

**PROVISION OF MARKET ASSESSMENT
ON THE STATUS OF
SUSTAINABLE PUBLIC PROCUREMENT
(SPP)**

Final Report

July 2011

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INTRODUCTION

In December, 2010 the Institute of Finance and Sofres-Liban represented by its CEO Mr. Faddoul Faddoul signed a contract for the latter to conduct a study in two stages on provision of market assessment on the status of sustainable public procurement in Lebanon in collaboration with Institute of Finance (IoF), known as the BASIL FULEIHAN INSTITUTE for ECONOMY and FINANCE).

The First phase: prioritization study was achieved, based on an extensive desk analysis accompanied by interviews with about 25 experts in the field of sustainable development.

This current report focuses exclusively on the prioritization study results. It covers 3 major sections. In section 1 a general context of the study is presented followed by its objectives in section 2 whilst section 3 lays down the result of this prioritization study as per the simplified prioritization methodology¹. However the quantitative study results shall be elaborated in the next final report.

¹ “Sustainable Procurement – first steps”, Barbara Morton (Eveline Venanzoni – Farid Yaker), 3rd International Conference on Green Purchasing Suwon, Republic of Korea, 21 October 2009

1- RESEARCH BACKGROUND

The Marrakech Task Force on Sustainable Public Procurement (MTF on SPP)

The Marrakech Process was initiated to respond to the Johannesburg Plan of Implementation agreed on at the World Summit on Sustainable Development in 2002. More specifically, the Marrakech Process is a global multi-stakeholder process to support the implementation of Sustainable Consumption and Production (SCP) projects. The first meeting took place in Marrakech, Morocco in June 2003, hence the name.

In order to support the implementation of concrete SCP projects at regional and national levels, seven Marrakech Task Forces have been created with the participation of experts from developing and developed countries. The Task Forces and their lead countries are: Cooperation with Africa (Germany), Education for Sustainable Consumption (Italy), Sustainable Buildings and Construction (Finland), Sustainable Lifestyles (Sweden), Sustainable Products (United Kingdom), Sustainable Tourism (France) and Sustainable Public Procurement (Switzerland). The current research deals with Sustainable Public Procurement.

Defining Sustainable Procurement

Sustainable Procurement is “the process whereby organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis. It results in benefits not only to the organization, but also to society and the economy, whilst minimizing damage to the environment.”² Sustainable Procurement seeks to achieve the appropriate balance between the three pillars of sustainable development i.e. economic, social and environmental.

Governments are major consumer of goods and services, with their purchasing power representing 15 to 25% of GDP in most nations. Governments are therefore strong levers for change and have a duty to lead by example and make responsible decisions to create a better and safer world.

Public procurement will be sustainable when procurement officers include sustainability issues at all stages of the procurement process – from the selection of suppliers to the management contracts. This implies new practices such as the screening of suppliers throughout the supply chain to check for compliance with labor laws and the insertion of

² Source: “Procuring the Future”, the report of the UK Sustainable Procurement Task Force, June 2006. This definition has been adopted by the Swiss-led Marrakech Task Force on Sustainable Public Procurement.

social or ecological criteria into technical specifications in the bidding documents (e.g. lower emissions of vehicles, organic food or certified wood...).

Capacity building for Sustainable Public Procurement in developing countries

The Marrakech Task Force on Sustainable Public Procurement (MTF on SPP) has developed an Approach for implementing SPP in both developed and developing countries. In January 2009, the United Nations Environment Program (UNEP) initiated a project to roll out this approach in up to 14 emerging countries worldwide. This project, entitled “Capacity building for sustainable public procurement in developing countries” is supported by the European Commission, the Swiss government and the Organization of Francophone countries. It is currently being implemented by UNEP and piloted in 7 countries, namely Mauritius, Tunisia, Costa Rica, Colombia, Uruguay, Chile and Lebanon.

2- RESEARCH OBJECTIVES

The MTF Approach on SPP works in the following way (Figure 1). First pilot countries assess their procurement status through an online questionnaire. Second, a legal review is undertaken to identify the legislative framework for procurement in the country. Third a country-based Market Readiness Analysis is carried out. After successful completion of these three preliminary actions, pilot countries are to develop a SPP Policy Plan. A subsequent training for the relevant procurement stakeholders is giving guidance for the implementation.

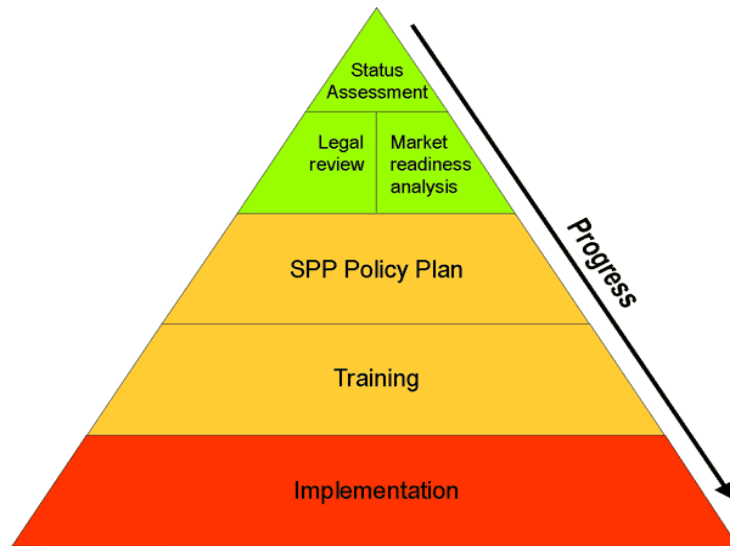


Figure 1 – The Marrakech Task Force Approach on Sustainable Public Procurement

The current research consists in the Market Readiness Analysis, and will lay the foundation for the SPP Policy and Implementation Plan in Lebanon.

Its purpose is to define:

- the existing productive capacities for sustainable products & services in Lebanon and
- the potential responsiveness of the Lebanese market to potential SPP tenders.

Such research is particularly important in Lebanon. Indeed, although Lebanon was a prosperous upper-middle income country in the mid-seventies, the interest of the Lebanese authorities showed at that time in the socio-economic field manifested itself in a logic of development. Environment was not perceived as a

concern in itself. Fifteen years of civil war have aggravated the environmental conditions and increased the social disparities in the country, through chaotic urbanization and encroachment on coastal plains, land abandonment and degradation of agricultural land, forest destruction and fires, unplanned digging of water wells leading to saline water intrusion into aquifers, dumping of solid and liquid wastes in land and in coastal waters, and neglect of cultural heritage and natural scenery sites. Great reconstruction efforts have been deployed since 1992, unfortunately without paying much attention to the environmental and social constraints. Therefore the major challenge facing Lebanon is the transformation from emergency reconstruction to sustainable long-term development.

3- PRIORITISATION RESULTS

Following the guidelines of the simplified prioritization methodology, this study was conducted in 6 steps:

- Step 1: Identification of all Lebanese government priorities regarding sustainability issues.
- Step 2: Reduction of the above exhaustive long-list of priorities into a shorter list regrouping top priorities.
- Step 3: Translation of the short-list issues into risk questions.
- Step 4: Analysis of the public spend areas simultaneously with previous step.
- Step 5: Selection of the public spend areas having the highest impact on sustainable development.
- Step 6: Formulation of strategic recommendations based on the risk/value matrix.

3.1- Identifying sustainability impacts

In order to create a long-list of sustainability issues, the following sources of data were considered:

- Professional documents and reports prepared by the UNDP and the World Bank (Plan Bleu³, Cost of Environment Degradation⁴, State of the Environment⁵) were also considered
- Official documents relative to different Lebanese ministries, i.e. Ministry of Environment, Ministry of Finance, Ministry of Social Affairs, Ministry of Tourism, etc. relating to mission, objectives, undergoing programs, and potential ones.
- Different current and up-to-date articles taken from the Lebanese written and on-line press releases.

³ “Mediterranean Country Profile: Lebanon – Environment and sustainable development issues and policies”, (1999), Plan Bleu

⁴ “Cost of Environmental Degradation – The Case of Lebanon and Tunisia”, (2004), Maria Sarraf, Bjorn Larsen and Marwan Owaygen, The World Bank Environment Department, Environmental Economics Series, Paper n°97.

⁵ “Lebanon State of the Environment Report”, (2001), ECODIT and Ministry of Environment/ LEDO

Each of the above mentioned documents was thoroughly analyzed, then summarized around key words. We had unified the terminology used in order to regroup all key words. Having completed this process enabled us the formulation of a list comprising 25 priorities as shown in Table 1.

TABLE 1 – Initial list of 25 national priorities

Emissions to air and water, waste to landfill
Air pollution
Climate change
Renewable energy promotion
Waste management (hazardous/Non hazardous)
Resource Use
Quarries management
Fair regional energy distribution
Clean energy sources usage
Natural resources preservation (Mountains/ Water)
Agriculture water usage management
Wastewater management
Water (production and home servicing)
Bio-diversity preservation
Environmental quality
Forests management (Re-Forestation and fire management)
Coastal areas preservation
Pesticides management
Agricultural lands preservation (Land Capita/Maintenance)
Education and employment
Regional job opportunities development
Quality of education improvement
Regional disparities minimization
Regional poverty reduction
Health
Health care management (Equitable health care)
Health indicators
Communities and other social
Traffic management (co-transportation/ state of the vehicles)
Public transport improvement

3.2- Prioritizing sustainability impacts (from long-list to short-list)

The second step of this prioritization consisted on identifying the most important and pressing national priorities. Therefore, a sample of 7 experts was consulted in the three main pillars of sustainable development, i.e. economical, ecological, and social (reference Appendix A)

Three key questions were asked to each expert (see Appendix B):

- How important is this issue to your government?
- What scope is there to improve?
- Will the market be able to respond to this issue?

Experts' answers were compiled on a scale from 1 to 5 according to their own professional opinion. Then we calculated the average score for each of these 25 priorities (see Appendix C). 8 major priorities were identified as shown in Table 2. A brief description of each priority is provided as per annex D.

TABLE 2 – Top eight priorities

Top eight Priorities on average basis	Average
Regional disparities minimization	4.29
Renewable energy promotion	4.24
Traffic management (co-transportation/ state of the vehicles)	4.19
Water management (production and home servicing)	4.17
Public transportation improvement	4.10
Waste management (hazardous/Non hazardous)	4.07
Coastal areas preservation	4.07
Regional job opportunities development	4.07

At this stage, following a common agreement with the Client, the top 8 priorities were regrouped into 6 priorities since it is only rational to merge “Traffic management and Public Transportation” into same priority since they go hand-in-hand well as “Regional disparities minimization and Regional job opportunities development” as the latter is an integral part of the former one. Therefore the creation of the short list of priorities was established (Table 3).

TABLE 3 – Short list of priorities

Top six Priorities
Regional disparities minimization
Renewable energy promotion
Transport and Traffic sector improvement
Water management (production and home servicing)
Waste management (hazardous/Non hazardous)
Coastal areas preservation

3.3- Developing risk questions

The third step of this prioritization study consists of transforming the list of 6 major national priorities into risk question. These questions were formulated in a generic way so that to include a broader range of public procurement (See appendix E for the priority of improving renewable energy)

The retained list of public procurement spent areas will be discussed in the next step. These public procurements areas have been regrouped under major categories (i.e. “Constructions”, “Maintenance”, “Acquisitions”, “Health”, “Material & Equipments”, “Service Purchases”, “Rentals”, and “Others”) in a way to optimize the answers of the interviewed experts. Moreover, a brief description of all procurements areas have been attached to the questionnaire – on need basis – for an improved understanding of the question (see Appendix E)

3.4- Analyzing expenditures

While working on the national priorities, a thorough analysis of the public expenditures was performed. The Ministry of Finance provided us with a relevant book concerning the policies and procedures of the public sector procurement applied in Lebanon. This document enabled us a better comprehension of the public procurement process.

Finally and once again, the Ministry of Finance provided us with several links concerning the distribution of governmental expenditures by ministry, by function, and by economic sector. Among these various classifications, we were able to retain the most relevant one to our study, i.e. the economical classification by sector. Table 4 hereafter provides the list of the 40 spend areas identified at this stage.

TABLE 4- Spend Areas

based on Government budget 2011

	#	Description	Amount in 1000 LBP	Amount in \$	M. Share
17		Financial Expenses	5,776,000,000	3,832,780,358	32.88
14		Transfers	5,029,292,062	3,337,287,367	28.63
13		Allocations, salaries, wages and peripherals	2,432,563,800	1,614,176,377	13.85
227	9	Other Establishments	1,278,520,000	848,387,525	7.28
227	5	Electric Establishments	831,125,000	551,509,622	4.73
16	7	Hospitalization Expenses-Private Sector	334,285,000	221,821,500	1.90
223		Expropriations for the Construction and Public Works of Roads, Ports & Airports	203,500,000	135,036,496	1.16
11	4	Medical & and Laboratory Supplies	181,657,500	120,542,468	1.03
228	3	Maintenance-Roads	180,095,000	119,505,640	1.03
16	3	Transportation and Locomotion	155,556,200	103,222,429	0.89
227	3	Construction of Roads	144,010,000	95,560,717	0.82
229	1	Expense for Studies, Consultations and Supervision	143,850,000	95,454,545	0.82
227	3	Buildings: Construction	114,270,000	75,826,145	0.65
226	2	Technical Equipments	106,434,000	70,626,410	0.61
11	2	Administrative Supplies	94,128,200	62,460,650	0.54
227	4	Water Establishments	92,130,000	61,134,705	0.52
12	1	Rent and Common Services	87,699,588	58,194,816	0.50
11	7	Water, Electricity and Wireless and non Wireless Communication	77,390,378	51,353,934	0.44
228	2	Maintenance-Building	58,133,000	38,575,315	0.33
224	3	Expropriation for Water Networks	50,000,000	33,178,500	0.28
12	4	Printed Advertisements & Public Relations	46,567,000	30,900,464	0.27

226	3	Computer Equipment	35,860,500	23,795,952	0.20
226	1	Furniture & Office Equipment	14,132,000	9,377,571	0.08
11	3	Transportation Expenses	12,879,300	8,546,317	0.07
16	4	Delegations and Conferences	11,325,700	7,515,395	0.06
228	7	Maintenance- Computer Equipment	10,765,500	7,143,663	0.06
11	5	Pesticides	10,434,000	6,923,689	0.06
12	9	Cleaning	9,887,287	6,560,907	0.06
11	8	Specialized supplies	9,645,000	6,400,133	0.05
16	3	Transportation and Locomotion	7,100,000	4,711,347	0.04
228	8	Maintenance- Transportation Means	7,059,000	4,684,141	0.04
11	1	Office Supplies	5,481,500	3,637,359	0.03
		Maintenance	4,232,500	2,808,560	0.02
12	6	Rent of Cars and Machinery	3,311,500	2,197,412	0.02
228	4	Maintenance- Water Constructions	2,490,000	1,652,289	0.01
16	5	Studies	1,957,000	1,298,607	0.01
226	5	Heating and Cooling Equipment	1,606,000	1,065,693	0.01
228	1	Maintenance-Land	1,000,000	663,570	0.01
12	5	Insurance	885,300	587,459	0.01
222		Building	500,000	331,785	0.00
		Total	17,567,758,815	11,657,437,833	

Three items (i.e. items 1, 2, and 3, respectively “Financial costs”, “Transactions”, and “Salaries & additional services to employees”) were eliminated given their non-relevance to our study, although they represent about 70% of the annual budget as per the Ministry of Finance.

