UNITED NATIONS
ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA

MAPPING GREEN ECONOMY IN THE ESCWA REGION

VERSION 1 (JUNE 2013)

.

TABLE OF CONTENTS

FIGURES

TABLES

ABBREVIATIONS

CAMRE	Council of Arab Ministers Responsible for the Environment
EE	Energy Efficiency
EGS	Environmental Goods and Service
ESCAP	Economic and Social Commission for Asia and the Pacific
ESCWA	Economic and Social Commission for Western Asia
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GG	Green Growth
GHG	Greenhouse Gases
ICT	Information and communications technology
ILO	International Labour Organisation
ISO	International Organization for Standardization
IT	Information technologies
KSA	Kingdom of Saudi Arabia
MDG	Millennium Development Goals
MENA	Middle East and North Africa
MOE	Ministry of Environment
MW	Megawatt
NGO	Non Governmental Organisation
OECD	Organisation for Economic Cooperation and Development
R&D	Research and Development
SD	Sustainable Development
SME	Small and Medium Enterprises
UAE	United Arab Emirates
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme

I. INTRODUCTION

The concept of the Green Economy has many interpretations that evolved ever since its first inception in 1989. The concept has evolved in such a manner that there is no longer a single interpretation of the green economy, but rather various green economies. The current interpretation is ideally suited for the conditions of the ESCWA Region and the Arab World. It supports a "bottom-up" approach defined by local, national and regional needs and priorities.

Initially, the term "green economy" was coined in a pioneering 1989 report for the Government of the United Kingdom by a group of leading environmental economists, who published a "Blueprint for a Green Economy[1]" that built upon research and practice in environmental economics that spanned back several decades. The concept was later revived in 2008, in the context of many discussions on policy response to multiple economic global crises. The G20 countries particularly focused on it in their "green stimulus packages" that constituted the core of their policy responses to the global financial crisis. The concept was later adopted as one of the two themes for Rio+20, further enhancing international attention. This stimulated a wider debate among various governments, civil society organizations, and international organisations. In the lead up to Rio+20, negotiations on the "Green Economy" saw many developing countries raising concerns regarding trade protectionism, conditionality, aid and finance, particularly challenging "one-size-fits-all" application of the concept, and stressing key social goals such as the need for greater focus on poverty eradication. Reports were published that further elaborated on the concept by most international organizations such as UNEP, OECD, the Global Green Growth Institute (GGGI), the World Bank, UNDESA, UNCTAD …etc.

In spite of all this wider attention and far reaching debate, the concept of the "Green Economy" still remains a relatively new one, particular in the ESCWA Region and the Arab World. In this region, the green economy initiatives and related statistics remain in short supply. However, the positive outcome of Rio+20 has clarified the "way forward", as it enabled the international community to redefine the green economy as a more balanced, flexible and acceptable concept that adequately addresses these concerns and risks. Rather than than an "*à la carte*" economic model, the current conception allows for a broader characterization of the Green Economy that is best suited to analyzing progress and monitoring relevant policies, decisions or programs.

The current interpretation is therefore best adapted for the conditions of the ESCWA Region and the Arab World, characterized by non-uniform economic development, environmental circumstances and strategic priorities. In this manner, the concept has been "regionalized" to embrace different national circumstances, economic systems, geographical locations, policy options and priorities. This approach is best adapted to the ESCWA Region.

A SCOPE OF THE STUDY

This study aims to provide a methodology for mapping the progress in the Arab region in the adoption and implementation of green economy policies. This mapping is proposed as a policy tool for governments of the ESCWA Region. As such, it is designed to identify the various challenges that the region faces as they still strive to achieve sustainable development, and to highlight potential opportunities for countries in the region to "green" their economies.

To do so, the mapping will rely on indicators to monitor the transition towards a green economy that are designed to monitor green activities and their impact on the private and public sector. The indicators are designed to achieve three objectives:

[1] Pearce et al., 1989.

1. Outline the current status of the economies of the region with respect to the objectives of a Green Economy,
2. Show the progress of regional economies,
3. Highlight each of the Enablers, Drivers, and Challenges for the transition towards a Green Economy and greater Sustainable Development.

The study relies on a set of indicators that represent the transition to a green economy at the macro and micro level. Those indicators are based on those developed by the OECD[1], UNEP[2], and UNIDO[3], and adapted in such a way as to also reflect key social goals, such as the need for greater focus on social equity and poverty eradication.

Because of the nature of the current approach, any precise mapping of Green Economy will be hampered by the lack of comprehensive datasets. In spite of significant improvements in data collection among ESCWA member states, the need remains for significant improvements in specialized surveys and their expansion, especially in the fields of environment, water and energy. Inadequate infrastructure and insufficient resources will result in a lack of reliable data, which will continue to hamper the monitoring of the transition to Green Economy.

However, the methodology will highlight key focus areas, which will thus help to assist the member states in their need to monitoring their efforts towards Green Growth, in their transition to a Green Economy. As such, it will help structure and outline the necessary set of policy recommendations that could assist ESCWA member countries of the region to monitor their transition towards a Green Economy, and to promote Green Growth.

B GREEN ECONOMY

The "Green Economy" concept is a developmental model rooted in sustainable development. It is "a system of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long term, while not exposing future generations to significant environmental risks or ecological scarcities", and "significantly reducing environmental risks and ecological scarcities" by being "low carbon, resource efficient, and socially inclusive[4]".

In this perspective, continued sustainable development, can therefore best be achieved through "Green Growth". To ensure Green Growth, an economy would be work on "fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies[5]", by emphasizing "environmentally sustainable economic progress to foster low-carbon, socially inclusive development[6]".

Both concepts of "Green Economy" and "Green Growth" have been at the centre of policy debates in recent years, both as a tool to address the 2008 financial crisis, and as one of the two themes for Rio+20. The "green economy in the context of sustainable development and poverty eradication" carries the promise of a new economic growth paradigm that is friendly to the earth's ecosystems while also contributing to poverty alleviation. This has resulted in a rapidly expanding literature and emerging international practice focusing on "Green Economy" and "Green Growth". While there appears to be at

[1] OECD
[2] UNEP
[3] UNIDO
[4] UNEP, 2007
[5] OECD
[6] ESCAP

least eight different definitions for "Green Economy" and thirteen definitions of "Green Growth", there is significant overlap between the two concepts, and they are now being used interchangeably. They are therefore likely to further merge in coming years and continue to gather momentum as more influential actors adopt the concepts into their programs and agendas geared towards ensuring sustainable development[1].

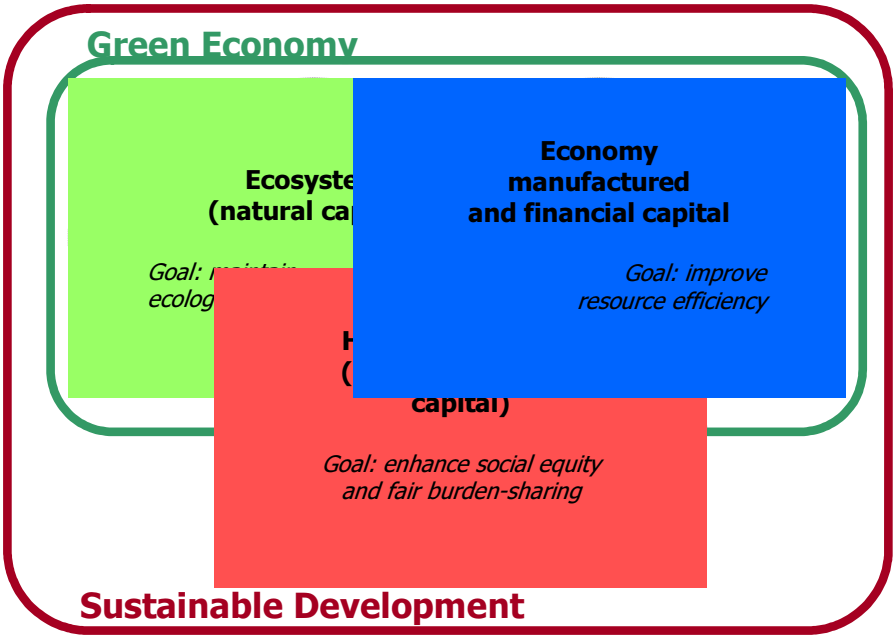


Figure 1. Sustainable Development and the Green Economy[2].

Both "Green Economy" and "Green Growth" offer a novel approach for development, in line with the needs for sustainable development. They both "should be understood as identifying and supporting opportunities to improve natural resource management and provide infrastructure services while meeting the core objectives of human development and well-being[3]". The Green Economy therefore balances the needs of "People", "Planet", and "Profits", by reconciling the "environment" (Planet), where humans live, with the "economy" (Profits), the system of activities that they undertake to improve their "standard of living" (People).

The regional commitment of countries of the ESCWA Region was formally outlined in the April 2012 "Arab Ministerial Declaration on the United Nations Conference on Sustainable Development (Rio+20)" of the Council of Arab Ministers Responsible for the Environment (CAMRE). The countries of the ESCWA Region are generally committed to the Green Economy, provided approaches to ensure **Environmental Sustainability** are developed based on national needs and priorities, rather than applying them as a standard model.

Box 1: Decoupling and Green Growth

There are two types of decoupling:

- **Relative**, in which production increases while resource use and pollution do not rise as quickly. This is readily achievable via gradual increases to resource productivity, increased value creation,

[1] UNDESA. 2012.
[2] UNEP; 2007; EEA, 2012.
[3] ESCWA, Sustainable Livelihoods and the Green Economy

and shifts toward less resource-intensive economic activities

- **Absolute**, or "**Green Growth**", is one in which production increases while resource use and pollution fall. This could require changes to how economic growth is defined. Despite some progress in this area, no country in the world has achieved a sustainable situation in which high resource productivity and high levels of social and human development are combined with low or falling per capita resource consumption.

It is also important to distinguish between resource and pollution decoupling, since it is possible to decouple pollution from production but not from resource use; or to decouple resource use from production, but not from pollution.

II. MONITORING THE GREEN ECONOMY TRANSITION

Green Economy therefore reconciles short term human needs for development to longer term imperative to ensure a liveable environment for future generations. It means both sustainable consumption and sustainable production, and therefore requires improved resource efficiency, decreased pollution and waste generation, minimization of Environmental Risks[1]. Such an "Eco-Efficient" development also requires "specific policies and institutions to be attached to green economy activities[2].

In order to monitor and map the transition to a Green Economy, one needs to consider four key aspects. Those aspects are; (**1**) measurable **Indicators** that measure Green Growth and define the Green Economy, (**2**) the **Drivers** of this transition and (**3**) the **Enablers** that facilitate it, as well as (**4**) any **Challenges** that the countries face and that may hinder their efforts.

A BASIC INDICATORS

In general, an indicator is either parameter, or a value derived from parameters. It is selected to provide contextual information that describes the state of a phenomenon/environment/area. Its significance extends beyond that of a simple parameter, which is a narrowly defined property that is simply measured or observed. Indicators can be aggregated into an Index, which can also contain "weighted" parameters.

Indicators have two major functions; they reduce the number parameters required to faithfully present a given situation, and they simplify the communication process. By reducing the number of measurements and parameters, indicators could still provide an accurate presentation of a given situation, provided the the size of an indicator set and its level of detail are limited. By simplifying the communication process, they provide to users with understandable measurements that do not necessarily demonstrate strict causal chains; they are essentially an expression of "the best knowledge available[3]".

The selection of indicators depends on three key parameters; "Level", "Focus", and "Quality". The "Level" defines the region or sector that they are trying to represent. The "Focus" of the indicators depends on their usage; and can vary from a need to track progress with respect to the environment, green growth, or sustainable development, or the need to advocate or raising the profile of these issues in public debate. The "Quality" depends on the reliability and accuracy of the underlying data.

In the context of the Green Economy, indicators must be used that are internationally comparable. These indicators need to be embedded in a conceptual framework and selected according to well-specified criteria[4], and designed in such a way as to track central elements of Green Economy.

Furthermore, the multi-dimensional nature of the Green Economy is such that single indicators are of limited use. For example, indicators such as Gross Domestic Product (GDP) may be simple to develop and use, but they remain limited[5] in this context, as they fail to account for such important factors as natural assets stock depletion in current production and consumption regimes, or the relevance of capital and labour stocks to current and future growth[6]. Governments committed to a transition to Green Economy require a wider set of indicators and targets by which progress can be measured.

---

[1] UNIDO, 2011, p.6.
[2] ESCWA, 2010, p.5.
[3] OECD, 1992.
[4] OECD, 2011.
[5] Stiglitz Commission Report.
[6] OECD, forthcoming 2012

Box 2: "Ideal" indicators to monitor progress towards Green Growth

Relevance	• Relevant for policy purposes, particularly: • Balanced coverage of the key features of green growth with a focus on those that are of common relevance to ESCWA member countries, • Transparent and easy to interpret, • Provides a basis for comparisons across countries, • Adaptable to different national contexts, and applicable at different levels of detail or aggregation.
Soundness	• Analytically sound, based on validated by scientific consensus. They should further lend themselves to being linked to economic and environmental modeling and forecasting.
Measurability	• Based on data that is available at a reasonable cost, is of known quality, and is regularly updated.

Source: OECD, 2011

The indicators are selected to represent each of the key factors of Sustainable Development; the "Environment" where we live, the "Economy" that describes the system of activities that humans undertake, the "Standard of Living" that people strive to improve in the context of various "Policy Responses and Economic Opportunities:

1. Environmental Sustainability:
   - Measured by indices of Environmental Sustainability and Performance.
2. Economic Transformation:
   - Improved resource efficiency through sustainable production and consumption, expressed by share of renewable energy and the share of waste water treatment.
   - Businesses "mix", expressed by the share of the private sector in Gross Domestic Product (GDP), and the proportion of Small and Medium Enterprises (SME)
3. Progress and Well Being:
   - Enhanced livelihood as measured by the Human Development Index (HDI), as well as measures of air and water quality
4. Policy Response and Means of Implementation:
   - Institutional means: policies and incentives, directly through green procurement, or indirectly through adapted environmental taxation, business incentives, and "Green Financing".
   - Technology transfer and education.

Each one of the indicators above is described by a set of number, or indices. Each comparative "index" can then be developed that shows how the different countries in the region relate to one another. In computing the index for each, the parameter measured for a given country is expressed as a percentage of the average of parameters across the country considered. For example, the parameter that measures "Environmental Sustainability" for "Lebanon" would be divided by the average of "Environmental Sustainability" measures of all the country in the ESCWA region. The indices thus obtained will be mapped together on the same chart, thus revealing, at one glance, a relative picture of the relative sustainability condition of one given country with respect to the other ESCWA member countries.

1 Environmental Sustainability:

The environment constitutes a "natural asset base" whose status defines sustainable growth. This asset is an active one that can be seen to provide "ecosystem services" to the wider economy, either directly through inputs to production, or indirectly through biodiversity. It is therefore vital to ensure that this "natural asset base" is either preserved or allowed to grow. The "net investment" has thus to be positive, with resources added in such a way as to promote natural regeneration rather than deplete or depreciate them.

Box 3: Biodiversity Hotspots in the ESCWA Region

The ESCWA Region is home to various biodiversity hotspots that represent diversified ecosystems. The region's hotspots are generally under threat due to:

- Habitat loss and destruction, due either to the region's high human induced pressures on land and seashore habitats, or to the effects of Climate Change.
- Over-exploitation, over-hunting and over-fishing. Changing consumption patterns of humans is often cited as the key reason for this unsustainable exploitation of natural resources;
- Alterations in ecosystem composition. The impact from invasive alien species remains be systematically documented.
- Pollution and contamination that cause irreversible damage to species, notably from hazardous waste generated either by the petrochemical industry, or by brine released from desalination plants.

In some countries of the ESCWA Region, a significant proportion of the land is set aside as protected areas, either terrestrial (Saudi Arabia, 38%; Jordan, 10%; Oman, 9%; Bahrain, 8%; Egypt, 8%), or marine (Bahrain, 12%; Jordan, 22%; Oman, 10%). As in other region's biodiversity in the ESCWA Region has the potential to contribute unique Ecosystems Good and Services. It does so through:

- **Provisioning**, through (a) the provision of food, fuel and fibre, or (b) provision of shelter and building materials,
- **Regulating**, through the (a) purification of air and water, (b) detoxification and decomposition of wastes, (c) stabilization and moderation of the climate, or (d) moderation of floods, droughts, temperature extremes and the forces of wind,
- **Supporting**, through (a) generation and renewal of soil fertility, including nutrient cycling, (b) pollination of plants, (c) control of pests and diseases, (d) maintenance of genetic resources as key inputs to crop varieties and livestock breeds, medicines,
- **Cultural**, through recreational and aesthetic benefits.

Source: ESCWA, 2011-b

Two aggregate indices are used to represent the environmental component; the **Environmental Sustainability Index (ESI)** and the **Environmental Performance Index (EPI).** By 2006, the ESI was replaced by the EPI. However, both indices are used here for because of problems with the reliability of regional data. Because each index takes into accounts different parameters, using both will help improve the accuracy of the mapping.

Environmental Sustainability Index (ESI)

The Environmental Sustainability Index (ESI) measures the ability of countries to manage various environmental challenges related to; natural resource endowments, past and current pollution levels, natural resource use, and societal capacities to address current and future problems[1]. To do so, the ESI tracks 21 elements of environmental sustainability covering natural resource endowments, pollution

[1] Srebotnjak and Esty, 2005.

levels, environmental management efforts, contributions to protection of the global commons, and a society's capacity to improve its environmental performance over time.

Box 4: Strategic Environmental Assessments (SEA)

Those are high-level, participatory, decision-making tools move the focus away from a "single sector" focus to include multiple sectors, and are thus better indicator of the combined or cumulative impacts on people and the environment. They can be particularly useful in a context of shared resources, as they can help support cooperation between countries.

Source: UNEP, 2012

Environmental Performance Index (EPI)

The Environmental Performance Index (EPI) was develop to better reflect the impact of a country's policies, and thus monitors how close countries are to the environmental policy goals that have been defined at the national level. The EPI is based on 25 performance indicators over 10 categories covering public health and the state of ecosystems. It formally superseded the ESI in 2006.

Box 5: Ecosystem Services

Nature provides largely unrecognized or "invisible" services to the larger economy that humans would otherwise have to exert effort to provide. For example, forests in a river basin help clean surface water, improve groundwater recharge, and prevent of soil erosion. Such services are difficult to account for, since those who provide the services (i.e. by not clearing the forest) do not directly benefit from the service it provides to others (i.e. a water utility).

Source: UNEP, 2012

2 Economic Transformation:

Sustainable development is defined by the volume of economic output generated by "inputs" derived from the services provided from natural assets. The efficiency of utilization of those resources is determined by the sustainability of the patterns of consumption and production, and the efficiency of utilisation of any resources extracted from the environmental commons.

This economic transformation is reflected through patterns of sustainable production by economic actors and by sustainable consumption by people. Those patterns depend on improved efficiency in the use of environmental resources, and the effectiveness at which those resources are renewed in the production of Environmental Goods and Services (EGS). Those measures are all mediated through efficiency of energy and water. In the context of the transition towards a Green Economy, those measures thus depend on the share of Renewable Energy, and the proportion of water that is treated. The speed and extent of this transition will greatly depend on economic dynamism, often at the local level, thanks to the combined actions of an economy's Small and Medium Enterprises (SME's).

Sustainable Production and Consumption

In order to facilitate the creation of new market opportunities, the introduction and use of environmentally sound technologies will need to enhance resource efficiency and reduce waste. Only then can the expected increases in competitiveness materialize. This improvement is easily reflected through two key parameters; the **Share of Renewable Energy** and the **Wealth Generated by the Use of Water in Industry**.

By considering the **share of renewable energy** as part of an entire map of the transition towards the Green Economy, it is possible to see how the far wider savings are distributed across the wider economic landscape, and will thus benefit investors and end users. This will address the concern that the shift to cleaner renewable energy and the greater treatment of water may result in increasing prices of energy and water, particularly on the energy-dependent services and commodities in the already challenged economy of a water-scarce region.

Box 6: Primary and Secondary Energy

Within a country's Energy Balance, a distinction is made up of new energy entering the system (primary) and the energy that is transformed within the system (secondary) ([1]):

- Primary energy is embodied in sources which involve human induced extraction or capture, that may include separation from contiguous material, cleaning or grading, to make the energy available for trade, use or transformation".
- Secondary energy is embodied in commodities that comes from human induced energy transformation.

In the case of electricity, the definition is complex, since it is produced as primary as well as secondary energy. Primary electricity is obtained from natural sources such as hydro, while secondary electricity comes from converting "thermal" energy from such sources as coal, natural gas, oil, or nuclear power ([2]). Furthermore, those definitions do not take into account the productive uses of energy through the labour of domestic animals, an important factor in rural areas. They tend to assume that productive uses only occur through the substitution of machines for animal and human labour.

Source: ([1]) UNSD, 2011; ([2]) IAE, 2006

Computing the **wealth generated by water** will reflect the effectiveness of the transition towards Green Economy. Three sectors can be considered; agriculture, industry, and services. Unlike other goods or resources, freshwater is essential for consumption or production activities, and can rarely be substituted for, except in industrial processes. Furthermore, the pollution of water can easily affect the economic output generated, be it direct uses, such as irrigated agriculture or domestic, indirect uses, such as the decline in value of polluted areas, or even non-uses, such as biodiversity[1]. Moreover, this is a key area in the ESCWA Region, where water scarcity is a major issue. For purposes of the transition towards a Green Economy, the wealth generated by water in industry is the most relevant:

- Unlike agriculture, it is the sector of activity where freshwater can potentially be substituted by another resource.
- Furthermore, in services, water use is generally confined to what might be defined as domestic uses, and very little is actually used as part of an individual service other than cleaning.

However, it should be noted that this indicator may over-represent the efficiencies of some industries or countries relative to one another, especially since, in addition to large differences in water intensity amongst various industrial sectors, the industrial structure differs greatly among the various countries of the ESCWA Region.

Sustainable Production and SME's

The transition towards the Green Economy requires a transition towards sustainable patterns of production of goods and services. Such a transition is often associated with an economic dynamism that depends largely on the business "Mix", the relative combination of various types of businesses in any given economy. A dynamic economic environment is one in which a variety of businesses thrive,

[1] Beaumont, 2000; ERF; 2012.

compete, and collaborate. Two good measures for the dynamism of such an economic environment are the **Share of the Private Sector in Gross Domestic Product (GDP)**, and the **Proportion of "Small and Medium Enterprises" (SME)** amongst those.

The proportion of Small and Medium Enterprises (SME) is another key indicator. SMEs are those business organizations that have up to 250 employees, with a simplified internal communication system that is usually informal, with control over business operations and decisions residing with one or two persons (usually family members). In various sectors of activity, the goods and services needed by large size enterprises are supplied by SMEs who act as suppliers, sub-contractors or co-contractors.

SMEs are crucial to the transition towards a Green Economy for two reasons:

1. Because of their size, SME's are **nimble** businesses that can be "early adopters" of green technologies. This allows them to be an important engine of innovation in the drive to build a greener economy[1]. The transition to the Green Economy affords the nimbler among those SMEs genuine advantages that enable them to gain market shares.
2. **Individually**, SME's have a limited contribution to the overall output in their sector of activity. However, in **aggregate**, they constitute a significant economic force since the represent the majority of enterprises, thus constituting the main source of employment in national economies. Indeed, in developed and high growth economies, SME's are the main drivers of economic development and sustainable job creation; in the OECD area, they constitute approximately 99% of all enterprises and two thirds of employment.

Box 7: Life-Cycle Thinking

This approach covers the entire life cycle of a product, from the point of resource extraction, to production, to consumption (cradle to grave), or over its entire recycling cycle (cradle to cradle).This is a "toolbox" which includes:

- **Life-Cycle Management**, that aims to decrease the environmental footprint of day-to-day operations,
- **Life-Cycle Assessment (LCA)**, to account for the the environmental impact of specific aspects of a service, or of the components of a product. LCA forms the basis of **Design for the Environment (DfE)**, which has three main objectives; (1) design for environmental processing and manufacturing; (2) design for environmental packaging; and (3) design for disposal or reuse. LCA criteria are defined by the ISO 14040 standard.
- **Social Life-Cycle Assessment (SLCA)**, to complements LCA and reflect the social implications of a good or service.
- **Life-Cycle Costing (LCC)**, or the sum of all economic cost over the full life cycle (or a specified period) of a good or service. LCA criteria are defined by the ISO 15600 standard.
- **Eco-labelling**, a communications tool that includes four main categories of labels, defined by the ISO 14020 standard.

Source: UNEP, 2012

3 Progress and Well-Being:

Standards of living cannot continue to rise without an enhanced Quality of life, itself dependent on the effect of environmental conditions on people's health and well-being. A rise in standards of living is immediately felt as **Enhanced Livelihoods**, and often reflected in greater social opportunities through **employment** that ensures youth participation in the economic life, as well as gender equity.

[1] ASEM Forum, 2010.

However, those improvements are insufficient by themselves, especially since there can be no sustainable enhancement to standards of living without enhancements to people's health and their physical well-being. Those are dependent on environmental conditions such as **Air Quality** and **Water Quality**.

Box 8: Environmental Employment

This concerns employed individuals who:

- Spend most of their work time on activities associated with environmental protection (air & water quality, waste management…), resource management (energy and/or water management, renewable energy…), or environmental sustainability (education, research and development, communication & public awareness…)
- Are employed in new emerging areas including Alternative/Renewable Energy & Eco-efficiency and Carbon & Climate Change Mitigation

Enhanced Livelihood

Livelihoods can benefit in many ways from the Green Economy transition. Properly implemented greener production techniques will have benefits beyond the environment, since they will also enhance longer term sustainability. This will result in longer-term, more stable economic benefits. Any enhancement of livelihoods is also reflected by the positive effect of enabling policies and increased gender equity.

This enhancement in Livelihoods can well be reflected by the **Human Development Index (HDI)**, a composite index measuring average achievement in three basic dimensions of human development[1]; a long and healthy life, knowledge, and a decent standard of living. However, since the calculation of HDI is an evolving methodology, comparisons between countries can only be strictly made within a given year. Only then would the index be based on similar data sources. However, the index may still be taken to indicate qualitative progress made over time.

Proportion of Employed Population

The transition towards Green Economy cannot be achieved without economic activity and the associated employment and its distributional effects. This is a prerequisite to poverty eradication and the development of household consumption, not least new patterns of demand. Furthermore, this is vital to the development of skills and green entrepreneurship. Down the road, this could lead to the necessary adoption of new technologies by the workforce and the development of new products, which will enhance people's ability to seize the opportunities for development of new green activities, building up new competencies, upgrading skills, and transforming and creating jobs.

Air Quality

Air pollution in the ESCWA region has many causes; in addition to purely "anthropogenic" ones such as such as industry and road traffic, deteriorating air quality can also be caused by dust particles released by the region's large desert areas. However, since the transition towards a Green Economy also involves individual consumption patterns, it is useful to focus on the portion of air quality that is related to human activity. In this respect, air Quality can be easily determined by measuring atmospheric emissions of CO_2 or CO_2 equivalent.

[1] UNDP, 2003.

In order to reflect individual consumption patterns, it is useful to consider "**per Capita CO_2 Emissions**". In addition to CO_2, the impact of other pollutants can be reflected by "**per Capita Commercial Energy Consumption**", since this parameter was found to correlate well with the emission of other pollutants such as nitrous oxides (NO_X) and sulphur dioxide (SO_2)[1]. This is particularly relevant for the ESCWA Region, where oil and coal power plants still account for most of the electricity produced[2].

It is important to note that, at first look, "such a simplification assumes that the energy efficiency does not differ among countries of varying level of development[3]" and thus differing progress towards their transition to the Green Economy. However, this remains a valid simplification, since the mapping also takes into account the share of renewable energy in total energy use.

Water Quantity and Quality

Water quality can still be evaluated based on the amount of biological pollution in water bodies, whose telltale sign is their **Biochemical Oxygen Demand (BOD)**. It is possible to normalise the BOD with respect to water availability and population data for each country, but this would understate the real extent of water pollution in some countries.

A third parameter would be faecal coliform counts, but regional data for this remains unreliable; the better to disregard this parameter rather than risk "skewing" the indicator, especially since, in regions of water scarcity, most of the urban population may only have nominal access to improved water sources; the pipes may be there, but not the freshwater. For the same reasons, "**per capita freshwater availability**" was considered instead of the proportion of urban population with access to safe water, and the parameter was **normalised** with respect to the value defined by the "**Water Stress Poverty Line**" of 1,000 m^3/capita/year, itself based on the "Water Stress Index[4]".

Those parameters would need to be combined with a measure for access of urban population to water[5] that is adapted to the ESCWA region. In the ESCWA Region, this is an important consideration because of the prevalent water scarcity and the restricted access to water in some countries. It is therefore necessary to also take into account each country's actual per capita freshwater availability[6]. The water availability

4 Policy Response and Means of Implementation

Any economic transition is greatly dependent on the policy environment, not least the transition towards a Green Economy. Two factors interact to define this transition and influence the behaviour of producers and consumers; the policy frameworks, and the economic opportunities. Green growth can only benefit from any policies that encourage investment in eco-innovation and sustainable practices in both manufacturing and services, and from any increased awareness of such policies.

Those are mediated by adapted Government institutions and regulatory framework, the available of appropriate financial tools such as **Environmental Taxation and Pricing**, **Green Financing**, and the existence of a solid educational base able to facilitate the necessary **Technology Transfer**.

[1] Rogers et al., 1997
[2] IPCC, 2000.
[3] Nasr, 2008, p.64.
[4] Falkenmark and Widstrand, 1992.
[5] Rogers et al., 1997.
[6] Nasr, 2008.

Institutions: Policies and Incentives

Institutions play a crucial role in the transition towards a Green Economy through a variety of means, either directly through **Green Procurement**, or indirectly through such means as **Adapted Environmental Taxation**, **Business Incentives**, and **Green Financing**,

Direct public action is possible through mechanisms of "**Green Public Procurement**". Through those programs, governments commit to purchase sustainable products, either through discretionary spending, or as part of regular procurement programs. When done as part of discretionary spending, this can help "jump start" markets for sustainable production and consumption. When done as part of regular procurement programs, the spending can be coordinated through a specialized authority which helps develop enabling policies, as well as oversee and coordinates the provision of targeted services and program.

Business Incentives are one way to encourage the transition towards the Green Economy. They are often considered as the optimal means to help businesses in their transition, and this is particularly the case of SMEs. Recent surveys of SMEs in the European Union (EU) has show that 51% of respondents favour such policies as tax rebates, grants, and loans. Furthermore, a large number of SMEs consider that their offering of green products or services would largely benefit from such specific financial incentives; this is the case of 49% of those already offering green products, and 31% of those who have yet to start offering such products.

Green Financing is essential for an effective transition towards Green. At the global and regional level, there are a variety of financing mechanisms, but this is not always the case at the country or local level, where they are most needed. At the global level, funding of climate change adaptation and mitigation is mainly available through the United Nations Convention on Climate Change (UNFCCC) and the Kyoto Protocol, including the Clean Development Mechanism (CDM) and the Global Environment Facility (GEF). However, at the regional level, access ESCWA member countries has been relatively limited, even if Arab development banks have increasingly devoted funds for financing sustainable development projects. Specific funds dedicated to green investments, such as the Arab Environment Facility (AEF), are still in the activation phase. It is at the local level that the financing is most needed. Yet it is at this level where it is still lacking. In general, banks have yet to commit to green projects, apparently because of a lack of capacity to assess them, and because government policies have yet to be implemented that facilitate investors' participation.

Technology Transfer and Education

Technology Transfer is essential to the transition towards a Green Economy. The transfer of the necessary knowledge and technology takes place in part both in the educational sphere and in the various sectors of activity, along supply chains.

The education sector plays a small but vital role in providing training and knowledge in sustainability tools and methodologies to cater to such key Green Economy sectors as expertise in renewable and energy efficiency, water efficiency, recycling and water desalination, sustainable agriculture, clean technology and industrial processes and practices, ecotourism, green transport, green cities and buildings.

B DRIVERS

The transition to a Green Economy entails an increase in "Green" patterns of production and consumption. This transition to the Green Economy will be significantly accelerated by a variety of economic incentives, social needs, and environmental changes. Those "Drivers" exert different types of pressure to change, and provoke a response that differs among the various economic and social actors.

Drivers exert two types of pressure to facilitate the transition towards a Green Economy. They exert both a "pull" towards participation in the emerging green sectors, and a "push" towards the adaptation of existing economic models to the requirements of a greener economy.

- Drivers exert a "pull" effect in cases when they encourage participation in the emerging green sectors. This drive for "**Growing the Green**" will be determined by incentives for seizing opportunities in eco-innovation and new Green market creation. An example could be market incentives that encourage water-efficient agricultural crops.
- Drivers can act as a "disincentive", or a "push" away from "Brown Economy" patterns. This "**Greening the Brown**" implies the greening of established production practices and business models across a wide range of industries, or the introduction of new ones. While it carries an immediate cost, it is done with the expectation of benefits that are felt either on the longer term, or shared by the wider economy. An example could be tax incentives that penalize excessively polluting sources of energy generation, or inefficient energy consumption patterns.

The responses to those drivers are diverse, and depend mostly on the specific nature and role of the actors in the larger economy. The distinction between those types of drivers is important, as the challenges and policies adopted by regional governments may differ substantially depending both on the relevant stakeholder and the desired objective.

- In case where the desire objective is to "**Grow the Green**" by promoting such new practices as "eco innovation", drivers would be those that facilitate the search for new business opportunities that open up during the transition towards enhanced sustainability.
- In the case where the need is to "**Green the Brown**" by helping businesses update their established businesses practices, drivers would be those that facilitate increased awareness, or access to alternatives.

C ENABLERS

Enablers are those actors or factors that permit, allow, promote, or empower the transition to the Green Economy. Enablers normally do so through enhancements in processes mediated through changes in the environment that allows their impact to be felt.

- Enhancements in processes are improvements in communications or new development in technology. Technology in this case acts more like a "vehicle" through which the "drivers" can act to enact change. Communications then spread the knowledge of such solutions
- Changes in the environment in which companies operate, be it social, political, or legal. Thos changes can then allow new activities to be done, or speed up existing activities.

D CHALLENGES:

Challenges are factors that can hinder the transition to a Green Economy. For an economy to be "Green", it should be environmentally friendly, sensitive to the need for economic growth that conserves natural resources, minimize pollution and emissions that damage the environment and produce products and services that do not harm the environment[1].

In the context of the ESCWA Region, the challenges faced are in four main areas; governance and society, knowledge and education, economic sectors, and resource.

- Improved governance mediated through a welcoming society and polity are vital to ensure that any approaches can work. For any associated change to help the transition towards a Green Economy, they need the fundamental support of specific governmental institutions and financing facilities.
- Shared knowledge and access to education are not only the best weapons to to fight poverty and inequality, but they can also "foster the attitudes and behaviours necessary for a new culture of sustainability[2]".
- Economic sectors that would play a key role in developing and applying the appropriate Green Technologies.
- Sustainable and fair access to resources also plays a key role.

Box 9: The "Productivity Trap"

There are two paths to the improving production;

- To have more people working, which implies a focus on increasing the number of workers at the expense of enhancing their skills.
- To increase the output per worker, which implies a focus on skills enhancement through better education, in addition to investment in efficient means of production and transport.

In many countries of the ESCWA Region, there is an excessive reliance on unskilled labour, mostly in -productivity sectors such as services, construction, and agriculture. In general, such low skills level provides no motivation for increased productivity, which therefore remains low in those sectors of activity. In turn, this low productivity and depressed wage cannot attract higher-educated national labour. This persistence of a low-wage, low-productivity economy thus hinders the transition towards more knowledge based work and thus Green Economy.

