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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT *AND/OR*
INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED GRANT FROM THE LEBANON FINANCING FACILITY

IN THE AMOUNT OF US$10.00 MILLION

TO THE

UNITED NATIONS DEVELOPMENT PROGRAMME
for the benefit of The Lebanese Republic

FOR A

BEIRUT CRITICAL ENVIRONMENT RECOVERY, RESTORATION AND WASTE MANAGEMENT PROGRAM

MAY 13, 2022

Environment, Natural Resources & The Blue Economy Global Practice
Middle East And North Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective April 29, 2022)

Currency Unit =	US$
1514.12 LBP =	US$1

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Ferid Belhaj
Country Director:	Saroj Kumar Jha
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ABBREVIATIONS AND ACRONYMS

3RF	Reform, Recovery and Reconstruction Framework
ACG	Anti-Corruption Guidelines
ACM	Asbestos Contaminated Materials
ACP	Advisory Committee on Procurement
AN	Ammonium Nitrate
BCA	Benefit Cost Analysis
BML	Beirut and Mount Lebanon
CAP	Contracts, Assets and Procurement Committee
CAS	Central Administration of Statistics
CDR	Council for Development and Reconstruction
CDW	Construction and Demolition Waste
COVID-19	Coronavirus Disease 2019
CPF	Country Partnership Framework
CPO	Chief Procurement Officer
CSO	Civil Society Organization
DFIL	Disbursement and Financial Information Letter
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
EU	European Union
E&S	Environment and Social
FMFA	Financial Management Framework Agreement
GA	Grant Agreement
GDP	Gross Domestic Product
GHG	Green House Gas
GoL	Government of Lebanon
IFR	Interim Financial Reports
IIA	Intermediary Implementing Agency
ILO	International Labor Organization
IRR	Internal Rate of Return
LBP	Lebanese Pound
LEPAP	Lebanon Environmental Pollution Abatement Project
LFF	Lebanon Financing Facility
M&E	Monitoring and Evaluation
MENA	Middle East and North Africa Region
MoE	Ministry of Environment
NGO	Non-Governmental Organization
NPV	Net Present Value
OP	Obsolete Pesticides

PCC	Project Co-ordination Committee
PDO	Project Development Objective
PMU	Project Management Unit
PoB	Port of Beirut
POM	Project Operations Manual
PP	Procurement Plan
PPSD	Project Procurement Strategy for Development
RACP	Regional Advisory Committee on Procurement
RDNA	Rapid Damage and Needs Assessment
RF	Results Framework
RtM	Rubble to Mountain Consortium
SWM / ISWM	Solid Waste Management / Integrated Solid Waste Management
TOR	Terms of Reference
TPMA	Third-Party Monitoring Agency
UN	United Nations
UN-Habitat	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Programme
WB	World Bank
WBG	World Bank Group

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Lebanon	Beirut Critical Environment Recovery, Restoration and Waste Management Program	
Project ID	**Financing Instrument**	**Environmental and Social Risk Classification**
P176635	Investment Project Financing	High

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[✓] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[✓] Responding to Natural or Man-made Disaster
[✓] Alternate Procurement Arrangements (APA)	[ ] Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
13-May-2022	30-Jun-2025

Bank/IFC Collaboration

No

Proposed Development Objective(s)

To support immediate environment control measures from the impacts of August 2020 Port of Beirut explosion and planning for longer term environmental restoration efforts in Beirut City

Components

Component Name	Cost (US$, millions)

Rehabilitation of damaged solid waste management infrastructure and management of asbestos contaminated debris generated due to POB explosion	8.00
Policy and institutional support for greening Beirut's reconstruction agenda	0.50
Project Management	1.50

Organizations

Borrower:	United Nations Development Program, New York
Implementing Agency:	United Nations Development Program, Lebanon

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	10.00
Total Financing	10.00
of which IBRD/IDA	0.00
Financing Gap	0.00

DETAILS

Non-World Bank Group Financing

Trust Funds	10.00
Lebanon Financing Facility	10.00

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2022	2023	2024	2025
Annual	0.50	2.50	4.50	2.50
Cumulative	0.50	3.00	7.50	10.00

INSTITUTIONAL DATA

Practice Area (Lead) **Contributing Practice Areas**

Environment, Natural Resources & the Blue Economy	Transport

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	High
2. Macroeconomic	High
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	High
5. Institutional Capacity for Implementation and Sustainability	Moderate
6. Fiduciary	High
7. Environment and Social	High
8. Stakeholders	Substantial
9. Other	
10. Overall	High

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[✓] Yes [ ] No

Have these been approved by Bank management?

[✓] Yes [ ] No

Is approval for any policy waiver sought from the Board?

[ ] Yes [✓] No

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
Cultural Heritage	Not Currently Relevant
Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description

To facilitate the Project implementation, UNDP shall establish by not later than three months after the effective date, a Project Co-ordination Committee (PCC), consisting of representatives of relevant ministries, departments and agencies of Government of Lebanon and other stakeholders, as may be relevant from time to time.

Sections and Description

UNDP shall prepare and furnish to the Bank an annual investment plan and budget for the Project by not later than four months after the Effective Date, and thereafter on an annual basis, by not later than January 31 each year

Sections and Description

UNDP shall (a) maintain establish and maintain throughout the life of the Project, the Project Management Unit ("PMU"), which shall be responsible for the day- to-day management and implementation of the Project, including the technical, fiduciary (such as Procurement and Financial Management), social and environmental aspects of the Project, and co-ordination of all field activities, as detailed in the Project Operations Manual ("POM") and (b) by not later than September 30, 2022, contract additional specialists for (i) project Management, (ii) environmental engineering, (iii) social and gender, (iv) financial management, and (v) procurement, as further detailed in the POM and under terms satisfactory to the Bank.

Sections and Description

UNDP shall cooperate with Third-Party Monitoring Agents (“TPMA”) engaged under the Lebanon Financing Facility Multi Donor Trust Fund for purposes of Third-Party Monitoring of Project implementation, and enable such external monitoring agents to: (a) to visit any facilities and sites included the Project; and (b) to examine the goods financed out of the proceeds of the Grant, and any documents relevant to the performance of its obligations under this Agreement. Nothing in the foregoing provision shall be construed as granting audit access to any such Third-Party Monitoring Agent or the Bank hereunder.

Conditions

I. STRATEGIC CONTEXT

A. Country Context

1. **The massive Port of Beirut (PoB) explosion on August 4, 2020, devastated Beirut city, killing at least 217 people, wounding more than 6,000 and displacing about 300,000 individuals.** In addition to causing extensive damage to homes, businesses, infrastructure and disrupting the city's economic activity, the explosion created multiple environmental challenges. These impacts were assessed in the Rapid Damage and Needs Assessment (RDNA) carried out jointly by The World Bank Group (WBG), European Union (EU) and United Nations Lebanon, immediately after the explosion. The RDNA assessed the impacts of the disaster on the population, changes in economic flows, physical assets, infrastructure, and service delivery in Beirut. Based on the assessment of damages and needs of 16 sectors, the RDNA estimated the damages to range between US$3.8 to 4.6 billion and losses to range between US$2.9 to 3.5 billion. Physical damages to the environment sector were assessed as US$20 to 25 million and recovery and reconstruction needs were estimated at US$75 to 100 million[1].

2. **The PoB explosion aggravated the ongoing economic, financial and health crises in Lebanon**. Ten months before the explosion, the economic crisis that began in October 2019 was triggered by a significant drop in capital inflows and a steady downfall of national currency against the dollar. In March 2020, the situation forced the Government of Lebanon (GoL) to default for the first time ever on a sovereign payment of US$1.2 billion Eurobond redemption. The recession was precipitated by a fixed exchange rate regime with acute economic conditions, followed by the sudden drop in capital inflows combined with larger internal and external imbalances. This has been accompanied by informal and ad hoc capital controls, shortage of US dollars that stifled trade and disrupted supply chains in virtually every sector, depreciation of the exchange rate, creation of multiple exchange rates. Exchange rate pass through effects on prices have resulted in surging inflation, averaging 84.3 percent in 2020 (well above the 50 percent threshold often used to define hyperinflation)[2] and 145 percent in 2021. The situation worsened further by the health crisis caused due to COVID-19 pandemic and countrywide lockdowns in the first six months of 2020. The PoB explosion in August 2020 caused further economic and environmental shocks to the country, in addition to its direct humanitarian impact. As a result of these crises, the real Gross Domestic Product (GDP) growth of Lebanon contracted by 21.4 percent in 2020 and the decline worsened with a 58.1 percent contraction in 2021[3].

3. **The high poverty rate combined with the large concentration of Syrian refugees in the country is strongly affecting jobs and livelihood opportunities in a context where structural gender inequalities are persisting[4].** It is estimated that about 15.36 percent (851,717) of all registered displaced Syrians live in Lebanon[5], joined by approximately half a million more unregistered and displaced Syrians. According to UN Human Settlements Program (UN-Habitat), in 2014 one out of every five residents in the country was a refugee and 25 percent of them live in Beirut.[6] The socio-economic situation of these refugees has been deteriorating over the years with close to three-fourths of the population falling below the poverty line (less than US$4 per day per person) and over 50 percent below the extreme poverty line (less than US$3 per person per day).[7]

[1] World Bank Group; European Union; United Nations. 2020. Beirut Rapid Damage and Needs Assessment. World Bank, Washington, DC. © World Bank. - https://openknowledge.worldbank.org/handle/10986/34401
[2] World Bank. "Lebanon Economic Monitor: Lebanon Sinking (To the Top 3)". 2021
[3] https://www.worldbank.org/en/country/lebanon/publication/lebanon-economic-monitor-fall-2021-the-great-denial
[4] Gender inequality is endemic to all aspects of life in Lebanon, including in relation to access to economic opportunities, human capital accumulation & agency. "World Bank and UN Women. 2021. The Status of Women in Lebanon: Assessing Women's Access to Economic Opportunities, Human Capital Accumulation & Agency. Washington D.C.: World Bank".
[5] UNHCR, "Operational Portal: Syria Regional Refugee Response – Lebanon," August 2021.
[6] UNHABITAT& UNHCR (2014), Housing, land& property issues in Lebanon: Implications of the Syrian refugee crisis, New York: UN
[7] UNHCR, WFP, UNICEF. (2019). Vulnerability Assessment of Syrian Refugees. VaSyR 2019. New York: United Nations.

4. **The worsening economic and poverty situation in Lebanon is significantly affecting the delivery of basic services and management of environmental resources.** This can be attributed to weak public governance and the political gridlock in the country, which is preventing the implementation of policy and reform agenda that is critical for ameliorating the fallout of the compounded crises. In addition, inadequate management of impacts after PoB explosion, combined with the economic crisis has eroded people's trust in the Government.

5. **Climate change is expected to have diverse impacts on Lebanon's environment, economy, and social structure.** Temperatures are projected to increase 1.2-1.7 ^{0}C by mid-century, while precipitation is expected to decrease by 4-11 percent by 2100[8] leading to long periods of drought and substantial reduction of snow coverage. Sea levels will gradually rise and are expected to cause coastal infrastructure damage. Over 85 percent of Lebanon's population live in urban areas concentrated along the coast. Rising Mediterranean levels are expected to amount to approximately 20 mm per year, with an expected increase in sea levels of a total of 30-60 cm in the next 30 years. Moreover, the fragile marine biodiversity, land-based ecosystems and natural habitats are expected to be threatened by increased forest fires and sea level rise. Climate change exacerbated by poor land use planning, coastal artificialization high population density and inadequate solid and hazardous waste management contributes to Beirut's coastal vulnerability.

B. Sectoral and Institutional Context

6. **The PoB explosion, according to media reports is believed to have occurred due to the ignition of about 2,750 tons of Ammonium Nitrate (AN) at the port and can be attributed to the poor management and storage of chemical and hazardous substances**. The disaster is also an example of the overall weak regulatory oversight of chemicals and hazardous materials in Lebanon. The RDNA has noted that large quantities of Obsolete Pesticides (OPs), pharmaceutical products and chemical substances were also stored at PoB at the time of the explosion. The presence of these materials and destruction of large number of houses and other structures has led to the generation of various waste streams with an estimated 320,000 tons of building demolition waste, 1,200 tons of hazardous waste (including asbestos material), 170 tons of electronic waste, 500 scrapped vehicles and four severely damaged sea vessels anchored at the port. In addition, about 900,000 tons of construction debris is estimated to be generated during the reconstruction of damaged buildings.[9]

7. **The PoB explosion has also caused other environmental impacts**, such as: (i) significant damage to Municipal Solid Waste (MSW) management infrastructure – Karantina solid waste sorting facility and Coral composting facility both adjacent to PoB; (ii) pollution of the marine ecosystem around the explosion site; (iii) loss of green cover/vegetation in Beirut City; and (iv) short term increase in dust levels (particulate matter) containing asbestos, during demolition, rehabilitation, and reconstruction of damaged buildings.

8. **The presence of hazardous waste material in various waste streams generated due to the explosion poses direct and immediate threat to the population[10] and overall environmental quality of Beirut**. The waste material present at PoB and other locations outside the port, is poorly controlled. In addition, the absence of containment and control measures at these locations poses threat to public health and urgent actions are needed for the containment and safe disposal of these waste materials. Given the hazardous nature of the material stored, the soil at these storage sites is also likely to have been contaminated and requires remediation.

[8] USAID, 2016, Climate Risk Profile Lebanon
[9] UNDP. October 2020. Demolition Waste Assessment Outside the Port of Beirut.
[10] Differentiated exposure to contamination is likely to occur to women and men, girls and boys based on gender roles and biological differences. "IPEN, 2020. Women, chemicals and the SDGs. https://ipen.org/sites/default/files/documents/ipen-gender-chemicals-report-v1_6dw-en.pdf"

9. **Several international agencies are providing technical assistance to Lebanon in addressing the environmental impacts of the explosion.** These include, support from the (i) EU for the preparation of Construction and Demolition (C&D) and hazardous waste management implementation plan for the waste arising at the port after the explosion; (ii) German Government through a private agency 'Combilift' to package and dispose hazardous chemical material stored in 52 containers at PoB; (iii) French Government through a private agency 'Recygroup' to conduct studies and options for recycling/ disposal of the waste and rubble generated at PoB and grains from the silos; and (iv) a study by the Netherlands Enterprise Agency (NEA) to assess the impacts on vessels/submerged objects and conduct dredging survey on the affected basins in the port. In addition, POB is also in discussion with various development partners on investment support for the port clean up and reconstruction. Outside PoB, UN Development Programme (UNDP) has carried out an assessment of demolition waste and in partnership with UN Environment Programme (UNEP) has developed advisory notes on its management. In addition, UN-Habitat and UN Children's Fund (UNICEF) are supporting a consortium of local Non-Governmental Organizations (NGOs) (Rubble to Mountain) who is managing the rubble generated from the explosion damaged structures outside the Port by storing, segregating and recycling it at the Bakalian site.

10. **An integrated approach and institutional co-ordination is, however, is needed for the long-term environmental recovery of Beirut.** While the above international support has greatly helped in initiating early assessments and studies, an overarching framework for medium to long term environment recovery for the city that integrates climate resilience aspects, is yet to be developed. Such a framework is essential to ensure effectiveness of proposed interventions, sharing of data among various agencies and planning further initiatives to address the impacts of PoB explosion. An institutional framework for co-ordination of all these activities is also critical in this regard, which is currently lacking.

11. **With regard to overall sectoral issues, infrastructure for the treatment and disposal of hazardous and chemical waste is absent in Lebanon**. While the country has limited capacity for the collection and temporary storage of hazardous waste, there are no facilities for their treatment or final disposal. Consequently, hazardous materials are mixed with MSW and disposed in the existing landfill or dumps. Development of adequate facilities and climate resilient waste infrastructure thus is essential for the management of hazardous waste generated due to the PoB explosion, as well as for the overall long-term waste management needs of Lebanon.

12. **While regulations exist for MSW management in Lebanon, further strengthening of the regulatory framework and technical and financial resources are needed to improve the overall solid waste management situation in Beirut and also to address the challenges emerging from the PoB explosion[11].** The 'Integrated Solid Waste Management (ISWM) Law No. 80/2018' and application Decree 5605/ 2019 for regulating waste sorting at source, defines four principles of: (i) waste reduction, reuse, and recycling; (ii) sorting at source; (iii) preventing uncontrolled dumping, landfilling and burning of solid waste and (iv) polluter pays. As per the Decree, the local authorities shall: (i) provide necessary bins for sorting the waste at source and (ii) establish drop off centers for collecting sorted waste materials (if they have the capacity). However, appropriate human and financial resources are required for the effective implementation of the Law, the decree and managing large quantity of debris generated by the POB explosion.

[11] According to UNDP "Gender Analysis" report (2021), challenges include the limited capacity and the current low status of the waste sector to adequately address gender issues (e.g., limited involvement of women in decision-making and in related activities as recycling).

13. **The damages caused by the PoB explosion to the Karantina centralized solid waste sorting facility (capacity 2000 tons/day) and Coral solid waste composting facility (capacity 750 tons/day), have exacerbated the problems of managing solid waste in Beirut.** The explosion rendered both the facilities non-functional and all the waste generated in the region is now disposed in two sanitary landfills in Costa Brava and Jdeideh. This situation, in addition to being unsustainable, is rapidly consuming available landfill capacity. Any intervention to rehabilitate the damaged facilities therefore should also consider long term issues of waste disposal. Poor waste management and exhausting landfill capacity are a major ecological concern that is critical to avoid contamination of water resources that are already stressed by climate change impacts.

14. **Environmental governance in Lebanon and in the city of Beirut, needs strengthening to implement environment recovery activities and to avoid recurrence of human-made environmental disasters such as PoB explosion.** The Ministry of Environment (MoE) is the main entity responsible for ensuring compliance to environmental regulations and overall environment management in Lebanon. Significant capacity constraints however exist both in the overall environmental regulatory framework of Lebanon and in monitoring and enforcing the existing regulations. The PoB explosion, despite the regulations for handling, storage, and management of hazardous waste (Decree No. 5606 of 2019) and health care waste management (Decree No. 13389 of 2004), reinforce this fact. In addition, specific regulations for the management of chemical substances and stockpiles in Lebanon need to be formulated to prevent future chemical explosions/ disasters.

C. Relevance to Higher Level Objectives

15. **Beyond addressing key constraints emerging out of the PoB explosion, the project also supports key development challenges outlined in the Lebanon Country Partnership Framework (CPF) FY17-FY22, including** governance and institutional challenges, infrastructure deficiencies, environmental degradation, data availability, conflict, security, and fragility as well as gender inequality. The project directly supports CPF Focus Area 1 (Expand Access to and Quality of Services), specifically the objectives to reduce industrial, hazardous and wastewater pollution and to improve the capacity of national and local governments to provide basic services to communities hosting Syrian refugees and stimulate economic development at the local level. Additionally, the project is aligned with the CPF's cross-cutting theme of governance, as it seeks to inform and stimulate debate around policy choices and reform options and building institutional capacity, improving data availability to contribute to evidence-based policy making and mainstreaming citizen engagement.

16. **The project also aligned with WBG's corporate and regional strategie**s. While the project contributes to WBG's strategic goals of eradicating extreme poverty and boosting shared prosperity in a sustainable manner by addressing environmental impacts of POB explosion, which affects the health and productivity of Beirut residents, the project activities are aligned with the pillars of 'addressing fragility' and 'enabling green growth' of Bank's Middle East and North Africa (MENA) regional strategy.

17. **The project is also aligned with the priorities identified under "Focus Area 1. Socioeconomic and business recovery" of the Reform, Recovery and Reconstruction Framework (3RF) for Beirut, which aims to respond to the immediate needs identified under both the Port sector and the Environment sector**. The interventions identified by the project are considered as urgent, critical, and no-regret measures, which will reduce and mitigate environment, health, and safety risks to the citizens of Beirut and especially those living in the area affected by the explosion. The project will also contribute to plans for future support under "Focus Area 2. Preparing for reform and reconstruction" of 3RF and adopting the principles of "Build back better, greener and smarter". In addition, the project is also aligned with the Lebanon Financing Facility (LFF)'s commitment to proactively identify, address and monitor gender gaps.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

18. To support immediate environment control measures from the impacts of the August 2020 Port of Beirut explosion and planning for longer term environmental restoration efforts in Beirut City.

