

1. Project information

The StREG project has been designed with the overall objective of improving the environmental performance of the Lebanese public sector through performing environmental governance, and with the purpose of:

- Creating effective capacity, specifically at the Ministry of Environment, to plan, execute and enforce environmental policy;
- Mainstreaming environmental policy through coordinating with key line Ministries.

The project comprises four major work components, each designed to achieve a specific result:

1. **Environmental inspection and enforcement strengthened** – to be achieved through undertaking the following activities:
 - A1.1 Review practice and prepare an options paper for a joint-Ministry working group;
 - A1.2 Draft new inspection and prosecution procedures in agreed sectors;
 - A1.3 Provide training to inspectors and prosecutors in using the new procedures;
 - A1.4 Identify equipment needs for evidence gathering by MoE and prepare specifications for the procurement (through different contract) of the identified equipment and associated software;
 - A1.5 Implement the new procedures.
2. **Ministry of Environment (MoE) administrative capacity improved** – to be achieved through undertaking the following activities:
 - A2.1 Establish Ministry of Environment regional Departments;
 - A2.2 Upgrade the management system of the MoE (workflow, archive and equipment inventory).
3. **Environmental fiscal instruments (EFI) developed and submitted to the Council of Ministers by the MoE** – to be achieved through undertaking the following activities:
 - A3.1 Identify suitable EFI (for Lebanon);
 - A3.2 Develop a priority action plan for introducing selected EFI into the legislative process.
4. **Environmental policy enhanced** – to be achieved through undertaking the following activities:
 - A4.1 Update the draft National Environmental Action Plan;
 - A4.2 Initiate the mainstreaming of environmental policy in agreed sectors;
 - A4.3 Equip the Inter-Ministerial Climate Change Coordination Unit with mitigation and adaption plans in agreed sectors.

2. Description of the assignment

The Ministry of Environment is confronting the challenge of burgeoning activity in the quarry and building materials industry, both to meet domestic demand and to meet anticipated demand when reconstruction work begins in Syria. Quarries have significant negative impacts on the Lebanese environment due to visual blight, dust, possible contamination of water supply, ecosystem harms, structural damage caused by blasting, and so on. This growth is therefore expected to pose major threats to the country's environment.

This assignment will analyse the expected growth of the sector, the resulting demand for quarry materials, the environmental impact of that quarrying, and the best strategies for preventing the environmental harm that would result from uncontrolled growth. The analysis will address the regional structure of the industry and Lebanon's place in it. Based on that assessment, it will project demand for quarry products and the broad environmental implications of that demand. It will also consider the market for recycled construction and demolition waste (CDW), including both the national and regional supply, and the use of that material to replace new quarry products or to rehabilitate existing quarries.

It will then consider several policy strategies that might affect demand for quarry products and consequent environmental impact; these include a significant export duty on building materials, a quarrying fee whose revenues would be used to rehabilitate existing abandoned quarries, a ban on exports of building materials, policy tools to facilitate or encourage use of CDW, or other mechanisms that may be identified in the course of the work (if any).

2.1 Tasks to be carried out

Assessment of the regional market for building materials

- Project demand for building materials in Syria; clearly this is speculative, since it depends on how long the conflict lasts, how much needs to be rebuilt, how many international refugees return to the country, and broader economic trends in the region and the world.
- Project the trends in the Lebanese construction industry over the next 5-15 years, based on such factors as expected population growth, economic trends, urbanization patterns, and so on. Clearly this is also highly speculative.
- Gather information on the regional market for construction materials, particularly who else is positioning themselves for Syrian reconstruction market, both in Syria and in other countries in the region.
- Evaluate the technical capacity of Lebanon to meet projected international demand, taking into account the suitability of Lebanese products (both primary and recycled) and the specific materials needed for building construction, roads, and other structures or infrastructure.
- Evaluate how conventional (i.e. not recycled) Lebanese products compare with those of other countries in terms of price, quality, and quantity, factoring in transportation costs, current tax structures, availability of primary material, environmental controls, existing productive capacity, and other features of the Lebanese market and those of its competitors. Based on those analyses, project one or several demand scenarios for Lebanese quarry products and consider the environmental harm that may result. Because this study focuses on the economics of the sector rather than physical aspects of its

environmental impacts, this projection of environmental harm will be broad and general rather than highly detailed or technical.