Source: ERF, 2012.

E DATA AVAILABILITY AND QUALITY

Data is the main challenge that any objective analysis of the ESCWA Region faces. The present mapping is based on available data on indicators, as well as the best available information on drivers, enablers, and challenges. Efforts were made to use only reliable data and to cross-check this data from various creditable sources. Problems remain with some of the data obtained, not merely with the sources, the sampling and the quality of their information, but also with associated issues such as uneven coverage, different timing, irregular frequency, as well as issues of comparability, common standards of quality and reliability.

[1] UNESCO, From Green Economies to Green Societies
[2] UNDESA, 2012, p. 20.

However, lest one fall to "paralysis by analysis", the mapping had to proceed with the best available data. This mapping can potentially draw on two categories of available socio-economic and ecological data; Global "macro-level" indicators published by international and regional organizations, Individual "micro-level" indicators published by national administrations.

1 Global "macro-level" Sources

Among official databases at the aggregate (national or regional) level, the mapping exercise relied on such sources as ESCWA's compendium on environmental statistics[1], the FAO[2] for agricultural data, UNEP's Global Environment Outlook (GEO) portal, the World Bank's World Development Indicators (WDI) Database, the African Development Bank[3], as well as Arabstats[4].

Because of the structure of the mapping, there was no need to search for specific environmental indicators, since the report simply relied on aggregated indicators for Environmental Sustainability and Performance. This avoids a key pitfall of directly measuring environmental indicators or variables. Indeed, while those variables that are related to the use of natural resources tend to be accurate when market goods are considered, as in the case of agriculture and industry, they are harder to quantify in the case of biodiversity and ecosystems.

This report relied heavily on those sources for the quantitative part, the mapping component.

2 Individual "Micro-Level" Sources

This category of data is collected at the "individual" level, in the sense that it is meant to inform a specific decision unit such as an individual, a household, or a business, as to the specific impact of a decision. It can provide information as to the sensitivity of decision-making to:

- Economic signals or variables, such as in prices
- Instruments of economic policies, such as taxes, subsidies, standards.

It is often not aggregated, to avoid biases related to such factors as population heterogeneity. When the information is linked to the corresponding "macro-level" relevant information, it was then possible to reveal the drivers and enablers of the transition towards the Green Economy, and to identify challenges. There is much quantitative and qualitative information of this type that is found in various documents such as official reports, scientific publications, or expert opinion.

3 Data Availability

The primary challenges in carrying out the mapping for the ESCWA region countries is the availability of reliable statistical data. In order to obtain sufficiently reliable data, sufficient capacity must exist within the relevant statistical offices and ministries. This varies among ESCWA member countries.

The case of the ESCWA environmental project, which has focused on water accounting for the region, is informative, as the same pattern of data availability is likely to be repeated for other types of data. The region can be classified the region in three groups, depending on the availability of environmental statistics and financial and human resources[5];

[1] ESCWA, 2009.
[2] FAOSTAT: http://faostat.fao.org/
[3] ADB, 2011
[4] Arabstat is a repository of statistical indicators for Arab progress toward the MDG. The archive is under completion (UNDP-POGAR, 2012).
[5] ERF, 2011, p.21.

- Countries where environmental statistics are **available yearly**, such as Bahrain, Egypt, Jordan, Lebanon, Oman and Palestine.
- Countries where environmental statistics are **not available yearly**, but where the relevant environmental financial and human resources are available, such as Kuwait, Qatar, Saudi Arabia and United Arab Emirates. The availability of environmental statistics is such that these countries are capable of compiling water accounts in two years.
- Countries where the relevant environmental financial and human resources are **not** available, which renders the collection of reliable statistics much harder. Those are countries such as Iraq, Sudan, Syrian Arab Republic and Yemen.

III. MAPPING GREEN ECONOMY IN THE ESCWA REGION

A MAPPING METHODOLOGY

The mapping in carried out in four steps, for each country: (**1**) **Plot** the measurable indicators that measure Green Growth and define the Green Economy, and then identify (**2**) the **Drivers** of this transition, (**3**) the **Enablers** that facilitate it, (**4**) the **Challenges** they each face.

1. In **plotting**, each parameter is computed in two steps:
   - The parameters across the countries considered are averaged up,
   - The parameters for each country considered are then expressed as a percentage or a ratio (in this methodology) of this average.
2. The **drivers** are then identified and listed. Those are any aspect of the country's economy that actively effects a change on another aspect of the economy. This would be a distinctly identifiable factor that contributes to either Green Growth, or to "Greening the Brown".
3. **Enablers** are then identified and listed. Those are any actors or factors that permit, allow, promote, or empower the transition to the Green Economy.
4. Finally, **challenges** are listed. Those are factors that can hinder drivers, or negate enablers.

Table 1. OVERVIEW OF MAPPING INDICATORS

Category	Indicator	Description	Source
Environment	ESI	Environmental Sustainability Index	FAO-Aquastat
	EPI	Environmental Performance Index	FAO-Aquastat
Economic Transformation	Energy	Share of Renewable Energy as % of Total	ESCWA
	WealthWater	Wealth Generated by the Use of Water in Industry	Beaumont, 2000
	GDP-P	Domestic Credits to Private Sector as share of GDP (-)	World Bank
	GDP-SME	Contribution of SMEs to GDP (-)	Nicola, 2009
Progress and Well-Being	HDI	Human Development Index	UNDP
	Emp	Proportion of the Population Employed, 2008 Data (-)	ESCWA, 2011-a
	Emp-WM	Ratio of Women to Men Employment (-)	ESCWA, 2011-a
	Air-CO2	Air Quality: per Capita CO2 Emissions (Tonnes/Capita)	World Bank
	Air-CEC	Air Quality: per Capita Commercial Energy Consumption, in kg of oil equivalent per capita	World Bank
	W-Quantity	Per Capita Water Quantity (m^3/Person), normalized with respect to "Water Stress Index".	FAO-Aquastat
	W-Quality	Water Quality: BOD Emissions Per Worker (kg / Worker / Day)	World Bank
Policy Response and Means of Implementation	GreenP	Green Procurement: % of public procurement earmarked for Green Projects.	N/A
	ETax	Environmental Taxation: % of Taxes and fines collected specifically linked to pollution	N/A
	Incentive	Business Incentives: % of public incentives earmarked for Green Projects or Green SMEs	N/A
	GreenF	Green Financing: % of bank financing for Green Projects or Green SMEs	N/A

B IMPLICATIONS OF THE GREEN ECONOMY FOR THE ESCWA REGION

The ESCWA Region faces challenges in all four areas of the mapping; Environmental Sustainability, Economic Transformation, Progress and Well Being, Policy Response and Means of Implementation.

For the countries of the ESCWA Region, the transition towards a Green Economy is focused on "a fundamental tenet" in which equal weight is given "to economic development, social equity, and environmental sustainability" and "a green economy places great emphasis on the efficient use and deployment of natural assets to diversify the economy[1]".

Since the late 1990's, the countries of the region had been already moving to establish formal legal and institutional framework to deal with environmental issues. Further regional commitment was formally outlined in the April 2012 "Arab Ministerial Declaration on the United Nations Conference on Sustainable Development (Rio+20)" of the Council of Arab Ministers Responsible for the Environment (CAMRE).

Table 2. YEAR OF ESTABLISHMENT OF ENVIRONMENTAL LAW BY COUNTRY.

Country	Entity in charge of environment	Year
Bahrain	Ministry of Housing, Municipalities, and Environment	1996
Egypt	Ministry of Environmental Affairs	1994
Iraq	Ministry of Environment	1997
Jordan	Ministry of Environment	2006
Kuwait	Environment Public Authority	2001
Lebanon	Ministry of Environment	2002
Libya	Ministry of Health and Environment	2003
Morocco	Minister of Energy, Mining, water, and Environment	2003
Palestine	Ministry of Environmental Affairs	1999
Qatar	Ministry of Environment	2002
Saudi Arabia	Presidency of Meteorology and Environment Protection	1992
Sudan	Ministry of Environment and Physical Development	2001
Syrian Arab Republic	Ministry of Local Administration and Environment	2002
Tunisia	Ministry of Environment and Sustainable Development	2003
United Arab Emirates (UAE)	Ministry of Environment and Water	1999
Yemen	Ministry of Water & Environment	1995

The countries of the ESCWA Region, while they share common cultural elements, remain very diverse in their social structure, in their environmental situation, and their state of development. This net erogeneity is reflected in the mapping, and will help provide a picture of the comparative relationship between the state of the environment, economic growth, social structure and progress, and governance. Specifically, some of the main challenges are:

- **Water Scarcity**, an endemic systemic problem in all ESCWA region countries, most of which depend on sources outside their borders for their supply. This problem is exacerbated by Climate Change.
- **Energy dependence** in spite of the region's potential for solar and wind power and, in some cases, hydropower.

[1] AFED,

- **High unemployment**, notably among youth and women, an acute problem in most countries of the ESCWA region.
- **Poverty eradication**, a paramount in the large majority of the countries in the region. It often goes hand in hand with the need for economic reform and the promotion of rural livelihoods.
- **Political instability**, a grave problem in Palestine, mostly stemming from the absolute lack of control of Palestinians over their own destiny. It is also an acute problem in some countries, Egypt, Iraq, Lebanon, Libya, and a potentially growing problem in Bahrain and the Syrian Arab Republic.

These multiple and often interdependent challenges demand that a green economy take an integrated approach to policymaking. ESCWA member countries need to design **Policies Responses and Means of Implementation** that ensure that the transition towards a Green Economy is more a vehicle to deliver sustainable development rather than a destination in itself. This takes into account both the "Economic Pillar" and the "Social Pillar" of Sustainable Development.

- The "Economic Pillar" that leads to the Green Economy's promise of **Economic Transformation** is thus framed in the context of sustainable development and poverty eradication as an important tool for sustainable development.
- Member countries further stressed the need to focus on the "Social Pillar" that define **Progress and Well Being**, particularly in light of the fact that unemployment is one of the main concerns facing the region. In their specific context,

1 Environmental Sustainability

Environmental sustainability is a key challenge for the ESCWA Region. Since over 66% of water resources originating from outside the borders of its member countries, water management is also a crucial factor

Quality of the Environment.

Environmental degradation in the ESCWA region is generally believed to be "more severe" than in other parts of the world". The many reasons for this are associated with systemic water scarcity and climate change, rising demographics and rapid urbanization without the necessary of appropriate infrastructures, as well as governance issues and a low level of environmental consciousness[1].

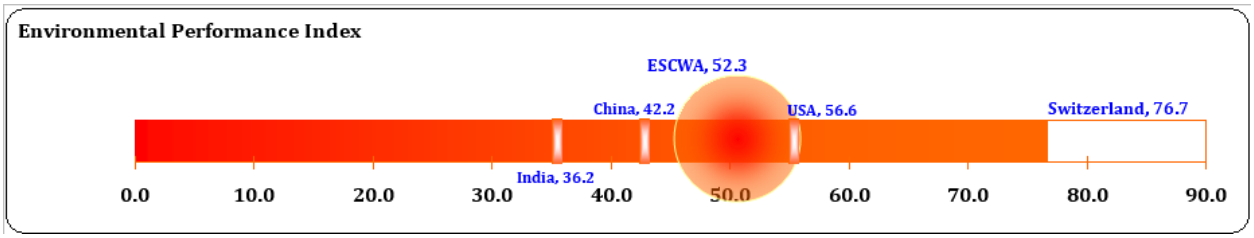


Figure 2. Environmental Performance Index (EPI) in the ESCWA Region in Context.

[1] ERF; 2012, p.5.

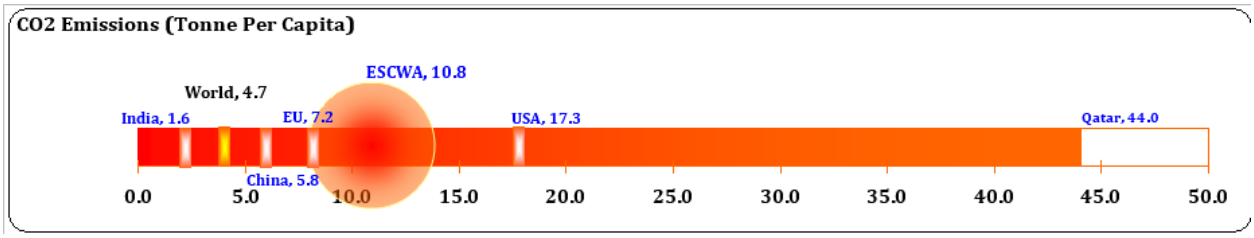


Figure 3. The ESCWA Region: Per Capita CO_2 Emissions in Context.

The Implications of Scarcity

It should be noted that the mapping reflects only a "snapshot" of the current situation, comparing how the countries fare with respect to the FAO's Water stress poverty line of 1000 m^3/capita/year. However, this does not reflect how the actual situation for the countries of the region has been worsening over time, under the combined effect of an increased demand due to population growth, and the decreased supply that is caused by Climate Change. this is shown by a comparison with the average of (1962-1987) and with Year 1992 (Table 1).

The data show that, compared with the 1960's, the various countries of the ESCWA region have been experiencing a decrease of 50% or more of renewable resources per person. There has been a lower level of decrease in renewable resources in Lebanon, as well as in the countries Maghreb countries of the Arab Maghreb. The countries that have experienced the most dramatic decrease in renewable resources are Qatar, Yemen and the United Arab Emirates (UAE).

However, it should be noted that the decrease has slowed down in countries such as Morocco, Oman, and Tunisia, while it appears to have accelerated in others, such as Jordan, Lebanon, and Yemen. In Palestine, it is most likely that the increase in the rate of deterioration is related to extraneous factors.

Table 3. CHANGES IN WATER AVAILABILITY IN THE ESCWA REGION

Country	Change in Water Availability (%)	
	Compared to Average (1962-1987)	Compared to Year 1992
Bahrain	-66.82	-32.07
Egypt	-52.66	-26.03
Iraq	-62.49	-36.50
Jordan	-73.03	-40.28
Kuwait	-73.99	-31.82
Lebanon	-39.96	-24.63
Libya	-63.78	-27.72
Morocco	-47.4	-18.66
Oman	-68.08	-28.93
Palestine	-67.94	-41.90
Qatar	-90.53	-61.43
Saudi Arabia	-72.68	-31.97
Sudan	-59.13	-31.07
Syrian Arab Republic	-66.26	-36.48
Tunisia	-44.77	-16.12
United Arab Emirates (UAE)	-93.73	-53.83
Yemen	-68.65	-40.80

Source: ERF; 2012, p.19.

The use of these surface and groundwater resources is therefore increasingly unsustainable, and the application of wastewater treatment is unequal across the region. A key factor in the transition towards a

Green Economy is therefore the promotion of water conservation and efficiency, through such measures as water metering, as well as the wide spread adoption of wastewater treatment and reuse to help protect the quality of regional aquifers.

However, studies on Ecological Footprint show that no sign that this is taken into account. As of 2006, all countries in the ESCWA region were found to have "an Ecological Footprint greater than their domestic biocapacity, though the individual rates of consumption varied widely" from country to country. While "Ecological Footprint accounts are not sufficient to manage a country's success", they may still prove to be an important limitation to development "in an ever more resource constrained world[1]".

2 Economic Transformation

The economic transformation of the ESCWA is reflected through patterns of sustainable production by economic actors and by sustainable consumption by people. This depends in large part on the share of Renewable Energy, the wealth generated by water, the role played by the private sector in the economy,, and combined actions of an economy's Small and Medium Enterprises (SME's) that go a long way to define economic dynamism at the local and national level.

Renewable Energy

The countries of the ESCWA area still lag in terms of the development of Renewable Energy, at less than 8% compared to a global average of approximately[2] 19%. This is spite of a high potential exists to generate electricity from such sources as solar, wind, and geothermal. While some projects have been initiated, it remains to be seen if the rate of new generation capacity would meet goals set by governments.

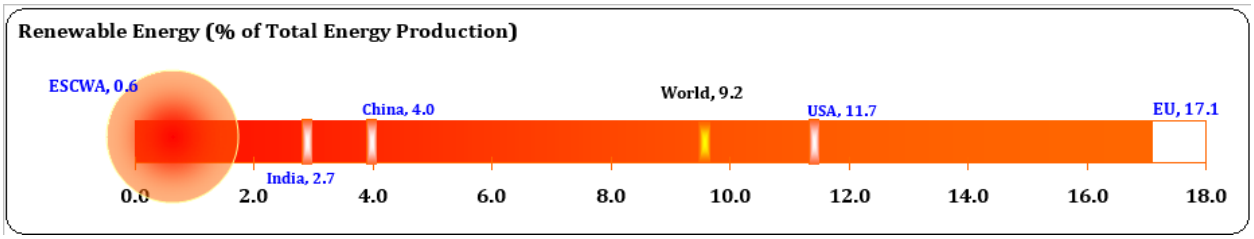


Figure 4. Renewable Energy: the ESCWA Region in Context.

Because of the need to reduce poverty and increase access to energy in an environmentally sustainable manner, the way forward requires greater implementation of renewable energy technologies. This is particularly critical in the ESCWA Region, where about 20% of the total population still had no access to electricity in the year 2003, with another 20% severely undersupplied[3].

Wealth Generated by Water

Water is unlike other goods or resources because it is essential for many consumption or production activities. This is ever more so in the ESCWA Region because of the prevailing freshwater scarcity; it not enough for countries to be water efficient, since they need to both secure a basic minimum of freshwater resources and ensure proper recycling. The scarcity of water resources can induce groundwater overexploitation that may decrease existing resources, thereby affecting all other related activities. This is

[1] ERF, 2011, p.25
[2] AUE, 2012a; EIA, 2011
[3] ESCWA, 2006.

already the case in some countries of the ESCWA Region. The prevailing scarcity is already reflected in the wealth generated by a cubic meter of water, an indicator that can help identify zones for improvement.

Table 4. WEALTH GENERATED BY THE USE OF WATER.

Country	Wealth Generated by Water (USD/m^3)		
	Agriculture	Industry	Services
Bahrain	0.61	315.15	
Egypt	0.96	18.58	685.53
Iraq		207.00	
Jordan	1.91	1,887.69	360.10
Kuwait		69.92	237.37
Lebanon	0.69	209.00	154.88
Libya	0.48	109.66	516.30
Morocco	1.47	389.47	2,036.30
Oman	0.45	653.57	
Palestine	9.89	492.18	
Qatar	0.53	22.60	
Saudi Arabia	0.81	53.04	411.07
Sudan	0.52	183.74	
Syrian Arab Republic	2.18	149.05	1,512.00
Tunisia	2.90	400.00	
United Arab Emirates (UAE)	1.16	315.15	
Yemen	1.77	18.58	

Source: Beaumont, 2000.

In the ESCWA region, the wealth generated by a cubic meter of water varies considerably among the various sectors of the economy; agriculture, industry, and services.

- The wealth generated by a cubic meter of water is particularly low in agriculture, averaging below US$2.00/cubic meter. The highest value of US$9.89 is found in Palestine, and the lowest value of US$0.45 in Oman.
- The regional average for industry is far above the wealth generated by agriculture. It averages at least US$344.02/cubic meter. However, this is a very large range, from a low of US$18.58 in Egypt to a high of US$1,887.69 in Kuwait. It is very likely that the high variation reflects resource extraction industries in oil-rich countries, particularly the related higher value added derived from petrochemicals when compared to traditional labour-intensive industries.
- services

A superficial economic analysis appears to suggest that it makes economic sense to transfer water from agriculture to the industrial sectors, however this would ignore the crucial fact that agriculture is often the only activity for a large segment of the population. Furthermore, it is very likely that the higher values obtained in industry reflect resource extraction industries in oil-rich countries.

The Role of the Private Sector

There is no published data on the Share of the Private Sector in GDP (GDP), however, there is a wealth of published data on the **Domestic Credits to Private Sector as Share of GDP**. Those are defined as financial resources provided to the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. In general, this reflects well the share of economic activity of the private sector. However, in some countries, the data may be misleading as these claims include credit to public enterprises.

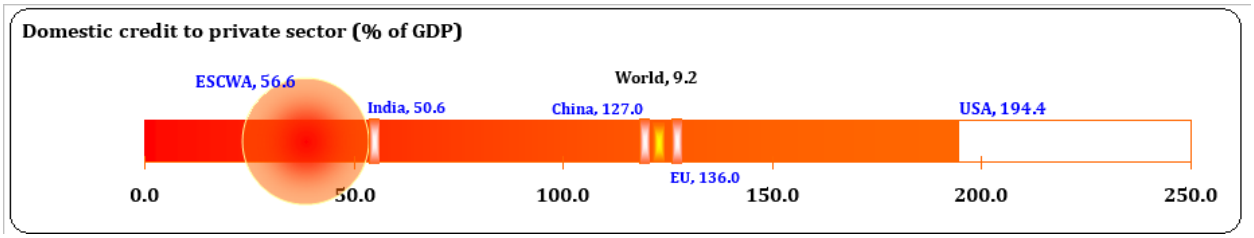


Figure 5. Domestic Credits to Private Sector as Share of GDP.

The Status of Small and Medium Enterprises (SME)

Policy makers in the ESCWA member countries are now seriously considering renewable energies as a viable alternative, and a key component of the transition towards a Green Economy. Efforts have been made, but the development of renewable energy is still in its beginning stages. Key actors of the transition towards the Green Economy may well be Small and Medium Enterprises (SME), as they often make up to 90% of businesses and provide significant job opportunities. In general, the global economic impact of SMEs is variable across the region, and their contribution to GDP differs between oil-producing countries and the others[1].

Outside the oil exporting states of the Gulf, SMEs are present in various sectors, and contribute significantly to the generation of Gross Domestic Product (GDP).

- In Egypt, they are the backbone of the economy, where they contribute almost 80% of GDP in non-agriculture sector and provide 75% of the private sector employment, mostly in manufacturing and retail trade.
- In Jordan, they represent 98% of all companies registered in the kingdom, and contribute about 50% of GDP; in the manufacturing sector alone (18% of GDP), they make up 87% of the enterprises.
- In Lebanon, SMEs account for 99% of the economic activity and contribute to 82% of the total employment in the country.
- In Morocco, SMEs account for 95% all enterprises, and represent 50% of employment, generate 30%, and mobilize 40% of private investment
- In Sudan, where the private sector is responsible for about 84% of employment, small companies with less than ten workers, accounted for 93% of the industrial base and about 40% of manufacturing employment.
- SMEs in Tunisia are estimate to account for 75% of private sector activity[2].

In oil exporting countries, SMEs tend to dominate the services sector. Governments are increasingly encouraging smaller scale entrepreneurship for the crucial reason of job creation.

- In Saudi Arabia, they account for only about 14% of total industrial production and 25% of employment, and their output represents about 8% of the value of exported industrial goods.
- In the United Arab Emirates (UAE), where the non-oil sector contributes over 60% of the country's GDP, SMEs are concentrated in the trading sector that contributes 16% of this share, and account for 86% of employment.

[1] DOC
[2] Di Tommaso et al. 2001.

In mature economies, SME's constitute a very large proportion to the economy, their contribution to GDP amounting to 45% in the US and 67% in the EU. In key emerging markets such as China, SMEs generate 60% of industrial output and contribute 40% of GDP[1]. They also have a significant impact in the region, where they constitute a major source of employment, even if a relatively high proportion of economic growth is either dependent resource extraction[2], or on large corporations with ties to the state. SME's therefore a special role to play for a balanced transition, with the potential to fit within the new "Green Value" chains and network of industries.

[1] Nicola, 2009.
[2] Need a Reference for this.

Table 5. ECONOMIC CONTRIBUTIONS FROM PRIVATE SECTOR.

Country	Domestic Credits to Private Sector ([1]) (% GDP)	Small and Medium Enterprises (SME) ([2]) Share of Total Business (%)	Share of Employment (%)	Contribution to GDP (% GDP)
Bahrain	75.9			
Egypt	33.1		([3])	80
Iraq	9.2			
Jordan	73.2		60	50
Kuwait	73.6	([5])		
Lebanon	85.5		82	
Libya	10.9			
Morocco	68.6			
Oman	42.9			
Palestine				
Qatar	43.9			
Saudi Arabia	45.9	90([4])	25	
Sudan	12.0			
Syrian Arab Republic	22.5			
Tunisia	68.8			
United Arab Emirates (UAE)	72.5	90	86	30
Yemen	6.3			

(1) Average over the period 2003-2007, except for Libya (1998-2002). Source: World Bank.
(2) Source: Nicola, 2009.
(3) SME Contribution to Employment in Egypt; 75% of Private Sector.
(4) SME Share of Total Business in Saudi Arabia; 70% of Businesses in Industrial Sector.

3 Progress and Well-Being

In the ESCWA Region, a large proportion of the working age population is young. Thanks to significant investments in human capital, the countries of the region have generally experienced reduced infant mortality, raised life expectancy, expanded school enrolments and increased literacy rates since the 1990s. As a result, the literacy level of this segment of the population far exceeds that of older generations, and it is therefore increasingly educated, mobile and informed.

However, the gap between rich and poor remained and, in some cases, it appears to be increasing. Such improvements have yet to fully translate into increased employment opportunities, as the local labour market struggles to absorb the large surplus of university graduates struggle. As a result, unemployment became a youth-centred phenomenon, with the share of youth in total unemployed exceeding 50 % for most Arab countries.

Job creation remains one of the top concerns and priorities of governments and the countries of the region share common characteristics with respect to demography and employment. Unemployment rates vary across the region, reflecting the region's diversity. On one hand, 45% to 50% percent of the female labour force aged 15 to 24 years is unemployed in Egypt, Jordan, Palestine, Saudi Arabia and the Syrian Arab Republic. Unemployment rates in some countries are highest among highly educated individuals; among university graduates, it reaches 56% in Jordan, 50% in Yemen, and 27% in Morocco[1]. Youth unemployment can therefore be considered a structural problem, often exacerbated by labour market rigidities, an in many cases a mismatch between the skills obtained by young graduates and the skills

[1] DOC

needed by businesses and industries in the region. A transition towards a green economy can help address this issue by;

1. Promoting sustainable development goals that seek to increase access to basic services, (e.g. electricity, clean drinking water, sanitation services, sustainable transport and healthcare), and thus create new employment opportunities in these specific sectors.
2. Fostering entrepreneurship and green enterprise development, especially SMEs, since they already employ the largest share of people in the region, drawing upon local labour[1].

4 Policy Response and Means of Implementation

Enterprises that are either engaged into green sectors or in greening their production have the potential to contribute to limiting waste, inefficiencies and pollution. This was recognized in the Rio+20 Conference, which considered that those businesses can play a key role in the transition towards Sustainable Consumption and Production (SCP).

Policy Response

In the run up to Rio+20, the regional commitment of ESCWA member countries to the Green Economy was outlined in the April 2012 "Arab Ministerial Declaration on the United Nations Conference on Sustainable Development (Rio+20)" of the Council of Arab Ministers Responsible for the Environment (CAMRE). The declaration considers that the transition towards a Green Economy be adapted for national priorities. In light of this, several regional initiatives have been undertaken to create employment opportunities within the context of a green economy:

- Among key national priorities is the promotion of SMEs. Towards this goal, In the ESCWA region, previous meetings of the Arab Economic and Social Development Summit heralded the establishment of an Arab Fund to support SMEs.
- "South-South" technology transfer through the initiation of the ESCWA Technology Centre to help knowledge transfer and raising awareness.
- Capacity strengthening work was done through the creation of three pilot Green Production Help Desks, hosted respectively by the Association of Lebanese Industrialists (ALI) in Lebanon, the Ministry of Environmental Affairs in Egypt, and the Ministry of Commerce and Industry in Oman.

However, the countries of the ESCWA region still lack and adequate economic management and structure that could enable them to develop proper policy responses and deploy proper means of implementation. In spite of relative progress, they do share a few common elements;

- Most countries have mostly emerged from a history of state ownership as a result:
    - They all have to contend with heavy government involvement in the economy, and now have a relatively large public sectors share of GDP, employment and investment. Job growth in the public sector has been slowing down compared to the 1990s, but the government wage bill in some countries is often still a major component of government expenditures.
    - They all have relatively weak private sectors with few large private enterprises and a low share of formal private sector employment in total employment.

[1] DOC

- Except for the Gulf states, capital markets remain largely underdeveloped. This restricts the supply of capital for private sector and SME growth is constrained, especially formal credit and risk financing.
- Countries share a low density of formal SMEs, with extremely low proportions of women-owned businesses. The majority of SMEs have fewer than 5 employees, and operate at a very low level of competitiveness.
- The cost of doing business is high, with high business transactions costs, tariff barriers with high reliance on import-substitution strategies, and domestic restrictions that impede private investment such as red tape, corruption, inefficient judicial systems and policy uncertainty.

Those are important weaknesses to overcome, if the transition towards a Green Economy is to ever be successful. Otherwise, the countries of the ESCWA Region would struggle to develop integrated and adequately coordinated policies and programmes, with proper means of implementation.

Means of Implementation

The means of implementation have two aspects; financial, and capacity. Both remain limited at the present time.

There is a lack on direct data in the countries of the ESCWA Region on Green Procurement or Green Financing. However, some effort is beginning on projects related to the provisions of the Kyoto Protocol, notably on **Clean Development Mechanisms (CDM)** and the **Adaptation Fund**.

- Clean Development Mechanisms (CDM) is a provision of the protocol that allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) to implement an emission-reduction project in developing countries. Such projects can earn saleable certified emission reduction (CER) credits, each equivalent to one tonne of CO2, which can be counted towards meeting Kyoto targets. The “CDM Projects” that fall under this article are those that stimulate sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission reduction or limitation targets, and they can be as diverse as a rural electrification project using solar panels or the installation of more energy-efficient boilers. At the present time, the total ESCWA emission reduction from CDM projects is about 22,930,000 Tonnes of CO_2, but the region has potential for much more.
- The Adaptation Fund has been established by the Parties to the Kyoto Protocol to finance specific projects and programmes in developing countries. The Fund is financed with 2% of the Certified Emission Reduction (CERs) issued for projects of the Clean Development Mechanism (CDM) and other sources of funding. The fund has recently approved its Operational Policies and Guidelines, which allow eligible Parties, seeking financial resources from the Adaptation Fund, to submit proposals. Among the agencies identified to manage grants from the adaptation fund are the United Nations Development Programme (UNDP) and the World Bank. At the present time, Egypt is the only member countries of ESCWA that has submitted project proposals for funding adaptation.

Table 6. CDM ACTIVITY IN THE ESCWA REGION.

Country	Number of Validated Projects	Emissions reductions (1,000 Tonnes of CO_2)
Egypt	N/A	5,750
Iraq	N/A	3,125
Jordan	N/A	1,219
Kuwait	N/A	1,407
Lebanon	N/A	104
Libya	N/A	454
Morocco	N/A	3,115
Oman	N/A	836
Qatar	N/A	1,464
Saudi Arabia	N/A	638
Sudan	N/A	275
Syrian Arab Republic	N/A	839
Tunisia	N/A	1,221
United Arab Emirates (UAE)	N/A	2,480

Note: Data as of January 2013

In addition to the funding available under the Kyoto protocol, "Third Party Financing" (TPF) is also available from multilateral sources. Those are funding by an external Energy Service Company (ESCO) that fully undertakes the financing, design, development and operation of the project, their investment being fully reimbursed by payments related to the performance of the technology. The concept of the energy service company (ESCO) has been implemented in countries such as in Egypt and Tunisia, and Lebanon's Central Bank has mechanisms in place to facilitate financing for some limited renewable energy projects. However, there are few wider scale initiatives with clear initial capital outlays from financial institutions, and potential investors appear to have little or no awareness of the relevant technological possibilities.

In turn, for such an economic management to be successful, the countries of the ESCWA region would need adequate ability for technology transfer. This requires an educational system well supplemented by adequate budgetary allocations should be made available by Arab governments for research and development (R&D).

Table 7. EDUCATION AND RESEARCH & DEVELOPMENT EXPENDITURE.

Country	Education Spending ([1]) (% of GDP)	R&D Spending ([2]) (% of GDP)
Bahrain	2.9	
Egypt	3.8	0.23
Jordan		0.34
Lebanon	2.0	
Morocco	5.6	0.64
Oman	4.3	
Qatar	2.5	
Saudi Arabia	5.6	
Sudan		0.29
Tunisia	6.3	1.02
United Arab Emirates (UAE)	1.6	
Yemen	5.2	

(1) Data for the year 2008, except Oman (2009); World Bank.
(2) Data for the year 2007 (Stevenson, 2007; ARF, 2009)

At the present time, the countries of the ESCWA Region remain "net importers" of technology; their weak high-technology export performance can be partly explained by the low level of R&D expenditures to GDP. The available data show this ratio to be less than 1 per cent of GDP, except for Tunisia which invested just over 1 per cent in 2007. Such a low-level of spending is far below the average of 2.47 % for high-income countries and indicates that the countries of the region risk falling "dangerously behind developed countries in innovation performance[1]" in spite of relatively high spending by the private sector.

[1] Stevenson, 2007, p.58.

C COUNTRY FACT SHEETS

1 Bahrain

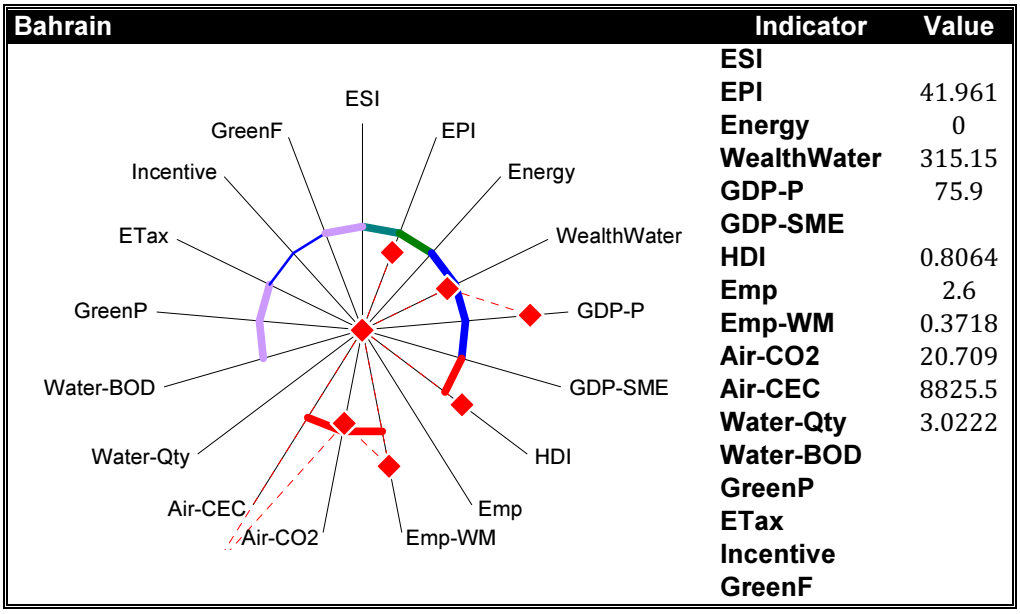


Figure 6. Bahrain.

Drivers

- The Arab Shipping and Repair Yard (ASRY) invested $2.3m in May 2012 to build an **eco-friendly sewage treatment plant**. The plant's design is based on Moving Bed Biofilm Reactor (MBBR) technology and will rely on an organic reed-bed treatment system to recycle majority of shipyards sewage. The current design is expected to use no chemicals, generate a low carbon footprint, and produce zero noise or odour, with low maintenance.