19. The environmental control measures to be supported by the project would include activities that can minimize/ mitigate environmental and health impacts on the neighboring population due to the storage of asbestos contaminated demolition waste at identified sites and its safe disposal. As regards to long term restoration efforts, the project will support establishment of a collaborative platform which will be instrumental in the development of a strategic plan for greening Beirut reconstruction.

PDO Level Indicators

20. The PDO will be monitored through the following outcome indicators (see Results Framework for further details):

- Contaminated Construction and Demolition Waste (CDW) at selected storage sites safely managed in line with defined control measures (site securing, containment measures, disposal, or treatment) (Metric tons)
- Waste management capacity of the solid waste infrastructure rehabilitated by the project, contributing to the ISWM in Beirut City[12] (tons/day)
- Direct Project Beneficiaries (number)
- Strategic plan for greening Beirut reconstruction developed in consultation with the collaborative stakeholders platform established through the project (Yes/ No)

B. Project Components

21. **The project aims at responding to urgent and critical environmental issues arising from the drastic PoB explosion and minimizing or mitigating public health and environmental risks stemming out from this disaster.** The interventions are specifically designed to address the management and disposal of asbestos contaminated demolition waste generated from the damaged buildings, rehabilitation of damaged solid waste infrastructure and technical assistance for their sustainable operation. These interventions are identified based on the damages and needs identified by the RDNA[13] carried out immediately after the explosion, the 'Construction and Demolition Waste Management Plan' prepared by the European Union (EU)[14], the 'Demolition Waste Assessment' carried out by UNDP[15] and waste categorization and assessment at PoB carried out by Recygroup (supported by the French Government).

22. Since the PoB explosion and based on studies carried out by various agencies, the Government and the Port Authorities have secured in principle alternative funding for the cleanup and management including recycling of

[12] measured based on the implementation of the operational plan prepared by the project
[13] World Bank Group; European Union; United Nations. 2020. Beirut Rapid Damage and Needs Assessment. World Bank, Washington, DC. © World Bank. - https://openknowledge.worldbank.org/handle/10986/34401
[14] EU. October 2020. Beirut Explosion: Construction and Demolition (C&D) Waste Management Plan
[15] UNDP. October 2020. Demolition Waste Assessment Outside the Port of Beirut

waste materials in the Port area. Project support through LFF funding is therefore not required to address environmental risks in the Port area. In view of this, project activities have been identified to meet other priority and critical environmental interventions in areas outside the Port that were affected by the August 2020 explosion. These include solid waste management facilities that serviced large parts of the Beirut metropolitan area and locations such as Bakalian site where construction and demolition waste generated from buildings damaged from the explosion, is stored and managed. To maximize the project outcomes within the limited funds available through LFF, the interventions were also prioritized based on the proposed/planned initiatives by other development partners and accordingly, the project activities comprise the following three main components.

Component 1. Rehabilitation of damaged solid waste management infrastructure and management of asbestos-contaminated debris generated due to PoB explosion (US$8.00 million)

23. This component aims to support the refurbishment and reintegration of affected SWM infrastructure in Beirut, and the containment of contaminated waste material generated from the port explosion, through the three sub-components below.

Subcomponent 1.1 Management of asbestos-contaminated debris generated in the explosion affected areas of Beirut (US$2.00 million)

24. **The CDW generated from the buildings damaged in the PoB explosion has been stored in a number of locations in Beirut. Of these, the Bakalian Site near the Port area is the largest site and was assigned by Beirut's Governor to receive CDW and authorized Rubble to Mountain (RtM) Consortium[16] to manage the site.** Since the Port explosion, the Bakalian site is reported to have received 150,000 tons[17] of CDW and mixed waste that resulted directly from the explosion as well as CDW from other locations in Beirut. The RtM Consortium with support from UN-Habitat and with the supply of equipment (including a crusher) from UNICEF, is in the process of developing capacity for waste processing and recycling at this site. There is evidence (from assessments conducted by USAID[18] and UNDP) that particularly in the first months after the explosion, part of the waste material that entered Bakalian site and other locations was contaminated with asbestos. Since then, the RtM consortium has developed protocols for safe management and has stopped receiving asbestos contaminated waste. A due diligence of the operations at the site was carried out during the project preparation and based on this assessment, the project would particularly focus on the safe management of (asbestos) contaminated waste material at the Bakalian site, and where possible more broadly support the safe management of these waste materials in other locations of Beirut.

25. In line with this, the following activities will be supported:

- ***Management of asbestos contaminated CDW***. The project, with support from an experienced international supervising entity, will finance robust testing and management activities to separate contaminated (including more than 0.1 percent asbestos) from uncontaminated CDW where feasible and adequately manage the contaminated fraction to prepare for transport from the site for safe disposal and subsequent restoration/ remediation of the CDW storage site(s).

[16] Rubble to Mountains consortium is composed of an NGO - Lebanon Reforestation Initiative (LRI), a private firm- Development Inc SAL and AUB Neighborhood Initiative. It has received limited financial support from UN-Habitat and UNICEF, towards overall management and technical assistance, provision of some equipment including a crusher for the operations at the site.
[17] quantity reported by Rubble to Mountain (RtM) consortium
[18] USAID, January 2021. Bakalian Sampling Results and Identification of Preliminary Management Alternatives

- ***Identification and preparation of contaminated CDW disposal site***. MoE has identified a shortlist of abandoned quarries as potential site for contaminated CDW disposal. The project in the first six months of implementation, will support the final site selection, planning, public consultations, and due legal process to develop the selected site. Climate and disaster risk screening will be conducted for the selection of the site. This activity will then further include the preparation of the site to receive asbestos contaminated CDW and the transportation and management of materials generated as a result of the PoB explosion. The development of waste disposal site is complex and requires extensive public consultations. If, towards the end of 2nd year of the project, the GoL is unable to secure a location for waste disposal and contaminated CDW cannot be removed from the site(s), the project will, alternatively, finance the long-term safe containment of these materials at these sites based on best environmental practices.

- ***Recycling of uncontaminated CDW***. The project will support the recycling of uncontaminated CDW through technical assistance by mobilizing international management capacity, local capacity building and analytical work to support the application of recycled CDW in Lebanon's construction sector. The activities, however, will only be initiated after necessary operational and environmental permits are obtained for recycling activities. As part of this activity, the project will also support effective participation of women in recycling uncontaminated CDW especially for women-led businesses/women's groups. Technical assistance will also include specific trainings on how to handle/recycle uncontaminated CDW targeting women-led businesses/women's groups (or quota for their participation) and/or formalization of their activities, etc.

  All these activities of the sub-component will integrate climate resilient aspects in the siting and design of CDW disposal site with low Green House Gas (GHG) emission potential during both construction and operation phases of the project. Upon closure, the CDW disposal site will provide an opportunity for green cover development that further contributes towards GHG reduction. In addition the activities will be implemented by involving the technical team of MoE and government entities, so that the capacity of these agencies is developed through 'learning by doing approach'.

Sub-component 1.2 Rehabilitation of severely damaged solid waste management facilities serving Beirut area (US$5.40 million)

26. **This subcomponent will finance the assessment and rehabilitation of one or more severely damaged solid waste management facilities** that have been directly impacted by the PoB explosion and are currently inoperable. These include two large facilities, Karantina (for the sorting of Beirut's mixed household waste for the extraction of recyclables) and Coral (for composting of the segregated organic fraction), located adjacent to the port. Both these facilities were seriously damaged due to PoB explosion. While initial cost estimates of the damage have been prepared by the Council for Development and Reconstruction (CDR), the detailed engineering assessment and actual rehabilitation has not been carried out.

27. **The rehabilitation process for the damaged waste management facilities will follow a Build Back Better and Greener approach.** The operations of both the Karantina and Coral facilities were characterized by operational challenges, mainly related to their integration into Beirut's waste collection system. In particular, the limited level of waste segregation at source resulted in lower a quantity and poor quality of feedstock to the sorting and processing facilities. Through this component, the project will analyze these factors, adopt national requirements, follow best international practices and support appropriate sizing (capacity) and improved integration of these facilities into the waste collection system of Beirut. Therefore, in addition to works and equipment to resume

operations at the selected facilities, it is envisaged that the rehabilitation activities will also aim to providing technical support for: (i) enhancing and integrating the overall waste management system (collection, transportation, receipt, sorting, composting, baling, etc.), and (ii) upgrading technologies, and environmental control measures.

28. To ensure the above, **the project will develop a detailed rehabilitation and operational plan for the Karantina and Coral facilities,** which will: (i) evaluate the design, technical and sustainability aspects of these plants; (ii) develop a rehabilitation plan (including optimum capacity, integration of climate and disaster resilience aspects in the design and operation and appropriate contracting arrangements for operation); and (iii) adopt specific strategies for integration with the waste collection system of Beirut. This plan will form the basis for rehabilitating either or both damaged facilities and related technical support activities for their sustainable operation. The rehabilitation of these plants will also integrate the elements of climate resilience, using the limited resources to tailor rehabilitation works to accommodate processing of source segregated waste materials in addition to the former practice of processing mixed waste only. Moreover, solar powered roofs for green power and energy efficient equipment will also be used to reduce operational costs.

Sub-component 1.3 Piloting ISWM in the selected explosion impacted areas of Beirut (US$0.60 million)

29. **Improvement of the overall waste management system of Beirut is also critical for the long-term sustainability of the facilities proposed to be rehabilitated.** With this objective, this subcomponent will also support implementation of demonstration pilot(s) on ISWM in the selected area(s) in Beirut City impacted by the explosion. The pilot(s) will be designed at the start of the implementation with active participation of MoE and will strive to demonstrate actions mandated by the Sorting at Source Decree (5605/2019) for waste management through recycling and reuse (including introducing the proof of concept of a “Drop Off Center”), in addition to promoting household and neighborhood composting to achieve minimum/ zero waste to landfills. The pilot(s) will be implemented by specialized NGOs/ agencies selected through competitive bidding process. To address barriers and constraints for women-led NGOs/groups to access and operate in the formal waste management system[19], the project will: (i) reach out to and inform women-led NGOs/groups of the opportunities offered under the project; (ii) encourage eligible women-led NGOs/groups to participate in the pilot implementation; and (iii) provide technical (training, formalization, etc.) and/or equipment support to strengthen their implementation capacity.

30. **The design and implementation of the demonstration pilot(s) also seeks to closely engage local communities and vulnerable groups in the selection of area(s) for the pilot(s), design of ISWM approaches and evaluation of the performance of the pilot(s).** The project will support needed technical assistance for capacity development and public awareness and will establish the basis for financial sustainability of the activities to be conducted under this sub-component. To challenge gender roles in solid waste management[20], the project will ensure both women and men are involved in the design, implementation and evaluation of the pilot. As such, technical assistance will support: (i) involvement of the community at large (women’s groups, community-based organizations, etc.) for the design of user-friendly measures meeting the specific needs of women and men in relation to waste management practices; (ii) the development of awareness campaigns on the pilot implementation targeting both women and men by using inclusive language/messages, information sharing through adequate channels as women’s groups/networks, etc.; and (iii) the development of a user feedback mechanism for identification of gaps/areas of improvement in service delivery which allows for gender-disaggregated information, analysis, and inform potential scale up.

[19] See Gender-related section (Para#71) for more details.
[20] See Gender-related section (Para#71) for more details.

Component 2. Policy & institutional support for greening Beirut Reconstruction Agenda (US$0.50 million)

31. This component supports the establishment of an enabling environment for policy and institutional reform for climate change and environmental management by strengthening the building blocks for environmental governance and climate action. In addition, the component will also support the participatory planning process for a green recovery of Beirut based on a comprehensive framework for responding to key priorities identified by stakeholders resulting from the explosion. This will be facilitated through the following two sub-components.

Sub-component 2.1. Establishment of a collaborative platform for stakeholder engagement and planning priority actions for greening Beirut's reconstruction agenda (US$0.30 million)

32. This sub-component aims at supporting the establishment of a collaborative platform for ensuring stakeholders' engagement in the climate and environmental agenda of Beirut with participation of citizens, NGOs, and academia[21], including marginalized interest groups and appropriate channels to ensure equal representation of women and men across stakeholder groups (with a quota for female/male representation). Relevant government institutions such as MoE, PoB, the Municipality of Beirut, and other institutions will also be included in the platform. A communication and outreach plan will be developed through appropriate stakeholder mapping and relevant tools for building trust among the concerned entities. The stakeholder mapping will include an assessment of female/male representation across stakeholder groups and identify potential barriers, especially for women and women-led groups, that may undermine fair representation and active participation in defining the strategy and action plan for greening Beirut's reconstruction agenda. The collaborative platform will also strengthen coordination mechanisms among key concerned Government entities to enhance exchange of information and the decision-making process. Based on the experience gained on the performance of the platform, the project in consultation with the stakeholder will also facilitate the finalization of modalities for sustaining the platform beyond the project life.

33. This sub-component will also support the identification and prioritization of activities aimed at greening the reconstruction agenda of Beirut city, which will be based on specific action plans covering; (i) mitigation of Environment, Health and Safety risks; (ii) SWM action plan for Beirut city; (iii) integrating climate change mitigation and resilience considerations in the reconstruction agenda[22]; and (iv) engagement plans to adequately address barriers to the participation of women and men and identify actions in greening the reconstruction agenda considering gender-differentiated needs and interests.

Sub-component 2.2. Strengthening monitoring and enforcement for the management of critical hazardous and chemical substances (US$0.20 million)

34. This sub-component will support environmental monitoring and enforcement activities for the management of hazardous waste in Beirut based on national mandates and international experiences[23], so as to prevent similar accidents in future. This will entail working closely with mandated monitoring and enforcement agencies and

[21] The AFD supported NGO platform "Shabake" is among the on-going initiatives that will be considered for implementing this activity.
[22] This will include the identification of Climate-smart investments as part of the rehabilitation of damaged buildings and businesses such as double-glazed windows, energy efficient lighting and solar water heaters, climate resilient building designs and linking to the extent possible with the Nationally Determined Contributions (NDC) and the NDC Partnership Plans.
[23] Role of Environmental Prosecutors and Investigation Judges as per law 251/2014, the interim arrangement for Environmental Police (given freeze of employment) and MoE's experience of calling upon watchdogs in monitoring activities.

coordinating with concerned government institutions. More specifically, the sub-component will carry out an inventory of hazardous waste and chemical stockpiles and strategies for their monitoring and management. This will help establish regular monitoring protocol to avoid recurrence of any environmental accidents/ disasters and to disseminate information to the public.

35. The sub-component will also support the development of an appropriate mechanism for cleanup and remediation operations during environmental accidents/ disasters. In addition, the sub-component will contribute to bridging the knowledge gap on sex and gender differentiated exposure to contamination by analyzing baseline environment data with relevant gender disaggregated data of the project area. As a result, a specific database/assessment on gender-differentiated exposure to contamination will inform related policies, raise awareness of policymakers, including informing the design of alert/warning systems (e.g., targeted awareness campaigns on potential risks for women, men, girls, and boys).

36. To strengthen the monitoring and enforcement mechanism for hazardous substances further, this sub-component will support the accreditation of two or three environmental laboratories in Lebanon. The criteria for the selection of laboratories shall be developed by the project Intermediary Implementing Agency (IIA) in consultation with MoE, early during the project implementation. In addition, the project will facilitate collaboration of these accredited laboratories with MoE in analyzing hazardous substances at regular intervals. This will strengthen the monitoring and analytical capacity of MoE and in devising appropriate enforcement and management strategies for hazardous substances/ chemicals.

Component 3. Project Management (US$1.50 million)

37. This component supports project management activities to be carried out by UNDP as an IIA. These include: (i) overall project management, fiduciary and Environmental Social Framework (ESF) compliance; (ii) conducting/ managing necessary technical, financial, environment and social safeguard studies; (iii) supporting technical assistance and institutional strengthening measures; and (iv) developing and implementing a monitoring and reporting plan to provide visibility of the results and a transparent model for the development and implementation of all activities. A Project Management Unit (PMU) will be established by UNDP for this purpose comprising a project manager, environmental engineer and safeguards analyst, finance associate, procurement associate and a social and gender analyst.

38. **In addition, a Third-Party Monitoring Agency (TPMA) will be engaged by LFF to carry out independent verification of all LFF projects, their activities and ensure a transparent and equitable implementation.** The TPMA will report on the progress of all activities, outputs, status of achieving the results and the fiduciary and ESF implementation. To ensure its independence, the TPMA will share its monitoring report with the World Bank and UNDP within two weeks from the date of submission of the monitoring report, will share a report to the World Bank on the corrective actions taken to address implementation issues identified by the TPMA.

C. Project Beneficiaries

39. **The project activities are expected to directly benefit an estimated 350,000 people (7.1** percent **of the Lebanese population) impacted by PoB explosion in Beirut**[24] through the: (i) containment and disposal of asbestos-contaminated CDW generated from the explosion and which is stored and/ or dumped at CDW sites in Beirut; and (ii) rehabilitation and sustainable operation of damaged MSW infrastructure.

40. The indirect beneficiaries of the project will be all inhabitants of Mount Lebanon (2,032,600 people[25]) who would be benefiting both from the operation of rehabilitated solid waste infrastructure (which receives MSW from these areas as well) and improved urban environmental quality due to safe management of contaminated CDW. In addition, the policy and institutional support through Component 2, the project will provide necessary enabling framework for Beirut's reconstruction agenda, which will benefit larger population of Lebanon.

D. Results Chain

41. **The theory of change for the project envisages mitigation of significant environment and health risks to the population affected by the explosion and improvement in urban living conditions of Beirut citizens** (see figure 1). While activities through Component 1 will address the urgent need for the rehabilitation and safe management of solid waste and contaminated CDW, Component 2 will develop an enabling framework for long-term sustainability. Critical assumptions underlying the results chain include: (i) key stakeholders in the waste management sector closely collaborate on the design and implementation of the project activities; (ii) competent and experienced agencies are willing to take part in bidding and timely completion of rehabilitation and CDW activities; and (iii) project implementation and management capacity of the intermediary agency.

