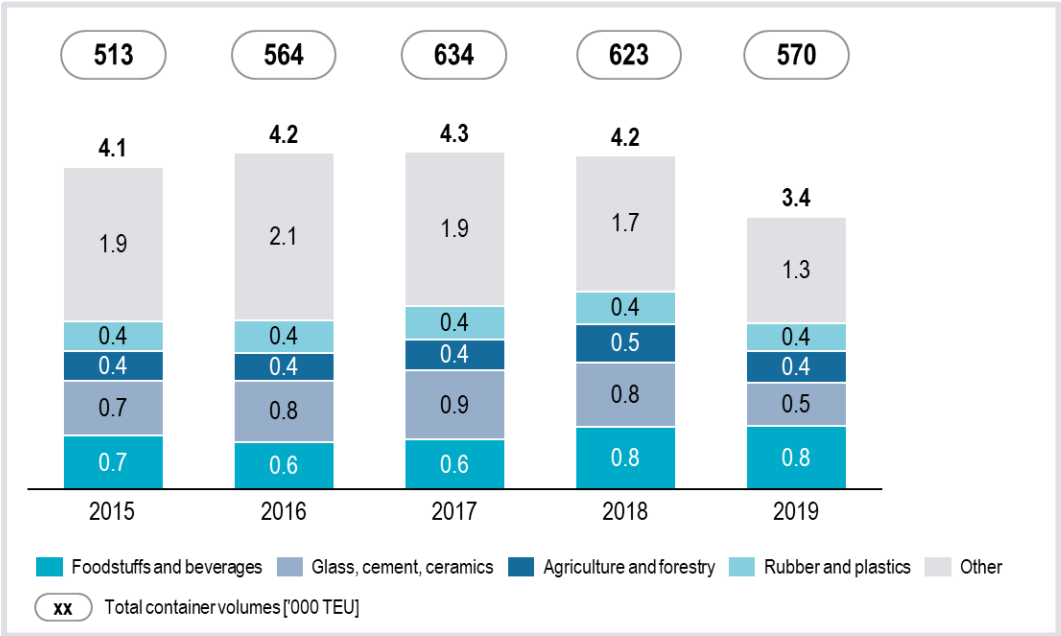


Source: Lebanese Customs, Port of Beirut, Roland Berger

Container cargo

Container cargo represents a total share of about 65 percent of import tonnage. The main commodities are foodstuffs and beverages (mainly vegetables, beverages and dairy products), glass, cement and ceramic goods, agriculture and forestry products (such as wood and paper), and rubber and plastics. Together, these commodities account for about 60 percent of all container imports.

Figure 14: Breakdown of imported container cargo in commodities at PoB [m ton; 2015-2019]

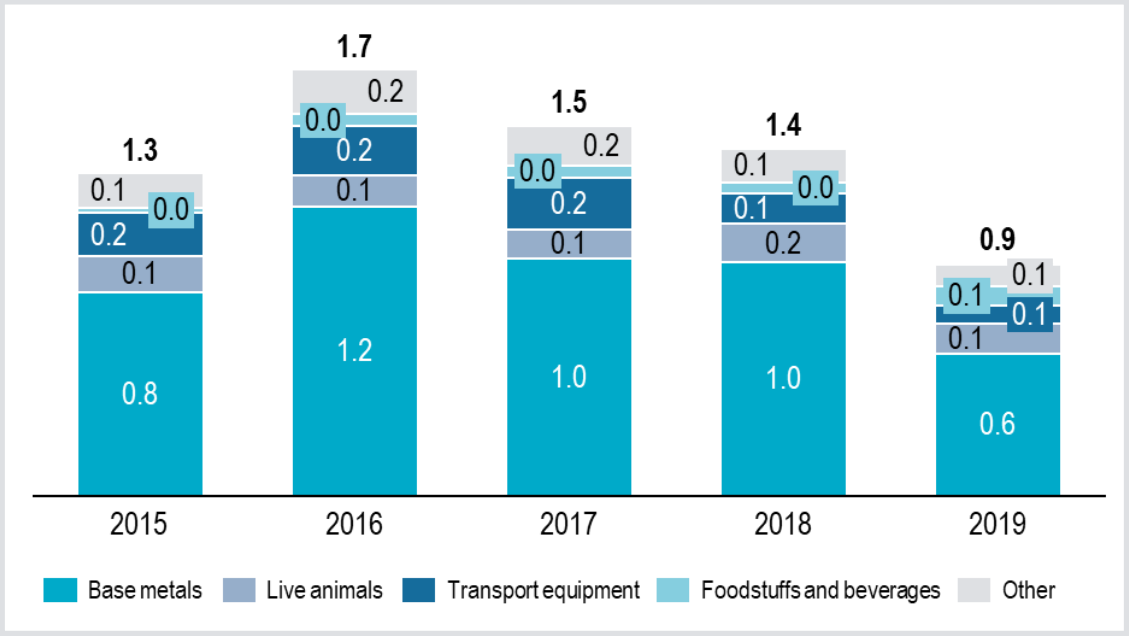


Source: Lebanese Customs, Port of Beirut, Roland Berger

General cargo

General cargo makes up approximately 20 percent of total imports by weight. The most imported commodities are base metals, accounting for around 65 percent. This is followed by live animals, transport equipment, and foodstuffs and beverages, these three groups together amounting to 25 percent on average. Base metals are mainly iron and steel, but also some aluminum and copper. These metals are mainly used for manufacturing and construction. Foodstuffs comprise mostly vegetables and dairy products. Transportation equipment includes Ro-Ro cargo, such as cars and other vehicles.

Figure 15: Breakdown of imported general cargo in commodities at PoB [m ton; 2015-2019]



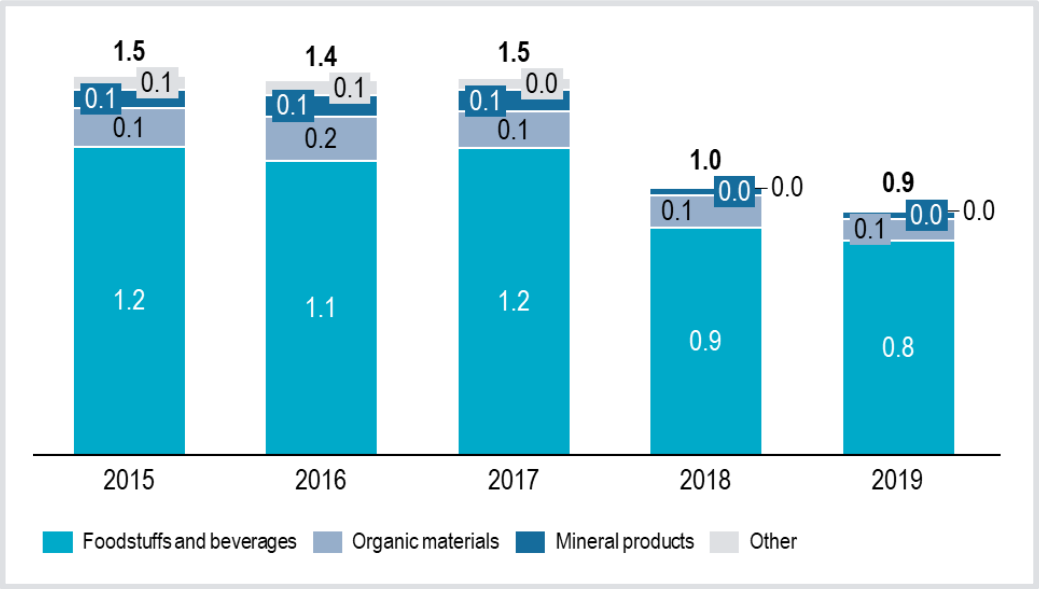
Source: Lebanese Customs, Port of Beirut, Roland Berger

The breakdown of commodities illustrates that while 2016 saw an increase in imported general cargo – mainly due to the larger share of base metals – the overall trend has been downwards. Since 2016 there has been a significant annual decline in general cargo coming into the country of around 18 percent per year. As a result, general cargo volumes were lower in 2019 than in 2015.

Dry bulk

The commodities categorized as dry bulk mainly consist of foodstuffs (predominantly grains and cereals), organic materials (such as food waste used as animal feed) and mineral products (such as salt, sulfur, earths and stone), as shown in Figure 16. In 2015 to 2017, import levels remained relatively stable. However, in 2018 dry bulk volumes decreased by about 30 percent. While grains and cereal still represent the largest share, their import volume also decreased in 2018 and remained at this lower level in 2019 (a trend also seen in commodities). Volumes of organic material and mineral products have also further decreased. Overall, this signifies a decline in domestic agriculture.

Figure 16: Breakdown of imported dry bulk cargo in commodities at PoB [m ton; 2015-2019]



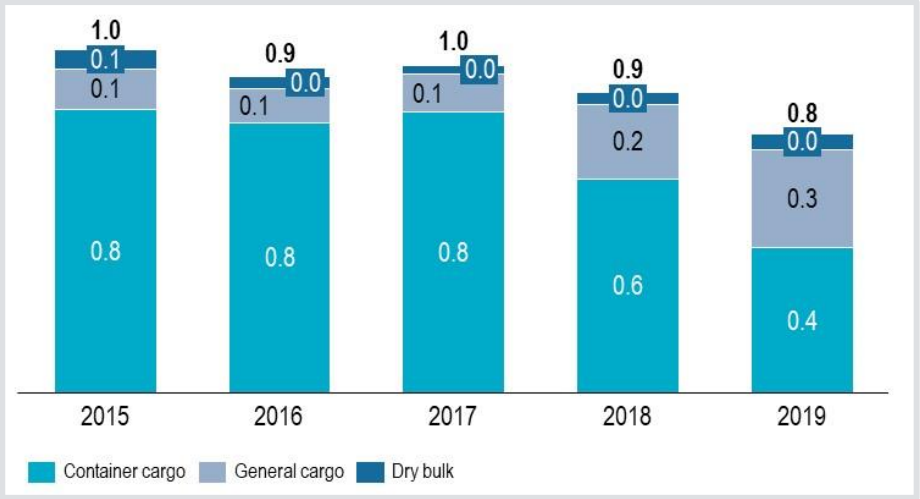
Source: Lebanese Customs, Port of Beirut, Roland Berger

Export assessment

With 90 percent imports and only ten percent exports, the trade imbalance at the Port of Beirut is significant. Lebanon is an import-oriented country whose exports are limited to just a few goods and industries. The exported goods handled by the Port of Beirut are mainly foodstuffs and beverages, base metals, and agriculture and forestry commodities, constituting about two-thirds of exports on average. Foodstuffs and beverage exports are mainly vegetables, fruits and nuts, as well as selected beverages; base metals are mainly iron and steel. As base metals are also imported in much larger volumes, it is assumed that exports refer to these commodities after processing. Agriculture and forestry commodities are mainly paper, plus paper and wood pulp. Organic materials include fats and oils, for example olive oil.

Our analysis shows that, on average across the years 2015-2019, 25 percent of exports by weight were exported as non-container cargo, while 75 percent were transported in containers. Figure 17, however, shows that container exports plummeted from 2018 onwards, while non-container exports (namely general cargo) increased, almost becoming the biggest share of exports.

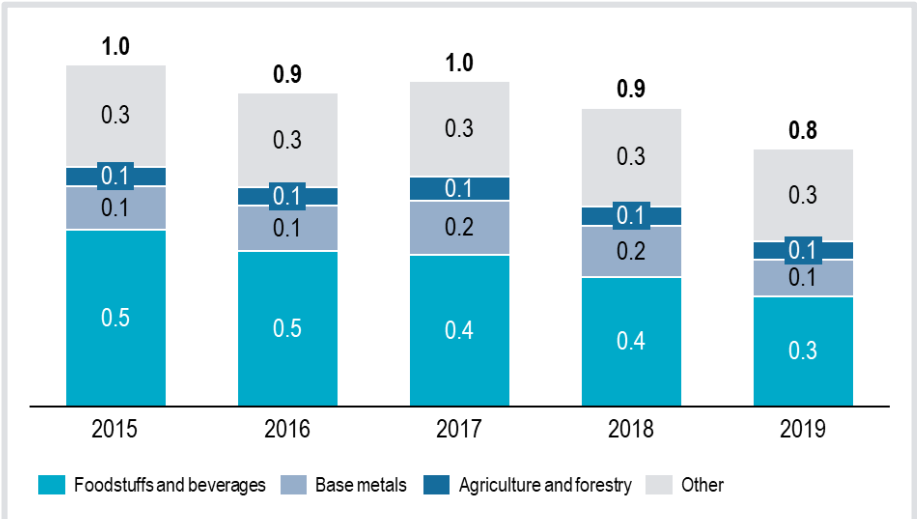
Figure 17: Total volumes of exported goods at PoB [m ton; 2015-2019]



Source: Lebanese Customs, Port of Beirut, Roland Berger

Due to data inconsistencies,[8] the split between container and non-container cargo is approximate and based on multiple sources. The allocation of export commodities to container and non-container categories in the Port of Beirut statistics may have some limitations. We have therefore adjusted it on the basis of expert input. Overall, the data from 2017 to 2019 shows that the main decrease in export volumes was for container cargo. However, Figure 18 indicates a decrease in all export commodity groups, indicating a slow decline in all export volumes during this period.

Figure 18: Total volumes of main export commodities at PoB [m ton; 2015-2019]



Source: Lebanese Customs, Port of Beirut, Roland Berger

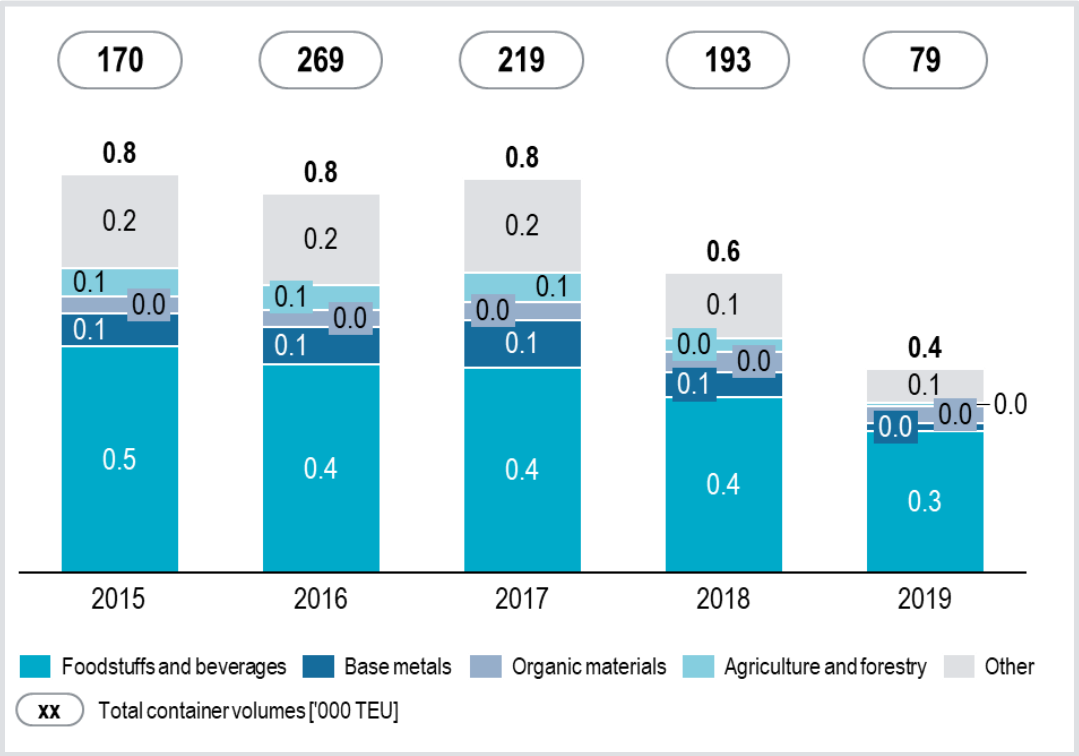
[8] See also Footnote 7

Container cargo

As containers at the Port of Beirut transport about 75 percent of export volumes, the main commodities are similar to those of overall exports. On average, about 60 percent of annual container export volumes are made up of foodstuffs and beverages, including vegetables, fruits and nuts. In addition, base metals make up on average about ten percent of total export volumes. Organic materials (such as animal or vegetable fats and oils) make up just six percent, and agriculture and forestry products five percent.

From 2017 to 2019, container export volumes fell by about 50 percent, while the split of commodities remained roughly the same (Figure 19). The decline was not as pronounced during this period in terms of total exports. This can be explained by the fact that the decrease in container cargo was partially offset by a simultaneous increase in volumes for non-container cargo types, mainly general cargo.

Figure 19: Breakdown of exported container cargo in commodities at PoB [m ton; 2015-2019]



Source: Lebanese Customs, Port of Beirut, Roland Berger

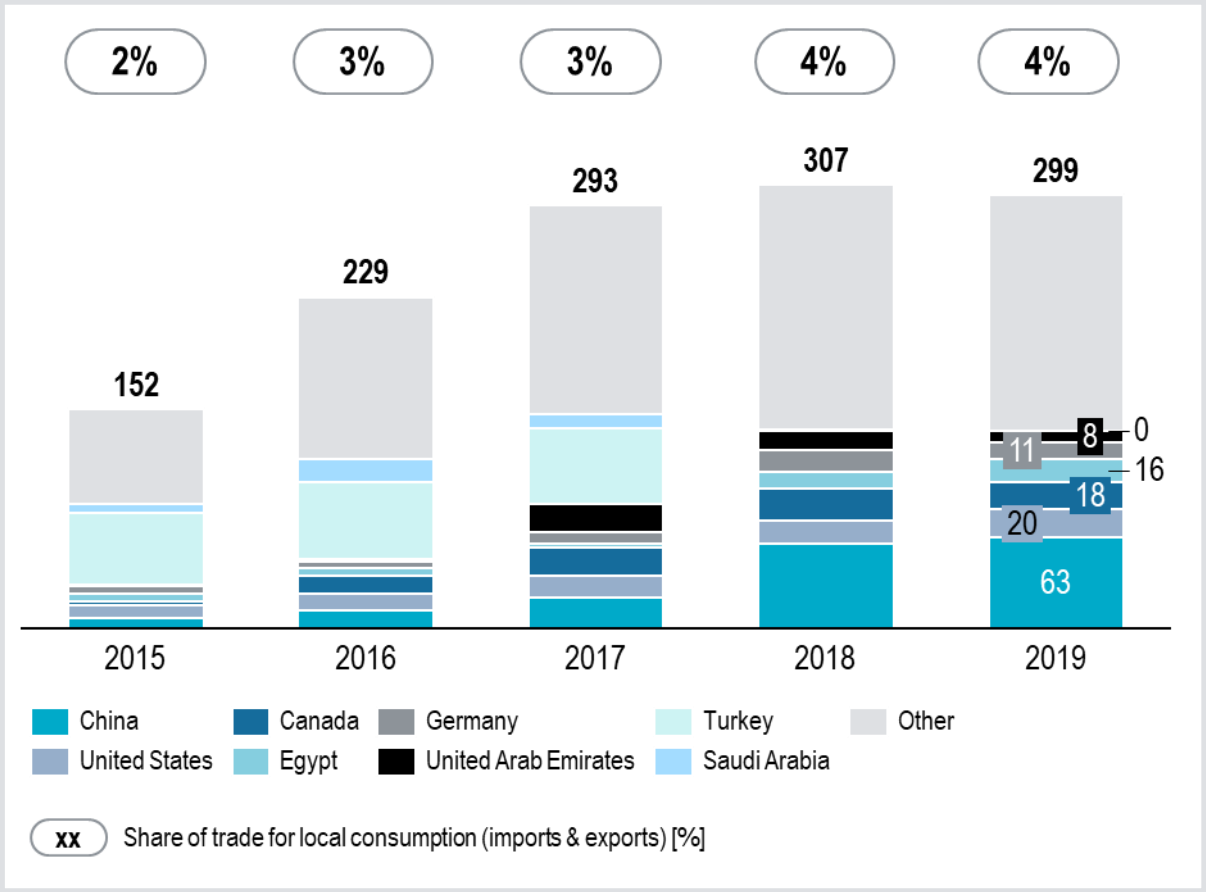
For details of general cargo and dry bulk exports, please refer to the Appendix.

2.2.1.2 Transit

"Transit trade" refers to foreign goods (imports and exports) that enter national territory but are not used for local consumption. The data on transit trade relates to how the goods were dispatched. Only the destination country is specified, so the cargo could have traversed numerous countries, including Lebanon, before reaching its destination.

The volume of transit trade through the Port of Beirut grew from 2015-2019. However, it still constitutes a relatively small share of overall throughput at the port when compared to volumes of total domestic trade, at most four percent. Figure 20 shows total transit trade volume by destination country.[9]

Figure 20: Total transit trade by country destination at PoB ['000 ton; 2015-2019]



Source: Lebanese Customs, Roland Berger

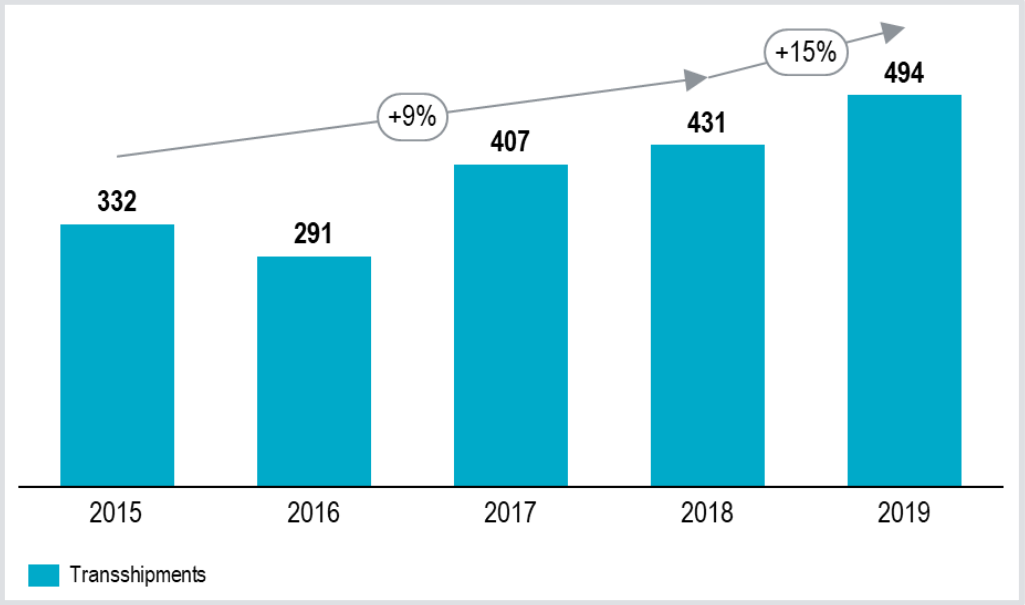
2.2.1.3 Transshipments

The Port of Beirut is generally considered a good hub for transshipments. Transshipment increased nine percent year-on-year from 2015 to 2018, then by 15 percent in 2019, when transshipment volumes reached approximately 500,000 TEU (Figure 21). Ocean carriers continue to design their Asia-Europe/Mediterranean and Middle East-Europe/Mediterranean networks around Beirut as a transshipment hub, so these transshipment volumes have the potential to increase further. Although throughput grew, interviews with shipping lines confirm that transshipment volumes decreased

[9] During interviews, stakeholders pointed out that these numbers may not reflect the total transit trade that passes from Lebanon to neighboring countries, primarily due to the freight practices of customers importing the products. Thus, in certain cases, customers may import products to Lebanon, pay the relevant custom fees and then go through the normal export process, instead of tagging the data in transit directly. In this case, the hypothesis is that the numbers recorded are included in the raw customs data on imports and exports.

considerably in 2020 due to Lebanon's economic and financial crises and the impact of the COVID-19 pandemic. This led, for example, to MSC stopping transshipments via the port.

Figure 21: Transshipment container volumes at PoB ['000 TEU; 2015-2019]



Source: Blominvest Bank based on Port of Beirut data

2.2.2 Traffic – Forecast analysis

2.2.2.1 Local demand (import and export)

Current demand

As a result of the various crises, Lebanon's economy has entered a downward spiral. This has led to a hitherto unseen depreciation of the currency, with prices for everyday goods becoming exorbitant and many people losing their jobs and their livelihoods. The World Bank and Oxford Economics estimated that by the end of 2020, Lebanese GDP will have decreased by almost 25 percent. Economists predict that this negative trend will continue in 2021 with further negative GDP growth of 2.3 percent and only a gradual increase to reach 2.5 percent GDP growth by 2027 (Euromonitor, 2020).

This macro-economic outlook has direct implications for the Port of Beirut, which acts as a mirror of the Lebanese economy. There are three main reasons for this. First, services contribute roughly 75 percent of GDP in Lebanon (World Bank, 2019d). Within this sector, the tourism industry acts as a driving force, contributing seven percent. Visitors from the region and all over the world come to Lebanon to experience the lively food scene and nightlife of Beirut, relax along the coast or ski in the mountains around Mount Lebanon. The COVID-19 pandemic and the economic crisis led to around 80 percent less tourist arrivals in the first half of 2020 compared to 2019 (Arabian Business, 2020). As a result, many of the import trade flows linked to foodstuffs and beverages, as well as consumer and lifestyle goods, declined significantly. As well as demand for such goods falling, the price of the US dollar keeps increasing, while the local currency has lost much of its value (Reuters, 2020b).

Second, remittances flowing into the country from Lebanese citizens or families of Lebanese origin have made the economic system dependent on foreign cash entering the country. Remittances account for more than 20 percent of the country's GDP, and almost ten percent of all Lebanese households depend

on them as their main source of income (CAS, 2020). As the economic situation worsened and social and political conflicts increased, these remittances slowed considerably. Remittance inflows were also affected by the COVID-19 pandemic, as 400,000 Lebanese live and work in oil-rich countries that saw a fall in oil prices. Lebanon experienced its lowest quarterly total remittance inflow in almost 13 years during the first quarter of 2020 (Arabian Business, 2020) and the World Bank was projecting a 17 percent decrease in remittance inflows from 2019 to 2020. Even more important was the collapse of the banking system. The local currency was devalued by more than 75 percent (The Washington Post, 2020a), resulting in bank deposits losing almost all their value. The Lebanese people cannot access their deposits, as informal capital controls were installed. Due to the strong depreciation of the currency combined with a lack of fresh money, the purchasing power of many people decreased, thus diminishing demand.