Enablers

- Draft legislation on new **eco-friendly policies** for new **buildings**, unveiled by Central Municipal Council of Bahrain unveiled in July 2012, scheduled to be implemented at the beginning of 2013. The new regulations follow international environmental standards and encourage better practices, in areas as lighting, air-conditioning and ventilation, noise, building materials, emissions, among others. Furthermore, buildings must include a minimum of 50% of greenery of the total land space, additionally to a green zone that must cover at least 50% of each new roof[1].
- Bahrain has also launched a pilot study in 2005 that was aimed at studying water usage, to inform planning for future projects and take into proper consideration of alternatives.

[1] http://www.tradearabia.com/news/ENV_219785.html (retrieved on 17 October 2012)
http://www.zawya.com/story/Bahrain_to_mandate_use_of_ecofriendly_best_practices_in_new_developments-ZAWYA20120916035107/ (retrieved on 17 October 2012)

Challenges

- A high reliance on **foreign labour**, most of which is often unskilled and engaged in low-productivity trades in such sectors as construction and services. In general, such low skills level provides no motivation for increased productivity. This low productivity and depressed wage cannot attract higher-educated national labour. This persistence of a low-wage, low-productivity economy thus hinders the transition towards more knowledge based work and thus Green Economy[1].
- A substantial share of the population lives abroad[2].
- Unsustainable **agricultural** practices, as shown by very high level of fertilizer, far higher than the average European consumption of fertilizers per hectare[3].

[1] ESCWA, 2011-a.
[2] ESCWA, 2011-a.
[3] ERF; 2012.

2 Egypt

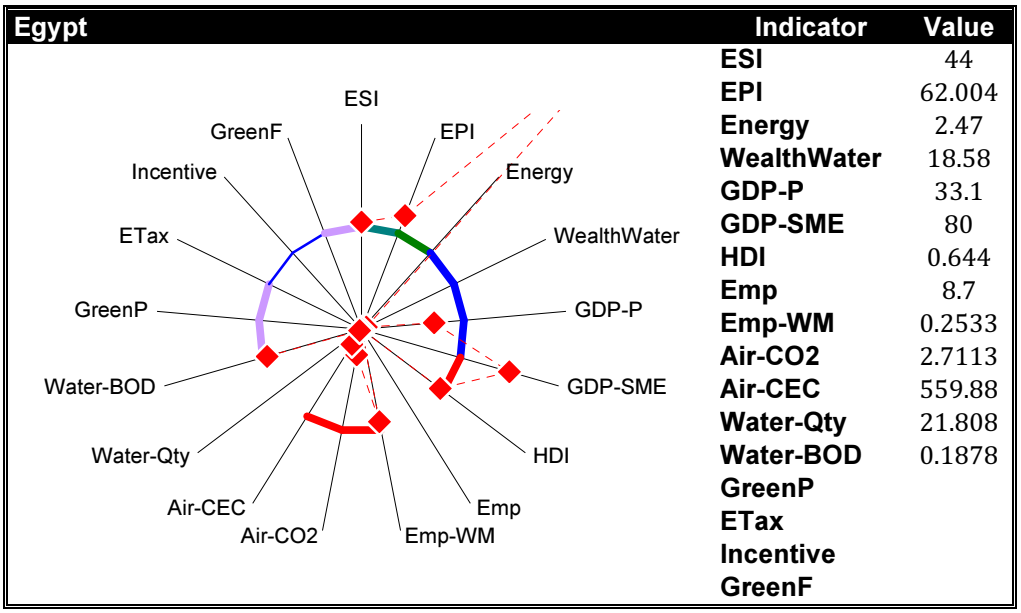


Figure 7. Egypt.

Drivers

- **Governance:** The newly instituted "New and Renewable Energy Authority" (NREA) Egypt is working on[1]:
    - **Renewable Energy:** Promoted the installation of a series of Photovoltaic and concentrated solar power (CSP) installations that generate electricity in part for water pumps, desalination, and rural electrification. The Egyptian Government has begun large-scale wind farm developments; with 430 MW currently installed (mostly along the coastal area between Hurghada and Zafarana) and plans to increase overall production to 7.2 GW. The Wind Atlas of Egypt estimates a potential for electricity from wind farms of up to 20 GW[2]. At the moment, plans for solar energy show a target of 100 MW by 2017.
    - **Green Businesses:** Resort city of El Gouna, on the Red Sea, developed along eco-friendly lines. Projects such as SEKEM promoted organic farming and the installation of biodynamic farms, reclaiming almost 17,000 acres of agricultural land, allowing for for an increase in water holding by up to 70%, a decrease in water consumption by 20-40%, as well as the protection of soils from erosion[3].
    - **Transportation:** transport: expansion of the existing Cairo metro service, and ongoing conversion of some of Cairo's fleet of over 80,000 taxis to natural gas. Similarly, the compulsory vehicle testing of cars for road worthiness and acceptable levels of vehicle emissions is another transport initiative.

[1] Young, 2012.
[2] Developed as a joint cooperation between Denmark's Risø National Laboratoryf, the Egyptian Meteorological Authority (EMA), and the New and Renewable Energy Authority (NREA); (Comsan, 2008).
[3] SEKEM, 2011

- The Egyptian economy is **well-diversified**, with SMEs contributing almost 80% of GDP. The largest contributors being manufacturing (16%) and wholesale and retail trade (11%).

Enablers

- **Investments: t**he share in total investment of the export-led manufacturing industry has increased from 5% in 2003-2004 to about 23% in 2006-2007. Its share in employment remained stable over the same period, around 12% to 13%.
- **Renewable Energy:** formal commitment, with an objective to achieve 20% of energy needs from renewable sources by 2020. This is further backed by a 20-25 years Power Purchase Agreements with Government guarantees, tax exemptions on equipment used for renewable energy, and benefit from carbon credits under the Clean Development Mechanism.
- There are a growing number of **Green Business** initiatives in Egypt
    - **Sustainable Tourism**, or "Eco Tourism", is being promoted by the Ministry of Tourism (MOT), with "eco-villages" near Al Fayoum city, North and South Sinai, in the Western and Eastern desert.
    - The "Green Pyramid Rating System" (GPRS) was issued by a ministerial decree in December 2010, to look into all aspects of sustainability towards **greening buildings** and cities, including ecology, energy efficiency, water efficiency, materials and resources, indoor environmental quality, management and innovation. It has developed a Sustainable Design Process Model (SDPM) that offers guidance to help build environmentally sound buildings by offering consultancy and professional advice[1].
    - Private enterprises have seized on the opportunities provided by the need for **solid waste treatment and recycling**. For example, an Egyptian SME realized the importance of recycling printer ink cartridges. Egypt's more than 300 million printer cartridges discharged every year represent a financial value of more than USD 450 Million, and a waste of more than 4,000,000 gallons of Oil[2]. This SME is today one of the biggest recycling enterprises in the Middle East.
- **Agriculture:** The Government has set a number of objectives towards achieving sustainable agricultural development by 2030, focusing on increased efficiency and better management of irrigation systems, using organic fertilizers as opposed to the use of chemical fertilizers, and reducing agricultural waste.

Challenges

- **Unemployment** has increased from 9% to about 12%, and about 25% of people aged between 15 and 24.
    - This figure that may understate the actual extent of the problem, since around 28 million people are actually accounted for in the labour market for a population of more than 83 million.
    - Unemployment is exacerbated by an extremely **unfavourable business environment**, as shown by the country's 114th ranking in the World Bank's "Ease of Doing Business

[1] El- Demirdash, 2011

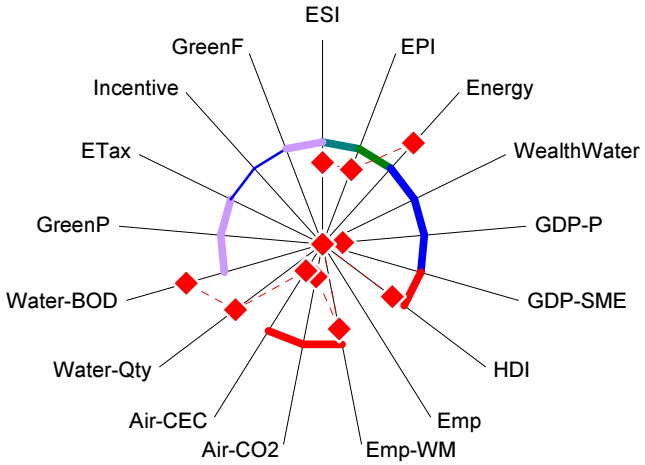
[2] on average, more than two ounces of oil are used for the production of every inkjet cartridge. Toners for laser printer represent an even higher amount.

Index". The low score is largely due to excess bureaucracy that creates key hurdles not only to construction permits and contract enforcements, but also to simpler tasks such as hiring workers, paying taxes, and closing a business.

- About 35% to 40% of the total population living **below the poverty line**. This is exacerbated by:
    - **High inflation**, estimated at above 16%, and continued contraction of the economy, with Gross Domestic Product (GDP) decreasing by 1.5%. Government public debt reached around 85.7% of GDP, a critical situation especially since Egypt became a net importer of oil in 2008.
    - **Poorly targeted subsidies** on which the government spends more than on education and health combined. They tend to benefit the rich as well as the poor; while 20% of the population is living under the poverty line, more than two-thirds of the population benefits from the subsidy for bread[1], in addition to the fact that about 39% of the wheat used for producing the local bread is lost through leakages and wastage.
- **Agriculture** faces an important challenge; while cropland yields were greater than the global average, the yields from grazing land, fisheries, and forest yields are lower.
    - Overall, the income generated from agriculture remains proportionally low, with about 32% of the labour force engaged in a sector that contributes only about 15% to GDP. In comparison, industry employs about 17% of the labour force and generates 40% by industry.
    - Only about 2.92% of the land is arable, with 0.5% allocated to permanent crops. In addition, agriculture uses 85% of available freshwater in a water-scarce country with annual per capita consumption of 750m^3, and uses comparatively high level of fertilizer, far higher than the average European consumption of fertilizers per hectare[2], which may be a significant contributor to the high level of nitrate contamination of surface water.
    - Egypt has been running an "ecological deficit" since the 1960's, in part sustained by the income from oil revenues. Its Ecological Footprint of production appears greater than its local biocapacity value, indicating that it may be drawing down its stock of natural capital. With fishing grounds in surplus, this "production overshoot" appears to come entirely from forest land. The resulting furthering of deforestation of the remaining forests may have severe impacts on soil stability, water storage, and biodiversity[3].
- **Governance** problems remain, notably in enforcement and accountability. As an example, while such the law[4] prohibits disposing of waste in the Nile, many industries continue to do so.
- **Pollution:** notably air quality, with the highest level of particulate pollution in the world. Particulate pollution is particularly a problem in the capital, Cairo.

[1] Situation Analysis: Key Development Challenges Facing Egypt, 2010
[2] ERF; 2012.
[3] ERF; 2011, p.36.
[4] Law 48 of 1982.

3 Iraq



Iraq	Indicator	Value
	ESI	33.6
	EPI	40.998
	Energy	0.86
	WealthWater	
	GDP-P	9.2
	GDP-SME	
	HDI	0.5729
	Emp	15.3
	Emp-WM	0.2344
	Air-CO2	3.5071
	Air-CEC	994.02
	Water-Qty	1067.9
	Water-BOD	0.2727
	GreenP	
	ETax	
	Incentive	
	GreenF	

Figure 8. Iraq.

Drivers

- Among the various service sectors, the Tourism industry has enormous potential in Iraq, both as cultural and as religious destination.
- Both the central government and regional administrations are committed to developing the agriculture, industry, and service sectors, as the optimal way to create both direct and indirect jobs.

Enablers

- Iraq has one of the world's largest oil reserves, which is a powerful source of funds to help the country in its transition towards a Green Economy. The oil sector currently provides more than 60% of the country's gross domestic product (GDP) and 95% of its hard currency earnings.

Challenges

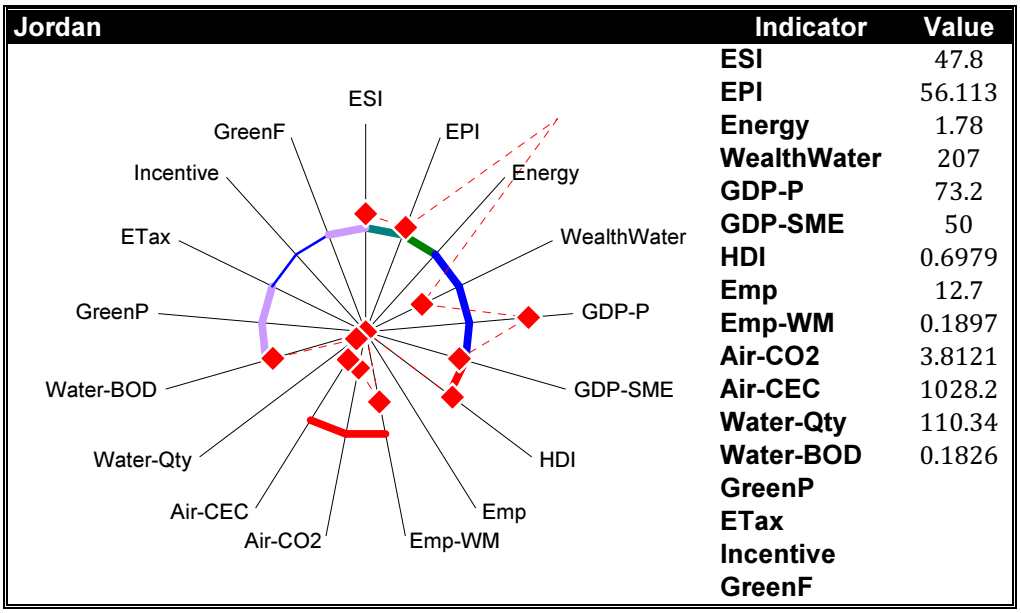
- The predominance of the oil producing sector indicates a **lack of diversification of industrial activity**, with manufacturing still making up only a small share of the industrial sector's contribution to GDP.
- The workforce remains largely segregated, with half of all employed men working for private sector companies, compared to only 17% of employed women. Most working women appear to have a preference for public sector work.
- Overall, there has been an appalling downward trend in almost all human development indicators relative to the 1980 baseline. Furthermore, because of the recent upheavals, Iraq now has inadequate processes for formulating and developing integrated policies. This is not only because of a limited consultation processes and the lack of effective advocacy from weak private sector associations and Non-Governmental Organizations (NGOs). In this context,

policy makers have yet to make effective use of research and evidence-based approaches.This is reflected in:

  - The unstable and unreliable supply of electricity with more than 3.2 million households experiencing interruptions.
  - The high cost and low quality of water with more than 76% of all rural households having problems accessing drinking water. In addition, urban access to safe drinking water is now only available to 60% of the population.
  - The decline in the quality of sanitation with more than 1.5 million people suffering from unimproved sewer systems and the high cost and low quality of housing affecting more than 45% of all households.

- Many areas of the country still have massive quantities of highly hazardous waste. Generated by military operations in the recent past, those wastes contain an extremely high amount of toxic chemicals and radioactive material. In addition, poor monitoring of the metals reclamation industry means that a significant amount of contaminated material has been recycled, untreated, in the larger economy.

4 Jordan



Indicator	Value
ESI	47.8
EPI	56.113
Energy	1.78
WealthWater	207
GDP-P	73.2
GDP-SME	50
HDI	0.6979
Emp	12.7
Emp-WM	0.1897
Air-CO2	3.8121
Air-CEC	1028.2
Water-Qty	110.34
Water-BOD	0.1826
GreenP	
ETax	
Incentive	
GreenF	

Figure 9. Jordan.

Drivers

- **Renewable Energy:** Between 2015 and 2020, the Government to have the following new electricity; 600 MW from wind power, 300 MW to 600 MW from solar-power generation capacity, and 30 MW to 50 MW from biomass.
- An extensive **Water Information System (WIS)** that allows for environmentally extended **input-output analysis of water usage** through a detailed metering system and thorough accounting. This enhances the alleviation of Jordan's **Structural Water Scarcity** by better managing water usage, since physical water flows are accurately related to economic activity; the system collects data from across the country, including real-time meter and telemetry, and stored in a centralised database for analysis by a variety of software-based analysis. This allows the accurate analysis to provide a more detailed picture of the physical flows of water in the economy.
- A **dynamic business sector**, with SMEs making up about 87% of enterprises in the country's industrial sector (about 18% of GDP). SMEs make up the vast majority of Jordan's industrial enterprises, with industrial exports accounting for 90% of their overall exports.

Enablers

- **Energy Governance,** enhanced through the "National Energy Strategy" calls for Jordan to derive 7% of its electricity from renewable energy sources by 2015, and 10% by 2020. The new "Renewable Energy Law" encourages renewable energy production, giving businesses with solar energy systems or wind turbines the right to sell excess electricity back to their electricity provider at the full retail rate. It also requires the "National Electric Power Company" (NEPCO) to purchase all electricity generation from utility-scale renewable energy projects.

- In order to help the **redistribution of available water resources** to different uses, the government's planning and future projects take into consideration alternative sources for water supply, including building dams and the use of such non-traditional sources as the reuse of treated water and desalinization. In 2008, the section of environment statistics in the Department of Statistics undertook a pilot study on that includes water sector challenges, data sources, and water supply and demand analysis.
- **Green Businesses:** Sustainable Tourism, or "Eco Tourism", has been a successful development, thanks in part to the work of the Royal Society for the Conservation of Nature (RSCN). Its importance was recognized since 1995 when the first Jordanian Environmental Protection Law was introduced, reinforced by the establishment of an Environmental Police Unit in 2006.
- Establishment of the ESCWA Technology Centre in Amman to promote South-South cooperation,

Challenges

- The country has **scarce natural resources**, with few water sources within its own border, and no significant oil finds.
- Highly **unfavourable business environment**, as shown by the country's 101st ranking in the World Bank's "Ease of Doing Business Index". The low scores is largely due to excess bureaucracy and inefficiencies, as shown by the high share of public sector employment, in spite of significant efforts made to downsize the public sector. Employment in the public sector is around 31% in 2008, having decreased from 45% in 1987 and 36% to 1996[1].
- **Agriculture** still relies on a comparatively large amounts fertilizer, and has a remarkably high level of pesticide use compared to most other countries in the region[2].
- The lack of sufficiently skilled human resources. There remains a need to reinforce linkages and cooperation between academia and industry. There is no significant policy drive to enhance productivity in many industrial that still rely on low-skilled labour. Those businesses make up a large proportion of exports, with such industries as leather and garments making up 35% of the exports of SMEs, and textiles and apparel accounting for more than 30% of total exports[3].

[1] ESCWA, 2011-a.
[2] ERF; 2012
[3] Nicola, 2009.

5 Kuwait

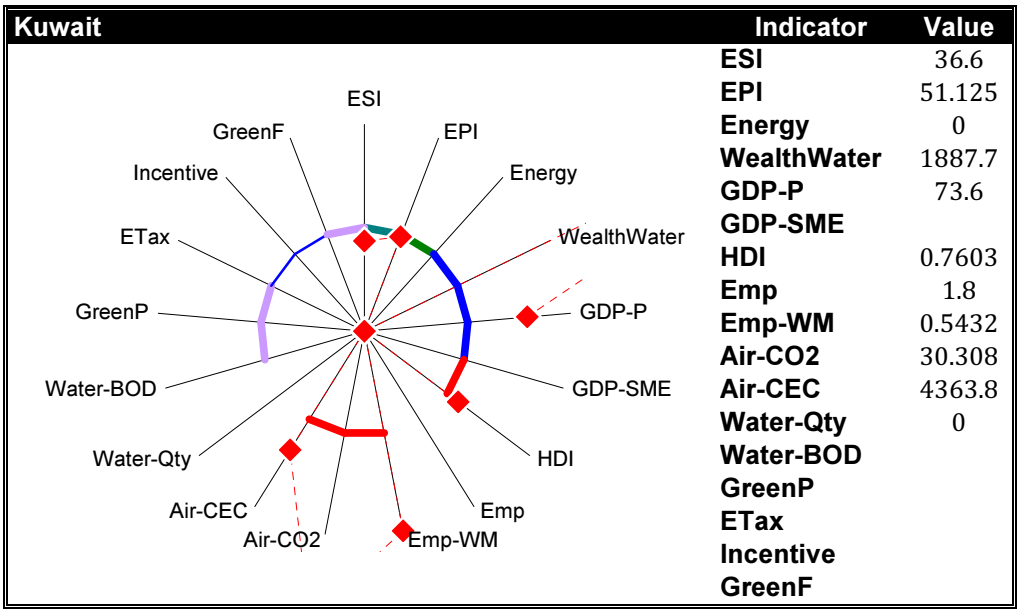


Figure 10. Kuwait.

Drivers

- The country is largely a desert, given its geographical location, with no forests and no significant land area that need to be protected to maintain biological diversity. A significant proportion of coastal areas, however, provide for rich shrimp fisheries. The government has therefore undertaken **effective fisheries management** measures to optimize sustainable production. The main measure are based on a closed fishing season to alleviate declining catches, closed areas along the coast to protect spawning, and "effort limitation", restricting entry to the fishery and monitoring mesh sizes.

Enablers

- **Governance:** Law presented to the parliament of Kuwait's parliament for the establishment of an independent SME authority to help create new channels for employment and diversify the country's economic base from resource extraction.

Challenges

- A high reliance on **foreign labour**, most of which is often unskilled and engaged in low-productivity trades in such sectors as construction and services.
- The share of women in wage employment in the non-agricultural sector was 37.33% in 2002, up from 30.96% in 1993, but still short of gender equity[1]. Furthermore, it appears that most of those gains have been achieved in the **public sector**, which represents more than 70% of total female employment[2].

[1] Kuwait; 2003 Country Report on the Millennium Development Goals: Achievements and Challenges.
[2] ESCWA, 2011-a.

- Limited water resources, most of the supply being provided by desalination and groundwater. The high-energy requirements of desalination is such that it may have played a significant role in the increase of energy use per capita.

6 Lebanon

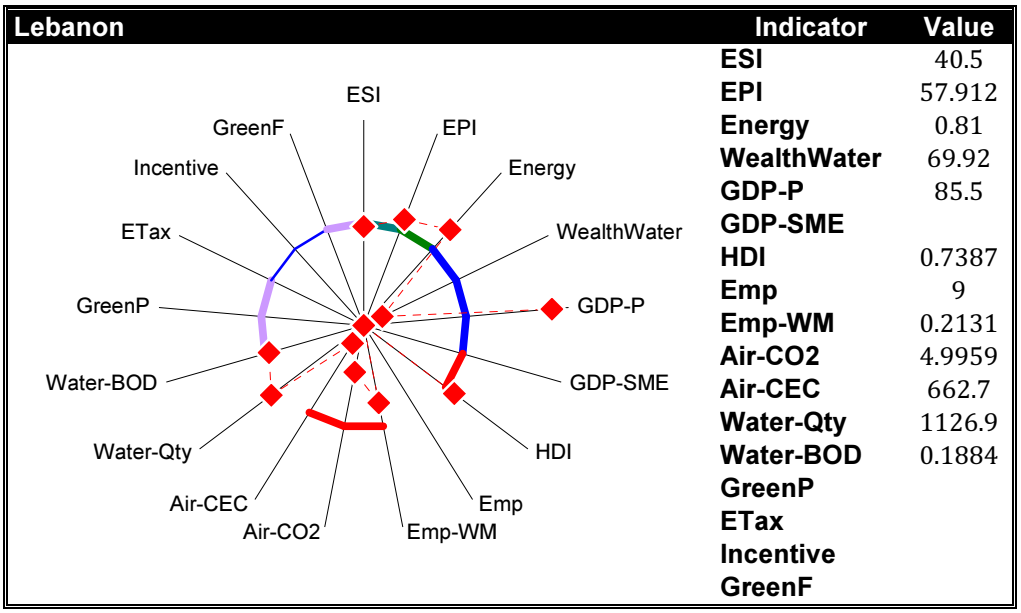


Figure 11. Lebanon.

Drivers

- Lebanon has a comparative advantage in water efficient organic **Agriculture**, which was demonstrated in recent projects by Lebanese non-profit organizations that are successfully promoting **access to market** for organic farming. Notably, organizations such as "Souk El Tayyeb" and "Watani", through their encouragement of traditional agricultural products, this green initiative has encouraged the creation of green jobs by providing rural access to market for their products. "Souk El Tayyeb" further helps raise awareness of the public for the value of organic farming, and act as a platform for people from several regions in rural Lebanon to cooperate and exchange information and best practices.
- There are planned **wastewater treatment** facilities at various stages of implementation. Currently, there are five complete wastewater treatment plants along the coast, two of which are operational, but limited to preliminary treatment before disposing of effluents into the Mediterranean Sea. In addition, there are eight small scale treatment plants operational inland.
- Greater awareness and demand is already leading to the creation of "**Green SMEs**": such as one established in 1996, only to became one of the leading plastic raw material suppliers. By May 2009, the company had pioneered the introduction of new technologies such as d2w™ which converts ordinary recycled plastics into a material with a completely different molecular structure. This "oxo-biodegradable" plastics technology allows plastics to degrade in a short time and environmental-friendly manner.
- The Lebanese Central Bank has recently permitted commercial banks to use a part of their deposited reserve funds at a zero percent interest rate for certain specified purposes. As a result;
    - Interest free loans for the purchase and installation of solar water heaters, are available from commercial banks in partnership with the Central Bank, with a repayment period of up to 5 years.

- This is facilitating the provision of grants from the Ministry of Energy and Water through the Lebanese Center for Energy Conservation for solar water heaters. As a result, solar water heaters became a significant industry in Lebanon. The "Lebanese Institute for Industrial Research Development and Technology" organizing training programmes on "manufacturing and installation of solar heaters for domestic and industrial uses".
- Interest free loans for energy efficiency projects, renewable energies and green buildings are also available from commercial banks in partnership with the Central Bank, and the Lebanese Center for Energy Conservation for technical evaluation, with a grace period of up to 4 years and a repayment period of up to 14 years.

Enablers

- **Green Businesses:** Sustainable Tourism, or "Eco Tourism" has been pioneered by the Lebanon Mountain Trail (LMT) which strives to enable the preservation of the region's natural heritage by leveraging it to enhance the economic opportunities of rural mountain area.
- High level of enrolment in education, with secondary school enrolment rates 14 points above the regional average.

Challenges

- A very high public debt-to-GDP ratio (162% in 2008), and continuing budget deficits. In the context of enduring political gridlock there is no clear path to public-sector reform.
- Lebanon consumed about 2,500 megawatts (MW) in 2008. It almost totally relied on imported **High Emission Factor Fuels** in its primary energy mix.
  - In 2008, electricity from thermal sources accounted for 99.3% of the production of the national electricity company, and for 64.7% of its energy purchases. At the same time green hydropower sources accounted for 0.7% of the production and 35.3% of energy purchases.
  - However, due to systemic power shortages, much of Lebanon's electricity is produced by individual generators. As a result, network energy consumption from thermal sources actually represents 96.7%, while hydropower still accounts for only 3.3%.
  - Demand for electricity is forecasted to reach over 4,000 megawatts (MW) by 2015, thus requiring an additional 1,500 MW capacity. With the current underinvestment in the national electricity company, the reliance on back-up generators will continue, with the associated increase in the consumption of imported High Emission Factor Fuels.
- Only 52% of buildings were **connected to the sewage network** by 2004. Most other buildings rely on sceptic tanks which are usually permeable to prevent overflow, and the bulk of raw sewage generated from residential and industrial areas in Lebanon is discharged without treatment either into the sea or in watercourses. There is no wastewater treatment and disposal cost recovery.
- Lebanon remains hindered by an **unfavourable business environment**, as shown in the World Bank's 2009 "Ease of Doing Business" index that ranks Lebanon 99th , largely to excess bureaucracy, inefficiencies, and an unevenness in the application of the law.
- In spite of the high level of enrolment in education, there is a strong **disconnect between public and private education**; while total education spending in Lebanon exceeds 13% of

GDP, public expenditure on education constitutes only 2% of the GDP and 8% of the total government expenditures.

- The economy remains **import-dependent**. In spite of increased awareness of the need to recycle, the adoption of better waste management practices remains unequal. Most of the country's employment is directly dependent on the trade sector, with more than 70% of the activity of SMEs concentrated in trade[1].

[1] Nicola, 2009.

7 Libya

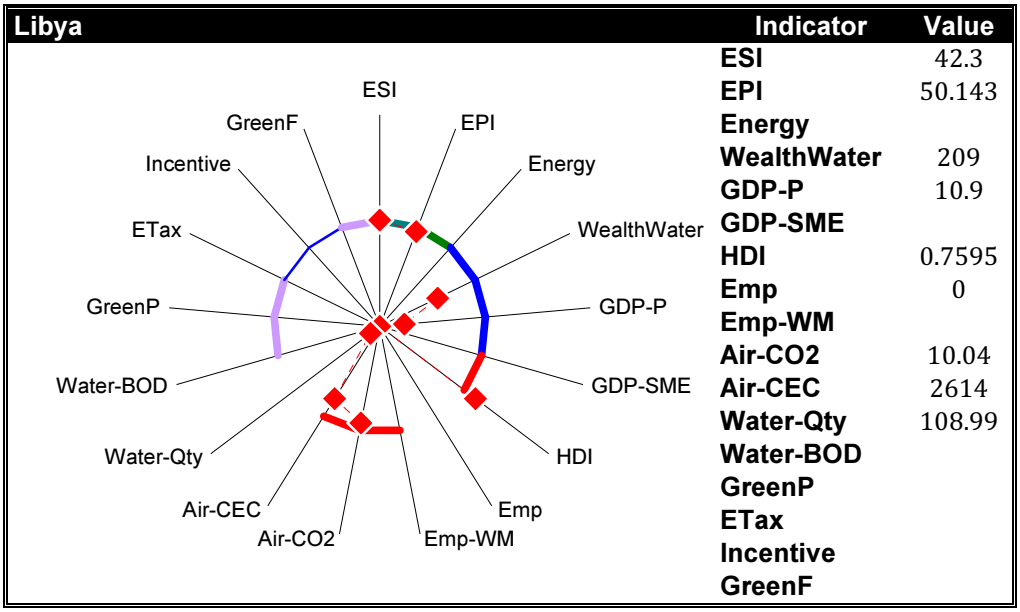


Figure 12. Libya.

Challenges

- The Libyan economy is characterized by a high dependence on the oil and gas sector. Outside the sector, private companies have struggled to provide much value added contributions and growth performance. Those companies are hobbled by three structural limitations:
- In the absence of a significant culture of entrepreneurship, business also generally lack know-how, and are often characterized by poor managerial, financial and marketing capabilities.
- Libyan SMEs are concentrated in clusters around Benghazi, Jebel Akhdar and Al-Marqab. The current political situation hinders any expansion beyond those clusters, or any further investment.
- Libyan private enterprise is generally hobbled by an oversized and inefficient public sector. In spite of the country's low business taxes. This leads to creates obstacle for SMEs creation such as transaction and start-up costs, and a heavy regulatory framework.

Enablers

- While Libya has emerged from the recent upheavals in dire need to rebuild its government institutions, its oil reserves can potentially provided it the financial resources to facilitate the transition towards a Green Economy. The country can thus "leapfrog" to Green Technology.

Challenges

- Libya still has inadequate processes for developing policies, with no central vision to formulate integrated strategies. In the current situation, the country has yet to develop an effective consultation processes, with advocacy from private sector associations and Non-Governmental Organizations (NGOs). It is not yet clear whether academic and research institutions have recovered well enough to provide the research and evidence-based studies that are needed by policy makers for effective decision making.

- Manufacturing has historically constituted only a small share of industry's contribution to GDP. The predominance of the oil producing sector indicates a **lack of diversification of industrial activity**.

8 Morocco

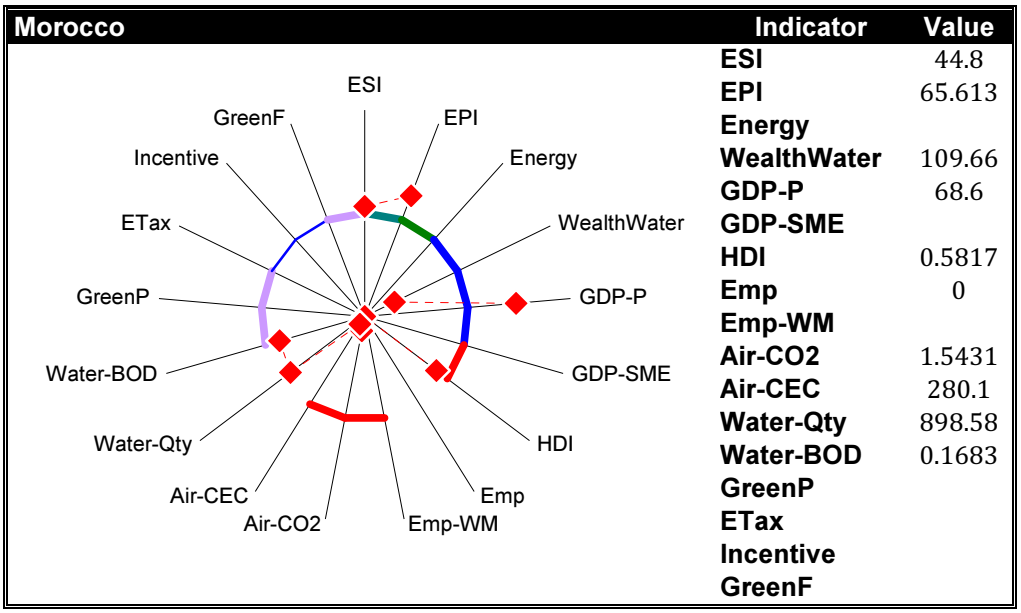


Figure 13. Morocco.

Drivers

- Construction of a 500 MW concentrated solar power plant in Ouarzazate, under a Public-Private Partnership (PPP).
- While still low by any international benchmarks, female labour force participation rates have increased rapidly since the early 1990s, although they have recently stagnated, at around , at around 27% of total employment. The higher rates may be partly due to women workers benefiting from growth in the textiles and garment sector in earlier years.
- The venture capital industry in Morocco is comparatively more developed compared to the other countries in the ESCWA Region. The first venture capital company in Morocco appeared in 1993 and by 2007 there were more than a dozen funds in operation[1].

Enablers

- Agriculture still plays a relatively dominant role in the Moroccan economy. Because of the country's growing potential as a source of organic agriculture for the European market, the enhanced high access to market may turn a low-income activity into a relatively higher income trade.
- In spite of its low segment of the population involved in manufacturing, Morocco's output is still significant. Indeed, at 9% of total manufactured exports, the country has the highest share of high-technology exports of the ESCWA Region.

[1] Stevenson, 2010.

Challenges

- While job growth in the public sector has slowed down compared to the 1990s, the ratio of government wage bill to gross domestic product (GDP) has increased over the 1990 level.
- The unemployment situation is particularly severe among youth, accounting for 42% of the unemployed population. Unemployment rates are similar for both men and women; depending on the actual underlying reason, this may prove to be a further hindrance to the promotion of gender equity in the context of a conservative society. Adult literacy rates remain relatively low at 60%, and the country has high drop-out rates, low tertiary enrolment rates, high unemployment among graduates and a high level of informal employment. The gender gap in all those measures is also very high.