[24] Labor Force and Household Living Conditions Survey (LFHLCS) in Lebanon Report, funded by EU delegation in Lebanon, published by Central Administration of Statistics (CAS) and International Labor Organization (ILO). 2018–2019

[25] Labor Force and Household Living Conditions Survey (LFHLCS) in Lebanon Report, funded by EU delegation in Lebanon, published by CAS and ILO. 2018–2019

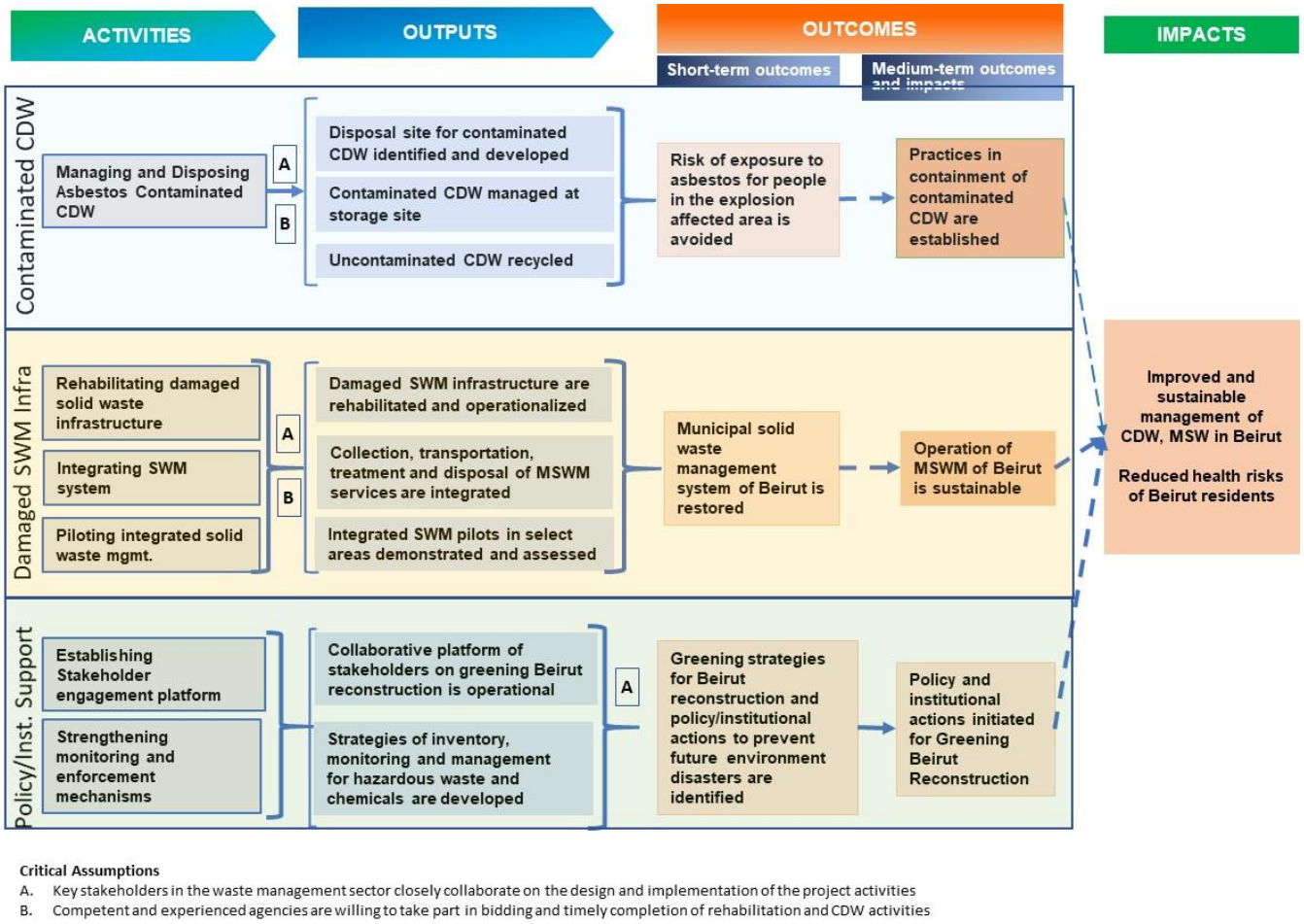


Figure 1: Theory Change

E. Rationale for Bank Involvement and Role of Partners

42. **The World Bank is uniquely positioned to support the recovery and reconstruction of Beirut after the PoB explosion.** In the immediate aftermath of the PoB explosion, the WBG, in cooperation with the UN, EU and other stakeholders, conducted RDNA to inform an expedited economic and social recovery plan to address Lebanon's immediate and short-term needs. An ensuing 3RF was jointly developed by the EU, UN and WBG and aims to provide a comprehensive, short-term reform, recovery, and reconstruction program. The framework was also the basis for the establishment of the LFF, which is managed by the World Bank, and which allowed the pooling and alignment of grant financing for 3RF's short term objectives. The proposed "Beirut Critical Environment Recovery, Restoration and Waste Management Project (US$10 million)" is one such project that will be supporting immediate environment recovery efforts of Beirut.

43. In addition to the principles of transparency, inclusion, and accountability, the World Bank understands the current crisis as a critical opportunity to "build back a better, greener, and smarter" as identified in the 3RF, building on existing initiatives to employ elements of right sizing, right siting, climate change adaptation, climate smart practices, and greening. Throughout the RDNA and 3RF process, Lebanese Civil Society Organizations (CSOs) have called on the World Bank and other development partners to adopt an integrated and transparent approach to effectively support vulnerable households.

44. **Specific to the proposed project, the World Bank has significant experience in supporting solid waste, chemicals, and hazardous waste management across regions and countries.** In case of hazardous waste/ contaminated sites, the Bank has supported projects in Croatia, China, India, Kosovo and in Africa region. In MENA region, Bank has successfully supported the implementation of Global Environmental Facility (GEF) financed projects in Lebanon, Egypt and Jordan on hazardous chemicals management and is financing a US$200 million project on solid waste and air pollution management of Greater Cairo region. This strong portfolio of experience, sector knowledge and existing strong collaboration with key government institutions in Lebanon, provides a strong rationale for Bank's involvement in the project.

45. The project will collaborate with UNDP as the IIA that has significant experience in the environment sector in Lebanon and also has an established relation with MoE and other government agencies in the country. Similarly, the sub-component 1.1 builds on the initial work supported by UN-Habitat and UNICEF to an NGO consortium and proposes to implement containment and management measures.

46. In addition, a series of consultations were carried out during preparation with an objective to inform the project design and also to ensure synergies with the work done/ being done by EU, UNDP, UNEP and other international/ bilateral donors such as Germany, France and the Netherlands. This collaboration and consultation with development partners will continue during the implementation phase of the project to ensure that the overall project objective environmental recovery is achieved.

F. Lessons Learned and Reflected in the Project Design

47. **The project design is informed by the lessons learned in the design and implementation of similar projects in other countries and ongoing environment sector projects in Lebanon.** The design of the project incorporates the lessons learned from Bank supported projects in the management of chemicals and hazardous waste sector in various countries and regions. Furthermore, the experience of implementing environment sector projects in Lebanon such as the Lebanon Environmental Pollution Abatement Project (LEPAP), the Poly Chlorinated Biphenyls (PCBs) Management Project and the Lake Qaraoun Pollution Prevention Project has provided critical technical inputs in the design of project components.

48. **The management of hazardous substances and their disposal requires strong technical expertise and comprehensive planning.** Sub-component 1.1 of the project proposes safe management and disposal of asbestos contaminated CDW generated due to the PoB explosion, which is a hazardous substance requiring special technical expertise. Considering this, a detailed due diligence was carried out during the project preparation and accordingly the design proposes deploying an internationally experienced consultant to work with local agencies currently managing the contaminated CDW. This would enable proper assessment of contamination and design of management strategies, disposal facilities and building capacity of local institutions.

49. **Integration of the entire MSW management value chain is critical for the long-term sustainability of the investments in the sector.** Building on this lesson, sub-component 1.2 of the project, in addition to supporting the rehabilitation of the damaged sorting and composting facilities, proposes to provide technical support to integrate waste collection and transportation activities in Beirut city. This will ensure the sustainable operation of rehabilitated infrastructure. Similarly, the sub-component 1.3 also plans to implement an ISWM demonstration pilot in the explosion-affected areas of the city. Implementation of this pilot will provide valuable lessons for the improvement of solid waste management in Beirut city, based on ISWM principles.

50. **Inclusive ongoing stakeholder consultation and engagement on an ongoing basis, is essential for successful post-disaster recovery and reconstruction initiatives.** Considering the importance of stakeholder engagement, sub-component 2.1 of the project proposes to establish a stakeholder platform, which not only enables involvement of stakeholders in monitoring the project implementation, but also provides an opportunity to inform the broader reconstruction agenda of Beirut city.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

51. **In line with the principles of LFF and considering the current institutional challenges in Lebanon, the project will be implemented by UNDP (as an IIA), in close coordination with the GoL, particularly with the relevant ministries and all stakeholders**. With technical expertise in environmental and waste management sector, strong local presence, as well as past and ongoing environment project implementation experience in Lebanon financed by number of development partners, UNDP is highly qualified for implementing the project. In addition, UNDP also has previous experience of supporting World Bank projects, such as in the management and delivery of technical assistance activities for the ongoing LEPAP project in Lebanon (since 2014) and various other projects in MENA region. This experience of UNDP and strong collaboration with the Bank in Lebanon further strengthens its suitability as an IIA for the project.

52. **As an IIA, UNDP will be responsible for:** (i) the overall implementation of the project; (ii) monitoring the project results towards the achievement of agreed outcomes; (iii) managing the project in line with the agreed procurement and financial management arrangements including the preparation of withdrawal applications under the project; (iv) ensuring the implementation of ESF requirements including the Environmental and Social Commitment Plan (ESCP) for the project; and (v) complying with all reporting requirements of the project as per the Grant Agreement (GA).

53. **UNDP will establish a PMU comprising qualified and experienced technical, financial, procurement and environmental and social professionals compatible to the requirements of the project activities**. The PMU will be responsible for overall planning, implementation and management of project activities and will supervise the implementation of activities by the consultants, contractors, NGOs and other agencies.

54. **To facilitate co-ordination, active participation and ownership of the project activities by the GoL agencies, relevant ministries and other stakeholders, UNDP will establish a "Project Co-ordination Committee (PCC)".** Building on UNDP's earlier experience in various projects in Lebanon[26], a PCC will be established in close consultation with GoL ministries, departments, agencies and other stakeholders relevant to the project and shall include MoE, Beirut Governorate, Municipality of Beirut and CDR and other stakeholders. The main objective of the PCC will be to (i) review the project progress and provide strategic guidance in the implementation; (ii) facilitate coordination/ collaboration between UNDP/ PMU, project implementing agencies and the government; (iii) facilitate resolution of implementation challenges including any statutory and administrative approvals that may be required for the project activities; and (iv) ensure synergies between project activities, other initiatives of the government and other development partners. The PCC will also ensure appropriate participation of relevant officials of the ministry/ agency in the implementation of project activities, so as to facilitate the transfer of

[26] GEF financed and UNDP implemented 'Land Degradation Neutrality in Mountain Areas in Lebanon Project', June 2020.

knowledge from the PMU, project implementing agencies and other technical experts involved in the project. Such participation will also help with capacity building of ministries in ensuring sustainability of the project interventions and their scale up in future. The overall project implementation structure is presented in Figure 2 below.

55. **A Project Operations Manual (POM) has also been prepared to guide the implementation of the project.** The POM describes in detail, the implementation arrangements, roles and responsibilities of the IIA, PMU, agreed Fiduciary and ESF procedures, overall implementation plan, progress reporting requirements, and arrangements for the monitoring and measurement of results.

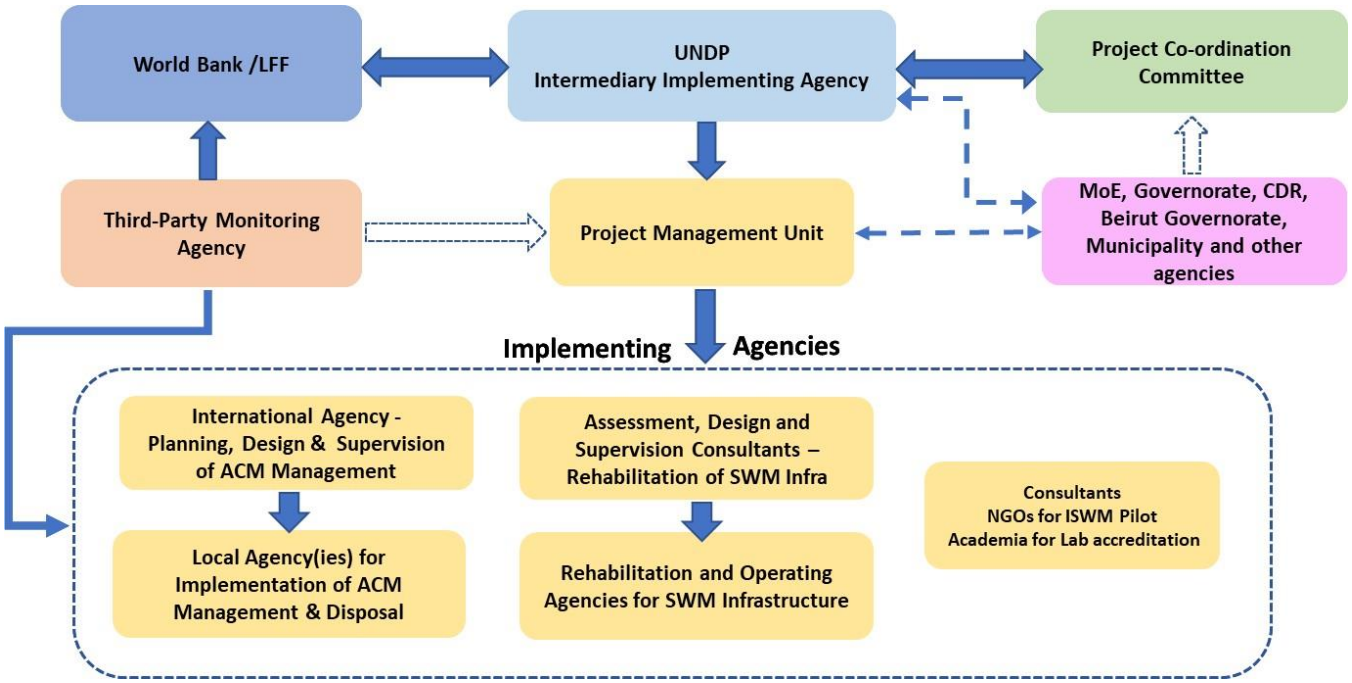


Figure 2. Project Implementation Structure

B. Results Monitoring and Evaluation Arrangements

56. **UNDP will be responsible for results monitoring and will ensure continuous monitoring of project implementation in close collaboration with local partners and assess progress towards the achievement of the end targets agreed in the results framework.** The POM developed for the project includes the approach and methodology proposed to be followed for monitoring the results. Monitoring and Evaluation (M&E) function will be assigned by the IIA to establish/ collect baseline data (on current level of CDW and waste management) and monitor the results (as per the methodology defined in the POM) as the project progresses in coordination with members of the PMU team. The assigned M&E staff will also ensure accuracy of the data and information collected and is reported as part of the project's progress reports.

C. Sustainability

57. **The project instills sustainability within its broader objective of critical environment recovery from the PoB explosion.** To this end, the project proposes to create an enabling environment for a sustainable program-wide approach to the management of hazardous substances/ waste and MSW management in Lebanon. The project activities that support creating an enabling environment for the technical, financial and institutional sustainability of investments include the following:

- Designing sub-component 1.1 to facilitate collaboration of experienced international agencies on Asbestos Containing Materials (ACM) management with local agencies with an objective to build local capacity for ACM management beyond the project.
- Establishment of a PCC to ensure: (i) ownership of GoL institutions; and (ii) participation of relevant GoL officials in the implementation of project activities that facilitates transfer of knowledge and continued operation of infrastructure developed/ rehabilitated through Component 1 of the project.
- Integrating the concept of ISWM into sub-component 1.3 through technical assistance to: (i) right sizing and design of appropriate maintenance contracts for the rehabilitated SWM infrastructure; (ii) mainstream rehabilitated solid waste infrastructure across SWM value chain (collection, transportation and treatment): and (iii) pilot ISWM concept in select explosion affected areas of Beirut. All these initiatives will help the technical and sustainable operation of project operations and scaling up ISWM approach based on project implementation experience in other area of Lebanon.
- Supporting the establishment of collaborative stakeholder platform, conducting inventory of hazardous chemicals/ substances in Lebanon and accreditation of laboratories, through Component 2. This will help in long-term planning and environmental sustainability of Lebanon.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis (if applicable)

Technical Analysis

58. **The project activities are designed primarily to address immediate critical environment recovery needs emerging from the PoB explosion.** Accordingly, the components are designed based on the damages and needs identified by the RDNA carried out by WBG (together with other development partners) immediately after PoB explosion. In addition, detailed due diligence was carried out on the (i) ongoing activities of CDW management at Bakalian site by the RtM consortium; (ii) initial structural rehabilitation requirements for the damaged solid waste infrastructure estimated by the consultant hired by CDR and (iii) implementation plan for CDW and other hazardous waste generated at PoB prepared by EU and other agencies. A series of consultations were also held with key government and other stakeholders such as (i) office of Deputy Prime Minister, MoE, Ministry of Public Works and Transport (MoPWT), PoB, Governor of Beirut and CDR, (ii) development partners such as UNDP, UNEP, EU, etc. (iii) bilateral agencies from France, Germany, Netherlands, etc. and (iv) CSOs/ NGOs involved in Lebanese environment sector. These reviews, due-diligence exercises and consultations indicated the following.

    - The advanced status of dialogue between of GoL and PoB with bilateral agencies to support the management and disposal of waste generated inside the port due to the explosion and the lack of need for LFF support through the project;
    - The need for the implementation of international best practices in the management and disposal of asbestos contaminated CDW and for capacity building of local partners in the area;
    - The dysfunctional status of solid waste infrastructure and overall SWM system in Beirut following the PoB explosion and the immediate need for its revival/ rehabilitation, and
    - The need for supporting long term environment reconstruction efforts focusing on stakeholder participation and capacity building of institutions.

59. **The project design considers the above findings and accordingly, includes specific components focused on addressing the immediate recovery needs (Component 1) and supporting longer term environment reconstruction efforts (Component 2).** Building on the findings of the above due-diligence and stakeholder consultations:

    - Sub-component 1.1 of the project proposes to seek support from an experienced international ACM management agency to assess the level of contamination, design appropriate containment measures and disposal facility for contaminated CDW.
    - Sub-component 1.2 in addition to supporting rehabilitation of SWM infrastructure, provides technical support to strengthening collection and transportation system, so as to ensure sustainability of SWM system in Beirut.
    - Component 2 includes specific sub-components to establish a collaborative platform for stakeholders, carry out an inventory of hazardous chemicals/ substances and support accreditation of environmental laboratories in Lebanon.

    These elements of the project are expected to address immediate environment recovery needs and lay the foundation for greening Beirut reconstruction agenda.

Economic Analysis

60. Limited budget requires focus on high-impact low-cost solutions. The available project budget of US$10 million can only cover a limited part of the estimated environmental restoration costs that resulted from the August 2020 explosion. Project has therefore carefully considered how this funding can be applied most effectively by selecting lowest cost solutions that will create most impact in reducing public health and environmental exposure and enabling environmental restoration. It should be possible, informed by existing and ongoing third-party investigations, to make a reasonable estimation of total costs for restoration efforts, related economic benefits and project's contribution to it.

61. The Project will be supporting public goods in terms of soft (setting up the collaborative platform) and tangible investments based on the Build Back Better principle following catastrophic PoB explosion that resulted in severe direct and indirect effects. Tangible investments include the sustainable management of the post POB explosion CDW that are stored at Bakalian and other sites and rehabilitation of composting and recycling facility lines which will reap socioeconomic and environmental benefits over the medium to long term.

62. The detailed economic analysis for the project and by Sub-Component is appended in Annex 3, which considered the following two options.

    - Option 1 considers rehabilitation of Karantina recycling facility to manage 650 tons/ day of MSW (project indicator) and a transfer of about 200 tons to Bourg Hammoud Coral for composting; and
    - Option 2 considers rehabilitation of both Karantina and Coral facilities within the available project budget of U$ 6 million, that will allow rehabilitation of Karantina recycling facility to a capacity of 1,497 tons per day for (75 percent of designed capacity of 2000 tons per day) and rehabilitation of Coral facility to a capacity of 260.2 tons per day (87 percent of designed capacity of 300 tons).

63. Overall five iterations of Benefit Cost Analysis (BCA) were carried out, which included: (i) BCA for overall project with option 1 of MSW sub-component; (ii) BCA for overall project with option 2 of MSW sub-component; and sub-component specific BCA for (iii) CDW sub-component; (iv) MSW sub-component option 1; and (v) MSW sub-component option 2.

64. Table 1 below summarizes the results of the economic analysis for the overall project with option 1 of MSW sub-component and Option 2 of MSW sub-component, where all the Base Case BCAs have a positive Net Present Value (NPV) (ranging from US$11.1 million to US$27.4 million), a positive economic Internal Rate of Return (IRR) (ranging from 54 percent to 77 percent) and a Present Value Benefit-Cost ratio always positive (ranging from 3.0 to 4.5). All the other optimistic and pessimistic scenario show positive results.