Third, the Lebanese industrial sector insufficiently backs the high import volumes. Exports remain low and are mainly of foodstuffs and beverages going to GCC countries (see Chapter 2.2.1).

Modeling future trade volumes is challenging, and the figures below are tentative. We base our forecasts to 2030 on a number of assumptions and input from experts (see Appendix for details). However, history shows that developments in the Middle East can be volatile.

Demand forecast

The Port of Beirut is the central hub of incoming and outgoing goods in Lebanon. The city of Beirut and the greater Beirut region are home to about one-third of the total population. This means that a very large share of imports for domestic consumption remains in the region, while imports supplying industrial activities are further distributed around the country. Our assessment of historical volumes shows that trade volumes through the Port of Beirut were relatively stable from 2015 until the start of the economic downturn in 2018. This direct link between the economic development and trade volumes serves as the basis for our demand forecast.

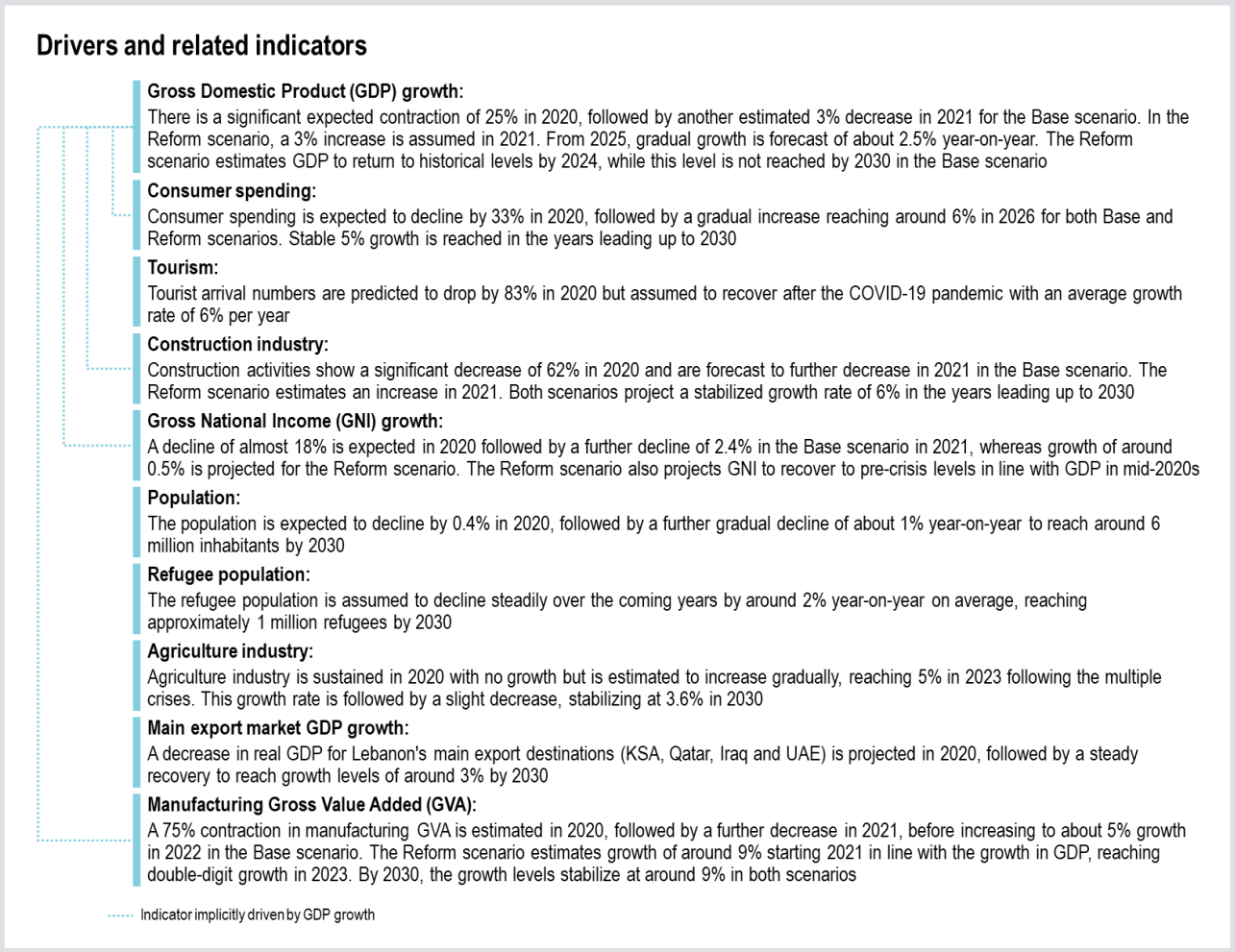
For import trade, we consider foodstuffs and beverages, base metals, glass, cement, ceramics, organic materials, and agriculture and forestry, together representing about 70 percent of all imports. For export trade, we consider foodstuffs and beverages, base metals, agriculture and forestry goods, organic materials, and rubber and plastics, together representing about 80 percent of all exports (Figure 22).

Figure 22: Table of main import and export commodities at PoB [2015-2020]

Source: Lebanese Customs, Roland Berger

For the main commodities, we make certain assumptions about growth drivers. Generally, demand depends on the overall economy. However, specific drivers may explain changes in particular trade volumes. For example, foodstuffs and beverage imports depend on local consumption as well as the increasing numbers of tourists. In this study we mainly use the macro-economic and socio-economic indicators from the World Bank Development Indicators, IMF and Euromonitor, as well as data from recent newspaper articles (Figure 23).

Figure 23: Overview of main drivers



Source: Desk research, World Bank Development Indicators, Euromonitor, Trading Economics, Bank Audi Lebanon, FAO, Roland Berger

Lebanon's current economic and social crises will largely determine its economic potential in the future (COVID-19, financial crisis, banking crisis and debt crisis). First, the COVID-19 pandemic has halted economic growth and the timescale for recovery is still unknown. Comparing this crisis to historical ones, the best-case scenario presents a return to normal as of Q3 of 2021. However, recovery times for emerging markets such as Lebanon are predicted to be longer, with full recovery not foreseen before Q2 of 2022.

Second, looking at the financial crisis in Lebanon, a comparison can be made with the Great Recession of 2009 in the United States, after which the economy took four years to resume steady growth (UK Parliament, 2015). This can be considered a highly optimistic scenario, possibly difficult to realize in Lebanon. Examining the behavior of Cyprus and Ireland, countries more comparable to Lebanon, after the Great Recession indicates a period of six to seven years before full recovery, a timescale that looks more probable for Lebanon currently (IMF, 2019a).

Third, the banking crisis that has manifested itself in Lebanon will also take several years to run its course. In the 1997 Asian crisis, countries recovered within a period of one to three years, depending on their economic state (IMF, 2000).

Finally, the debt crisis has had a powerful effect on Lebanon's economy. A similar incident happened in Argentina in 1998-1999 where a recovery to pre-crisis levels was only achieved within three to four years (The Washington Post, 2003). On the other hand, Greece, even today, has still not returned to the economic levels recorded before its debt crisis in 2007.

As all forecasts at the moment rely heavily on assumptions, we consider two scenarios for GDP growth (Figure 24):

> **Continuation of status quo (Base scenario):** This scenario is primarily based on the Euromonitor prognosis, cross-checked with forecasts from Oxford Economics and the World Bank, which all paint a similar picture. Real GDP is forecast to contract in 2020 (-25 percent) and 2021 (-2.3 percent), return to positive real GDP growth in 2022 (+1.3 percent) and 2023 (+2.3 percent), then settle at annual growth of around +2.5 percent from 2025 onwards

> **Reform & revival scenario (Reform scenario):** This scenario assumes serious political and economic reforms, such as those laid out by the IMF and the World Bank in the latest Lebanon Economic Monitor. Carrying out these reforms could make double-digit growth possible in 2022 and 2023. The 13 percent real GDP growth figure for 2022 is adapted from the recovery behavior of Lebanon's GDP after the 2006 war, the ramifications of which were similar to those of the current economic crisis, the global pandemic and the August 4 explosion. Drastic reforms would need to be implemented quickly for the Reform scenario to be realized

Figure 24: Overview of real GDP growth scenarios [%; 2020-2030]

Real GDP growth scenario	Unit	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Base scenario growth	[%]	-25.0%	-2.3%	1.3%	2.3%	2.7%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Reform scenario growth	[%]	-25.0%	2.5%	13.0%	10.5%	8.0%	5.5%	3.5%	2.5%	2.5%	2.5%	2.5%

Source: Euromonitor, Oxford Economics, Bloomberg, desk research, expert interviews, Roland Berger

Figure 25: Weighted growth rate allocation of main import and export commodities[10]

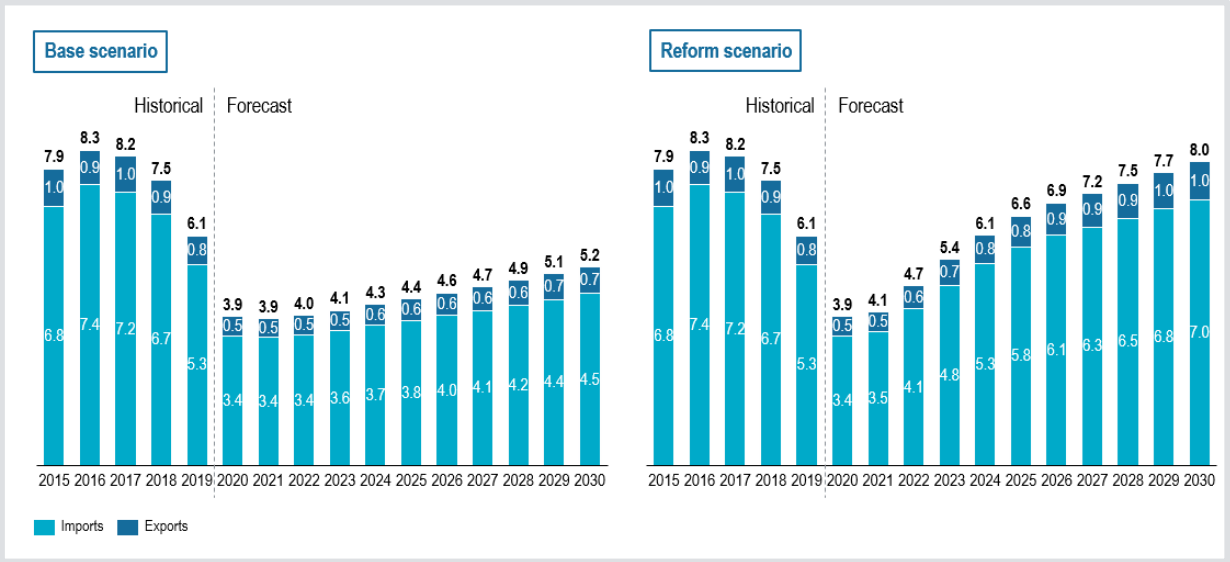
	Top import commodities					Top export commodities					Source
	Foodstuffs & beverages	Base metals	Glass, cement, ceramics	Organic materials	Agriculture & forestry	Foodstuffs & beverages	Base metals	Organic materials	Agriculture & forestry	Rubber & plastics	
GDP growth		25%	25%	35%	65%	15%	30%	45%	90%	45%	World Bank Development Indicators; Euromonitor; Roland Berger estimations
Consumer spending growth	35%					35%					Trading Economics; Eurobarometer; Roland Berger estimations
Tourist arrival growth	20%										World Bank Development Indicators; Newspaper Resources
Construction activities growth		70%	70%				30%				World Bank; Bank Audi Lebanon; Roland Berger estimations
GNI growth	30%					25%					World Bank Development Indicators; Roland Berger estimations
Population growth	10%			5%		5%					Euromonitor
Refugee population growth	5%	5%	5%				15%				World Bank Development Indicators, Roland Berger estimations
Growth in agriculture industry				60%				35%			FAO; Roland Berger estimations
Main export market GDP growth								20%	10%	20%	World Bank Development Indicators; CEIC; Roland Berger estimations
Manufacturing GVA growth					35%	20%	25%			35%	Euromonitor; Roland Berger estimations

Source: Desk research, expert interviews, Roland Berger

The total trade volume forecasts differ widely for the two scenarios (Figure 26), mainly due to differences in forecast GDP growth. In the Base scenario, the decrease in trade volumes in 2019 and 2020 is projected to continue into 2021, and trade volumes are estimated to only pick up again in 2022. However, this is expected to happen slowly and previous traffic levels at the port will most likely not be reached by 2030. In the Reform scenario, demand is predicted to increase from 2021, with historical volumes from 2018 and 2019 being reached within seven to eight years. Overall trade is forecast to exhibit a seven percent CAGR over the ten-year period, more than double that of the Base scenario. However, this rate is contingent upon how fast structural, political and economic reforms take place.

[10] Our demand forecast is a straightforward year-on-year growth calculation starting from the base year of 2019. The database set up for the assessment of historical volumes is used for the forecast. Each unit represents a specific cargo type pertaining to a commodity group per year (trade volume in tons). For each main import or export commodity, a weighted average was calculated per year to constitute a growth factor per commodity/year. Growth rates are then applied to forecast demand. For all other commodities, an average growth rate was assumed building on the specified growth factors for the main commodities (Figure 25).

Figure 26: Demand forecasts for the Base and Reform scenarios – Imports and exports at PoB [m ton; 2015-2030]

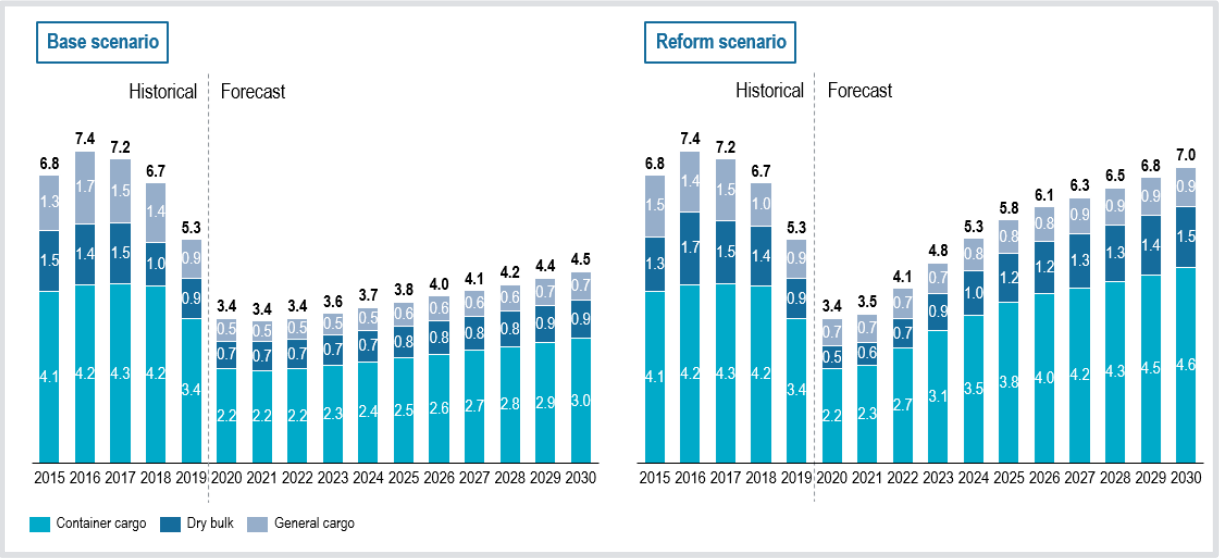


Source: Lebanese Customs, Port of Beirut, Roland Berger

Import

For imports, in the Base scenario, the accumulation of multiple crises primarily affects domestic consumption, while domestic demand, tourism and manufacturing pick up only slowly. The Reform scenario, by contrast, foresees a full recovery of import volumes within the ten-year period, with a gradual increase in volumes from 2021 (Figure 27).

Figure 27: Total volumes of imported goods – Base and Reform scenarios at PoB [m ton; 2015-2030]



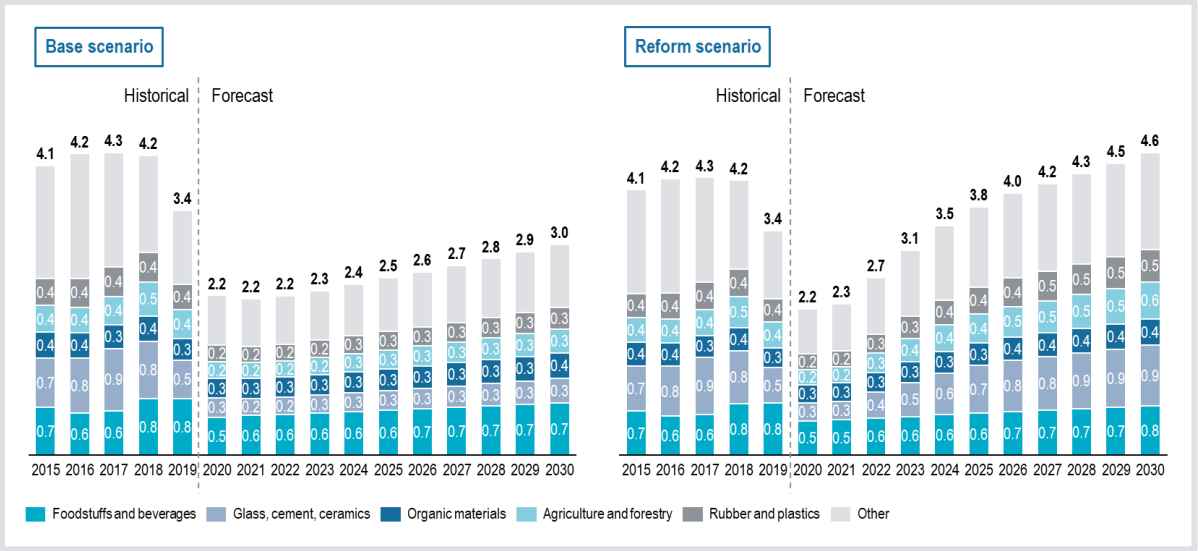
Source: Lebanese Customs, Port of Beirut, Roland Berger

Container cargo

In the Base scenario, the decline in imported container cargo continues until 2023. Only a slight increase in volumes is foreseen, and even the relatively low historical volume of 2019 may not be recovered by 2030. By contrast, the Reform scenario foresees import volumes recovering to their 2019 levels by 2023-2024.

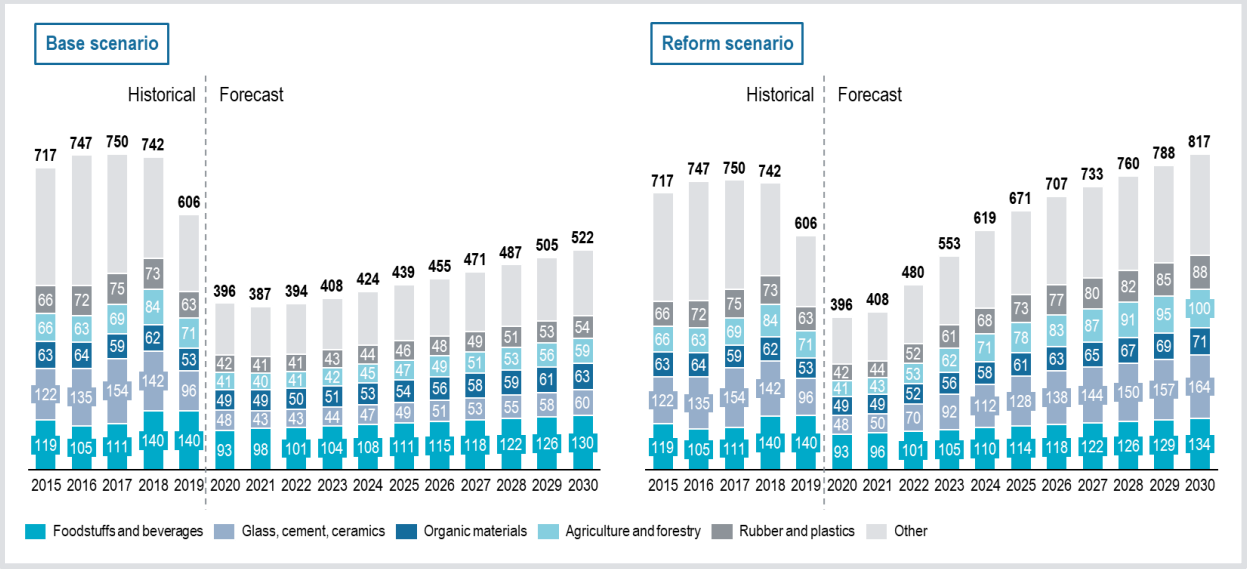
Figures 28 and 29 show the historical and forecast imported container cargo commodities for the Base and Reform scenarios. In both scenarios, the main driver of container imports, foodstuffs and beverages, is expected to be significantly impacted. Imports of this commodity are predicted to decline by about 35 percent from 2019 to 2020 and may build up only slowly. Despite assumed growth in the economy and increasing levels of local purchasing power and incoming tourists, the country will most likely remain affected by the economic crisis, even in the Reform scenario.

Figure 28: Total container volumes of imported goods by commodity – Base and Reform scenarios at PoB [m ton; 2015-2030]



Source: Lebanese Customs, Port of Beirut, Roland Berger

Figure 29: Total container volumes of imported goods by commodity – Base and Reform scenarios at PoB ['000 TEU; 2015-2030]

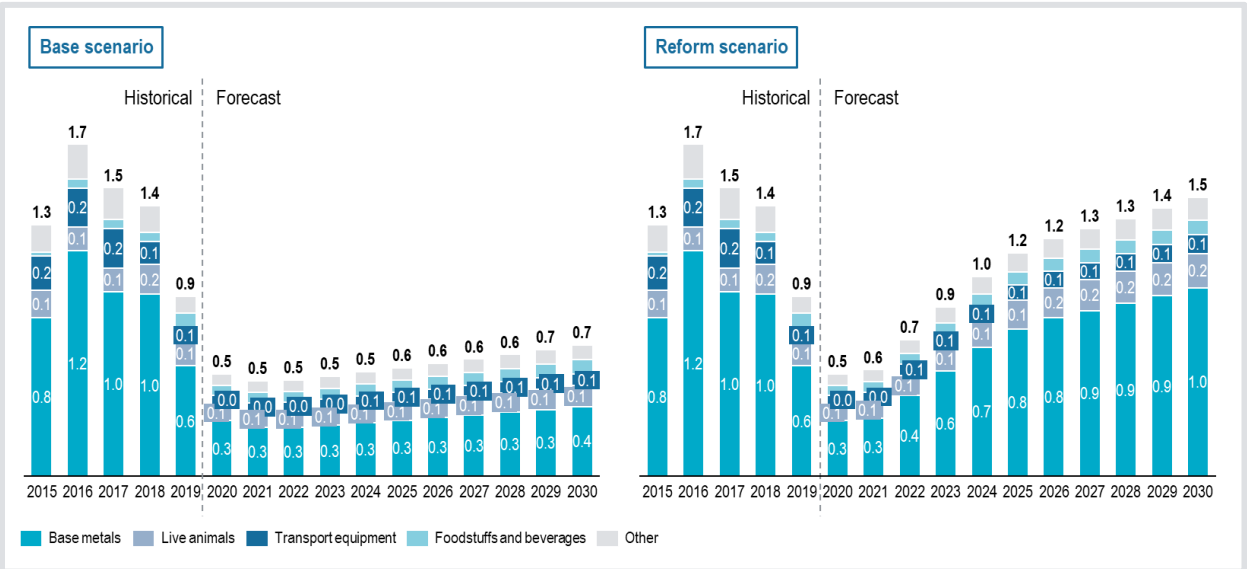


Source: Lebanese Customs, Port of Beirut, Roland Berger

General cargo

A similar picture is predicted for general cargo flows (Figure 30). In the Reform scenario, the 2019 levels may potentially be reached again by 2023-2024, and the levels of 2018 and 2017 could be reached after seven to eight years. In the Base scenario, on the other hand, even the 2019 volumes will mostly likely not be reached within the ten-year period. General cargo imports are usually a good indicator of the size of the manufacturing sector in a country.

Figure 30: Total general cargo volumes of imported goods – Base and Reform scenarios at PoB [m ton; 2015-2030]



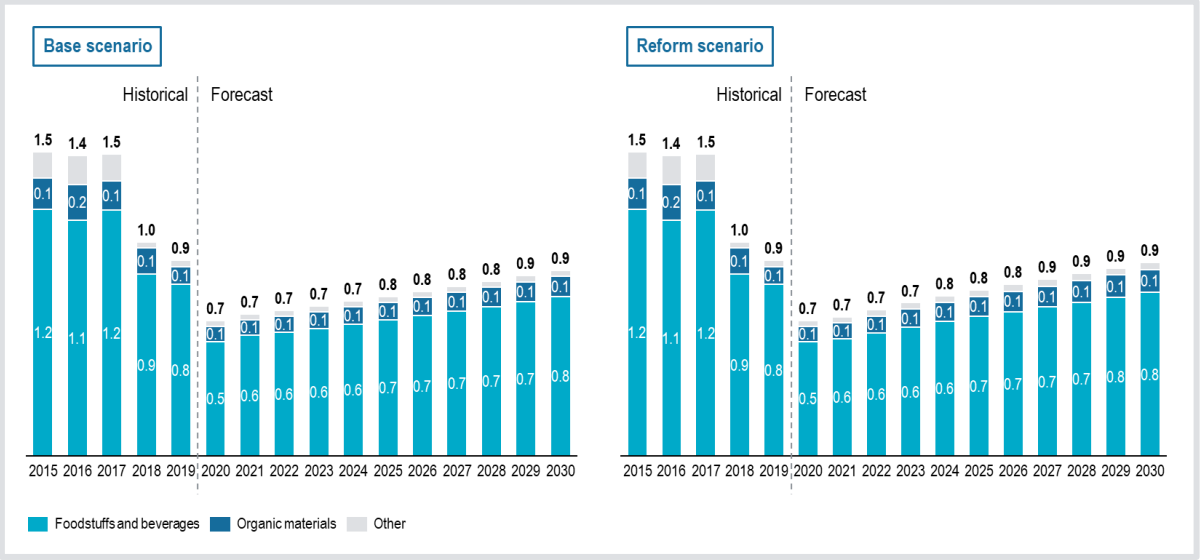
Source: Lebanese Customs, Port of Beirut, Roland Berger

Dry bulk

Dry bulk is an important type of cargo handled at the Port of Beirut. It is predominantly made up of grains (so-called "clean" dry bulk). Satellite images from a few days after the explosion show that dry bulk was already being unloaded in makeshift operations. While grains were stored in a specific grain silo before the August 2020 explosion, they are now mostly transported directly to the mills. As these mills are distributed across the country, such goods could continue to be imported through the Port of Beirut.