9 Oman

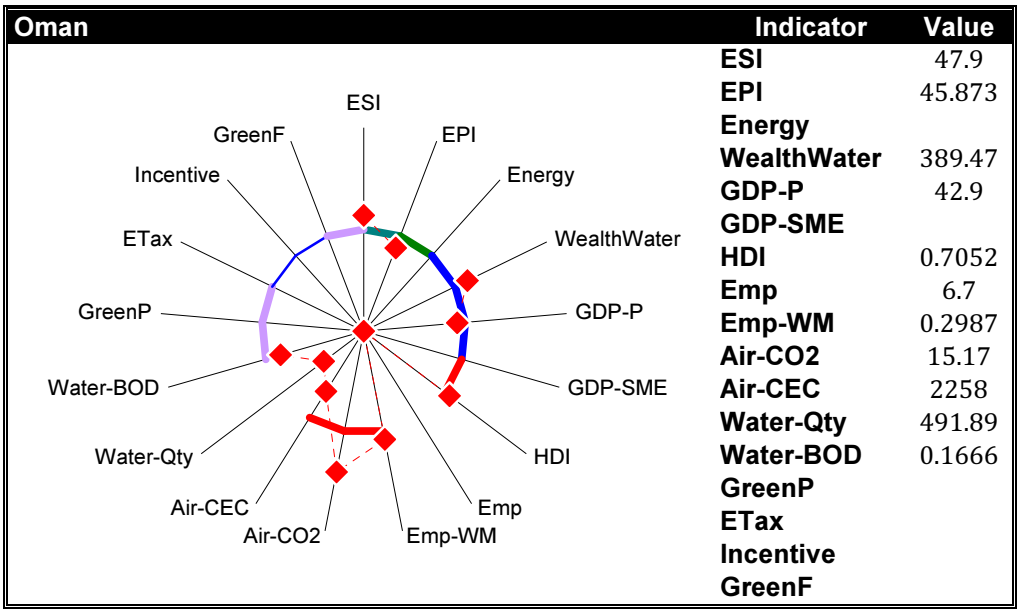


Figure 14. Oman.

Drivers

- The Omani economy is managed within the framework of the Vision Conference: Oman 2020". held in Muscat in June 1995 to chart a series of five-year development plans that would draw define the country's future sustainable economic growth. In the 7th Five-Year plan, has an explicit focus on enhancing women's participation in development, conserving the natural heritage of Oman, and encouraging the establishment of SMEs. This is in addition to the initial emphasis on sustainable economic growth and reducing the dependence on oil and diversifying the economy.
- Since 2010, the government has been promoting farming and fishing, two of the oldest traditional occupations in Oman. The "Executive Regulation for Farming System" was issued by the Omani Ministry of Agriculture and Fisheries Wealth (MAFW) in 2010, and new regulations followed in May 2011 to help support the fisheries sector.
- The tradition of Farming in Oman is largely sustainable, centered around the "Aflaj" system. The MAFW has so far implemented several pilot projects with farmers on enhancing **water efficiency**, in addition to supporting the maintenance and expansion of the "Aflaj".
- The MAFW also has a programme that targets **rural women** as an important production element in the agricultural sector through the development of their capacity and improvement of their performance in various processes on the farm.
- An Agriculture and Fisheries Development Fund, was established in 2004 to support the agriculture and fisheries sector in rural communities.
- The Sultanate currently has established so far 16 Nature Reserves proclaimed by Royal Decrees, in addition to rules and regulations that ensure minimal environmental impact of development and industrial projects.

Enablers

- The government has several programmes aimed at **poverty eradication**, such as Social Security, Social Assistance, and a Housing Programme. In addition, the Ministry of Social Development (MSD) is implementing Livelihood Projects to help people wean themselves off government aid.
- The Authority for Electricity Regulation (AER) has carried studies that determined that, under current technologies, Oman has enough solar energy not only to meet its electricity requirements, but also to provide for export. The Public Authority for Electricity and Water (PAEW) has further identified sites for a potential 200 MW solar power plant. Both the AER and PAEW are further considering the introduction of policies to promote energy-efficiency.
- Women's empowerment has been enhanced during the seventh five-year plan, with the issuance of Royal Decree No. 125/2008 that amended the Government Land Entitlement System and granted Omani women full land ownership rights.
- The Research Council (TRC) of Oman, established in 2005, has launched an "Adaptation Towards Sustainable Development" programme, and the "Oman Eco-House Design Competition" to promote awareness on the use of sustainable energy and adoption of green standards in the design and construction of buildings.

Challenges

- A high reliance on **foreign labour**, most of which is often unskilled and engaged in low-productivity trades in such sectors as construction and services. In general, such low skills level provides no motivation for increased productivity. This low productivity and depressed wage cannot attract higher-educated national labour. This persistence of a low-wage, low-productivity economy thus hinders the transition towards more knowledge based work and thus Green Economy[1].
- Foreign Direct Investment (FDI) remains focused on an **oil and gas sector** that accounted for 75.8% of the total revenues of the Sultanate, and which received 45% of the total in 2008. In comparison, only 17% FDI went into manufacturing sector[2]. FDI may futher fuel inflation, as 8.3% went into real estate and 4.3% into construction.
- The **structure of the workforce** is a challenge; while the number of expatriate workers in the private sector has risen, the number of Omanis has decreased, as most nationals appear to favour the public sector. In addition, **rising salary levels** could hamper growth of the manufacturing sector if not paralleled with appropriate production levels.

[1] ESCWA, 2011-a.
[2] MCI, 2011: p55

10 Palestine

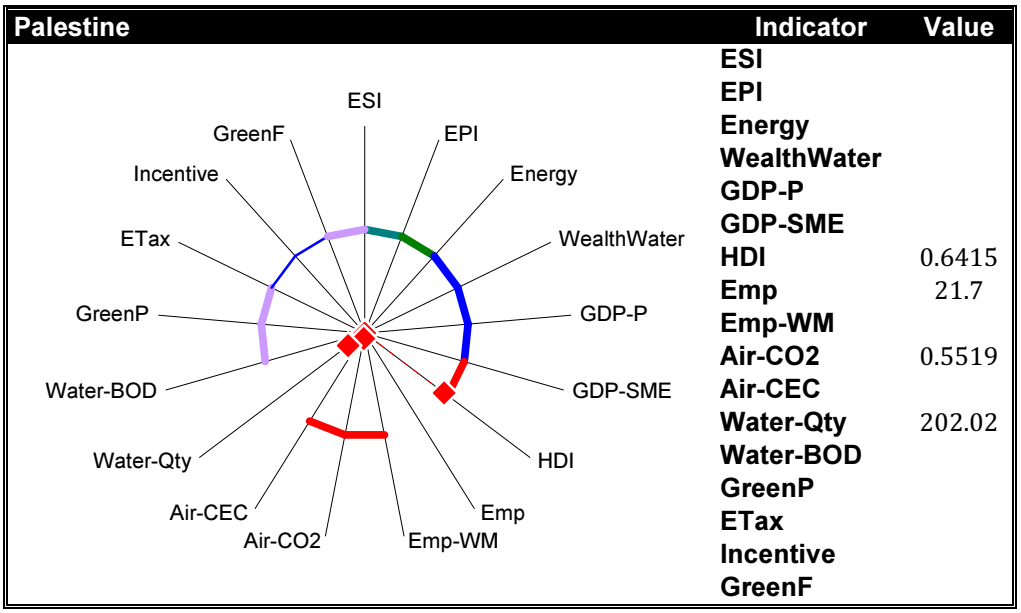


Figure 15. Palestine.

Drivers

- **Agriculture:** Leveraging traditional farming knowledge, by adapting to the harsh conditions of rural life and occupation, most notably through:
    - Various ingenious means of growing food that are **water and energy efficient**, such as rooftop gardens that use simple soil-creation technologies.
    - Various project help promote Palestinian agriculture, most notably **olive production** that has a very significant contribution to the national economy, and on which many vulnerable Palestinian families depend for their income. An example is the EU funded project "Increasing Marketing Competitive Abilities for the Palestinian Olive Oil" was initiated in 2008. It centered on the **income and living standards for vulnerable rural populations** through applying profitable environment-friendly and sustainable agricultural techniques.
- In the face of tremendous odds, Palestine retains the potential for **technical innovation**. This is exemplified by the establishment in 2008 of "MENA Geothermal", the first licensed geothermal enterprise in the ESCWA Region. The company has been successful, winning several contract awards since its creation, notably Jordan's American University of Madaba (AUM), the largest geothermal heating and cooling system in the ESCWA Region with a total cooling and heating load of 1.6 MW and 1.5 MW, respectively, saving the equivalent of 200,000 kWh/year of electricity consumption, and reducing CO_2 emissions by 47% compared to conventional systems.

Enablers

- The transition towards a Green Economy will be greatly helped by the high degree of education of the Palestinian population, and the relatively large number of people with marketable skills.

Challenges

- Long-standing conflict has resulted in devastation of basic infrastructure, displacement of people and businesses, interruption of trade activity, outflows of private capital and skilled labour, rising public spending, high unemployment and loss of investor confidence, all adversely affecting private sector growth.
- Lack of control over land and water resources, and over sources of pollution such as disposal sites; uncontrollable **open dumps** for solid waste and waste water may still be functioning at levels that cannot be accounted for, with possible mixture of medical and industrial waste. The Palestine Authority started the rehabilitation and closure of open dumps in the major cities that it is administers.
- High share of public sector employment, in spite of significant efforts made to downsize the public sector. Employment in the public sector was around 28 % in 2008[1].

[1] ESCWA, 2011-a.

11 Qatar

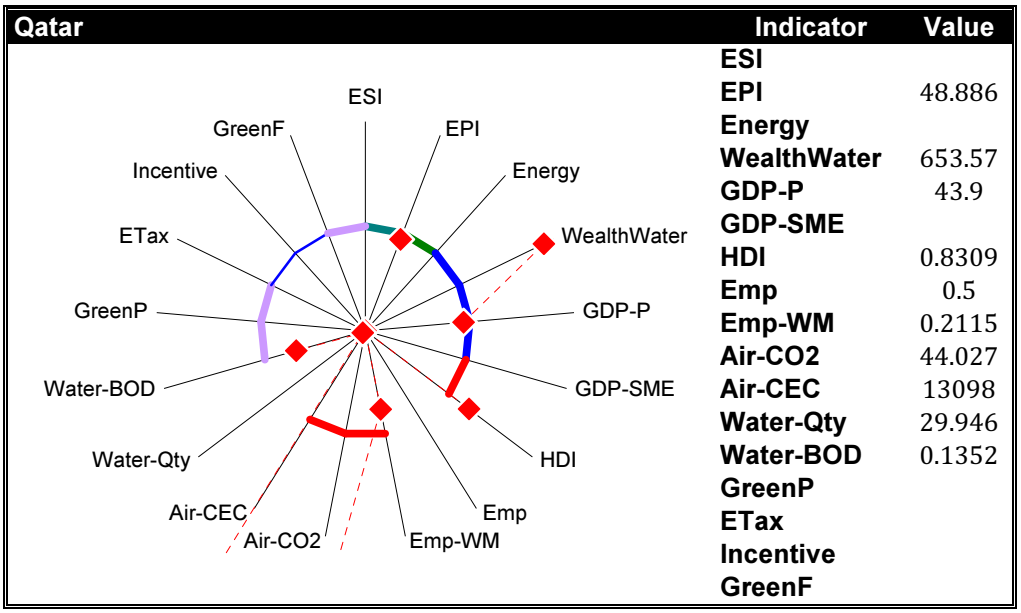


Figure 16. Qatar.

Drivers

- **Green Businesses:** Regional large scale production of poly-silicon for solar panels through a joint venture between the German Company Solar World and the Qatar Foundation.

Enablers

- **Green Finance:** "Enterprise Qatar" an authority that focuses on SMEs and tasked with coordinating debt, equity, training, and business services programs

Challenges

- A high reliance on **foreign labour**, most of which is often unskilled and engaged in low-productivity trades in such sectors as construction and services. In general, such low skills level provides no motivation for increased productivity. This low productivity and depressed wage cannot attract higher-educated national labour. This persistence of a low-wage, low-productivity economy thus hinders the transition towards more knowledge based work and thus Green Economy[1].
- Very high level of **fertilizer** use[2].

[1] ESCWA, 2011-a.
[2] ERF; 2012

12 Saudi Arabia

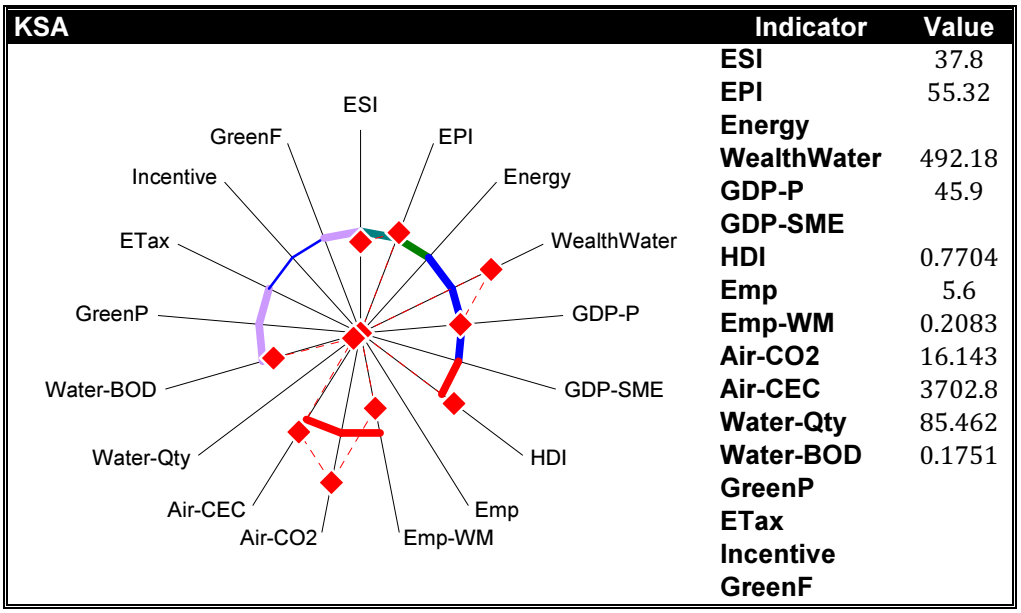


Figure 17. Saudi Arabia.

Drivers

- A significant proportion of the land is set aside as **protected areas**, with about 38% of Saudi Arabia.
- The government has embarked on a **strategy of diversification** to decrease the economy's vulnerability to oil-price fluctuations.
    - One of those steps is the promotion of entrepreneurship and the development of SMEs, and in 2006, the Saudi Arabian General Investment Authority (SAGIA) established the National Competitiveness Center (NCC) to simplify the business start-up process. The effectiveness of the policy response was such that Saudi Arabia's ranking in the World Bank's "**Ease of Doing Business**" Index reached 36th, up from 159th within a year[1].
    - The Saudi Industrial Development Fund (SIDF) was established to provide assistance to nationals setting up businesses in the industrial sector. This is done through technical support and financial assistance through soft loans at low interest rates.

Enablers

- Various **national initiatives** such as the one launched by King Abdulaziz City for Science and Technology for water desalination using solar energy through applying advanced nanotechnology techniques in the production of solar energy systems and membranes for water desalination.

[1] Nicola, 2009; Al-Saleh, 2012.

Challenges

- The Saudi economy is **dominated by the hydrocarbon sector**, with oil contributing over 80% of government revenues and over 50% of GDP, while the industrial sector accounts for 9% of the economy.
- In spite of much progress towards enhancing the ease of doing business, the main obstacle facing SMEs in Saudi Arabia remains bureaucracy, according to 65% of businesses surveyed by Riyadh Chamber of Commerce and Industry in 2011[1].
- A extremely high reliance on **foreign labour**, either as business owners, or as workers:
    - SMEs currently account for only about 14% of total industrial production and 8% of the value of industrial goods exported. Furthermore, most SMEs are run by non-nationals, with only 2% owned or run by Saudi nationals.
    - Most of foreign labour is often unskilled and engaged in low-productivity trades in such sectors as construction and services. In general, this risks confining those sectors of the "productivity trap" in which the persistence of a low-wage, low-productivity economy would hinder the transition towards more knowledge based work and thus towards a Green Economy[2].
- It appears that **women** are excessively oriented towards **public sector** employment, which represents more than 70% of total female employment[3]. This reflects the lack of opportunities for women in the public sector.
- Because of the country's large oil-related activities such as oil drilling, refining, transportation, a significant proportion of waste generated is **hazardous waste**.

[1] Al-Saleh, 2012.
[2] ESCWA, 2011-a.
[3] ESCWA, 2011-a.

13 Sudan

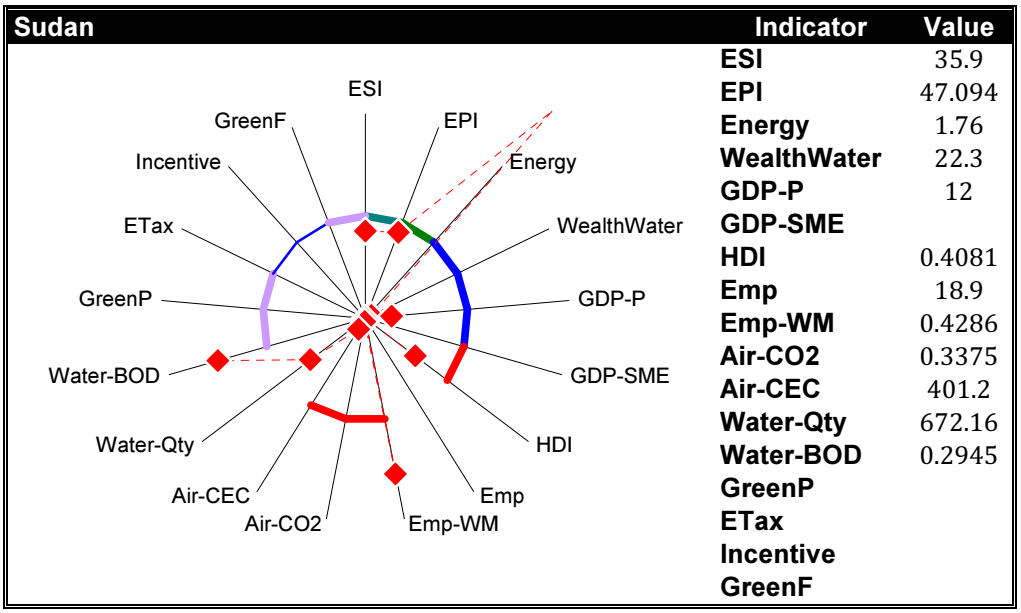


Figure 18. Sudan.

Drivers

- The government's commitment to develop alternative sources of energy has been demonstrated by the signing of a 2010 deal with a private French company to build three solar power plants to produce solar electricity over the next 10 years using concentrated solar power and generate electricity across the country. Initial projects will be initiated to generate a total capacity of 250 megawatts, to be completed by 2013/2014.

Enablers

- The country has a high potential in solar and renewable energy that remains largely unexplored. Already, there are private businesses involved in the sector, such as a small solar plant assembly in Soba outside Khartoum produces 2 MW solar panels annually.

Challenges

- About 80% of the Sudanese labour force depends on agriculture for their livelihood. The low productivity of the sector is such that most of this population is low-income, with a significant proportion of this population is relying on subsistence farming.
- After the secession, Sudan has experience reduced income from the oil sector, and needs to actively search for alternative sources of energy.

14 Syrian Arab Republic

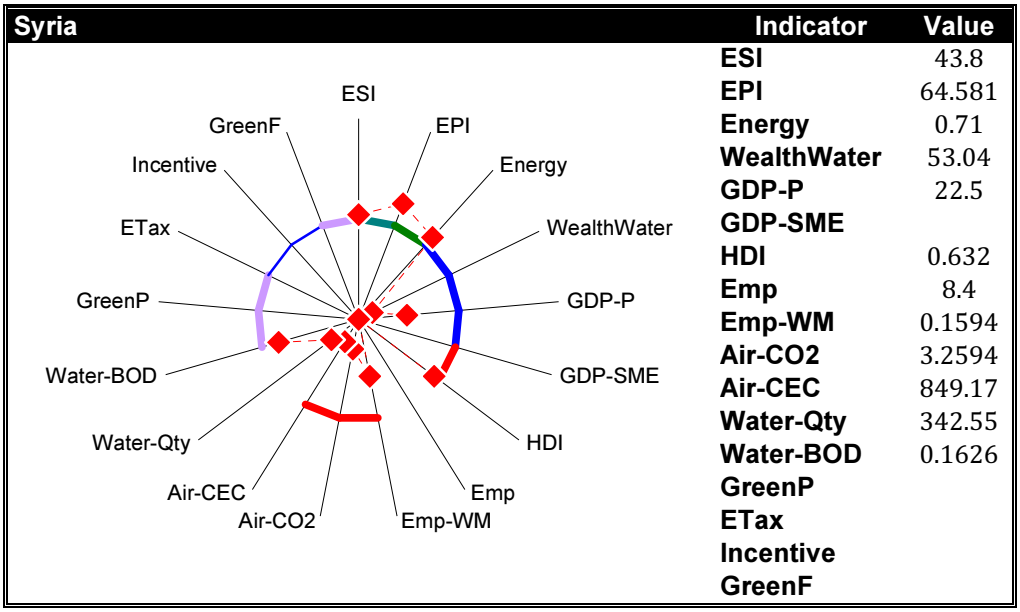


Figure 19. Syrian Arab Republic.

Drivers

- Renewable Energy: Two wind farms in planning, with capacity of 100 MW and 30 MW.

Enablers

- Renewable Energy: New "Master plan for Energy Efficiency and Renewable Energies" for the period 2011 to 2030, with official target for renewable energy of 4.3% of primary energy demand by 2011. This is designed to meet rising demand for electricity, which has increased by 75 per cent over the past decade, and the Government predicted it would triple in the next 20 years.
- Over two-thirds of the labour force is in the service sector, many of them outside the country. This is a very flexible, highly mobile segment of the population with diverse skills.

Challenges

- High dependence on water outside its own border, and dwindling oil and gas reserves.
- In spite of extensive efforts at education, a large proportion of the population remains poorly qualified.
- High share of public sector employment, in spite of significant efforts made to downsize the public sector. Employment in the public sector is around 36 % in 2008[1].

[1] ESCWA, 2011-a.

15 Tunisia

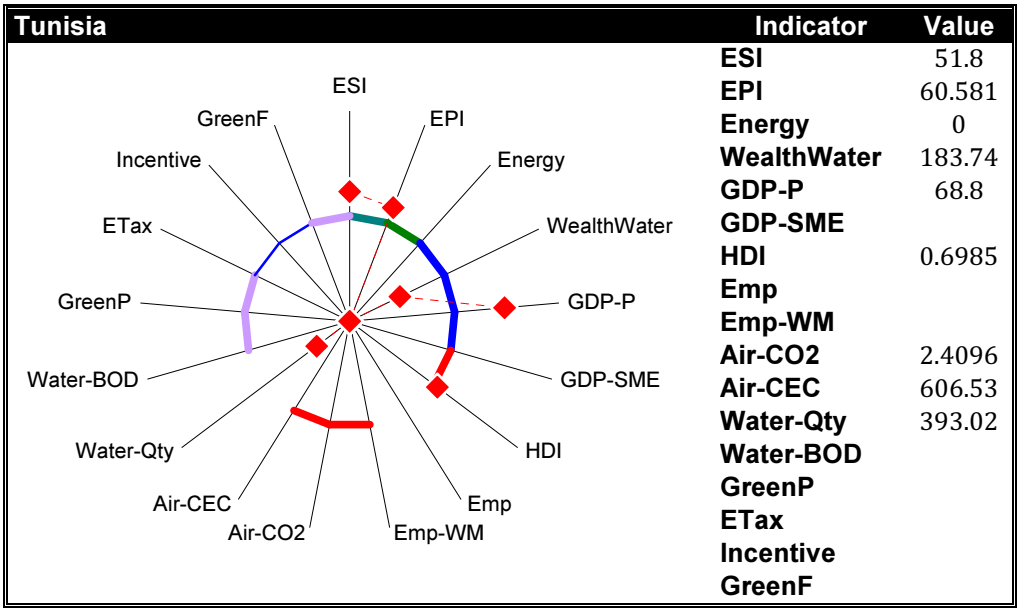


Figure 20. Tunisia.

Drivers

- **Specific legal and incentive frameworks** have been progressively adopted for solid waste management. Those are Eco-Lef program for plastic waste in 2001, Eco-Piles for electrotech batteries in 2005, Eco-Zit for lube oil in 2008 … For example, in the specific case of Solar Water-Heaters, the introduction of additional fiscal incentives and investment subsidies in 2004 was crucial to their development and expansion. This led to an installed area of solar collectors to 81,000 m² by 2010, with 47 manufacturers and importers, 1,100 installers that provide permanent and direct employments to 1,400 people[1].
- By 2011, the surface dedicated to **organic agriculture** had reached 330,000 Hectares, or about 6.6% of the arable land of the country.
- The increasing demand of **organic products for export** to neighbouring European markets and competitive prices are also important drivers that contributed to boost organic farming sector in Tunisia. Thus, 27% of the organic farms reserve their certified products mainly to exports to European countries of which 62% are olive grove farms. New organic products such as jojoba, sugar, cactus and derivates have been recently introduced by young companies in response to the increasing demand from Europe.
- Legal framework that establishes an "**Energy Conservation System**" backed by a funding mechanism. The plan to increase the share of renewable energy to 4.3% of primary energy by 2014, including the use of solar photovoltaic systems, solar water heating systems and solar concentrated power units for electricity generation.
- **Green Financing** support through the

[1] RAC/CP, 2011.

  - National Fund for Energy Conservation (FNME). Administered by the National Agency for Energy Conservation, the FNME is funded by taxes on car registration and on imports or on local production (excluding exports) of air conditioning equipments.
  - National Fund on Pollution Abatement (FODEP), managed by the National Agency for Environmental Protection. The fund aims to help industries in investing in pollution abatement techniques.
  - Development Fund for Industrial Competitiveness (FODEC) that aims at boosting the Tunisian industry competitiveness towards the integration of Tunisia in the European Community free trade zone, through supporting system upgrades.

- **Fiscal** support through such measures as a capital grant qualifying for a VAT exemption, customs duty reduction and a bank loan with a reduced interest rate[1].

Enablers

- Facilitating legal framework, with laws that[2]:
  - Facilitates **Waste Management**, amended with additional decrees related to the recovery of packaging waste and plastics, the collection and recycling of used batteries, drilling mud, waste water…
  - Promotes **Organic Agriculture**, by regulating production, processing and commercialization, as well as control and certification systems. The law also establishes a national board for organic agriculture and defines applicable enforcement mechanisms.

Challenges

- Difficulty in evaluating progress, due to the "lack of independent evaluations of environmental impacts and the difficulty of access the original database". The resulting unreliability of past data related to "crucial indicators and data" led to statistics whose sole purpose was to serve as "an instrument of a political propaganda[3]".
- The country is resource poor, and imports most of the resources it needs. In this context, awareness-raising remains a concern, particularly in regards to recycling and better waste management practices.
- The lack of sufficiently skilled human resources. There remains a need to reinforce linkages and cooperation between academia and industry. There is no significant policy drive to enhance productivity in many industrial that still rely on low-skilled labour.

[1] RAC/CP, 2011.
[2] RAC/CP, 2011.
[3] RAC/CP, 2001, p.16.

16 United Arab Emirates

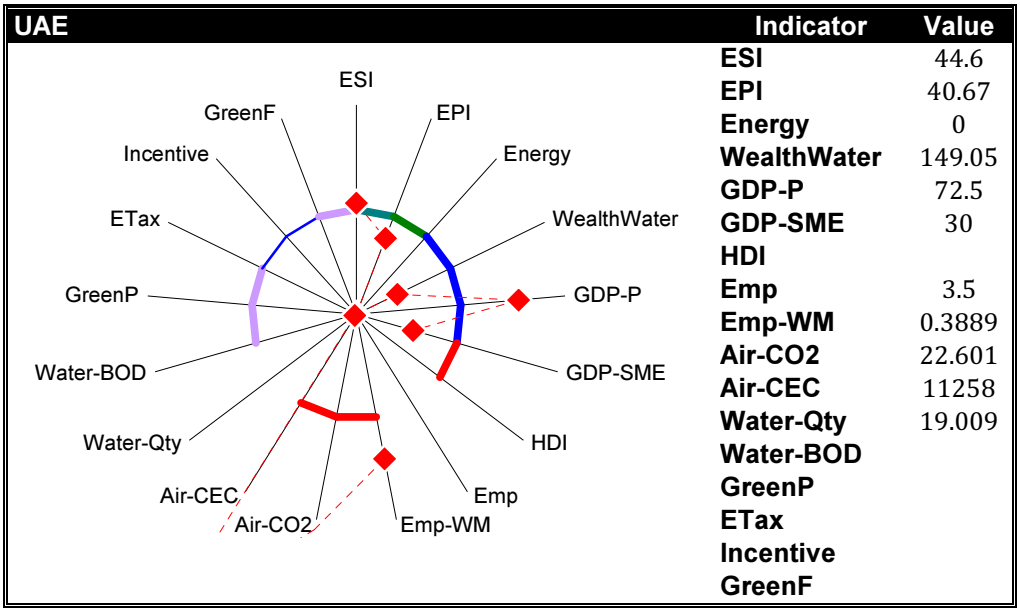


Figure 21. United Arab Emirates.

Drivers

- Abu Dhabi Future Energy Company is building the USD 22 Billion "Masdar City", the world's first zero-carbon and zero-waste city, which will provide 7% of the United Arab Emirates' power through renewable energy sources by 2020.
- In 2009, Dubai launched a fully-automated metro system to east congestion by carrying up to 1.8 million passengers per day.
- A **National SME promotion law** is under consideration, to complement existing programs in place targeting SMEs at various stages of their lifecycle and in different sectors. The world's fifth-largest oil exporter, the UAE has striven to diversify its economy in recent years, and the non-oil sector already contributes over 60% GDP[1].

Enablers

- Established in 2009, the **International Renewable Energy Agency** (IRENA) is located in Abu Dhabi. With 149 countries signed up IRENA will the collect, generate and share knowledge about renewable energy, advise member states on the financing of renewable-energy projects, and build a global database of policies to promote renewable energy.
- The development of the UAE as a **logistics centre** is providing businesses with an efficient infrastructure they need to grow. This is facilitating the growth of the manufacturing sector, notably in activities such as fabricated metal products, machinery, and equipment that depend highly on importing goods such as textiles for sale in the UAE and exporting metal products.
- In order to better understand their Ecological Footprint, in October 2007, the UAE launched the **Ecological Footprint Initiative** to look at the possible institutionalization of the Footprint

[1] Nicola, 2009.

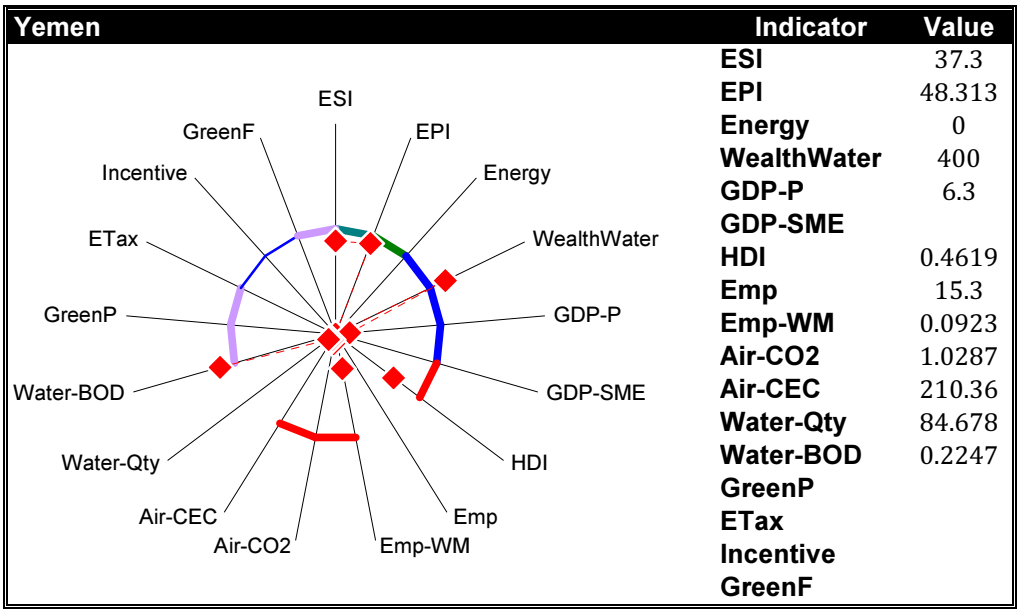
Methodology in the UAE and help develop an environmentally extended Input-Output approach to Ecological Footprinting to disaggregate the country's overall demand into its key activities and identify areas for potential environmental policy intervention for sustainable planning.

Challenges

- A substantial share of the population of some emirates lives abroad[1]. Due to its high reliance on **foreign labour**, the UAE's expatriate population is almost 85% of the total population, many of which are unskilled labour. This leads to low productivity of some industrial sectors, often most of which is often unskilled. The persistence of low-wage, low-productivity sectors of activity thus hinders the wider transition towards more knowledge based work and thus Green Economy[2].
- The United Arab Emirates' average Ecological Footprint per capita is the highest in the world, indicating an economy that remains heavily dependent on imports for most of its needs[3]. Indeed, most of the SMEs in the UAE are concentrated in the trading sector. While this secotr contributes 16% of non-oil GDP[4], most of its activity is related, directly or directly, to the revenues generated by the oil production sector.

[1] ESCWA, 2011-a.
[2] ESCWA, 2011-a.
[3] ERF, 2011, p.40.
[4] Nicola, 2009.

17 Yemen



Indicator	Value
ESI	37.3
EPI	48.313
Energy	0
WealthWater	400
GDP-P	6.3
GDP-SME	
HDI	0.4619
Emp	15.3
Emp-WM	0.0923
Air-CO2	1.0287
Air-CEC	210.36
Water-Qty	84.678
Water-BOD	0.2247
GreenP	
ETax	
Incentive	
GreenF	

Figure 22. Yemen.

Drivers

- Establishment of a **Credit Bureau** for the benefit of SMEs by the Central Bank of Yemen (CBY), in partnership with the Small Enterprises Development Fund (SEDF).

Enablers

- There are a number of small enterprise downscaling initiatives undertaken by the commercial banking sectors, both private and public aimed at reaching out to small entrepreneurs. An example is Al-Tadhamon Islamic Bank. This financial supports adds to various **micro-finance initiatives**[1]:
    - Initiatives to promote SMEs through Mobile Banking through the Post and Postal Savings Corporation, or microfinance through individual loans, group lending that jointly guarantee larger loans in ways similar to ASA Microfinance Foundation of Bangladesh, or village banking in which a larger group is involved. Those initiatives are often in conjunction with Micro insurance schemes or micro-leasing.
    - Youth lending targeted at men and women aged between 18 and 30. These loans are relatively bigger in size than micro loans. Al-Amal Bank started providing such loans using a fund from Silatech, a Qatari philanthropic organization. Further ventures may proceed with the help of a USAID fund.
    - Those initiatives are supported by **Social Welfare Fund** (SWF) targeted a addressing immediate needs, and thus providing a period of relief through cash transfers for the disadvantaged segment of population. By 2011, nearly 5% of Yemen's population was benefiting from the fund.

[1] Mansour, 2011.

- Programs that promote "**access to market**" and "**Value chain development**" for SMEs and rural areas, such as:
    - The Handicraft Export Promotion Program (HEPP) targeted at Yemen's poorest communities through assistance to the development of traditional Yemeni handicrafts and linking them to higher value and higher volume markets in the US and Europe.
    - Promotion of the coffee sector in Yemen by addressing weak points along the value chain, from cultivation to export markets, with the collaboration of farmers, traders, exporters, and foreign importers. The country can further benefit from the need to enhance the biodiversity of the current coffee trees in cultivation worldwide, particularly in the face of the spreading blight that is threatening existing crops.