Table 1 Cost/Benefit Analysis Summary

Key Economic Indicators	**Project**		
	10 Years Discounted at		
Scenario	**4% Optimistic**	**6% Base Case**	**8% Pessimistic**
BCA (Overall Project with Option 1 of MSW sub-component			
NPV (US$, millions)	*12.8*	**11.1**	*9.7*
ERR (%)	*54%*	**54%**	*54%*
PV benefit/cost ratio	*3.2*	**3.0**	*2.8*
BCA Total Project Option 2 of MSW sub-component			
NPV (US$, millions)	*30.9*	**27.0**	*23.6*
ERR (%)	*77%*	**77%**	*77%*
PV benefit/cost ratio	*4.9*	**4.5**	*4.2*

65. The benefit-cost, sensitivity and scenario analysis results for the overall project for both options was carried out as well. The scenario analysis in this case includes: (i) an optimistic scenario with a 10 percent increase in benefits and a 10 percent decrease in costs discounted at 4 percent; and (ii) a pessimistic scenario with a 10 percent increase in costs and a 10 percent decrease in benefits discounted at 8 percent.

66. For both options, the project generates positive and robust NPV (ranging from US$ 9.7 million to US$35.6 million), a positive economic IRR (ranging between 42 percent and 93 percent) and a significative Value Benefit-Cost ratio (2.3 to 6.0). The scenario analysis is similar to a stress test where the project could still reap benefits with an increase of more than 125 percent of the cost under the pessimistic scenario for Option 1. Likewise, the total Project will reap benefits with a cost overrun that could almost double to 245 percent under the pessimistic scenario for Option 2. The project under both options is sensitive to a decrease in benefits than an increase in costs reflected by the switch-off points (see Annex 3 for details).

Climate Change, Gender and Citizen Engagement

Climate Change

67. **The project will adopt the principles of "Build back better, greener, and smarter" as identified in the 3RF and will employ elements of right sizing, right siting, climate change adaptation, climate smart practices, and greening of project investments.** Towards this end, the development of a CDW disposal facility (siting and design) and rehabilitation of solid waste infrastructure (right sizing and design) will integrate these elements of climate smart and climate resilience. Specifically, the envisioned solid waste infrastructure will incorporate resilient planning, sustainable design, construction, and O&M of facilities adapting to the climate change vulnerability and disaster risks. Also, improvements in waste management envisioned by the project will prevent leachate, blocking of waterways and hence would address flood and pollution of water resources. Similarly, as part of the rehabilitation on solid waste infrastructure, the project will include the procurement of energy efficient equipment and the deployment of solar powered roof, which can offer clean and green power for the efficient and sustainable operation of these facilities. In addition, the CDW facility after its closure will provide an opportunity to develop

green cover, which will contribute to the improvement of green cover in Beirut City (which has a low green cover of 3.9 m^2/inhabitant as against WHO's standard of 9 m^2/inhabitant). Increasing the green cover will reduce risks of flooding during extreme weather events and heavy rainfall due to climate change, as well as reducing the heat island effect with heatwaves expected to become more frequent and intense.

68. **The project will offer opportunities for mitigation and adaptation climate Co-Benefits through reduced GHG emissions from improved waste management practices and improved resilience of solid waste infrastructure (due to the interventions under sub-component 1.2) in the explosion affected areas of Beirut.** These improvements can be attributed to reduced open dumping, open burning and increased recycling of waste. The project will also support planning for longer-term environment restoration efforts, integrating climate considerations in the Beirut reconstruction agenda and the identification of specific measures for climate-smart investments that will reduce vulnerability of solid waste infrastructure to climate risks.

69. The project carried out a broad level of GHG emission analysis along with the economic analysis and based on this analysis, it is estimated that about 2.01 million tons of GHGs will be saved if Option 1 of sub-component 1.2 is implemented and about 3.70 million tons of GHGs will be saved if Option 2 of the sub-component 1.2 is implemented by the project.

Gender

70. **According to UN Women et. al (2020), the impact of the PoB explosion compounded with the economic crisis and the COVID-19 pandemic is likely to negatively affect achieved gains on gender equality in the country, with the risk of deepening structural gender inequalities.** Gender roles and responsibilities, social and cultural norms result in women's restricted access to education, health services, economic opportunities (female labor force participation stands at 25 percent vs. 76 percent in the case of men[27]), access to and control over resources and decision-making (women hold 6 out of 128 seats in the Lebanese parliament and only 5.4 percent of local government positions[28]). This is also reflected in the waste and environment-related sectors, where social norms and constraints still limit women's participation and involvement[29]. For instance, women tend to be responsible for domestic tasks such as gathering the waste, while men tend to collect and dispose of it. This may result in a more limited involvement of women in decision-making over waste management practices, especially at community and institutional level, and a more limited access to related economic opportunities (operating in the formal waste sector, recycling/reuse, etc.). Overall, the UNDP "Gender Analysis" report (2021) highlights the waste sector as a priority area to address gender issues based on both the high potential impact and the current low status of the sector to adequately addressing these issues.

71. **The project will directly support actions to address some of the identified gaps and related determinants**. Under Component 1 (Subcomponent 1.1, 1.2) and to address barriers and constraints for women-led NGOs/groups to access and operate in the formal waste management system, the project will: (i) reach out to and inform women-led NGOs/groups on the opportunities offered under the project; (ii) encourage eligible women-led NGOs/groups to participate in the pilot implementation; (iii) provide technical (training, formalization, etc.) and/or equipment

[27] World Development Indicators Database.
[28] UNDP, 2021. Lebanon Gender Analysis.
[29] According to ISWA (2020), there are no sex-disaggregated statistics related to those working in the solid waste sector in Lebanon. Nevertheless, the number of women in the sector has been increasing despite the persisting social barriers and constraints they tend to face. Among other consequences of the economic crisis in the country, some women may have opted to informally operate in the waste sector.

support to effectively operate and strengthen their implementation capacity. In addition, under the demonstration pilot(s), the project to support: (i) the involvement of the community at large (women's groups, community-based organizations, etc.) for the design of user-friendly measures meeting the specific needs of women and men in relation to waste management practices; (ii) the development of awareness campaigns on the pilot(s) targeting both women and men by using inclusive language/messages, information sharing through adequate channels as women's groups/networks, etc.; (iii) the development of a user feedback mechanism for identification of gaps/areas of improvement in service delivery which allows for sex-disaggregated information and analysis and inform potential scale up.

72. Under Component 2 (Subcomponent 2.1), the establishment of the collaborative platform to develop the reconstruction agenda will set up appropriate mechanisms to ensure equal representation of women and men across stakeholders' groups (this may include quota for female/male representation) and identification of gender-differentiated needs and interests in the reconstruction agenda. In addition, under Subcomponent 2.2, the project will contribute to fill a knowledge gap on sex and gender differentiated exposure to contamination by analyzing baseline environment data with relevant sex and gender disaggregated data of the project area. As a result, a specific database/assessment on sex and gender-differentiated exposure to contamination will be made publicly available and inform related policies, raise awareness of policymakers, including inform the design of alert/warning systems (e.g., targeted awareness campaigns on potential risks for women, men, girls, and boys).

73. In addition, to ensure adequate implementation and monitoring of the actions proposed, the PMU of UNDP will include a dedicated social and gender specialist (Component 3).

Citizen Engagement

74. Citizens Engagement (CE) activities and engagement with government and private sector stakeholders will be carried out during both project preparation and implementation. The project will explore mechanisms through multi-stakeholder planning for increasing the level of citizen engagement, inclusion, and ownership among beneficiaries in particular with regards to project activities under Sub-Components 1.2 Component 2. A detailed citizen engagement approach will be prepared for the project, which will include: (i) meaningful consultation and feedback mechanisms, such as focus groups, satisfaction surveys and grievance redress mechanisms; (ii) participatory mechanisms; (iii) citizen-led mechanisms; (iv) the potential for creation of green jobs, given that the waste sector is labor intensive. A Grievance Mechanism (GM) will be set up for the project. This project GRM will help close the feedback loop on citizens' concerns and questions about the project activities and will allow for transparency. The GM will also include referral pathways in the event of any sexual exploitation and abuse and sexual harassment (SEA/SH) related complaints with the adoption of the principles of confidentiality and anonymity.

B. Fiduciary

(i) Financial Management

75. The project will be implemented by UNDP. The GoL has agreed for the project to be implemented by UNDP through an official letter dated November 24, 2021. UNDP is a signatory of the Financial Management Framework Agreement (FMFA); hence the World Bank will rely on the financial management system of UNDP to implement the project. UNDP will assign a PMU to handle project execution. The PMU will include a Financial Associate (FA) that will handle all FM aspects of the project.

76. The financial management risk is rated as substantial. With the proposed mitigating measures and proposed financial management arrangements, the financial management risk rating would be reduced to Moderate (refer to the financial management section in the annex for details about the risks and proposed mitigating measures).

77. A POM has been prepared by UNDP detailing the implementation arrangements including financial management. UNDP will be the main implementing agency and the direct recipient of the funds from the World Bank. Funds will be transferred directly from the World Bank to UNDP. UNDP will use its own systems to records transactions and produce quarterly financial reports which will be due 45 days after the end of each quarter. UNDP will include the project in its yearly audit and will publish the audit reports on its external website. A TPMA will be recruited at the LFF level to verify and validate all the activities and payments made in the context of the project.

(ii) Procurement

78. **Procurement Arrangements**. Pursuant to paragraph 1(b) of Section III.F (Alternative Procurement Arrangements) of the World Bank Policy, Procurement in IPF and Other Operational Procurement Matters ("Procurement Policy"), Alternative Procurement Arrangements (APA) will apply, UNDP will follow their own procurement procedures as approved by the World Bank.

79. **Procurement Assessment of UNDP**. Pursuant to the World Bank Policy Procurement in IPF which enables the use of APA, UNDP Procurement Rules and procedures were assessed against World Bank's core procurement Principles and Governance requirements. The findings revealed that UNDP has a good procurement system in place with the required organization, internal controls, monitoring and tracking system and external audits, and their procurement rules and procedures meet the World Bank's requirements. UNDP's Procurement Services Unit (UNDP/PSU) provides procurement services to UNDP Country Offices worldwide. Areas of expertise include data analysis and sourcing strategy, procurement advisory services, supply chain management, procurement training and certification and sustainable procurement. UNDP takes a decentralized approach to procurement by different business units. Procurement oversight is provided at three levels with thresholds: (i) The Contracts, Assets and Procurement Committee (CAP) at the business level (above US$50,000); (ii) the Regional Advisory Committee on Procurement (RACP) at the UNDP Regional Hubs (US$500,000 – US$2 million); and (iii) the Advisory Committee on Procurement (ACP) at UNDP Headquarters which is chaired by the Chief Procurement Officer (CPO) (above US$2 million). However, the following measures are required: (i) UNDP will have to further screen suppliers against the Bank's Debarment List and the Sanctions List; and (ii) bidders and suppliers will have to sign an acceptance of the Bank's Anti-Corruption Guidelines (ACG) and sanctions framework.

80. **The World Bank also conducted supplementary procurement capacity assessment of the UNDP Office in Lebanon, with main focus on the staffing and experience, procurement oversight arrangement, and general country office procurement performance.** For the purposes of this project, UNDP will ensure that the PMU is staffed with one qualified 'procurement associate' to conduct day-to-day procurement and contract management functions. UNDP shall also arrange to prepare and submit procurement plans and periodic reports on the progress.

81. **Project Procurement Strategy for Development (PPSD).** The procurement strategy is aimed to broaden the social and employment benefits of the project while ensuring the quality of the project's execution. PPSD has been prepared and cleared by the Bank . The PPSD will be updated, when needed, during implementation.

82. **Procurement Plan.** An initial Procurement Plan (PP) for project implementation has been developed by UNDP and

agreed with the World Bank. UNDP will be responsible for implementing the PP as agreed with the World Bank and monitor implementation to comply with the agreed timelines. The PP will be updated as needed and cleared by the World Bank.

83. **Key Procurement Activities.** The project is expected to finance the following main activities: (i) management of contaminated waste materials on the targeted site under the supervision of an experienced international entity; (ii) development and preparation of the disposal site for contaminated CDW; (iii) providing technical assistance for recycling of uncontaminated CDW; (iv) rehabilitation of severely damaged selected solid waste management facilities to restore its operations; (v) development of an enabling environment for policy and institutional reform for a green recovery of Beirut; and (vi) establishment of a collaborative platform for stakeholder's engagement. In addition, NGOs are expected to be hired under sub-component 1.3 through competitive bidding process to support the implementation of demonstration pilot on ISWM. The project will also finance necessary technical, financial, environment and social safeguards studies, monitoring and reporting plan and PMU cost through Component 3.

84. **Implementation Supervision Plan**. Overall, the procurement risk of the project is rated as 'high' due to the factors outlined in paragraph 101 on fiduciary risk and accordingly Bank task team will provide support and closely monitor the progress and performance of the project.

(iii) Waver of Specific Operational Policies

85. **A waiver has been obtained for the application of the Anti-Corruption Guidelines (ACGs) for the Project.** Given that UN Agencies face institutional and policy constraints to the application of the World Bank's ACGs specifically, a waiver has been obtained for the World Bank Directive for Investment Project Financing and Section 5.14 of IBRD General Conditions for Credits and Grants for Investment Project Financing, which would otherwise require application of World Bank's Anti-Corruption Guidelines. To ensure appropriate adherence to the principles of the ACGs, specifically in terms of the due diligence and monitoring of fraud and corruption, the waiver allows UNDP to use their own internal procedures for fraud and corruption under alternative arrangements modeled on the integrity provisions of the World Bank – United Nations Fiduciary Principles Accord (FPA), to which UNDP is a party.

C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

D. Environmental and Social

86. **Environmental risk of the project is high.** The project will have overall positive environmental impacts by adequately managing and disposing the rubble resulted from the explosion, including high risk ACM waste, restoration of two waste handling facilities at Karantina and Coral allowing resuming their operation on waste sorting and composting respectively and carrying out pilot sub-projects demonstrating the Integrated Solid Waste Management approach contributing. The institutional and policy interventions and support to strengthen the priority environmental monitoring and enforcement activities will also bring many long-term environmental benefits to the City of Beirut.

87. On the other hand, the project interventions will be associated with environmental risks, including:

- Risk of generating asbestos-containing dust during the handling of ACM waste (Component 1.1), affecting neighboring areas of the Bakalian site is high. This would be mitigated through preparing and implementing asbestos management procedures by experienced contractor to be recruited;
- Risk to the health and safety of workers is substantial, while handling different types of waste such as ACMs and broken glass (Component 1.1) and waste at Karantina and Bakalian facilities (Component 1.2), sampling and monitoring hazardous waste (Component 2.2). This would be mitigated through preparing and implementing a waste management plan and an occupational health and safety plan for handling special types of waste;
- Risk of improper management of the disposal sites impacting soil and subsurface water at disposal sites is substantial. This would be mitigated through proper analysis of alternatives for selecting the site and adopting measures to prevent migration of contaminants, preventing soil erosion and protecting water resources;
- Risk of inadequate management of accumulated waste at Coral and Karantina during the restoration process (Component 1.2) is moderate, causing improper waste storage, odors, breeding of insects/rodents and possible runoff. This would be mitigated through preparing and adopting proper waste management plan;
- Risk of improper management of the disposal sites impacting soil and subsurface water at disposal sites or release of ACM waste after project closure (substantial). This would be mitigated through proper analysis of alternatives for selecting the site and adopting measures to prevent migration of contaminants, preventing soil erosion, protecting water resources; and ensure site stability and put adequate restrictions on future land use to prevent release of ACM waste after closure. Post closure measures shall be implemented by the owner and monitored by the MoE, and a tripartite agreement will be made between land owner, MoE and the municipality, identifying post closure responsibilities, before initiating the bid process for the development of the disposal site.
- Risk of improper waste management practices during the implementation of pilot projects leading to unplanned waste storage or leaking is moderate. This would be mitigated through adopting proper waste management plan;
- Traffic risks to the community while transporting waste is moderate. This would be mitigated through abiding to proper driving safety measures;
- Risk of generating air emissions and noise while restoring waste handling facilities, implementing ISWM pilot projects and transporting waste (Component 1.2) (moderate) this would be mitigated through taking precautionary measures for minimizing emissions and adjusting working hours to minimize exposure, and
- Risk of affecting flora and fauna while preparing the disposal site (Component 1.1), through removal of vegetation or disturbing shelters of certain fauna, or causing runoff at Coral to the adjacent Beirut River and the marine environment (Low). This will be mitigated through adequately planning the site preparation works, excluding sites of high flora and fauna biodiversity value and managing the runoff at Coral.

88. The environmental risk is considered high due to the following: i) the surroundings of areas where ACMs will be handled are densely populated and, hence, highly sensitive; ii) the consequences of dispersion of asbestos-containing dust are severe; iii) there is a possibility of cumulative impacts from other rubble removing activities at the affected areas in Beirut emitting asbestos-containing dust; iv) safe handling of asbestos waste requires expertise that may not be readily available in the country and is not regulated by existing laws and standards; and (v) the untested capacity of the implementing agencies in fulfilling ESF requirements in practice. The high risk is related to Component 1.1, while risk of other components is substantial risks as the impacts are predictable could be effectively mitigated.

89. **Social risk of the project is substantial**. The project activities under Component 1 include the safe management and disposal of asbestos-contaminated debris generated in the explosion affected areas of Beirut and stored at the Bakalian site, the rehabilitation of severely damaged solid waste management facilities serving Beirut area, and the implementation of demonstration pilot(s) on ISWM in the selected area(s) impacted by the explosion in Beirut City. Component 2 activities include policy and institutional level reforms for greening Beirut's reconstruction agenda, which mainly involves a stakeholders engagement collaborative platform for ensuring the participation of citizen groups, NGOs and academia, including the most marginalized. The project is expected to have numerous positive social impacts, including on the health and safety of Beirut and Greater Beirut residents, through the removal of hazardous wastes and by engaging in an inclusive and transparent manner with CSOs and NGOs and representatives of vulnerable and marginalized groups on the reconstruction and environmental agenda of Beirut.

90. However, the project is associated with adverse social risks and impacts. Component 1 of the project which includes the safe disposal of contaminated construction and demolition waste and rehabilitation of damaged solid waste facilities is involved with the use of a predominantly unskilled labor force (about 50-60 laborers), which may result in health and safety risks on the workers as well as surrounding communities. Citizen mistrust toward the government is another potential social risk which may impact successful implementation of the project and which has been escalating since the October 2019 mass demonstrations partly driven by the lack of transparency and mismanagement of public resources, the economic and financial crisis and the PoB explosion of August 2020 which have compounded to result in numerous protests erupting across Lebanon against the government even today. The project may cause nuisances to residents during the transport of segregated contaminated construction and demolition waste, including noise, and increased level of traffic. Moreover, the project activities also have the potential to exclude certain vulnerable groups in the stakeholder engagement collaborative platform under Component 2.

91. There will be no land acquisition involved in the project, as the quarry sites which will be selected at a later stage in project implementation will engage with landowners through mutual agreement to ensure safe measures to rehabilitate the selected sites, as per the relevant MoE relevant regulations on quarry sites and good international practices. The UNDP will therefore ensure that the mutual agreement with the landowner(s) will be reached as per the requirements of footnote 10 of ESS5 where the Borrower is required to demonstrate that: (a) the potential land owner or owners have been appropriately informed and consulted about the project and the choices available to them; (b) potential land owners are aware that refusal is an option (i.e. alternative land plots can be used instead), and have confirmed in writing their willingness to proceed with the mutual agreement ; (c) the amount of land being used for the project purposes will not reduce the land owner's current livelihood; (d) no household relocation is involved; (e) the land owner is expected to benefit directly from the project; and (f) for community or collective land, mutual agreement can only occur with the consent of individuals using or occupying the land. The Borrower is also required to maintain a transparent record of all consultations and agreements reached.