In addition, it is worth mentioning that item 4 “Other Establishments” is not itemized in details but rather as a lump sum. After discussions with our sources, it was revealed that these expenditures concern actions undertaken by the Council for Development and Reconstruction (CDR) and therefore have to be retained for this study.

Finally fuel expenses were omitted since they require the formulation and implementation of a national policy.

3.5- Selection of expenditures

Among this preliminary list of 37 areas, those commanding more than 0.5% of the market share were selected which led to 33 sectors retained.

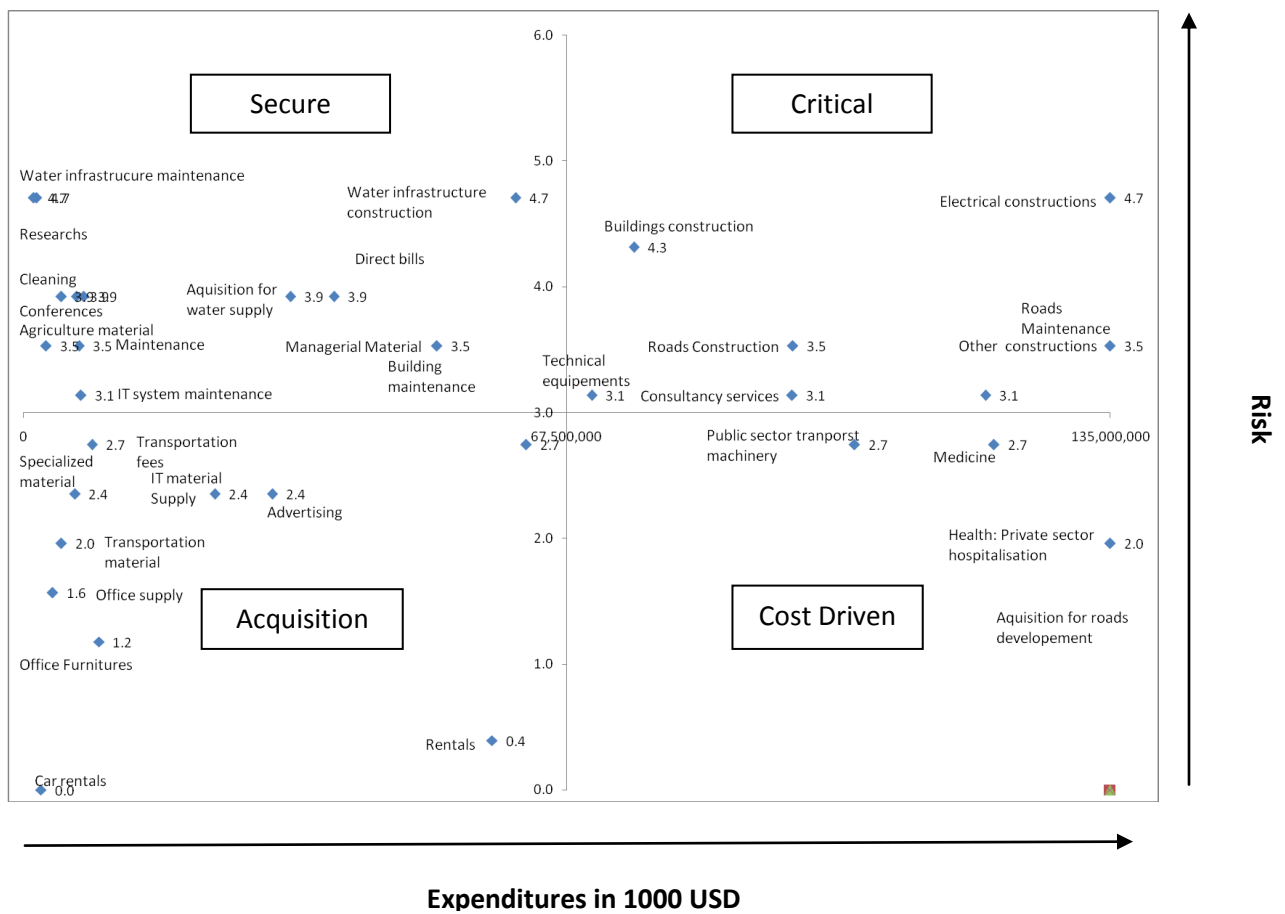
We have grouped 3 experts for each priority depending on their respective field of expertise in order to assess the level of risk associated with the procurement of goods and services. The Total Risk Score will be given by adding the totals given for each of the above themes. In fact this part consists on transforming the 6 government priorities into risk questions in order to have experts opinions each in his/her field of expertise in order to obtain the risk expenditure that each priority requires. The main objective is to calculate the number of “Yes” each expenditure category scores in order to create the final mapping (Table 5).

TABLE 5 – Risk Questionnaire Results

	Minimizing regional disparities	Preservation of coastal areas	Improving the transportation sector	Renewable energy sources	Waste management (hazardous/Non hazardous)	Water	Total	%
Constructions								
Roads construction	2	0	1	1	3	2	9	3.53
Buildings: Construction	1	0	1	3	3	3	11	4.31
Electrical Constructions	3	1	2	3	2	1	12	4.71
Water infrastructure construction	3	1	1	2	3	2	12	4.71
Other constructions	2	0	2	1	2	2	9	3.53
Maintenance								
Roads maintenance	2	2	1	1	1	1	8	3.14
Building maintenance	2	2	1	2	1	2	10	3.92
Transportation material Maintenance	2	2	3	2	1	0	10	3.92
IT system maintenance	3	0	3	1	1	0	8	3.14
Maintenance	3	2	3	0	1	0	9	3.53
Water infrastructure maintenance	3	2	2	1	2	2	12	4.71
Acquisitions								
Acquisitions for road development	1	1	2	0	0	1	5	1.96
Acquisitions for water supply	3	2	1	1	0	3	10	3.92
Health								
Health: private sector hospitalization	0	1	0	2	2	0	5	1.96
Medicine	3	1	0	0	3	0	7	2.75
Material And equipments								
Material for the Public sector transport machinery	2	1	2	0	2	0	7	2.75

Technical Equipments	3	1	3	0	1	0	8	3.14
Managerial Material	3	1	1	0	2	0	7	2.75
IT material supply	3	0	1	1	1	0	6	2.35
Agriculture material : Pesticides and divers	3	0	0	1	3	2	9	3.53
Specialized material	2	0	1	1	1	1	6	2.35
Transportation material purchase	2	0	2	0	1	0	5	1.96
Office supply	2	0	0	0	1	1	4	1.57
Furniture for offices	2	0	0	0	1	0	3	1.18
Service purchases								
Advertising	1	0	1	2	1	1	6	2.35
Consultancy services	1	2	2	2	0	1	8	3.14
Cleaning	3	2	2	0	2	1	10	3.92
Conferences	2	2	3	2	0	1	10	3.92
Research	2	2	3	2	2	1	12	4.71
Rentals								
Rentals	1	0	0	0	0	0	1	0.39
car rentals	0	0	0	0	0	0	0	0.00
Other								
Electricity, water and Communication (Direct payment)	2	1	0	3	1	2	9	3.53
Transportation fees	3	1	1	1	1	0	7	2.75
							255	100.00

3.6- Mapping Risk



N.B.: “Electrical constructions”, “Other construction”, “Health: private sector

hospitalization” and “Acquisition for roads development” have an expenditure value above USD 135 Millions.

3.7- Preliminary Strategically Recommended Priorities

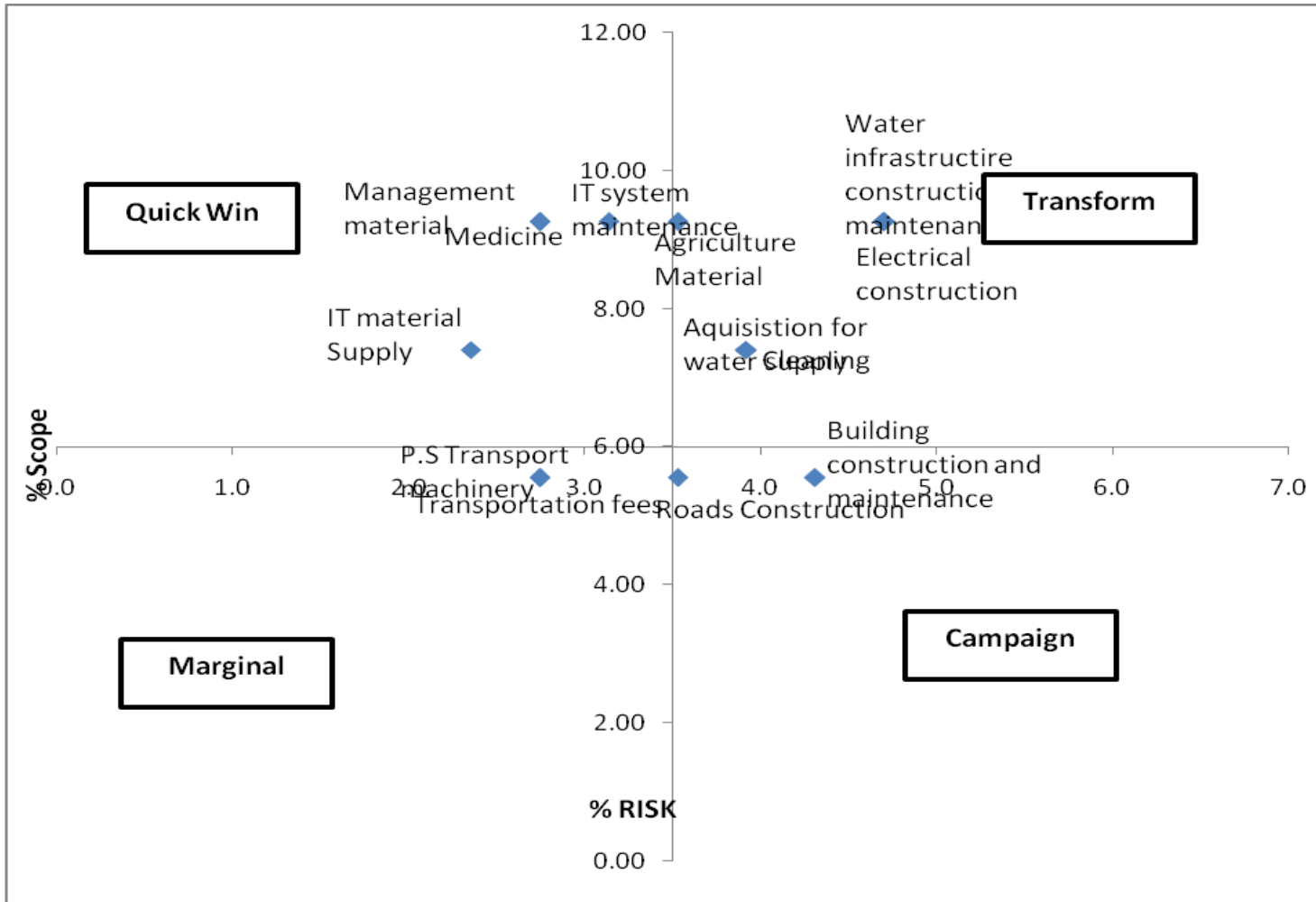
At this stage and further to the initial risk mapping, the study recommends the following 10 priorities:

- a. Electrical construction
- b. Buildings construction and maintenance
- c. Roads construction and maintenance
- d. Water infrastructure construction and maintenance
- e. Cleaning
- f. Agricultural material
- g. Acquisition for water supply
- h. IT system maintenance
- i. Management material
- j. IT material supply
- k. Transportation fees
- l. Medicine
- m. Public sector transport machinery

The “Acquisition” and “Cost Driven” quadrants’ categories were disregarded in the remaining part of the study since they do not have a major effect on the national sustainability priorities (i.e. “Regional disparities minimization”, “Renewable energy promotion”, “Transport and public sector improvement”, “Water management”, “Waste management”, and “Coastal areas preservation”). The decision to exclude above mentioned categories was mainly based on the experts’ survey results as well as on consolidating intertwined and redundant categories.