The two scenarios in Figure 31 show a similar outcome, with 2019 volumes reached again in full by the end of the decade. GDP growth has a lesser impact on dry bulk forecasts than those for other cargo types, as grains are basic and essential foodstuffs and there are no significant changes expected in the size of the population. Following the explosion, storing clean dry bulk has become a key challenge for the Port of Beirut. If an adequate storage solution cannot be found and cargo flows divert, the import volume for dry bulk may not develop as illustrated.

Figure 31: Total dry bulk volumes of imported goods – Base and Reform scenarios at PoB [m ton; 2015-2030]

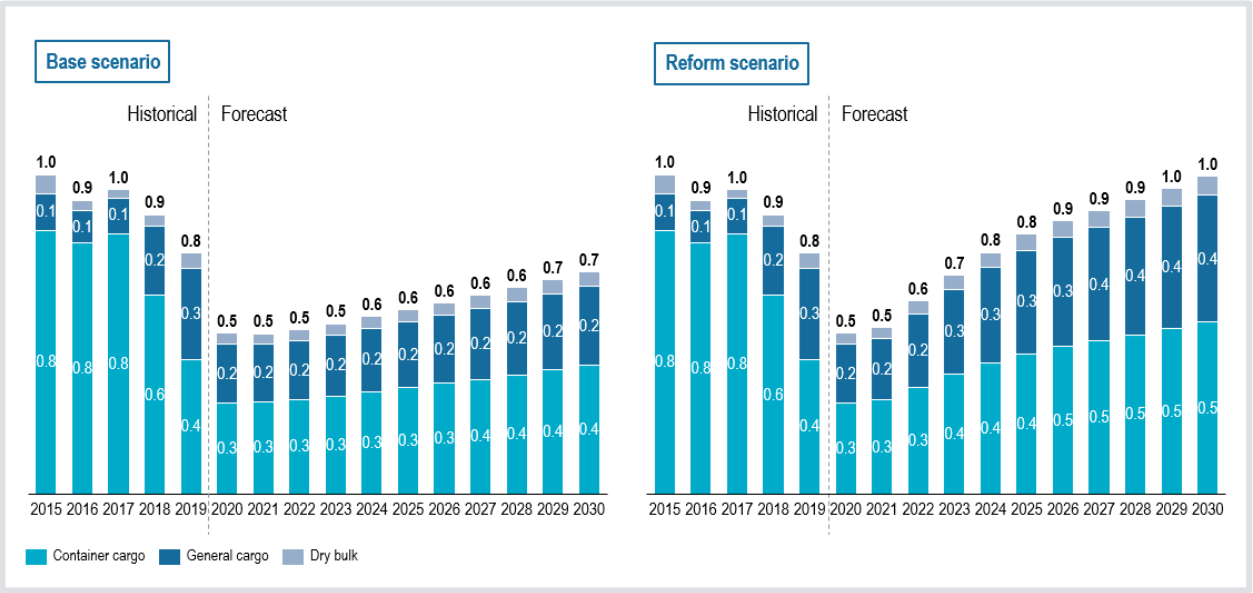


Source: Lebanese Customs, Port of Beirut, Roland Berger

Export

The multiple crises in Lebanon have led to an expected decline of around 20 percent in export volumes from 2019 to 2020. In the Base scenario, only partial recovery is foreseen at the end of the ten-year period. In the Reform scenario, however, growth could be around seven percent, and 2015-2017 volumes could be reached again by 2026-2027, with potential for further growth thereafter (Figure 32).

Figure 32: Total volumes of exported goods – Base and Reform scenarios at PoB [m ton; 2015-2030]



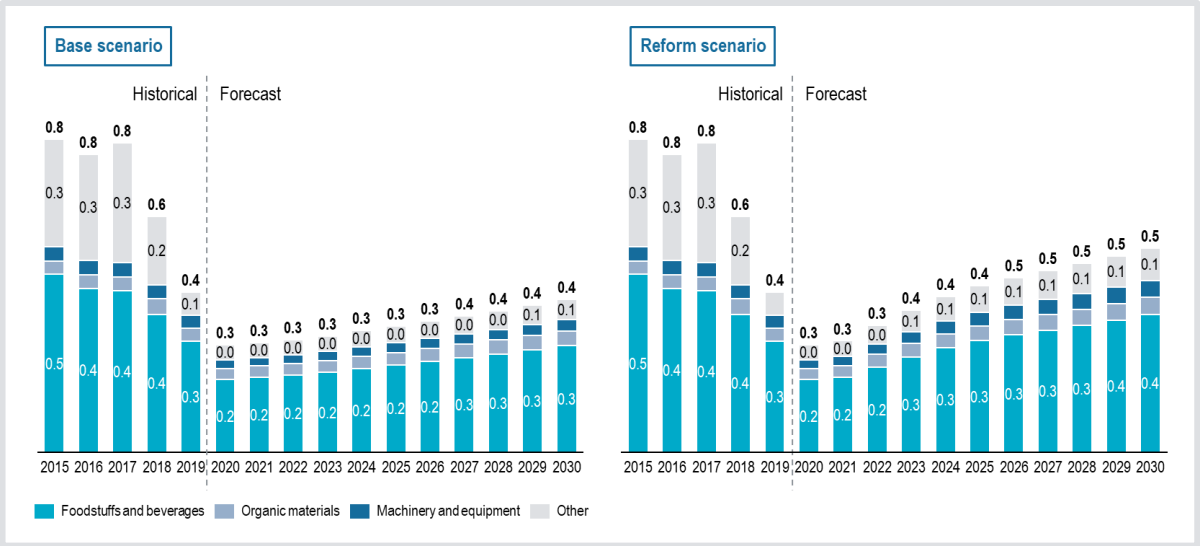
Source: Lebanese Customs, Port of Beirut, Roland Berger

Container cargo

Container cargo makes up the largest share of export volumes. The Base scenario foresees a decrease of 25 percent of total container exports from 2019 to 2020, with an almost full recovery by 2030. In the Reform scenario, 2019 volumes are forecast to be exceeded by 2026.

Figures 33 and 34 show which goods may contribute most to volumes after 2019. Foodstuffs and beverages, one of the main commodities in container exports, are believed to have been the largest contributor to the decline during 2019-2020, with an estimated decrease of 103,000 tons year-on-year (around 35 percent). Both scenarios forecast strong volume recovery for all main commodities, and in the Reform scenario, foodstuffs and beverages are expected to exceed 2019 volumes in 2028.

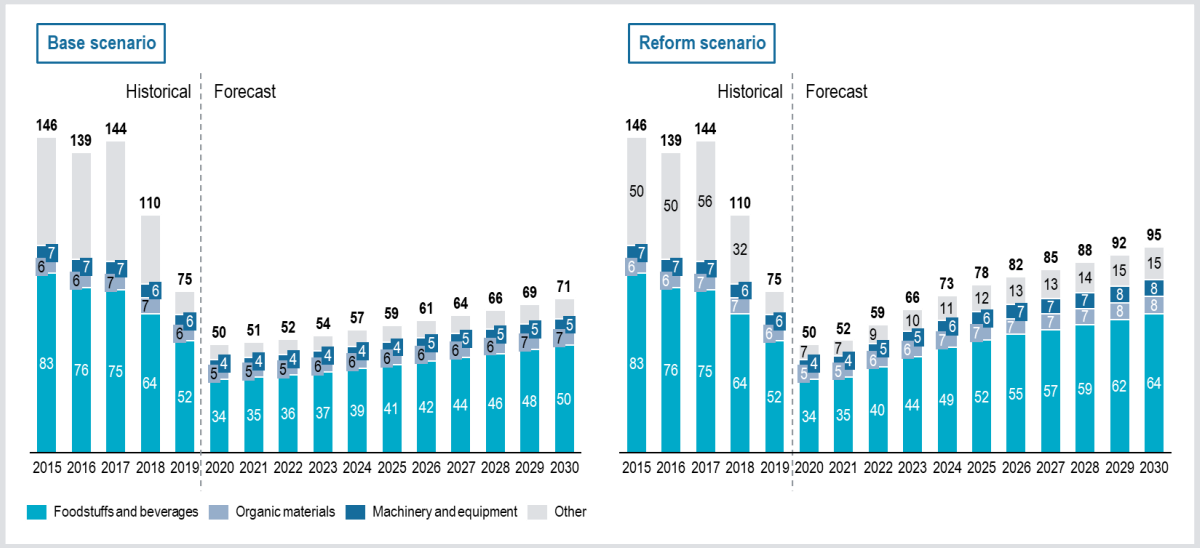
Figure 33: Total container volumes of exported goods – Base and Reform scenarios at PoB [m ton; 2015-2030]



Source: Lebanese Customs, Port of Beirut, Roland Berger

Figure 34 shows that the forecast growth in container volumes is not as pronounced as for other types of export cargo.[11]

Figure 34: Total container volumes of exported goods – Base and Reform scenarios at PoB ['000 TEU; 2015-2030]



Source: Lebanese Customs, Port of Beirut, Roland Berger

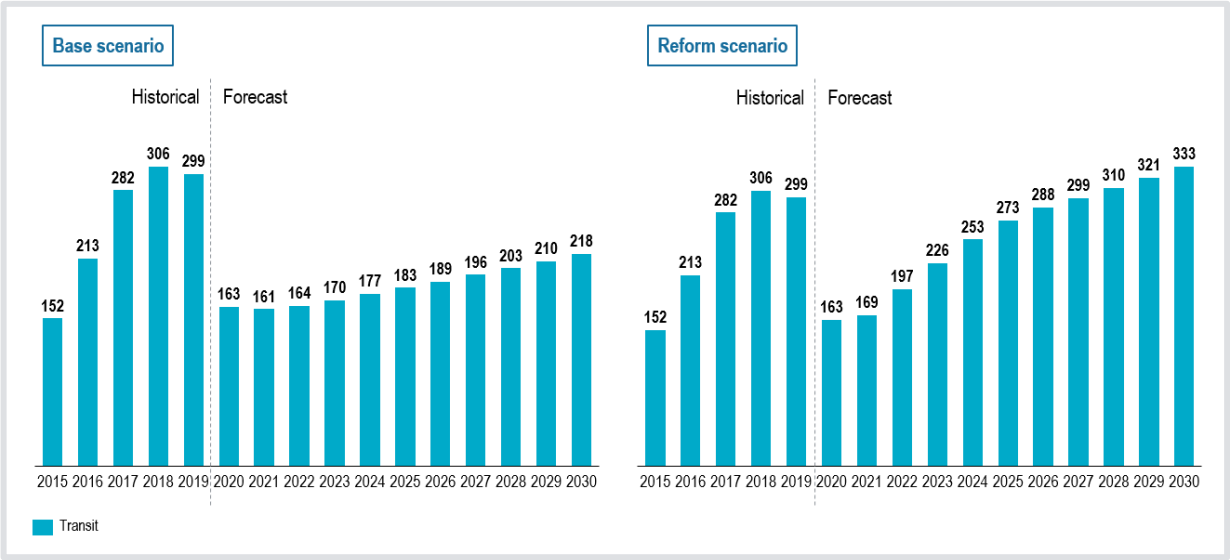
[11] This is due to the assumed split across container and non-container cargo that was approximated based on multiple sources. The forecast builds on the container vs. non-container split for 2019. As Figure 19 shows, this ratio has differed over the years. Hence, it should be noted that while the overall volumes would follow the same projection, the share of container cargo could differ from the indicated estimates and assume a share as demonstrated in other years.

Details for general cargo and dry bulk exports are given in the Appendix.

2.2.2.2 Transit

Transit trade (excluding transshipments) at the Port of Beirut represented a maximum of four percent when compared to total trade volumes for domestic demand historically. Our forecasts are based on transit behavior in 2017-2019. Due to their link to overall trade volumes, forecast developments differ in the Base and Reform scenarios (Figure 35). In the Base scenario, an increase in transit volumes is not expected before 2022, with only slight growth, potentially reaching almost a 75 percent recovery after the ten-year period. In the Reform scenario, which assumes stronger growth, transit trade volumes could be recuperated by 2026-2027, reaching around 330,000 tons in 2030.

Figure 35: Total transit trade – Base and Reform scenarios at PoB ['000 tons; 2015-2030]



Source: Lebanese Customs, Port of Beirut, Roland Berger

As discussed in Chapter 2.1.4, Lebanon has only road access to its neighboring regions. Currently, the political situation and the US Caesar Act (regulating bank activities) hinders official trade and business with Syria. For these reasons, our forecasts are tentative and based on historical development. Future development also depends on whether planned infrastructure developments in Lebanon materialize, such as the Levant Gate railway and tunnel project linking the Port of Beirut to a dry port in Chtaura, Bekaa. At the time of writing, it is unclear when such projects will materialize and so their effect on transit volumes has not been considered.

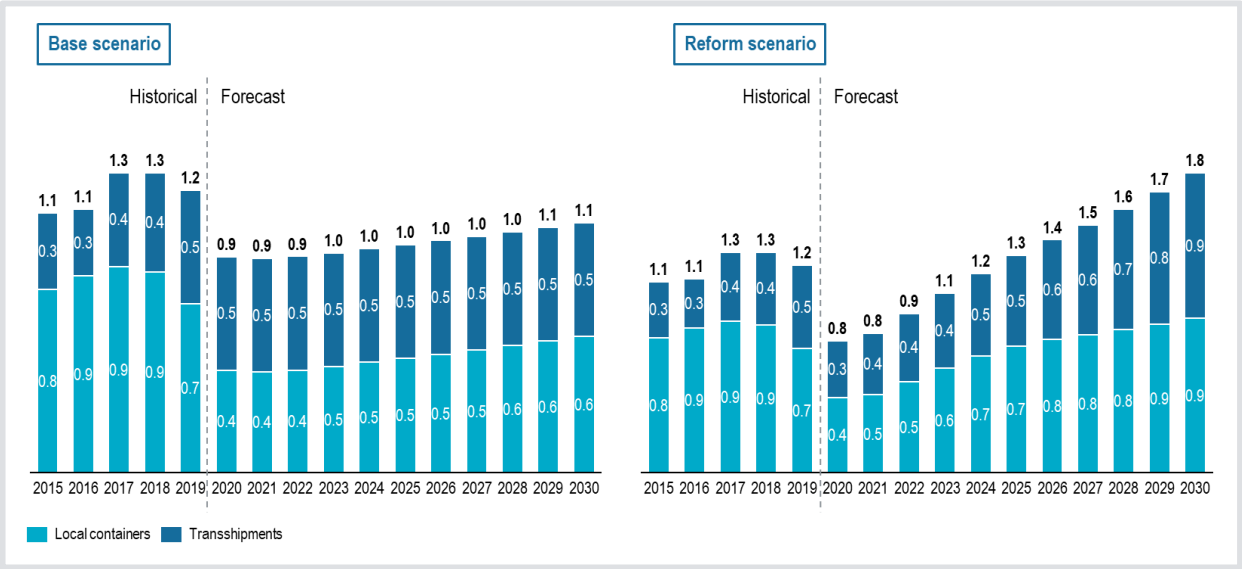
2.2.2.3 Transshipments

From 2017 to 2019, transshipment container volumes constituted between 30 percent and 40 percent of total container volumes, indicating a rather large contribution to trade activities. With a capacity of 1.5 million TEU, the Port of Beirut could play a significant role in transshipment in the region, depending on the strategies of the shipping lines.

Transshipment trade activities were forecast for the two different scenarios. In the Base scenario, 2019 transshipment volumes (nearly 500,000 TEU) are maintained for the next ten years. In the Reform scenario, a year-on-year increase of transshipments by ten percent is forecast based on developments over the past five years, and transshipment volumes are expected to reach the same volume as that of the import/export containers and twice the historical transshipment volume of 2019.

Growth in transshipments was forecast taking into account the port's container capacity and the maximum quantity of transshipment containers it can handle (the capacity of the container terminal could be increased to between 2.4 and 3.0 million TEU by enacting operational improvements and expanding the container backyard). Figure 36 shows historical and forecast volumes of local containers (used for import/export) and transshipment containers for the two scenarios.

Figure 36: Total container volume for local import and export containers and transshipment containers – Base and Reform scenarios at PoB [m TEU; 2015-2030]



Source: Lebanese Customs, Port of Beirut, Roland Berger

2.3 Benchmarking exercise

2.3.1 Governance models

2.3.1.1 Overview of port administration models globally

To build a solid, appropriate and successful governance model, we first need to look at the administration of ports and the roles of the different entities involved in them around the world. This varies greatly from port to port, but some general trends are visible, as shown in Figure 37.

Figure 37: Degree of involvement of different entities in port functions

Port functions \ Port actors	Port authority/ regulator	Port land owner	Port operator(s)	Terminal operators	Other actors
Port development planning	●	●	●	◑	
Land-bank acquisition & control	●	●	◑		
Port infrastructure construction	●	●			
Port infrastructure maintenance (breakwaters, dredging)	●	●	◑	◑	◑
Contract management (concessions)	●	●			
Terminal/berth construction		◑	●	●	
Tariffs & rates control	●	◑	●	●	◑
Marketing & promotion		●	●	●	
Performance control	●	●	●		
Anchorage management	◑	●	●		
Port traffic control	●		●		●
Piloting	●	●	●		
Tugging and mooring	◑	●	●	◑	◑
Berthing operations			●	●	●
Terminal operations & maintenance			●	●	
Cargo handling operations			●	●	●
Yard operations			●	●	●
Port safety management & response	◑	●	●		
Port security		●	●		
Terminal security		◑	●	●	◑
Deciding on investment proposals	●				
Staff recruitment	●				
Port data collection and analysis	●				

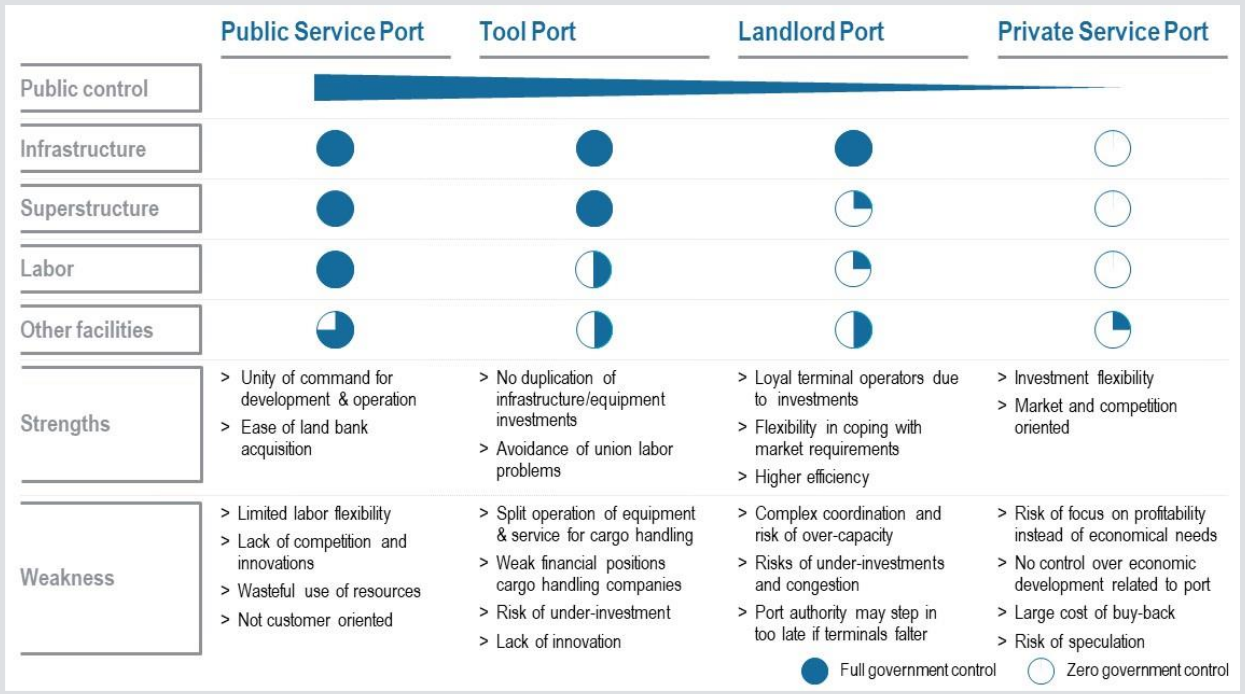
● Common option ◑ Occurs, but not common

Source: Desk research, Roland Berger

Port regulators, landowners and operators are usually a mix of public and private sector entities, each assuming different roles and tasks. The degree to which the public authorities or the private sector have control over the ports' functions dictates their administration model. At one end of the spectrum, the port regulator or authority can be a public entity in charge of all functions of the port, acting as authority, landowner, port operator and terminal operator. At the other extreme, all of these responsibilities can be in the hands of the private sector, as is the case in a fully privatized port. Hybrid approaches are also possible. In all cases, there is usually a government body or bodies that provide oversight.

Four primary port administration models have emerged over the years, each with its own pros and cons. We may classify them by degree of governmental control for each key port function. The main characteristics where they differ are: (i) ownership of infrastructure, (ii) ownership and operation of superstructure, (iii) management of dock labor and (iv) various other functions, including type of cargo handled. The four different models are called "public service port", "tool port", "landlord port" and "private service port" (Figure 38).

Figure 38: Degree of involvement of governmental entities in the four port administration models



Source: Desk research, World Bank, Roland Berger

Public service ports

Public service ports are predominantly public for all four characteristics. The Port Authority owns and operates all land, equipment and services. The dock laborers are directly employed by the Port Authority, and in some cases the cargo handling activities are controlled by a separate public entity. To avoid managerial challenges, the Port Authority and cargo handling company often merge into a single entity. Public service ports are either supervised by or part of the Ministry of Transportation or the Port Authority, and the port chairperson reports directly to the Minister involved. While there exists a unity of command for operational handling, public service ports are often not market oriented, as the private sector does not play any role in their running.

Tool ports

Tool ports have both public and private characteristics. The Port Authority owns and maintains all assets such as land, quay cranes and cargo handling equipment. However, operations performed by dock laborers are handled by private cargo handling firms licensed by the Port Authority. This split in operational responsibilities gives rise to conflicts between Port Authority staff and terminal operators. The lack of capitalization of the private cargo handling firms restricts their ability to expand and compete on an international level. On the other hand, a tool port model reduces the initial capital investment requirement when transitioning to a landlord port model.

Landlord ports

Like tool ports, landlord ports represent a mix of private and public characteristics. The Port Authority owns the infrastructure of the port but allows private companies to use their own superstructure and cargo-handling services. The infrastructure is leased yearly or over a period of years to private operating companies for a fixed sum per square meter or such like, indexed to inflation. Landlord ports are the commonest model for medium-sized to large ports. Their advantage is that a single entity runs the cargo

operations, and the private companies are loyal due to their long-term leases. However, in countries with multiple ports there is a risk of capacity overlap from the various private operators. Compensation models vary in landlord ports, often including some fixed payments and some variable payments linked to throughput.

Private ports

Private ports are fully privatized. This model is very rare, and only found in the United Kingdom, New Zealand and Hong Kong. Private entities own the infrastructure, superstructure and cargo-handling services. The risk with this model is that the port is entirely controlled by the private sector, which can affect the prices at the port and prioritize private sector interests (profit) over national economic interests. Private ports do have their advantages, however, as they allow maximum flexibility with respect to investments and are not subject to government interference.

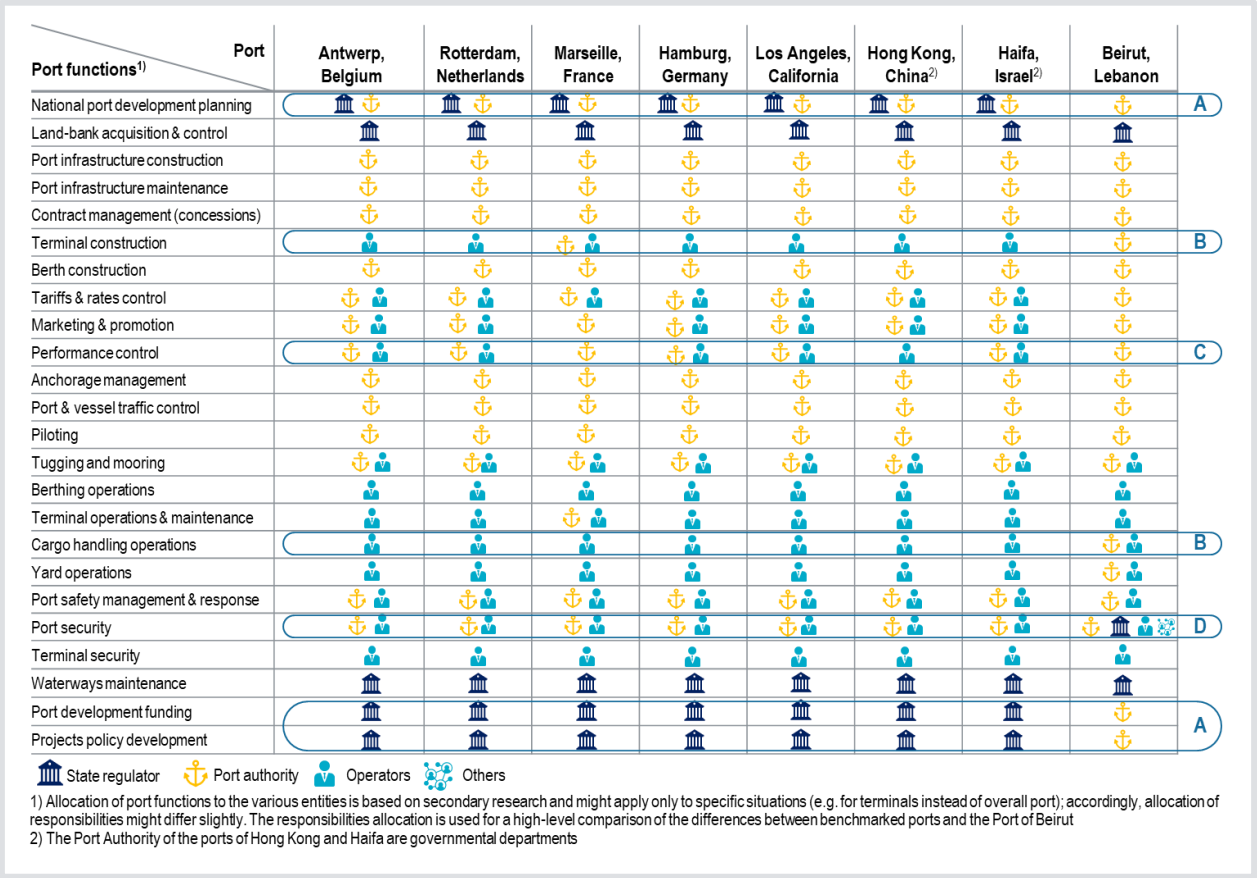
2.3.1.2 Lessons learned from port administration models

We studied the various models from a number of different perspectives, namely the entities involved in running the port, the legal set-up of the Port Authority, the level of interdependence between the Port Authority and the regulating entity, the relationship between the Port Authority and the operators, and the ownership of the port's infrastructure and superstructure.