92. **Stakeholder engagement/Grievance Mechanism**: During the preparation phase, the UNDP PMU conducted stakeholder consultations with the three categories of the identified stakeholders. On 17/02/2022, a stakeholder consultation meeting was conducted virtually by the UNDP where 200 identified stakeholders were invited and over 20 attended. During the meeting the UNDP presented the project objectives and described the project components and interventions, as well as the Environmental and Social Management Framework and relevant E&S instruments which were prepared by the UNDP such as the SEP, LMP and ESCP. In addition, the environmental and social risks and impacts and mitigation measures associated with the project activities were presented. The participants mainly included representatives from governmental institutions (CDR and MoE) and non-governmental bodies (Waste Coalition, LCPS, Democracy Reporting International, DTCare, Arc El Ciel and Madinati),

and academia (American University of Beirut and Notre Dame University). The participants provided their feedback and expressed their appreciation of the project and requested additional clarifications including on the project institutional arrangements, the economic sustainability of the project and the environmental governance. The project GM principles were also presented where it was noted that the GM will be established and communicated as per the SEP and implemented throughout project implementation. The GM will ensure: (i) the principles of confidentiality and anonymity as requested' (ii) multiple uptake channels to reach all stakeholders including vulnerable groups as per the SEP; (iii) timely closure of complaints/concerns (iv) escalate to management as deemed necessary; (v) include trained and sensitized staff to handle the GM; (v) include referral pathways in the event of complaints related to sexual exploitation and abuse/sexual harassment (SEA/SH).

93. **The project will be implemented by UNDP as an intermediary agency. The UNDP will follow the World Bank's ESF for this project**. UNDP participated in numerous past and ongoing World Bank projects such as LEPAP, where they are supporting the MoE for improving the compliance with environmental regulations. UNDP also has previous experience in the implementation of the World Bank's safeguards requirements and are expected to have reasonable capacity on the World Bank ESF. The UNDP also has its own safeguards policies. For the current project, the UNDP will assign a full-time environmental specialist and a social specialist for the duration of the project life-cycle. In addition, the UNDP technical team has extensive environmental management experience and will be closely involved in environmental and social management of the project.

94. ESF instruments have been prepared, cleared and disclosed. The project ESCP, SEP, LMP and ESMF have been prepared and cleared and disclosed both by UNDP (https://www.lb.undp.org/content/lebanon/en/home/library/beirut-critical-environment-recovery--restoration-and-waste-mana.html) and the World Bank (https://projects.worldbank.org/en/projects-operations/document-detail/P176635?type=projects). The UNDP material measures and timelines are stipulated in the provisions of the cleared and disclosed ESCP.

V. GRIEVANCE REDRESS SERVICES

95. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

VI. KEY RISKS

96. **The overall residual risk to achieving the PDO is rated High.**

97. **Political and governance (High).** Political and governance factors may affect the achievement of the PDO. Parliamentary elections are scheduled for May 2022, which may cause disruptions to the workflow of the government. To mitigate these risks, the team will closely monitor the political developments, macroeconomic

environment, and the Lebanon portfolio and will propose corrective measures accordingly. The proposed implementation arrangement, with UNDP as the recipient of the grant for the benefit of The Lebanese Republic and with the support of GoL will help avoid delays and bottlenecks in implementing project activities. The World Bank will engage and coordinate closely with implementing partners to ensure that they are fully briefed on bottlenecks and pending issues. The WBG will also continue to implement strict screening and monitoring measures throughout implementation of the activity to ensure utmost transparency and accountability.

98. **Macroeconomic (High).** Lebanon is facing the most severe and economic crises in modern history. These crises were further exacerbated by COVID-19 pandemic and the recent war in Ukraine, in addition to the serious damages and losses caused by the PoB explosion. Should this macroeconomic instability deteriorate further, this could affect the achievement of the PDO. In the current context of a rapidly depreciating Lebanese Pound against international currencies and rising inflation, it is important to preserve the purchasing power of project funds, e.g. by maximizing the US dollar value of the funds provided through LFF. To mitigate the foreign exchange and inflation risks, the benefit amount in LBP will be reviewed regularly, or at more frequent intervals if required, by the Bank and the intermediary agency. Other mitigation measures will be designed during the preparation and finalized during the project's appraisal.

99. **Sector strategies and Policies (Substantial).** The regulatory framework and technical capacity of institutions in Lebanon to manage hazardous and chemical substances is weak. Hence, the sector strategies risk has been rated as 'substantial'. However, the project is part of a broader international effort to support the recovery from the PoB explosion, and the team and UNDP (the project intermediary implementing agency) will coordinate closely with the Government, local authorities as well as other development agencies, NGOs, or civil society organizations to ensure that overall program strategies are coordinated. In addition, the project through Component 2 will support strengthening policy and regulatory framework for hazardous waste and chemicals management.

100. **Technical design (High).** Given the complex nature of asbestos materials management and solid waste management activities to be supported by the project, the technical design risk of the project has been rated as 'high'. The risk is proposed to be mitigated through deployment of qualified and experienced professional, careful design review and adoption of best available international practices.

101. **Institutional capacity for implementation and sustainability (Moderate).** UNDP as the proposed intermediary agency has sound experience in Lebanon with the implementation of development sector work and projects financed by international donors. The agency has also good experience in managing World Bank Projects. Institutional capacity for implementation hence is rated as 'moderate'. To ensure sustainability, the project will establish a PCC involving key stakeholders ministries and government agencies. In addition, a collaborative platform for stakeholder engagement will also be established, which will help coordinating the project and other interventions in Beirut and long-term planning efforts.

102. **Fiduciary (High).** Overall Procurement Risk is rated 'High' due to several factors that may affect the procurement process and create delays. These include; (i) current deteriorating socio-economic situation in the country impacting the implementation and construction works; (ii) perception of corruption at the Government level in the current fragile political environment; (iii) complexity of coordination with other concerned stakeholders (i.e., relevant ministries and other public institutions); (iv) the complex nature of project activities and specialized contractors/consultants that need to be deployed for project implementation; (v) high safeguards issues related to waste management, critical hazardous and chemical substances; (vi) the low market response to the available work opportunities; and (vii) implementation/delivery delay because of the potential imposed curfew and social distancing requirements due to the outbreak of COVID-19.

103. The following measures are proposed to mitigate these risks: (i) regular reporting on procurement process and contracts implementation progress; (ii) close coordination of UNDP with the World Bank task team to review the status and progress of implementation of activities; (iii) hiring of qualified staff to conduct procurement activities and contract management; (iv) submit updated PPs and periodic reports on the progress; (v) identify requirements to include specialized qualification in the procurement process and the selection of contracts including requiring a ES specialist as part of key staff of contractors' staff; and (vi) TPMA is in the process to be hired by the World Bank at the LFF level to conduct verification and provide fiduciary assurance of all projects financed by the LFF TF including the proposed project. Another foreseen risk is potential delays occasioned by UNDP internal processes and approvals. This risk would be mitigated by advance planning and close coordination between the UNDP Beirut office and CAP, RACP and ACP for procurement above the threshold of the country office. Considering the mitigation measures in place and the progress in implementing activities timely, the risk rating may be revised to 'Substantial'.

104. **With regard to financial management, the risk is rated 'substantial'** due to the factors mentioned above on the procurement risk and additional factors such as: (i) currency crisis and the devaluation of the LBP vs the US$; (ii) delays in flow of funds due to the economic crisis and heavy bureaucratic procedures imposed by the Government; (iii) the nature of the activities which include selection of NGOs, and limited government oversight on utilization of funds. The following mitigation measures are proposed: (i) utilize UNDP as main implementing agency of the project where the Bank will rely on the UNDP's financial management system for project control and reporting; (ii) direct transfers of funds from the Bank to UNDP which will ensure the availability of fresh US$ to pay for project activities; (iii) detailed financial reporting on a quarterly basis from UNDP to the Bank, the content and format of the financial reports has been agreed upon ; and (iv) include the project activities within UNDP yearly external audit which will be made public.

105. **Environmental and Social Risks (High).** The environmental risk is rated "high" and social risk is rated "substantial" considering risks/impacts from both the project itself and the country's capacity to manage these risks. Project interventions are associated with environmental risks during implementation including risk of generating emissions of asbestos containing dust during the handling of ACM waste affecting neighboring areas; risk of improper disposal and securing of the disposal sites impacting soil and groundwater at disposal sites, risks to the health and safety of the workers performing waste containment operations and site restoration. Project interventions are also associated with social risks during implementation, including health and safety of workers involved in waste management operations, risks of sexual exploitation and abuse and sexual harassment with labor force mobilization, nuisances to residents from transportation of waste materials. Environment and social instruments have been prepared to mitigate potential risks and impacts of the project, which have been cleared and disclosed. All E&S provisions have been outlined in the Environmental and Social Commitment Plan (ESCP).

106. **Stakeholders (Substantial).** Given the range of stakeholders active in Lebanon on the (environmental) restoration agenda, their varying interests and limited governance structures to rule this agenda, the stakeholders risk is rated as 'substantial'. The project will support a pro-active and inclusive stakeholder and citizen engagement process and has developed an inclusive communication and a stakeholder engagement plan aiming to maintain close consultation with the different public and private stakeholders and civil society in preparation and implementation of the project and related ESF instruments (ESMF and ESMPs).

107. **Other (High).** Upcoming parliamentary elections in May 2022 and ongoing COVID-19 pandemic, could impact co-ordination with local authorities and delay implementation of project activities. The pandemic could also negatively impact the mobilization of international experts and companies, whose field presence is crucial for activities under Component 1.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Lebanon

Beirut Critical Environment Recovery, Restoration and Waste Management Program

Project Development Objectives(s)

To support immediate environment control measures from the impacts of August 2020 Port of Beirut explosion and planning for longer term environmental restoration efforts in Beirut City

Project Development Objective Indicators

Indicator Name	PBC	Baseline	End Target
Support immediate environment control measures from impacts of August 2020 Port of Beirut explosion			
Contaminated Construction and Demolition waste at selected storage sites safely managed in line with defined control measures (site securing, containment measures, disposal or treatment) (Metric ton)		0.00	150,000.00
Waste management capacity of the solid waste infrastructure rehabilitated by the Project, contributing to the ISWM in Beirut City (Metric ton)		0.00	400.00
Direct Project Beneficiaries (Number)		0.00	350,000.00
Support planning for longer term environmental restoration efforts in Beirut City			
Strategic plan for greening Beirut reconstruction developed in consultation with the collaborative stakeholder platform established through the project (Yes/No)		No	Yes

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	End Target
Rehabilitation of damaged solid waste management infrastructure& management of contaminated debris			
Municipal Solid Waste Management Infrastructure damaged due to the explosion is rehabilitated (Yes/No)		No	Yes
Improved waste management measures initiated in Beirut City to support the operation of rehabilitated solid waste infrastructure (Yes/No)		No	Yes

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Contaminated Construction and Demolition waste at selected storage sites safely managed in line with defined control measures (site securing, containment measures, disposal or treatment)	The indicator measures the performance of activities supported by the the project for the safe management of Construction and Demolition Waste (CDW) generated in Beirut City from August 2020 explosion. The management measures could include safely securing the site(s) that received	The indicator is proposed to be measured on half yearly basis.	UNDP (Project intermediary implementing agency) and the component implementing agency/ contractor	Reports submitted by the implementing agency/ contractor and verification/ monitoring reports submitted by the monitoring/ management agency	UNDP (Project intermediary implementing agency) and the component implementing agency/ contractor

	CDW, implementing containment measures to avoid health and environmental impacts of handling CDW at the site(s) and treatment/ disposal of CDW following local and international best practices.				
Waste management capacity of the solid waste infrastructure rehabilitated by the Project, contributing to the ISWM in Beirut City	Achievement of this indicator is measured based on the waste management capacity (per day) of the infrastructure rehabilitated by the Project that is contributing to the Integrated Solid Waste Management (ISWM) of Beirut City.	Half Yearly	Beirut Governorate for the waste collection/ segregation and transportatio n data CDR and operators of waste segregation and composting facilities on the total waste processed/ disposed.	Data will be collected through the records of the respective waste collection, transportation and disposal operators and verified by the management/ monitoring agencies	UNDP in collaboration with Beirut Governorate, CDR and respective waste collection, transportation and disposal operators
Direct Project Beneficiaries	The indicator measures the people/ residents benefitting from the Project Interventions	Once at the end of the Project	Government of Lebanon and other reliable	Secondary data from Government of Lebanon and other reliable sources and its	UNDP - The Project Intermediary Implementing Agency

			sources	analysis/interpretation	
Strategic plan for greening Beirut reconstruction developed in consultation with the collaborative stakeholder platform established through the project	Achievement of the indicator is measured based on the establishment of stakeholder platform for Beirut Reconstruction	Once year during the project period	UNDP - the project intermediary implementing agency and the Ministry of Environment	Progress reports by UNDP and MoE	UNDP

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Municipal Solid Waste Management Infrastructure damaged due to the explosion is rehabilitated	This indicator measures the rehabilitation of either of the two solid waste management infrastructure - Segregation facility at Karantina and Composting facility at Coral, based on a detailed technical and sustainability assessment	Once to assess the completion of rehabilitation as per the design and detailed technical assessment	UNDP - the project intermediary implementing agency CDR - entity owning the facilities Operating entities of the facilities		UNDP - the project intermediary implementing agency CDR - entity owning the facilities Operating entities of the facilities
Improved waste management measures initiated in Beirut City to support the	This indicator measures the implementation of activities	Half Yearly	UNDP - Project	Progress Reports in line with the agreed report	UNDP - Project Intermediary

operation of rehabilitated solid waste infrastructure	under sub-component 1.2, to introduce source sorting and segregation in the waste management system in Beirut city aimed at ensuring sustainability of the rehabilitated facilities.		Intermediary Implementing Agency Beirut Governorate Respective implementing agencies/ operators	structure and information	Implementing Agency Beirut Governorate Respective implementing agencies/ operators

ANNEX 1: Implementation Arrangements and Support Plan

COUNTRY: Lebanon
Beirut Critical Environment Recovery, Restoration and Waste Management Program

Institutional Arrangements

1. **In line with the principles of LFF and considering the institutional challenges in the current political situation of Lebanon, the project will be implemented by UNDP (as an IIA), in close coordination with the GoL, particularly with the relevant ministries and all stakeholders**. With technical expertise in environmental and waste management sector, strong local presence, as well as past and ongoing environment project implementation experience in Lebanon financed by number of development partners , UNDP is highly qualified for implementing the project. In addition, UNDP also has previous experience of supporting World Bank projects, such as in the management and delivery of technical assistance activities for the ongoing LEPAP project in Lebanon (since 2014) and various other projects in MENA region. This experience of UNDP and strong collaboration with the Bank in Lebanon further strengthens its suitability as an IIA for the project.

2. **As an IIA, UNDP will be responsible for** (i) the overall implementation of the project; (ii) monitoring the project results towards the achievement of agreed outcomes; (iii) managing the project in line with the agreed procurement and financial management arrangements including the preparation of withdrawal applications under the project; (iv) ensuring the implementation of ESF requirements including the Environmental and Social Commitment Plan (ESCP) for the project and (v) complying with all reporting requirements of the project as per the Grant Agreement (GA).

3. **UNDP will manage the project from their Beirut office through a PMU, as per the implementation arrangements presented in the figure 2 below.** The PMU will be staffed with qualified and experienced technical, financial, procurement, Environmental and Social Specialists compatible to the requirements of the project activities. These PMU staff will be duly supported by appropriate UNDP staff and will be responsible for the overall planning, implementation and management of project activities and will supervise the implementation of activities by the consultants, contractors, NGOs and other agencies.

4. **To facilitate co-ordination, active participation and ownership of the project activities by the GoL agencies, relevant ministries and other stakeholders, UNDP will establish a "PCC.** The PCC will be established in close consultation with GoL ministries, departments, agencies and other stakeholders relevant to the project and shall include MoE, Beirut Governorate, Municipality of Beirut and CDR and other stakeholders. The main objective of the PCC will be to (i) review the project progress and provide strategic guidance in the implementation; (ii) facilitate coordination/ collaboration between UNDP/ PMU, project implementing agencies and the government; (iii) facilitate resolution of implementation challenges including any statutory and administrative approvals that may be required for the project activities; and (iv) ensure synergies between project activities, other initiatives of the government and other development partners. The PCC will also ensure appropriate participation of relevant officials of the ministry/ agency in the implementation of project activities, so as to facilitate the transfer of knowledge from the PMU, project implementing agencies and other technical experts involved in the project. Such participation will also help with capacity building of ministries in ensuring sustainability of the project interventions and their scale up in future. The PCC shall be formed within one month after project effectiveness and will meet at least once in a quarter and on a demand basis. The detailed terms of reference (ToRs) of PCC is elaborated in the POM.

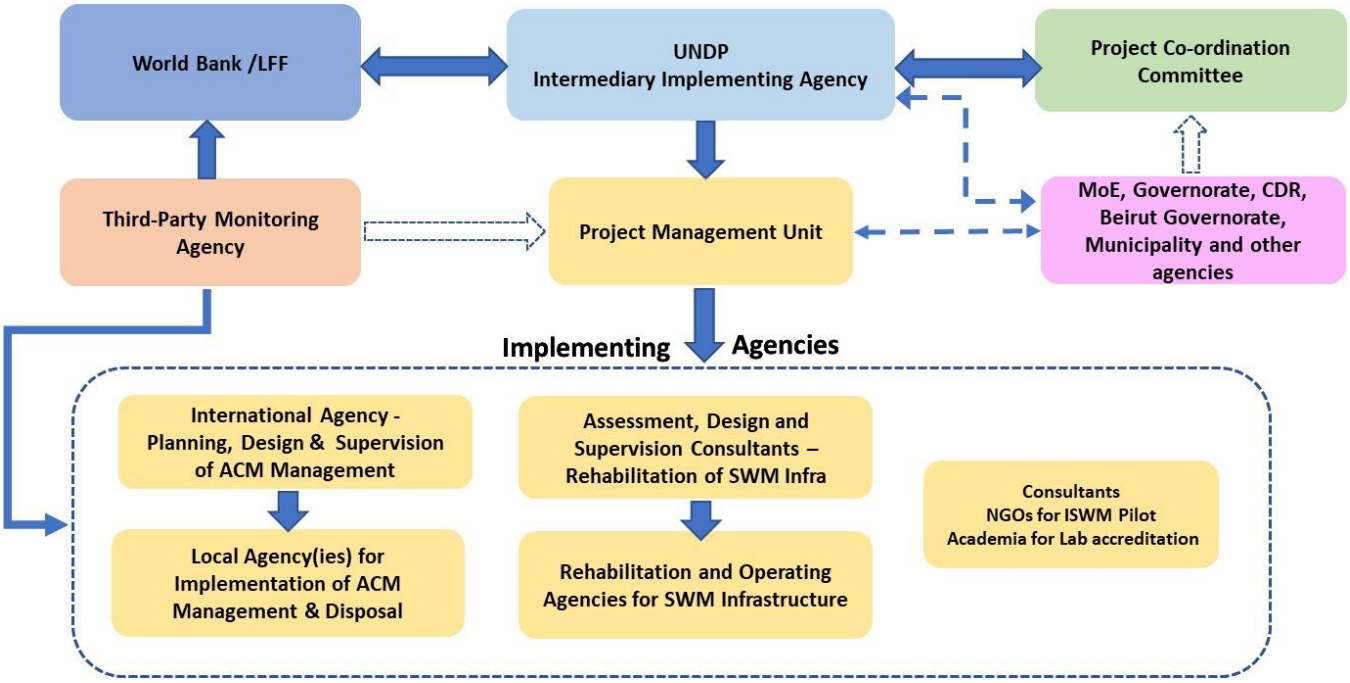


Figure 2. Project Implementation Structure

5. **A POM has also been prepared to guide the implementation of the project.** The POM describes in detail, the implementation arrangements, roles and responsibilities of the IIA, PMU, agreed Fiduciary and ESF procedures, overall implementation plan, progress reporting requirements, and arrangements for the monitoring and measurement of results.