Challenges

- Financial challenges such as the **high inflation** that had remained above 12% annually for the past decade, reaching 18% recently, in addition to an endemic **exchange rate instability**.
- There remains **public sector barriers** impeding private sector participation such as weak economic strength and viability of the public sectors and municipalities, lack of qualified local private companies for responding to international tenders, unclear government policies, and programmes that support and encourage private sector participation, and absence of incentive instruments.
- Those problems are exacerbated by **private sector barriers**, be it NGOs or the SMEs themselves. Many NGOs operating in Yemen still have weak institutional capacities, as they lack expertise on delivering financial services to SMEs. Furthermore, SMEs tend to suffer from management deficiencies, such as inconsistent planning or proper strategizing, compounded by the difficulty in finding qualified personnel and high employee turnover.

IV. APPENDIX: DETAILED REPORT ON PILOT COUNTRIES

Detailed reports are presented for four "pilot" counties of ESCWA Region; Egypt, Jordan, Lebanon, and Oman. Reports were compiled for ESCWA specifically for Egypt, Lebanon, and Oman. A detailed report was developed by UNDP specifically for Jordan.

The details reports were developed to review and assess the existing green policies, programmes and services in each of the "pilots" countries. This was the first stage of the Project on "Strengthening National Capacities in the ESCWA Region on Developing Green Production Sectors", led by the Production Sectors Section (PSS) of its Sustainable Development and Productivity Division (SDPD). The project aims to build the capacity of policymakers, civil society and the private sector in the ESCWA member countries to develop green production sectors starting with the design and implementation of effective policies and programmes.

The findings in those detailed mapping exercise will help further outline any needs to devise and develop green services, policies and programmes in the following stages of the project through the establishment of "Green Helpdesks". The report's primary audience includes policy-makers, private companies, civil society organisations, and whoever is interested in greener economy in Lebanon.

A EGYPT

The data compiled in this pilot country report on Egypt was resourced from reports published by the leading public and private entities in Egypt dealing with one or more of the three dimensions of sustainable development. The material collected on Egypy was further updated through the websites of the relevant stakeholders, which are updated with the latest information on their plans and activities related to Sustainable Development and the transition towards the Green Economy. The report is divided into four (4) parts.

1. The first part provides a snapshot of the country's basic geography, demography, economy and environment as well as some information on its international, regional and bilateral cooperation.
2. The second part provides an overview of Egypt's policies and institutional framework.
3. The third part sheds light on the production sectors in Egypt.
4. Finally, the detailed mapping is concluded with highlighted success stories from Egypt in the field of sustainable development.

1 Overview

Egypt is situated in northern Africa along the Mediterranean Sea and the Red Sea. Its land area is about 1 million km^2, but most of its habitable area lies along the Nile River. As a result, only 2.92% of its land is arable, with 0.5% cultivated with permanent crops.

Demography and Workforce Structure

Egypt's is concentrated along the Nile River. The population is currently estimated at around 83 million people with a 2.04% annual population growth rate. Before the Revolution, the government aimed to reduce population growth rate from 2.04% to 1.9%. Around 43.8% of the population lived in urban areas by 2011. In 2011, before the Revolution, Egypt had a GDP of US$ 231.9 billion.

Unemployment is a major concern, having risen from an official rate of around 9% during the years prior to the Revolution, to 12% in 2012. The actual rate may be higher, since only around 28 million people are actually accounted for in the labour market. This was probably one of the main drivers for the

Egyptian Revolution; at least 25% of people aged between 15 and 24 are unemployed, but it may even be higher since the formal labour market accounts for less than half of the overall labour force, with the rest is absorbed by the informal or shadow sectors.

This is reflected in indications of economic equality before the Egyptian Revolution, when already 40% of the population live below the poverty line. While PPP-adjusted GDP per capita In Egypt around US$ 6,500 in 2011, the distribution of income was unequal, with the highest 10% earners own 34.4% of GDP whereas the lowest 10% only own 3.9%.

Education

Currently Egypt allocates less than 0.8% of its GDP to research and development up from 0.2%. The Government provides almost 95% of the R&D budget. The Higher Council for Science and Technology is mandated to prioritize and coordinate R&D at the national level. Two other institutions have also been established to provide incentives for R&D namely, the Science and Technology Development Fund and the EU-Egypt Innovation Fund.

Economic Structure

The share of agriculture, industry, and services in GDP remained more or less constant for the period between 2001-2011; with agriculture at 17%, Industry at 34%, and Services at 49 %. However, post-2012, the relative share of each sector was drastically altered, particularly due to the collapse of tourism following the Egyptian Revolution.

Economic Development

The main sources of foreign revenue in Egypt are the Suez Canal, Tourism and remittance from Egyptian expatriates. According to the Central Agency for Public Mobilization and Statistics (CAPMAS) revenue from the Suez Canal and from remittances from Egyptian expatriates has gone up in 2012. Tourism however, which accounts for about 11.3% of the GDP in 2012 suffered significantly since the Revolution due to the unstable political situation in the country.

2 Infrastructure

Current Status.

1. **Energy and Electricity:** After years of self-sufficiency in oil, gas, and energy, in 2008 Egypt became a net importer of oil, and domestic fuel prices were up to 75% lower than international prices during 2009, with subsidies outspending education and health combined. Furthermore accelerated production of natural gas may be rapidly depleting that source of energy. This affected the production of electricity, since most energy is derived from the burning of fossil fuels such as oil and natural gas:
    a. The nuclear energy programme was initiated in Egypt in 1954 with the first power plant with a capacity of 2MWconstructed in 1961. The programme was stopped in 1967 and prospects for expansion became dimmer after the Chernobyl accident. In 2006 Egypt once again decided to proceed with its civilian power programme, with plans to build a 1,000 MW nuclear power station in El Dabaa along the North coast of Egypt. However there is a lot of resistance in Egypt to go ahead with the project. This is mainly due to the risks associated with nuclear power stations and the potential of

Egypt for wind and solar energy. Moreover, there are claims by local residents for the project site[1].

b. The coastal area between Hurghada and Zafarana that houses new wind farms with a capacity of 430 MW, and in Ras Ghareb, along the Red Sea, with a capacity of 400 kW. During the period between 1992-1995 pilot wind farms had been built in Hurghada generating a total of 5.2 MW. This trend continued with exponential growth. In 2000, a large-scale wind farm was built generating 63 MW and was increased to 305 MW in 2007. This was then connected to the national grid.

c. The first solar energy plant in Egypt was constructed in Kuraynmat in 2011 with a capacity of 140 MW out of which 20MW is from CSP[2].

2. **Water:** Egypt is considered to be among the world's most water scarce countries, with an average annual per capita water consumption of 750 m^3, which is below the 1,000 m^3 world poverty limit. It is projected that Egypt will be a water deficit country by 2017[3]. In the agriculture sector that uses about 85% of available water, much is wasted. It is considered possible[4] to reduce annual water demand per feddan from 4,850 m^3 to 3,900 m^3.

Outlook

Environmental policy in Egypt is guided by National Environmental Actions Plans (NEAP). The first two plans covered in the report were from 1992 to 2002 and from 2002 to 2017. .

1. **Energy and Electricity:** the 2002-2017 NEAP emphasises actions to improve returns from Renewable energy. Egypt has already initiated action towards greening the energy sector through the establishment of the New and Renewable Energy Authority (NREA), a government body aims to achieve 20% of the energy from renewable sources such as solar and wind by 2020.

   a. Several projects have been planned for and are in progress such as the Kuraymat hybrid plant and the Kom Ombo plant to be built in 2017. Several other plants are in the design phase through partnerships with Germany and Italy and aim to produce[5] 7.2 GW.

   b. The potential for wind energy in Egypt is particularly high in coastal area according to estimates drawn from the Wind Atlas of Egypt. The Egyptian Government has begun large-scale wind farm developments in areas such as Zaafarana and El-Zeit Gulf can increase generation of electricity from wind farms up to[6] 20 GW. Plans for solar energy are more modest with a target[7] of 100 MW by 2017.

   c. Though Egypt is one of the highest solar radiation countries worldwide, providing energy through solar power receives low priority in the country. Solar energy both CSP and PV is expected to represent 4% of supplied energy in Egypt by 2020.

[1] Vidican, 2012
[2] Vidican, 2012
[3] Attia, 2004
[4] UN CCA, 2001.
[5] Wadvalla, 2011
[6] Comsan, 2008
[7] Building Domestic Capabilities in Renewable Energy, A case Study of Egypt, German development Institute, Georgeta Vidican, Bonn 2012

2. **Water:** the 2002-2017 NEAP emphasises actions to minimize water losses, allow for gradual expansion of groundwater wells as a secondary water source, improve irrigation system, redesign field irrigation systems, promote cost recovery, use of aquifers in the Nile Valley and Delta as well as in the Western Desert and Sinai, as well as increase Egypt's share of the Nile Water by implementing projects such as, Jongil Canal, Bahr el Ghazal, in addition to Desalination and harvesting flash floods and rainfall to conserve about 2BCM/year. The planned yearly returns are: 57.5 BCM from the Nile Water, 1.5 BCM from rainwater and flash floods, 8 BCM from renewable groundwater, 8.5 BCM from reuse of agricultural drainage, 2 BCM reuse of treated wastewater, 3 BCM from reallocation of water to less crops with lower virtual water content, 4 BCM from increased efficiency in water irrigation[1].
3. **Wastewater:** the 2002-2017 NEAP emphasises actions to reuse of agricultural drainage and sewage water, and increase the use of agricultural drainage from 5 BCM to 9 BCM.
4. **Solid Waste:** the 2002-2017 NEAP emphasises actions to identify types and quantities of hazard waste(HW) generated in order to develop a national municipal solid waste programme, which could include measures to phase out uncontrolled dumping practices and impose user charges for solid waste collection and disposal and create refund schemes on certain containers, encourage on-farm recycling, develop a national strategy for medical waste management and integrated waste management systems in hospitals with 40% waste treatment facilities, develop and implement an integrated system for construction waste

3 The Environment and Environmental Policy

Egypt has been introducing the environmental dimension into its penal codes. There are rules for noise pollution, (Law 58/1937), the regulation of solid waste (Law 38/1967), the protection of the Nile and waterways from pollution (Law 48/1982), environmental protection (Law 102/1983), prevention of land degradation (Law 116/1983)…

However, the application of environmental laws and regulation remain patchy. As an example, while Law 48 of 1982 prohibits disposing of waste in the Nile, many industries continue to do so. Furthermore, Egypt faces hard to address environmental problems such as having the highest level of particulate pollution (PP) in the world.

The Role of Governmental Organizations

Faced with the need for integrated policies, the Government has constituted a National Committee for Sustainable development (NCSD). The NCSD is tasked with coordinating policies between different ministries as part of a framework for sustainable development. The secretariat of the committee is provided by Egyptian Environmental Affairs Agency (EEAA). Egypt has also launched a clean development mechanism (CDM) strategy in 2000, with a designated national authority.

Projects and Initiatives

The Ministry of State for Environmental Affairs (MSEA) and the Egyptian Environmental Affairs Agency (EEAA) produced a report entitled "Ten Years of Donors Experience in Environmental Management in Egypt" to review the support provided to environmental-related matters in Egypt by donor countries. This highlighted the rate of environmental degradation in Egypt, and the need to realize the importance of environmental protection for maintaining national security and the rights of future generations to development, the Government adopted a number of policies. The following NEAP was prepared in 1999 to address current and emerging environmental problems in the country. One of the

[1] Attia, 2004

objectives of NEAP was overseeing the implementation of multilateral environmental agreements (MEAs) including the Convention to Combat Desertification (CCD), the Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD). It also included measures to monitor Egypt's environmental situation and the sound management of the country's natural resources.

The NEAP for Egypt identifies seven main areas to be addressed during the period from 2002 to 2017;

- Emphasis on green economy and promoting development that relies less on carbon emissions,
- Support integrated environmental management to provide a healthy environment for the population.
- Promote sustainable development ensuring the integration of the environmental dimension in development projects, including small and medium size enterprises.
- Promote Natural resources conservation, including protected areas and land and marine resources.
- Promote public awareness to influence attitudes towards the environment, adopt incentive measures and policies that promote environmentally friendly practices and introduce punitive measures for environmentally negative activities.
- Further develop the environmental regulatory system.
- Support decentralization of environmental management and build capacities at the governorate level.
- Integrate the environmental dimension in policies, plans and programmes in close coordination with public and private sector institutions at the national, regional and international level.
- Integrate the social dimension and the role of women and youth in environmental policies.

Education and Research

Efforts have been directed towards linking research to industrial activity needs, with emphasis also on renewable energy, agriculture and water. Financial support is also provided to encourage national researches and reverse the brain drain in Egypt.

4 Production Sectors

Five sectors are considered to be the main growth engines for the Egyptian Economy. Those are agribusiness, manufacturing, tourism, ICT, and the micro small and medium size enterprises sectors. Other three important sectors are construction, housing, and energy.

In general, the export-led manufacturing industry has experienced remarkable progress during the years preceding the 25thof January Revolution. The sector has achieved a 7.8% rate of growth, which was higher than what was stipulated by the National Industrial Development Strategy (NIDS) for 2011. Its share in total investment has increased from 5% in 2003-2004 to about 23% in 2006-2007. Its share in employment has also risen from 12% to 13% during the same period. The main goal for the NIDs was for Egypt to be the main industrial hub in the Middle East and North Africa.

Two main challenges face the industrial sector in Egypt; the need to alter the composition of export from being resource based to products with more value added, and the necessity to meet the European Union (EU) hygiene regulation for food products. An additional challenge is the high competition from Asian products, which can only be faced through skills and capacities to support industrial development, the infrastructure needed, as well as private sector involvement in long-term projects and in R&D.

5 Green Initiatives and Projects

To achieve the target of 7.2 GW of wind power by 2020, large investments are needed, notably in manufacturing of the necessary components. One of the companies involved in this sector is Elsewedy, one of the lead companies involved in the manufacturing of wind energy components in Egypt. Elsewedy Towers, which is located near the Ain Sokhna tollgate produces the turbine towers used for wind energy. This factory was founded in 2010 and is strategically located near Zaafarana where the new large-scale wind farm is located, and where most of the potential expansions are likely to take place. The towers themselves are produced locally, the engines are imported from Elsewedy factory in Spain and the blades are purchased from the global market. The Zaafarana wind farm is the largest in the country and amongst the ten largest wind farms in the world. Its 700 turbines supply around 550 megawatts. This site alone saves Egypt around 332,000 tons of fuel and reduces carbon emissions by around 834,000 tons according to the NREA[1].

1. **Environmental Sustainability through Sustainable Tourism:**.
2. **Economic Transformation in the Private Sector:** Currently, the wind farms in Egypt employ 110 engineers and operation and maintenance workers. Though these figures are rather modest, if the full potential of renewable energy in Egypt is realized the figure would be significant. It is estimated for instance that in order to achieve the Government's set target for renewable energy, about 75,000 new jobs are expected to be generated in that sector. In terms of manufacturing, about 30% of the equipment is manufactured locally with the potential of increasing this percentage to 70%, according to the National Renewable Energy Agency (NREA).
3. **Progress and Well Being through the promotion of Rural Livelihoods:**.
4. **Implementing Policy Responses:**.

[1] Viney, 2012

B JORDAN

The data compiled in this pilot country report on Jordan was resourced from reports published by the leading public and private entities in Jordan dealing with one or more of the three dimensions of sustainable development, as well as from reports by the United Nations Development Programme (UNDP), the United Nations Industrial Development Programme (UNIDO), the International Bank for Reconstruction and Development (IBRD)… However, most of the material collected comes from the United Nations Environment Programme (UNDP) August 2011 report "Towards a Green Economy in Jordan: a Scoping Study". The report is divided into four (4) parts.

1. The first part provides a snapshot of the country's basic geography, demography, economy and environment as well as some information on its international, regional and bilateral cooperation.
2. The second part provides an overview of Jordan's policies and institutional framework.
3. The third part sheds the light on the production sectors in Jordan, mainly focusing on Small and Medium-sized Enterprises (SME), the role they play in the Jordanian economy and the efforts exerted by the public and private sectors and international donors in order to develop and empower this sector. Examples are given of potential green businesses and projects in Jordan.
4. Finally, the detailed mapping is concluded with highlighted success stories from Jordan in the field of sustainable development. These examples are intended as a first step in a long-term project, this report will certainly be followed by further in-depth studies.

1 Overview

Jordan is a small, middle-income, open economy, with a limited natural resources base and active trade flows.

Demography and Workforce Structure

Jordan has witnessed during the last decades large population growth, mainly because of forced migrations, in addition to the high natural growth rate. Population growth is high, but has decreased from (3.1%) in 1992 to (2.8%) in 2000, and the reproduction rate declined from 5.6 infants per woman in 1990 to 3.9 in 2000. 75 % of the Jordan's 5.039 million inhabitants are concentrated in urban areas, contributing to widen the socioeconomic gap between rural and urban areas[1].

Education

The education sector witnessed an improvement during the decade after 2000. The number of schools increased by 12% in the 5 years following 1995 to reach 4,588 schools for 1.4 million students, and the number of teachers rose to reach 60.000. Over the same period, illiteracy rate for ages 15 and above decreased from 22.5% to 11%.

The country witnessed an expansion in higher education and vocational education, with 20 governmental and private universities and 45 vocational schools. The proportion students in vocational education rose between 1995 and 2000 from 17% to 43% for males and 13% to 23% for females. About

[1] GCEP; 2001

60.000 students joined higher education institutions in 1997/1998 in official universities, 32.000 in private universities, and 23.000 in community colleges[1].

Healthcare

Jordanian life expectancy increased to reach 68 in 2000, while mortality rate declined to about 5% per 1000. The number of physicians 25/10,000 reached inhabitants by 2000, with 86 hospitals across the country[2]. Jordan spends around 7% of GDP on health.

Economic Structure

Since 1992, Jordan adopted economic reform programs in collaboration with the IMF. Those programs included a vast set of policies, measures and procedures aiming at treating whole and structural imbalances and returning economic stability, in addition to preparing the appropriate environment for investment and improving the level of economic performance, developing the legislative environment to better attract Foreign Direct Investments and provide attractive options to national savings. Policies and measures concentrated on consolidating the pillars of sustainable development, with growth relying on exports.

Economic Development

Poverty remains one of Jordan's major challenges[3], and has deepened during the 1980's recession, when inflation rates reached 26% and the unemployment rate peaked at 18% in 1989. The percentage of population who live under poverty line increased from 16% in 1987 to 21% in 1993. The situation improved then worsened after the Second Gulf War, as 300,000 returnees flooded the country, and was further exacerbated by the 2008 recession.

To face this, Jordan has activated the role of National Aid Fund, established Work and Development Fund, and launched the Social Security Program and provide several training and rehabilitation programs for workers. In the late 1990's this led to a measure of poverty reduction, with poverty levels receding to 11.7% in the 1997.

However, unemployment is chronically high, hovering between 12.3 and 15.3 per cent1, and sometimes appears to increase in spite of economic growth. The labour market suffers from a severe structural unemployment due to a mismatch between (1) the skills of job seekers, (2) the demand In the labour market; and (3) the perceived better working conditions in government offices that offer a higher than average pay, social security and health insurance, less working hours and greater job security than the private sector. As a result, a large share of the labour force is employed by the public sector . Furthermore, lack of adequate transportation networks tends to limit workers' geographic mobility, leading to regional disparities in employment. Hence, while job openings do exist, they tend to be taken up by guest workers. The number of guest workers equals and sometimes exceeds the number of the unemployed; and it surpasses the number of Jordanians working in the Gulf.

2 Infrastructure

Current Status

1. **Energy and Electricity**: Jordan lacks energy resources and imports most of its needs; only 4% is produced or found locally, and Jordan relies on Egyptian gas for 80% of of its electricity needs. As a result, oil imports cost the country about 13% of GNP.

[1] GCEP; 2001
[2] GCEP; 2001
[3] GCEP; 2001

a. Approximately 13% of GDP in 2009 was spent on energy. As a result, the heavy reliance on oil Imports of the current energy policy is already adversely impacting the growth of industrial production. A 10% energy price increase leads to a decrease in Jordanian industrial output, as measured by the industrial Production Index, of 1%, and the potential job loss for 2,600 of industrial workers.

2. **Water:** Jordan is a water scare country, and therefore chronically water deficient, with about 1,257 MCM in the year 2000, only of which 970 MCM were available. This represents a deficit of about a quarter of water available, and Jordan is ranked third among the 18 countries in the world considered to be at risk for water insecurity. If present trends continue, between 2030 and 2050, the country's (surface) aquifers will be severely drained. Furthermore, 80 per cent of the land area will transform from "semi-arid" to "arid".

    a. Up to 51 per cent of the country's water is wasted and around 35 per cent of households are not connected to a sewage system. Thus, an immediate goal is to improve the conservation and efficient use of water; reducing water usage by one-fifth could save up to 200 MCM.

    b. Water and agricultural challenges in Jordan are closely related, with the sector currently accounts for 71% of water demand and 64% of supply, while only about 5% of the land is arable. The contribution of agriculture to GDP declined steadily from 14.4% in 1971, to 3% in 2009. However, an estimated 28% of the GDP and % of Jordan's exports are related to agricultural activities, and the sector supports livelihoods for about 20% of the population, employing about 7% of the labour force.

3. **Wastewater:** Jordan is actively promoting wastewater treatment, with 19 plants established to treat more than 60 MCM of wastewater annually.

4. **Solid Waste:** there is a growing focus on solid waste treatment. since the early 1990's, as the government has been working on a variety of relevant policies and measures[1]. Current collection rates of solid waste are estimated at 90% in urban areas, and 70% in rural areas. The management of hazardous and medical waste still needs to be substantially improved, as most of hazardous waste is disposed of with no treatment.

Outlook

1. **Energy and Electricity:** Power demand is expected to grow by 7% yearly between 2010 and 2020, with fuel imports growing at a slow pace at about 2.5% annually. As a result, the amount of national expenditure spent on fuel alone would significantly increase above the current rate of 5.1%. For this reason, Jordan encouraged the search for local energy resources such as oil shale, in addition to renewable energy such as solar and wind.→

    a. In order to better promote oil exploration, the government reformed the Oil Directorate in Natural Resources, turning it into a national commercial oil company. The Petra Drilling Company has been established to assume oil prospecting and exploitation. This is leading to recent interest in shale oil, of which Jordanian reserves represent roughly 50 Billion Tonnes. However, it is not clear how water-intensive shale oil extraction process could be carried out in such a water-scarce country.

    b. The Jordanian Electricity Authority became a public share-holding company, and a center for renewable and new energy research was also established and a new

[1] GCEP; 2001

electricity law has been issued. Jordan aims to generate 7% of its energy mix from renewable energy sources by 2015. A figure that is expected to reach 10% by 2020.

2. **Water:** In addition to policies already in place, the government is undertaking a rehabilitation of wetlands. Better allocation of water to relevant economic activity is being promoted, to enhance the economical productivity of water.
    a. Investment in improved water systems is expected to create an estimated 31,000 jobs, and the Jordanian government is currently seeking US $3.1 billion for water management projects.
    b. Sustainable agriculture, including organic farming, can ease the pressure on precious water and soil resources. For example, organic fanning relies on water saving techniques that can increase the size of the irrigated land by a ratio of 6 in Jordan. It is estimated that, If 5 per cent of the total agricultural land is used as organic farmland, this will lead to the creation of 1,700 jobs.
3. **Solid Waste:** Measures to improve Jordan's Solid Waste Management (SWM) system following a model developed in the capital city of Amman include a more comprehensive and detailed legislative famework, and a full sector strategy. In addition, cost recovery rates will need to improve to alleviate the resource constraint that hinders the SWM system in many municipalities.

3 The Environment and Environmental Policy

Under Jordan's National Agenda (2006-2015), “environmentally- sustainable economic development" is a key policy goal reflected In a wide range of sectors, including energy, transport, and waste management. Within its 2010 Executive Programme, the Government of Jordan announced the launch of a “programme for green services and industries to meet the requirements for adhering to environmental standards and turning Jordan into a regional centre for green services and industries”.

The Role of Governmental Organizations

The MoE is currently involved in various projects including:

- The Jordan Cleaner Production Program (JCPP): launched in 2002 together with 11 Jordanian governmental and non-governmental organizations as a programme which aims to improve profits through the application of environmentally friendly industrial processes. The programme is a means to transfer knowledge and technology to Jordanian producers, thus facilitating their access to international markets.
- The 2010 Eco-Cities imitative that allowed the creation of the Jordan Green Building Council (JGBC) and led to a workshop on Green Financing, the enhancement of a national programme on Clean Production, and the proposed tax exemption of hybrid cars.
- The Electric Car Project consists of an effort of MoE to stimulate private sector investment in zero-emission vehicles in partnership with major car manufacturers and dry battery manufacturing companies.
- Rehabilitation of the Zarqa Rim Basin (ZOOgr020): a joint project of the MoE and IUCN.
- A “Green Economy for Jordan” Initiative (2014-2012) that was launched in 2010 jointly by the MoE, the Ministry of Planning, and UNEP, to assist the country in the implementation of its 2010 Executive Programme on green economic development.

In addition, different ministries and state institutions have departments dealing with environmental issues. Their main mandate is the protection and/or measurement of pollution rates in Jordan.

The Role of Non-Governmental Organizations

Jordan sought consolidate institutions and the role of the community based organisations in the decision making process. The number of non-governmental organizations recently increased significantly, especially those pertaining to environment, and women empowerment.

Projects and Initiatives

Jordan has been actively seeking to tap into opportunities offered by the Clean Development Mechanism (CDM). This effort led to the creation of the creation of the Al-Russalfah Bio Gas Company that produces 1.7 MW of electricity from landfill gas.

In total, the Jordanian government is expected to sponsor US $3.1 billion in water management projects. In May 2008, the Ministry of Environment floated a tender to build an Industrial wastewater treatment plant in Zarqa, where approximately 52% of the factories in the Kingdom are located. In addition, many other wastewater treatment plants are under construction in other parts of the country.

4 International, Regional and Bilateral Cooperation

Jordan ratified the UNFCCC Kyoto Protocol in 1993, and the MoE became the national focal point for climate change issues. In 1996, Jordan started Its climate change mitigation efforts with a GEFUNDP supported programme for capacity building in documenting national emissions of GHG and preparing the country's national communication to the UNFCCC The Second National communication was published in 2009.

Jordan has been actively seeking to tap into opportunities offered by the global carbon market, particularly through the Clean Development Mechanism (CDM). As a matter of policy, the country is attempting to classify 13 current projects as CDM, particularly in the areas of water treatment and transportation.

5 Policies and Institutional Frameworks

In response to the many energy challenges, the energy strategy of Jordan emphasises (1) Significant progress in and expansion of, all types of clean energy technologies (2) Encouragement of prudence in energy usage, and cost effective demand management (3) Sustainable economic growth and ecological preservation (4) Creatlon of an energy grid, utilizing renewable sources, to be supplied to rural areas. The The Renewable Energy and Energy Efficiency Law No. (3) of 2010 was therefore ratified as temporary legislation in February 2010 by the parliament, with the following objective;

- Exploiting renewable energy sources for increasing the percentage of their contribution to the total energy mix.
- Contributing to environmental protection and achieving sustainable development by pmmotlng the exploitation of Renewable Energy.
- Rationalising the exploitation of energy and Improving Its efficiency in various sectors
- Creating the Jordan Renewable Energy and Energy Efficiency Fund (JREEEF) as a financial Incentive to further Investments and developments.

Financing Mechanisms

The Jordanian government has been working towards facilitating investments in the renewable energy sector through various mechanisms. Clean sustainable energy initiatives that support the Initial funding of pilot projects indude:

- **The Jordanian Renewable Energy and Energy Efficiency Fund (JREEEF)** devoted to the support of energy-saving and renewable energy initiatives. Private sector partners can apply to the fund, which will be financed by the state budget and international donor agencies. The Fund has already received financing from the Global Environmental Fadlity (GEF) through the World Bank, as well as the French Global Environmental Facility (REM) through the Agence Francaise de Developpement (AFD). Other international agencies such as the German Development Bank and the Japan International Cooperation Agency have expressed interest in offering assistance.
- The World Bank "Clean Technology Fund" allocated US $112 million for Jordan to assist with the construction of the Solar Plant in Ma'an, and the power line between Qatraneh and Samra. However, Jordan has so far declined the offer because of its already large budget deficit and growing debt
- An initiative launched in 2010 by the MoE, in cooperation with the World Bank, the lFC and AFD, is leading the way forward to establish Green Financing in commercial banks In the Kingdom.

Laws and Decisions ensuring an environmentally-conscious development

Jordan's environmental protection efforts as well as the scarcity of natural resources were the motivations behind the adoption of the flrst Environmental Protection Act Law (EPA) and the establishment of the Ministry of Environment (MoE) as a separate ministry in 2003. Since its establishment, the MoE has:

- Spearheaded efforts to improve treatment of industrial wastewater, medical and hazardous waste, working in partnership with the private sector.
- Enhanced the Inspection system through updated and comprehensive regulations, which are soon to be adopted.
- Played a key role in the establishment ofthe Environmental Rangers Department in 2006, which has helped to improve the effectiveness of vehicle and industrial inspection and enforcement, in addition to assisting in the fight against illegal logging.
- Promoted environmental protection and prevention of pollution in partnership with local NGOs

6 Green Initiatives and Projects

Some Green Success Stories

1. **Environmental Sustainability through Sustainable Tourism:** Tourism makes up roughly 10% of GDP, and represents the largest export segment and the second biggest private sector employer, with over 90,000 people employed in 2010. Various eco-tourism pilot projects in Jordan have created jobs and sustainable incomes for local communities; if 5 per cent of all tourists used sustainable infrastructure, then approximately 3,900 jobs could be created.
2. **Economic Transformation in the Private Sector**, promoted by such projects as the Amman Green Growth Programme (AGGP) that follows an integrated approach. With a total investment of US$2.825 billion over 28 years, the program will cover four sectors; Municipal Waste, Transport, Energy, and Urban forestry. As such, it will have a positive impact on sustainability through land use by mitigating urban sprawl, improving the efficiency of municipal services through the promotion of transit and mixed land use, protecting and conserving agricultural lands, creating a "Natural Heritage System", and, conserving the "Cultural Heritage" of Amman.

3. **Progress and Well Being through the promotion of Rural Livelihoods** through partnership between the Royal Society for the Conservation of Nature and USAID, GEF, and other donors to implement community-based approaches to achieve protected area management and poveerty reduction in rural areas. Such projects center on Tourism services and nature-based craft enterprises in various Nature Reserves. In this context, projects such as the Badia Research and Development Center that is attempting to market Jordan remote "Badia Area" and its many historical and ecological characteristics as a sustainable tourism project.
4. **Implementing Policy Responses:** by efforts to tap into the Clean Development Mechanism (CDM) led to the creation of the creation of the Al-Russalfah Bio Gas Company that produces 1.7 MW of electricity from landfill gas.

C LEBANON

The data compiled in this pilot country report on Lebanon was resourced from reports published by the leading public and private entities in Lebanon dealing with one or more of the three dimensions of sustainable development. The data was supplemented by phone interviews with representatives of key stakeholders namely the United Nations Industrial Development Programme (UNIDO), the Ministry of Industry (MOI), the Ministry of Environment (MOE) and the Association of Lebanese Industrialists (ALI). The material collected on Lebanon was further updated through the websites of the relevant stakeholders, which are updated with the latest information on their plans and activities related to Sustainable Development and the transition towards the Green Economy. The report is divided into four (4) parts.

5. The first part provides a snapshot of the country's basic geography, demography, economy and environment as well as some information on its international, regional and bilateral cooperation.
6. The second part provides an overview of Lebanon's policies and institutional framework with a particular focus on the Paris II and Paris III meetings and their implications for Lebanon in addition to a highlight of the main Laws and Decisions that ensure an environmentally-friendly development.
7. The third part sheds light on the production sectors in Lebanon, mainly focusing on Small and Medium-sized Enterprises (SME), the role they play in the Lebanese economy and the efforts exerted by the public and private sectors and international donors in order to develop and empower this sector. Examples are given of potential green businesses and projects in Lebanon.
8. Finally, the detailed mapping is concluded with highlighted success stories from Lebanon in the field of sustainable development. These examples are intended as a first step in a long-term project, this report will certainly be followed by further in-depth studies. At the current stage, the illustrations are:
    a. Sustainable tourism illustrated by the Shouf Biosphere Reserve,
    b. Fair trade and green business initiative accomplished by Souk El Tayyeb,
    c. Nature conservation and local development initiative implemented by the Lebanon Mountain Trail (LMT) Association.
    d. Green industry illustrated by Phoenix Energy, Cosmaline and Pharmaline.

1 Overview

Across history, the geographical location of Lebanon helped create several ports along its coast and encouraged trade, making Lebanon the regional hub for commercial, banking and cultural activities. From its seashore and coastal pains to its mountain ranges and interior plane, Lebanon enjoys beautiful landscapes, which in addition to giving it its moderate weather and its archaeological heritage make it a perfect tourist destination in all seasons.

Demography and Workforce Structure

In 2007 the Lebanese population totalled 3,759,137 people living in Lebanon. In 2008, Lebanon witnessed 84,823 births, of which 49.5% were females, and 21,048 deaths of which 44.8% were females.

In 2009, approximately 73% of the population that were working or available for work was made up of men. The workforce is distributed as follows[1]:

- There is a large gap in labour participation between males (67%) and females (21%) though it narrows to 17 points among university degree holders with participation rates reaching 45.4% for females and 62.5% for males (MOSA, 2011). Almost 26% of the employed women had professional positions (such as doctors, teachers, engineers, etc.) compared with only 8% of employed men.
- 30% of the working people had no or basic education whereas 43% had secondary or university degrees. Unemployment rate reached 6% in 2009 at the national level, and was higher among women (10%) than men (5%). The unemployment rate was higher among people holding university degrees the majority of whom were drawn to other economies, mainly to the Gulf countries, Europe and America.
- As of 2007, Lebanon had a labour participation rate of 43.4%. In Lebanon employment is seen as the best way to escape poverty so the majority of people take up any job even if it does not match their qualifications. It is estimated that 6.9% of the workers had temporary employment positions. The employed population was divided as follows: 39% in the services, financial intermediation and insurance sector; 27% in Trade; 12% in Manufacturing; 9% in Construction; 7% in Transport and telecom and 6% in Agriculture.
- About 19% of the jobs in Lebanon were craft related, and 14% were senior officials and managers in the public and private sectors.

Education

In Lebanon there is a big gap between the quality of education and internal efficiency offered by the private schools and those offered by the public schools. Secondary school enrolment rates in Lebanon are 14 points above the regional average and the total education spending in Lebanon exceeds 13% of GDP; however, public expenditure on education constitutes only 2% of the GDP and 8% of the total government expenditures. The Ministry of Education and Higher Education (MEHE) developed the National Education Strategy (NES) in 2007, based on which the five-year Education Sector Development Plan (ESDP) was set to reform public education, and strengthen vocational and technical education to be able to respond the the country's needs.

The total number of students enrolled in primary and secondary education in public and free private schools in Lebanon totalled 427,761 in the Academic Year 2007-2008, decreasing by 5.1% from the 450,784 students enrolled in 2006-2007. At the Lebanese University, the number of enrolled students increased by 1.7% between 2007 and 2008, from 72,961 to 74,176 (PCM, 2009).