> **Roles and responsibilities:** Port Authorities are entities, mostly owned or controlled by the government or a municipality, that take care of the management of the port. The role of private operators depends on the port administration model and can include the handling and management of labor (in the case of tool ports), construction and management of superstructures (in the case of landlord ports), and construction and management of terminals (in the case of private ports). For example, at the Port of Marseille Fos, the Port Authority is more involved in the tasks usually assigned to private operators at other ports; some terminals have been constructed by the Port Authority, while new terminals are being built by private operators. This is part of a strategy adopted by the French government to involve more private operators in the construction and operation of the port, while still retaining a strong influence in it. A key source of funding for infrastructure development projects in France is the Deposit and Consignments Fund, which is a public financial institution.

In general, the tariffs imposed by the operators are planned and discussed in advance with the Port Authority in order to ensure competitiveness with other ports. However, in fully privatized ports, for example the Port of Hong Kong, each terminal operator sets its own tariffs. The same applies to "performance control" at each terminal: Typically, this is handled by the Port Authority, but in the case of the Port of Hong Kong it is done by private operators.

Figure 39: Roles and responsibilities at the Port of Beirut and benchmark ports



Source: Desk research, Roland Berger

In the case of the Port of Beirut, the Temporary Committee for Management and Investment of the Port of Beirut is responsible for most of the port functions. This is a very unusual set-up. Key activities, such as setting tariffs, funding development projects, marketing, performance control and project policy development, are all handled by the Temporary Committee. Comparing the allocation of responsibilities at the Port of Beirut with the benchmark ports, we find the following:

> The Temporary Committee currently assumes the functions of port development planning and funding, with minimal coordination from the state (Ministry of Public Works and Transportation) (reference to box A in Figure 39).

> There is an opportunity in the future to maximize private sector involvement in reconstructing the terminals and handling operations (reference to box B in Figure 39).

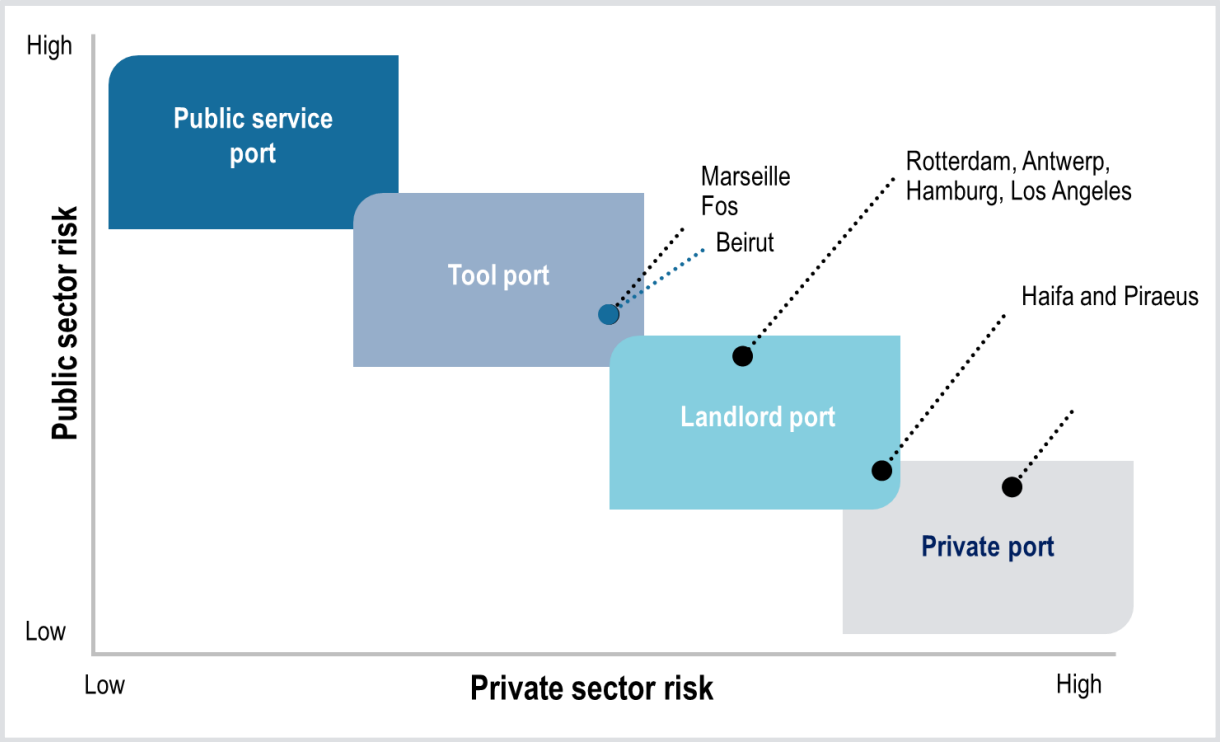
> Performance control is minimal and currently limited to operations at the port; the benchmark ports deploy various performance-control measures (reference to box C in Figure 39).

> Multiple entities with overlapping mandates operate at the port, assuming various functions in managing port security (reference to box D in Figure 39).

Legal set-up of the Port Authority: The government is strongly involved in the ownership of most of the benchmark Port Authorities. For example, at the Port of Marseille Fos – a tool port – the Port Authority is 100 percent owned by the French government. The Port Authority of the Port of Rotterdam – a landlord port – has two shareholders, the Municipality of Rotterdam (70 percent) and the Dutch government (30

percent), while the Port Authorities of Antwerp and Hamburg are solely owned by their respective cities. The ports of Haifa and Piraeus are moving from being landlord ports to more privatized ones, while still having state involvement in their respective authorities. The Israel Ports Authority, a department of the Israeli Ministry of Transport, owns 100 percent of the managing entity of the port of Haifa (it is worth noting that the Port of Haifa is being privatized), while 23 percent of the Piraeus Port Authority is owned by the Hellenic Republic Asset Development Fund, an entity responsible for managing the privatization of state assets. The Port of Hong Kong is a privatized port and is managed by the Marine Department under the supervision of the Secretary for Transport and Housing.

Figure 40: Administration of benchmark ports and the PoB



Source: Desk research, Roland Berger

Governmental entities are always present in the management structure of ports, albeit with varying degrees of involvement. This is mainly due to the vital role of ports in facilitating and promoting a country's external trade. Ports also represent significant accumulated capital investments and are extremely valuable assets for the national economy. Accordingly, any changes to them need to be considered carefully.

Fully privatized ports raise issues when a country relies economically on a limited number of ports of strategic importance, as is the case in Lebanon with its ports in Beirut and Tripoli. Such models restrict the government's ability to develop the ports sector in line with national strategy, as most decisions about the ports are taken by the owners and their shareholders. Privatizing ports also defeats the purpose of attracting foreign investment.

The role of Port Authority at the Port of Beirut is currently exercised by the Temporary Committee for Management and Investment of the Port of Beirut, which is neither a public institution nor a company. Looking at the benchmark ports, the best option would appear to be for the Port of Beirut to establish a company that is fully owned by the government (either through the Ministry of Finance or the Central

Bank) to act as Port Authority. This would enable the Port Authority to act swiftly, like a private company, while the port infrastructure would be fully owned by the Lebanese government.

> **Level of interdependence between the Port Authority and the regulating entity:** All the benchmark ports are continuously supervised by a supervisory body, often the Ministry of Transportation, Shipping and Works. Supervision can be either direct or indirect. In some cases, the level of interdependence is as high as having individuals appointed by the government on the boards of the Port Authority. The Port of Marseille Fos, for example, has government appointees on the supervisory and executive boards of its Port Authority. Greece has a Committee for Planning and Development of Ports made up of representatives of nine different ministries, whose task is to carry out general planning of port programs, distribute funds, determine specifications for port construction projects and the adaptation of port infrastructures to new technology, follow up on implementation and approve development programs in ports and coastal areas.

State influence can also come indirectly through state ownership interests in Port Authorities, or through agreements with Port Authorities. For example, a joint venture between the Dutch government and the Port Authority of the Port of Rotterdam determines annual tariffs at the port.

> **Type of relationship between the Port Authority and the operators:** Private-public partnerships (PPPs) and concessions of various types exist, with different levels of private versus public involvement in designing, building, financing, owning and operating the port infrastructure and superstructure. Precise arrangements differ between countries. In all cases, explicit contractual agreements exist that strike a balance between the strategic development of the sector from a public perspective and maximizing profits from a private perspective.
> Ownership **of the port's infrastructure and superstructure:** Many public service and tool ports are looking for ways to enhance their productivity and performance. The majority of ports are currently transitioning to a landlord port model. This is usually achieved by decreasing the role of the state and forming partnerships with the private sector. This approach allows the government to retain ownership of the port land and infrastructure, while superstructures are financed and owned by the terminal operator – and potentially transferred back to the government at an agreed price at the end of the term of the partnership.

We can summarize our findings as follows:

> At a **national level**:
  – All the benchmark ports have their work supervised by relevant entities. Strategic direction and policies are usually set at a national level, then translated into strategies for individual ports.
  – In certain cases, national committees have been set up to coordinate planning and development.
> At the **level of the Port Authority**:
  – All the benchmark ports have Port Authorities. These can be joint-stock companies fully owned by the government or city in question, partly owned by the government, or autonomous public institutions.
> At the **level of operations**:
  – Many ports are currently transitioning to a landlord port model to maximize the operating skills and investment capacity typical of the private sector, while maintaining supervision. Private sector operators are awarded operating licenses, leases and concessions in clear public procurement and application procedures.

2.3.1.3 Implications for the Port of Beirut

Our examination of benchmark ports suggests that a clear structure should be established in Lebanon at both national and individual port management level. This would ensure clear reporting lines, responsibilities and liabilities. Operations should be properly monitored and coordinated nationally. The roles and responsibilities of the Temporary Committee and the Ministry should be rebalanced. Moreover,

the Port of Beirut should increase private sector participation by transitioning from a tool port to a landlord port. This would enable private sector participation in reconstructing the port, while the ownership of the infrastructure would remain with the Lebanese government. The government should set up a Port Authority to replace the Temporary Committee. Additionally, contracts should be signed between the Port Authority and the private operators. The precise type of partnerships and number of private players will depend on the overall strategic plan developed for the port.

3. Port of Beirut development strategy

3.1 Framework for strategic development options

Ports are complex ecosystems with various national, regional and global interdependencies. Given its significance for the overall economy of Lebanon, strategy decisions for the Port of Beirut ultimately influence its contribution to the national economy. As such, the port development strategy must be aligned with the national transportation and logistics strategies, as well as overarching national economic development strategies and interests.

In this chapter we look at the "option space" for different port development strategies for the Port of Beirut.[12] Furthermore, we include financial modeling of potential future revenues for the port if certain strategic prerequisites are met, building on the assessment of the current situation, demand and cargo traffic forecasts and competitor analysis in Chapter 2.

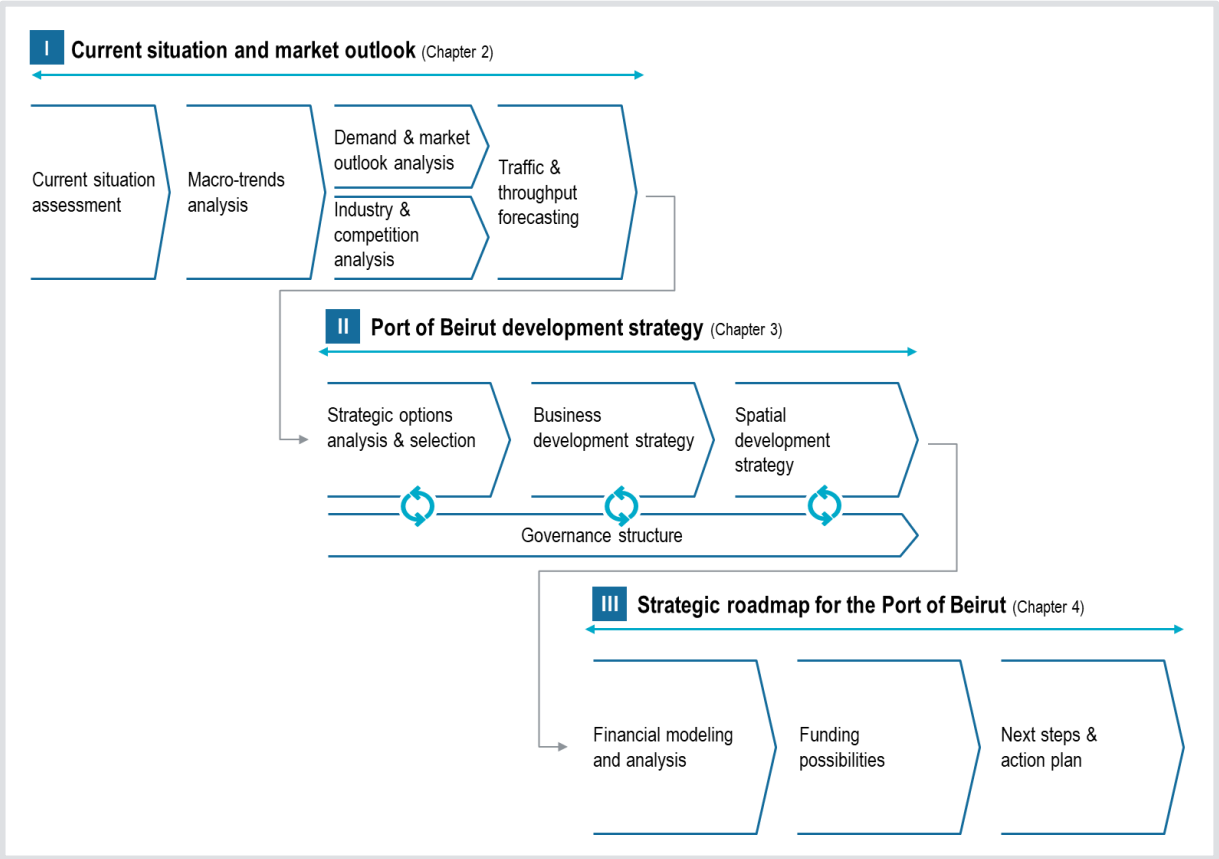
When developing port strategies, a broad range of questions need to be answered. What is the best port management model? What is the best way to finance port development? How to best manage and integrate ports, inland infrastructure, industry, transportation systems and logistics? What is the best location for developing the port? How are the port planning processes best managed? How can the port's performance be continuously improved? And so on. The "option space" at ports is therefore vast – and this certainly applies to the Port of Beirut.

A key success factor for ports is their ability to balance and connect long-term (20-40 years), medium-term (8-15 years) and short-term (5-8 years) planning. All of these planning horizons differ in their nature. Short-term strategies discuss all aspects of operations and development and suggest management tools for ports. Long-term planning, on the other hand, should discuss questions relating to location, land bank and zoning. The frequency of updating these plans also differs.

We use a structured approach to develop various strategic options for the Port of Beirut. This approach has three parts. First, we assess the current situation at the port, its stakeholder and competitive landscape and the market outlook (Chapter 2). Second, we set out a port development strategy, including strategic options, an overall business strategy and possible spatial adaptations, including criteria for the port's future governance model (Chapter 3). And finally, we draw up a strategic roadmap for the port (Chapter 4) (Figure 41).

[12] We use the term "option space" to refer to the development and assessment of different variations on strategic decisions (options) linked to various development strategy dimensions.

Figure 41: Structure of this report



Source: Roland Berger

We discuss various strategic options for the business and spatial development of the Port of Beirut, looking at the pros and cons of each. We take this approach as the strategy ultimately chosen for developing the port comprises different elements from the business development and spatial development options. Any strategy chosen should be subject to further analysis and feasibility studies.

3.2 Port of Beirut development strategy assessment and recommendation

3.2.1 Strategic options – Analysis and selection

The development of strategic options focuses on two key aspects of the Port of Beirut: its future role and its future location. As discussed, the Port of Beirut mainly serves the domestic market, and this fact will continue to shape its operations in the future. At the same time, its location in the heart of a buzzing city brings certain challenges around space, capacity, traffic, noise and pollution.

3.2.1.1 Future role of the Port of Beirut

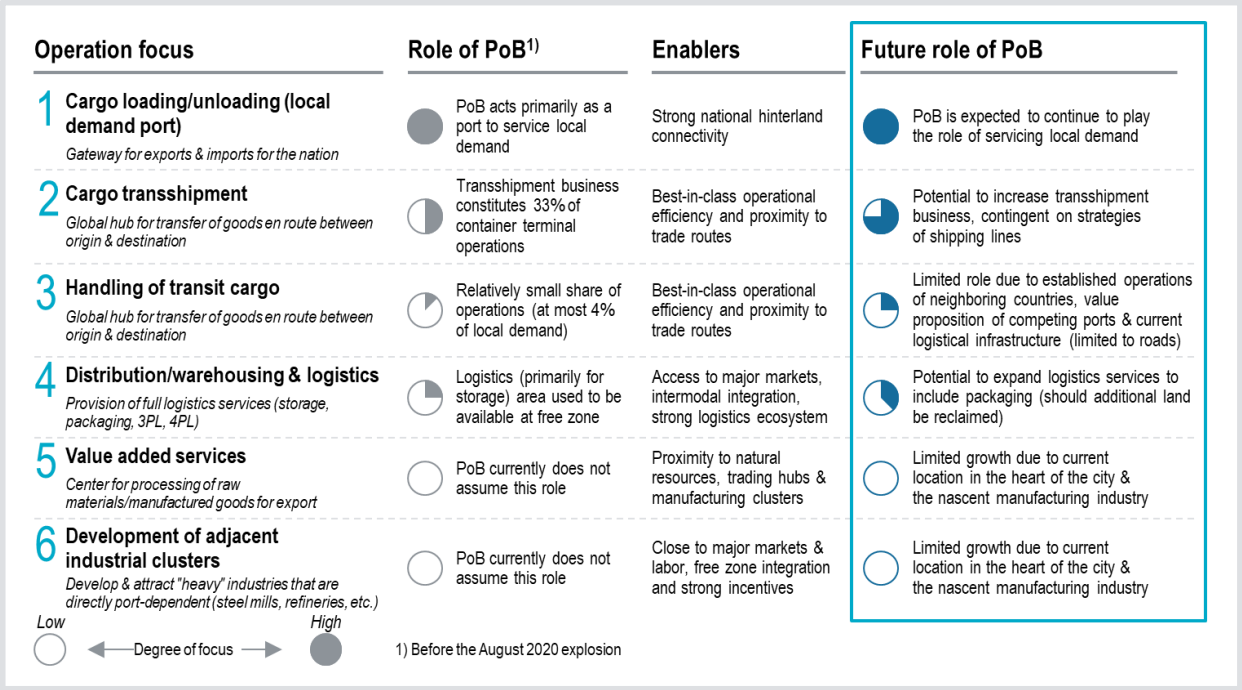
The role of the Port of Beirut is inherently linked to the operations that it will perform: the services it will offer, the cargo types handled, the logistics and warehousing provided and the industrial clusters the port will serve. Figure 42 provides an overview of the different focus areas of operations and the current and future role of the Port of Beirut. Lebanon offers a number of specific enablers, which will influence the port's future role.

Our assumption is that the Port of Beirut will continue to mainly serve domestic demand in the future. An important enabler here is the port's strong connections to its hinterland: Most of the incoming cargo at the Port of Beirut is used within the Beirut and Mount Lebanon area (see Chapter 2.1.4). In addition, the transshipment business at the port could be increased, as the service offering and pricing structure at the Port of Beirut are in line with the strategies of shipping lines. The port also benefits from its location on the Eastern Mediterranean.

Regarding transit volume, the Port of Beirut's role is expected to remain limited due to the well-established port infrastructure in neighboring countries, the value propositions of competing ports and the current logistical infrastructure, which is limited to roads. The Port of Beirut will most likely continue to see some transit flows but will not be able to significantly expand its position as a transit hub. Transit flows are also primarily influenced by geopolitical relations in neighboring countries.

By contrast, the port has the potential to offer more comprehensive logistics services. If a strong logistics ecosystem is created, these services could be expanded to include repacking and packaging. Depending on the level of ambition, it may be necessary to provide additional port land for these operations.

Figure 42: Focus areas of operations and role of the Port of Beirut



Source: Desk research, Roland Berger, HPC

3.2.1.2 Location of the Port of Beirut

We consider three different strategic options for the port: rebuild as before, "rightsize", and relocate (Figure 43):

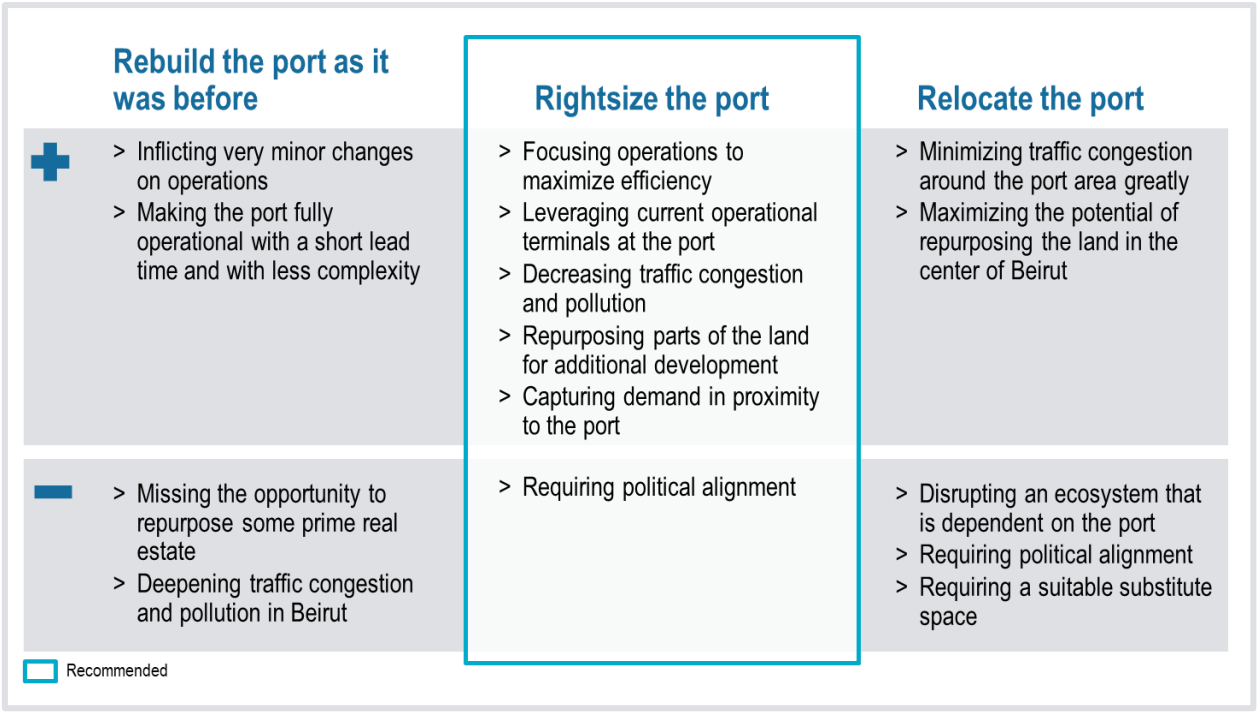
> **Rebuild the port as it was before:** While this would meet existing needs, it would pass up the opportunity to maximize efficiency with a leaner set-up or to repurpose parts of the port land for other uses, such as real estate for housing, educational facilities or office space

> **Rightsize parts of the port:** By "rightsizing" we mean determining which terminals and warehouses should be set up within the port by looking at the main operations and expected trade volumes. This option would involve either rebuilding previous structures or rededicating spaces to different purposes

(see Chapter 3.2.2 and 3.2.3). Some operations could be shifted to areas next to the port or different locations

> **Relocate the port:** At the other extreme, it may be possible to relocate the port, maximizing land use for developing the city and minimizing traffic and congestion within the city center. However, this option would disrupt the established port ecosystems and entail a complex search for alternative locations, as well as very costly construction work

Figure 43: Options regarding the port's location



Source: Roland Berger, HPC

Our analysis shows that the second option – rightsizing the port – would be the most appropriate. This option offers the possibility of focusing operations and maximizing efficiency, while providing continuity and leveraging the current port infrastructure and superstructure. In addition, it potentially delivers economic benefits from streamlining processes and maybe repurposing some port areas for new development. Rightsizing the port also acknowledges the long history of the port within the city of Beirut and does not imply any major changes that would disrupt the current ecosystem. It does require some changes, however, and as such it would need political support in the country.