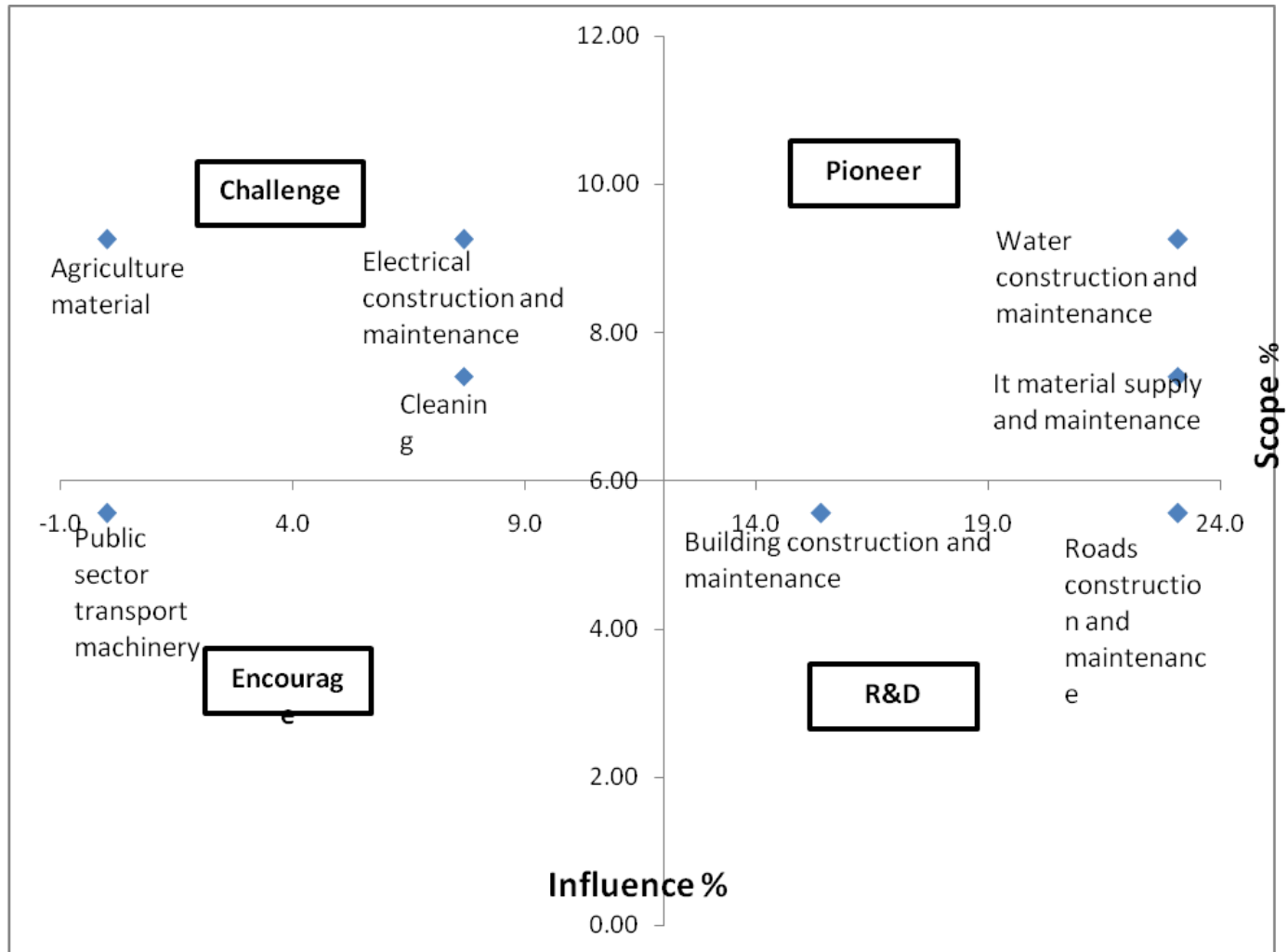
3.8 – Mapping – Scope – Risk

	Regional disparities minimization	Coastal areas preservation	Transport and traffic sector improvement	Water management (production and home servicing)	Waste management (hazardous/non hazardous)	Total	%
Buildings construction and maintenance	N	N	Y	Y	Y	3	6.12
Roads construction and maintenance	N	N	Y	Y	Y	3	6.12
Public sector transport machinery purchases	Y	Y	Y	N	N	3	6.12
Transportation fees	Y	Y	Y	N	N	3	6.12
Cleaning	Y	Y	N	Y	Y	4	8.16
Acquisitions for water supply	Y	Y	N	Y	Y	4	8.16
IT material supplies	Y	Y	N	Y	Y	4	8.16
Electrical construction	Y	Y	Y	Y	Y	5	10.20
Water infrastructure construction and maintenance	Y	Y	Y	Y	Y	5	10.20
Agricultural material	Y	Y	Y	Y	Y	5	10.20
IT system maintenance	Y	Y	Y	Y	Y	5	10.20
Management material	Y	Y	Y	Y	Y	5	10.20
						49	100.00



3.9 – Mapping – Scope – Influence

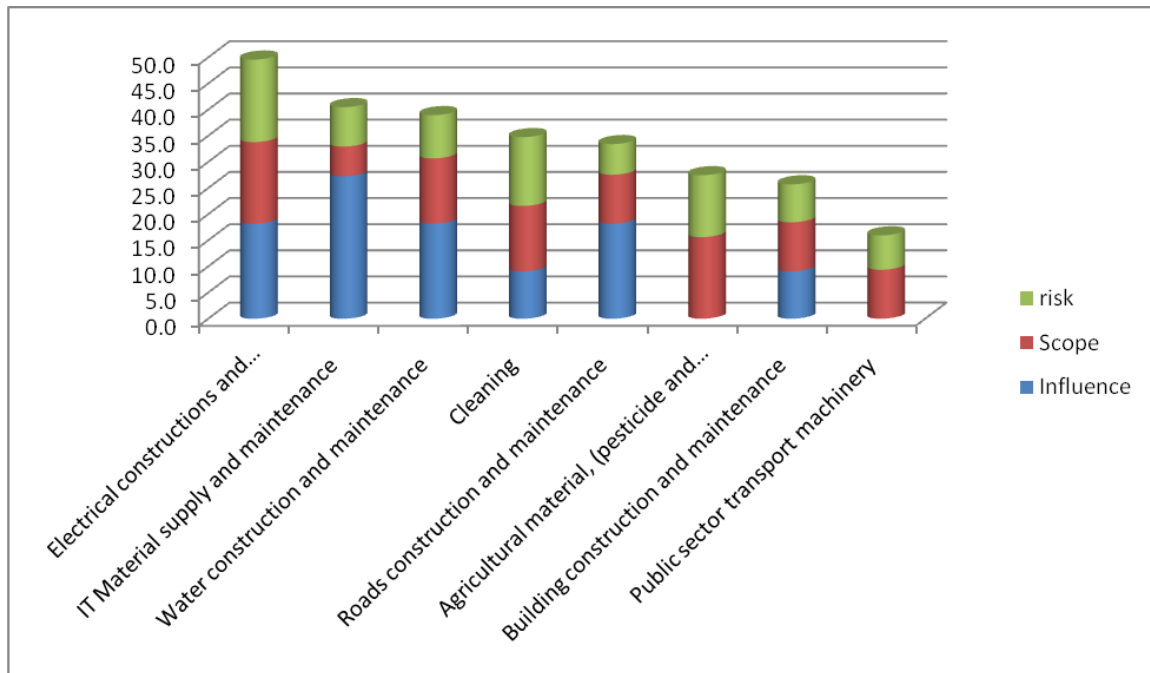
	Public relations					Improving suppliers			Total Yes	Influence Score
	Saturated market	Market Share	Suppliers turnover	Clients	Society	Policy	Legislation	compliance		
Cleaning	Y	N	N	N	N	N	N	N	1	9.1
Agricultural material, (pesticide and different medicines for agricultural and chemicals ...)	N	N	N	N	N	N	N	N	0	0.0
Electrical constructions and maintenance	N	Y	Y	N	N	N	N	N	2	18.2
Building construction and maintenance	N	N	Y	N	N	N	N	N	1	9.1
Roads construction and maintenance	N	Y	Y	N	N	N	N	N	2	18.2
Water construction and maintenance	N	Y	Y	N	N	N	N	N	2	18.2
Public sector transport machinery	N	N	N	N	N	N	N	N	0	0.0
IT Material supply and maintenance	N	Y	Y	N	N	N	N	Y	3	27.3
									11	100.0



3.10 –Final Strategically Recommended spent areas

The recommended final priorities for sustainable national procurement policy are obtained as per final recapitulative graph considering the risk, scope, and influence (Figure 2).

Figure 2 – Final National Priorities



As afore-mentioned regarding the recommendations and guidelines of the SPTF, it is always advisable to start the SPP process with a limited number of spend areas, mainly those with substantial impact on sustainable development objectives. Based upon this rational, the study depicts the following 8 categories to be retained for in-depth analysis – unless later modifications become necessary:

- a. Electrical construction and maintenance
- b. IT material supply and maintenance
- c. Water construction and maintenance
- d. Cleaning
- e. Roads construction and maintenance
- f. Agricultural materials
- g. Buildings construction and maintenance
- h. Public sector transport machinery

According to the experts, below is a preliminary list of products for each spent category.

Electrical constructions and maintenance	Building construction and maintenance	Roads construction and maintenance	Water construction and maintenance
<ul style="list-style-type: none"> Alternative and Renewable energy production systems. Efficient electric transmission/ distribution equipment. Energy efficient consuming products/ equipment Waste / emission control and treatment systems 	<ul style="list-style-type: none"> Construction equipment Energy efficient construction materials. Waste / sewage treatment equipment Inspection and testing systems and equipment (for control and audit purpose). Cement Painting Cabling Lighting Architecture 	<ul style="list-style-type: none"> Construction equipment Road maintenance equipment Traffic control systems Public transport solutions (railways, subways, etc). Lighting Asphalt Painting 	<ul style="list-style-type: none"> Waste Water treatment systems Water storage systems Irrigation systems Distribution systems

IT Material supply and maintenance	Public sector transport machinery
<ul style="list-style-type: none"> PC + printer Servers Switches Routers Software and licenses 	<ul style="list-style-type: none"> Police and army cars Operating government cars

Cleaning	Agricultural material, (pesticide and different medicines for agricultural and chemicals ...)
<ul style="list-style-type: none"> Environment friendly detergents: without phosphates 	<ul style="list-style-type: none"> Bio-pesticides Bio insecticide

4.0 Market Readiness Study

At this stage a meeting was called by the consultant to have all steering committee members' input and approval on the final products to be adopted based on the prioritization study for the market readiness study. Therefore the committee consulted during one full week and then provided the consultant with below scoring (Table 6). All agreed that a short-term list and a medium/intermediate list of products will be retained for further assessment based on the 8 categories identified in the above part (Table 7).

Choice of products rationale: short-term products were chosen as per spend areas different categories. There was no scoring but rather a common agreement provided to the consultant from the steering committee members. Medium-term products were also chosen by the steering committee members however with a scoring methodology. Therefore the category of IT material and supply and maintenance contained different items out of which the choice fell on printers and toners since their life-cycle is relatively short and impact is felt immediately. As for paper, although not identified in the original 8 spend areas however all present members agreed that it was an interesting product to study and elaborate further.

Table 6 – Steering Committee Medium Term Products' Scoring Results

Category	Scoring 1	Scoring 2	Scoring 3	Scoring 4	Scoring 5	Scoring 6	Scoring 7	Scoring 8	Scoring 9	Total
Lighting	1	3	2	1	2	1	1	1	1	13
Water Saving (Taps)	2	1	4	2	4	2	2	2	2	21
Alternative Energy production	5	2	1	3	5	3	3	4	3	29
Architecture	4	4	3	4	3	4	4	3	5	34
Asphalt	3	5	5	5	1	4	4	5	4	36

Table 7 – The final List of chosen products

Short Term	Medium Term
1- Paper 2- IT (Printers and toners) 3- Detergents 4- Pesticides	5- Lighting 6- Water saving taps

4.1 Survey of Businesses

Several businesses (Appendix I) were thoroughly surveyed with the objective to learn more about their current status regarding sustainability issues, i.e. the range of sustainable goods and services available within the Lebanese and international markets. These businesses were selected based upon their reputation in the Lebanese market. The survey focused primarily on their general opinion on sustainable development, general information on the market of sustainable products each within its industry, the company policy implementation, and finally provide a list of products that are considered sustainable.

The consultant would like to remind all stakeholders at this point that Lebanon relies heavily on importing raw materials and mainly finished products, therefore transportation cost and impact on the environment were not considered – even in the case of local manufacturer of recycled paper for example, they still have to import raw materials to process and reach the final recycled paper product. In addition it is worth mentioning that limited local production is available only for detergents (so far none of the local suppliers has shown interest to shift production to integrate sustainable raw materials since no demand exists yet in the marketplace for sustainable products, in addition that a main global player closed down its powder production capacity of approximately 45,000 tons per year and shifted it to Syria) and paper products only.

Finally, the consultant exhausted different channels in order to obtain accurate data with regards to the number of SMEs, names of suppliers, and their corresponding price list however it seems almost impossible and therefore is considered as a major limitation to list all the players in the Lebanese market place however we do acknowledge the few big multinational players. Over and above at any time the study provided illustrative examples – paper and LED lighting – it was an indicative percentage of the currently used products. Another limitation is the fact that the study was unable to

provide an exhaustive price list of all products above chosen for further study given the multiple combinations and variety of the said products (lamps: type, power; paper: weight etc.) rather the consultant will provide an indicative summarized price list of the most common items alongside a comparison between regular products and sustainable ones (Appendix J).

4.1.1 Paper

The experts in the paper category are highly aware of the sustainability aspect and are well knowledgeable in their respective field. Lebanese suppliers involved in the distribution of sustainable products confirm that the demand for sustainable paper is rising yearly and the majority of them believe that the government can be their big client and thus create an imminent market behavior change and also initiate different rules, regulations, and initiatives to those who shift their consumption to sustainable paper.

Sustainable paper can be defined as any effort undertaken to reduce deforestation for paper production as well as consuming less energy and producing fewer emissions in manufacturing than virgin paper.

Today, paper is made in many environmentally responsible forms, from a variety of fibers. Paper can be manufactured from partly to fully recycled materials using pre and post consumer waste. It can be produced without chlorine bleaching. Paper can also be derived from sustainable forests, where trees are farmed specifically for paper production. Finally, paper can be produced from plant fibers other than timber such as cotton, hemp, bamboo or sugar cane.

Although the use of sustainable paper has grown significantly however today virtual technology is reducing our paper consumption and provides us with alternatives that provide heavy users with sustainable solutions such as in the case of the Lebanese government.

4.1.1.1 Categories of Paper

Essentially paper can be made from virgin wood, recycled materials or tree free.

a. Virgin Wood

Virgin paper comes directly from trees and is sourced from native forests and plantations. It contains the strongest fiber but requires the most energy to manufacture and has the most immediate impact on the forest and is the most commonly used. However, that impact may be diminished if the pulp is harvested from a source that is part of a sustainable forest certification program (as indicated in the eco-labeling and certification section 4.1.1.3).

b. Recycled Paper

Recycled paper is a broad term, generally applied to any sort of environmentally friendly paper. When most people hear

the term recycled, they are thinking of post consumer recycling--a product made of materials already used by consumers. Recycled paper, though, can also be pre-consumed generally meaning it is made of scraps from the mills that were not used in making finished paper.