Lebanon hosts 36 higher education establishments in addition to the Lebanese University and they vary in size, cost and quality of education they offer. 56% of university students attend private universities whereas 44% go to the Lebanese University. Conversely, the Lebanese University graduates 33% of the total number of university graduates while the rest of the universities combined are the source of 67% of Lebanon's graduates. Hence the major role played by the Lebanese University in addressing the needs of the labour market (MOSA, 2011).During the scholastic year 2007/2008, there were 2,805 schools in Lebanon, 49.4% of which are public schools, 13.3% are private free schools and 37.3% are private schools. There were 907,211 students studying in these schools and 87,808 employees working there. In the same year, there were 97 official vocational schools recruiting 10,394 teachers and 435 managers and 365 private vocational schools recruiting 7,035 teachers and 457 managers. As for higher

[1] CAS, 2008, 2011; MOSA, 2011

education in the same academic year, there were 167,165 students enrolled of whom 54.9% were females and 85.7% were Lebanese (CAS, 2008).

Education

In terms of the healthcare services in Lebanon, the health expenditures constituted 8.8% of the GDP in 2007, a higher share from the other countries in Middle East and North Africa (MENA) region where total health expenditures constitute 5% of the GDP on average. However, Lebanon spends a lot of money on health as out-of-pocket private household payments; for instance Lebanon spent $ 1.8 billion on health in 2005, 44% of which consisted of out-of-pocket payments. This badly impacts the budgets of the relatively poorer households that spend on average 11.3% of their income on health. Besides, there is a low demand for public primary health care services in Lebanon in general as approximately 80% of the patients rely mainly on private clinics. The latest Health Strategy of the GOL has proposed strengthening primary health care services in addition to reforming the health insurance and increasing its efficiency (MOSA, 2011). In addition to reform, the Ministry of Public Health needs to acquire an institutional capacity and be empowered with a legal authority to be able to address major demand and supply loopholes.

Economic Structure

By 2014, the Lebanese economy had yet to fully recover from the Lebanese Civil War of 1975-1990. After the war, in the period between 1990 and 2008, the annual economic growth rate after the end of the Civil War remained below the target rate of the reconstruction programmes, below the average of 6% growth rate that the country had in the run up to 1975, during fifteen prosperous years that preceded the start of the war. This gap was largely due to three reasons;

1. The huge capital losses incurred during the war. The repercussions of the Lebanese Civil War on the local economy had been disastrous: slow to negative economic growth, devaluation of the currency, hyperinflation, internal and external migration, high unemployment rate. This weakened the ability of the government to provide essential public services beyond basic emergency relief missions, so much so that the militias stepped in to fill the void, as well as civil society organisations, the private sector.
2. Lower demand on the Lebanese Economy for Arab countries and particularly the Gulf Countries, which had decreased during and after the war as compared to the sixties and early seventies, and remained low.
3. The huge losses incurred during the 2006 war in which Israel bombed much of the country's basic infrastructure.

In this context, the GDP has been showing strong annual growths since 2001 and the largest contributors to the GDP have been the construction, services (banking and tourism) and industrial sectors.

1. Unlike other places in the world the real estate sector in Lebanon was not haltered by the economic crises, if anything, it boomed and flourished. The total area of construction permits in the country increased from 7.9 million to 14.2 million m2 between the years 2007 and 2008 (MOE and UNDP, 2010). The building permits registered at the order of engineers increased from 8,826 thousands m2 in 2005 to 8,997 thousands m2 in 2006 and 9,044 thousands m2 in 2007 (PCM, 2008). And Arab investment in real estate in Lebanon increased by 20% in 2009, from $3.6 billion in 2008 to $4.3 billion (MOE and UNDP, 2010). This is highly unsustainable in the long run particularly that Lebanon's surface area is too small compared to its population.
2. Services (banking and tourism) make up an important part of the economy.

a. In terms of tourism, and based on data from the General Directorate of General Security, the total arrivals to Lebanon in 2008 amounted to 6,515,425 people, with the non-Lebanese constituting 61.4% of the total arrivals (CAS, 2008).According to the New York Times Travel, Beirut was ranked as first destination among 44 places to go to in 2009 (CAS, 2008b). Ecotourism is also growing in Lebanon and getting more and more appreciated particularly by tour operators, municipalities and the general public near protected areas recognizing it as an important source of income. Lebanon has the potential to further develop this sector and provide ecotourism services balancing income generation with sustainable natural resource management and the protection of public commons[1].

b. In 2008, there were 64 banks in Lebanon 81.2% of which were commercial banks and 18.8% were business banks. These banks employed 18,632 people in 2008, 55% of which were men and 64% were university degree holders. Lebanese commercial banks (SAL) recruited 94% of the total employees (CAS, 2008) .

3. According to the Directory of Exports and Industrial Firms in Lebanon there were 6,148 new industrial establishments registered in Lebanon in 2008, 47.8% of which were in Mount Lebanon.The industrial sectors include: Food and Beverage industries; Non-mineral mining products, glass and pro; Chemical industries, including plastics; Leather, leather products and footwear industries; Wood products industries, excluding furniture; Paper and paper products industries and printers; Textile industries including garments; Manufacturing of Jewellery, Fine Stones and Expensive Metals; Metal products industries; Machinery and electrical appliances industries; Transport machinery and equipment; Furniture; and Miscellaneous industries.

Economic Growth

In 2004 the Lebanese economy was growing but was interrupted by political unrest in 2005 and then in 2006 but it picked up again in 2007 and continued to grow in 2008 and 2009. The growth of domestic economic activity measured by the Gross Domestic Product (GDP) was: 1.4% in 2006; 8.4% in 2007; 8.6% in 2008; 9.0% in 2009; 7.0% in 2010 and 5.2% in 2011 (table 2). As for inflation, it recorded[2] 5.6% in 2006, 9.3% in 2007, 5.5% again in 2008, 3.4% in 2009, 4.6% in 2010 and 3.1% in 2011. Nevertheless, the growth in the GDP has been consistently lower than demand and the decline in demand did not necessarily imply a decrease in domestic activity as the figures show; in 2005 and 2006, while overall demand decreased in real terms by 1% and 0.5%, the rate of economic growth remained positive (+1% in 2005 and + 0.6% in 2006) (PCM, 2010).

In terms of the fiscal performance of Lebanon, for the treasury transactions, the total resources amounted to 757,813 million Lebanese Pounds (LBP) and total withdrawals amounted to LBP 3,973,259 million, creating a total treasury deficit of LBP 3,215,446 million or 80.93% of the percentage of total expenditures[3].The GOL's purchasing power currently constitutes 15-25% of the GDP[4]. Hence it is important to ensure sustainable public procurement. In this regard, Lebanon is taking part in a pilot project on Capacity Building for Sustainable Public Procurement[5] implemented by the United Nations Environment Programme (UNEP) with funding from the Swiss government. Under the project, an assessment identified six priority areas for public procurement: minimization of regional disparities;

[1] MOE and UNDP, 2010
[2] MOET, 2012
[3] CAS, 2008
[4] MOE, 2012
[5] http://www.unep.fr/scp/procurement/implementing/ accessed on 11 August 2012.

promotion of renewable energy; improvement of the transport sector; water management; waste management; and preservation of coastal areas. The assessment proposed the encouragement of Research and Development (R&D); subsidies to the organic farming sector; tax reductions on sustainable products; and the streamlining of sustainable procurement practices to encompass all goods and services purchased by the GOL[1].

After 2008 and the world financial crisis, however, the situation did not significantly worsen. Compared to the rest of the world, Lebanon remained relatively unscathed by the latest global financial crisis, with economic growth rates averaging between 7.5% and 9.3% annually between 2008 and 2010. Several factors contributed to that mainly the improvement in the internal political climate after the Doha agreement in 2008, the formation of a national unity government in 2009, and the strong and resilient banking sector in Lebanon. This engendered capital inflows supporting activities in construction, tourism, commerce, and financial services. The business environment has also slightly improved lately, as measured by the World Bank's Doing Business survey in 2012 where Lebanon ranked 104 out of 183 countries, compared to 109 in 2010. However, Lebanon's economic situation remains vulnerable, particularly with the on-going turmoil in neighbouring Syria and other countries in the region and the worsening outlook for the global economy which would impact remittances inflows and foreign investments, all this being exacerbated by the lack of proper structural reforms, and the relatively weak key infrastructure sectors, particularly electricity, water supply, solid waste management and transport. Lebanon still has a long way to go to achieve a sustainable and resilient growth[2].According to the World Bank, the challenge for Lebanon to reach financial sustainability is addressed not by increasing government investments but by prioritising investments and devising a proper financial management system based on clear priorities and well-defined outcomes[3].

However, it should be noted that those relatively high growth rates achieved by Lebanon have so far failed to translate practically into a decrease in poverty or an increase in the standard of living for many Lebanese people. Between 2004 and 2005, 8% of the Lebanese population were living on less than $ 2.4/person/day and 28.5% living on $ 4/person/day or under the upper poverty line. In 2009, a National Poverty Targeting Programme (NPTP) funded by the Government of Lebanon (GOL), the World Bank, Italy and Canada was initiated to create a targeting mechanism to deliver social services to the poor and vulnerable[4]. Inflation was 17% between the years 2008 and 2011 mainly attributed to the rising cost of transport, education and health provision[5]. And the public debt in Lebanon accumulated over the years amounted to $ 51.2 billion in 2009, not including payment arrears and the debt of the Lebanese Central Bank (Banque du Liban; BDL)[6].

2 Infrastructure

Current Status

The infrastructure in Lebanon is not very reliable and not properly managed which negatively impacts the quality of life, services and the environment and causes economic losses in terms of competitiveness on the regional and international markets.

Yet, the GOL is keen on increasing the share of expenditures in infrastructure as reflected for instance in the proposed investment in electricity which increased from LBP 4 billion to LBP 483 billion between 2009 and 2010. The majority of the infrastructure-related expenditures in Lebanon is managed by the

[1] UNDP, UNEP and Institut Basel Fleihan, 2011
[2] ECORYS, 2012
[3] WB, 2011
[4] MOSA, 2011
[5] MOE, 2012
[6] WB, 2011

Council of Development and Reconstruction (CDR). Implemented projects accounted for $ 6.5 billion between 1992 and 2008, and projects under implementation as of end 2008 amounted to $ 2.45 billion. Between 1992 and 2008, the transportation sector had a share of 25% of the projects, followed by electricity (17%), water supply and wastewater treatment (15%), solid waste (14%), education (11%), post and telecommunications (9%), and public health (4%)[1].

1. **Energy and Electricity:** Lebanon is an importer of energy almost totally relying on imported High Emission Factor Fuels in its primary energy mix. As it is now, electricity provision by the public sector i.e. the EDL costs the GOL massively in the form of subsidies to cover for the insufficient revenue from electricity due to a tariff set far below cost recovery and low collection of bills. Lebanon continues to rely on imported gas-oil to run its power plants, and pays massive amounts of money for the Operation and Maintenance (O&M) of its power plants which are old and lead to technical losses and lead to even higher bills on the GOL. In 2008, Electricité du Liban (EDL) produced 12,221 million kilowatt-hours (KWh) of which 99.3% were thermal and 0.7% hydraulic energy, and energy purchases were 867 million KWh of which 64.7% were thermal and 35.3% hydraulic. As for the network energy consumption, it was 10,769 million KWh of which 96.7% were thermal and 3.3% hydraulic[2]. The volume of electrical energy distributed in 2008 increased by[3] 6.7%. The demand for electricity is forecasted to reach over 4,000 megawatts (MW) by 2015, which given the amount generated in 2008 would require an additional capacity of 1,500 MW to be generated[4].

    a. As for the electricity consumers, despite an electrification rate of 100% in Lebanon, they suffer from frequent power blackouts (reaching 12 hours per day in some regions) and hence are obliged to spend extra money on back-up generators to complement the electricity provided by the national grid. Back in 2008, this additional cost was estimated at 25% on top of the EDL bill per month (WB, 2008). In addition, there is a large number of households which cannot even afford to subscribe to back-up generators and end up with no heat, no air conditioning, no light (for children to study properly for instance or access the internet) and no means to preserve their food (MOSA, 2011).

    b. In terms of the industrial sector, the loss in sales per year reached $8,360 million. The firms located outside Beirut experience even higher average sales losses due to higher power shortages. If the assumption is that the majority of the enterprises affected by the power cuts are in the industrial sector which represented 20.8% of the GDP in 2004, and based on an estimated GDP of $22 billion in 2004, the calculated loss to Lebanon due to the power cuts will amount to at least $360 million per year (WB, 2008). For the large industries in Lebanon it hence becomes more economical to generate their own electricity using back-up generators than to rely on the national grid not only due to the tariff charged by EDL but also the risk and associated cost of the interrupted electricity.

2. **Water:** Lebanon is one of the few countries in the Western Asia Region which enjoys heavy rainfall; however, most of the precipitated water is wasted to sea due to lack of adequate infrastructure to retain it (MOSA, 2011). The main challenges facing the water sector are the constrained resources coupled with growing demand, inefficient and old water networks, and the fact that several agencies are responsible for water investment planning, capital spending

[1] WB, 2011
[2] CAS, 2008
[3] PCM, 2010.
[4] WB, 2008

and service provision and there is a weak interagency collaboration, inefficient/inexistent tariffs, gaps in the legal framework, and limited conservation activities (WB, 2009 and MOEW, 2010).

Renewable water resources per capita are already slightly below scarcity threshold, and expected to decrease even more in the coming years, exacerbated by the impacts of climate change on water availability (MOEW, 2010).

Surface water resources are largely exploited and oftentimes polluted while significant stress is put on groundwater through undeclared private wells.

Current groundwater extractions amount to around 700 million m^3 (MCM) per year leading to a deficit of around 200 MCM/year (MOEW, 2010). The available water in Lebanon was estimated to be around 1,100m^3/capita/year, keeping in mind that going below 1,000 m^3/capita/year indicates water stress (WB, 2009).

The collection rates are very low; the cost recovery of water provision by GOL is only achieved in Beirut and Mount Lebanon. There are no conservation incentives at the consumer level, and no incentive for reducing losses and increasing availability at the water establishment level. In addition, many residents pay 2-3 times the water tariffs in alternative sources of water because of intermittent supply and lack of trust in the supply system.

In 2010, the MOEW calculated rural domestic demand at 160 litres/capita/day; urban domestic demand at 180 litres/capita/day; industrial demand at 30% of the domestic demand; tourism demand at 400 litres/tourist/day; and agriculture demand at 9000 m^3/hectare/year (MOEW, 2010). In terms of water supply, all water establishments in Lebanon apply the same tariff structure with slightly different rates varying between \$118 and \$157 per year (\$0.32-0.43/m^3). The tariff is independent from real consumption and instead is a lump-sum flat tariff.

As for irrigation, there are generally two tariffs: lump sum charges based on the area irrigated (\$140-650/hectare/year) or volumetric charges which are applied in the case of pressurized networks equipped with water meters (\$0.10-0.15/m^3). However, MOEW plans to review the tariffs structures and amend them so they reflect the value for real consumption and provide incentives for water efficiency (MOEW, 2010).

3. **Wastewater:** In Lebanon in 2004, only 52% of buildings were connected to the sewage network. Most people rely on sceptic tanks which are usually permeable to prevent overflow (CAS, 2006). The bulk of raw sewage generated from residential and industrial areas in Lebanon is discharged without treatment either into the sea or in watercourses. Municipal wastewater load was estimated at 248 million m3/year in 2010 and wastewater management is one of the high priority issues in Lebanon. There are five complete wastewater treatment plants along the coast of which only two (Ghadir and Saida) are operational but limited to preliminary treatment after which the effluent is disposed of into the Mediterranean Sea. The other plants have not started operating yet because the majority of the connecting sewerage networks are still under construction. In addition, there are other planned treatment facilities still at various stages of implementation. Inland, there are eight small scale treatment plants which are operational in addition to one in Baalbeck(WB, 2011).The MOEW's planned National Water Sector Strategy proposes the selective introduction of a wastewater tariff not to exceed \$36.5/household/year and generalised with service coverage to be increased to \$84/household/year by 2015, based on 1 m3 of water consumption/household/day (WB, 2011). In terms of wastewater treatment and disposal cost recovery, it is almost non-existent because either a low municipal fee is collected or none at all. The majority of municipalities in Lebanon do not have enough resources to provide adequate and sustainable wastewater

services, which in turn has led to under-funding which negatively affected the capacity of the municipalities to provide a proper service and achieve financial sustainability.

4. **Solid Waste:** The amount of municipal solid waste (MSW) generated in Lebanon in 2009 was estimated between 0.85 and 1.1 Kg/capita/day in urban areas and around 0.7 Kg/capita/day in rural areas. For a population of 4.5 million in that year, the total municipal solid waste generated that year amounted to 1.57 million tonnes. As for the waste composition, organic materials constitute 50-55%; paper/cardboard 15-17%; plastics 10-13%; metals 5-6%; glass 3-4%; and other materials 10-12%. In terms of industrial waste, -most of which are waste mixed with the MSW-, the industrial non-hazardous waste generated amount to around 185,000 Tonnes/year, and the industrial hazardous waste amount to around 3,380 Tonnes/year (SWEEP-Net, 2010).

Approximately 84% of the MSW generated in Lebanon ends up in landfills or open dumps. There are two sanitary landfills in Lebanon; one in Zahle and one in Naameh, the latter being close to the end of its lifespan. After the Naameh landfill is closed, only 53% of Lebanon's municipal waste will be disposed of in an environmentally conscious way as per international standards. The dumpsite in Tripoli has controlled dumping and methane flaring and is close to full capacity whereas the dumpsite in BourjHammoud though stabilised in 1997 is still sinking and dispersing into the sea. As for the other dumpsites along the coastal zone, they are uncontrolled and polluting the air and the sea. Once a municipal solid waste incinerator was built in Amroussieh in the Southern suburbs of Beirut at the cost of $ 16 million, but it was set on fire by citizens in 1997 by citizens due to the NIMBY syndrome (WB, 2011).In terms of the health care waste, some progress has been achievement in their management. However, with regard to industrial wastes, Lebanon still lacks the adequate infrastructure to properly manage them, and their accumulation and disposal with the regular MSW lead to major environmental such as increased air pollution, water and soil pollution. In terms of public awareness, there is still some lack, not only of the knowledge about the methods and ways for SWM, but also in terms of the willingness to consider the 3Rs (Reduce-Reuse- Recycle) principle even among the educated sectors of the population. Consequently, there is an urgent need for public awareness at both the household and policy-making levels in order to develop a proper strategy with the adequate implementable decrees and successfully put them in action (SWEEP-Net, 2010).

In 1996, the CDR was charged to implement a Wold Bank-funded Solid Waste Environmental Management Program (SWEMP); however, after facing strong public opposition to the landfill sites proposed by the project, the program was terminated and the loan withdrawn. Under an EU-funded programme "Assistance to the Rehabilitation of the Lebanese Administration" (ARLA), the Office of the Minister of State for Administrative Reform (OMSAR), launched a municipal SWM programme to improve solid waste services provision in rural areas in Lebanon. The fund amounted to €14.2 million to build and equip 12 SWM with a capacity of 700 Tonnes/day (or 18% of waste generated in Lebanon). OMSAR programme has also supported municipalities by supplying them with waste collection and handling equipment such as compactor trucks, pickups, wheel loaders, etc.) and conducted awareness-raising campaigns to promote waste reduction and segregation at source. In addition, OMSAR secured $15 million from the national treasury invested to operate and maintain the facilities (WB, 2011 and R10). In 2005, COM requested from MOE and CDR to prepare a 10-year municipal SWM plan which proposed an integrated approach involving collection, sorting, recycling, composting, and landfilling. The plan was approved by the COM in 2006 but then aborted due to the July war with Israel. In 2010, the COM issued Decision 55 to amend the 2006 master plan and implement it. Among other things, the Decision advocated Waste-To-Energy (WTE) technologies in large cities whereby public-private partnerships are encouraged (WB, 2011).

The private sector in Lebanon is highly involved in the collection and transfer of the MSW. In Greater Beirut, a relatively advanced solid waste management (SWM) system was developed by a private sector operator since the nineties. However, it is mainly focused on bailing, wrapping, some segregation, little

composting and landfilling, and all this at a very high cost. As for outside Beirut, waste management systems are mainly based on "collect and dump" approaches, with a few exceptions in some towns and villages. Also outside Beirut, the main services of SWM are undertaken by private companies.

Outlook

Any increase in investment in infrastructure should be coupled with better management and administration of these sectors[1]. For example, before 2009, there were no proper industrial zones in Lebanon and industrial establishments were scattered almost everywhere amidst residential areas, in the mountains or along the coast. The National Land Use Master Plan was endorsed by the Lebanese Council of Ministers (COM) in June 2009 as per Decree No. 236/2009. The Master Plan is meant to be a reference document for all administrations making decisions related to urban development or the provision of public services. It also recognizes nine planning zones including one zone for industries.

1. **Energy and Electricity:** Unless the GOL responds to that forecast by improving the capacity of EDL to supply electricity, enhancing energy efficiency and encouraging renewable energy resources, the reliance on back-up generators will continue to increase to satisfy the demand.

    a. The Lebanese Centre for Energy Conservation (LCEC) was established in 2002 with funding from the Global Environment Facility (GEF), hosted at the Ministry of Energy and Water (MOEW) and managed bythe United Nations Development Programme (UNDP). In 2011, the LCEC was registered as an organization under the direct supervision of MOEW to address end-use energy conservation and renewable energy at the national level. It also offers policy and technical support to the MOEW to promote energy efficiency and renewable energy at the consumer level. Several legislations have been introduced or at least considered by the government to incentivise clean electricity production such as Feed-In Tariffs and Net Metering. In 2008, the Lebanese Ministry of Finance signed a Sustainable Energy Strategy (SES) project with the UNDPin collaboration with MOEW and the MOE. Under this project, the Ministry of Finance (MOF) studied options of fiscal incentives that can be adopted to encourage energy efficiency, renewable energy and better environmental practices, such as the law stipulating full exemption from customs fees for Hybrid cars for instance (MOE and UNDP, 2010).

    b. In 2010, the MOEW developed a Policy Paper for the electricity sector to rehabilitate the sector by 2015 and the COM approved it in June 2011. The Paper aims to switch the reliance on Liquefied Natural Gas instead of the polluting fossil fuels, promote energy efficiency and increase the share of renewable energy resources in the mix. In 2009 in Copenhagen, the GOL committed itself to increase the share of renewable energy to 12% of the total electricity consumption by 2020. In early 2012, the COM approved the National Energy Efficiency Action Plan (NEEAP) to invest in energy efficiency, renewable energy, and green building projects. NEEAP described several initiatives among which were the banning of the import of incandescent lamps; the adoption of the energy conservation law and institutionalisation of the LCEC; the promotion of electricity generation from wind and solar power; the design and implementation of a national strategy for efficient and economic public street lighting; and the promotion of a building code for Lebanon. Also in early 2012, the COM approved the Draft Energy Conservation Law which proposes, among other things, to conduct obligatory and periodic energy audits; evaluate energy intensive projects; provide energy labelling of products, machines, and appliances; and provide tax

[1] MOSA, 2011

exemptions for energy efficiency and renewable energy equipment. If properly implemented and enforce, this law will potentially create a market for energy audit firms, create job opportunities for graduates in these fields, improve energy efficiency and enhance technological know-how (MOE, 2012).

c. An important initiative in the electricity sector is the National Energy Efficiency and Renewable Energy Account (NEEREA), a joint cooperation between BDL, UNDP, the European Union (EU), MOEW-LCEC, Lebanese banks and private investors. NEEERA will provide the majority of the funding for NEEAP. It is anticipated that many sectors and interest groups mainly SMEs in agriculture, industry and hospitality will be competing for limited funds. There are several provisions included in the NEAAP, among which are 190,000m² of DSWH to be installed by 2014. The MOEW has subsidized this program at $200 per grant for the first 7,500 applications and the units are financed at 0% interest rate over a five year period according to the BDL Circular No 236 in 2010.

2. **Water:** There is a great need to introduce metering to link supply with demand coupled with an improved bill collection rate(WB, 2009).

The MOEW estimated the total operational expenditure requirements in the sector for the period 2011-2020 at $ 2.1 billion and the total revenues of the water sector are estimated to reach $ 2.72 billion for the same period. According to MOEW's calculations, and under the set policies and targets, O&M cost recovery is expected by 2014 and full cost recovery by 2021. There are 321 on-going or planned water projects with a budget of $ 2.45 billion between 2001 and 2015 with around $1.6 billion to be spent on new projects (MOEW, 2010).The planned water conservation initiatives by MOEW include the installation of conservation kits such as high-efficiency toilets and showerheads, kitchen aerators, etc. at the level of households, and complete retrofit of industrial and commercial establishments and adoption of high efficiency on-farm irrigation techniques; coordination with the Ministry of Agriculture to adopt lower water consumption crops; public outreach, awareness and education programs targeting householders, farmers, etc. and planned and executed mainly through the Lebanese Centre for Water Management and Conservation; in addition to undertaking household, farm and establishment water audits. It is expected that these initiatives will save 3.0 litres/capita/day per year from 2011 to 2020 and will decrease water consumption in irrigation from 9,000 to 7,000 m^3/hectare/year by 2035.

In 2010, MOEW developed a National Water Sector Strategy and is developing a "Water Code" that would recognise the main legal principles prevailing in the field of water such as sustainable management, determination of responsibilities of several authorities, the right of each citizen to receive water, etc., the introduction of a National Water Council including the representatives of the main authorities in charge, determine the possibilities to private sector participation and implement a water master plan. Then identify and implement the legal requiring ensued from the implementation of the National Water Sector Strategy. The MOEW also plans to undertake a Strategic Environmental Assessment (SEA) to ensure that the environmental concerns related to waster are addressed and mitigated.

3. **Wastewater:** The German Government is assisting the GOL in designing a wastewater tariff that will eventually recover the initial O&M and gradually capital investments (WB, 2011).

4. **Solid Waste:** Political indecision and the Not-In-My-Backyard (NIMBY) syndrome have delayed SWM master plans, leaving the country to rely on emergency response measures. In early 2012, the COM approved the Integrated Solid Waste Management (ISWM) Law (COM Decision 34), including waste-to-energy technologies (Article 31). The ISWM Law describes priorities, principles and responsibilities of relevant bodies (ministries, municipalities, etc.) as well as the institutional framework for the integrated management of solid waste. This Law awaits parliamentary approval. However, the law by itself is not sufficient to implement an

integrated SWM system in Lebanon. In addition to the law, this would necessitate the setting and issuing of applicable decrees, strategies and plans in the various domains, in the aim of ensuring a sustainability of the system, in terms of cost-recovery system, well-defined institutional framework; and consensus on a strategy. Further positive developments, however, will come from the private sector. The private sector has also been involved in the construction and operation of composting plants in some villages, as well as the construction of recycling facilities such SICOMO and SOLICAR for recycling paper and cardboard, ELIE DEBS Company for recycling plastics, LEEDS for recycling some types of plastics, and SOLIVER for recycling glass (MOE and UNDP, 2010). Usually in Lebanon the private sector is more effective than the public sector in SWM. In terms of recycling efforts, the informal and semi-formal private sector undertake recycling activities mainly outside Beirut, which provide means of livelihood for at least thousands of people. Lebanon recycles about 40-45% of its cardboard, 27-29% of its plastics in addition to varying percentages of other materials such as tins, wood, tyres, glass, and aluminium. Actual material recovery rates may be may be higher than reported rates, thanks to an organized network of scavengers who remove waste. There is mostly no source separation of the MSW. When recycling is taking place, material recovery is carried out at the end of the pipe at centralized Material Recovery Facilities, which unavoidably leads to lower quality of recyclables. Several active non-governmental organizations based in Lebanon like TERRE and Arcenciel have long ago initiated small-scale recycling campaigns and several leading commercial outlets and malls have started to provide biodegradable and eco-friendly bags to their customers. Such initiatives could be widespread by introducing a green tax or mandatory fee on the regular plastic bags, so commonly and nonchalantly used in Lebanon (MOE and UNDP, 2010).

3 The Environment

The environmental neglect in Lebanon accumulated over the years of civil war then reconstruction and the conflicts with Israel have had a great impact on the Lebanese economy and led to a degradation valued at $ 565 million in 2000 for local environment or 3.4% of GDP. In terms of Lebanon's environmental performance, its Ecological Footprint was 2.9 hectares/capita in 2007, its Environmental Performance Index (scale 0-100) was 57.9 in 2010 (compared to 93.5 in Iceland, 81.1 in Norway), its Carbon Dioxide (CO2) emissions were at 4.1 Tonnes/capita in 2008 and grew annually by 2.5% between 1970-2008; and its Greenhouse Gas (GHG) emissions per capita in 2005 were at 0.4 Tonnes of carbon dioxide (CO2) equivalent[1]. This is reflected in studies by the World Bank and the Arab Economic Forum.

The World Bank concluded that the Lebanon is still at an early stage in achieving environmental sustainability, using indicators for Millennium Development Goals (MDG); the Environment Performance Index (EPI); the Adjusted Net Savings (ANS); the Cost of Environmental Degradation; and the Environment-related spending (ERS). In terms of the MDGs there are doubts as to whether Lebanon will be able to achieve MDG 7 (Ensure Environmental Sustainability) by 2015 particularly with the shrinking forest coverage and the improper solid waste and wastewater management systems. In terms of the EPI, Lebanon ranks 90th among 163 countries and its score was 57.9 in 2010, decreasing from 70.3 in 2008. As for the ANS, it has been showing a decline in recent years signalling a decline in the physical and natural assets. The COED as a tool to monetise environmental damage and mitigation was calculated by the World Bank at $ 969 million in 2008 prices, equivalent to 3.7% of the GDP. As for the ERS, water, wastewater, and solid waste capital and O&M spending reached an average of $ 203 million and

[1] UNDP, 2011: p147

US$ 210 million per year, respectively, between 1999 and 2008 or 1.2% and 1.3% of the GDP, respectively[1].

The study prepared for the Arab Economic Forum assessed the cost of environmental degradation associated with three environmental categories: health care costs linked to inadequate potable water, sanitation and hygiene; outdoor air pollution; and land degradation costs caused by agricultural crop cultivation, estimated the annual cost in Lebanon to be close to $800 million in 2008[2]. The environmental cost of air pollution in Lebanon is estimated at $170 million/year made worse every year by pollution from transport, factories, power plants, agriculture, etc. especially that the Lebanese population is heavily car-dependent.

Lebanon has ten nature reserves and harbours 1.11% of the world's plant species and 2.63% of the mammal, bird and reptile species. Its sea is home to 1,790 species, accounting to around 2.7% of the world's marine species. Historically, 74% of Lebanon was covered with forests, a number that has come down to less than 13%, of oaks, pines, cedars, junipers, and evergreen cypress. The annual deforestation rate is 0.4% while annual reforestation is estimated to be[3] 0.83%.

The Role of Governmental Organizations

The main problem remains the government's approach for development in a segregated manner, aiming to develop a specific sector or even a sub-sector of the economy instead of concentrating the efforts on a holistic approach to development starting with a national strategy to develop productive sectors and services through an inter-ministerial and multi-sectoral collaboration[4]. Yet, despite political instability, frequent COM changes, and the bad economic performance of the country, there have been great achievements in Lebanon's institutional and legal framework since the establishment of the MOE in 1992.

The MOE, understaffed (60 in 2010 instead of 183 full-timers as per the Decree No 2275/2009) and under-sourced ($4.88 million in 2010)[5]. The MOE budget averaged $ 2 million/year between 1999 and 2008 the majority of which (97%) went towards administrative expenses[6]. In spite of all this, it has been very active since its establishment by Law No. 216/1993 after the 1992 Rio Earth Summit. Its mandate and organizational structure were further amended by Law No 695/2005 and Decree No 2275/2009 to include sustainable development issues including coordination. The MOE has set up strategies, managed programmes, and implemented national projects. The MOE also prepared two decrees on the environment impact assessment (EIA) and the SEA.

The MOE prepared a work plan for the period 2010-2012 in line with the multilateral environmental agreements ratified by the GOL as a prelude to updating the National Environmental Action Plan which was prepared in 2005-2006 but was never officially endorsed. The work plan comprised 10 themes, among which: strengthening environmental inspection and enforcement, adapting to climate change, promoting environmentally-friendly products, promoting eco-job opportunities, and strengthening the role of MOE. The implementation of the work plan necessitates a close coordination between MOE and other ministries, and the public and private sector groups.

---

[1] WB, 2011
[2] AFED, 2011
[3] MOE and UNDP, 2010
[4] Outcome report on the status and vision of sustainable development in Lebanon, by a joint committee of the Ministries of Environment, Foreign Affairs, Social Affairs and Economy and Trade to oversee the compilation of a report 5th of June 2012.
[5] MOE, 2012
[6] WB, 2011

Yet, there are still considerable challenges to overcome; mainly that priorities are constantly changing; law enforcement and monitoring are weak; and there is a lack of information sharing and public participation in the environmental management system. Though the councils of ministers have committed themselves in declarations to protecting the environment, none of them provided the necessary backing in terms of financial resources and political will to carry them through. The most important factors that the country should focus on to improve environmental management are instilling a strong political will, improving inter-ministerial collaboration, enhancing monitoring and enforcement of environmental laws and regulations and strengthening environmental governance.

The Role of Non-Governmental Organizations

Environmental activism in Lebanon started a long time ago at the grassroots level, at a time when the State was absent. Lebanon has now a vibrant and active civil society that supports environmental protection. There are currently more than 450 Non-Governmental Organisations (NGOs) with environmental objectives in Lebanon and this is the highest number in the ESCWA Region. Though most of these NGOs are small, they are active in raising environmental awareness, mobilizing funds and advocating for environmental issues. Environmental programs and degrees have been introduced in several universities and the environmental topics have long been discussed and debated in Lebanese newspapers and magazines.

There are no reliable, comprehensive data on the size and activities of NGOs, but most of them workat the grassroots level such as the Green Line Association, the Society for the Protection of Nature, and the Association for Forest Development and Conservation, to name a few. Lebanon has two political parties dedicated to environmental work: the Green Party of Lebanon (GPL) and the Lebanese Environmental Party (LEP). The GPL was founded in 2004 and advocates for the protection of the environment, sustainable development, and human rights. The GPL lobbies the parliament for greener legislation, such as assisting in the draft and backing the promulgation of the draft Environmental Prosecutor Law. As for the LEP, it was founded by seven Lebanese environmental activists in 2005 and seeks to plan strategies and prepare policies related to water management, transport, quarries, solid waste, etc. The LEP also collaborated with the MOE in formulating the 2010-2012 Work Plan (MOE and UNDP, 2010). Lebanon also has the Environment and Development Magazine[1] launched in 1996, which is the first pan-Arab environmental news magazine in Arabic. It is a monthly magazine which supports more than 300 environment clubs in schools and has a supplement entitled The Young Environmentalist.

Environmental Projects and Initiatives

Lebanon has come a long way in terms of designing environmental strategies and the interest in environmental protection is not only limited to professionals in the field but has spread out to become a national concern. After the end of the civil war and mainly in the past 15 years, the Lebanese private sector has played a major role in contributing to the provision of environmental services particularly in the design, management, and supervision of projects financed by the government and development partners. The CDR outsources the majority of the national projects to the private sector and the MOE outsources the project management of its grants to consultants, private universities, and consulting firms. There have been several environmental initiatives and projects initiated and implemented by many public and private entities mainly with international funding. Below is a list of those initiatives.