3.2.2 Business development strategy

The business development strategy describes the future focus of operations at the port. It considers the types of cargo historically handled at the port, expected future volumes, and how future business can be run more efficiently and profitably. Our examination includes an assessment of the current status of the port terminals and an analysis of forecast demand.

3.2.2.1 Current status of the port area

Figure 44 summarizes the current status of the four major areas of the port after the explosion. This includes the container terminal, the general cargo area, the dry bulk area and other areas. These areas also represent the main types of cargo handled at the port.

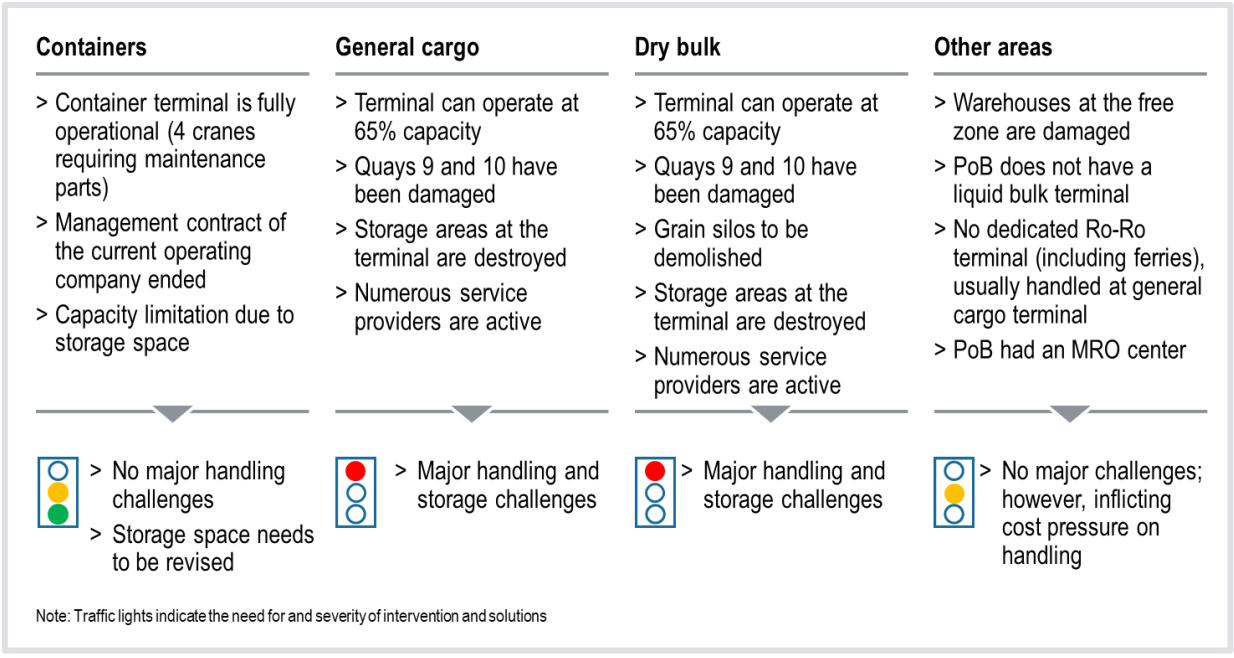
> **Container terminal:** While the container terminal is operational and has not been heavily damaged, productivity is down by around 50 percent due to maintenance issues on cranes (World Bank, 2020). Owing to current temporary solutions and limitations on financial investments, it is not possible to predict when these maintenance issues will be resolved. There are also some capacity limitations regarding storage spaces.

> **General cargo area:** The general cargo terminal can currently operate at 65 percent capacity (Al Khaleej Today, 2020) as some quays were destroyed in the August explosion. In addition, storage facilities were largely destroyed, leading to significant challenges in both handling and storage. Numerous small and medium-sized service providers are involved in handling activities, creating some complications for operations.

> **Dry bulk area:** There are limitations on handling due to the fact that the general cargo terminal is also being used for dry bulk. The dedicated grain silo for clean dry bulk was destroyed and a decision has been taken to demolish the remaining structure (Barron's, 2020). A new grain silo would have to be rebuilt entirely. This has created major challenges for handling and storage. As in the general cargo area, numerous small and medium-sized service providers are involved in handling activities for dry bulk cargo, creating complications for operations.

> **Other areas:** This refers mainly to the free zone and warehouses (the port does not have a dedicated Ro-Ro terminal or liquid bulk terminal). Storage and warehouses in the free zone were damaged, but buildings remain partially operational. Hence, there are no major challenges except for some necessary rebuilding work. Private operators used to run the warehouses at the free zone, which were primarily used to cater to local demand. This is putting price pressure on users of the port.

Figure 44: Current status of the port's four major terminals



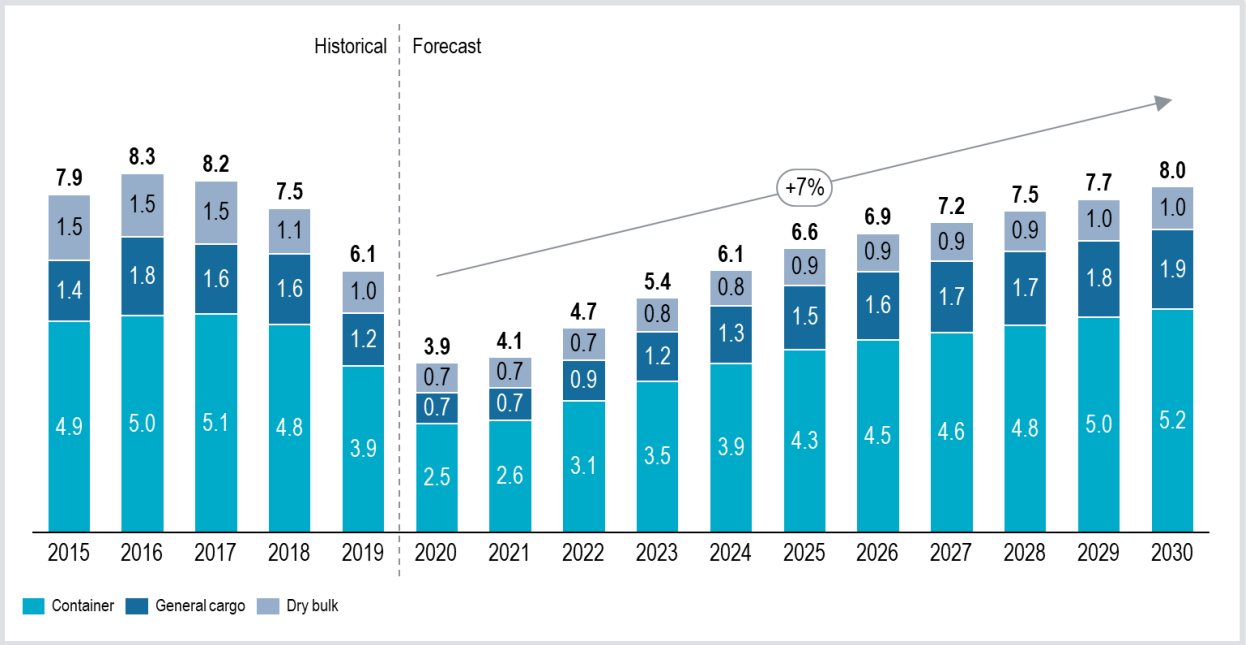
Source: Desk research, Roland Berger, HPC

3.2.2.2 Demand forecast and economic outlook

The demand forecast in Chapter 2.2.2 offers two possible economic development scenarios. The Base scenario projects a slow process of economic recovery in which 2018 pre-crisis levels of the economy will most likely not be reached within the next ten years. The Reform scenario, by contrast, builds on the assumption that, through political reforms and international support (investments and financial aid), a boost in the country's economic development can be initiated that enables a recovery by the second half of the 2020s.

These two scenarios also apply to the recovery of trade volumes at the Port of Beirut. In neither scenario are trade volumes expected to exceed previous levels, even if all operations remain at the port. Figure 45 illustrates the impact of the economic development on the demand forecast for the Port of Beirut in the Reform scenario.

Figure 45: Total volumes of traded goods (imports and exports) – Reform scenario at PoB [m ton; 2015-2030]



Source: Lebanese Customs, Port of Beirut, Roland Berger

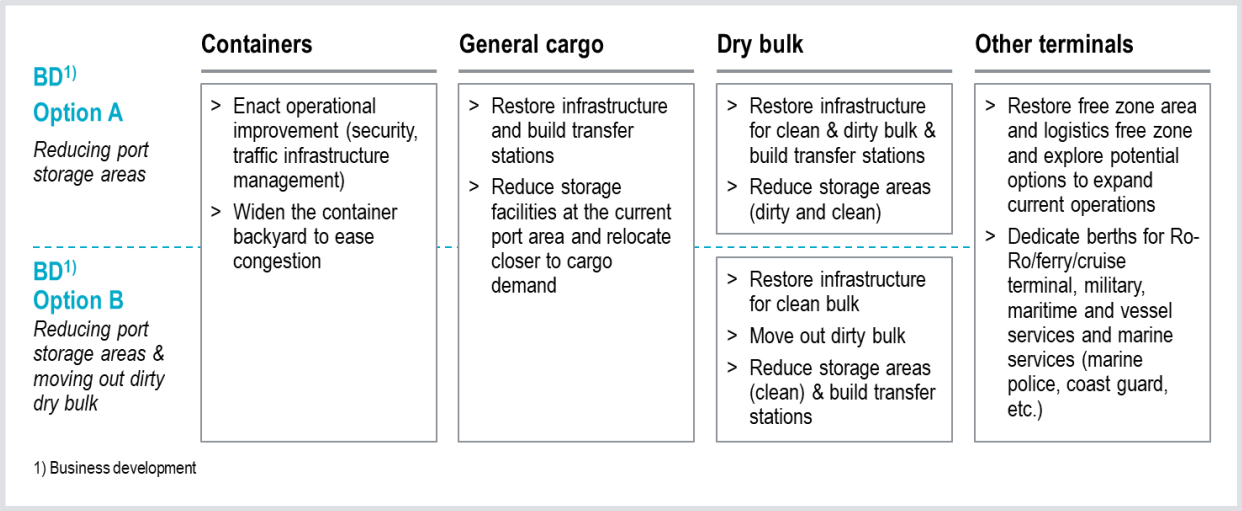
The key question for the business strategy is the future focus of operations, so the demand forecast above provides a solid basis for determining what types of cargo will be most in demand. In terms of trade volume, first of all, container cargo should be a main business focus. As indicated above, transshipments could also be further expanded, and this could lead to even higher container volumes at the port. Second, general cargo accounts for a significant share of trade volume, so a separate terminal would be necessary to manage this demand. Lastly, dry bulk is important: Here, we should distinguish between clean dry bulk (grains for domestic food supply) and dirty dry bulk (serving industrial and other purposes).

3.2.2.3 Definition of strategic business development options

To define strategic business development options, we match the demand forecast with (a) the terminal operations to be performed and (b) the actions needed to rebuild and ensure these operations. We identify three options for business development that would provide benefits for the city and the country as a whole. Business development option A is to reduce the storage areas at the port for general cargo and dry bulk, to make room for a different use of the land. Business development option B is to reduce port

storage areas for general cargo and clean dry bulk, while moving the handling and storage of dirty dry bulk out of the city (Figure 46).

Figure 46: Strategic business development options and required operations by terminal



Source: Roland Berger, HPC

For all the terminals, storage is a key element. Our expert interviews and further research indicate that, in the past, port warehouses and storage spaces (except the grain silo) were mainly used for dirty cargo and long-term storage. This principle is also reflected in the port's pricing structure, as the usual handling fees include storage of up to nine days, whereas port benchmarks indicate that a two-to-three-day storage period or even hourly rates are standard. In addition, our interviewees indicated that 60-70 percent of import cargo coming through the Port of Beirut was handled directly by the receiving entities, using their own trucks and warehouse facilities. Distribution companies operating out of the port generally centered their operations around the free zone area and did not use port-specific storage areas.

This provides good reason to assume that a more streamlined rebuilding of the storage space (for example, modern transfer stations and warehousing facilities) catering to efficient storage and faster turnover would be economically beneficial for the port operations. Port storage areas could be reduced in line with an assessment of the actual requirements, while the freed-up space could be used for modern transfer stations and warehousing facilities. This option might also facilitate the introduction of customs clearance outside the Port of Beirut, at the premises of the importers.

Another important question relates to the handling of dirty dry bulk. International benchmarks indicate that this usually takes place outside densely populated areas due to safety issues and pollution. In Beirut, it was dirty dry bulk that led to the explosion in August 2020, so moving dirty dry bulk closer to industrial locations is an important option. This could also bring operational benefits.

The two business strategy options have different requirements regarding the use of space at the port. The required berthing length and port land is also linked to various requirements with regard to connectivity and implementation. We assess these dimensions at a high level and identify a preferred business development option for the Port of Beirut (Figure 47).

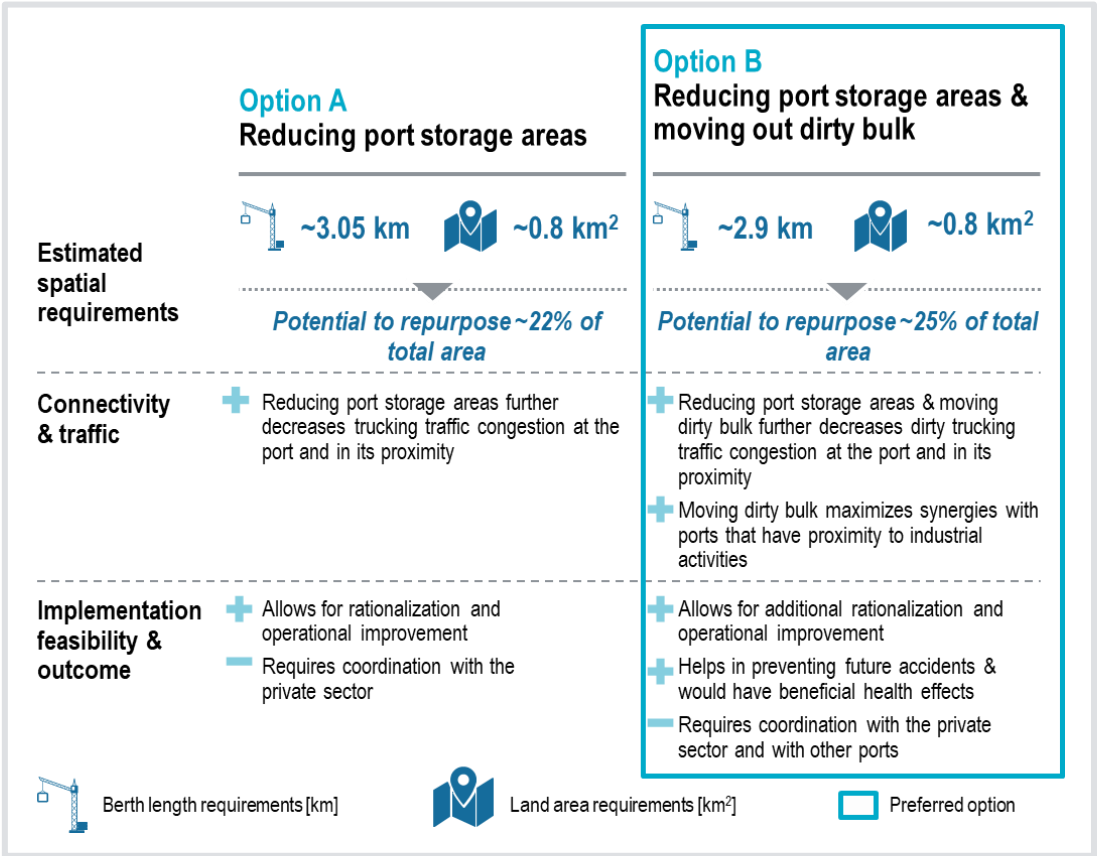
> **Spatial requirements:** Berth length requirements are calculated on the basis of the cargo demand forecast. International benchmarks provide input on how much cargo can usually be handled per meter berth length per year. This figure differs across cargo types. Hence, the demand forecast at the Port of Beirut indicates that the longest berthing length will be required by container operations, followed by general cargo operations. In addition, Ro-Ro and ferry handling need to be considered.

Similar benchmarks also exist regarding the average land requirements needed for port-land clusters that do not relate to the immediate loading or unloading space, such as storage, logistics and support buildings, and roads. These facilities are also required to ensure regular port operations. Based on this input, we can calculate the total port land per business strategy option.

> **Connectivity and traffic:** Connectivity is a key element for port operations, as millions of tons of goods are transported in and out of the port. The Port of Beirut is specific as it lies in the center of the city. Although the port is connected to the highway system, it is not uncommon for traffic congestion to delay entry to the city and the port perimeters quite significantly. Our assessment of connectivity therefore centers on options for reducing or diverting some of the port-related traffic flow to reduce congestion and pollution.

> **Implementation feasibility and outcome:** The implementation feasibility assessment is based on interviews with local stakeholders and port experts. It ensures that the strategic business development options are linked to the current status of port business and the political environment at the Port of Beirut.

Figure 47: Assessment of the business development options



Source: Desk research, expert interviews, Roland Berger, HPC

Our assessment indicates that Option B – reducing port storage and shifting dirty dry bulk operations to a different location – is the best business strategy. This option creates room for professionalizing operations, maximizing efficiency and making the best possible use of the available land. In addition, it takes past events into account and offers safety and risk prevention for the city.

3.2.3 Spatial development strategy

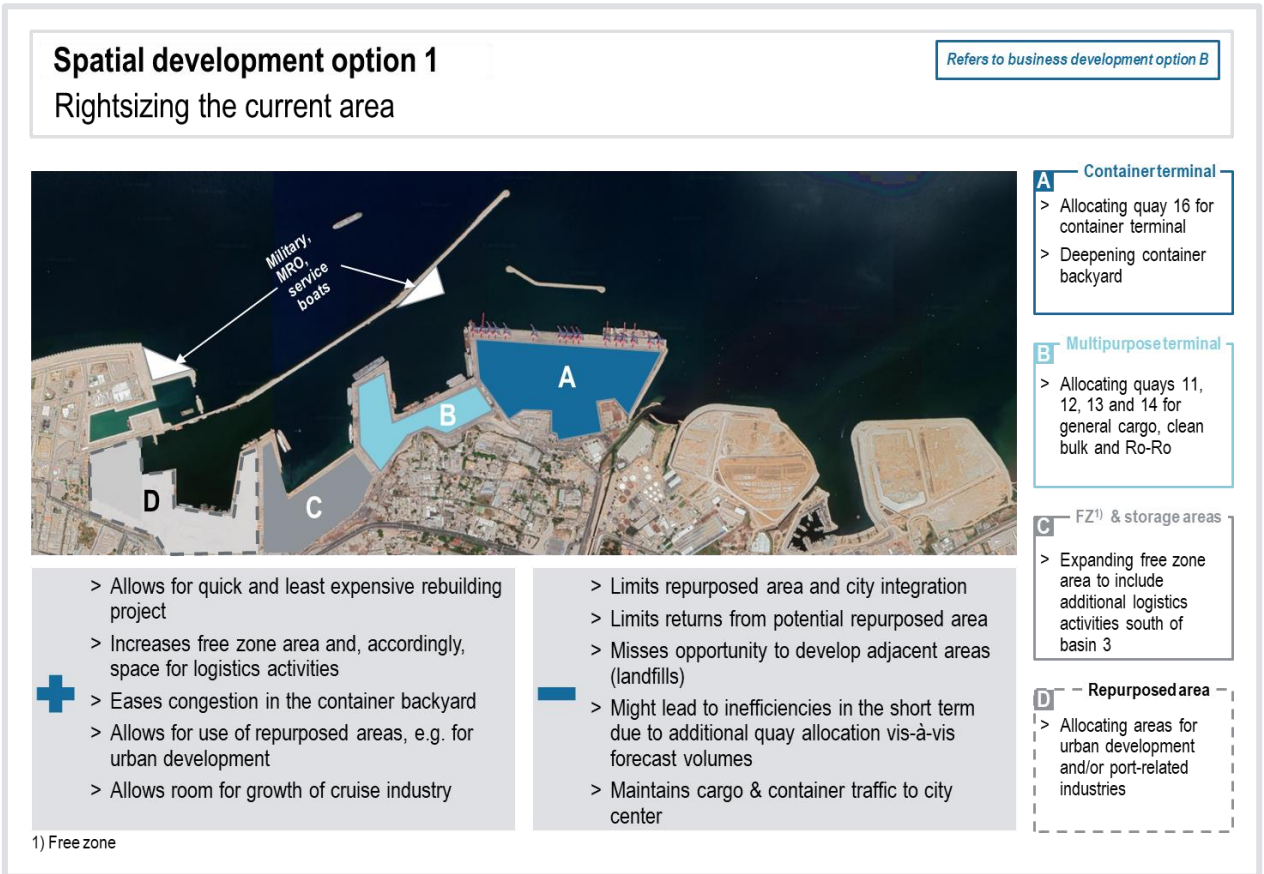
The spatial development strategy is the final step in developing an overarching "option space" for the Port of Beirut. The spatial options in this section combine the input developed in the assessment of the future role and location of the port and the business development options identified. We take a close-up view of business development option B (reducing port storage areas and moving dirty dry bulk out of the port) to see what the terminal planning and operations allocation could potentially look like. On this basis, we also provide three high-level plans that demonstrate the possibilities available to the Port of Beirut regarding the location of the terminals in the port area as well as future expansion.

The spatial parameters represent the playing field for how the required terminals and operations can be located. In addition, the ideas for future expansion demonstrate the opportunities that the port can exploit in the short, medium and long term. The three high-level spatial plans are distinct but could also be implemented one after the other to enable future growth.

The spatial plans in this section were produced jointly by HPC and Roland Berger.

Spatial development option 1:
Rightsizing the current area

Figure 48: High-level spatial plan – Option 1



Source: Roland Berger, HPC | Image: Google Earth

Option 1 is based on the area of the Port of Beirut before the explosion, rightsizing it in line with current and future needs. It foresees the best possible use of the previous port area, maximizing capacity and

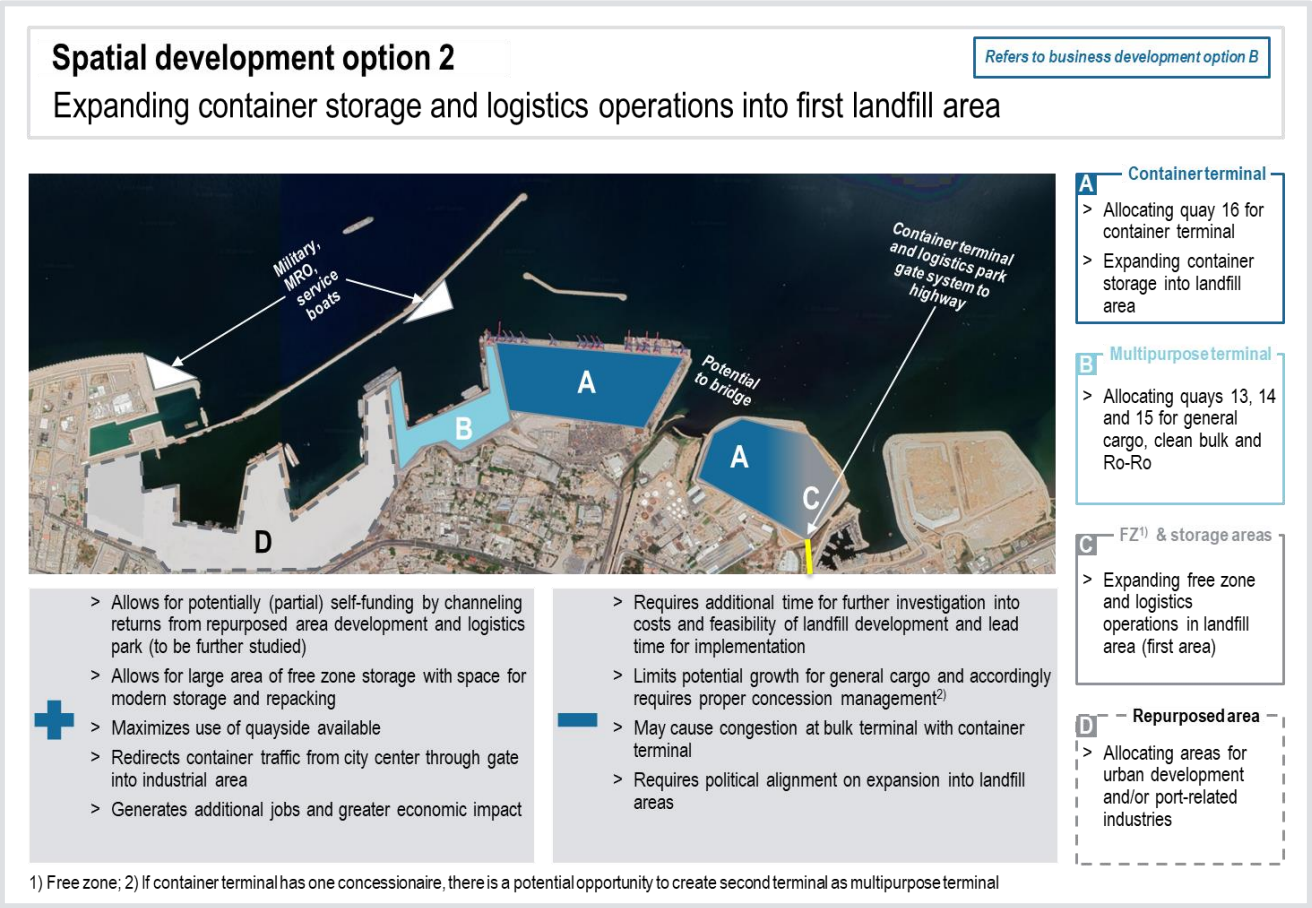
streamlining cargo handling. Some port land is freed up that can be used for port-related industries or urban development.

This option allows for a quick and cost-effective rebuilding project at the port, repairing the damage caused by the explosion and not making any major infrastructure changes. The free zone area is expanded and related logistics activities strengthened. Adapting the layout of the container backyard eases congestion in container storage. Repartitioning the berthing capacity offers potential for growth of the cruise industry. The envisioned set-up of the cargo terminal allows some port land to be freed up that can potentially be repurposed. Possible uses of the area include integrating port-related industries or urban development with some housing or other types of buildings.