Different studies of recycled copy paper performance were conducted in the US and Europe over the past few years contradict the commonly held belief that recycled paper always causes more paper jams and equipment malfunctions than virgin paper.

Four main benefits can be attributed to recycled paper:

- A. Conservation of resources and landfill space
- B. Reduction of waste and pollution
- C. Job creation.
- D. Conservation of Energy

c. Wood Free Paper

Wood free paper is the type of paper made from fibers/chemical pulp only. Wood free helps reduce the deforestations for paper production. These fibers can be mixed with recycled paper fibers to produce excellent quality paper.

4.1.1.2 Other Sustainability Criteria – Bleaching Process

Upon choosing the sustainable paper, procurement should pay close attention to the bleaching process of paper as the usage of chlorine in the process is extremely harmful to the environment.

Three types of sustainable bleaching: process chlorine free (PCF), elemental chlorine free (ECF), and totally chlorine free (TCF).

4.1.1.3 Eco Labeling and Certification

In order to ensure the appropriate paper sustainable procurement, the following labels and/or certifications must be endorsed.

- a. Forest stewardship council



The Forest Stewardship Council (FSC) is an international non-profit, multi-stakeholder organization established in 1993 to promote responsible management of the world's forests. Its main tools for achieving this are standard setting, independent certification and labeling of forest products. This offers customers around the world the ability to choose products from socially and environmentally responsible forestry.

b. PEFC label



Program for the Endorsement of Forest Certification PEFC or (European Forest Certification Plan "became" Program for the Endorsement of Forest Certification schemes) is generally presented as an eco-label and is a certification mark of forest management, aiming to contribute to the management of sustainable forests. Affixed to a product made of wood or wood-based, this logo guarantees that this product consists of at least 70% of wood from forests that meet the recommendations for their management of national and regional entities to PEFC.

c. The Swan Label




The Nordic environmental label is a neutral independent label, which guarantees a certain environmental standard. Only products, which satisfy strict environmental requirements on the basis of objective assessments, are allowed to display this product label. The label helps consumers to identify the products that cause the least damage to the environment amongst those in the marked. As a result, manufacturers are stimulated to develop products and production processes better for the environment.






d. ISO 14000



The ISO 14000 family addresses various aspects of environmental management systems. It identifies and controls the environmental impact of activities; improve the environmental performance continually; and implement a systematic approach to setting environmental objectives and targets.

4.1.1.4 Paper Sustainable Procurement Criteria Table
Table 8 - Paper Sustainable Procurement Criteria Table

Sustainable Paper Type	Eco Labels / Certifications	Cost (+/-%)	Performance (High/Medium/Low)	Supplier Availability (Local Importer/ International)
Recycled Paper	Forest Stewardship council  FSC Recyclable	3% can be reduced to 0% if the purchase is done in big quantities	Medium improving	Local and international suppliers available
Wood Free Paper		+ 3%	High	Local and international suppliers available

<p>Virgin wood paper from sustainable forest / Fast growing forests</p>	 <p>Program for the endorsement of forest certifications</p>  <p>PEFC Nordic eco- Label</p>  <p>Elemental chlorine free Bleaching</p>  <p>Total Chlorine free Bleaching</p> 	<p>0%</p>	<p>High</p>	<p>Local and international suppliers available</p>
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4.1.1.5 Sustainable Paper Status in Lebanon

First, the paper industry is already aware of the importance of sustainable products and the products are already available in the Lebanese market. Further, the study also found that the cost of shifting to sustainable products is relatively low and can be even reduced to zero therefore it is highly recommended. Finally, the purchase must ultimately take into consideration the labels as they are available on all the products

4.1.2 IT Products (Printers and Toners)

Upon surveying the market, the study found that the experts in the IT products category are not aware of the sustainability aspect of IT products. Therefore they don't believe that the distribution of sustainable IT products can improve their business. Over and above the demand for such products is still negligible in the Lebanese market but the suppliers are willing to import sustainable products if the government or any other big client becomes interested. There is neither local production nor raw materials to manufacture printers and toners in Lebanon thus Lebanon relies solely on importing these two IT products.

Sustainable printing is the process of producing commercial printed materials with the least impact on the environment. Therefore if sustainable printing is to be a goal the first thing that needs to be done is to identify how the commercial printing process affects our natural environment.

The main issue for printers and their impact on the environment revolves around the production process itself. The second issue for printers is waste and recycling. Waste from this process can include plastic and ink (including ink containers). An additional issue lies within the toxic chemicals used, and finally the high energy consumption associated to run these printers.

Reducing these can significantly have an impact upon environmental issues application of technology and training can help make serious inroads into the amount of waste produced.

4.1.2.2 Categories of IT Products (Printers and Toners)

The overall commercial printing industry is viewed by some a wasteful industry given the current advancement in this digital era - but it does not need to be so. By combining knowledge, commitment and technology one can make significant inroads into the environmental impact of the process.

a. Emulsion Aggregation (EA) Toners

A sustainable printing alternative is the EA technology process which is far more environmentally friendly, using much less energy since the toner particles are produced by non-mechanical means. It is a water-based, low-energy process in which particles are "grown" to the required size. They are isolated from the growth compound and processed for use.

The quality of the printing with toners from EA Technology is approaching that of offset printing with liquid ink because of the extremely small size of the toner particles, often measuring between 4 and 5 microns, about half the size of

previous toner particles. Because of the new material's size and uniform circular shape, the toner particles transfer efficiently and uniformly to the receiving paper, wasting less and needing less to form the print. This results in color prints that more accurately depict subtle, graded or shifting tones and hues.

The EA manufacturing process requires approximately 25 percent less energy per pound of toner and generates less waste compared to the conventional method of manufacturing toner.

The smaller toner size leads to 40-50 percent less toner per printed page. One hundred grams of conventional toner are needed to produce 1000 prints. With EA Toner, only 50-60 grams per 1000 prints are needed.

Due to its efficient and effective process, EA technology conserves resources while improving customer satisfaction by eliminating potential service calls.

b. Non-Toxic Toner

Toners by definition are made of different chemicals and particles that are dangerous to human health thus causing a myriad of health hazards from asthma to dizziness and vomiting to the operator and equally harmful to the environment. Thus the need to use a sustainable alternative with an endorsement of Non-Toxic toner is imminent.

c. Solid Ink: Color Cubes

One of the most progressive sustainable alternative to traditional printing processes. Solid ink color printing technology gives you the most value for your money. Solid ink produces brilliant, vibrant prints on a wide range of media, is the easiest technology on the market to use, and produces 90% less waste than a typical color laser product. One of the major advantages is waste and disposal reduction since solid blocks of ink are used versus disposable ones. A loose ink block does not leave any residual cartridge after it is consumed - only a crushable, thin, plastic packing tray and a recyclable cardboard packaging box. Another advantage is the ozone free production making this product more environmentally friendly in addition to its high efficiency for office work performance than laser technology. Another advantage regarding its performance is the print quality. Due to the way solid ink printers put the ink onto the page, print quality is considered to be excellent with lively colors. Finally, solid inks are able to print on different types of paper – especially on sustainable paper

types since they have a good tolerance for changes in media types. However the main disadvantage of using solid inks in Lebanon is power outage thus making the machine consume more wax as it keeps on melting with each power outage. A viable solution is to add a UPS if not already available which raises its purchasing cost. The cost of the purchase of a new machine that uses Solid Ink (Color Cubes) varies from the different size and model of the machinery used. However the experts estimated that the cost of acquisition of the new machinery is 50% more expensive than normal machinery, however the operation cost / Toners have a 50% lower cost and a longer life.

d. Duplex Printing

One of the aspects of a sustainable printer is its capacity of being able to print on both sides of the paper. Transforming the printers into duplex printing reduces the paper usage in the Lebanese government to half thus reducing cost and environmental impact. Duplex printers are provided by all suppliers and are available in different models.

However the cost of acquisition of a new duplex printing machine according to experts can approximately incur a cost of US\$ 100 compared to a normal machine.

In order to check the viability of this option, we did the exercise on a life time cost basis and came up with below results:

Table 9 – Paper Savings with Duplex Printing – Illustrative Example for Even Page Print Jobs

	Cost per 100 paper	Cost per paper	Paper Usage per printer/day	Cost/day	200 days/year
Simplex printing	3\$	0.03\$	150	4.5	900\$
Duplex printing	3\$	0.03\$	75	2.25	450\$
				Saving/year	450\$

Based on above calculations, each printer can save up to US\$ 450 per year from paper usage reduction. Compared to an initial investment of only 100\$. (These calculations are based on an

assumption that each printer prints everyday 100 papers in the governmental institute).

Based on the above example, the consultant strongly recommends that the number of printed papers per day must also be modulated and raised with the centralization on the printings of each office in one machine.

4.1.2.3 Eco Labeling and Certification

In order to ensure the appropriate printers and toners sustainable procurement, the following labels and/or certifications must be endorsed.

a. Energy Star



Earning the ENERGY STAR means products meet strict energy efficiency guidelines set by the US Environmental Protection Agency. Products that have earned the ENERGY STAR deliver exceptional features, while using less energy. Saving energy helps save money on utility bills and protects the environment by reducing greenhouse gas emissions in the fight against climate change.



b. ISO 14000



The ISO 14000 family addresses various aspects of environmental management systems. It identifies and controls the environmental impact of activities; improve the environmental performance continually; and implement a systematic approach to setting environmental objectives and targets.

4.1.2.4 Printers and Toners Sustainable Public Procurement Criteria Table

Table 10 – Printers and Toners Sustainable Procurement Criteria Table

Sustainable Printers and Toners Types	Eco Labels / Certifications	Cost (+/- %)	Performance (High/Medium /Low)	Supplier Availability (Local Importer/International)
Non-Toxic Toner	 	0	High	XEROX – HP
EA Toners		Same		
Solid Ink: Color Cubes		50% lower	High but needs a continuous electricity feed	XEROS
Solid ink printers		50% higher	High but needs a continuous electricity feed	XEROS
Duplex Printing		+100\$(printer cost) Paper cost reduction (depending on the number of pages printed)	Same	Canon – Xerox – HP - ...

4.1.2.5 Sustainable IT (Printers and Toners) Status in Lebanon

The consultant came to the conclusion that there is a very weak awareness in the market of IT for sustainability , both from suppliers' and consumers' end. However suppliers are willing to start dealing with sustainable products if they are guaranteed big accounts. Therefore the government could eventually change its own IT purchases to a more sustainable one, thus having a high potential of reaching the objective of raising the awareness for sustainable products in the local market. Finally, different organizations are working on waste disposal of the IT industry from companies and recycling them. It is recommended to make a

deal with one of them after making sure that their operations are performed professionally.

4.1.3 Detergents

Within the Lebanese market, the experts in the Detergent category are aware of the sustainability aspect of their industry however once again they don't believe that the distribution of sustainable detergents can help enhance their business. In parallel, there is no clear labeling scheme in the Lebanese market since even on the international arena the sustainability aspect is still freshly explored. We can find some local detergent manufacturing – both powder and liquid forms but it cannot fulfill the demand of the Lebanese market. Local manufacturers as well as importing agents are willing to gradually shift to sustainable products should there be a need or regulations enacted by the Lebanese government.

Detergents, residential or industrial, by their very nature are harmful to the environment. However throughout the years many responsible activities were initiated by this industry thus improving its products along with its public image. To earn the label of sustainable detergent, product should contain chemicals that are not harmful or toxic – biodegradable –, be water efficient – requires less water and/or lower temperature, should fulfill green manufacturing process, packaging, and distribution processes.

4.1.3.1 Detergents Categories

a. Liquid Detergents

This category comprises all liquid detergents such as liquid soap for hand wash, body wash, shampoos, multipurpose cleaning agents, dishwashing agents, and stain removers among others as well as all detergents under the form of gel cleaning agents.

b. Solid Detergent

This category comprises all paste and powder agents such as multipurpose cleaning, hand and machine clothes washing, shaving foam and stain removers.

Often the words "soap" and "detergent" are used interchangeably, but really they are quite different things. A detergent – in its liquid or solid form – is a chemical substance used to break up and remove grease and grime, while soap is simply one kind of detergent. Soap has a long history and was originally made from purely natural products like goat's fat and wood ash. Today, detergents are more likely to be a mixture of synthetic chemicals and additives cooked up in a huge chemical plant and, unlike traditional soap they are generally liquids rather than solids. The most important ingredients in detergents are chemicals called

surfactants—a word made from bits of the words surface active agents.

To make water wash better, we have to reduce its surface tension so it wets things more uniformly. And that's precisely what a surfactant does. The surfactants in detergents improve water's ability to wet things, spread over surfaces, and seep into dirty clothes fibers.

Surfactants do another important job too. One end of their molecule is attracted to water, while the other end is attracted to dirt and grease. So the surfactant molecules help water get a hold of grease, break it up, and wash it away.

Surfactants aren't the only thing in detergents; a closer look at the ingredients on a typical detergent bottle and the user will see lots of other chemicals too. In washing detergents, you'll find optical brighteners (which make your clothes gleam in sunlight). Biological detergents contain active chemicals called enzymes, which help to break up and remove food and other deposits. The main enzymes are proteases (which break up proteins), lipases (which break up fats), and amylases (which attack starch). Other ingredients include perfumes, while household cleaning detergents contain abrasive substances such as chalk to help scour away things like burned-on cooker grease and bath-tub grime.

Today's sustainable trend of detergent is focused on efficiency. Consumers can wash the same amount of laundry with less (up to one-third) detergent and less water consumption. Smaller packaging means each bottle uses less plastic, enabling retailers to stock higher number of bottles in the same space, saving on labor and out-of-stock costs. There's big savings for companies, in manufacturing and transportation as well.

Leading international detergent companies are under pressure from both retailers and consumers to go green in the same moment that the cost of commodities used in manufacturing is skyrocketing. Complicating the manufacturers' dilemma is international market research that shows consumers want more environmentally friendly products but don't want to pay more for them or compromise on performance. At the same time, a myriad of new laws on the international arena banning many traditional chemicals have reinforced the need for detergent makers to find chemical alternatives – biodegradable enzymes, phosphate free, and lower water temperature.