Assessment of the Market for Construction and Demolition Waste

- Based on prior work on Lebanese CDW and additional data to be collected in the course of this assignment,¹ estimate the quantity of CDW that may be available in Lebanon over the next 5-15 years.
- Assess the areas in which CDW can compete with new quarry products as an input into construction, based on existing technical literature and an evaluation of the cost data and regulatory framework in the two industries.

Analysis of policy tools to reduce quarry impacts

Analyse the feasibility and impacts of several possible fiscal and non-fiscal instruments to influence quarry growth:

- A tax on all conventional (i.e. not recycled) building materials. This would be designed to make recycled CDW more attractive relative to new quarry materials, decreasing demand for new materials. The funds could go to the treasury, could be used to fund quarry rehabilitation, or could be used to for other specific environmental purposes.
- A significant ad valorem export duty on all conventional building materials (at all points in the value chain). This kind of instrument would be designed to reduce demand for Lebanese exports, and therefore reduce the impact on the Lebanese environment of the quarries needed to produce those exports. The revenues could go to the treasury, could be used to fund quarry rehabilitation, or could be used to for other specific environmental purposes.
- A quarry fee used to fund rehabilitation of existing quarries that will not be rehabilitated by their owners (currently abandoned or orphaned quarries). The design of this fee is open; for example, it might be a one-time fee assessed based on expected extraction when the permit is issued, a per-unit charge based on extraction, an ad valorem charge, or any other charge as appropriate. This kind of charge would be designed to raise the money needed to rehabilitate existing abandoned quarries, so that while new quarries would create more blight on the landscape, the existing blight would be eliminated and overall the Lebanese landscape and environment would be improved. The amount would be set based on the total funds needed to rehabilitate existing abandoned or orphaned quarries across the country (see below); this would be allocated among expected new quarries based on a decision about how quickly the funds need to be accumulated for rehabilitation.
- A ban on export of building materials (at all points in the value chain).
- Policy tools designed to facilitate or encourage the use of recycled CDW in the construction sector.
- Other measures that may be identified in the course of the study, if any.

¹ The data collectors will be hired through StREG TOR number 20, and so do not appear in the staffing of this TOR.

These instruments should be assessed from several perspectives:

- Impact on the Lebanese primary and recycled building materials value chain; price and quantity of Lebanese exports, number of quarries that would be opened, amount of material that would be extracted, amount that would be exported, etc.
- Treasury revenues generated (in the case of an export duty)
- Impacts on domestic demand for quarry products (in the case of a rehabilitation charge)
- Impacts on imports of building materials (if the charges make imports less expensive than domestic ones)
- Revenues generated for the quarry rehabilitation fund (in the case of a rehabilitation charge), taking into account how much output would drop because of the fee.
- Political feasibility

Related analyses:

Two additional tasks will be needed to design and introduce the proposed charges, two of them carried out through this TOR and the third carried out in parallel by the StREG EFI expert:

- Estimate cost of rehabilitating the existing abandoned quarries in Lebanon. This will build on the work in this area already undertaken by the ABQUAR – Alleviating Barriers to Quarries Rehabilitation in Lebanon project, completed in 2007, and by the MoE study (carried out by H.A.S. consultants) of rehabilitation of 15 quarry sites carried out in 2014-2015. Insofar as possible, the estimation of these costs will take into account the nature of the problems caused by different quarry materials, the feasibility and monetary value of rehabilitating specific sites for land reuse, water storage, or other purposes, and the expected cost of different kinds of rehabilitation. The exact algorithms used to estimate total rehabilitation cost will depend on the data available.