Option 1 also has some limitations, however. The quay allocation for multipurpose terminals might lead to inefficiencies in the very short term due to there being slightly more dedicated berthing space. This option foresees only a relatively small area (approximately 400,000 m^2) for repurposing, which limits the potential for other, non-port uses, such as urban development and port-related activities. This could also put pressure on funding. If, by contrast, additional areas were freed up and repurposed in the current location, this could channel money back into the port for rebuilding work. Option 1 also fails to exploit the opportunity to develop adjacent areas, such as the current landfills to the east.

Spatial development option 2:
Expanding container storage and logistics park into the first landfill area

Figure 49: High-level spatial plan – Option 2



Source: Roland Berger, HPC | Image: Google Earth

Option 2 is to expand the container storage and logistics operations into the first landfill area located to the east. This represents a break with the past. By expanding the container terminal and moving the free zone, a significant part of the previous port land will be made available for other uses, such as educational and cultural buildings and housing.

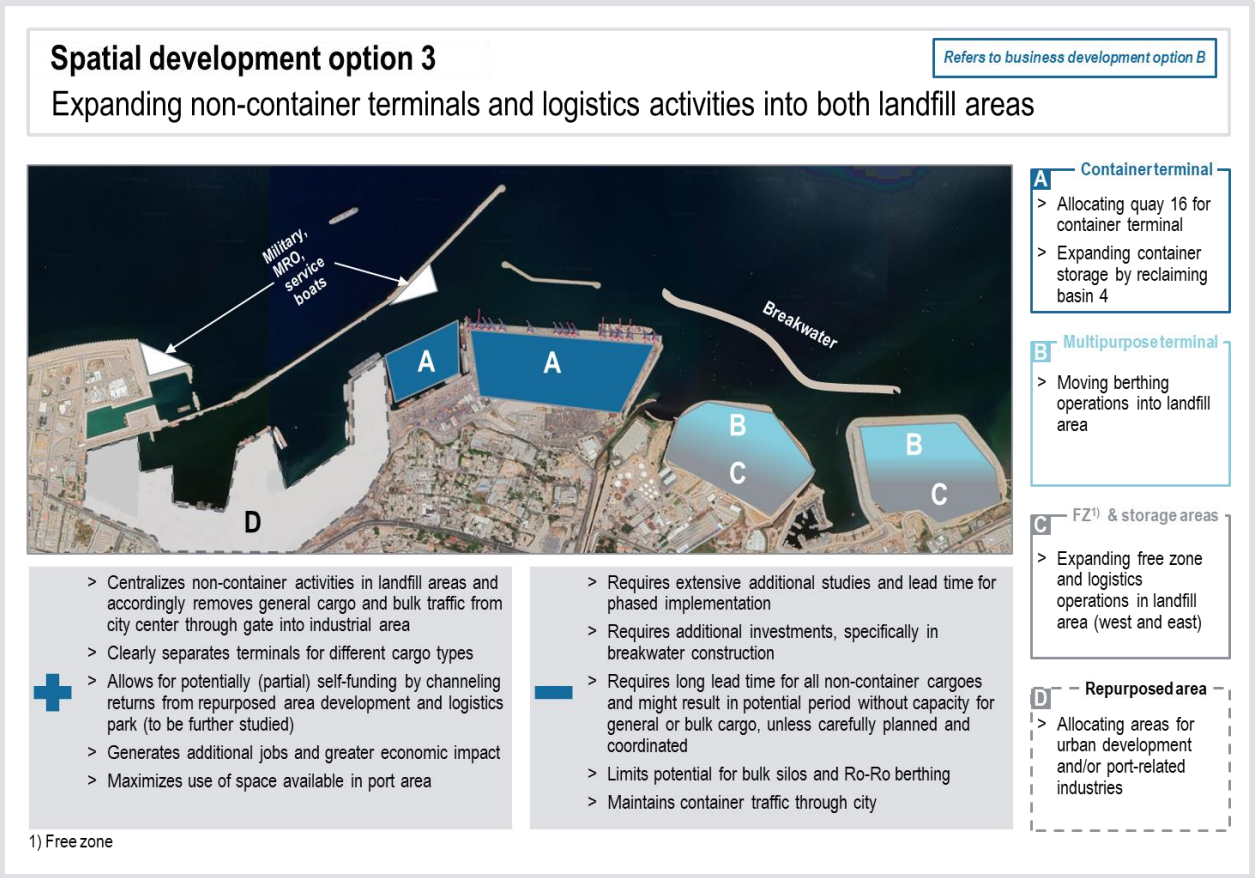
The main advantage of this option is that freeing up space for other purposes would mean that returns from the repurposed area and logistics park could potentially fund the reconstruction of the port, at least in part. This is, of course, subject to further research and a thorough feasibility assessment. At the same time, the new location would offer a large area for free zone storage with space for modern storage and repacking operations. The additional container terminal space has multiple benefits: The greater storage capacity allows for higher TEU turnover; a new road access system could redirect container traffic from the city center through a gate into the industrial area, easing congestion and reducing pollution in the city center; and the increased activity potentially could generate additional jobs and a greater economic impact.

Option 2 also has some limitations. Investigating whether the landfill area can in fact be used will take time. If it is confirmed, realizing the project will also take 10-15 years according to estimates.

Furthermore, while this option provides more capacity for container traffic, it may limit growth of general cargo and cause congestion at the multipurpose terminal. Full political support for the expansion onto the landfill site and the plans to repurpose former port land would also be necessary.

Spatial development option 3: Expanding non-container terminals and logistics activities into both landfill areas

Figure 50: High-level spatial plan – Option 3



Source: Roland Berger, HPC | Image: Google Earth

Option 3 foresees the most extensive changes to the current layout and operations at the Port of Beirut. Most of the port activity (besides the container terminal) is shifted east towards both landfill areas. In addition, the current Basin 4 is reclaimed to provide room for expansion of the container terminal. This plan can only be realized if an additional breakwater is built to protect the repurposed landfill areas from strong waves. As a result of the comprehensive restructuring of the port towards the east, a large plot of port land will be freed up and can be repurposed.

Like Option 2, although on a slight larger scale, Option 3 foresees a repurposing of significant parts of the former port area. This could enable self-funding of the necessary construction work by channeling returns from the development of the repurposed area and logistics park. Option 3 also removes general cargo and bulk traffic from the city center through a gate into the industrial area and clearly separates the terminals for the different types of cargo. In addition, both the extended port operations and the establishment of further companies in the repurposed area will generate additional jobs, increasing the economic impact.

However, Option 3 requires extensive additional research and time for realizing the project. The plan entails significant investments, specifically regarding the envisioned breakwater construction. The time required for building may result in periods without capacity for general cargo or bulk, unless this is carefully planned and coordinated. From a city planning perspective, this option foresees changes in the road system; however, significant amounts of container-related traffic will continue to be channeled through the city. As in Option 2, this plan would require clear political alignment in order to be successful.

Based on the high-level cost-benefit estimates carried out by HPC and Colliers International, Option 2 would currently appear to be the most attractive. Capital expenditure to refinance the building of the port was estimated to be between USD 200 million and USD 1 billion (based on a high-level assessment by HPC and subject to further studies) depending on which option is pursued. Specifically, Option 2 could be realized for a cost between USD 500-750 million depending on the layout and equipment requirements of the new port. On the other hand, if opportunities around repurposing (parts of) the current port area for urban development are leveraged, channeling returns from a waterfront development project would be one way of (at least partially) financing the reconstruction and might generate between USD 1-3 billion in direct value (based on a high-level assessment by Colliers International).

However, further studies, including detailed prefeasibility studies and the identification of technical requirements, would be required before any final decision is taken. Any decision would also be dependent on political alignment between the various parties involved at a local and national level. **For this reason, this study intentionally does not make a clear recommendation; all three suggested options have both advantages and limitations.**

The three options outlined above could also potentially be carried out one after the other. In the short term, the focus will lie on reconstructing the port in order to ensure its basic functioning. In parallel, however, strategic considerations for a time horizon of more than five years should be considered, so as to already set the course of future development and growth opportunities, including potential plans for expansion.

3.2.4 Governance model options and recommendation

One of the key issues for the development of the port is its governance structure. Creating a new, transparent and efficient governance model is vital for the development of the port in the future. In this section, we look at the various options for a revamped governance structure at the national, port management and port operations levels. To do this we draw on our examination of the current governance structure, international best practices and the following guiding principles:

> Implement a governance model that ensures national competitiveness and pushes for efficient operations
> Ensure efficient private sector participation in rebuilding the port
> Connect the various entities involved through a streamlined structure and ensure a clear division of roles and responsibilities, enhancing transparency in operations
> Adopt a holistic approach when engaging and coordinating with the various stakeholders
> Design a structure that is based on best practices in port administration

3.2.4.1 National level

At a national level, we recommend establishing two committees: a National Port Development Committee and a National Port Logistics Committee.

National Port Development Committee

The National Port Development Committee is a governmental entity responsible for the supervision of the Port Authorities' work (Beirut Port Authority, Tripoli Port Authority, Sidon Port Authority, Tyre Port

Authority and the Port Authorities of any additional ports that may be built in the future). The role of the National Port Development Committee is dependent on the structure of the underlying Port Authorities, above all whether those Port Authorities are merged or function as independent entities.

The suggested responsibilities of the committee are:

- Setting rules and regulations for individual ports
- Establishing the national maritime and port development strategies
- Managing the relationship between the different ports in Lebanon
- Identifying synergies between the development projects related to the port infrastructure and connecting infrastructure

The National Port Development Committee also assumes other roles depending on the jurisdiction of the individual Port Authorities (see Chapter 3.2.4.2).

If the Port of Beirut and the Port of Tripoli function as separate entities, we recommend that the National Port Development Committee take on a "championing" role. As such, it would be responsible for devising a master plan and approving any major projects, development projects and funding. The objective is for it to be a single, dedicated entity that drives development planning and approvals.

However, if the Port of Beirut and the Port of Tripoli authorities are merged (potentially along with other ports), then the National Port Development Committee would take on an advisory role in which it guides and supports the Port Authorities, with a transparent feedback mechanism. The objective of the Committee would be to provide with ports with independent insights from experts and the private sector. From a supervisory perspective, its function would be to oversee the work of the Port Authorities based on audits and the ports' performance levels.

The National Port Development Committee should include the following individuals:

> Representatives of the Ministries of Public Works and Transportation, Finance, Environment and Industry
> Representatives of the different Port Authorities (Beirut Port Authority, Tripoli Port Authority and so on)
> Representatives of the local municipalities (Municipality of Beirut, Municipality of Tripoli and so on)
> Key experts on port development and economic development
> Representatives from the private sector (logistics companies, industrial companies, agricultural companies and so on)

National Port Logistics Committee

Furthermore, we recommend creating a National Port Logistics Committee – a government entity responsible for coordinating work between the Port Authorities and other relevant entities active in the logistics industry. The National Port Logistics Committee would also act as an advisory committee for development projects.

The National Port Logistics Committee should include the following individuals:

> Representatives of the Ministry of Public Works and Transportation (specializing in traffic infrastructure)
> Representatives of the various Port Authorities
> Representatives from the private sector (logistics companies, distribution companies)
> Representatives of Beirut Rafic Hariri International Airport

3.2.4.2 Port management level

It is necessary to create a Port Authority to manage the port. This should be a corporate public entity. Our recommendation is that the governance structure of the ports be based on a landlord port model (see Chapter 2.3.1), allowing the integration and involvement of both private and public sectors. In a landlord port model, the government owns the infrastructure and land in the port, while private companies build their own superstructure and apply their cargo handling services to operate the port.

We consider three options for the individual port management level:

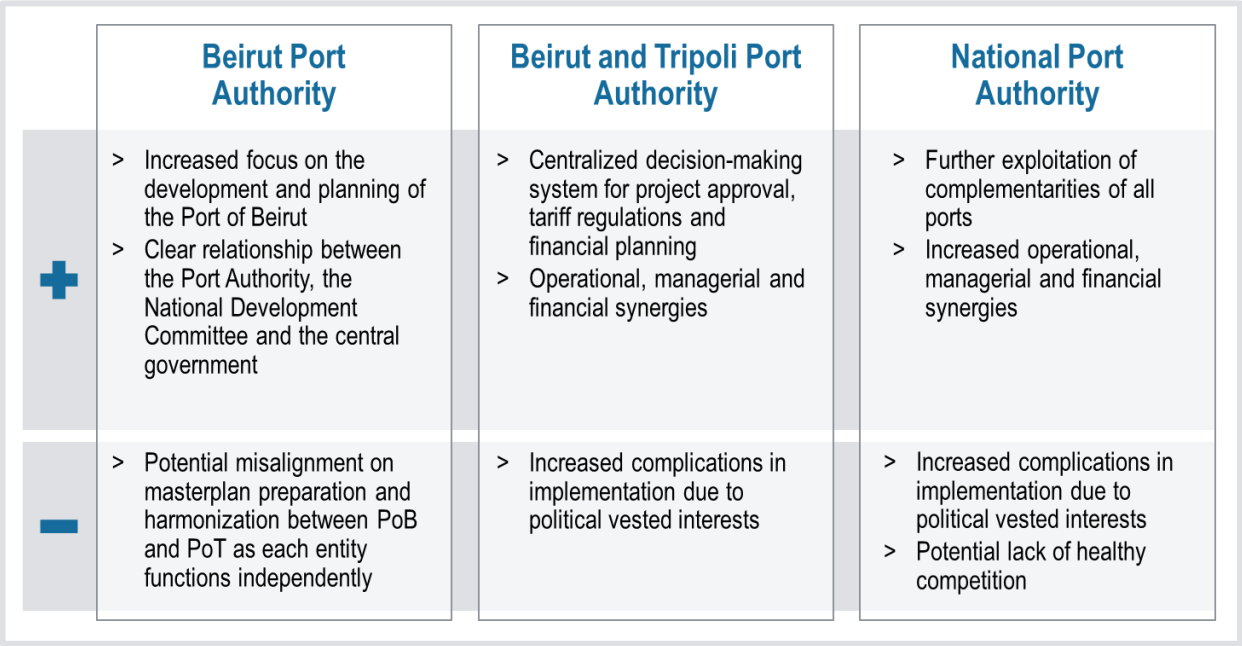
> Create a Beirut Port Authority and keep it separate from the Port Authorities at the other ports
> Create a Beirut Port Authority and merge it with the Tripoli Port Authority, keeping it separate from the Port Authorities at the other ports (Sidon, Tyre and any others that may be built)
> Create a Beirut Port Authority and merge it with all other Port Authorities

The suggested roles and functions of the Port Authority are largely similar in each case. However, if they are kept separate, each Port Authority will prepare its own master plan and approval will be the responsibility of the National Port Development committee. If, on the other hand, they are merged, the National Port Development Committee will assume a more advisory role and the merged Port Authority will be responsible for approving the master plan.

Whether merged or separate, Port Authorities are responsible for the following:

> Strategy development (based on their jurisdiction and in line with the national ports strategy)
> Policy design suggestions and enactment
> Enforcement of laws and regulations
> Environmental and other inspections
> Maintenance of quays, piers and water depth
> Tariff setting (in cooperation with operators)
> Managing operators
> Construction programs

Figure 51: Advantages and disadvantages of different port governance options



Source: Roland Berger

It should be noted that during interviews, stakeholders stressed that there was a need to upgrade the capabilities of the organization managing the ports. One viable option may be to outsource management to an international private company that has the ability to restructure and rebuild the port. This could be regulated by a service contract: The international private company would not own the infrastructure or superstructure at the port but only manage the redevelopment for an agreed period of time.

Port of Beirut Holding

We suggest creating a holding company – the Port of Beirut Holding – as a special purpose entity and subsidiary of the Port Authority responsible for managing the port's land and a potential port fund. This fund should be used to accumulate profits from port activities and potential development projects – money that can then be invested in reconstructing and developing the port.

The responsibilities of this entity would be as follows:

> Land reclamation and development
> Land banking and management for potential development projects
> Investment management for returns generated by the port

Beirut Port Monitoring Unit

We also suggest setting up a Beirut Port Monitoring Unit (BPMU), a third-party external entity responsible for implementation management, risk identification and cost efficiency during the development of the Port of Beirut.

The BPMU would have the following functions:

> Monitoring program and project progress
> Utilizing project management tools
> Guaranteeing quality of action plans
> Ensuring project reporting

> Coordinating and following up on management meetings
> Assisting in resolving issues and identifying and mitigating risks

3.2.4.3 Port operations level

At the level of port operations, given the need to switch to a landlord model, we recommend carrying out cargo handling using PPPs (for example, BOT contracts), concessions or management contracts. Port operations will most likely be handled by terminal operators and other licensed operators (stevedoring, mooring and so on).

At present, it is not possible to make a recommendation about the segmentation of the different operations, the type of partnerships that can be set up and hence the number of private sector players to be involved. This will only be feasible when the port development plan is decided and agreed upon. It is important, however, that these future partnerships should be based on open and transparent processes and systems.

4. Strategic roadmap

4.1 Financial modeling and analysis

Strategic options have various dimensions, as discussed in Chapter 3. In addition to developing a strategic "option space", this study provides a high-level analysis of the financial implications of these options. In this chapter, we build on our assessment of historical trade volumes at the Port of Beirut and the forecasts for future traffic in the Base and Reform scenarios.

Our financial analysis takes into account both the historical performance of the different revenue streams and their forecast values through 2030.[13] We also present forecasts for operating expenditure (OpEx). CapEx in particular depends strongly on the strategic options pursued for the Port of Beirut during the timeframe under consideration.

4.1.1 Port revenue estimates

Revenues are calculated as a function of price per volume. Three main inputs are needed for estimates for the period through 2030:

> **Price:** We use the official pricing structure of the Port of Beirut as available on its website (tariffs section). We made an estimate based on expert input to identify average applicable fees. The available tariff structure is divided into separate charges and activities: port dues on vessels and port dues on cargo (dependent on specific cargo types and commodities), handling fees, storage fees and other fees (not further specified).

> **Port traffic volumes:** Trade volumes at the Port of Beirut varied in recent years, as shown in Chapter 2.3. The volume forecast can also be used in the financial analysis. Trade volumes are considered separately for container and non-container cargo. Container volumes are further split up into local containers and transshipments. Non-container volumes are split up into general cargo, dry bulk and transit. They can be further broken down by commodity, if tariffs apply at this level.

> **Vessel traffic:** The vessel traffic data refers to activity at the port with regard to berth occupancy, ship size and call sizes. The number of vessels, their average length and the average call size are included in the financial analysis (historical and forecast).

Revenue streams

The Port of Beirut has five main revenue streams:

> **Port dues on vessels:** Port dues on vessels cover berthing and mooring activities related to the accommodation and safeguarding of vessels at the port. These dues depend mainly on the length of the vessel and its average stay at the port. Tariffs at the Port of Beirut are applied in USD per meter per day, in five length categories, and include a minimum due.[14]

> **Port dues on cargo:** Port dues on cargo are specific tariffs imposed on cargo being channeled through the Port of Beirut.[15] These charges are applied on the different commodities coming in and going out of the port and are based on the number of containers or the volume of non-container cargo. For container cargo, including both local and transshipment containers, dues are priced per TEU. For non-container cargo, such as general cargo and dry bulk, dues depend on the weight of the cargo and

[13] The Port of Beirut publishes information on its performance, revenue streams and expenses on its website in a report called "Highlights on Key Achievements (2005 to 2018)", written by an economic and corporate financial consulting firm. We have not audited or verified this data. In this study, it serves as a point of reference for the purpose of aligning historical figures with our assumptions and estimated future financials.

[14] The vessel length categories given by the Port of Beirut statistics are: (i) 0-7 m, (ii) 76-150 m, (iii) 151-225 m, (iv) 226-300 m and (v) >300 m.

[15] Port dues on cargo are a specific tariff charged by the Port of Beirut and do not constitute a common revenue stream in the port industry.

are priced per ton. The tariffs applied by the Port of Beirut depend on the type of commodity being transported. Essential goods, such as sugar and flour, are given lower tariffs, whereas non-essential goods, such as alcohol and fireworks, are given higher tariffs. In addition, a 27 percent reduction is applied to export goods.

- **Handling and hire of equipment:** The Port of Beirut offers a full range of handling activities for container and non-container cargo. The pricing structure indicates that much emphasis is placed on service provision through the port. As such, handling fees are outlined in detail and specific services are priced separately depending on the cargo type (in USD/ton or USD/TEU). In addition, there is separate pricing for the hire of equipment related to discharging/loading and other relevant activities (charged in USD/hour). There is no standard handling package, as is sometimes offered by other ports. Hence, it can be assumed that administrative efforts related to this pricing structure are fairly high compared to a potential "one-price" handling package.
- **Storage:** Storage fees are based on the cargo type and duration of storage at the port. For both container and non-container cargo, port dues (see above) include the first nine days of storage; after this initial period, charges apply per additional storage day, depending on the cargo type and the number of days required.
- **Other:** The "other" category is included as a separate revenue stream. It is assumed that this category mainly relates to administrative processes. However, the data provided by the Port of Beirut does not offer any further detail.

Figure 52: Estimated average tariffs by revenue stream

	Estimated average tariff
Port dues on vessels [USD/vessel]	
Length group 1: 0-75 m	1,110
Length group 2: 76-150 m	2,151
Length group 3: 151-225 m	1,938
Length group 4: 226-300 m	1,686
Length group 5: > 300 m	3,425
Port dues on cargo (specific tariff charged by the Port of Beirut, based on commodity type)	
Containerized cargo [USD/TEU]	
Containers for local consumption	95
Transshipments	10
Non-containerized cargo [USD/ton]	
General cargo	8
Dry bulk clean	3
Transit	2
Handling	
Containerized cargo [USD/TEU]	
Containers for local consumption	125
Transshipments	60
Non-containerized cargo [USD/ton]	
General cargo	7
Dry bulk clean	7
Transit	7

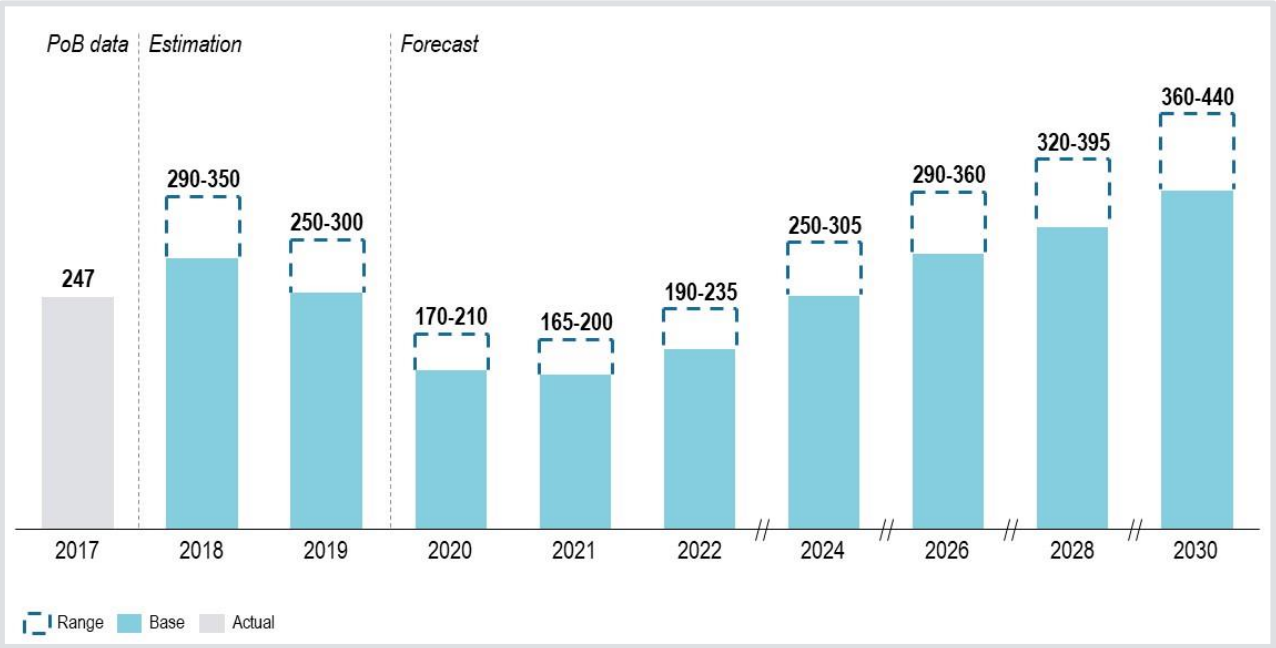
Source: Port of Beirut, Roland Berger

Results of revenue estimates

The revenue estimates can be used to derive an overview of how business at the Port of Beirut will develop over the next few years, based on forecast demand for goods and the current pricing structure. As demand is fundamental for revenues, the impact of Lebanon's general economic development is once again important here. Figure 53 illustrates the forecast development of total revenues at the Port of Beirut in the Reform scenario. Total revenues are estimated to reach USD 360-440 million by 2030. Again, it becomes clear that the overall performance mainly hinges on the state of the Lebanese economy and the trade volumes being channeled through the port.

The results presented in Figures 53 and 54[16] refer to the Reform scenario for throughput of local demand, business development option C and the optimistic forecast for transshipments.

Figure 53: Overview of total forecast revenue at the Port of Beirut [2017-2030; USD m]



Source: Port of Beirut, Roland Berger

[16] Actual reported revenues by the Port of Beirut for 2017 exclude provisions pertaining to the European Investment Bank (EIB) of USD 67 million. Based on the GEPB document, reported revenues were USD 313 million in 2017.

Of the different revenue streams in Figure 54, handling fees make up the largest share, followed by port dues on cargo. By comparison, the share of revenues from port dues on vessels is relatively small, behind that of both storage and other revenues.[17]

Figure 54: Overview of total revenue by revenue stream at PoB [2020-2030; USD m]

Source: Port of Beirut, Roland Berger

4.1.2 Operating expenditure estimates

The published historical financials for the Port of Beirut allow us to construct an overview of OpEx at the port.[18] According to the official figures, the main OpEx are personnel expenses (40 percent on average), cargo terminal operator fees (51 percent), financial charges (one percent) and provisions and other unspecified expenses (eight percent).