6. **An independent TPMA will be hired by LFF for the overall portfiloio with an objective to ensure that the project is implemented according to all agreed procedures and bank standards of transparency, clarity and equity.** The TPMA will monitor and verify the activities and payments made under the project. The TPMA ToRs will be drafted by the LFF secretariat and reviewed by the WB task team. The TPMA will be producing quarterly reports to be submitted to the LFF and the WB task team simultaneously within 15 days after the end of each quarter. In addition, UNDP will propose and adopt specifically for this project a grievance and redress mechanism which will allow all parties the ability to express their complaints in an efficient and transparent manner.

7. **The World Bank will provide implementation support and oversight to the project.** The World Bank will closely coordinate with UNDP for the implementation and overall oversight of the project. Bank team will conduct regular (every six months, or more frequently as needed) implementation support missions with UNDP. These missions will: (i) review implementation progress and achievement of the PDO and intermediate indicators; (ii) provide support for any implementation issues that arise; (iii) provide technical support related to implementation, achievement of results, and capacity building; (iv) discuss relevant risks and mitigation measures; and (v) monitor overall project performance through progress reports, and audit reports. The World Bank's role in results M&E will also extend to identifying relevant lessons for future World Bank activities in similar contexts. Intensified assessment of project performance and results will be carried out at mid-term, led by UNDP. Similarly, an implementation completion and results report will be prepared within six months of project completion.

Procurement

8. **Procurement Arrangements**. Pursuant to paragraph 1(b) of Section III.F (Alternative Procurement Arrangements) of the World Bank Policy, Procurement in IPF and Other Operational Procurement Matters ("Procurement Policy"), Alternative Procurement Arrangements (APA) will apply, UNDP will follow their own procurement procedures as approved by the World Bank.

9. **Staffing.** For the purposes of this project, UNDP will ensure that the procurement unit is staffed with one qualified procurement specialists to conduct day-to-day procurement functions.

10. **Procurement Assessment of UNDP**. Pursuant to the World Bank Policy Procurement in IPF which enables the use of APA, UNDP Procurement Rules and procedures were assessed against World Bank's core procurement Principles and Governance requirements. The findings revealed that UNDP has a good procurement system in place with the required organization, internal controls, monitoring and tracking system and external audits, and their procurement rules and procedures meet the World Bank's requirements. UNDP's Procurement Services Unit (UNDP/PSU) provides procurement services to UNDP Country Offices worldwide. Areas of expertise include data analysis and sourcing strategy, procurement advisory services, supply chain management, procurement training and certification and sustainable procurement. UNDP takes a decentralized approach to procurement by different business units. Procurement oversight is provided at three levels with thresholds: (i) The Contracts, Assets and Procurement Committee (CAP) at the business level (above US$50,000); (ii) the RACP at the UNDP Regional Hubs (US$500,000 – US$2 million); (iii) and the Advisory Committee on Procurement (ACP) at UNDP Headquarters which is chaired by the CPO (above US$2 million). However, the following measures are required: (i) UNDP will have to further screen suppliers against the Bank's Debarment List and the Sanctions List; and (ii) bidders and suppliers will have to sign an acceptance of the Bank's Anti-Corruption Guidelines (ACG) and sanctions framework.

11. **The World Bank also conducted supplementary procurement capacity assessment of the UNDP Office in Lebanon, with main focus on the staffing and experience, procurement oversight arrangement, and general country office procurement performance.** For the purposes of this project, UNDP will ensure that the PMU is staffed with one qualified procurement associate to conduct day-to-day procurement and contract management functions. UNDP shall also arrange to prepare and submit PPs and periodic reports on the progress.

12. **Project Procurement Strategy for Development (PPSD).** The procurement strategy is aimed to broaden the social and employment benefits of the project while ensuring the quality of the project's execution. PPSD has been prepared and cleared by the Bank. The PPSD will be updated, when needed, during implementation.

13. **Procurement Plan (PP).** An initial PP for project implementation has been developed by UNDP and agreed with the World Bank. UNDP will be responsible for implementing the PP as agreed with the World Bank and monitor implementation to comply with the agreed timelines. The PP will be updated as needed and cleared by the World Bank.

14. **Key Procurement Activities.** The project is expected to finance the following main activities: (1) management of contaminated waste materials on the targeted site under the supervision of an experienced international entity; (2) development and preparation of the disposal site for contaminated CDW; (3) providing technical assistance for recycling of uncontaminated CDW; (4) rehabilitation of severely damaged selected solid waste management facilities to restore its operations; (5) development of an enabling environment for policy and institutional reform for a green recovery of Beirut; (6) establishment of a collaborative platform for stakeholder's engagement. In

addition, NGOs are expected to be hired under sub-component 1.3 through competitive bidding process to support the implementation of demonstration pilot on ISWM. The project will also finance necessary technical, financial, environment and social safeguards studies, monitoring and reporting plan, as well as PMU cost through Component 3.

15. **Implementation Supervision Plan**. Overall, the procurement risk of the project is rated as 'high' due to the factors outlined in paragraph 101 on fiduciary risk and accordingly Bank task team will provide support and closely monitor the progress and performance of the project.

Financial Management

16. **UNDP, the IIA for the project a signatory of the FMFA with the World Bank, hence Bank will rely on the financial management system of UNDP to implement the project.**

17. **The World Bank financial management team conducted a risk assessment of the project and implementation arrangements and the risk is rated as substantial** due to the following: (i) the socio-economic and political situation of the country and perception of corruption in the current fragile political environment; (ii) lack of coordination with other concerned stakeholders such as ministries and other public institutions; (iii) currency crisis and the devaluation of the LBP vs the USD; (iv) flow of funds delays due to the economic crisis and heavy bureaucratic procedures imposed by the government; (v) the nature of the activities which includes cash transfers and recruitments of NGOs; and (vi) limited government oversight on utilization of public funds.

18. **The following are the proposed mitigating measures that would reduce the risk rating to Moderate**: (i) utilizing UNDP to implement the project, UNDP will be the main implementing agency and the direct recipient of the funds from the World Bank which will enable the payment in fresh US$ for the activities of the project, hence preserving the value of the funds; (ii) relying on UNDP systems to produce quarterly financial reports (format and content will be agreed upon between the World Bank and UNDP) to enable the World Bank to follow on the physical and financial progress of the project; (iii) UNDP will include the project in its annual auditing and the audit report will be published on UNDP website; and (iv) a TPMA will be recruited by LFF level to validate and confirm the activities and payments made under the project.

Financial Management Arrangements

19. **Project Execution**. The PMU of the project will include a Financial Associate (FA), who will handle all financial management aspects of the project.

20. **Accounting and Reporting**: UNDP will prepare and submit to the World Bank's review quarterly Unaudited Interim Financial Reports (IFRs), not later than 45 days after the end of the quarter. The format and content of the IFRs will be agreed upon between the World Bank and UNDP. The IFRs should contain the following information:

    a. Statement of Cash Receipts and Payments for the quarter ending and cumulatively from inception date up till the quarter ending for all project activities and divided by category and by component.
    b. Explanatory notes including schedules: (i) list of all expenditures paid by category and component; (ii) list of all signed contracts per type of activity including NGOs, beneficiaries and other organizations showing contract amounts committed, paid, and unpaid under each contract.

21. **Internal Controls**: UNDP will be responsible for the internal control arrangements including oversight and monitoring of all activities and payments made under the project. UNDP will use their own internal control systems to ensure that funds are used for their intended purposes. For the purpose of the project, a POM detailing the implementation arrangements including financial management will be prepared by UNDP.

22. **Financial Audit**: The project will be included in the UNDP yearly corporate audit. UNDP will ensure that the audit of its respective part of the Project is: (a) carried out pursuant to the UNDP Financial Regulations and Rules; and governed by (b) the Financial Management Framework Agreement. The audit reports will be published in UNDP website.

23. **Third Party Monitoring Agent (TPMA)**: A TPMA will be recruited at the LFF level to verify project activities. The TPMA will carry out a review of the project activities to ensure that the activities are being implemented according to the POM, in addition the TPMA will carry out a technical audit to validate the expenditures made under the project. The TPMA will be producing quarterly reports to be submitted 30 days after the end of each quarter.

24. **Disbursements and Flow of Funds**: Funds will be channeled directly from the World Bank to UNDP bank account in US$ outside Lebanon. UNDP will then use the funds to pay for project expenditures. The funds will be treated as fresh US$. UNDP will be responsible for submitting withdrawal applications to the World Bank to request the funds. Withdrawal applications will be prepared by UNDP using the report-based disbursement method (i.e., based on IFRs for a six-month expenditure projection). The format and content of the IFRs that will be used for disbursement purposes will be added as annex to the Disbursement and Financial Information Letter (DFIL). The method of disbursements will be UN advance and UN Commitment. The amount of the advance will be based on a projection of six months expenditures. Disbursement's arrangements will follow the guidelines set in the grant agreement and the DFIL.

25. **The project category of expenditures is divided as follows:**

Category	Amount of the Grant Allocated (expressed in USD)	Percentage of Expenditures to be Financed (Inclusive of Taxes, if applicable)
(1) Goods, works, non-consulting services, consulting services, and operational cost under Parts 1 and 2 of the Project	8,500,000	100%
(2) (a) Direct Costs under Part 3 of the project	1,023,810	100%
(b) Indirect Cost under part 3 of the project	476,190	100%
TOTAL AMOUNT	10,000,000	

26. **Authorized Signatories**: The authorized signatories will be nominated by UNDP for the project to sign the withdrawal applications. The corresponding specimen of authorized signatures will be submitted to the World Bank prior to the receipt of the first withdrawal application. Each withdrawal application will be approved and signed by the authorized signatories.

27. **Fraud and corruption may affect the project resources, and thus impact negatively the project outcomes.** The above proposed fiduciary arrangements, including the utilization of an UN-Agency to implement the project, the preparation of a POM with a detailed FM chapter, the financial reporting and the recruitment of a TPMA, will help address the risk of fraud and corruption that are likely to have a material impact on the project outcomes.

Implementation Support Strategy and Approach

28. Bank team's strategy for supporting project implementation will involve a continuous face-to-face or virtual co-ordination with IIA in the initial stages of project implementation with an objective to develop a detailed work plan and timely initiation of critical procurement activities for a successful and timely implementation of the project. In addition , the task team will provide technical support to the project on an ongoing basis.

29. **Implementation support missions**. The Bank implementation support missions will be on a semi-annual basis. These may be complemented by short visits by individual specialists to follow up on specific thematic or technical issues as needed. The first year of implementation will be more on technical support, and later the focus will change to ensuring the execution of project activities and sustainability of the interventions. Each implementation support mission will include a review of progress in achieving the project's objectives as laid out in the Results Framework. The mission will also provide an opportunity to review the project design issues that may require adjustments to ensure satisfactory achievement of the project's objective.

30. **ESF.** The World Bank Environmental and Social Development Specialists will provide support to the IIA and PMU to ensure proper implementation of the ESF instruments. They will join the implementation support missions, or undertake separate missions as needed, to (a) assess the level of compliance with the ESCP, (b) assess the level of compliance with the cleared environmental and social instruments (including mitigation, monitoring, and management measures), (c) review environmental and social progress reports, and (d) ensure that procurement arrangements are consistent with the ESF requirements set out in the project legal agreements. The specialists will also discuss the findings with the implementing agencies to help identify and address any shortcomings, share lessons learned from other projects and other countries, and propose good practices to the implementing agencies to help improve ESF compliance as well as environmental and social sustainability.

Table 1. Scope and Focus of Implementation Support

Time	Focus of Implementation Support	Skills Needed
First 12 months	• Project start-up • Support to preparatory activities (PMU formation, project sensitization, community consultations and stakeholder engagement, Project planning and Progress Review) • Technical support • Guidance on applying ESF instruments • Support on M&E and impact evaluation methodology • Procurement, FM, M&E, and ESF training of staff • Establishing and re-enforcing the coordination mechanisms with stakeholder agencies	▪ Task team ▪ Technical specialists ▪ ACM/ Hazardous Waste ▪ SWM ▪ Design/ Civil Engineers ▪ Financial management ▪ Procurement ▪ specialists ▪ Social Specialist ▪ Communications ▪ M&E
13 to 36 months	• Monitoring implementation performance including progress • Review of work plan and disbursement schedule; and periodic reports • Review of procurement systems and implementation challenges • Review of audit reports and IFRs • Review adequacy of the FM system and compliance with financial management procedures	▪ Task team ▪ Technical specialists ▪ ACM/ Hazardous Waste ▪ Solid waste management ▪ Design/ Civil engineers ▪ Financial management ▪ Procurement ▪ Environmental and Social ESF specialists ▪ Social development ▪ Communications ▪ M&E

ANNEX 2: Technical Analysis

COUNTRY: Lebanon

Beirut Critical Environment Recovery, Restoration and Waste Management Program

A. Pre-blast analysis on the Solid Waste Management in Beirut City:

1. **The management of Municipal Solid Waste (MSW) in Lebanon has been unstable and continuously changing**. A national plan for the highly populated area surrounding the capital (Beirut, Mount Lebanon and the Caza of Keserwan) – representing about 50 percent of the total generated waste had been followed. The plan, overseen by the CDR consists of collection of combined waste followed by material recovery in Amroussieh and Karantina facilities. The organic material recovered from both facilities was partially (22 percent of total received waste) processed in the Coral composting plant and residuals were disposed in the sanitary landfills of Jdeideh and Costa Brava. Part of the recovered organic materials in Coral (8 percent of total received waste) were sent to the "MSW Treatment Center" in Saida / South Lebanon.

2. **The Beirut and Mount Lebanon (BML) region is served by two MSW sanitary landfills and two collection contractors each serving the Northern and Southern parts of the region.** The area affected by the POB explosion is covered by the contractor hired for Beirut city by the Beirut municipality and for Metn/Keserwan area by the CDR. The contractor is in charge of sweeping and collection of MSW in these areas.

3. **The MSW is collected from bins in spread out points on the streets.** Although in 2019, the contractor in coordination with CDR and MoE, started rolling out labelled bins for sorting at source, the initiative stopped due to protests that took place during October – December 2019 (where many of the bins were destroyed or set on fire), followed by a national economic crisis, which limited the financial capacity of the contractor to follow up on such an initiative. Before the POB explosion, the waste used to be transferred to the Karantina centralized sorting facility to recover materials and segregate organics sent for composting at the Coral Facility). since both the sorting and composting facilities were heavily damaged and not yet rehabilitated, the waste is currently landfilled without any material recovery.

4. **The fallout of the economic collapse of the country that was further exacerbated by (i) the absence of social safety nets; (ii) the deprivation of provision of services (such as electricity, fuel, and water); and (iii) the significant loss of incomes, affected the vulnerable populations.** As such, there has been a noticeable increase in the number of informal waste-pickers collecting valuable recyclables (metals, plastics, and electronic & electrical equipment) from MSW bins or through door-to-door and selling them to bulk scrap buyers by weight. Although this activity could seem like a nuisance with municipal waste being left on sides of the roads and health and safety risks to the waste-pickers, the reality is that there is recognition of the value of the material in the waste and these materials are being segregated.

5. **There are no sex-disaggregated statistics related to those working in the solid waste sector in Lebanon**[30]. Yet, despite social barriers and constraints, the role of women in the sector has increased (this might include their involvement in the informal sector as consequence of the economic crisis).

30 Woman and Waste Management in Lebanon, ISWA, Rami Nassif, March 2020. *https://iswalebanon.org/blog/women-and-waste-management-in-lebanon/*

6. **There have been many small initiatives undertaken by NGOs in many regions around the country and in the BML region that has attempted to promote source sorting and recycling but with varying degrees of success.** The sustainability of pilot projects conducted by such initiatives has proven limited and often last only as long as the value of grant supporting it. This is largely due to: (i) poor governance of sector vis-a-vis the physical aspects (e.g., collection treatment and disposal infrastructure); (ii) cost of operation had been higher than the revenue; (iii) limited willingness from citizens to adopt to change; and (iv) lack of means of disposing rejects encountered. In this regard, pilot projects that may interfere with the interests of the existing formal and informal collection systems will face many challenges to ensure sustainability.

7. **In 2019, an application Decree (5605/2019) regulating the sorting at source had been issued**. This Decree includes the Law 80/2018 ISWM principles: (i) waste reduction, reuse, and recycling principles; (ii) sorting at source principle; (iii) principle of prevention of uncontrolled dumping, landfilling, and burning of solid waste; and (iv) polluter pays principle. Based on the Decree, the Local Authorities are: (1) to provide the needed bins for sorting at source process; and (2) to establish Drop Off centers for the sorted at source materials (if they have the capacity).

8. **Based on MoE's data for year 2018, it is estimated that Lebanon generated about 2,700,000 tons of MSW per year and the MSW generated in Beirut is about 614 tons per day.** However, due to the acute economic crisis in the country and associated considerable drop in the overall purchasing capacity of the population, a substantial reduction in waste generation is anticipated. Data reported by the facilities managed by CDR indicate about 36 percent reduction in the quantity of MSW collected in Beirut and Mount Lebanon. Hence, any estimates of MSW generation prior to 2020 will not be relevant in the current context and a fresh assessment would be required [31].

9. **Regarding CDW, roadside dumping and burying of CDW as backfill material is very common in Lebanon**. There is no database on generation and composition of CDW, except some academic papers on specific locations/ areas in the country. Based on such research studies it is estimated that about 38-43 kg/m^2 CDW is generated by new development projects in Beirut city[32] and 76 kg/m^2 of CDW is generated for low-rise buildings in the suburbs of Beirut[33].

10. **Based on MoE's 2016 study, it is estimated that there are 324 CDW dumpsites in Lebanon[34] with a total volume of 2,160,536 m^3**. The study further concluded that most of this CDW is found in Beirut and Mount Lebanon area with a total volume of 419,880 m^3 and 1,116,910 m^3 (overall total of 1,536,790 m^3).

11. **According to the State of Environment Report (SOER), 2020**[35], the major gaps in the management of CDW include: (i) absence of a recycling/disposal infrastructure; (ii) lack of technical and huma resources to control open dumping; (iii) absence of a national database and recycling/reuse standards; and (iv) lack of a national investigation regarding the suitability of CDW for recycling – as various contaminants may be present depending on the source of the waste.