4.1.3.2 Eco Labeling and Certification

a. Environmental Protection Agency





Design for the Environment Program (DfE) is a United States Environmental Protection Agency (USEPA) program, created in 1992, that works to prevent pollution, and the risk pollution presents to humans and the environment. The EPA DfE program provides information regarding safer electronics, safer flame retardants, safer chemical formulations, as well as best environmental practices. DfE employs a variety of design approaches that attempt to reduce the overall human health and environmental impact of a product, process or service, where impacts are considered across its life cycle. Different software tools have been developed to assist designers in finding optimized products (or processes/services).

The three main goals of DfE are:

- Promoting green cleaning and recognizing safer consumer and industrial and institutional products through safer product labeling.
- Defining Best Practices in areas ranging from auto refinishing to nail salon safety.
- Identifying safer chemicals, including life cycle considerations, through Alternatives Assessment.

b. ISO 14001



The ISO 14000 family addresses various aspects of environmental management systems. It identifies and controls the environmental impact of activities; improve the environmental performance continually; and implement a systematic approach to setting environmental objectives and targets.




c. Energy Star (for products requiring lower water temperature)



Earning the ENERGY STAR means products meet strict energy efficiency guidelines set by the US Environmental Protection Agency. Products that have earned the ENERGY STAR deliver exceptional features, while using less energy. Saving energy helps save money on utility bills and protects the environment by reducing greenhouse gas emissions in the fight against climate change.

4.1.3.3 Detergents Sustainable Public Procurement Criteria Table

Table 11 - Detergent Sustainable Procurement Criteria Table

Sustainable Detergents	Eco Labels / Certifications	Cost (+/-%)	Performance (High/Medium/Low)	Supplier Availability (Local Importer & Manufacturer/International)
Phosphate free detergents		0%	Medium	Local Importer International
Biodegradable detergents		+3-5%	Medium	International
Water saving detergents	 		High	International

4.1.3.4 Sustainable Detergent Status in Lebanon

The study found that detergent providers are fully aware as to the harm caused by the chemicals used during the manufacturing process. Water consumption needs to ignite efficiency of detergents, the energy required, and the disposal of packaging waste. But end users demand higher efficiency which might be compromised when shifting to alternative detergents. In addition there is a lack of public awareness and labeling. Finally, It is highly recommended to start different public initiatives to educate the public and mainly the main users of detergents.

4.1.4 Pesticides

Since the bulk of the end users (i.e. farmers) are of limited education, pesticides are of the hardest products to study. Indeed, given that the concept of sustainability is out of their humble understanding, their utmost concern is efficiency, effectiveness and the costs of such products. However the experts in the pesticides category are aware of its sustainability issues but still an almost complete absence of a clear labeling scheme in the Lebanese market. Internationally the sustainability aspect is well explored.

4.1.4.1 Sustainable Category Products

a- Bacillus Thuringiensis

Bacillus Thuringiensis (or Bt) is a Gram-positive, soil-dwelling bacterium, commonly used as a biological alternative to a pesticide; alternatively, the Cry toxin may be extracted and used as a pesticide. Bacillus Thuringiensis also occurs naturally in the gut of caterpillars of various types of moths and butterflies, as well as on the dark surface of plants.

During sporulation many Bt strains produce crystal proteins (proteinaceous inclusions), called δ -endotoxins, that have insecticidal action. This has led to their use as insecticides, and more recently to genetically modified crops using Bt genes. There are however many crystal-producing Bt strains that do not have insecticidal properties.

b- Pyrethrin

It is derived from certain chrysanthemum flowers. It is a non-systemic insecticide with contact action. Normally, combined with synergists it increase insects toxicity.

Pyrethrin attacks the nerves, causing paralysis followed by death. Pyrethrins knock insects down quickly, hence their use indoors to control nuisance insects.

Pyrethrins alone provide limited crop protection because they break down quickly. The many product labels list a wide range of insects and mites in public health, indoor/outdoor plants, food/feed storage areas, animal houses, on domestic and farm animals.

Apply when insects or mites are present. Do not apply as residual surface sprays because Pyrethrins have very short residual action. Repeated applications become necessary if the source of insect infestations is not removed. Most Pyrethrin products for household and garden use are ready-to-use. Users have the main responsibility to follow label instructions for mixing concentrate products.

Pyrethrins have a very short residual life and thus have minimal impact on the environment. Pyrethrum compounds are broken down in water to nontoxic products. Pyrethrins are toxic to bees and other beneficial insects.

c- Neem oil

Neem oil is a vegetable oil pressed from the fruits and seeds of neem (*Azadirachta indica*), an evergreen tree which is endemic to the Indian subcontinent and has been introduced to many other areas in the tropics. It is perhaps the most important of the commercially available products of neem for organic farming and medicines.

4.1.4.2 Eco-Labeling and Certifications

a. Organic

Organic pesticides are pesticides, which are derived from natural sources. They are not manufactured synthetically.



b. Integrated Pest management (IPM)

Integrated Pest Management (IPM) is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment.

The IPM approach can be applied to both agricultural and non-agricultural settings, such as home, garden, and workplace. IPM takes advantage of all appropriate pest management options including, but not limited to, the judicious use of pesticides. In contrast, organic food production applies many of the same concepts as IPM but limits the use of pesticides to those that are produced from natural sources, as opposed to synthetic chemicals

c. GLOBAL G.A.P (Good Agriculture Practices)

GLOBAL G.A.P is a private sector body that sets voluntary standards for the certification of production processes of agricultural (including aquaculture) products around the globe.

The GLOBAL G.A.P standard is primarily designed to reassure consumers about how food is produced on the farm by minimizing detrimental environmental impacts of farming operations, reducing the use of chemical inputs and ensuring a responsible approach to worker health and safety as well as animal welfare.

GLOBAL G.A.P serves as a practical manual for Good Agricultural Practice (G.A.P.) anywhere in the world. The basis is an equal partnership of agricultural producers and retailers who wish to establish efficient certification standards and procedures.

The GLOBALG.A.P website is a comprehensive knowledge base for all interested parties: producers, suppliers, retailers, journalists and consumers. With its clear and easy navigation www.globalgap.org incorporates exhaustive information on the GLOBALG.A.P standard and its modules and applications.


4.1.4.3 The government and the sustainable pesticides

After interviewing experts in the field concerning the support of the government is giving them to import or produce sustainable pesticides. We discovered the following:

- 1- They believe that the distribution of sustainable pesticides is profitable
- 2- The prices of sustainable products is still expensive sometimes
- 3- There is no enough legal framework to promote sustainably
- 4- No help from the government to produce sustainably
- 5- Some small initiatives where mentioned: The ministry of Agriculture has offered each organic farmer some bio pesticides (copper and sulfure).
- 6- Government could play a role in facilitating the import of Bio pesticides into Lebanon.
- 7- Encourage Research and Development.
- 8- Government should offer subsidies for the organic farming sector mainly in the livelihood

4.1.4.4 Pesticides Sustainable Public Procurement Criteria Table

Table 12 - Pesticides Sustainable Procurement Criteria Table

Sustainable Pesticides	Eco Labels / Certifications	Cost (+/-%)	Performance (High/Medium /Low)	Supplier Availability (Local Importer /International)
Bacillus thuringiensis		30 % higher	Higher	International / Local
Pyrethrin		20% Less	High	International suppliers
Neem oil			High	Local and international suppliers

4.1.4.5 Sustainable Pesticides Status in Lebanon

Like other countries, pesticides in Lebanon were always perceived as hazardous to human health however little concern was attached to use products considered less harmful to individuals and nature. Add to that the lack of awareness of alternatives that is commonly spread in the market place. Therefore it is recommended to move immediately all pesticides products to those having appropriate and non-hazardous effects and labeling.

4.1.5 Lighting

The Lebanese experts in the Lighting category are well aware of the sustainable lighting products. They think that the distribution of sustainable lighting products can improve their business performance. They also noted that the demand for sustainable lighting is increasing exponentially. Thus with the increase in demand, the prices of sustainable products are decreasing along with considerable technological improvements. It is worth mentioning that the initial purchase cost of sustainable products is higher than normal products, but the usage cost is lower and its lifecycle is longer. The Lebanese government just started encouraging and providing incentives to all those willing to convert to sustainable lighting products however no detailed data is yet accessible.

The consumption of electricity is a high expense imposed on the Lebanese government to service the operations of its institutions. These expenses are associated with all types of bulbs, halogen sources, projectors, spotlights and fluorescent bulbs

Most have inefficient energy systems that do not optimize the use of electricity, particularly in regards to lighting. This particular issue does not only impose high costs but also a harmful production process and post-handling to dispose of these products in addition to different environmental hazards during consumption such as mercury emission.

The current trend is to implement strategies for rational use of energy translated by the Ministry of Energy and Water efforts to replace existing non-efficient bulbs with new sustainable ones.

4.1.5.1 Categories of Lighting

According to experts in the field, there are three main types of light bulbs: incandescent, compact fluorescent, and light-emitting diodes lamps.

a. Incandescent Lamps

By definition incandescent lamps generate light by passing electric current through a resistive filament, thereby heating the filament to a very high temperature so that it glows and emits visible light. A broad range of visible frequencies are naturally produced, yielding a "warm" yellow or white color quality. Incandescent light is highly inefficient, as about 98% of the energy input is emitted as heat. Older light fixtures are designed for the size and shape of these traditional bulbs.

b. Compact Fluorescent Lamps (CFL)

A compact fluorescent lamp (CFL), also known as a compact fluorescent light or energy saving light (or less commonly as a compact fluorescent tube), is a type of fluorescent lamp. CFLs are characterized by an average emission of mercury. Many CFLs are designed to replace an incandescent lamp and can fit into most existing light fixtures formerly used for incandescent.

The average rated life of a CFL is between 8 and 15 times that of incandescent. CFLs typically have a rated lifespan of between 6,000 and 15,000 hours, whereas incandescent lamps are usually manufactured to have a lifespan of 750 hours or 1,000 hours

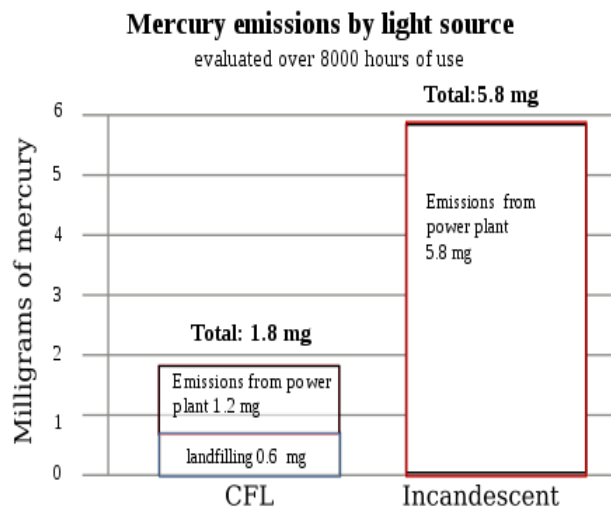


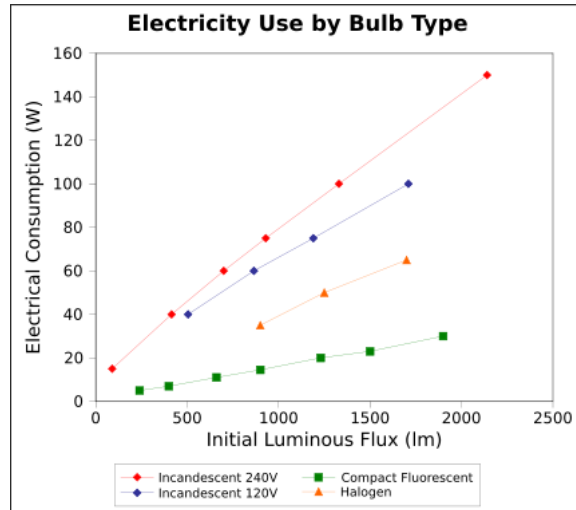
c. Light-Emitting Diodes Lamps (LED)

This category of lamps is the most sustainable as it has the lowest energy consumption and has zero mercury emission. LED lamp may in general refer to conventional semiconductor light-emitting diodes,

to organic LEDs (OLED), or polymer light-emitting diodes (PLED) devices, although OLED and PLED technologies were not yet commercially available in 2010.

Since the light output of individual light-emitting diodes is small compared to incandescent and compact fluorescent lamps, multiple diodes are often used together. In recent years, as diode technology has improved, high power light-emitting diodes with higher lumen output are making it possible to replace other lamps with LED lamps. Below charts proves the efficiency in energy consumption and mercury emission of LED lamps versus CFL and incandescent lamps.





LEDs are damaged by being run at higher temperatures, so LED lamps typically include heat management elements such as heat sinks and cooling fans. LED lamps offer long service life and high energy efficiency, but initial costs are higher than those of fluorescent lamps. Although initial cost is higher (approximately 300% higher), substantial savings and satisfactory return on investment can be accumulated on a long-term basis of its whole life cycle as shown in below example.

Table 13 - LED Lighting Energy Savings per Year - Example

Light Bulb Type	Energy consumption (W/H)	Per 1200 h	Cost per KW (LL)	Annual cost per lamp	Cost per 100,000 lamp per year
Incandescent	36	64,800	250	16,200	1,620,000,000
LED	3	5,400	250	1,350	135,000,000

Saving per Year	1,485,000,000
Purchase of new lamps	39,600

Hours	Days	Cost of the LED lamp (+/-)
1,800h	300	37,500LL

4.1.5.2 Eco Labeling and Certification

In order to ensure the appropriate paper sustainable procurement, the following labels and/or certifications must be endorsed.

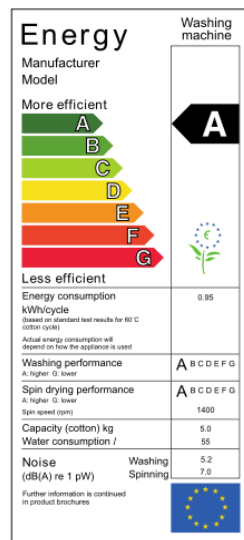
a. Energy Star



Earning the ENERGY STAR means products meet strict energy efficiency guidelines set by the US Environmental Protection Agency. Products that have earned the ENERGY STAR deliver exceptional features, while using less energy. Saving energy helps save money on utility bills and protects the environment by reducing greenhouse gas emissions in the fight against climate change.

b. European Union energy label

EU Directive 92/75/EC established an energy consumption labeling scheme. The directive was implemented by several other directives thus most white goods, light bulb packaging and cars must have an EU Energy Label clearly displayed when offered for sale or rent. The energy efficiency of the appliance is rated in terms of a set of energy efficiency classes from A to G on the label, A being the most energy efficient, G the least efficient. The labels also give other useful information to the customer as they choose between various models. The information should also be given in catalogues and included by internet retailers on their websites. In an attempt to keep up with advances in energy efficiency, A+ and A++ grades were later introduced for refrigeration products.