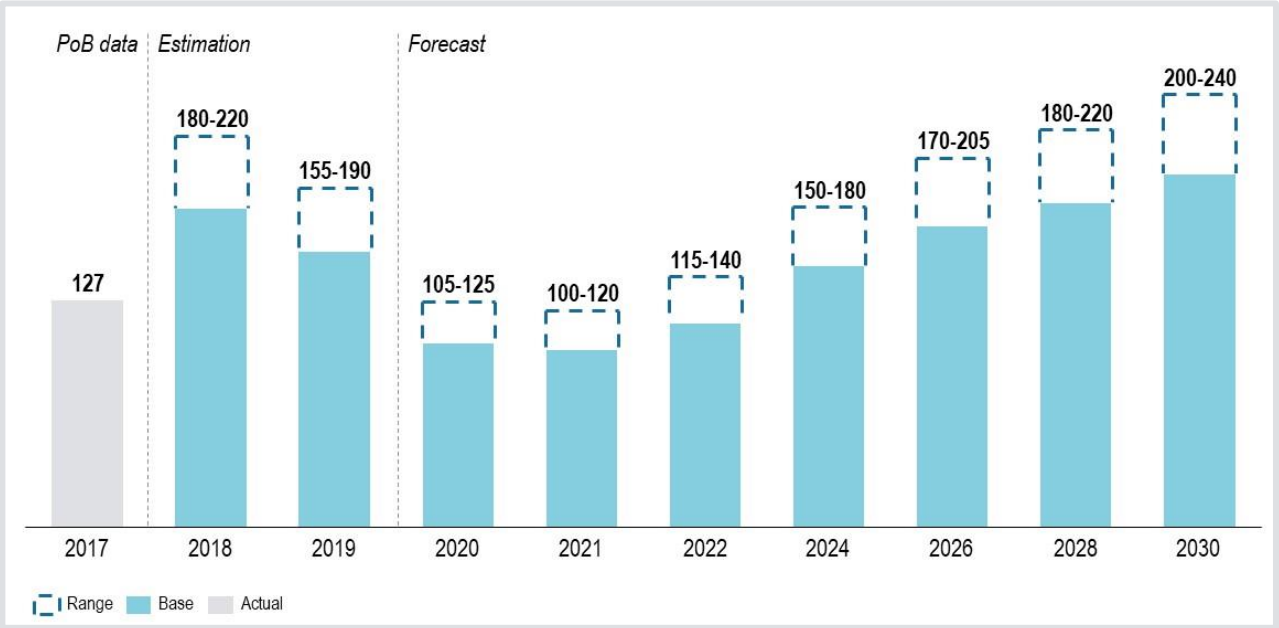
[17] The historical data on the official website of GEPB has not been audited and cannot be verified (see Footnote 13). As can be seen in Figure 54, the major difference between the report's revenue estimates and the historical figures stems from the value of handling. Hence, it is not clear what is included in the historical values of handling revenues, for example if the handling revenues of transshipments are included or not. Accordingly, a like-for-like comparison based on the current figures is not possible. This report includes estimates for revenues based on prices retrieved from the Port of Beirut website and the cargo forecasts, making the estimates as close to reality as possible. However, it remains unclear whether the historical figures reported by the GEPB include all revenues generated, and whether they reflect actual traffic at the Port of Beirut.

[18] Due to the limited information available and the fact that the financial statements are not audited, OpEx figures could not be broken down fully and certain assumptions have been made. To estimate OpEx and align the information given by the Port of Beirut with other port-related OpEx ratios, we rely on benchmarks and expert input.

Results of OpEx estimates

The OpEx estimates for the Port of Beirut are closely linked to the revenue forecasts and assumptions for the share of the different OpEx items. Total OpEx in 2020 is estimated to be around USD 105-125 million. In 2030, OpEx is estimated at USD 200-240 million, in line with increased revenues (see Figure 55). Overall, total OpEx will be at around 60 percent of total revenue in 2020 and is expected to reach a target of 55 percent of total revenue by 2030, assuming the operational improvements described are implemented.

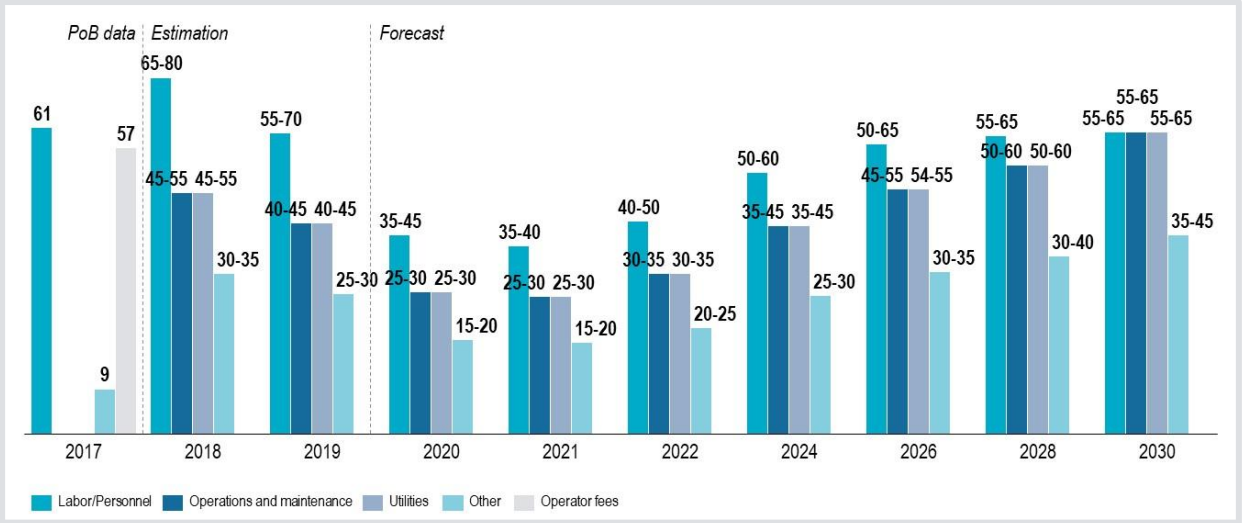
Figure 55: Overview of total OpEx at PoB [2020-2030; USD m]



Source: Port of Beirut, Roland Berger

The main expense item in OpEx is personnel expenses. While these costs are currently estimated to account for around 40 percent of total OpEx, we have assumed that staff efficiency will improve. This will bring the share of personnel expenses to around 27 percent (equivalent to 15 percent of total revenue) by 2030. Therefore, personnel expenses, operations and maintenance and utilities will all be around 15 percent of total revenue by 2030. We assume a ten percent share of total revenue for other expenses not accounted for in the main OpEx items. We record financial provisions (for example, CapEx depreciation) separately and do not include them in OpEx. Figure 56 shows the breakdown of OpEx items.

Figure 56: Breakdown of total OpEx by main expense items at PoB [2020-2030; USD m]



Source: Port of Beirut, Roland Berger

4.2 Funding options

As a rule, ports are highly valuable assets and hence of great importance to a country's economy. The funding strategy for developing the Port of Beirut therefore requires careful consideration. It will be vital to carry out a thorough due diligence and credit/investment evaluation in order to determine funding options for the project. If the governance structure of the port is revamped and a port development plan agreed, various financing options exist. During interviews, potential financiers pointed to the need for a detailed development plan as a first step. The present study can provide input here. A detailed prefeasibility study and a technical feasibility study should follow. Using this data, business and financial plans can be drawn up. Funding options also rely inherently on the country's economic state, which can translate into risk for potential financiers.

Depending on the port development plan chosen, opportunities arise in repurposing land for new development. One option here would be to channel returns from urban development projects back into the reconstruction work at the port. This could involve a public-private partnership (PPP) with a master developer. Another option is to use equity and debt financing, drawing on concessions or PPPs with terminal operators for the reconstruction and running of the terminals. Various investors or financial institutions could provide funds, or a special purpose company could be created for the purpose of reconstructing and running the terminals. PPPs come in various forms depending on the level of private versus public involvement, primarily in designing, building, financing, owning and operating the infrastructure and superstructure.

Figure 57: Potential financing partners

	Partner	Description	Advantages	Disadvantages	Expected IRR *indicative*[1]	Examples *selection only*
Equity	Infrastructure funds	> Open/closed funds with focus on economic infrastructure projects	> Focus and expertise on infrastructure	> Partially very high expected returns	> 7-15%	Brookfield, MACQUARIE
	Pension funds	> Open/closed funds with focus on long-term wealth maintenance and growth	> Long-term, stable investment preferences	> Require complex, long-term revenue guarantees	> 5-10%	KWAP
	Sovereign wealth funds	> Sovereign-backed fund, e.g. based on resource revenues	> Strong interest in diversifying portfolios, e.g. into infrastructure	> Potential politicization of projects	> 4-8%	KHAZANAH NASIONAL, GIC
	Major EPC companies	> EPC industry players focused on infrastructure delivery	> Synergies with EPC contracting and technical expertise	> Lack of risk diversification	> 7-9%	HOCHTIEF
	Terminal operators	> Port industry players focused on operations and business expansion	> Synergies with technical expertise	> Lack of risk diversification	> 5-10%	DP WORLD, PSA
Debt	Commercial banks	> National, regional and international financial institutions with a focus on infrastructure	> Specific fit with infrastructure projects	> Higher credit terms than budget finance or IFIs	> 7-10%	Maybank, CIMB
	Pension funds	> Open/closed funds with focus on long-term wealth management (e.g. via bonds)	> Long-term, stable investment preferences	> May require long-run revenue guarantees	> 5-10%	KWAP
Debt & equity	International financial institutions	> Bilateral or multilateral donor institutions working on infrastructure	> Good financing conditions and technical expertise	> Potentially lengthy and bureaucratic project management	> 2-6%	IFC, AIIB, European Investment Bank

1) Expected IRRs are based on secondary research and expert interviews; these serve as indicative figures and may change according to each project's specification

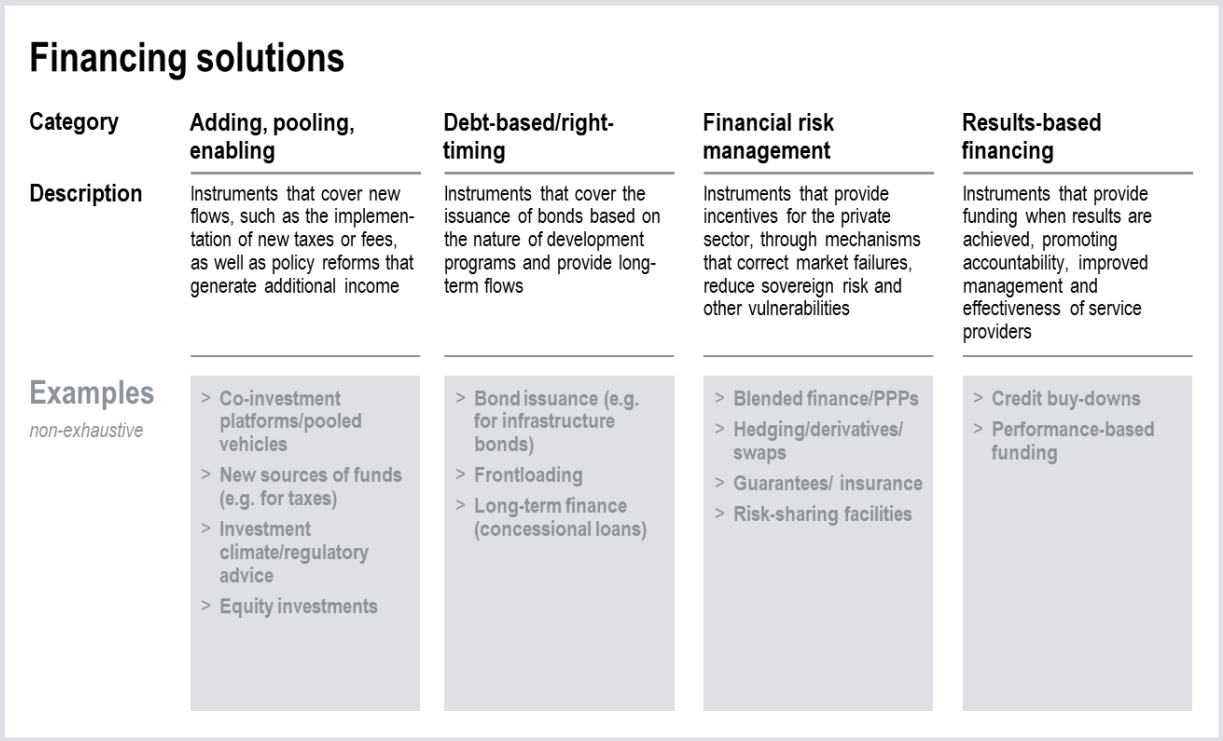
Source: Desk research, Roland Berger

The private sector is generally very involved in port affairs and businesses, investing heavily in sea and land transportation services that use ports, while offering a wide range of trade facilitation and logistics services. In the case of the Port of Beirut, the private sector should be encouraged to continuously upgrade operations and invest in equipment and facilities. However, this will be contingent on the government's ability to provide a fiscal space that encourages investments.

If a partnership agreement is signed with a project company (a terminal operator, for example, or a joint venture with a terminal operator), equity financing could be provided by infrastructure investors such as Macquarie or Brookfield, or by major EPC companies focusing on infrastructure projects. Pension and sovereign wealth funds also offer equity financing, and commercial banks and pension funds offer debt financing, in return for long-term revenue guarantees. However, such guarantees may be difficult to provide in the case of the Port of Beirut.

International Financial Institutions (IFIs) such as the IFC, EIB, ICD and AIIB provide financing or equity for infrastructure projects, as well as technical assistance. The funding they offer comes in four types, as shown in Figure 58. For example, if the Port of Beirut forms a PPP with a private operator, IFIs could provide blended financing solutions based on a combination of market loans and grants (for example, interest rate subsidies, loan guarantees and technical assistance). The advantage of this is that the funding is adapted to the recipient's needs, which increases the volume, impact and economic benefit of such solutions.

Figure 58: Financing solutions offered by development banks



Source: Desk research, Roland Berger

As discussed above, various funding options are available for the Port of Beirut. However, before reaching out to potential financiers, the following key steps must be taken:

> Conduct a detailed prefeasibility study
> Obtain approvals and commitment to the chosen development plan
> Determine the number and type of investment partners
> Define the value proposition for each partner

4.3 Next steps

Crises create opportunities. But in the case of the Port of Beirut, time is of the essence. To restore trust, urgent action is needed at both the national (and port ecosystem) level and the level of the port itself.

At a national level, a revamped port law and governance structure for ports are needed. These would ensure that operations are safe and allow ports to develop in a way that would benefit the entire economy. A unified national entity overseeing ports is essential. This would establish a common vision for both the maritime and the transportation and logistics sectors. Reforming customs administration, including a new customs law with digitalized operations, would be beneficial. In addition, a streamlined system connecting all port stakeholders in a transparent manner would be desirable.

At the level of the Port of Beirut, it will be necessary to set up a Port Authority with clear roles and responsibilities and a plan for how to move forward. This is vital in order to rebuild investor confidence and willingness to invest. Accordingly, a national custodian for the reconstruction efforts should be established, including a steering committee and project management office. At the same time, immediate action is needed to clear away the damage, dispose safely of the waste and reconstruct the port.

In parallel, we recommend carrying out prefeasibility and technical feasibility studies. The prefeasibility study should have a broader horizon (more than 20 years) and look at forecast handling of cargo by type, vessel forecasts, operations and layout planning, investment needs, hinterland access, financial analysis, a competitive assessment, details of the governance structure and an analysis of the socio-economic impact. The prefeasibility study should then form the basis of a "go/no-go" decision on future plans for the port.

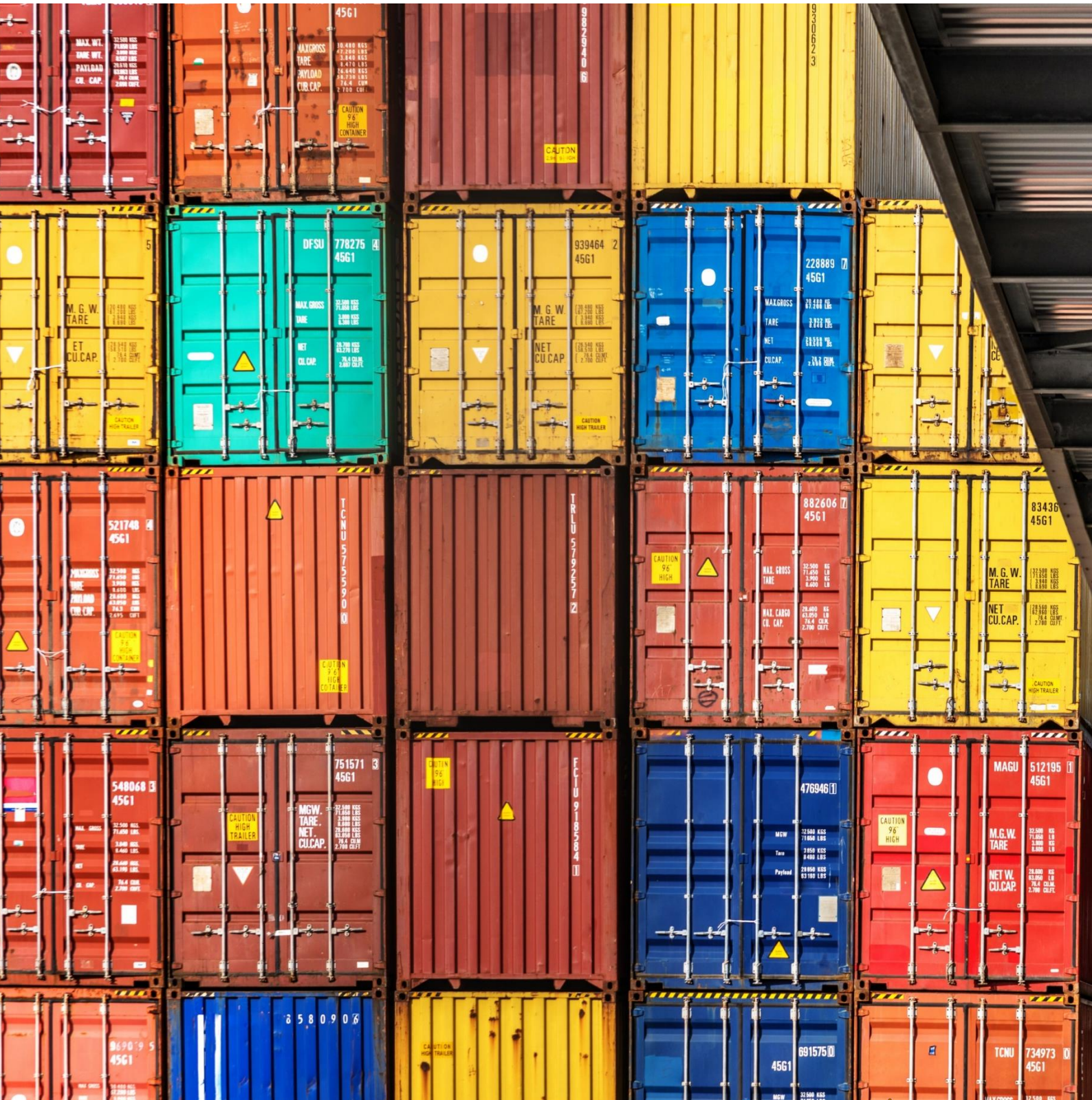
The prefeasibility study should be followed by a detailed technical feasibility study, including soil, navigation and traffic studies, detailed design plans, detailed CapEx estimates, a pricing plan, partnerships, an organization and management plan, an environmental management plan, detailed financial analysis including risks, and a financing plan.

The prefeasibility and technical feasibility studies should form the basis for detailed preparation for the project. This includes determining the set-up of the project management, detailed engineering requirements, details of the special purpose vehicle and drawing up financing and tender documents. Only then can construction and site development begin.

These studies and the implementation plans based on them will provide a clear basis both at the level of the Port of Beirut and at a national level (maritime, logistics and transportation strategies) for potential investments and partnerships. Together, they will form a compelling value proposition.

As detailed in this study, structural, economic, social and political reforms at a national level are critical in order to unlock the future development of the Port of Beirut and, by extension, Lebanon as a whole. Implementing the actions outlined above as a matter of urgency could, we believe, make the Port of Beirut a transparent, safe and efficient economic hub for Lebanon and the region, and at the same time open up long-term opportunities for the population.

5. Appendix


DFSU 778275 4
45G1
TCNU 5755900
TRLU 5792557
MAGU 512195 1
45G1
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TARE
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CU.CAP.
CAUTION
96
HIGH
CONTAINER
CAUTION
HIGH TRAILER

This Appendix includes additional information on the analyses and methodologies we used in this study. The order in which we present the information follows that of the report itself.

5.1 Cargo analysis: Detailed figures, drivers and assumptions

5.1.1 Fuel imports

This section gives a detailed overview of the current situation regarding fuel imports in Lebanon and the reason why we separated these volumes from the throughput at the Port of Beirut.

Figure 59: Distribution of petroleum terminals across Lebanon

Source: UNDP

The government in Lebanon imports two types of fuel: diesel and fuel oil. These arrive at two governmental terminals previously used as refineries: Sidon (Zahrani) in the south of Lebanon and Tripoli in the north.

By contrast, gasoline 95-98, diesel, LPG and bitumen are imported by 13 companies from the private sector. The Association of Petroleum Importing Companies in Lebanon (APIC) represents all 13 members: IPT, Total, Liquigas, Medco, United Petroleum, Uniterminals, Wardieh Holdings, Hypco, Gefco, HIF (HODICO), Coral Oil, Cogico and Arabian Petroleum Company. The market is dominated by Total, Medco and Hypco, which hold a combined market share in excess of 50 percent. The remaining importers control roughly equal shares of the rest of the market (Blominvest, 2016a).

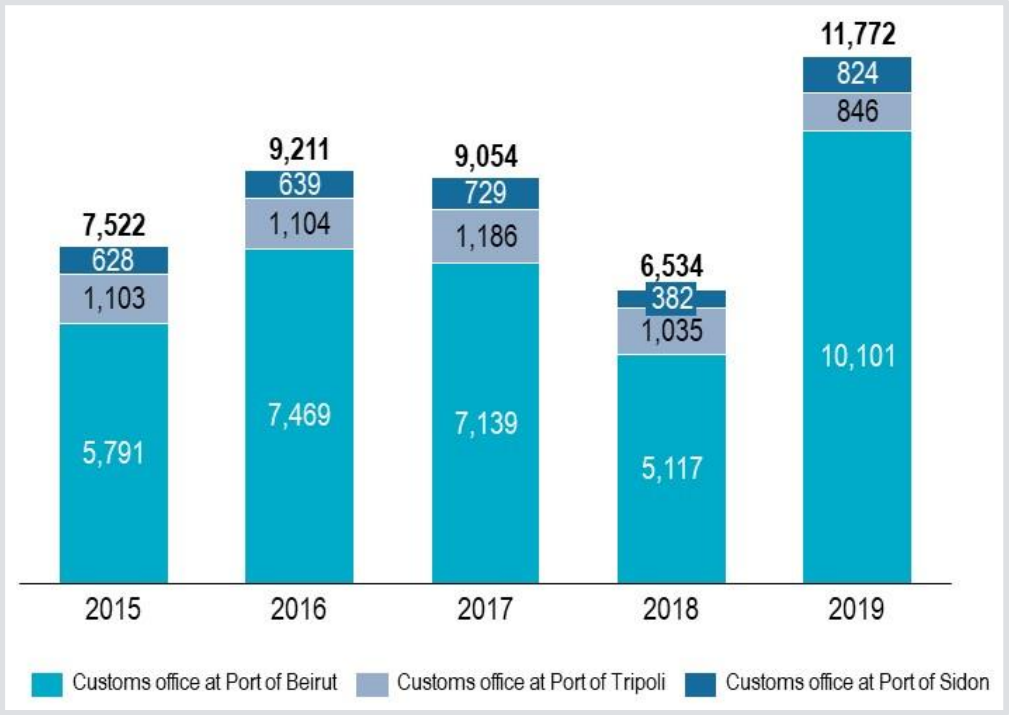
Petroleum is imported via these companies' private terminals spread along the coast of Lebanon. There are 13 private fuel import terminals, with a total holding capacity of approximately 440,500 liters. The coast by Mount Lebanon accounts for 77 percent of the total storage capacity, with ten terminals

distributed across Dora, Bouchrieh, Antelias and Karantina. Two terminals are located in the North Governorate in Anfeh and Amchit, and one in the South Governorate in Jiyeh (UNDP, 2016).

Each of the private fuel-importing terminals has a customs office that is responsible for two main operations, namely setting tariffs and border control. When a tanker arrives at the terminal, it carries a receipt with information about the type and quantity of fuel present. This receipt originates from the company the fuel is bought from. Once the ship docks, the Customs Office extracts samples of the products and tests them against set criteria in the Tripoli and Zahrani terminals. If the checks are successful, the ship can then pump and unload the fuel into the appropriate tanks. Finally, after checking for volume and quality standards, the Customs Office calculates the tariff and the private companies are required to pay the next morning in order to continue operating.

Since the Port of Beirut is not involved in importing fuel, all mineral fuel data reported by the Customs Office at the Port of Beirut has been separated out in our figures. Figure 60 below shows the weight of mineral fuel trade at the various customs offices.

Figure 60: Total mineral fuel imports and exports segmented by customs office[19] ['000 tons; 2015-2019]



Source: Lebanese Customs

[19] Customs offices only consider sea trade.