This analysis will be an important input into the design of a possible quarry charge to be used for rehabilitation of quarries across the country, one of the policy options to be considered by this study.

- Monetary valuation of the environmental harm caused by currently operating and abandoned quarries in Lebanon. This will be carried out by the StREG EFI expert in parallel with the assignment, but outside the framework of this TOR, so it is not described in detail here. Some work on quarries was part of the World Bank work on costs of environmental degradation in Lebanon undertaken in 2002; this assignment will build on that work with a more comprehensive and updated analysis. This valuation will be used in two ways. First, the rehabilitation charge could be set at a level that not only recovers direct rehabilitation costs, but also recovers some or all of the social costs imposed by the quarries in the past. Second, an understanding of the magnitude of non-marketed harm caused by quarries may be essential in order to overcome political objections to imposing fees on the industry.

Both of these studies will rely on the existing Ministry of Environment database on known quarries in the country.

2.2 Final Deliverables

- Report presenting the results of the rehabilitation cost analysis, sectoral demand projections, analysis of the market for recycled CDW, and analysis of possible policy tools for reducing quarry impacts.
- Fully documented spreadsheets including all data collected or estimated in the process of carrying out these analyses, showing (through the formulas and additional documentation as needed) all calculations made.
- Report and associated fully documented spreadsheets on the costs of quarry rehabilitation.

In parallel (not a deliverable of this assignment), the EFI expert will prepare a report and fully documented spreadsheet on the valuation of environmental harm caused by existing operating and abandoned quarries.

Deliverables	Responsible expert	Indicative deadline
Contribute, along with other team members, to a work plan for the overall assignment.	All consultants plus StREG EFI expert	3 weeks after start of assignment
Estimate of the costs of rehabilitating existing quarries in Lebanon, including report and spreadsheets.	Building materials recycling expert	4 months into assignment
Assessment of the market for conventional building materials in the region and Lebanon's competitive position.	Economist and construction inputs engineer	4 months into the assignment
Assessment of the market for recycled CDW in the region and its impact on the demand for conventional building materials.	Building materials recycling expert	5 months into the assignment
Analysis of potential policy tools for reducing the environmental impact of demand for building materials, including policy tools to encourage use of recycled material. Materials submitted will include draft report and spreadsheets.	Economist with inputs from the other two team members	5 months into the assignment
<i>Not a deliverable of this assignment:</i> Monetary valuation of marketed and non-marketed costs imposed by quarries, including report and spreadsheets.	StREG EFI expert	To be determined
Response to Ministry of Environment comments on draft reports	All consultants and StREG EFI expert	one week after provided by Ministry

2.3 Expertise needed

The assignment will be carried out by a three-member team supervised by the StREG EFI expert:

- National economist with primary responsibility for economic and policy issues related to the tools for reducing quarry impacts.
- National building materials recycling expert, with primary responsibility for analysis of market for recycled CDW and the cost of quarry rehabilitation.
- National construction inputs engineer, to address engineering issues in the analysis of demand for Lebanese building materials.

The consultant positions are further described below.

3. Requested services: senior economist (national)

3.1 Duties and responsibilities

- Take primary responsibility for analysis of the market for building materials in the region, considering Lebanese demand, future Syrian demand, and competition with manufacturers in other countries to meet that demand.
- Take primary responsibility for analysis of the effectiveness and feasibility of policy tools to minimize the impacts of quarries.
- Working with the other team members, analyse the impacts of the proposed policy instruments on the contribution of recycled CDW to the Lebanese quarry and building materials industry.

3.2 Timetable and level of effort

The assignment is expected to take place over a six month period (this is indicative). The expected level of effort for the policy analyst will be about 45 days.