1. Projects and initiatives by or in collaboration with the MOE
    a. In 1998, MOE and UNDP started the National Ozone Unit (NOU) to meet Lebanon's obligations under the Montreal Protocol. The NOU provided assistance to around 100

[1] http://www.mectat.com.lb/

industries in Lebanon to help them convert the technology from using Ozone Depleting Substances (ODS) to non-ODS.

b. The German Government launched the Environmental Fund for Lebanon in 2007 mainly to reduce the environmental impacts of the 2006 Israeli war. In collaboration with ALI, the EFL executed the "Cleaner Production Options for the Chemical Sector in Lebanon" to encourage four chemical industries to adopt cleaner production processes to maximize profits and minimize the environmental pollution from contaminated solvents. A second call for proposals by the EFL between 2011 and 2012 offered assistance to eight industries to implement wastewater treatment on their premises. Among these industries, and to mention a few examples, EFL provided €68,657.50 to assist a sanitary paper company, Mimosa , located in Zahle (Bekaa) to further treat its wastewater effluent and reuse it at the factory by installing a sand filter. EFL also provided €200,000 to assist sunflower vegetable oil producer, Pulper , located in Nahr Ibrahim (Mount Lebanon) to implement a closed-circuit water cooling system to improve the existing production process and eliminate ensuing negative environmental impacts. The fund provided another €200,000 to assist SIDEM in ZoukMosbeh (Mount Lebanon), a company specialized in coating of aluminium profiles, to treat its wastewater containing high levels of AluminiumSulfate and Aluminium Hydroxide, and which was originally discharged into the municipal sewage system and eventually in the sea.

c. Strengthening the Permitting and Auditing System for Industries (SPASI) SPASI was a two-year project which started in 2000 and was financed by the European Commission, managed by the UNDP and hosted by the MOE. As its title implies, SPASI aimed to strengthen the permitting, monitoring and auditing system for industries by developing necessary legislation and introducing the proper matching tools. The objectives of the project were to set/update decrees for classified establishments, standards for environmental quality, and environmental auditing procedures; strengthen the capacity for environmental monitoring procedures and develop a compliance action plan; raise awareness and build the capacity of stakeholders in monitoring and environmental auditing.

d. Strengthening the Environmental Legislation Development and Application System in Lebanon (SELDAS) implemented by the MOE and which engaged many stakeholders including parliament, ministries, universities and NGOs, helped raise awareness about environmental legislation development, and promoted environmental law education in several universities. It culminated in the production of a book on the State of the Environmental Legislation Development and Application System in Lebanon encompassing several topics such as construction, land use, energy, industry, tourism, solid waste etc. and their relation with the environment.

e. Other projects by or in collaboration with MOE: Alleviating Barriers for Quarries Rehabilitation in Lebanon; Integrated Waste Management for the Olive Oil Pressing Industries in Lebanon, Syria and Jordan; Demonstrating and Promoting Best Techniques and Practices for Reducing Health-Care Waste to Avoid Environmental Releases of Dioxins and Mercury; Technical Assistance to Reinforce Governance in Environmental Tasks; Sustainable Development Networking Programme; Strategic Environmental Assessment and Land Use Planning in Lebanon; Promoting and Monitoring Synergy between Trade and Environment in Lebanon, etc.

2. Projects and initiatives by the BDL

a. The BDL launched an initiative to support rural development and environmental protection through its branches in the Mohafazats by raising awareness among the private sector and particularly banks, municipalities, NGOs, etc. The BDL has also issued a circular that subsidises interest rates to environmental projects which incentivizes banks to grant loans serving environmental projects. The annual cost of these subsidy policies are shared with the Treasury which has so far contributed LBP 128 billion in 2010 increasing from LBP 99 billion in 2009 (WB, 2011).

b. The BDL also launched environmental loans in 2010 (BDL, 2010) related to energy efficiency and renewable energy undertakings as well as projects related to pollution abatement, solid waste and waste water treatment, recycling, ecotourism, organic agriculture, and landscaping. For new projects, the repayment period was up to 10 years, starting after the end of the grace period which could range from 6 months up to 4 years. As for the amendments in existing projects, the repayment period can go up to 10 years, including the grace period, which can range between 6 months and 2 years. The loans amounting to less than $20,000 need approval from the Board of the BDL for an umbrella amount, whereas the loans with values of than $20,000 need individual approval from the Governor of the BDL (BDL, 2010).

3. Projects and initiatives by the United States Agency for International Development (USAID).

a. In August 2010, the USAID launched a five-year project on Developing Hydroponics to Access International Marketsfor $ 22,197,271. This project aims to improve the lives of rural greenhouse producers by enhancing growth production, increasing access to credit for SMEs and small agriculture producers and establishing a high-value produce using hydroponics, thus mitigating climate constraints and reducing the use of water, fertilisers and pesticides.

b. In 2009, the USAID launched a six-year programme: “Lebanon Investment in Microfinance” $ 12 million. This programme aims to supply loans to individuals, micro and small enterprises, and farmers by providing grants to local micro-finance institutions (MFIs) in Lebanon which in turn disburse funds as loans and services to the beneficiaries mainly in the sectors of agribusiness, tourism, and Information and Technology, as well as to women and youth entrepreneurs. The ultimate objective is to establish new income-generating businesses and improve existing ones through job creation, and the availability of finances.

c. In 2009, the USAID launched a three-year programme on Agriculture Product Quality Control and Certification for $ 3 million. This programme aims to establish decentralized accredited food testing labs. So far, the project has upgraded three agricultural product development and testing laboratories in the Chambers of Commerce, Industry, and Agriculture in Tripoli, Zahle, and Saida and is assisting them to become certified and internationally recognized ‘one-stop-export-shops’ in order to meet the growing needs of the agro-food processors and exporters in Lebanon.

d. In 2004, the USAID in collaboration with the United States Forest Service started the Reforestation Partnership Programin Lebanon to support the Lebanese efforts to combat wildfires. Then USAID and the U.S. Forest Service launched the Lebanon Reforestation Initiative, a four-year project with $ 11.9 million aimed at enhancing seedling nursery operations and improving reforestation practices.

e. Another three-year project for $ 3 million entitled Support for Lebanon’s Accession to the World Trade Organisation (WTO)aims to support Lebanon’s accession to and

participation in the WTO thus increasing Lebanon's participation in the world economy. USAID coordinates efforts with the Lebanese private sector, academia, and business associations for trade-related regulatory reforms.

4. Projects and initiatives by the EU.
    a. In the context of the European Neighbourhood Policy, the EU announced the Annual Action Programme 2011 for Lebanon in August 2011, a package of € 33 million targeting the reform of three areas: municipal finance, environmental governance and justice. The Support to the Reform of Municipal Finance project (€ 20 million) aims to provide support to local governments in order to achieve a better socioeconomic development. The Support to the Reform of Environmental Governance (€ 8 million) aims to enhance the environmental performance of the Lebanese public sector by providing training to the MOE and other stakeholders to assist them with the planning and implementation of environmental policy, including law enforcement. It is expected that this program will improve the environmental performance of the public sector through four angles: legal, administrative, financial and technical. As for the Support to the Reform of the Judiciary (€ 5 million), it aims to the establishment of a more independent and better-performing judiciary system (ECORYS, 2012).
    b. In 2000, the GOL through the CDR signed a financing agreement with the European Commission to implement the Economic and Social Fund for Development (ESFD) project aimed at poverty reduction. The ESFD was to be funded until the end of 2008 with a contribution of € 25 million from the EC and € 6 million from the GOL, provided that the EFSD becomes self-funded and self-sustainable after the end of that period. In order to achieve its mission, the ESFD partners with civil society organizations and universities to join efforts to attempt to improve the livelihoods of the under-privileged in Lebanon, such as the supply of basic services in health, education, water and agriculture and the provision of micro-credits. For instance, in 2004, Lebanese University students volunteered to assist with olive harvesting in South Lebanon, and in 2006, the American University of Beirut (AUB) assisted people in North Lebanon in civil works.
    c. The EU may fund a program aiming to "Stimulating Sustainable Growth and Jobs Opportunities in Lebanon" in order to support sustainable growth and create new green job opportunities mainly through the implementation of good practices and clean technologies, innovative financing and green banking mechanisms, the dissemination of project results, the promotion of dialogue among stakeholders, support to the creation of the National Environmental Council and the development of a roadmap for green economy in Lebanon.
5. Other projects and initiatives
    a. A project "Supporting the Judiciary System to the Enforcement of Environmental Legislation" executed by the Ministry of Justice, and financed by the World Bank and the UNDP: it aims to support the judiciary system in Lebanon to enforce environmental legislation mainly through the creation of an online database of environmental jurisprudence and the introduction of a course on environmental law in the curriculum of the institute of judicial training.
    b. The UNDP, in collaboration with the MOEW, MOF and the CDR has been managing the "country energy efficiency and renewable energy demonstration project for the recovery of Lebanon" (CEDRO) since 2007 with a budget of $9.73 million funded by a donation from the government of Spain through the Lebanon Recovery Fund.

CEDRO mainly aims to complement the national power sector reform strategy and to support the greening of Lebanon's energy sector through the application of energy efficiency and renewable energy applications to public sector buildings and facilities across Lebanon.

Environmental Education and Research

Lebanese universities are increasingly offering environmental courses. The extent and depth is variable, with some universities offer full-fledged multidisciplinary environmental programs, while others provide environmental courses only for non-environmental majors. Some programmes are geared towards natural sciences (such as ecosystem, ecology and water) while others are more focused on engineering (such as solid waste, air pollution control, cleaner production and wastewater). Occasionally, universities may cover environmental issues from urban planning and urban design perspectives.

The main environmental programmes are those of the American University of Beirut (AUB), the Notre-Dame University - Louaize (NDU), the Lebanese American University (LAU), the Beirut Arab University (BAU), and the Université Saint-Joseph (USJ).

- The AUB[1]: Bachelor Degree (BS) in Environmental Health (1964), Masters of Science (MS) in Ecosystem Management, MS in Environmental Health and MS in Environmental Technology (1996). Bachelor of Engineering (BE) in Civil and Environmental Engineering and Masters of Engineering (ME) in Environmental and Water Resources Engineering.
- Notre-Dame University Louaize (NDU[2]): BS in Environmental Sciences (1997).
- The Lebanese American University (LAU): BE in Civil and Environmental Engineering (1996).
- Beirut Arab University (BAU[3]): MS in Urban Planning (1975) and MS in Urban Design (1985).
- Université Saint-Joseph (USJ[4]): Licence (BS equivalent) in Science de la Vie et de la Terre, Licence and Maîtrise (Masters equivalent) in Environnement et Aménagement du Territoire (1997), Diplôme-Ingénieur (BE equivalent) in Eau et Option Environnement (1996), Diplôme d'EtudesApprofondies (D.E.A) in Sciences de l'Eau (1996) and Doctorat (PhD –Doctorate in Philosophy- equivalent) in Sciences de l'Eau (1998).

There is a dynamic research community in Lebanon, though funding is oftentimes limited. Many universities are active in research in environmental sciences, environmental engineering, sustainable development and related fields. Funding is provided by the universities themselves, the private sector or international research agencies, and conducted individually by each institution or in collaboration with local and/or international partners. In addition to the research conducted by higher education institutions, there are research centres in Lebanon which are very active in conducting research in the field. The main research centre in Lebanon is the National Council for Scientific Research ("Conseil National de Recherche Scientifique"; CNRS[5]), established in 1962 under the authority of the Lebanese Prime Minister as the central science and policy‐making public institution. It manages and runs four subsidiary centres: (1) National Centre for Remote Sensing, (2) National Centre for Atomic Energy, (3) National

[1] http://www.aub.edu.lb
[2] http://www.ndu.edu.lb
[3] http://www.bau.edu.lb
[4] http://www.usj.edu.lb
[5] http://www.cnrs.edu.lb, accessed on 4 August 2012.

Centre for Geophysical Research, and (4) National Centre for Marine Sciences. The CNRS has administrative and financial autonomy and has two main functions:

- An advisory function whereby it proposes the general outline of the national science policy and submits proposals to the government and undertakes surveys of on-going research activities in Lebanon; and
- An executive function whereby it implements the national science policy by initiating, encouraging and undertaking research.

The CNRS also has a Scholarship Grant Program and a Research Grant Program. In 2004, the CNRS's mandate was expanded by Law No.576 to include human and social sciences in addition to basic and applied sciences and in 2006, the CNRS launched its Science, Technology and Innovation Policy for Lebanon. In addition to its programmes to support scientific research, the CNRS disseminates scientific information in its Lebanese Scientific Journal, publishes a quarterly newsletter and a bi-annual Research Directory which lists all research projects sponsored or supported by the CNRS. Between 2006 and 2007, the CNRS sponsored 120 studies, 21 of which were in the environmental field.

4 International, Regional and Bilateral Cooperation

Lebanon has ratified key treaties by the International Labour Organisation (ILO) and other treaties on determination of working hours, working shifts and holidays, nocturnal labour of women employed in industry, convention on the rights of the child, prohibition of labour discrimination based race, colour, sex, religion, political opinion, national or social origin, convention on the eradication of all forms of discrimination against women, prohibition of forced labour. In addition, Lebanon signed or ratified most of the important international conventions on the environment, labour and social justice.

- Lebanon ratified the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter in 1973, the Barcelona Convention for Protection against Pollution in the Mediterranean Sea in 1976 and the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources in 1980, the Basel Convention regulating the trans-boundary movement of hazardous wastes and their disposal in 1994. In addition to the Vienna Convention for the Protection of the Ozone Layer, the Montreal Protocol on Substances that deplete the Ozone Layer, the Cartagena Protocol on Biosafety, the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change (UNFCCC), the Convention to Combat Desertification
- Lebanon signed the Stockholm Convention on reducing and eliminating the release of persistent organic pollutants (POPs) in 2001.

Lebanon has a myriad of development partners who have provided the country with technical and financial assistance to meet environmental challenges and work on its environmental agenda. In addition to USAID, ESCWA, the EU, GEF, UNDP, UNEP, and the World Bank, Lebanon has benefited from the assistance of the Canadian International Development Agency (CIDA), the International Development Research Centre (IDRC), the AgenceFrançaise de Développement (AFD), the Deutsche GesellschaftfürInternationaleZusammenarbeit (GIZ), the KreditanstaltfürWiederaufbau (KfW), the European Investment Bank (EIB), the Mediterranean Action Plan (MAP), the Mediterranean Environmental Technical Assistance Program (METAP), and the Japan Bank for International Cooperation (JBIC).

5 Policies and Institutional Frameworks

Lebanon has yet to develop a national Sustainable Development strategy and a focused financial strategy. However, it does have a national social strategy.

Instead of a national Sustainable Development strategy, Lebanon has a variety of individual development strategies prepared by its different ministries and organisations, in addition to developed sectoral strategies, programmes, and action plans such as the National Biodiversity Strategy and Action Plan (1998); the National Implementation Plan for the Management of Persistent Organic Pollutants (2003-2005) and the National Action Plan for Protected Areas (2004-2005). Going forward, the development of any National Sustainable Development Strategy is hindered by poor institutional governance, the civil war, successive military occupations, and the presence of a high refugee population in the country. However, according to the World Bank, Lebanon is the only country in the ESCWA Region that has comprehensively assessed its environmental legislations through:

- The review of the "State of the Environmental Legislation Development and Application System" (SELDAS). SELDAS analysed the environmental legislative framework of Lebanon from 1913 up till 2003, shedding light on the lack of coherence in the texts and the overlapping functions, and suggesting improvements to "greening" legal texts.
- The National Land Use Master Plan of the CDR that was approved by the COM in 2009 by Decree No. 2366/2009. The plan suggests land use categories and sectoral action plans and is considered a reference for the urban planning policy in the country, defining the principles for the development of the regions, in terms of infrastructure and best activities suited for each location[1].

The financial strategy of Lebanon has focused, since the end of the Civil War in 1990, mainly on developing the real estate and tourism sectors, with no mention of related social concerns. Consequently, the flow of capital after the Civil War and after the reconstruction was mainly invested in the real estate and banking sectors rather than on the sectors of productive economy, while approximately 37% of government spending between 1993 and 2009 was earmarked to cover the interests on the public debt.

The social strategy of Lebanon is a comprehensive framework to promote equitable social development in the country. The National Social Development Strategy (NSDS) is the the first attempt of a Lebanese government to develop a social development strategy that considers social issues as a priority, and was devised by the Lebanese Ministry of Social Affairs (MOSA) in 2010-2011, in collaboration with an Inter-Ministerial Committee for social issues headed by the Lebanese Prime Minister. The NSDS is based on a 7 pillar "Social Pact" aimed at establishing a "citizenship-based Civil State"through; (1) strengthening of social development; (2) ensuring equal quality health care services; (3) building social safety nets to protect vulnerable groups; (4) promoting equal quality education; (5) providing equal work opportunities based on skills; (6) adopting social and economic policies in harmony with the sustainable management of natural resources; and (7) applying integrated land use plans.

Laws and Decisions ensuring an environmentally-conscious development

Thus far Lebanon has emphasised investments rather than policy reforms as a mitigation of environmental problems. Such financing mechanisms are not sustainable particularly with the increasing public debt in the country; Lebanon should instead become more efficient with public expenditures, start to impose resource utilization costs and internalise environmental costs. On the other hand, there is a lack of strong enforcement of the environmental laws and the main barrier to effective implementation of the laws is the fragmentation among several public authorities such as the regulatory institutions, licensing agencies, the police, etc. at both the national and local levels. Hence the first institutional priority to enforce the laws is to achieve a higher degree of inter-agency coordination.

The main law to guarantee an environmentally-conscious development if properly enforced is Environmental Law No. 444/2002 (hereafter referred to as the Law). Approved by the Lebanese

[1] MOE, 2012 and MOSA, 2011

parliament in 2002, it is an overarching legal instrument for environmental protection and management. The law defines eleven environmental principles: Precaution; Prevention; Polluter-Pays-Principle; Biodiversity conservation; Prevention of natural resources degradation; Public participation; Cooperation between central government, local authorities, and citizens; Recognition of local customs; Environmental monitoring; Economic incentives to encourage compliance and pollution control; and Environmental Impact Assessment to control and mitigate environmental degradation. The Law needs 36 application decrees to achieve full implementation. Article 19 of the Law recognizes the inherent right of the public to participate in environmental decision-making[1]. For instance, in the context of EIAs and SEAs, public hearings and consultations are a must. The Law also called for the establishment of the National Environmental Council and the setting up of a National Environmental Fund. The COM has recently approved the following laws, which still need to be approved by the parliament: environmental prosecutor, nature reserves, integrated solid waste management, and air quality protection. It has also recently enacted the following decrees: environmental impact assessment, strategic environmental assessment, environmental compliance for establishments, and the national council for the environment. The enactment of these laws and decrees will largely contribute to the protection of the environment and the creation of green job opportunities. The MOE also drafted a decree to institutionalize Lebanon's environmental police to fall under the authority of the "Service of Regional Departments and Environmental Police" in cooperation with the Ministry of Interior and Municipalities. This police force is expected to help curb environmental crimes and be equipped with the proper tools needed to assume their responsibilities such as adequate vehicles, cameras, GPS instruments, etc.

Lebanon witnesses frequent cabinet shuffling and almost with every change of government or ministers draft policies are shelved and new ones are drafted which delays the process of law making and enforcement. Despite the fact that Lebanon has made great strides to strengthen its institutional and legal infrastructure with the assistance of the international community, the most important factor lacking is the strong political will to be manifested by the performance record of the entire government to commit to environmental sustainability and translate the speeches into policy and institutional improvements.

6 Production Sectors

The SME sector

An SME Support Unit was established at the Ministry of Economy and Trade (MOET) to implement the EU-funded 'Integrated Small and Medium enterprise support programme (ISSP)' and help establish an enabling business environment conducive to the development of SMEs and increase the competitiveness of the Lebanese economy by promoting the capacity of the private sector. The programme prepared a legal matrix based on a business and legal review and proposed amendments to existing law and, highlighted the areas of policy and the regulatory framework which needed intervention. An agreement was signed between MOET and the Ministry of Industry in 2004 to execute the technical and financial sides of the Programme. The programme also established three Business Development Centres (mentioned in the following section) across Lebanon to build the capacity and enhance the competitiveness of SMEs through a wide variety of support services. The programme improved the access of SME's to finance through Kafalat (discussed later in more detail) by providing 64 million Euros of credit guarantees granted upon approval of the business plan or feasibility study. The SME Support Unit also finalised the documentations to launch another EU-funded programme entitled "Reinforcement of the Private Sector Competitiveness in Lebanon". The MOET conducted a tariff review of all the environmental goods and services (EGS) that Lebanon imports and found that they constitute 2.1% of the total imports and that over 93% of them have tariff rates of 5% or less.

[1] MOE, 2012

Associations assisting the SME sector

In addition to the SME Support Unit established at the MOET, there are several associations that offer assistance to the SME sector in Lebanon. There are also two entrepreneurial centres established at private universities in Lebanon which also offer assistance to entrepreneurs and join efforts between entrepreneurs and academia. The main ones are:

- The Business development centres: The SME Support Unitat the MOET established three business development centres across Lebanon.
    - Berytech provides entrepreneurs with business skill training and offers advice and mentoring. It provides physical incubation whereby a smart building and office space from 30 to 200m2 are at the service of the entrepreneurs. It also offers virtual incubation through networking and training and periodically audits the evolution of the projects and the performance of the "incubatees".
    - BIATassists clients with their financial, technical, marketing, legal, accounting, exporting and training issues as well as connection with the authorities. BIATmostly assists potential businesses in North Lebanon. It is also assessing the feasibility of establishing an e-commerce operation to promote, market, and sell products made in North Lebanon.
    - SouthBICis the first innovation centre of its kind in South Lebanon. Its mission is to boost the creation, development, and support of innovative SMEs by offering professional incubation and counselling services to enterprises which offer a value-added to the local economy. It also assists the SMEs through risk minimization strategies and facilitating access to technical, managerial, and logistical resources.
- Trade Associations:
    - The Association of Lebanese Industrialists (ALI), established in 1942 as the main industrial lobby group in Lebanon, encompassing all the manufacturing establishments. ALI contributes to policy-making consultations including economic and social policy, labour legislation, health care, taxation, policies for SMEs, education and training, research, technology, and the environment. ALI has a permanent Environmental Unit which provides information as well as technical assistance to members on issues related to environmental protection, cleaner production, energy efficiency, etc. and better integrates them in the move towards green economy by amending their strategies, products and production processes. Industrial Indicators and Services Committee which analysed ALI's services compared to similar associations to identify best standards and practices, and assess the needs of the Lebanese Industrialists. Based on this research, the Committee signed Memorandums of Understanding with several organisations to answer to the needs of ALI's members: a commercial bank to offer exclusive loans and other financial opportunities to members; an academic institution to offer continuing education programmes; a research centre to assist ALI in its research activities; and CAS to launch regular surveys aiming to assist ALI in monitoring the growth of the industrial sector[1].
    - The Federation of the Chambers of Commerce, Industry and Agriculture (CCIA) in Lebanon, established by Decree No. 9656/96, the Federation comprises the four CCIAs of Beirut and Mount Lebanon, Sidon and South-Lebanon, Zahle and the

[1] ALI, 2012

Bekaa, and Tripoli and North Lebanon. The main mission of the Federation is to coordinate the efforts of the CCIAs in handling public economic affairs and represent them before the public institutions, in addition to holding conferences, organising exhibitions and collaborating with the authorities to develop the national economy.

- Government-Affiliated Institutions:
  - The Industrial Research Institute (IRI): The IRI was established in 1955. It is a non-profit institution affiliated to the MOI since 1997 but with administrative and financial autonomy.IRI's mission is to conduct industrial research, investigate and disseminate information about available raw materials, provide testing and analysis services, and grant certificates of conformity with standards and purchase specifications.
  - The Investment Development Authority of Lebanon (IDAL), a government agency established in 1994 by Decree No. 5778, and which reports to the President of the COM. It aims to increase and retain Foreign Direct Investments (FDIs) in Lebanon and simplify bureaucratic procedures for investors throughout their operations in Lebanon: from the provision of information to the granting of incentives to the facilitation of procedures to start up a business. In 2001, Investment Law No. 360 identified agriculture, agro-industry, industry, tourism, information, communication and technology, and media as the most promising sectors in terms of their FDI potential. Accordingly, IDAL developed investment packages to attract FDIs to these sectors.
  - LIBNOR, established by law in 1962 and is attached to the MOI. It is the public authority responsible for issuing, publishing and amending Lebanese standards. The national standards cover all products within the agro-food, chemical, construction, mechanical, electro-technical and electro-mechanical sectors, and deal with everything from measurements to conventions, from testing methods to codes of practice and building codes.
  - The Euro-Lebanese Centre for Industrial Modernisation(ELCIM): ELCIM supports manufacturing SMEs in Lebanon to develop their businesses, improve their productivity and grow their exports potential. It offers SMEs the opportunity to access European know-how and Lebanese expertise in the fields of financial and technical management. Since it started the implementation of its mission in 2006, ELCIM has supported the participation of SMEs to international fairs, offered them free diagnosis and feasibility studies, assisted them in investing in new production equipment and laboratories and facilitated their access to loans.
  - The Lebanese Cleaner Production Centre (LCPC): The LCPC started as a project in 2002established by the MOE with funding from the European Commission and the Austrian Government through UNIDO. In 2004, it relocated to the IRI. It is one of many National Cleaner Production Centres in 41 countries around the world which provides pro-bono assistance to SMEs in adopting Cleaner Production measures that reduce the consumption of raw materials, water and energy, decrease emissions and effluents and save money. After inspection of the enterprise, the LCPC experts suggest amendments to the process but the implementation of the recommendations along with the cost implications are up to the enterprise. For example, one of the SMEs that LCPC collaborated with installed a new boiler burner, insulated the steam network and installed a new technology for water pumps with an investment of $ 86,000. The application of these measures saved $163,000 and the payback period of the money invested was around six months.

- Kafalat, a Lebanese financial company that assists SMEs in industry, agriculture, tourism, traditional crafts and high technology in accessing commercial bank funding throughout Lebanon by providing loan guarantees based on a business plan or feasibility study that demonstrates the viability of the proposed activity. In 2008, Kafalat offered 918 guarantees to entrepreneurs amounting to a total of LBP 171,366 million[1].
- The EIB's Facility for Euro-Mediterranean Investment and Partnership (FEMIP) : Since the start of its activities in Lebanon in 1978, the EIB has provided over € 1.15 billion to Lebanon, mainly to support public infrastructure projects in energy, water and transport (around 62%) in addition to providing assistance to SMEs (around 38%). Since the FEMIP's launch in Lebanon, the SMEs have been the largest beneficiaries of EIB loans with more than € 422 million worth of credit lines channelled to them through the local banks. In addition to the SMEs, the EIB facilitates households' access to micro-credits through an NGO specialised in microfinance "Al Majmoua" and the estimate is that around 150,000 micro and small Lebanese enterprises are eligible for such support.

- Non-Government Affiliated Institutions:
  - The Lebanese American University's Institute for Family and Entrepreneurial Business: The Institute established by the School of Business at LAU provides a forum to those having concerns about their family business in terms of human resources, responsibilities, succession problems, etc. to share and develop their knowledge about family businesses and help them develop and grow. It is a non-profit academic-based organisation which undertakes research and is committed to LAU values.
  - The AUB's Centre for Entrepreneurship and Innovation: The Suliman S. Olayan School of Business (OSB) at the AUB established the Centre for Entrepreneurship and Innovation with an endowment of around $ 5 million from the Mohammed bin Rashid Al Maktoum Foundation. The centre aims to become a hub for research and training and the dissemination of knowledge in the region to promote entrepreneurship as a solution to the problem of unemployment and path towards achieving sustainable economic growth in the Arab world. The centre presents its resources and research output to eligible entrepreneurs, researchers, or any other stakeholders as identified by mutually agreed upon criteria by AUB and the foundation.
  - The Lebanese Industrial Research Achievements (LIRA): LIRA's mission is to build partnershipsamong industry, academia, and research centres to respond to research and development needs of the Lebanese industry, build the capacity of the industrial sectorand pave the way for a transition from a welfare economy to a knowledge-based economy. LIRA contributes to the creation of jobs, introduction of new production lines into existing factories and the incubation of new ideas into start-up businesses. LIRA attempts to increase mutual trust between graduates and industrialists by matching university activities and research with the needs of the local industries, seeking industrial sponsorship for university or research programmes, and providing fresh graduates with opportunities for industrial training.

[1] CAS, 2008

7 Green Initiatives and Projects

Lebanon has a considerable potential in the sectors of; energy (solar water heating and photovoltaics), construction (energy-efficient buildings), agriculture and forestry (organic farming and marketing) and waste management (jobs that decrease waste loads and the use of virgin raw materials and treating the substances harmful to public and environmental health resulting from waste handling such as recycling, composting, wastewater treatment)[1].

Some green jobs forecasted in Lebanon were in green energy, construction, waste management, and organic farming. The expansion of Jobs in green energy would depend on on the 12% renewable energy pledge by 2020 made by Lebanon and the 1,050,000 m^2 of solar water heaters planned to be installed, and could reach 4,000 by 2020. Since Lebanon is not manufacturing the appliances, it would only benefit from green jobs in the related manufacturing sector if the manufacturing sector is encouraged to venture in that business. Based on projections by the BDL, $100 million are to be invested in green buildings over the five years, which could lead to the creation of 900 green jobs in construction per year between 2011 and 2016, provided adequate regulations and standards are present and incentives for green buildings are strengthened. There is the potential to create 1,900 to 2,500 new green jobs in Solild Waste Management (SWM) by 2020, provided the strategies for waste-to-energy (previously mentioned) are implemented, with an additional 640 permanent and 400 temporary jobs. By 2020, there can be 900 new green jobs in organic farming and integrated pest management and 15,000 new green jobs in forestry, provided the government if the government carries on with the national reforestation plan and focuses on developing the ecotourism and sustainable tourism sector.

In general, it appears that Lebanon is heading in the right direction, particularly in terms of construction and SWM. For example, the Lebanese Green Building Council (LGBC) in partnership with the International Finance Corporation (IFC) established the ARZ Building Rating System (ARZ BRS) to support the growth and adoption of sustainable building practices in Lebanon and take into account the specific context of Lebanon's unique mix of climatic zones and environments. In addition, there are programs such as the EU-funded programme ARLA at OMSAR targeted at the SWM sector to improve the provision of solid waste services in rural areas in Lebanon executed since 2004 and which has so far led to the construction of nine solid waste treatment facilities in rural areas, a medical waste sterilization treatment centre in South Lebanon and two new sorting and composting facilities.

Some Green Success Stories

Lebanon has several success stories in the field of sustainable development; though they are not full-fledged projects in terms of simultaneously taking into consideration the enhancement of the human capital, social equity, environmental sustainability and economic development, they may be signs of more solid initiatives yet to come in the future to move the country towards a greener economy. Some initiatives were implemented by SMEs, universities, banks, and the public sector, and tackle the various issues related to Sustainable Development.

1. **Environmental Sustainability through Sustainable Tourism,** through such initiatives as the Lebanese Mountain Trail (LMT). It started as a project implemented by Ecodit, an environmental consultancy firm, with funding from USAID between 2005 and 2008. The trail is a 400meter-track extending from Qubaiyat in North Lebanon to Marja'youn in the South and crossing more than 70 villages and towns on its path. The track is split into 26 sections each of which varying in length between around 10 and 24 kilometres with the trail altitude varying between 600 and 1,900meters. Hikers can either cover any part of the trail over one, two or more days, or walk through the whole trail which would take up to 26 days, crossing a campsite, three rest areas, three nature reserves: HorschEhden, Tannourine Cedar Reserve and

[1] ILO and UNDP, 2011

Al-Shouf Cedar Reserve, in addition to the World Heritage Site of Wadi Qannoubine, as well historic sites dating from the various periods of the country's long history. Critically, the LMT provides customers to various rural residents who run guest houses and rural inns, providing 57 rural lodging facilities, 11 guesthouses, all in integration with at least 12 tour operators who now organise regular trips on the LMT[1], thus showcasing Lebanon as a destination for alternative tourism that focuses on natural heritage and traditional livelihoods. This expands economic opportunities in villages and creates jobs for locals and market for their good.

2. **Economic Transformation in the Private Sector**, through companies such as Phoenix Energy and Cosmaline-Pharmaline. Phoenix Energy has created a biofuel using locally available agricultural waste for olive husks for domestic, commercial and industrial heating. Until earlier in 2012, the company had installed a total of 3000 kW of biomass heating capacity, which saved more than $ 400,000 annually in fuel expenses. Cosmaline-Pharmaline manufactures personal care products such as shampoos and creams, household products and aerosols that leveraged the implementation of standardized processes to minimize of water use (reduction of 12% to 12% over the past 5 years) and energy consumption (reduction of 5% to 6% over the past 5 years) and the generation of solid waste (reduction of 20% over the past 5 years)[2].
3. **Progress and Well Being through the promotion of Rural Livelihoods** that enhances access to markets for traditional areas. The most prominent of those is Souk El Tayyeb (SET), which leverages city dwellers' increased (1) awareness of the importance of organic farming for their health and that of the environment and for sustaining an income-generating activity for local farmers and (2) their willingness to pay extra money to get a healthier produce. The SET mainly connects consumers with valued traditional organic products and allows the farmers to get a decent price for their home-grown/home-made produce. In parallel to the weekly market, the SET expanded to include education programmes targeting the farmers and the public at large, such as "Tatweer" aimed at building the capacity of small organic farmers in food processing techniques and business development, and a Farmers Exchange project was a bilateral exchange programme which allowed the Lebanese farmers to share their work experience with farmers and producers from different countries mainly the Netherlands, the United Kingdom and the USA.
4. **Implementing Policy Responses** through the such projects as the Shouf Biosphere Reserve (SBR). This is the largest nature reserve in Lebanon with an area of approximately 50,000 hectares, instituted as a Nature Reserve since Law No. 532 was promulgated on 24 July 1996, and was later declared a UNESCO) Biosphere Reserve in 2005. The SBR encompasses the Al-Shouf Cedar Nature, the Ammiq Wetland Protected Area, and twenty four villages surrounding the biosphere. It has juniper and oak forests but the most famous attractions of the reserve are its three cedar forests which together account for a quarter of the remaining cedar forests in Lebanon; some of the cedar trees in the SBR are around 2,000 years old. The SBR is also home to 520 species of plants, 25 threatened species, and 14 rare species, 250 bird species, and 31 species of reptiles and amphibians. The MOE provides the biosphere with an annual funding of $ 43,000, which contributes 32% towards the total expenditures of the reserve, the rest of which is secured by donations and ecotourism activities. The SBR is not only a biosphere reserve which contributes to the preservation of the natural heritage of Lebanon, mainly the cedar which is Lebanon's emblem, but it is also a hub for green jobs mainly for the youths working as tour guides, botanists and horticulturalists, in addition to small entrepreneurs making local produce and marketing it at the stores and visitors' centres

[1] Ecodit, 2008
[2] Tabcharani, 2012

of the SBR. The location of the reserve amidst the villages also contributes to the flourishing of the businesses in close proximity to the reserve such as restaurants, souvenir shops, cafes, etc. The SBR is a good example of a natural and cultural heritage conservation site which enhances the well-being and income of the inhabitants of the villages in the vicinity and offers a tourist attraction to local and international visitors alike.

D OMAN

The data compiled in this report was resourced from one-on-one interviews with key representatives of relevant stakeholders in the Sultanate as well as from published data either provided as hard copies by the interviewees or downloaded from the worldwide web when available online. The interviews provided an insight into each institution/organisation's plans and works related to sustainable development and/or green economy which were further explored in the published material.

The report is divided into four (4) parts.