On every label, you will find:

- The energy efficiency category from A to G.
- The luminous flux of the bulb in lumens.
- The electricity consumption of the lamp in watts and the average life length in hours. According to the light bulb's electrical consumption relative to a standard (GLS or incandescent), the light bulb is in one of the following classes.





4.1.5.3 The government and sustainable lighting


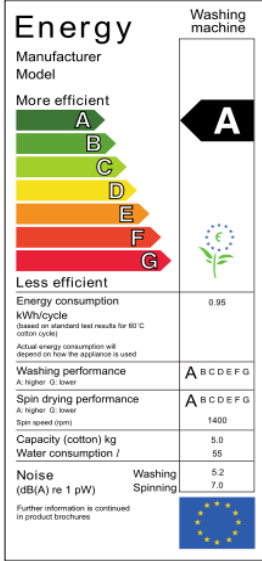
After interviewing experts in the field concerning the support the government is giving them to import or produce sustainable lighting. We discovered the following:

- 1- They believe that the distribution of sustainable products isn't profitable
- 2- There is no enough legal framework to promote sustainably
- 3- No help from the government to produce sustainably
- 4- They think that a tax reduction on the importation of sustainable products can help them distribute more sustainable products

4.1.5.4 Lighting Sustainable Public Procurement Criteria Table

Table 14 - Lighting Sustainable Procurement Criteria Table

Sustainable Light Bulb Types	Eco Labels / Certifications	Cost (+/- %)	Performance (High/Medium /Low)	Supplier Availability (Local Importer /International)
Compact Fluorescent Lamps (CFL)	Energy Star	Same	High	Available supplier in the local and international market

<p>Light-Emitting Diodes Lamps (LED)</p>	 <p>ENERGY STAR</p> <p>European Union energy label</p> 	<p>+3000% But with a much lower energy consumption (ref.table 11)</p>	<p>High</p>	<p>Available supplier in the local and international market</p>
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4.1.5.5 Sustainable Lighting Status in Lebanon

LED lighting is highly recommended for its high saving energy consumption. However purchase cost is still very high. According to the experts the costs will decrease with the technology improvements. Thus it is recommended to keep the lighting project as planned, i.e. as a mid term project.

4.1.6 Water Taps

Lebanon is blessed with an abundance of this natural resource – water. Over the years and due to global warming and climate change this natural resource is becoming more of a scarcity thus the urgent need to find alternative solutions since local citizens and government alike are purchasing water for all types of consumption. The main concern of this part is focused on water taps and flushing systems for toilets. The Lebanese government is quasi absent in formulating rules and regulations promoting water conservation and efficiency.

For these products to be sustainable one should consider their material and production process and their water consumption/usage.

4.1.6.1 Categories of Water Taps

Literature for this product is quite limited as it focuses on three main sustainable systems:

a. Automatic Water Taps

Battery-powered hands-free automatic sensor operated system. Automatic taps are common in new installations Automatic water taps dispense water through pre-installed sensors and water stops running automatically as one removes his/her hands. Therefore careful design is needed during the production process to ensure the viability of the sensors. This sustainable alternative is highly efficient in water preservation.

b. Water / Air water taps

Reduced water flow taps are considered to be water saving taps as long as their flow is less than 4liters per minute. This alternative revolves around the production process to ensure the limited water flow however not the time-length of this flow. One of the best technologies for efficient water consumption is the 50% water, 50% air discharges ex: Eco joy

Ex: Eco Joy (Water and Air Discharge)

EcoJoy range uses first class materials and design innovation to ensure water efficiency – this directly equates to reduced water consumption and products that really do last a lifetime. This alternative solution lies much on psychological sensation over water consumption since its production process

is designed to discharge 50% water and 50% air thus giving the sensation of 100% water! The EcoJoy range offers an overall water saving solution that comprises of taps, showers, bathroom fittings and kitchen mixers. All EcoJoy products deliver a defined flow volume of 5.8 litres per minute, the EcoJoy flow rate saves up to 50% water.

4.1.6.2 Categories of Water Flush

Technology is advancing in this field. Therefore major strides were able to reach new achievements with regards to water efficiency. Three types were identified according to experts in the field.

a. Dual Flush

The discharge valve gives the user a choice between a single or dual flush. This flexibility is provided by a clever pneumatic system which offers easy operation and very simple installation. Dual flush plates let the user decide how much water to use to flush the toilet. Pressing the large button will release all 1.6 gallons (6 l) of water. Pressing the Eco button, flushes with a reduced 0.8 gallons (3 l) reduced volume. Over and above products can be made out of recyclable material.

b. Automatic Flush

Battery-powered hands-free automatic sensor operated flush system.

Electronic automatic flushes are common in new installations. Active or (more usually) passive infrared sensors identify when the urinal has been used (or when someone has stood in front of it and moved away), and activate the flush. Thus the urinal is cleaned, where with a manual flush it might not have been, but water is not wasted when the toilet is not used.

Automatic flush facilities can be retrofitted to existing systems. The handle-operated valves of a manual system can be replaced with a suitably-designed self-contained electronic valve, often battery-powered to avoid the need to add cables. Timed-flush installations may add a device that regulates the water flow to the cistern as per the overall activity

detected in the room. It is simple and cheap to add because only one device is required for the whole system.

To prevent false-triggering of the automatic flush, most infrared detectors require that a presence be detected for at least five seconds, such as when a person is standing in front of it. This prevents a whole line of automatic flush units from triggering in series if someone just walks past them.

The automatic flush mechanism also typically waits for the presence to go out of sensor range before flushing. This reduces water usage, compared to a sensor that would trigger a continuous flushing action throughout the whole time that a presence is detected.

c. Water-Free Urinals

Water-free urinals save time and money, conserve tremendous amounts of freshwater and create more hygienic, odor-free restrooms. These systems are less expensive to purchase and install than flush urinals because they have no flushing mechanism. All that is required is a drainage outlet, typically less than an hour to install, and seconds to install the cartridge. Major cost savings can be achieved: save 100% of the water going through urinals and 100% of water and sewer charges—both of which will certainly rise in the future. In addition a reduction in cost is noticed due to a lack of maintenance through a periodic changing of the cartridge and quick cleanup as with traditional urinals. Elimination of costs associated with stuck or broken valves from normal wear and vandalism. Reduction in pipe cleaning since lines remain free of calcification as no hard water is running through them. Reduction in energy costs associated with transporting water to and from urinals.

4.1.6.3 Eco Labeling and Certification

In order to ensure the appropriate sustainable procurement, the following labels and/or certifications must be endorsed.



a. Energy Star




Earning the ENERGY STAR means products meet strict energy efficiency guidelines set by the US Environmental Protection Agency. Products that have earned the ENERGY STAR deliver exceptional features, while using less energy. Saving energy helps save money on utility bills and protects the environment by reducing greenhouse gas emissions in the fight against climate change.

4.1.6.4 Water Taps Sustainable Public Procurement Criteria Table

Table 15 - Water Taps Sustainable Procurement Criteria Table

Sustainable Water Taps & Flush Systems	Eco Labels / Certifications	Cost (+/-%)	Performance (High/Medium/Low)	Supplier Availability (Local Importer /International)
Automatic Water Taps	Energy star 		High	International suppliers
Water / Air water taps		Same with a water saving that is approximatly 50%	High	International suppliers

Sustainable Water Taps & Flush Systems	Eco Labels / Certifications	Cost (+/-%)	Performance (High/Medium/Low)	Supplier Availability (Local Importer /International)
Dual Flush		Same	High	International suppliers
Automatic Flush			High	International suppliers
Water-Free Urinals		Same	Medium	International suppliers

4.1.6.5 Sustainable Water Taps Status in Lebanon

The labeling scheme in the water taps/Toilet flushes category is relatively small in the Lebanese market though it is available internationally. However, the products provided above are highly sustainable. So it is highly recommended to switch to these products in the new projects established by the government.

4.2 National Initiatives

Although Lebanon is engaged with regional and local conflicts, there are a handful of sustainable national initiatives undertaken by the private sector and subsidized by the Lebanese government whose involvement is felt especially through pilot projects implemented through CEDRO (Country Energy Efficiency and Renewable Energy Demonstration Project for the Recovery of Lebanon). In addition different ministries such as the Ministry of Energy and Water, Ministry of Environment, Ministry of Tourism, Ministry of Agriculture, and Ministry of Social affairs among others are formulating and/or implementing pilot projects which focus primarily on sustainability factors. In addition the Association of the Lebanese Industrialists recently announced a new program in cooperation with the Ministry of Environment. The following list provides a starting point for national initiatives although not all inclusive. Details about below initiatives can be found respectively in Appendix H.

a. Beatouna



- b. Lebanese Green Building Association
- c. LEGISLATION ON ORGANIC AGRICULTURE IN LEBANON
- d. CEDRO (Country Energy Efficiency and Renewable Energy Demonstration Project for the Recovery of Lebanon)

5.0 Conclusion and Policy Recommendations

The study sheds the light on the market awareness and predisposition to respond positively to sustainable goods and services, although for most products the study faced different limitations due to lack of availability and accuracy of such information, i.e. the market share of all targeted sustainable products and the number of SMEs dealing with targeted products among others. The Lebanese market has proved to be in its early days with that respect although different efforts in various industries are ongoing.

All businesses involved in this study showed their readiness and complete cooperation to shift to importing sustainable products granted the government and industry leaders start different initiatives. Therefore, in order to spread the sustainability awareness the government alongside the private sector each in its respective area of expertise can join their efforts and educate the average or uninformed end users of all products.

This recommendation comes following the businesses involved in this study who made it clear that the government has to start all types of sustainability initiatives – i.e. taxes reduction or removal, customs duties elimination or reduction, VAT, government subsidies, government control and enforcement agencies – then the private sector would easily follow coupled with end users

compliance through intensive, creative, and innovative awareness and marketing campaigns.

5.1 Results of the Prioritisation Study

The main outcome of this objective is the ability to extract 8 spend areas where further analysis needed to be conducted. As presented in earlier section, this process involved an exhaustive assessment of risk, scope, and influence associated with the procurement of goods and services in their respective spend areas. Then experts provided a list of products to be considered for the market readiness study given their environment and socio-economic impact.

5.2 Results of the Market Readiness Study

Following the identification of the products, a survey of 18 businesses (Appendix I) relevant to each product identified earlier was performed. All criteria were exposed in tables. In addition an attempt to provide a comparative price evaluation is provided in Appendix J where it exposes the difference and/or convergence of the conventional products versus the sustainable ones.

5.3 Recommendations

The tables signaled above in each of the categories , summarize the recommendations for each selected product.

However the table below gives additional recommendations or insights on the possibility of sustainable products stemming from the interviewed experts in each category of products.

Paper	<p>The paper industry in Lebanon is already aware of the importance of sustainable products and the products are already present in the lebanese market.</p> <p>The cost of shifting to sustainable products is relatively low and can be even reduced to 0 therefore it is highly recommended.</p> <p>The purchase must ultimately take into consideration the Labels as they are available on all the products.</p>
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Table 16 – Summary of Recommendations

IT products	<p>Very weak awarness in the market of IT for sustainability , both from suppliers' and consumers' end.</p> <p>Suppliers are willing to start dealing with sustainable products if they are guaranteed big accounts.</p> <p>Changing the IT purchases of the gouvernement to a more sustainable one have a high potential of reaching the objective of raising the awarness for sustainable products in the local market.</p> <p>Many organizations are working on waste disposal of the IT industry from companies and recycling them. It is recommended to make a deal with one of them after making sure that their operations are performed professionally.</p>
Detergents	<p>Detergent providers are fully aware as to the harm caused by the chemicals used during the manufacturing process. Water consumption needs to ignite efficiency of detergents, the energy required, and the disposal of packaging waste.</p> <p>End users demand higher efficiency which might be compromised when shifting to alternative detergents.</p> <p>Lack of public awareness and labeling.</p> <p>It is highly recommended to start different public initiatives to educate the public and mainly the main users of detergents.</p>
Lighting	<p>LED lighting is highly recommended for its high saving energy consumption.</p> <p>However purchase cost is still very high. According to the experts the costs will decrease with the technology improvements. Thus it is recommended to keep the lighting project as planned, i.e. as a mid term project.</p>
Water taps / Toilet flushs	<p>The labeling scheme in the water taps/Toilet flushs category is relatively small in the Lebanese market though it is available internationally.</p> <p>However, the products provided above are highly sustainable.</p> <p>So it is highly recommended to switch to these products in the new projects established by the gouvernement.</p>
Pesticides	<p>Pesticides were always percieved as hazardous to human health however little concern was attached to use products considered less harmful to individuals.</p> <p>Little awareness of alternatives is spread in the market place.</p> <p>It is recommended to move immediately all pesticides products to those having appropriate and non-hazardous effects and labeling.</p>

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<http://www.un-documents.net>
- WBCSD: World Business Council for Sustainable Development.
<http://www.wbcd.org>
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- World Commission on the Environment and Development: Our Common Future
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APPENDIX A

**List of Experts interviewed
to move from the long-list to the short-list of national priorities**

NAME	POSITION
Fadi DENNO	Project manager at Indy Act, the League of independent environmental, social and cultural activists
Lea HAKIM	Economic Officer, UNDP Project at Ministry of Finance
Nancy KANBAR	Assistant Professor of Economics at Notre Dame University, Lebanon worked at the International Food Policy Research Institute in Washington D.C where she contributed to the Millennium Ecosystem Assessment (MEA). She has fulfilled consulting assignments sponsored by the World Bank
Lamia MOUBAYED/ Rana RIZKALLAH	Head of the Institute of Finance (IoF), known as the BASIL FULEIHAN INSTITUTE for ECONOMY And FINANCE. Procurement officer, Institute of FINANCE (IoF)
Manal MOUSALLEM	Environmental Services Consultant and Contractor Project manager in the UNDP
Sami NADER	Professor in Saint-Joseph University, Finance expert
Jihan SEOUD	Program Analyst - Officer in Charge at UNDP Energy

APPENDIX B

National priorities questionnaire

Score each of the issues listed below from 1--> 5 (1 as the lowest and 5 as the highest) according to: Importance to the government/ Scope to do more / Market responsiveness

	Government priority	Scope to do more	Market Responsiveness	Average
Emissions to air and water, waste to landfill				
Air pollution				
Climate change				
Renewable energy promotion				
Waste management (hazardous/Non hazardous)				
Resource Use				
Quarries management				
Fair regional energy distribution				
Clean energy sources usage				
Natural resources preservation (Mountains/ Water)				
Agriculture water usage management				
Wastewater management				
Water (production and home servicing)				
Bio-diversity preservation				
Enviromental quality				
Forests management (Re-Forestation and fire management)				
Coastal areas preservation				
Pesticides management				
Agricultural lands preservation (Land Capita/Maintenance)				
Education and employment				
Regional job opportunities development				
Quality of education improvement				
Regional disparities minimization				
Regional poverty reduction				
Health				
Health care management (Equitable health care)				
Health indicators				
Communities and other social				
Traffic management (co-transportation/ state of the vehicles)				
Public transport improvement				

Urban development planning

Government priority:

Scope to improve:

Market responsiveness:

How important is this issue to the government

How this issue is currently managed and how can we improve?