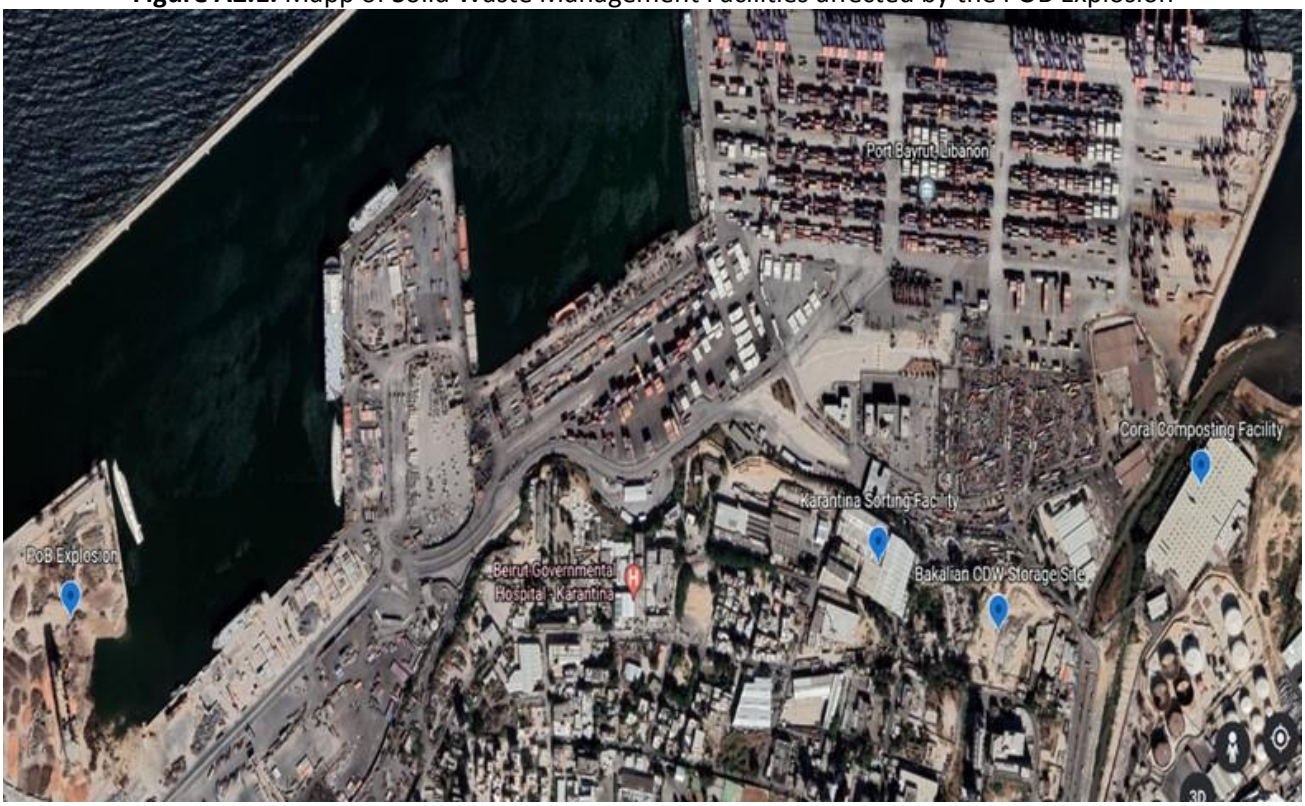
[31] Lebanon State of the Environment and Future Outlook: Turning the Crises into Opportunity 2020 (MoE/UNDP/UNHR/UNICEF), 2021
[32] Bakshan, A., Srour, I., Chehab, G., El-Fadel, M. (2015). A field-based methodology for estimating waste generation rates at various stages of construction projects. Resources, Conservation and Recycling, 100, 70-80.
[33] Ghanimeh S., Jawad, D., Semaan, P. (2016). Quantification of Construction and Demolition Waste: A Measure Toward Effective Modeling. The 3rd International Conference on Advances in Computational Tools for Engineering Applications, IEEE, Lebanon, July 13-15, 2016.
[34] Ministry of Environment (MoE), United Nations Development Program (UNDP), Earth Link and Advanced Resources Development s.a.l. (ELARD) (2017). Updated Master Plan for the Closure and Rehabilitation of Uncontrolled Dumpsites Throughout the Country of Lebanon
[35] Lebanon State of the Environment and Future Outlook: Turning the Crises into Opportunity (MoE/UNDP/UNHR/UNICEF), 2020

12. **The national Strategy for Integrated Solid Waste Management (Draft Final Report, February 2019),** among other objectives, seeks to, (i) separate management of demolition waste from old buildings containing asbestos, (ii) treat contaminated CDW with a view to recovery or disposal, (iii) develop a network of appropriate treatment and disposal facilities, and (4) promote reuse, recovery, recycling, and energy recovery of materials included in uncontaminated d CDW.

13. **Lebanon's quarry sector is poorly organized and has no official data on exact number of active quarries**[36]. As a result, large number of quarries in the country are unlicensed, leading to indiscriminate mining thereby causing serious impacts to the natural landscape. In addition, many exhausted quarries are abandoned without rehabilitation[37]. According to Rapid Cost of Environmental Degradation (2018) study conducted by MoE and UNDP[38], Lebanon has about 1,330 active and passive quarry sites spread over 52.6km^2.

Solid Waste Management in Beirut City after the Blast:

Figure A2.1. Mapp of Solid Waste Management Facilities affected by the POB Explosion



14. **In addition to impacts on various structures and infrastructure, the PoB explosion has severely damaged the MSW composting plant at Coral (750 tons/day capacity) and sorting facility at Karantina (2000 tons/day capacity).** Coral, the only composting plant serving Beirut and Mount Lebanon governorates as well as Keserwan caza, became completely non-operational. Sorting activities at Karantina have stopped and the facility is being used only as a transfer station. Amroussieh facility in the South of Lebanon, even though operational, stopped the

[36] Lebanon State of the Environment and Future Outlook: Turning the Crises into Opportunity (MoE/UNDP/UNHR/UNICEF), 2020
[37] Mediterranean Quarry Rehabilitation Manual: Learn the Holcim Experience (CNRS-L/AFDC/IUCN/Holcim), 2014
[38] Rapid Cost of Environmental Degradation 2018 (MoE/UNDP), 2019

diversion of organic materials to Coral Composting Facility. Thus, the waste that used to be received at Coral and Karantina is now being sent to landfills directly at Jdeideh and Costa Brava. As a result the life of both these landfills is reducing rapidly.

15. **A damage assessment report was prepared by CDR's supervision consultant on both Coral and Karantina facilities.** This assessment was mainly based on visual inspection of the damages and is not comprehensive. Based on this assessment**,** the Karantina Sorting Plant was found to be the most affected by the explosion with significant damage to the roof. As indicated in the table A2.1, the plant is spread over an area of about 12,081 m^2 with sorting and picking, baling, polishing and other facilities.

Figure A2.2. Karantina – MSW Sorting Facility

Table A 2.1 Damages to Karantina Sorting Facility

Building	Length (m)	Width (m)	Area (m^2)	70% Damage
Main Facility Buildings				
Sorting & Picking	85	49	4,165	2,195
Canopy attached to the sorting	75	10	750	525
Baling	88	52	4,576	3,200
Polishing	39	41	1,599	1,120
Entrance Shed	52	18	936	615
Control room	11	5	55	39
Support Building				
Administration and other support facilities	-	-	250	-

Source: Waste Treatment Facilities; Karantina and Burj Hammoud – Damage Assessment Report, Laceco CDR, August 2020

16. **In case of Coral Composting Facility, the assessment found that the facility cannot be operated as the tunnel's doors were destroyed by the explosion.** In addition, significant damages to roof structures were also observed. The plant is spread over an area of about 33,795m^2 with fermentation, baling, polishing, leachate ponds, maintenance zone, etc. Table A2.2 below summarizes the details of various components of the facility and their estimated level of damages.

Figure A2.3 Coral – General Layout of the Facility[39]

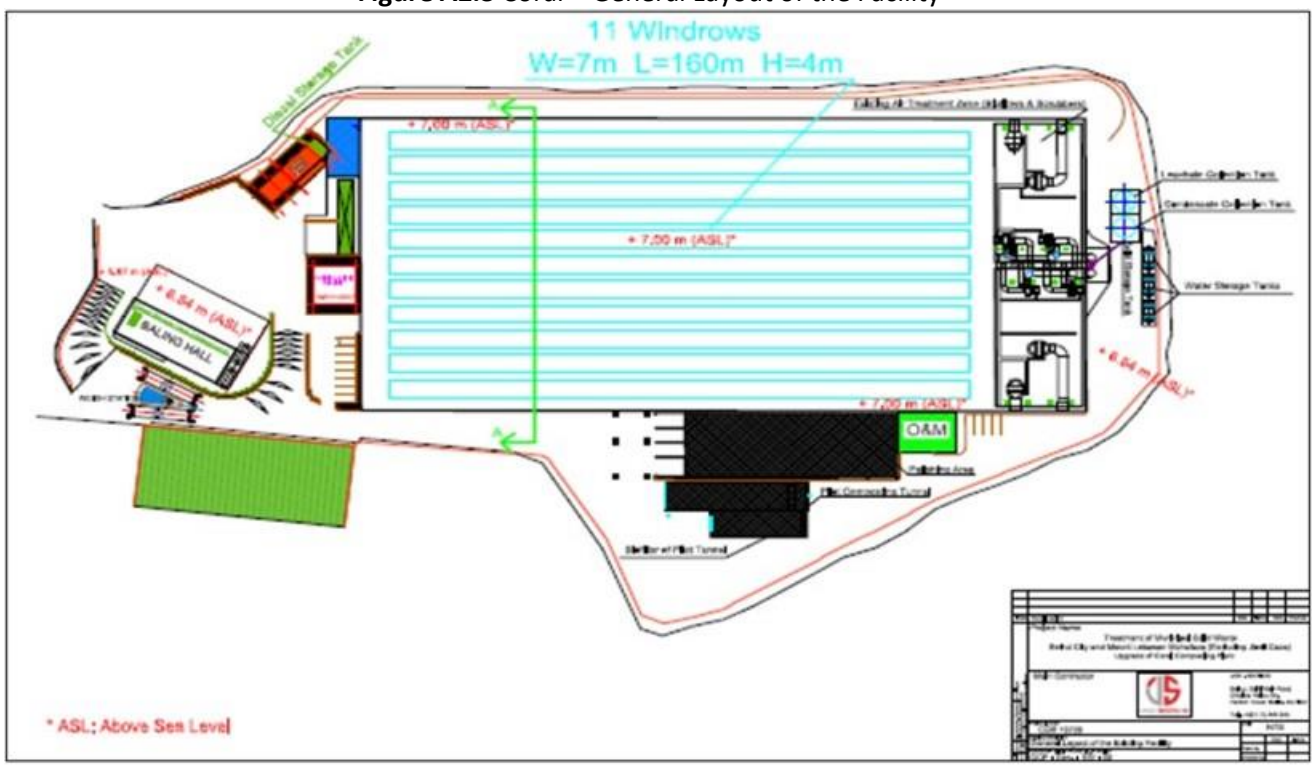


Table A 2.2 Damages to Coral Composting Facility

Main Facility Building	**Area (m^2)**	**% Damage**
Fermentation Hangar	16,800	50
Polishing Line	2,100	100
Old Baling	4,000	100
Maintenance Zone	4,000	50
Support Building		
Administration and other support facilities	60	-

Source*: Waste Treatment Facilities; Karantina and Burj Hammoud – Damage Assessment Report, Laceco / CDR, August 2020*

17. While the above assessment provides the extent of damages to both solid waste facilities, a thorough and comprehensive engineering assessment of all components is required to understanding level of rehabilitation required from civil, mechanical, electrical and operational perspective.

Construction and Demolition Waste

[39] EIA – For the Upgrade & Operation of the Existing Coral Composting Facility (Geoflint), 2017

18. **PoB explosion on August 4, 2020, resulted in server damage / destruction of large number of structures that created huge volume of CDW, both inside and outside the port**. After the explosion, UNDP carried out an assessment of the waste generated and stored outside the port. According to this assessment, it is estimated that about 800,000 to 1,000,000 tons[40] of CDW was generated due to the explosion. These quantities were validated against other damage assessment reports, including the Building Structural Assessment Report by the Order of Engineers and Architects[41], and Beirut Rapid Damage Assessment by UNHabitat and the Municipality of Beirut[42]. The former report provides the results of an on-ground survey of 2.8 km^2, whereby the buildings were categorized according to the extent of structural and non-structural damages whereas the latter covered the buildings within 2 km radius from the blast.

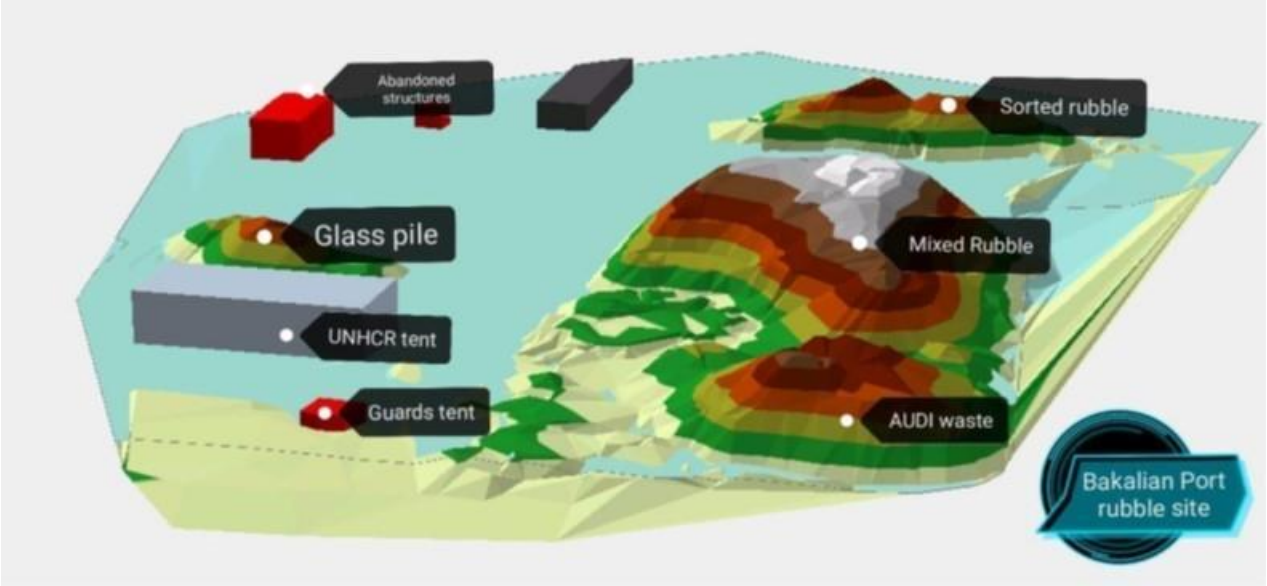
19. **The large quantify of CDW, the lack of disposal facilities and mix of asbestos, aggravated the management CDW**. As a result the CDW was stoned in number of locations or disposed in low lying areas, along the streets, etc. With the presence of asbestos, this became a serious health and safety issue for the people of Beirut.

20. **In response to this situation, several on-ground efforts were initiated by various local agencies to manage CDW.** The initiative by Rubble-to-Mountain (RtM) consortium comprising UNHabitat, American University of Beirut Neighborhood initiative (AUB), Lebanon Reforestation Initiative (LRI) and Development inc. one such initiative. This consortium was authorized by the Beirut Governor to receive construction and demolition waste at the Bakalian site for its storage, sorting and crushing of accumulated debris in line with appropriate environment, health, and safety measures.

21. **The Bakalian waste storage site is one of the largest CDW storage sites that was established after PoB explosion and is located in northeastern Beirut in the Karantina district (Medawar 1343), facing a Flour Mill.** This site is under the jurisdiction of two entities. While a 6,000 m^2 of are is under Beirut Governor's jurisdiction, the other part of 11,000 m^2 belongs to Port of Beirut[43]. During 2015 solid waste crisis in Lebanon, Bakalian site was used to store baled solid waste. The site is constituted of natural soil (sand and clay) without any course material or pavement on the top.

[40] United Nations Development Program (UNDP) (2020). Demolition Waste Assessment Outside the Port of Beirut.
[41] Order of Engineers and Architects (OEA) (2020). Beirut Port Explosion of Aug 04, 2020: Buildings Final Structural Assessment Report.
[42] UNHabitat and Ministry of Beirut (2020): Beirut Municipality Rapid Building-level Damage Assessment
[43] Bakalian Sampling Results and Identification of Preliminary Management Alternatives (USAID/DAWERR/ECODIT), March 2021

Figure A2.4 3D scanning of Bakalian *(Source: UN-Habitat 2021)*



22. The site has received an estimated 150,000 tons[44] of CDW, a mix of waste that resulted directly from the explosion as well as from other locations in Beirut. The RtM Consortium operates the site and is in the process of developing capacity for waste processing and recycling. There is evidence (assessments by USAID and UNDP) that particularly in the first months after the explosion part of the waste materials that entered the site are contaminated with asbestos. Since then, procedures have been adopted on site to reject truck loads with asbestos contaminated CDW. In addition, the RtM carried out small-scale trial to gather and analyze air and wastewater samples associated with the rubble-crushing operations at the Bakalian storage and disposal site. The site had been fully fenced by the RtM with Aluminum Sheets, Metals grids and Wires on top and did reach around 50 percent of its storage capacity. While the site is being managed by RtM, the operations have not been permitted by MoE**.** The consortium recently submitted the Environmental Scoping Report in compliance to the Environmental Impact Assessment Decree (Decree 8633/2012) to the MoE and is awaiting permit.

[44] Estimation reported by Rubble to Mountain consortium

ANNEX 3: Economic Analysis

COUNTRY: Lebanon
Beirut Critical Environment Recovery, Restoration and Waste Management Program

1. The Project will produce tangible and intangible benefits although only the former will be quantified and valued in this analysis. The intangible investments include the strengthening stakeholder engagement to participate in the green inclusive and resilient recovery after the PoB explosion as well as strategy to manage hazardous wastes. The tangible investments include: (i) the sustainable recycling and disposal of the post POB explosion contaminated (asbestos) CDW; and (ii) restoring the recycling and composting facility lines to increase the circularity of municipal wastes and reduce the disposal volume. The investment costs were included in the economic cost-benefit analysis. However, Operation and Management Expenditures (OMEX) were not included at this stage as the CDR contract with the municipal waste operators are on hold for the recycling and composting in Bourg Hammoud and Coral respectively, but still valid. Hence, the economic Cost-Benefit, Sensitivity and Scenario Analysis (CBA) (Box A3.1) considers only the more directly quantifiable benefits from the hard investments.

Box A3.1 Purpose and Criteria of Economic Benefit-cost, Sensitivity and Scenario Analyses

Commercial profitability analysis seeks to assess the net financial results of a project from the investor's point of view, while a national viability analysis aims to identify and measure the net economic benefits of a project from a social perspective. The financial and economic analyses usually look at three main indicators to determine the profitability and viability of a project, respectively:

- Net present value (NPV), which is the difference between the discounted total benefits and cost.
- Internal rate of return (IRR), which is the discount rate that zeroes out the NPV (in other words, the interest rate that makes the NPV of all cash flows equal to zero). The IRR estimates the actual return on the project, expressed as a percentage interest rate. IRR can be used for a financial analysis when private goods and/or services are considered and for an economic analysis when public goods and/or services are considered.
- Benefit-cost ratio, which is the ratio of the present value (PVBCR) of benefits over the present value of costs over the lifetime of the project. In other words, the ratio allows showing the benefits accruing from each currency unit spent.

The sensitivity analysis will allow to determine the switch off points when variables (costs and benefits) are increased or decreased. The scenario analysis will allow to add a layer of risk by looking at the project results using a combination of several discount rates (±6 percent suggested by the World Bank) and increased or decreased costs and benefits will be considered. However, delays in project disbursement and implementation are not considered.

2. The project is assessed on its own merits. Therefore, the project financial costs should be adjusted to reflect the economic costs. i.e., customs, income/corporate taxes, value-added tax and social compensations, market distortions and subsidies. Despite the sharp depreciation of the Lebanese pound, the customs, taxes, VAT and social security contribution are still based on the October 2020 exchange rate of LBP1,505.5 for the US dollar against a market exchange rate of about LP20,000 to the US dollar in February 2022. Therefore, the shadow pricing adjustments will slightly improve the overall results of the benefit-cost analysis in terms viability of the project. Moreover, although the fossil fuels are sold based on international prices, the electricity supplied through generators is over-valued and has distortionary effects on the economy and its competitiveness. Still, this distortion will not be considered in the shadow pricing of the financial costs of the Project.

3. The financial and economic costs are illustrated in Table A3.1. The economic costs were adjusted based on customs, tax, VAT and social security rates based on the current on US dollar market rate and not the old rate still considered by the Ministry of Finance. The economic costs represent 86.4 percent of the financial cost of US$ 10 million.