Deliverable	Indicative deadline
Contribute, along with other team members, to a work plan for the overall assignment.	3 weeks after start of assignment
Assessment of the market for conventional building materials in the region and Lebanon's competitive position (with inputs from other team members).	4 months into assignment
Analysis of potential policy tools for reducing the impact of building materials demand on the environment, including use of policy tools to encourage use of recycled material. Materials submitted will include draft report and spreadsheets (with inputs from other team members)	5 months into assignment
Response to Ministry of Environment comments on draft reports	one week after provided by Ministry

3.3 Expert profile

Qualifications and skills

- Education: Degree in economics; master's degree or PhD would be an advantage
- Fluency in written and spoken English and Arabic.
- Demonstrated ability to write clear well-structured policy and technical reports in English.

Professional Experience

- Five to ten years of experience working on economic issues related to trade or public finance in Lebanon or elsewhere in the region.
- Experience with the building and construction industry in the region or elsewhere would be a strong asset.

4. Requested services: senior building materials recycling expert (national)

4.1 Duties and responsibilities

- Report to EFI StREG expert.
- Take primary responsibility for analysis of the market for recycled construction and demolition waste.
- Take primary responsibility for estimating the costs of quarry rehabilitation, with input from the construction inputs engineer on feasibility of using CDW as fill material.
- Working with the other team members, design policy instruments that could be used to encourage use of recycled CDW in order to reduce demand for primary quarry material.

4.2 Timetable and level of effort

The assignment is expected to take place over a six month period (this is indicative). The expected level of effort for the construction and building materials industry expert will be about 45 days.

Deliverable	Indicative deadline
Contribute, along with other team members, to a work plan for the overall assignment.	3 weeks after start of assignment
Estimate of the costs of rehabilitating existing quarries in Lebanon, including report and spreadsheets.	4 months into assignment
Assessment of the market for recycled CDW in the region and its impact on the demand for conventional building materials.	5 months into assignment
Input into analysis of potential policy tools for reducing the impact of building materials demand on the environment, focused on policy tools to encourage use of recycled material	5 months into assignment
Response to Ministry of Environment comments on draft reports	one week after provided by Ministry

4.3 Expert profile

Qualifications and skills

- Education: Degree in engineering or other field related to the construction or recycling industry; master's or PhD degree would be advantageous
- Fluency in written and spoken English and Arabic.
- Ability to write clear well-structured policy and technical reports in English.

Professional Experience

- Minimum five years of professional experience related to the building materials and construction industry.
- Demonstrated experience compiling and presenting data from diverse sources to conduct quantitative analyses of policy issues.
- Demonstrated experience collecting quantitative data in the informal sector an asset.

5. Requested services: construction inputs engineer (national)

5.1 Duties and responsibilities

- Report to EFI StREG expert.
- Provide engineering inputs into the analysis of Lebanon's ability to meet projected demand for building materials over the next 5-15 years.
- Provide engineering inputs into the analysis of potential to use CDW to replace primary quarry products.
- Provide engineering inputs into analysis of the costs of quarry rehabilitation, particularly pertaining to use of CDW as fill material.
- Provide engineering inputs into the design of policy tools that could facilitate or encourage use of recycled CDW

5.2 Timetable and level of effort

The assignment is expected to take place over a six month period (this is indicative). The expected level of effort for the construction and building materials industry expert will be about 10 days.

Deliverable	Indicative deadline
Contribute, along with other team members, to a work plan for the overall assignment.	3 weeks after start of assignment
Inputs into analysis of costs of rehabilitating existing quarries in Lebanon	4 months into assignment
Inputs into assessment of the market for recycled CDW in the region and its impact on the demand for conventional building materials.	5 months into assignment
Inputs into analysis of potential policy tools for reducing the impact of building materials demand on the environment, focused on policy tools to encourage use of recycled material	5 months into assignment
Response to Ministry of Environment comments on draft reports	one week after provided by Ministry

5.3 Expert profile

Qualifications and skills

- Education: Degree in engineering with emphasis on construction; master's or PhD degree would be advantageous
- Fluency in written and spoken English and Arabic.
- Ability to write clear well-structured policy and technical reports in English.

Professional Experience

- Minimum five years of experience related to the building materials and construction industry in Lebanon and the region.
- Minimum five years of experience working on engineering issues related to building materials