Will the market be able to respond to this issue (Suppliers/ Mentality)

APPENDIX C

National priorities scoring

	Average 1	Average 2	Average 3	Average 4	Average 5	Average 6	Average 7	Total Average
Emissions to air and water, waste to landfill								
Air pollution	3.00	4.33	4.50	3.00	3.33	3.67	4.00	3.69
Climate change	3.33	4.00	4.50	3.67	2.33	3.00	4.00	3.55
Renewable energy promotion	3.33	4.33	5.00	3.67	4.00	4.67	4.67	4.24
Waste management (hazardous/Non hazardous)	2.67	4.00	4.50	4.33	4.00	5.00	4.00	4.07
Resource Use								
Quarries management	2.67	4.00	4.50	4.00	3.67	4.33	3.33	3.79
Fair regional energy distribution	3.00	4.00	4.50	2.67	4.00	4.00	3.67	3.69
Clean energy sources usage	3.33	4.00	4.00	3.67	3.67	4.33	4.00	3.86
Natural resources preservation (Mountains/ Water)	4.00	3.67	5.00	2.33	3.67	3.67	3.67	3.71
Agriculture water usage management	3.67	3.67	4.50	3.00	3.67	3.67	3.67	3.69
Wastewater management	2.67	3.33	4.50	3.67	3.00	5.00	4.67	3.83
Water (production and home servicing)	3.33	4.00	4.50	4.00	3.67	5.00	4.67	4.17
Bio-diversity preservation	4.00	3.33	4.00	2.67	3.00	3.00	3.67	3.38
Environmental quality								
Forests management (Re-Forestation and fire management)	4.00	3.33	4.50	3.67	3.67	4.00	4.00	3.88
Coastal areas preservation	3.67	4.00	4.50	3.33	4.00	4.67	4.33	4.07
Pesticides management	3.33	4.00	4.00	2.33	3.33	3.00	3.33	3.33
Agricultural lands preservation (Land Capita/Maintenance)	3.33	4.33	5.00	3.33	3.67	3.67	3.33	3.81
Education and employment								
Regional job opportunities development	3.33	4.33	4.50	4.00	3.67	5.00	3.67	4.07
Quality of education improvement	3.67	4.00	4.00	3.67	3.67	4.67	4.33	4.00
Regional disparities minimization	3.00	4.67	5.00	4.00	4.00	5.00	4.33	4.29
Regional poverty reduction	3.00	4.33	4.50	3.50	3.00	5.00	4.33	3.95

Health								
Health care management (Equitable health care)	2.67	4.67	3.50	4.33	4.33	4.67	4.00	4.02
Health indicators	3.67	3.67	3.50	4.00	3.00	3.67	3.67	3.60
Communities and other social								
Traffic management (co-transportation/ state of the vehicles)	3.00	4.67	5.00	3.67	4.00	5.00	4.00	4.19
Public transport improvement	3.00	4.67	5.00	3.67	4.00	4.67	3.67	4.10
Urban development planning	2.67	4.33	5.00	3.67	3.33	4.00	3.33	3.76

APPENDIX D

Final eight priorities definition

1- Regional disparities minimization

Minimize the growth gap between regions (developed and underdeveloped). This gap includes the social and economical aspects, i.e. job opportunities, education, infrastructure...

2- Renewable energy promotion

Produce energy from natural sources such as sunlight, wind, rain, tides and geothermal heat.

3- Traffic management (co-transportation/ state of the vehicles)

Develop the culture of co- transportation to reduce the number of vehicles circulating

Improve the regulations on the state of the vehicles and their gas emissions

4- Water management (Production and home servicing)

Increase annual water production in the country and improve the quality of water distribution to homes

5- Public transportation improvement

Develop the public transportation sector which will help reduce noticeably the traffic and the pollution in produces

6- Waste management (Hazardous/ Non hazardous)

Waste management is the collection, transport, processing, recycling or disposal, and monitoring of waste materials. The term usually relates to materials produced by human activity, and is generally undertaken to reduce their effect on health, the environment or aesthetics.

7- Coastal areas preservation

Improve the coastal area planning (illegal construction and projects by the coast line) and reducing the sea coast pollution

8- Regional job opportunities development

Create job opportunities in all the Lebanese regions.

APPENDIX E

Risk questionnaire



Dear Dr.Sioufi,

My name is Patrick RIZK from Sofres-Liban. We are a market research company, currently conducting a survey on behalf of the United Nations Organization about sustainable public procurement.

This study is part of a larger ten-year framework of programs on sustainable consumption and production patterns, developed with support from the UN and other agencies. It follows guidelines developed by the Marrakech Task Force in the context of a plan on Sustainable Public Procurement (MTF on SPP), a joint initiative between the Swiss government and the United Nations Environment Program (UNEP).

Sofres-Liban has been contracted to carry out the study. More specifically, we would like to have your opinion about some aspects related to the **promoting renewable energy**.

This questionnaire is just a preliminary phase, in which we would like to know, which of the governmental expenses could have an effect on the renewable energy promotion or usage.

We require that you give us your opinion with complete openness and frankness.

Your collaboration in the successful completion of this survey is very much appreciated.

Thank you.

Here is a list of public of the following or usage of renewable energy sources?

procurements. According to you, could each procurements have an effect on the promotion

Sector	Yes	No	Comment
Constructions			
Roads construction			
Buildings: Construction			
Electrical Constructions			
Water infrastructure construction			
Other constructions			
Maintenance			
Roads maintenance			
Building maintenance			
Transportation equipments Maintenance			
IT system maintenance			
Maintenance			
Water infrastructure maintenance			
Acquisitions			
Acquisitions for road development			
Acquisitions for water supply			
Health			
Health: private sector hospitalization			
Medicine			
Material And equipments			
Material for the Public sector transport machinery			
Technical Equipments			
Managerial Material			
IT material supply			
Agriculture material : Pesticides and divers			
Specialized material			
Transportation material purchase			
Office supply			
Furniture for offices			
Service purchases			
Advertising			
Consultancy services			
Cleaning			
Conferences			
Research			
Rentals			
Rentals			
car rentals			

Other			
Electricity, water and Communication (Direct payment)			
Transportation fees			

Sector	Description
Constructions	
Roads construction	
Buildings: Construction	Construction of managerial buildings, Specialized buildings and buildings for privates
Electrical Constructions	Construction of power plants, electrical transfer center
Water infrastructure construction	Infrastructure for drinkable water, Infrastructure for agricultural water, Infrastructure for waste water
Other constructions	Water projects, Big roads constructions, Construction of prisons, Governmental buildings, waste treatment constructions, electrical dispatching centers, infrastructures, hospital constructions
Maintenance	
Roads maintenance	
Building maintenance	Maintenance of managerial buildings, Specialized buildings and buildings for privates
Transportation equipments Maintenance	
IT system maintenance	Maintenance of the IT System
Maintenance	Small maintenance of office machinery, and supplies
Water infrastructure maintenance	Maintenance of the Infrastructure for drinkable water, Infrastructure for agricultural water, Infrastructure for waste water
Acquisitions	
Acquisitions for road development	Lands acquisition in order to construct roads on them
Acquisitions for water supply	Real estate purchases for Infrastructure of drinkable water, Infrastructure for agricultural water, Infrastructure for waste water
Health	
Health: private sector hospitalization	
Medicine	Different types of medicines for the private sector hospitalization
Material and Equipments	
Material for the Public sector transport machinery	
Technical Equipments	
Managerial Material	Cloth, Food, Fuel for generator, fuel for heating
IT material supply	Computers, servers, ...
Agriculture material : Pesticides and divers	Purchase of pesticides and different medicines for agriculture
Specialized material	
Transportation material purchase	Cars, bigger vehicles....
Office supply	Papers. Books, ...
Furniture for offices	Chairs, decoration, ...
Service purchases	
Advertising	Printing material, Events and consultancy services
Consultancy services	Consultancies, studies, implementation, and control

Cleaning	
Conferences	Sponsoring international conferences and invitations, participation in international conferences
Research	
Rentals	
Rentals	Office rentals +services, school rentals, Real estate rental
car rentals	
Other	
Electricity, water and Communication (Direct payment)	Electrical, water and phone bills
Transportation fees	For employees, Ministers and army

APPENDIX F

Experts interviewed to identify priority spend areas

Full Name	Domain of expertise	Position	Institution
Dr. Marina Al Khayat	Population growth and environment	Head of public relations	Ministry of Social Affairs
Mary Deeb	Population growth and environment	Professor	AUB
Bashir Osmat	Population growth and environment	Socio-Economic expert	
Dr. Oussama Jadayel	Transport and environment	Associate professor	University of Balamand
Tammam Nakkash	Transport and environment	Managing partner	Team international
Lilya Abi Chahine	Transport and environment	President	Fast Forward NGO
Mr. Walid Bakhos	Urban Planning and environment	Architect - Urban planner	Bakhos - dcw
Dr. Jocelyne Gerard	Urban Planning and environment	Professor	USJ
Dr. Gerard	Urban Planning and environment	Professor	USJ
Dr. Adel Mourtada	Energy production and environment	Environmental Energy Expert	
Mr. Kamal Sioufi	Energy production and environment	Electromechanical Engineer - Consultant - Vice president of the order to engineers	Consultant office - Kamal Sioufi
Mr. Tony Matar	Energy production and environment	technical Advisor	ALMEF
Samir Faysal	Water	Head Of Hydraulic department	
Dr. Mirvat Kraideh Abou Daher	Water	Coordinator for water quality	Ministry of energy and water
Nicolas Gharib	Water	Professor, researcher , hydrobiology - Biodiversity	Lebanese university - Faculty of science
Dr. Naji Chamieh	Waste	General Manager	Envirotech
Mr. Rami Samaha	Waste	Expert in recycling	
Dr. Mirvat el Hozz	Waste	Professor	

APPENDIX G

Questionnaire

Market readiness questionnaire

I- COMPANY AND RESPONDENT INFORMATION

1- Company/Organisation Name:

.....

2- Business Area:

.....

3- Number of employees : Less than 5 5 -19 20 -49 50 -99 100 and above

4- Is your Company/Organisation a subsidiary of a bigger organization? Yes No

5- If yes, name and office address of the parent company:

.....

6- Company Address:

.....

.....

7- Telephone: Fax:

.....

8- Website:@.....

9- Contact Name:

10- Gender : Male Female

11- Age : Less than 30 years 30 -39 years 40 -49 years 50 years old and above

12- Current Position:

.....

13- Direct Phone: 13- Email:

.....@.....

14- Seniority in the Company: years 15- Seniority in the Position: Years

15- Could you please briefly describe your responsibilities in your current job:

.....

16- What is your personal degree of knowledge/ experience in the following aspects:

Aspects	Good	Fair	Poor
Environmental issues			

Economic issues			
Social issues			
Labelling			
Certification			
Public tender			

II- GENERAL DEVELOPMENT

17- Below are few statements regarding the sustainable Lighting Products. Please indicate to what extent you agree or disagree with each of the following statement, using a 6-point-scale where 1 means “I strongly disagree” and 6 means “I strongly agree”.

For each statement, please circle one number corresponding to your opinion.

	I strongly disagree	I disagree	I slightly disagree	I slightly agree	I agree	I strongly agree
My company is actively involved in the distribution of sustainable products	1	2	3	4	5	6
There is a strong demand for sustainable products	1	2	3	4	5	6
My company communicates about its sustainable products	1	2	3	4	5	6
Eco-Labeling helps in the promotion of products in the Lebanese market	1	2	3	4	5	6
Sustainable products are generally less efficient than normal products	1	2	3	4	5	6
In my company, social and environmental aspects are secondary	1	2	3	4	5	6
In the market there are not enough reliable suppliers capable of providing sustainable service products	1	2	3	4	5	6

III- GENERAL

INFORMATION ON THE MARKET OF SUSTAINABLE LIGHTING PRODUCTS

18- On the market, in general, who are the major consumers of Sustainable lighting products?

	In the whole market	Your products' consumers
Public institutions (Government)		
Private companies		
Individuals		
Other		

IV- POLICY IMPLEMENTATION

	Yes	No
19- Does your organization have a health and safety related policy concerning employees working conditions?		
20- Does your company have an environmental management system in place?		

21-According to your Lebanese market?

knowledge and experience, which types of sustainable lighting products are available on the

Please specify each product in the table below (e.g.)

22-Which of these sustainable lighting products is produced by your company/ organisation? **Put a tick in the appropriate cell**

23-Which of these sustainable lighting products is imported by your company/ organisation? **Put a tick in the appropriate cell**

24-In general, who are the Lebanese suppliers of each of the following sustainable lighting products? **Write the name of the suppliers in the appropriate cell**

25-In general, who are the international suppliers of each of the following sustainable lighting products? **Write the name of the suppliers in the appropriate cell**

26-As compared to a similar unsustainable product, is the sustainable more/ less/ as efficient? **Put a tick in the appropriate cell**

27-As compared to a similar unsustainable product, is the ACQUISITION cost (purchasing cost) of the sustainable higher/ lower/ the same?