Table A3.1 Financial and Economic Costs, US$ million

Adjustment Factors			Component	Financial Cost	Economic Cost
Procurement	Tax	Rate	Component 1.1 management of CDW	2.00	1.78
Works	VAT	11%	Component 1.2 Rehabilitation of MSW Infrastructure	6.00	5.21
Equipment	Customs; VAT	5%; 11%	Component 2 Policy & Inst. Support	0.50	0.45
Services	VAT	11%	Component 3 Project Management	1.50	1.07
Salaries	Income Tax; Social Security	2%-25%; 25%	**Total**	**10.00**	**8.64**

Source: Lebanon Customs Decree 4461/2000, Article 295 website: www.customs.gov.lb/; Ministry of Finance website: www.finance.gov.lb; CNSS website: <https://beirut-cnss.business.site>; and Project Files

4. The economic analysis relies on different methods to value the quantifiable benefits of the project:

- **CDW.** After disposing the CDW currently stored at Bakalian (and other sites), benefits will accrue at the rehabilitated abandoned quarry in the Metn Casa (Governorate division) not far from Beirut city and will help appreciate the average price of residences around the rehabilitated quarry.
- **Municipal Solid Waste Management**. With increasing the recycling capacity and composting in terms of considering the market price of recycled materials and compost as an opportunity cost as well as the reduction of cost of landfilling in one of the two coastal landfill servicing Greater Beirut, Jdeideh landfill. The GHG averted is calculated but the cost has not been added in the analysis as the benefits accrue at the global level.

Sub-Component Earmarked and Needed Investment Costs

5. The costs per sub-component reaping tangible benefits are listed in Table A3.2.

Table A3.2 Investment Costs used in the Benefit-Cost Analysis

Sub-Component	Financial Cost, US$ million	Economic Cost, US$ million
CDW to be Disposed	2.00	1.78
Karantina Segregation Original Capacity	3.60	3.20
Coral Compost Original Capacity	2.40	2.14
Total	8.00	7.12

Source: Project files

Benefit Valuation Methods

Safe disposal of CDW

6. A Two-prong approach is considered to derive the benefits: (i) a hedonic pricing to gauge the re-appreciation of the residences around the abandoned quarry after rehabilitating the abandoned quarry and offset the depreciation due to sight pollution; and (ii) a willingness to pay to put a value on the restoration of the ecological services after the rehabilitation of the quarry.

7. A hedonic pricing method developed by Campbell (2015) demonstrates that proximity to a quarry lowered nearby property values. The percentage change in the log linear function of the price of a residence was 0.12229 as distance increases. A single coefficient, -0.006715, A single coefficient, -0.006715, is transferred from the study and is applied to all residence values in Metn (average US$51,754 which is very conservative and considered controlled for all amenities) quarry area, as it represents a weighted average of the impact of the radius around the quarry where residence values are actually affected by the quarry. Other studies such as Hite (2006) and Erickcek (2006) consider a longer radius.

8. The shortlist of abandoned quarry sites identified by MoE for the disposal of CDW, are privately owned and are located in the Metn Caza, Nahr el Mott region and next to both the Nahr el Mott-Broummana highway and the non-perennial Nahr el Mott. With an approximate area of 53,200 m2, the quarries served to extract limestone for construction and possibly coastal artificialization. The contaminated and non-recyclable CDW of about 150,000 tons will be transferred from the Bakalian site where most of the CDW is stored and will be used to restore the quarry. A radius (2,414 meters from the initial quarry radius of 115 meters) around the quarry (Campbell, 2015) was hypothetically considered to determine environmental risk in terms of sight pollution around the quarry. The quarry area population is used and divided by the member number per household (Central Administration of Statistics - CAS, 2020) which will allow to derive the number of residences (Table A3.2). Based on the CAS (2020), the Metn density was considered for both areas that allowed to derive the population of 38,834 and the 11,095 residences surrounding the Quarry in 2022. Hence, the restoration of the abandoned quarry is expected to appreciate the surrounding residence prices and bring them to their original or market value: US$ 3.86 million (Table A3.3).

Table A3.3 Residence Depreciation due to Quarrying that will be recovered with the Quarry Restoration

Input	Unit	Residence Price After Quarrying
Density	Capita/m^2	D
Area based on radius retained	m^2	R
Population	#	P=DxR
Household members	#	H
Number of residences	#	R=P/H
Average Cost per residence	US$	V (from Table A2.2)
Depreciation coefficient	#	C=-0.006715
Total Depreciation	US$	T=VxRxC

Source: Campbell (2015); Property Finder (www.propertyfinder.com.lb); OLX (www.olx.com.lb/en/properties); Realty Lebanon (www.realtylebanon.com); CAS (2020); and MOE/UNDP (2019).

9. Water pollution, erosion and ecosystem services impacted by the quarry operations and abandonment are difficult to gauge. A Willingness to Pay (WTP) derived from the OECD (OECD, 2015) equivalent to 0.1 percent of the 2018 GDP per capita for Lebanon to restore water flow, land erosion and damaged ecosystem services is considered. In this case, the population living in the quarry radius area is considered although most of the Metn population could have been considered to value the damages. Restoring the ecologic services amounts to US$294,506 bringing the total benefits to US$4.15 million. Conversely, the US$1.78 million preliminary assessed by the Project are expected to cover the investment cost including the rehabilitation of the quarry repair costs of 52,300 m^2. Still, the benefits allow enough leverage in case the rehabilitation costs are undervalued.

Waste Management

Municipal Waste Management

10. Before the POB explosion, Greater Beirut waste was collected by compacting trucks and transferred to two sorting facilities: Karantina next to the POB (2,000 tons/day with 5 sorting lines) and Amroussieh in the southern suburbs (1,000 tons/day with 4 sorting lines). A first manual sorting and then mechanical sorting (magnetic separation and rotating sieves) were carried out. Part of the organic fraction, from the Karantina (200 tons/day) and Amrousieh plant (100 tons/day), was transferred to the nearby Bourg Hammoud Coral composting plant (300 tons/day) to produce a low-quality compost. The product was either sold or given to farmers or landfilled. The fraction of recyclable material segregated was either auctioned off to wholesalers/industries or sold at prices fixed by contracts.

11. Both Karantina and Bourg Hammoud facilities sustained damages by the POB explosion and two Options will be considered:

    a. Option 1 considers a rehabilitation that will allow Karantina to treat the project target of 650 tons per day out of the designed capacity of 2,000 tons per day for segregation and a transfer of 200 tons to Bourg Hammoud Coral out of the designed capacity of 300 tons per day to treat the organic fraction and produce compost. The benefit costs of composted and recycled materials will be used as opportunity cost in the BCA to which the averted cost of the disposed fraction will be added. The GHG averted will be calculated but not added to the analysis. Preliminary estimated repair cost investments assessed by CDR to retore the facility to full capacity (all 5 lines for the segregation) exceed the earmarked investments by the Project to reach the 650 tons per day target. Hence, a slightly lower investment will allow to operate both facilities at 33 percent (650 tons/day) and 67 percent (200 tons per day) of their original installed capacity, respectively (Table A3.4). However, the detailed repair costs will be re-assessed by the Project as they could have been under-valued. Yet, all the residual waste after repairing the facilities will be disposed at the Jdeideh landfill.

    b. Option 2 also considers utilization of US$6 million (US$5.34 million in economic cost) allocated for Component 1.2 of the project, which will allow rehabilitation at 77 percent (1,539.2 tons per day) for Karantina and 88 percent (262.7 tons per day) for Bourg Hammoud of their designed capacity, respectively (Table A3.4). The same benefit cost method used under Option 1 will be retained. Similarly, the detail repair costs will be re-assessed by the Project as they could have been under-valued. Yet, all the residual waste after repairing the facilities will be disposed at the Jdeideh landfill.

Table A3.4 Preliminary Waste Capacity and Investment Economic Cost Options

Options	**Karantina % of 2,000 Tons/day Capacity Repaired**	**Bourg Hammoud % of 300 Tons/day Capacity Repaired**	**Karantina Economic Repair Costs**	**Bourg Hammoud Economic Repair Costs**	**Total**
	%	%	US$ million	US$ million	US$ million
Option 1	33%	67%	1.36	1.63	2.99
Option 2	77%	88%	3.20	2.14	5.34

Source Project papers

12. Municipal solid waste fractions in Lebanon are based on two generally considered sources: (CDR, 2014) and Sweep-Net (2015). However, the MOE Memo 8-1/2015, which is retained for the analysis, sets the compostable at 50 percent and the recyclables at 35 percent and other at 15 percent (Table A3.5). For the BCA, the breakdown of the recyclables (35 percent) has been adapted from Sweep-Net (2014). Moreover, Lebanon costs per ton from collection to disposal are illustrated in Table A3.4 and the differential between the cost of treatment and the cost of disposal per ton of waste will not be considered for the BCA as the OMEX of treatment and disposal are covered under CDR contracts for both facilities when will be back in operation after being repaired, and the landfill (Table A3.4).

Table A3.4 MSW Cost Breakdown per Ton in Lebanon, 2017

Waste Operation Cost	**Unit**	**BML except Jbeil**	**Tripoli**	**Saida**	**Zahle**	**Tyre**	**Other Areas**	**Total**
Collection	US$/ton	36	27	24	18	10-24	10-27	10-36
Segregation and Composting	US$/ton	77	25	95	22	25	25_{OMSAR}	11-95
Ultimate Disposal	US$/ton	37	29	NA		29.2	15_{OMSAR}	11-37
Total	US$/ton	**149.6**	**76**	**119**	**40**	**64.2-79.2**	**10-67**	**32-149.6**

Source Note on Brown Issues in Lebanon, Internal World Bank Analysis (2020).

13. The results of the benefits annualized over 10 years are illustrated in Table A3.5 below.

Table A3.5: Benefits under 2 Waste Options

Waste Fraction	Breakdown by Fractions	Gross pre-Compost and Recycled Materials	Mid-point cost of Compost and Recycled US$/Ton	Annual Benefits under Option 1 US$ million	Annual Benefits under Option 2 US$ million
Organic	50%	62%-34%	8	2.42	5.67
Glass	5%	2%	40		
Plastic	7%	4%	150		
Metal	3%	1%	150		
Paper Cardboard	17%	8%	60		
Textile	3%	1%	5		
Other	15%	0%			
Total	100%			2.42	5.67

Note: Gross organic pre-composting is 62 percent (Option 1) and 34 percent (Option 2) of the organic waste fraction of 50 percent. Net compost produced is expected to lose half of its mass during composting.
Source: Sweep-Net (2014); MOE (2015); Chamieh et al. (2016).

Additional Assumptions

14. A number of additional key assumptions were also considered for the economic analysis:

- Benefits will start accruing for solid waste component from 2024 and CDW component by 2025
- The economic analysis considers the benefits over 10 years.
- An actual discount rate of 6 percent per annum recommended by the World Bank is used for the economic analysis. The right-of-way including the price of land and any structures upon it is unaccounted in the analysis.
- Operation and maintenance (OMEX) of waste facilities is not considered in the analysis as an existing contract is still valid between CDR and operators.
- Population served and waste generation are considered constant in the BCA over 10 years.

Results of the GHG Averted

15. The GHG averted under Options 1 and 2 are substantial over 10 years for the targeted waste volume with 2.0 million and 3.7 million tons of CO2 equiv. averted respectively. When considering Stiglitz and Stern (2017) average price of Carbon over the 2022-2031 period, the monetary value of the GHG averted is equivalent to US$139.8 million and US$257.5 million respectively (Table A3.6). GHG emission of transportation and facility operations are not included in the calculations.

Table A3.6: GHG Averted from Partially Repairing Karantina and Bourg Hammoud Facilities over 10 years

GHG from 2022 to 2031	**Landfill Business as Usual**	**Landfill and Composting Emission Averted**	**Recycling Emission Averted**	**Total Emission Averted**	**Unit Value of CO_2. equiv.**	**GHG Value Averted over 10 years**
	Ton of CO_2 equiv.	Ton of CO_2 equiv.	Ton of CO_2 equiv.	Ton of CO_2 equiv.	US$/Ton of CO_2 equiv.	US$
Option 1	2,981,877	1,946,367	65,339	2,011,705	69.5	139,769,931
Option 2	7,064,754	3,551,699	154,802	3,706,501	69.5	257,521,531

Source: Project Files; and Stiglitz and Stern (2017)

Results of the Benefit-Cost, Sensitivity and Scenario Analysis

16. The economic analysis is based on the only tangible quantifiable benefits of the project. The project will also reap other tangible and intangible benefits that are not quantified. The economic analysis was performed by using a 6 percent social discount rate (as suggested by the World Bank since 2016) starting from 2022 over 10 years. An optimistic scenario considers a 4 percent discount rate whereas a pessimistic scenario considers an 8 percent discount rate.

17. Five BCA are carried out: (i) Total project with Municipal Waste Management Option 1; (ii) Total project with Municipal Waste Management Option 2; (iii) CDW Sub-component; (iv) Municipal Waste Management Sub-Component Option 1; and (v) Municipal Waste Management Sub-Component Option 2.

18. Table A3.7 summarizes the results of the economic analysis for the 5 BCA iterations where all the Base Case BCAs have a positive NPV (ranging from US$1.7 million to US$27.0 million), a positive economic IRR (ranging from 54 percent to 99 percent) and a Present Value Benefit-Cost ratio always positive (ranging from 2.1 to 6.6). All the other optimistic and pessimistic scenario show positive results (Table A3.7).

Table A3.7 Cost Benefit Analysis Summary

Key Economic Indicators	Project		
	10 Years Discounted at		
Scenario	**4% Optimistic**	**6% Base Case**	**8% Pessimistic**
BCA Total Project Option 1			
NPV (US$, millions)	*12.8*	**11.1**	*9.7*
ERR (%)	*54%*	**54%**	*54%*
PV benefit/cost ratio	*3.2*	**3.0**	*2.8*
BCA Total Project Option 2			
NPV (US$, millions)	*30.9*	**27.0**	*23.6*
ERR (%)	*77%*	**77%**	*77%*
PV benefit/cost ratio	*4.9*	**4.5**	*4.2*
BCA CDW Sub-Component			
NPV (US$, millions)	*1.9*	**1.7**	*1.6*
ERR (%)	*62%*	**62%**	*62%*
PV benefit/cost ratio	*2.2*	**2.1**	*2.1*
BCA MSW Sub-Component Option 1			
NPV (US$, millions)	*12.3*	**10.7**	*9.3*
ERR (%)	*75%*	**75%**	*75%*
PV benefit/cost ratio	*5.4*	**5.0**	*4.6*
BCA MSW Sub-Component Option 2			
NPV (US$, millions)	*30.3*	**26.5**	*23.3*
ERR (%)	*97%*	**97%**	*97%*
PV benefit/cost ratio	*7.1*	**6.6**	*6.1*

19. Table A3.8 summarizes the benefit-cost, sensitivity and scenario analysis results for the Total project with Municipal Waste Management Option 1 whereas Table A3.9 summarizes the benefit-cost, sensitivity and scenario analysis results for the Total project with Municipal Waste Management Option 2. The scenario analysis in this case includes: (i) an optimistic scenario with a 10 percent increase in benefits and a 10 percent decrease in costs discounted at 4 percent; and (ii) a pessimistic scenario with a 10 percent increase in costs and a 10 percent decrease in benefits discounted at 8 percent.

20. For both options, the Total project generates positive and robust NPV (ranging from US$ 9.7 million to US$35.6 million), a positive economic IRR (ranging between 42 percent and 93 percent) and a significative Value Benefit-Cost ratio (2.3 to 6.0). The scenario analysis is similar to a stress test where the total Project could still reap benefits with an increase of more than 125 percent of the cost under the pessimistic scenario for Option 1. Likewise, the total Project will reap benefits with a cost overrun that could almost double to 245 percent under the pessimistic scenario for Option 2. The Total project under both options is more sensitive to a decrease in benefits than an increase in costs reflected by the switch-off points.

Table A3.8: Cost/Benefit, Sensitivity, and Scenario Analysis of Total Project Option 1

Key Economic Indicators	Projections		
	10 Years Discounted At		
Scenario	**Optimistic (4%)**	**Base Case (6%)**	**Pessimistic (8%)**
Cost/Benefit Analysis			
NPV (US$, millions)	*12.8*	**11.1**	*9.7*
ERR (%)	*54%*	**54%**	*54%*
PV benefit/cost ratio	*3.2*	**3.0**	*2.8*
Viability			
Sensitivity Analysis	*Benefit +10%* *Cost -10%*		*Cost +10%* *Benefit -10%*
NPV (US$, millions)	*15.2*	**11.0**	*7.6*
ERR (%)	*68%*	**54%**	*42%*
PV benefit/cost ratio	*3.9*	**3.0**	*2.3*
Switch-off point			
>cost = <benefit (±%)	*±59.0%*	**±49.0%**	*±39.0%*
>cost (±%)	*+295.0%*	**+195.0%**	*+128.0%*
<benefit (±%)	*-74.0%*	**-66.0%**	*-56.0%*

Table A3.9: Cost/Benefit, Sensitivity, and Scenario Analysis of Total Project Option 2

Key Economic Indicators	Projections		
	10 Years Discounted At		
Scenario	**Optimistic (4%)**	**Base Case (6%)**	**Pessimistic (8%)**
Cost/Benefit Analysis			
NPV (US$, millions)	*30.9*	**27.0**	*23.6*
ERR (%)	*77%*	**77%**	*77%*
PV benefit/cost ratio	*4.9*	**4.5**	*4.2*
Viability			
Sensitivity Analysis	*Benefit +10%* *Cost -10%*		*Cost +10%* *Benefit -10%*
NPV (US$, millions)	*35.6*	**27.0**	*19.8*
ERR (%)	*93%*	**77%**	*62%*
PV benefit/cost ratio	*6.0*	**4.5**	*3.4*
Switch-off point			
>cost = <benefit (±%)	*±71.0%*	**±63.8%**	**±55.0%**
>cost (±%)	*+495.0%*	**+353.0%**	*+245.0%*
<benefit (±%)	*-83.0%*	**-78.0%**	*-71.0%*

ANNEX 4: Project Cost

COUNTRY: Lebanon

Beirut Critical Environment Recovery, Restoration and Waste Management Program

Component	Cost, US$
Component 1 Rehabilitation of Damaged Sold Waste Management Infrastructure and Management of asbestos contaminated debris generated due to PoB Explosion	
1.1. Management of Asbestos Contaminated debris generated in the explosion affected areas of Beirut	2,000,000.00
1..1.1.Consultancy for Design of ACM Management Measures, Contaminated CDW disposal facility Design and Supervision	500,000.00
1.1.2. Contract for Implementation of ACM Management of Measures, contaminated CDW Transportation and Disposal	1,500,000.00
Sub-Total (Sub-Component 1.1)	*2,000,000.00*
1.2 Rehabilitation of severely damaged solid waste management facilities serving Beirut Area	
1.2.1 Detailed Engineering Assessment, costing, bidding and supervision of SWM facilities	50,000.00
1.2.2. Detailed operation plan and integration of SWM facilities with C&T system of Beirut	200,000.00
1.2.3 Contract for the Rehabilitation of SWM Facilities	5,150,000.00
Sub-Total (Sub-Component 1.2)	*5,400,000.00*
1.3 Piloting ISWM in the explosion impacted areas	
1.3.1 Demonstration Pilots for ISWM	500,000.00
1.3.2 Capacity Building and Community Awareness	100,000.00
Sub-Total (Sub-Component 1.3)	*600,000.00*
Total (Component 1)	**8,000,000.00**
Component 2 Policy and Institutional Support for Greening Beirut Reconstruction Agenda	
2.1 Establishment of a collaborative platform for stakeholder engagement and planning priority actions for greening Beirut's reconstruction agenda	
2.1.1 Collaborative Plat form for Stakeholder engagement	100,000.00
2.2.2 Action Plan for Beirut Reconstruction Agenda	200,000.00
Sub-Total (Sub-Component 2.1)	*300,000.00*
2.2 Strengthening monitoring and enforcement for the management of critical hazardous and chemical substances	100,000.00
2.2.1 National Inventory and Action Plan for Hazardous Wastes and Chemicals	100,000.00
2.2.2 Support for the accreditation of Environmental Laboratories	
Sub-total (Sub-Component 2.2)	200,000.00
Total (Component 2)	**500,000.00**
Component 3 Project Management	
3.1 Project Management Costs (Staffing and Operating Expenditure)	1,023,810.00
3.2 General Management Services (GMS)	476,190.00
Total (Component 3)	**1,500,000.00**
Grand Total (Project Cost)	**10,000,000.00**