5.1.2 Traffic development – Historical analysis

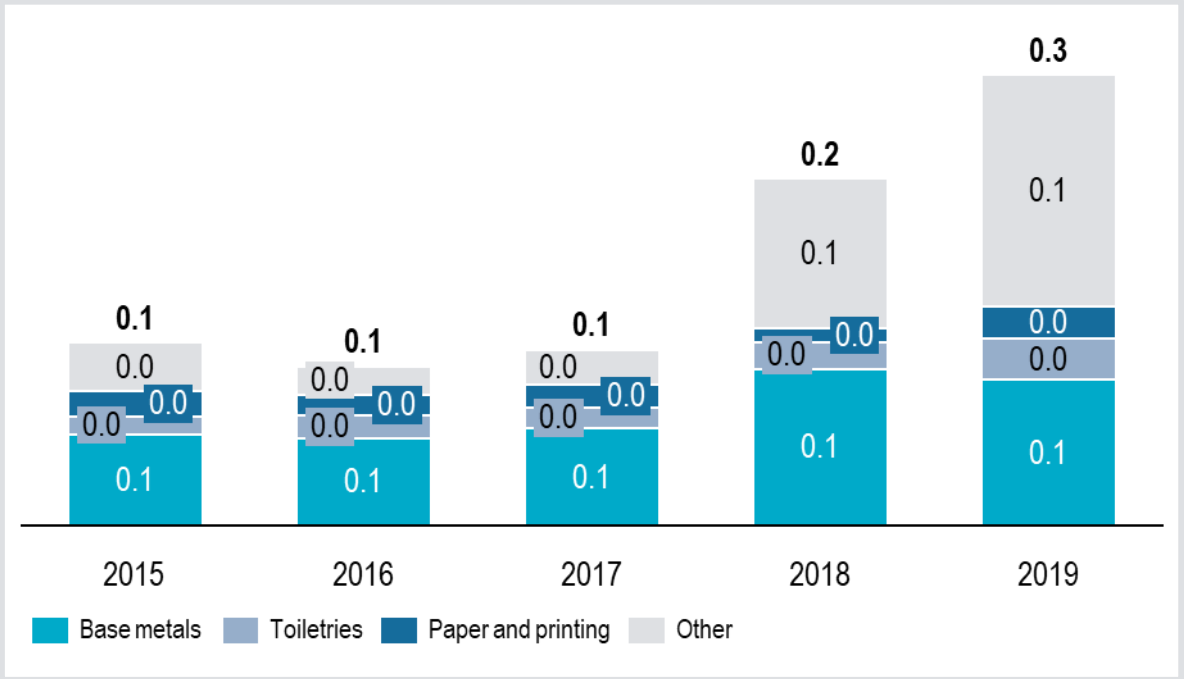
This section gives a detailed historical analysis of export volumes for general cargo and dry bulk.

Exports

General cargo

The main type of general cargo from 2015 to 2017 was base metals, such as iron, steel and aluminum. In total, these account for around 50 percent of general cargo on average. Considerably lower export volumes were recorded for toiletries such as soaps (about 12 percent) and paper and printing goods (about 13 percent). From 2018 onwards, an increase in volumes was recorded for base metals and also other commodities with smaller shares, such as chemicals as well as rubber and plastics (Figure 61).

Figure 61: Breakdown of exported general cargo in commodities [m ton; 2015-2019]

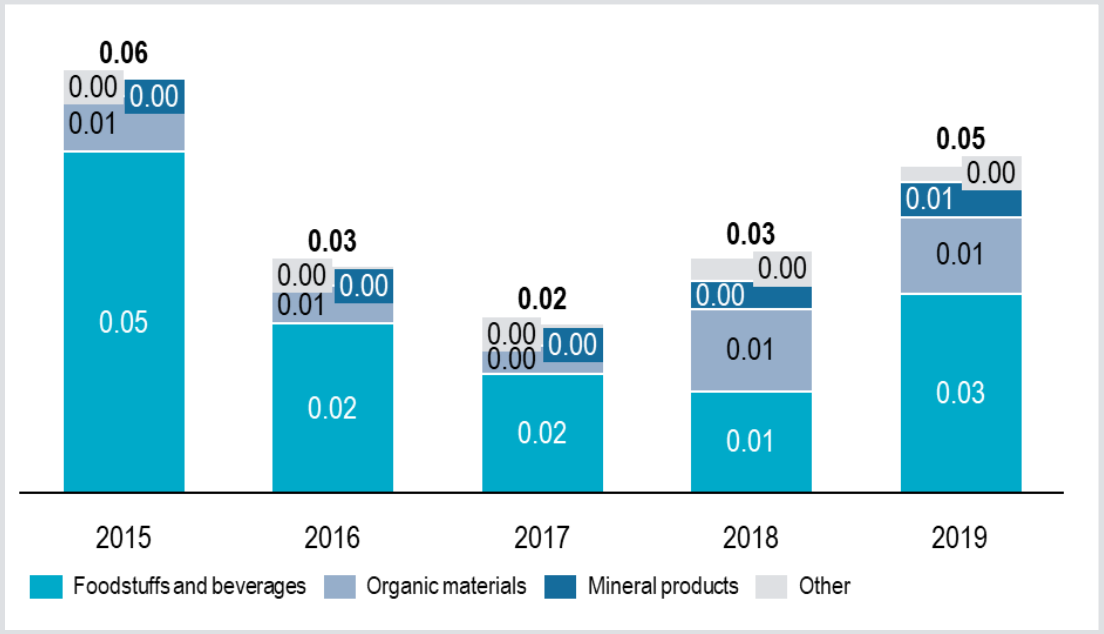


Source: Lebanese Customs, Port of Beirut, Roland Berger

Dry bulk

The main dry bulk commodities exported from the Port of Beirut are foodstuffs (cereal products, sugar, confectionery) and beverages, organic materials such as residues from the food industry, and mineral products such as salt, sulfur, earths and stone. Of these commodities, foodstuffs account for the largest share, ranging between 40 and 80 percent of the total depending on the year. Organic materials follow, with an average share of about 20 percent (Figure 62).

Figure 62: Breakdown of exported dry bulk cargo in commodities [m ton; 2015-2019]



Source: Lebanese Customs, Port of Beirut, Roland Berger

5.1.3 Traffic development – Forecast analysis drivers

In this section we explain the drivers used to forecast cargo demand and throughput at the Port of Beirut, indicating our sources. The overarching driver of demand for the main commodities handled at the Port of Beirut is the country's real GDP. This assumption was confirmed by testing for correlations between different drivers. Experts also confirmed that GDP growth is the most relevant indicator for forecasting trade volumes, as trade is one of the main economic pillars of the country. Due to the strong correlation between GDP and several other drivers of demand, the GDP growth forecast was additionally used as a basis for projecting the development of other drivers, based on the historical correlation.

The main drivers included in the forecast trade volumes refer only to Lebanon, unless otherwise stated. They are as follows:

> **GDP growth:** GDP growth measures how fast a country's economy is growing. Data on GDP growth from the World Bank Development Indicators, Oxford Economics and Euromonitor was compared; ultimately, the Euromonitor data was used. Forecast GDP growth plays a significant role in the analysis as many indicators are correlated with it.

> **Car density:** Car density is the ratio of the total number of cars in a country to the size of the population. This was calculated by using a proxy, taking Euromonitor data on the number of passenger cars in Lebanon and dividing it by the total population.

> **Refugee population growth:** This measures the development in the number of displaced refugees in a country. Data was taken from the World Bank Development Indicators.

> **Population growth:** This is the increase or decrease in the total number of nationals in a country. Data was taken from Euromonitor.

> **Consumer expenditure growth:** This indicates changes in the spending habits of individuals over the years. Data was taken from Trading Economics and Eurobarometer.

> **Tourist arrival growth:** This is the increase or decrease in the number of tourists visiting a country. Tourist arrival data was taken from the World Bank Development Indicators and newspaper sources.

- **Gross National Income (GNI):** This constitutes the total domestic and foreign output claimed by residents of a country. GNI growth is a measure of how fast a country's national income is developing over a set period. GNI growth data was taken from the World Bank Development Indicators database.
- **Growth in construction activities:** This measures the development of the construction industry. As a proxy, we used data on total cement deliveries and construction permits issued, taken from Bank Audi Lebanon and the World Bank databases.
- **GDP growth in main export markets:** This was calculated as an average of the GDP growth of the Kingdom of Saudi Arabia, Qatar and Iraq, which represent the main export markets for Lebanon. Data was taken from the World Bank Development Indicators and CEIC.
- **Growth in agriculture:** This uses the Gross Production Index Number (GPI), calculated by weighting the production quantities for each commodity by the average international commodity prices, then calculating the sum for each year from 2014 to 2016. This value is then divided by the average aggregate for this base period to obtain the index. Data was sourced from the Food and Agriculture Organization of the United Nations (FAO). The forecast was developed based on historical volumes.
- **Manufacturing Gross Value Added (GVA):** This is a productivity metric that measures the contribution of any unit engaged in the production of goods and services. Manufacturing GVA growth data was taken from Euromonitor.

Figure 63: Table of main economic drivers' growth rate – Actual and forecast

	Actual						Forecast									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
GDP growth [1]																
Base scenario [1.1]	0.4%	1.6%	0.6%	-1.9%	-6.9%	-25.0%	-2.3%	1.3%	2.3%	2.7%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Reform scenario [1.2]	0.4%	1.6%	0.6%	-1.9%	-6.9%	-25.0%	2.5%	13.0%	10.5%	8.0%	5.5%	3.5%	2.5%	2.5%	2.5%	2.5%
Growth in car density [2]	1.2%	2.1%	3.1%	3.6%	2.5%	2.5%	2.6%	3.0%	2.9%	3.0%	2.6%	2.2%	1.9%	1.5%	1.3%	1.2%
Refugee population growth [3]	-4.8%	-3.4%	-0.6%	-3.0%	-2.3%	-1.9%	-2.4%	-2.2%	-2.2%	-2.3%	-2.2%	-2.2%	-2.2%	-2.2%	-2.2%	-2.2%
Population growth [4]	4.3%	2.8%	1.6%	0.6%	-0.1%	-0.4%	-0.8%	-1.2%	-1.5%	-1.5%	-1.4%	-1.1%	-0.8%	-0.6%	-0.4%	-0.3%
Consumer expenditure growth [5]	-0.7%	5.8%	8.3%	1.7%	-5.8%	-33.1%	3.7%	4.7%	4.8%	6.5%	5.2%	5.2%	5.1%	5.2%	5.1%	5.1%
Tourist arrival growth [6]	12.0%	11.2%	10.0%	5.8%	-1.4%	-82.8%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%	6.4%
GNI growth [7]	0.1%	0.9%	2.2%	-2.1%	-5.5%	-17.7%	0.9%	8.0%	6.3%	4.6%	2.9%	1.5%	0.9%	0.9%	0.9%	0.9%
Construction activities growth [8]		1.6%	-3.0%	-15.9%	-32.2%	-61.8%	5.5%	51.2%	40.3%	29.4%	18.6%	9.8%	5.5%	5.5%	5.5%	5.5%
Growth in agriculture industry [9]	-4.9%	6.0%	-3.4%	-2.1%	-0.9%	0.3%	1.5%	2.6%	5.0%	3.0%	3.6%	3.9%	3.5%	3.6%	3.7%	3.6%
Main export market GDP growth [10]	3.4%	6.3%	-0.6%	1.1%	1.5%	-7.3%	2.7%	3.5%	3.2%	2.2%	2.0%	2.7%	2.7%	2.6%	2.4%	2.5%
Manufacturing GVA growth [11]	11.0%	6.2%	2.8%	-4.7%	-20.9%	-75.0%	8.8%	40.7%	33.1%	25.5%	17.9%	11.8%	8.8%	8.8%	8.8%	8.8%

Sources:

1 World Bank Development Indicators, Euromonitor, Roland Berger estimates

1.1 Euromonitor

1.2 Euromonitor, Roland Berger estimates

2 Euromonitor, Roland Berger estimates

3 World Bank Development Indicators, Roland Berger estimates

4 Euromonitor

5 Trading Economics, Eurobarometer, Roland Berger estimates

6 World Bank Development Indicators, Newspaper Resources

7 World Bank Development Indicators, Roland Berger estimates

8 World Bank, Bank Audi Lebanon, Roland Berger estimates

9 FAO, Roland Berger estimates

10 World Bank Development Indicators, CEIC, Roland Berger estimates

11 Euromonitor, Roland Berger estimates

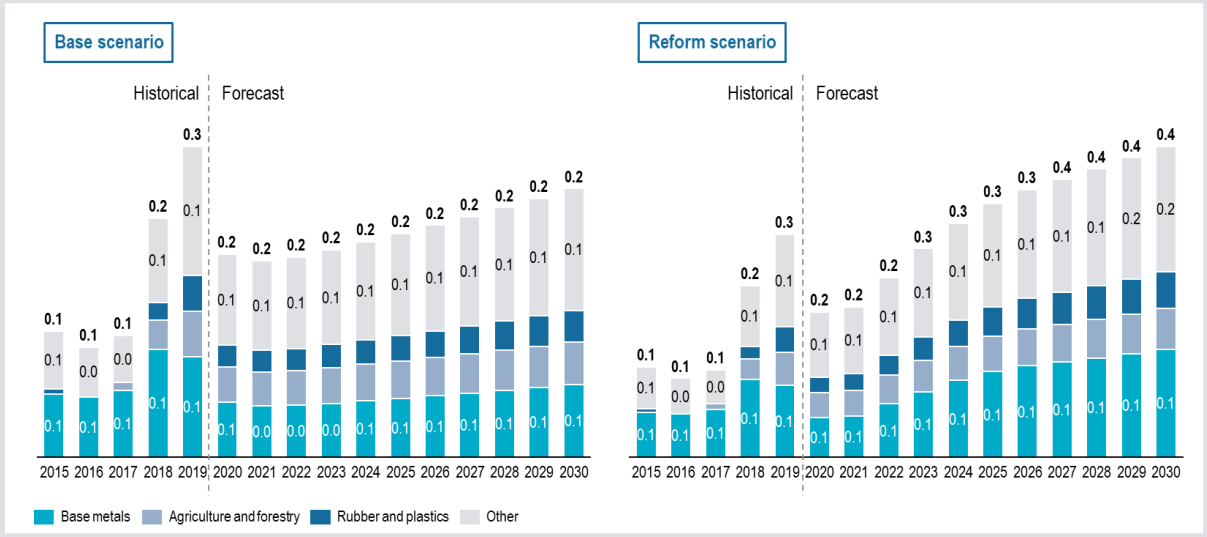
5.1.4 Traffic development – Forecast analysis

This section gives a detailed forecast analysis of export volumes for general cargo and dry bulk.

Exports
General cargo

General cargo exhibits the same behavior as container cargo, with an estimated 35 percent decrease in export volumes from 2019 to 2020. This is largely attributable to the decrease in base metals and agriculture export commodity volumes, both of which are assumed to have contributed almost half of the decrease in volumes. Figure 64 gives the general cargo export volumes for both the Base and Reform scenarios. The forecast numbers in the Base scenario project a steady increase of general cargo exports, potentially surpassing pre-2017 values but not fully recovering to 2019 values. By contrast, the Reform scenario predicts a nearly complete recovery by 2023.

Figure 64: Total general cargo volumes of exported goods – Base and Reform scenarios [m ton; 2015-2030]

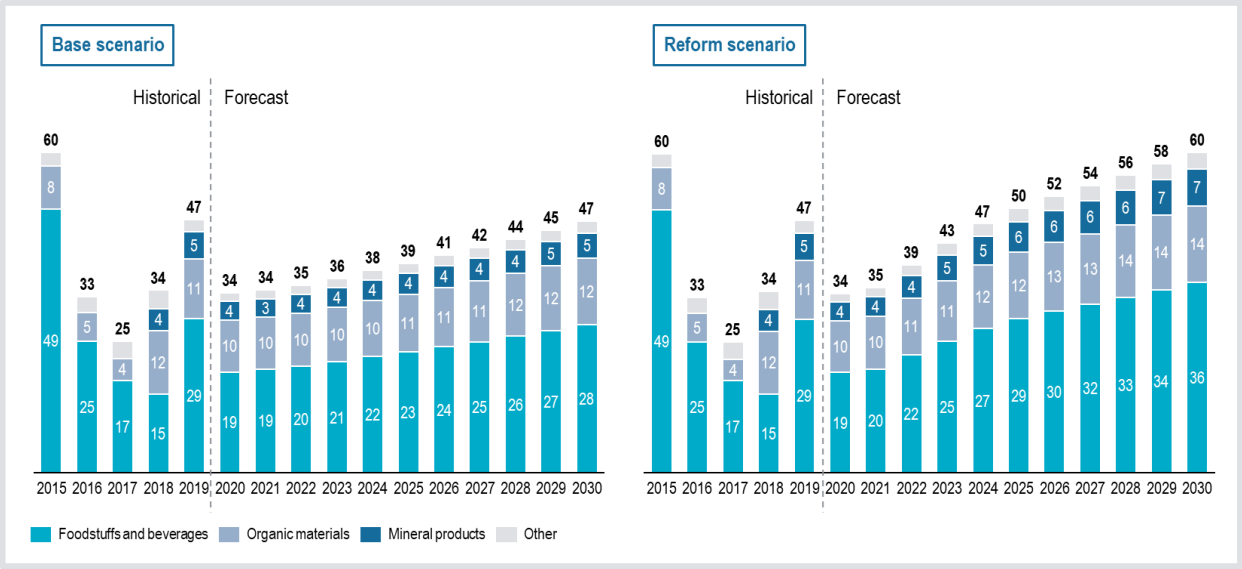


Source: Lebanese Customs, Port of Beirut, Roland Berger

Dry bulk

Dry bulk exports, which represent the smallest share of export volumes, are made up mostly of clean bulk, including foodstuffs, which are estimated to shrink by almost 35 percent from 2019 to 2020. In the Base scenario, total dry bulk exports, and also the main commodity totals, are expected to make a nearly full recovery by 2030, as shown in Figure 65. In the Reform scenario, volumes increase at a rate twice that of the Base scenario from 2020 to 2030: The dry bulk export volumes from 2019 are surpassed by 2025 and the final 2030 volumes are close to 2015 volumes, around 25 percent higher than those of 2019.

Figure 65: Total dry bulk volumes of exported goods – Base and Reform scenarios ['000 tons; 2015-2030]



Source: Lebanese Customs, Port of Beirut, Roland Berger

5.2 Financial analysis methodology

In this section we detail the methodology used to estimate revenues and operating expenditure at the Port of Beirut.

5.2.1 Estimated revenues

Methodology

The financial analysis builds on two input factors: the pricing structure at the Port of Beirut and the forecasts for vessel traffic and trade volumes. For each revenue stream, a separate approach was developed in order to estimate future revenues. The Base and Reform scenarios also play into the methodology for the financial analysis, as they provide the fundamentals for the development of trade volumes. However, in this analysis, only the Reform scenario is considered, as this is in line with our recommended strategy.[20]

Given the lack of information on storage and other revenue streams, assumptions had to be made in order to derive estimated total revenue. Historical data provided the average share of each revenue stream in total revenue. The average share of port dues in total revenue is 55 percent, while the average share of handling fees is 27.5 percent. Using these shares, total revenue can be forecast. This approach also allows us to specify the estimated revenue streams for both storage and other revenues. For all pricing, an increase of two percent every three years is assumed. In addition, inflation rates are considered.

Port dues on vessels: Port dues per vessel are determined on the basis of average vessel length categories. The Port of Beirut reports statistics on the number of vessels and the total import and export volumes, differentiated by vessel length category. For each length category, average vessel length and time spent at the port were estimated on the basis of this historical data. Average port dues per vessel

[20] For details, see Chapter 3.

(within each vessel length group) were calculated as the product of the tariff per meter per day, the average length of the vessel, and the average stay. For the purposes of this calculation, the set minimum was considered in case the actual time spent at the port was less than the minimum due indicated. Figure 66 shows the average port due per vessel.

To estimate future revenues from vessel port dues, a vessel forecast was conducted. Future vessel traffic per year was forecast based on the historical ratio of trade volumes to number of vessels. Finally, the forecast number of vessels was split across the vessel length categories, based on historical ratios, and multiplied by the average port due.

Figure 66: Table of detailed information on average vessel dues at the Port of Beirut

Vessel length category	Average vessel length	Average stay at PoB	Average port due
0-75 m	58 m	6.4 days	1,110 USD/vessel
76-150 m	107 m	6.1 days	2,151 USD/vessel
151-225 m	187 m	1.5 days	1,938 USD/vessel
226-300 m	272 m	0.8 days	1,686 USD/vessel
> 300 m	358 m	1.4 days	3,425 USD/vessel

Source: Port of Beirut, Roland Berger

Port dues on cargo: The volume assessment in Chapter 2.3 allows us to calculate future revenues from cargo dues, split into container and non-container dues. Average tariff per cargo type was calculated based on the import and export commodity shares within each cargo type, as developed for the volume forecast. Future revenues were estimated as a function of this average tariff multiplied by the forecast volumes for each of the local and transshipment containers, and general and dry bulk cargo. The estimated average tariffs are 95 USD/TEU for container cargo and 8 USD/ton for non-container general cargo. Clean dry bulk is charged at 3 USD/ton. Transshipment containers are set at a fixed port due of 10 USD/TEU and transit cargo at 2 USD/ton (including storage for up to nine days) as indicated by the Port of Beirut.

Handling and hire of equipment: Handling fees are charged separately and differentiated for containers and non-containers. For each cargo type, average handling tariffs are calculated based on the usual service items from the service catalogue. For container cargo, a "standard handling bill" to be applied per TEU was developed based on expert input. For transshipment containers, the separate pricing structure per TEU from the Port of Beirut was used. For non-container cargo, handling operations are priced per ton and depend on the type of commodity and the service required. The overall share of commodities was therefore applied to identify an average handling fee.

For the hire of equipment, the most common service items were identified from the catalogue. Due to the low share of the equipment hire price per TEU or ton, these were not included in the "standard handling bills" per TEU/ton, as they would not have made a significant difference to the overall tariffs.

Future revenues were estimated as a function of the handling fee per cargo type multiplied by the forecast volumes, differentiated for local containers, transshipments, general cargo, dry bulk and transit cargo. The estimated average handling fees are 125 USD/TEU for local containers, 60 USD/TEU for transshipment containers, 7 USD/ton for general cargo and clean dry bulk, and 7 USD/ton for transit.

Storage: Data from the Port of Beirut indicates that the first nine days of storage are included in the handling price and therefore cannot be separated out explicitly. It is therefore assumed that further storage revenue is charged separately from this first nine-day period. Due to the limited information available, storage revenue is calculated based on the historical share of total revenue, at around 7.5 percent. In the forecasts, storage revenue is estimated based on its share of total revenue.

Other revenues: Using the same approach as for the forecast for storage revenues, other revenues were estimated at around ten percent of total revenue.

5.2.2 Operating expenditure (OpEx) estimates

Methodology

In the financial analysis, OpEx is estimated based on total revenues. Benchmarks were used to identify the OpEx items from the OpEx statements of other ports, reflecting both regional and best-practice ports.[21] By looking at relevant OpEx items, we could use the benchmarks as a rough guide to what a reasonable share of OpEx in total revenue would be. A proportionate share of the individual OpEx items could also be deduced and verified by experts. For the estimated OpEx, inflation rates were taken into account as well.

Overall, the benchmarks indicate that OpEx as a share of total revenue should not exceed 55 percent. Historically, the Port of Beirut came in at about 47 percent on average from 2005-2017. However, OpEx represented a share of around 40 percent, based on the Port of Beirut reporting structure. While this might indicate an optimal level of performance, in fact the reported OpEx figures are only comparable if we adjust the reporting structure in line with the benchmarks.

OpEx items

By comparing historical Port of Beirut data and the benchmarks, we can compile an overview of the main OpEx items. We then use this as a guide for our assumption-driven estimates. Overall, the Port of Beirut reports four main expense items, which we matched with standard OpEx items for the estimates. This was backed up with input from experts regarding key expense items.

As shown in Figure 67, the main matching expense item is "personnel expenses". This refers to labor and personnel-related expenses. "Operator fees" refers to costs incurred by the GEPB due to management agreements with operators, for example the BCTC operating the container terminal. Since this set-up will likely be adapted in the new governance structure, this expense item is not used as a future key reporting item for the Port of Beirut. "Financial provisions" refers to financial charges and EIB provisions. As neither of these are further specified and financial provisions are not usually considered part of operating expenses, we also ignore this expense item in our future estimates; although financial provisions will most likely still occur in the future, they should be accounted for separately.

Two additional expense items are included in our OpEx estimates. First, "operations and maintenance costs", which refers to all items relating to regular expenses in operations and the maintenance of port infrastructure and superstructure. And second, "utilities", which are not currently included in the Port of Beirut data but should be, as energy and water-related costs usually represent a significant share of OpEx.

Figure 67: Comparison of OpEx items in the Port of Beirut data and this study

[21] The selected benchmark ports are the Port of Haifa, Port Said, the Port of Piraeus, the Port of Rotterdam and the Port of Hamburg.

Port of Beirut	Study approach
Personnel expenses	Personnel expenses
Operator fees	*Ignored as number of operators and structure of payments to operators is unknown*
Financial provisions	*Ignored as incidental and cannot be estimated*
Port of Beirut historical figures do not include operations and maintenance costs – It is assumed that they are included as part of "Operator fees"	Operations and maintenance
Port of Beirut historical figures do not include operations and maintenance costs – It is assumed that they are included as part of "Operator fees"	Utilities
Other	Other

Source: Port of Beirut, Roland Berger

Personnel expenses: The Port of Beirut reports that a significant improvement in staff efficiency took place from 2005 to 2017 (Port of Beirut, 2019). In the last reported year, personnel expenses accounted for about 22 percent of total revenue (about 50 percent of the total share of OpEx). This value is slightly above the best-practice examples. It was therefore assumed that with further gains in efficiency, an OpEx share of 15 percent of total revenue could be reached by 2030.

Operations and maintenance: Operations and maintenance are introduced as a new OpEx item. As such, there are no historical values. Which costs are included depends on the port-specific accounting structure, but a share in total revenue of 15 percent would put the Port of Beirut in the same range as most of the benchmark ports.

Utilities: Best-practice examples show that a utilities-related item should be clearly disclosed in the OpEx reporting. Therefore, a share in total revenue of 15 percent was assumed.

Other: It is standard practice to group miscellaneous OpEx items together as "other". Usually, these costs come in at about five to ten percent of total OpEx. The Port of Beirut historically reports an average share of four percent. In the new target structure, a share of ten percent is assumed in order to allow some room for adjustments to expense items not accounted for in other OpEx items.

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