Put a tick in the appropriate cell and specify the level of extra (under)cost in percentage

28-As compared to a similar unsustainable product, is the USAGE cost (cost of activation/maintenance during its lifetime) of the sustainable higher/ lower/ the same?

Put a tick in the appropriate cell and specify the level of extra (under)cost in percentage

21- Description of the Product	22-Produced by YOU	23-Imported by YOU	24- Lebanese suppliers	25- International suppliers	26- Efficiency	27- Acquisition cost	28- Usage cost
	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/> More <input type="checkbox"/> Less <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same
	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/> More <input type="checkbox"/> Less <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same
	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/> More <input type="checkbox"/> Less <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same
	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/> More <input type="checkbox"/> Less <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same
	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/> More <input type="checkbox"/> Less <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same

	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/> More <input type="checkbox"/> Less <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same
	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/> More <input type="checkbox"/> Less <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same	<input type="checkbox"/> More → % <input type="checkbox"/> Less → % <input type="checkbox"/> Same

29-How do you ascertain that these lighting products are sustainable?

- Because they are certified by a third party
- Because they are produced by a EMS (Environmental Management System) certified company
- Other reason. Specify

30-Please provide a list of all labels and certifications under which the sustainable claims are made?

31-Does your company/ organization manufacture or import sustainable PAPERS backed by any certification or label?

- No
- Yes → Please provide more information

APPENDIX H

Local initiative for sustainable development in Lebanon

Trions nos déchets électroniques ! (ONG Bi'atouna)



Saviez-vous que 65% des libanais laissent leurs déchets électroniques à la maison et que vous pouvez faire partie d'eux ! Regardez autour de vous, chez vous, vous trouverez sûrement un ordinateur qui traîne quelque part et que l'on n'utilise plus. Ceci est appelé déchet électronique (e-waste).

Les déchets électroniques concernent les ordinateurs, tout le matériel audio visuel et tous les matériels électroniques que vous n'utilisez plus. Ils contiennent un taux élevé de produits toxiques qui empoisonnent l'eau, l'air et la nourriture que vous consommez.

En 2008, Bi'atouna, une organisation libanaise non gouvernementale (ONG), a lancé son projet "E-waste and battery recycling for a better environment", « les déchets électroniques et les batteries recyclables pour un environnement meilleur », dans le but de sensibiliser contre les dangers de la mauvaise utilisation des batteries dans 170 écoles en Jordanie, en Tunisie et au Liban, comme première étape, et les déchets électroniques, comme deuxième étape.

Aujourd'hui, la deuxième phase du projet est appliquée au Liban et en Jordanie en partenariat avec une organisation jordanienne appelée LHAP (Land and Human to Advocate Progress).

Au Liban 20 écoles participent au projet ! Votre école en fait partie ? Si non, aimeriez-vous y

participer ? Visitez notre site www.beeatoona.org, localisez le revendeur

d'ordinateurs le

plus proche où vous pouvez déposer vos déchets électroniques pour les recycler et

contactez-nous.



LEBANON GREEN BUILDING COUNCIL

WHAT IS THE LEBANON GREEN BUILDING COUNCIL?

The Lebanon Green Building Council (LGBC) is an NGO that provides stewardship towards a sustainable built environment. It promotes, spreads and helps implement high performance construction concepts that are environmentally responsible, healthy and profitable. LGBC acts on market, educational, and legislative issues to achieve its goals.

WHY WAS LGBC CREATED?

Lebanon faces an urgent need to upgrade its built environment towards sustainability. Serious action must be taken to ensure that future construction growth in Lebanon complies with the principles of sustainable development. LGBC was chartered to take the lead to mobilize and guide all major players in the socio-economic and legislative arenas in order to secure full commitment to this goal

Considering that Green Buildings lead to better resources management and energy efficiency, the strategic implications of this action are incommensurable taking into consideration the fact that Lebanon is endowed with few natural resources other than its fast dwindling natural capital

WHO CAN JOIN THE LGBC?

All organizations and individuals from all walks of life are welcome to join the LGBC. Green Buildings are a national concern and therefore all the Lebanese society is a stake holder in this endeavour. The details of membership can be found on the LGBC application form.

IS THE LGBC PART OF THE USGBC?

The LGBC is not related to the USGBC or any other GBC around the world in any way whether legal or technical. The LGBC is planning to become an emerging member of the World GBC which is the umbrella organization for all national GBC around the world. Joining the LGBC does not entitle the member to any prerogatives with respect to other GBC.

HOW CAN WE / CAN I GET INVOLVED WITH THE LGBC?



LGBC has five committees to which those who like to contribute volunteer work can join according to their abilities and liking: 1) Awareness, 2) Education & Training, 3) Events 4) Membership & 5) Technical.

DOES THE LGBC ISSUE GREEN BUILDING CERTIFICATION LIKE LEED, BREEAM OR OTHER?

In its mandate, LGBC will work on introducing a “Lebanese” applicable certification and labeling of buildings. Any devised and suitable system shall have no relationship with LEED, Breeam or others certification model.

WHEN WILL A LOCAL GREEN BUILDING CERTIFICATION SYSTEM IS AVAILABLE?

LGBC members are keen to prepare a certification system that will be widely applicable in Lebanon. Understanding the immense volunteer works rendered by our members, the hopes are to conclude such system within the coming two years.

In parallel, the LGBC whenever possible will be supporting projects which are implementing any of the International certification systems.

WHAT TO DO IF ONE SEEKS A LEED CERTIFICATION FOR A LOCAL BUILDING?

The party interested in a LEED certification can contact the LGBC for guidance, we will do our utmost to provide technical advice and guidance regarding the procedures to follow.

WHO IS MANAGING THE LGBC?

LGBC is a newly born organization. The current structure of its Board includes the founding members. Most of the Members of the Board of directors are also coordinators of the standing committees. In its bylaws, LGBC board members shall be elected by its membership and will serve for two years.

WHAT DO I BENEFIT FROM JOINING THE LGBC?

- Access to information and stay current with changing industry trends and discover new methods for transforming the built environment.
- Platform for networking and great opportunity to connect with peers.
- Opportunity to play an active role in the advocacy of green buildings and environment care.

- Participation in local activities and committees and addressing the needs and interest of green building professionals from a variety of disciplines.
- Special discounts for LGBC programs, events and publications
- Members News letters
- Training Programs will offer an opportunity for members to be recognized as leaders in green building education.
- Serve on a LGBC committee to shape the future of green building.
- Participate in legislative outreach efforts and stay up to date with green building programs.

LEGISLATION ON ORGANIC AGRICULTURE IN LEBANON

The Lebanese Standards for Organic Farming were drafted by Green Line Association with the support of GTZ, reviewed by a technical committee at the Lebanese Standards Institution “Libnor” and approved by Libnor’s Board in March 2004.

The Lebanese Standards for Organic Farming are divided into four parts:

- (1) Plants and plant products, livestock and livestock products, food processing and beekeeping.
- (2) Aquaculture.
- (3) Forest management.
- (4) Accreditation criteria for bodies certifying organic production and processing.

The book “Lebanese Standards for Organic Farming” – Arabic version is available free of charge at Green Line Association and ALOA.

ORGANIC CERTIFICATION

The last two years witnessed an important development of the organic sector in Lebanon. Organic certification has started to be performed by two local certifying bodies: IMC-Liban and LibanCert. IMC-Liban works under the umbrella of IMC Italy; LibanCert works in partnership with Bio.Inspecta Switzerland until achieving international accreditation.

This awaited establishment of local organic certification bodies foresees an increase in organically certified businesses in Lebanon and the region. Provision of services and expertise has now become more cost-effective, language barriers have been removed, and monitoring and control are more frequent.

Despite an initial suspicion that local consumers might have in regards to local certification, the coordination with international certification bodies, and the acquirement of an international accreditation are expected to give more credibility and trust in local certification. Local prices are also expected to slightly decrease with the acquirement of certification at a lower cost, and the emergence of more competition.

Country Energy Efficiency and Renewable Energy Demonstration Project for the Recovery of Lebanon (CEDRO)

In partnership with the Ministry of Energy and Water" the Ministry of Finance" and the Council for Development and Reconstruction" the United Nations Development Programme (UNDP) is managing the "country energy efficiency and renewable energy demonstration project for the recovery of Lebanon" (CEDRO). Created in October 2007" the project has a mandate of five years" lasting till October 2012" and a budget of \$9.73 million funded by the Lebanon Recovery Fund by means of a donation from Spain.

CEDRO has been established with an aim to complement the national power sector reform strategy" and to support the greening of Lebanon's recovery" reconstruction" and reform activities. To achieve this" the project will focus on activating end-use energy efficiency and renewable energy applications in public sector buildings and facilities across Lebanon.

More specifically" CEDRO's mandate will be implemented on several levels:

- The first level involves the implementation of end-use energy efficiency (EE) and renewable energy (RE) demonstration projects in approximately 80 public sector buildings and facilities across Lebanon;
- The second level involves the gearing of CEDRO projects towards assisting in alleviating barriers to increased penetration of RE and EE applications;
- The third level targets public awareness issues on climate change, energy consumption, and RE and EE applications;
- The fourth level increases the availability of validated data on energy consumption patterns, and RE and EE performance costs and benefits;
- The fifth level consists of supporting the formulation of a national sustainable energy strategy and action plan through a research and development program.

Pilot Projects:

In line with the first level of CEDRO of implementing renewable energy and energy efficiency projects for public sector buildings and sectors, several sites where chosen to receive the following technologies:

Energy efficiency measures for saving on electricity and other power sources

- Photovoltaic systems for electricity generation
- Small wind turbines for electricity generation
- Solar water heaters to save on the water heating bills of several buildings and on diesel usage
- Thermal Insulation to decrease heating and cooling loads of buildings

APPENDIX I

Businesses Surveyed List

Name	Company	Position	Category
Elie chedid	Dataconsult	Sales	IT
Mr.Fadel	460	Deputy general manager	IT
Sleiman Corbani	Xerox	General Manager	IT
Sleiman el Murr	CIS	Sales	IT
Michel Ayyoub	Sicomo	GM	Paper
Fadi Gemayel	Gemayel Brothers	GM	Paper
Fouad Fadel		GM	Paper
Carole Milan	Henkel Lebanon	GM	Detergents
Robert Gabriel	M1 Group	Consultant	Detergents
Tino Semaan	A to Z services	GM	Detergents
Roula Fares			Pesticides
Hadi el Solh			Pesticides
Georges Keyrouz	Grohe	Regional Sales manager	Water taps
Hady Abou Jawde	Freelance	Engineer	Water taps
Mohamad Hussein	Geberit	Sales	Water taps
Carlos Martinez	Sakr Lighting	Project manager	Lighting
Joe Aoun	United lighting	A. Manager	Lighting
Roland Bitar	Shneider Electrics	Trainer	Lighting

APPENDIX J

Prices of Conventional and Sustainable Products

Tentative Comparative Prices between Conventional and Sustainable Products

Below prices were provided by mentioned companies or retailers selling their brands. Prices provided are subject to change given the hyper inflation rate at this point and rate of exchange between US dollar and Euro currencies. In addition, the prices depend heavily on the purchased quantities where bargaining and different types of discounts can be granted to the buyer. Finally, prices are also subject to fluctuation pending the forces of the invisible hand of supply and demand not only in the Lebanese market but also in the world market. Therefore, the consultant cannot guarantee below prices for the above reasons.

1. Paper

Paper - Conventional	Price \$US
Standard A4 white paper 80 grams per m ² in packs of 500 (EQuality; IQuality; Multioffice; Voyager)	3.15~3.75

Paper - Sustainable	Price \$US
Standard A4 white paper 80 grams per m ² in packs of 500 (EQuality; IQuality; Multioffice; Voyager)	3.80~4.35

2. IT (Printers and Toners)

Ink & Toner - Conventional	Price \$US
Ink Jet (HP; Canon; Xerox) Black & Color	26~36
Laser Jet/Toner (Epson; HP; OKI) Black & Color	70~160

Ink – Sustainable	Price US\$
EA Toners (Xerox)	70
Color Cubes (Xerox)	50

3. Detergents

Detergent – Conventional	Price US\$
Powder (Henkel, Procter & Gamble, Unilever)	3.66~3.70 per KG
Multipurpose liquid (Henkel, Colgate Palmolive, Unilever, Procter & Gamble)	2~3 per Liter

Detergent - Sustainable	Price \$US
Powder – phosphate free (Henkel)	3.66 per KG

4. Pesticides

Pesticides EU Normes – Conventional (any living organism getting into contact will be negatively impacted)	Price US\$
Chlorpyriphus – ethyl (Insecticide)	30 per Liter
Dimethoate (Insecticide)	30 per Liter
Thiophanate – methyl (Fungicide)	30 per Liter
Mancozeb (Fungicide)	30 per Liter
Methomyl (Insecticide)	40 per KG
Dichloruos (Insecticide)	40 per KG
Acephate	40 per KG

Pesticides EU Norms – Sustainable (no harm to living organism getting into)	Price US\$

contact)	
Iron phosphate (Anti slugs and snails)	70 per KG
Copper hydroxide(Fungicide & bactericide)	35 per Liter
Copper oxychloride (Fungicide & bactericide)	35 per Liter
Spinosad (Insecticide)	450 per Liter
Neem oil (Insecticide)	N/A
Boric Acid (Insecticide)	N/A
Sulfur (Fungicide & acaricide)	N/A

5. Lighting

Lighting - Conventional	Price \$US
Standard bulb GLS: 40, 60, 75 or 100 watts (Philips, MBH, Osram, GE, Tungsram and Sylvania)	0.28~0.31

Lighting - Sustainable	Price \$US
Standard bulb GLS: 23 watts= 100 watts conventional (Philips, MBH, Osram, GE, Tungsram and Sylvania)	2.50~2.70

6. Water Taps & Water Flush

Water Taps & Water Flush – Conventional	Price US\$
Water Taps (Grohe, Viega, Geberit, Kohler)	30
Water Flush (Grohe, Viega, Geberit, Kohler)	20~35

Water Taps & Water Flush - Sustainable	Price US\$

Water Taps (Grohe, Viega, Geberit)	100
Water Flush (Grohe, Viega, Geberit)	30~50