1. The first part provides a snapshot of the country's basic geography, demography, economy and environment as well as some information on its international, regional and bilateral cooperation.
2. The second part provides an overview of Oman's policies and institutional framework with a particular focus on its "Vision 2020" and a highlight of the main Royal Decrees and Ministerial Decisions that ensure an environmentally-friendly development, then provides a brief description of the main Omani organisations and associations working in sustainable development.
3. The third part sheds light on the production sectors in Oman mainly focusing on the small and medium enterprises, the role they play in the Omani economy and the governmental efforts exerted in order to develop and empower this sector. Also in this chapter, the projects implemented by the Public Authority for Craft Industries and Haya Water are given as examples of green initiatives in Oman.
4. Finally, the detailed mapping is concluded with highlighted success stories from Oman in the field of sustainable development namely: sustainable tourism illustrated by the work of Oman Sail, nature conservation achieved by the Oman Botanic Garden, an attempt to reduce the carbon footprint of the oil industry accomplished by Petroleum Development Oman's Nimr Water Treatment Plant, green building design and implementation illustrated by the Omani Research Council's "Eco-House Initiative", in addition to the sustainability efforts exerted by Octal Petrochemicals, a private sector company located in the Southern Governorate of Dhofar.

1 Overview

The Sultanate of Oman stands today is great contrast with the 1970, when His Majesty Sultan Qaboos Bin Said Bin Taymurin acceded to power. The country went on from being in desperate need for development to making great strides, during four decades of a "Blessed Renaissance" that saw life expectancy at birth grow from 49.4 years in 1970 to 75.9 years in 2008, among many other improvements in various key indicators[1]. Through various "Royal Decrees", the government organized the country and spurred development on.

Administratively, the Sultanate is made up of nine Governorates; Dakhiliyah, Dhahirah, Batinah, Buraymi, Wusta, Sharqiyah, Dhofar, Musandam and Muscat. Muscat is the political, economic and administrative capital of Oman.

[1] Retrieved from http://www.meed.com/sectors/economy/government/reflecting-on-40-years-of-sultan-qaboos-rule/3008038.article, accessed on 5 September 2012.

Oman's strategic geographical location is a value added to the Omani economy particularly to trade and shipping. The Sultanate is capitalising on that by establishing international economic links, expanding its ports and establishing free zones across the country.

Demography and Workforce Structure

According to the Omani Census Administration the total population of Oman was 2,773,479 in 2010, with 1,957,336 Omanis and 816,143 Expatriates. The population density averaged 9.0 persons/km^2. The average Omani household size was 7.5 in 2010, down from 9.0 in 2003, whereas the average expatriate household size was 4.1 in 2010 compared to 4.2 in 2003. The total number of people enrolled in the labour force of Oman in 2009 was 1.19 Million[1], about 10% to 11% of which are expatriates, and general unemployment level is recorded at 5% in 2008.

Education

Oman made great strides in education since 1970, with the adult literacy rate increased to 82% for males and 65.4% for females in 2002[2]. The number of government schools rose from 16 in 1970 to 1,052 in 2007, the number of teachers in government schools rose from 200 in 1970 to 42,000 in 2007 and the number of students enrolled in schools increased from 7,000 in 1970 to 553,000 in 2007 (table 9). In the period 2000-2007, public expenditure on education was 4.0% of the GDP and on health 1.9% of the GDP[3].

Healthcare

The Sultanate enjoys very advanced health and education services. The World Health Report of 2000 ranked Oman first in Performance Health Level and eighth in overall health performance in the world[4]. The number of hospitals in the Sultanate increased from 2 in 1970 to 58 in 2008, the number of beds in hospitals per 1,000 people increased from 1 in 1975 to 5.4 in 2007, while the number of doctors per 1,000 people increased from 0.01 in 1970 to 4.9 in 2007. Infant Mortality Rate decreased from 118 in 1970 to 10.1 in 2007. The number of government and private health clinics increased from below 20 in 1970 to 946 in 2007 across the Sultanate

Economic Structure

In 2007, oil sector revenues accounted for 75.8% of the total revenues of the Sultanate, with the contribution of natural gas expected to reach 10% of the GDP in 2020.

The second biggest contributor is the industrial sector, which saw its contribution to GDP reach 17.9% in 2010. Most Industrial activities include mining and quarrying, manufacturing, building and construction in addition to electricity and water supply. Industrial estates have been established around the country and the government offers big incentives to SMEs, including low interest investment loans.

Farming and fishing are two of the oldest traditional occupations in Oman. In 2010, cultivated land was estimated at 167,000 Feddan and agricultural production at 1,720,000 Tonnes[5], including dates, fruits, vegetables, frankincense and livestock. Agriculture in the Sultanateis closely connected with the aflaj[6] water, a millennial integrated social, cultural and environmental system of water channels. Fisheries

[1] MCI, 2011: p20
[2] (MONE, 2008: p44
[3] UNDP, 2011: p205
[4] MONE, 2008: p44
[5] MONE, 2011b: p19
[6] The singular word for aflaj is falaj.

generated about 164,000 Tonnes in 2010, 88,900 Tonnes of which was for export (commercial and traditional fishing combined)[1].

The services sector is a growing sector of activity, forecasted to constitute 46.9% of GDP in 2020, mostly around tourism. The Sultanate had 159 hotels in 2005 and 258 hotels in 2012. There were 1,454,083 tourist arrivals in 2010, a progress that was recognized when Muscat earned the Arab Tourism Capital Award in 2011 by the Arab League's Tourism Ministers.

Economic Development

In the first half of 2011, the Gross Domestic Product (GDP) achieved a growth rate of 20.7% compared to the same period in 2010[2], mainly thanks to the 28.5% increase in the value added of oil activities that related to the 29.9% rise in the price of crude oil and 13.1% rise in the price of natural gas[3]. The value added from non-oil activities grew by 13.8% in the same period. In general, economic activity in Oman grew by 4.7 % in 2010.

Oman was well prepared when the global economic crisis of 2008 hit, mostly thanks to cautious and well planned macroeconomic management of the wealth generated from oil, its adequate regulatory framework, and the implementation of reforms to boost non-oil sector growth. A "State General Reserve Fund" acts as a safety valve in which any surplus revenue generated from the rise in oil prices is transferred.

Inflation in Oman peaked at 13.7% in 2008 but dropped to around 4.2% in 2010. Salary levels rose only by 6.4% in 2010. In general, an upward pattern has been the norm in both private consumption and private investment between 1976 and 2005; the share of private consumption from the total consumption rose from 58% during 1976-1980 to 66% between 2001 and 2005, and the share of private investment from total investment increased from 27.7% during 1976-1980 to 28.8% in 2001-2005. Foreign Direct Investment (FDI) still flows mainly in the oil and gas sector receives the largest amount of FDI reaching 45% of the total FDI in 2008 while the manufacturing sector got 17%, real estate 8.3% and construction 4.3% in the same year[4].

The Sultanate of Oman has several programmes aimed at combating poverty, providing decent and healthy living standards to the citizens and improving their quality of life[5]:

- Social Security, which is a monthly subsistence of about RO 80/capita and RO 264/family to people in need. The number of beneficiaries reached 50,750 cases in 2009;
- Social Assistance is also provided in special circumstances to the beneficiaries of the social security programme in cash or in medical devices or for covering for the fees of connecting to electricity and water networks;
- Housing Programme, which entails providing housing units to people with limited income or housing loans to citizens whose monthly income does not exceed RO 500;
- Livelihood Projects, which provide the transition for social security families towards becoming more productive whereby the Omani Ministry of Social Development (MSD) awards three best projects every year; and

[1] 1 Feddan = around 0.42 hectare or 1.038 acre (http://www.encyclo.co.uk/define/feddan)
[2] 1 Omani Riyal (RO) = around 2.6 US Dollars ($)
[3] MONE, 2011a: p4
[4] MCI, 2011: p55
[5] MECA, 2012: p12, p14

- Agriculture and Fisheries Development Fund, which was established in 2004 to support the agriculture and fisheries sector in rural and Bedouin communities. Until 2010, this fund had financed 127 projects at a total value of RO 32,120 million

2 Infrastructure

Current Status

1. **Energy and Electricity:**

Government-owned companies were established for the generation and distribution of power. The Law for the Regulation and Privatization of the Electricity and Related Water Sector promulgated by Royal Decree 78/2004 regulates the privatization of electricity and water in Oman whereby it established the Authority for Electricity Regulation (AER) to ensure that the costs of regulating the electricity and water do not impose excessive burdens on the customers and the licensees. According to the AER, there was a strong growth in the electricity demands of the commercial and industrial customers in 2010, whereby the Gross electricity generation reached 19.8 Terawatt hours (TWh), 7.4% higher than in 2009, and the total electricity supply reached 16.1 TWh, 11.4% higher than the previous year. At the same time, all electricity Permitted Tariffs in Oman, including the Residential Permitted Tariff, remained unchanged for more than 10 years while inflation (measured by the Consumer Price Index) increased by around 34% over year 2000 prices.

2. **Water:**

In this context, there was a general increase in electricity intensity throughout the Sultanate in 2009 and 2010 and that the average intensity per account increased by 32.6% (from 17.9MWh to 23.8MWh) since 2005. The AER and Public Authority for Electricity and Water (PAEW) are considering the introduction of policies to incentives to promote energy efficiency. In 2005, PAEW and MCI developed a programme to rationalise energy consumption in the industrial sector, through actions that, when implemented would reduce the energy consumption by about 10-15% and set standards and benchmarks for energy consuming devices[1]. Furthermore, a study commissioned by AER determined that Oman has enough solar energy not only to meet its electricity requirements, but also to provide for export. PAEW also identified sites for a potential solar power plant sized up to 200 Megawatts (MW). The Sultanate joined the International Renewable Energy Agency (IRENA) in 2009 and in 2011, and signed an agreement with Japan International Cooperation Agency (JICA) to develop a master plan for rationalising energy consumption.

The total amount of water distributed increased from 26,562 million gallons in 2007 to 28,531 million gallons in 2008, increasing by 7.4%. The PAEW provides water to its consumers from two main sources: desalinated water from seawater desalination plants and underground water wells. Water produced by desalination plants increased by 3.8% from 19,257 million gallons in 2007 to around 20,007 million gallons during 2008 and accounted for 67.8% of the total water production[2]. There are 759 wells spread all over the Sultanate and they provided 31% of the total amount of water produced in Oman during 2008[3].

3 The Environment and Environmental Policy

The Government has gone to great lengths to protect the human and natural environment of the Sultanate since 1970, starting with the Royal Decree No. 68/79 which led to the establishment of the

[1] MECA, 2012: p16
[2] PAEW, 2008: p6
[3] PAEW, 2008: p9

Council for the Conservation of the Environment and Prevention of Pollution. Then came Royal Decree No. 45/84 which promulgated the creation of the Ministry of Environment which became the Ministry of RegionalMunicipality, Environment and Water Resources in 2001 (Royal Decree No.86/2001) then in 2007 became the current Ministry of Environment and Climate Affairs (MECA) promulgated by Royal Decree No. 90/2007 (MECA, 2012). Article 2 of The Law on Conservation of the Environment and Prevention of Pollution issued by Royal Decree (114/2001) specifies that MECA represents the Sultanate in negotiations regarding any regional and international environmental conventions and has the right to recommend accession or non-accession to such conventions.

The total GHG emitted in Oman in 1990 was 10.3 Metric tonnes of CO_2 equivalent, or 6.3 Tonnes/capita, and reached 30.9 Metric tonnes in 2004 or 13.6 Tonnes/capita, or 0.1% of the world's total[1]. The ecological footprint of consumption in Oman was 3.5 hectares/capita in 2006[2], compared to 4.0 in Germany, 9.0 in the United States of America (USA), 9.7 in Qatar and 10.3 in the UAE. MECA is in the process of conducting a national survey of greenhouse gas emissions to create a database and prepare the first national notification report according to the guidelines of the Conference of the State Parties to the United Nations Framework Convention on Climate Change (UNFCCC). The Ministerial Decision No. 18/2012 requires the issuing of Regulations for Climate Affairs Management aiming to review and assess applications for obtaining permits for projects causing greenhouse gas emissions in the Sultanate.

The Role of Governmental Organizations

In 2001, the then Ministry of Regional Municipalities, Environment and Water Resources (MRMEWR) in collaboration with the International Union for the Conservation of Nature (IUCN) and with the support of the Global Environment Facility (GEF) prepared the National Biodiversity Strategy and Action Plan for the Sultanate which underlined the importance of biodiversity protection and highlighted the economic value of biological diversity.

The Sultanate currently has 16 Nature Reserves proclaimed by Royal Decrees. While it encourages private sector investments, the Sultanate has put rules and regulations that ensure that development and industrial projects do not negatively affect the natural environment and naturalresources are tapped into with minimal environmental impact.

The government institutions namely MECA and Muscat Municipality (MM) urge the private sector to use the best available techniques to minimise the impact of their projects on the natural environment. The Sultanate also endeavours to increase the involvement of the local community in conservation efforts through awareness raising campaigns using the mass media, e-books, etc. Under the United Nations Educational, Scientific and Cultural Organisation (UNESCO), the Sultan Qaboos Prize for Environmental Preservation has been awarded since 1989 to support efforts in environmental research and studies.

The Role of Non-Governmental Organizations

There are yet no organisation or association in the Sultanate specifically dealing with Green Economy. However, there are many entities and associations dealing with issues pertaining to sustainable development. Oman's Statute of State issued by Royal Decree No. (101/96) stipulates the freedom of association of citizens and the establishment of national associations which perform legal activities and do not breach the rules and provisions of the Statute (Sultani Decree, 1996). The Omani MSD is the government authority which supervises the permission of establishing associations, clubs and organisations in the Sultanate. MSD is in the process of preparing a new law governing non-governmental organisations (NGOs) to cope with the local and international changes.In 2010, the MSD issued

[1] UNDP, 2009: p249
[2] UNDP, 2010: p171

Ministerial Decision No. 53/2010 that put forward rules and procedures allowing organisations to get financial support from the private sector to fund their activities and projects (MECA, 2012). This section gives a quick overview of some of the NGOs and academic and research institutions working in one or more of the dimensions of sustainable development in the Sultanate of Oman, namely: the Environment Society of Oman, the Omani Economic Association, the Research Council, the Sultan Qaboos University and the German University of Technology.

1. The Environment Society of Oman is the only environmental NGO, established in 2004. ESO aims to raise environmental awareness in society and advocate for environmental conservation with decision-makers through scientific research, awareness campaigns, media releases, and participation in regional and international conferences. It is in the process of developing its new strategy and for this it attempts to strengthen the engagement of all stakeholders to ensure its role as a credible actor in the environmental field. It is very active locally and regionally in the field of scientific research in both the marine and terrestrial environments and has built the capacity of local and international scientists in environmental research techniques through the transfer of knowledge and best practices. ESO gets its funding mainly from the private sector but also from research agencies around the world to support its research projects, and has a wide range of projects and campaigns.

    a. A joint project between ESO and the Omani Ministry of Education (MOE) in collaboration with MECA and the private sector developed an environmental education document which includes tools to assist curriculum designers to integrate major sustainable development concepts in the school curricula.

    b. Another environmental project implemented in collaboration with MOE was raising the awareness of public school students on climate change and giving them tips on easy-to-do activities to introduce into their daily routine to reduce their carbon footprint.

    c. After over ten years of scientific research on whales and dolphins, ESO presented scientific findings at the International Whaling Commission (IWC) in 2010 which supported the discovery of a genetically unique population of Humpback Whale which breeds and feeds exclusively in the Omani waters. This sub-species of whales was then given the name of Arabian Sea Humpback Whale.

    d. ESO also has a frankincense research project aimed at ensuring the sustainability of frankincense farming, a primary source of livelihood for the citizens of Dhofar region and an integral part of Omani history and heritage.

    e. The Women's Empowerment and Environmental Education project is one of ESO's community outreach projects which aims to empower local women in the regions of the Sultanate to advocate for environmental issues with their elected members of Majlis Ash' Shura and endeavour to reduce and mitigate their impacts on the social and natural environment.

Projects and Initiatives

The Omani Economic Association (OEA) aims to contribute to the development of socio-economic activities in Oman through encouraging and publishing scientific research and cooperating with the government and private agencies, providing economic experts and offering advice in economic matters. In addition, OEA conducts conferences, lectures and exchange visits for colleagues in the Arab countries and beyond. The fourth conference of OEA held in December 2010 discussed the opportunities and challenges of sustainable development in the GCC region (www.oea-oman.org).

Education and Research

The main educational and research institutions in Oman are the Sultan Qaboos University (SQU), The German University of Technology (GUtech), and The Research Council (TRC) of Oman.

1. Sultan Qaboos University (SQU) established by RoyalDecree No. 71/2006, issued on the 2nd of July2006. SQU's Centre for Environmental Studies and Research (CESAR), the College of Agricultural and Marine Sciences (CAMS) and the College of Economic Sciences (CES) undertake research on several aspects of sustainable development, and the CAMS and CES offer undergraduate and graduate programmes in the field of sustainable development. CESAR commemorates the World Environment Day every year and in 2012, it organised a conference on Green Economy in collaboration with MECA, ESO and the private sector. On the other hand, in December of every year, the students of the CAMS organise a workshop targeting high school students to raise their awareness on the importance of sustainable agriculture. CAMS faculty members are planning to develop new curricula and very keen to find jobs for their graduates by linking up with the industry. There is also an on-going research in SQU on green desalination in collaboration with the public sector
2. The German University of Technology (GUtech) offers a degree in Urban Planning and another one in Sustainable Tourism, and has applied for a programme in environmental engineering to the Ministry of Higher Education. GUtech also holds public lectures on different topics related to sustainable development and green economy several times a month. GUtech is designing a green campus in Muscat where the "3 R's" is the motto whereby the campus will have its own sewage treatment plant for instance and the treated water will be reused on the premises, mainly for irrigation purposes.
3. The Research Council (TRC) of Oman was established in 2005 by Royal Decree No. 54/2005 to regulate research and support and promote innovation through building partnerships among the public sector, private sector and the research community to serve the national economy of Oman[1]. TRC is in the process of preparing anational scientific research strategy and has already launched the "Adaptation TowardsSustainable Development" programme which has aseries of in-depth studies in areas of strategic importance in the field of sustainable development. TRC has also recently launched a national competition "Oman Eco-House Design Competition" targeting higher education students in the Sultanate, aiming to promote awareness on the use of sustainable energy and adoption of green standards in the design and construction of buildings.

4 International, Regional and Bilateral Cooperation

The Sultanate of Oman has entered into both regional and international cooperative agreements.

Regionally, the Sultanate of Oman is part of the Gulf Cooperation Council (GCC) and the the Greater Arab Free Trade Area (GAFTA). The GCC aim to help member countries unify their standardisation activities, develop their production and service sectors, foster trade among each other and encourage GCC's industrial and agricultural production while at the same time protecting consumer, environment and public health. Economic integration has been progressing since the establishment of a Free Trade Zone in 1989, with the general Under the agreement, any GCC port is a single entry point for imports according to a unified customs law, and any product originating in any of the Gulf States is treated as a national product throughout the GCC region, and Common Market was established in 2008. GAFTA was established in 1997, and import duties were cancelled on all merchandise products in 2005 within its region.

[1] TRC, 2005

Internationally, the Sultanate signed a Free Trade Agreement with the USA in 2005-2006 for 100% of the industrial and 85% of the agricultural goods. In addition, Oman has entered into bilateral agreements of reciprocal promotion and protection of investments with more than twelve countries in the world including Egypt, Syria, Lebanon, Iran, Turkey, France, the UK, Italy, the Netherlands, Germany, China, India, Croatia, Bulgaria etc. The Sultanate has been a member in the United Nations Organisation (UN) since October 1971 and joined the World Trade Organisation (WTO) in November 2000. It also joined the Paris Convention on Protection of Industrial Property and Berne Convention on Copyright Protection and amended laws on copyrights, trademarks and intellectual property rights. In addition, Oman has committed to all the conventions resulting from the Rio Conference on the Environment and Sustainable Development in 1992 and cooperates with many organisations such as the International Centre for Agriculture Research in Dry Areas (ICARDA), GEF, IUCN…

5 Policies and Institutional Frameworks

Oman witnessed a quantum leap in early 1975, when the then development council approved a strategy encompassing four five-year plans for the following two decades. At first, the Sultanate focused on maintaining a sustainable economic growth, expanding basic services such as education, health and infrastructure, enhancing standards of living, creating job opportunities; and encouraging private investments. Starting 1996 and the fifth plan more focus was placed on reducing the dependence on oil and diversifying the economy, going a bit further in seventh five-year plan to focus on enhancing women's participation in development, conserving the natural heritage of Oman, and encouraging the establishment of SMEs.

The **first** five-year Development Plan (1976-1980) focused on benefiting from the oil boom to complete the infrastructure, enhance the national economy and promote the private sector, in addition to investing in income-generating projects and developing domestic human resources. It is during this period that the State General Reserve Fund was established. The **second** five-year Development Plan (1981-1985) added a focus on raising investment rates, strengthening production capacities, pursuing completion of the infrastructure, and ensuring equal regional distribution of the national income. The **third** five-year Development Plan (1986-1990) coincided with a drop in oil prices, but still strived to maintain a focus on economic activity while continuing to provide basic services and social support to citizens. The **fourth** five-year Development Plan (1991-1995) focused on investing in productive projects and concentrated on policies as effective means for achieving objectives.

In June 1995, the "Vision Conference: Oman 2020" was held in Muscat to chart a new series of five-year development plans that would draw the course for the Omani economy for the following 25 years and achieve a sustainable economic growth. The conference highlighted the main policy areas that were to direct Oman's efforts towards a prosperous and sustainable economy. The main policy areas of the vision are: the development of human resources; the creation of a stable macroeconomic framework; the establishment of a competitive private sector; the diversification of the economy away from oil while ensuring an optimal use of natural resources; the enhancement of the standard of living of Omanis; and the preservation of the achievements accomplished thus far. This led to the **fifth** five-year plan (1996-2000) during which the GDP grew by an average of 7.5% per annum, and several achievements such as the establishment of the Oman Liquefied Natural Gas Project, the transformation of the Salalah Port in Dhofar into a world class container terminal, and the promulgation of Laws of Intellectual Property Rights (Royal Decree No. 47/96) that was enacted in 1997.

Following this, the **sixth** five-year plan (2001-2005) adopted four main dimensions: sustainable economic growth, targeting an annual growth rate of the GDP of at least 3% and enhancing the standard of living of Omani people in all regions; expansion of education and training programmes and provision of job opportunities to Omani citizens; reduction of the dependence of the economy on oil and development of non-oil goods and services increasing their contribution to the GDP; and encouragement of private investments through the creation of a suitable investment climate and progressive withdrawal of

the public sector where the private sector can take over. Royal Decree No. 77/2004 dated 14 July 2004 promulgated a new Privatization Law aiming to create competition while at the same time protecting customers and developing local human resources. The key privatization sectors identified were electricity, telecommunications, aviation and ports, water and wastewater and hazardous wastes,

The **seventh** five-year plan (2006-2010), increased the focus of diversifying the economy away from oil by stressing the enhancement of women's participation in development, the conservation of the natural heritage, with special attention to research and development, developing the tourism and fisheries sectors and encouraging the establishment of SMEs. Tourism and trade grew by 10.2% in 2010, as much as the manufacturing sector in the same year. Royal Decree No. 125/2008 also amended the Government Land Entitlement System and granted Omani women the right to be entitled to land for housing on the same terms as men.

The **eighth** five-year plan was initiated in 2011, marking the fourth stage of the approved development strategy set out in the Oman 2020 Vision. The goals of the eighth plan include the boosting of productivity through ultimate use of natural resources. The government established a "one-stop-shop" at the Investor Services Department at MCI to simplify procedures for investors and provide them with prompt and efficient services, and maintained the focus on education and training to develop the local human capital to meet the requirements of sustainable development by providing 1,000 scholarships at the graduate level in scientific and economic fields.

Financing Mechanisms

Back in 1996, the Omani Centre for Investment Promotion and Export Development (OCIPED) was established by Royal Decree to assist in the development of the private sector locally and encourage investment by the local and international private sector. On the 27th of March 2011, Royal Decree No. 52/2011 established the Public Authority for Investment Promotion and Export Development (PAIPED) to replace the OCIPED to improve the effectiveness of the bodies responsible for investment in Oman. PAIPED seeks to increase private sector investment and promote the export of Omani non-oil products to improve Oman's trade balance and provide facilities for local and international investors.

There is a wide range of funding sources available for SMEs in Oman mainly through commercial banks, finance companies, and the state-owned Oman Development Bank (ODB) that provides micro-loans, small and medium loans, as well as large loans. There are also funds which provide start-up financing such as: Sharakah (or Fund for the Development of Youth Projects), Intilaqah which not only provides debt financing but also advises on business services, market analysis, risk management… In addition,

The Self-employment And National Autonomous Development (SANAD) supports the establishment of individual and collective small projects, in addition a fund that supports livelihood projects through interest-free loans

Laws and Decisions ensuring an environmentally-conscious development

The Omani Council of Ministers assists His Majesty the Sultan of Oman in developing and implementing state policy; the council submits recommendations to His Majesty on matters of concern to the government, including proposals for draft laws and decrees, draws up the goals and policies for economic social and administrative development, proposes implementation mechanisms, and follows up the implementation of policy, laws, decrees, statutes, decisions, treaties and court rulings while ensuring the efficient use of resources. Up until the write up of this report, the Financial Affairs and Energy Resources Council is the authority responsible for developing the state's fiscal policy, preparing the annual General State Budget and examining the approved financial allocations for development projects. The Supreme High Committee for the Five-Year Development Plans defines the basic elements for the five-year development plans, evaluates the plans, monitors their implementation according to Royal

Decree No. 1/2006 and coordinates efforts between the GOSO, the State Council and Consultation Council in the achievement of the plans.

MECA is the focal authority in charge of devising and ensuring the implementation of environmental laws in collaboration with other public authorities involved in the aspects of the issue in question. Many Royal Decrees and Ministerial Decisions pertaining to the protection of the natural environment were promulgated, such as the Law on Conservation of the Environment and Prevention of Pollution, the Ministerial Decision No. 187/2001 on Issuing the Regulations for Organising the Issuance of Environmental Approvals and the Final Environmental Permit, as well as Royal Decrees on issuing laws on Handling and Use of Chemicals (46/95), the Protection of Water Wealth (29/2000), Protection of Sources of Potable Water from Pollution (115/2001), Nature Reserves And Wildlife Conservation (6/2003)…etc…

Given the development of the policies and institutional framework of Oman in the past four decades and following this logical path taking into consideration Vision 2020, the next step will be to have more robust policies to go in line with the more elaborate industries that GOSO is planning to establish or encouraging the local, national and international private sector to invest in. By robust, it is meant more structured and straightforward policies which would not allow for any ambiguity in their implementation or enforcement, such as for instance, the one translated by the term "unavoidable threat" in Article 16 of The Law on Conservation of the Environment and Prevention of Pollution issued by Royal Decree No. 114/2001 mentioned earlier. "Unavoidable threat" somehow carried a contested view. The next phase needs to engender more stringent laws and decrees with the intentions to build and encourage heavy industries, but have them better controlled beyond voluntary measures, not only to reduce the negative impacts on the natural environment but also to focus on education and capacity building of the local human resources to increase the rate of "Omanisation" in the private sector, and link up with academic and research institutions to encourage knowledge sharing and transfer between theory and practice

6 Production Sectors

The SME sector

Oman suffers a handicap in the promotion of SMES. The Omani population is spread out over a very large surface area which demands costly infrastructure investments. Another factor which may potentially constitute another obstacle to the further development of the SMEs sector is the fact that Omanis appears to favour working in the public sector. The entrepreneurial culture has yet to take root, and a large percentage prefers the safety net provided by a government job which ensures public pension, shorter working hours, and better working conditions.

However, Oman has a favourable environment for the development of SMEs: a stable economic and political environment, an attractive investment framework, a strategic geographical location, well developed infrastructure (access to water, energy, roads, ports and airports) and developing even further, very good institutions and an educated population.

This is the objective of Oman's Vision 2020, which aims at helping industry become one of the major economic sectors to replace oil resources as a source of national income. The main focus of the industrial development strategy is to establish mega projects in collaboration with foreign capital to produce goods for export, produce liquefied natural gas and petrochemicals, chemicals, chemical fertilisers, refined oil products and metals. The eighth five-year development plan (2011-2015) focuses in particular on development of basic industries and SMEs to increase their contribution to the GDP and boost the annual growth rate of exports. The aim is to do so by improving the efficiency and competitiveness of the industrial sector, enhancing scientific research and development and ensuring better utilization of mineral resources.

Promoting Green Growth

As of yet, and according to the people interviewed and the references reviewed for this report, there are no green productive sector enterprises in the Sultanate. However, there are many establishments around the country that implement Corporate Social Responsibility policies, or that have introduced environmentally-friendly measures into their practices.

In order to further promote the development of "green" SMEs, the Directorate-General for the Development of Small and Medium Enterprises (DG-SME) was established by Royal Decree No. 19/2007. The DG-SME liaises with government institutions, the private sector and scientific/academic institutions to promote the competent and environmentally-friendly SMEs. The Sultanate has implemented several projects and initiatives which fall under the broad category of "green projects/initiatives", such as projects implemented by the Public Authority for Craft Industries and those implemented by Haya Watercompany.

7 Green Initiatives and Projects

Promoting Green Growth

Companies are currently focusing on registering a Clean Development Mechanism (CDM) under the UNFCCC for carbon credits in collaboration with MECA and the UN. For example, Haya Water is currently looking for ways to benefit from the treated wastewater in ways other than irrigation in collaboration with SQU, MECA and MAFW. The company is also working on an integrated Environmental Management System for all its sewage treatment plants, pumping stations and networks to address gaps and attend to non-compliance aspects in a systematic approach. Haya has a newly founded environmental department and is working to be registered for the potential GHG abatement projects to receive benefits, a first in the Middle East in the field of wastewater treatment.

Some Green Success Stories

1. **Environmental Sustainability**. In 2007, based on the recommendations of a report commissioned by the then Ministry of National Economy (MONE), the Oman Environmental Services Holding Company (SAOC, or "Be'ah"; meaning "environment"), was officially established and its legal status granted through Royal Decree No. 46/2009. SAOC is tasked with optimizing, streamlining and privatizing the solid waste management sector, thus ensuring the protection of the environment and public health. SAOC plans to rectify the current solid waste management system by establishing a sector for solid waste management similar to oil and gas or telecommunications and give it a sustainable structure then hand it over to the private sector once it is up and running. Once the integrated solid waste management strategy is implemented it will have a multiplier effect on the activation of existing SMEs and the creation of new ones in construction, material segregation, recycling, hauling, etc. Going forward, large-scale projects would be required to apply standards that minimize energy, water and resources use as much as possible. Another project is the Oman Botanic Garden (OBG) is a governmental project developed by the Office for Conservation of the Environment at the Diwan of the Royal Court. It aims to protect the botanical heritage of Oman and conserve its plant diversity through a 420-hectare-botanic garden, the largest in the Arabian Peninsula with more than 1,200 plant species from the Sultanate. The project was initiated in 2006
2. **Economic Transformation in the Private Sector**. An example is the Oman Wastewater Treatment Company "Haya Water", a company handling sewage treatment in Oman, manages 54,000 m^3 of water effluent per day. The company converts wastewater into a treated effluent and a soil fertilizer, and soon expects to double the amount it treats. One of the by-products of

the Haya Water project is sludge; instead of disposing of the sludge back into the environment and causing water and soil pollution and adding to GHG emissions, Haya turns it into Kala Compost used for agriculture and landscaping. Also as part of the project, the company is developing the Al Ansab Wetland in Muscat to become a bird sanctuary. Another example is the initiative implemented by the Petroleum Development Oman (PDO) to reduce the carbon footprint of its activities was the construction of the "Nimr Water Treatment Plant" (NWTP) in the south of Muscat, co-executed in collaboration with BAUER Environment in 2010. The NWTP treats 45,000 m^3 of brackish water per day generated by the oilfield but PDO and BAUER are working on increasing the facility's capacity to 95,000 m^3 of water per day. the NWTP reduced the total ecological footprint associated with disposal wells, but it also has economic benefits, as it PDO to enhance oil recovery rates. Yet another example is the Oman Eco-House Design Competition, inaugurated in June 2011, to design and construct sustainable and energy efficient (green) houses based on the Omani architectural heritage. The main aim of the competition is to enhance the culture of social and economic sustainability linking it to the building of eco-houses and raise awareness on its importance at the national level.

3. Many projects promote **Progress and Well Being through the promotion of Rural Livelihoods**. One of them is the Public Authority for Craft Industries (PACI) was established under Royal Decree No. 24/2003, and supports several projects designed to meet the needs of Omani artisans, grow the sector and improve quality. Though the contribution of the handcrafts to the national income is not much, it remains an important element of traditional livelihoods. Another is the Oman Sail Project is an initiative which was started in 2008 by the GOSO to revive Oman's historical glory in riding the seas. The main aim of the project, as described in their motto is to "Reignite Oman's Maritime Heritage".
4. **Implementing Policy Responses**. After what has been seen so far, it is obvious that Oman has been witnessing positive changes towards a more sustainable economy, particularly in terms of the steady economic development coupled with an increasing interest in nature conservation and accompanied by the long held views and eagerness of developing the social capital and providing job opportunities to the citizens. The Sultanate has many success stories in the field of sustainable development; though they are not full-fledged projects, they constitute seeds of change and signs of bigger and more widespread initiatives yet to come in the near future. The successful initiatives listed under this section are a tangible evidence of the growing awareness of the government, the private sector and the people of Oman of the importance of developing the country sustainably and moving it towards a greener economy.

V. REFERENCES

ADB; 2011: *Gender, poverty and environmental indicators on African Countries*. Volume XII, Economic and Social Statistics Division, African Development Bank (ADB), Tunis, Tunisia.

AFED, 2011. Arab Environment 4; Green Economy: Sustainable Transition in a Changing Arab World. [online] Beirut. Available at [Accessed 19 July 2012]: <http://www.afedonline.org>.

ALI (Association of Lebanese Industrialists), 2012. The Industrialist's Journey Companion. [online] Newsletter 1. Association of Lebanese Industrialists. Available at [Accessed 30 April 2013]: <http://www.ali.org.lb/uploads/projects/pdf/ALInews2012-2.pdf>

Al-Saleh, A.; 2012: *Exploring Strategies for Small and Medium Enterprises in Saudi Arabia*, RIBM Doctoral Symposium on "Strategies for SMEs in Saudi Arabia", 14th-15th March 2012.

ARF; 2009: *Arab Knowledge Report 2009*, Arab Research Forum (ARF).

AUE; 2012: Statistical Bulletin 2011, 20th issue. Arab Union of Electricity (AUE).

Beaumont, P.; 2000: *The Quest For Water Efficiency - Restructuring Of Water Use In The Middle East*, Water, Air, and Soil Pollution, No. 123, p. 551–64.

BDL (Banque du Liban), 2010. Circular Number 236 (Arabic). Banque Du Liban.

CAS (Central Administration for Statistics), October 2011. Issue 1. Statistics in Focus: The Labour Market in Lebanon. [online] Beirut: Presidency of the Council of Ministers Available at [Accessed 19 July 2012]: <http://www.cas.gov.lb/images/PDFs/SIF/CAS_Labour_Market_In_Lebanon_SIF1_16-12-2011.pdf>

CAS (Central Administration for Statistics), 2008. Statistical Yearbook of Lebanon. [online] Beirut: Presidency of the Council of Ministers Available at [Accessed 19 July 2012]: <http://www.cas.gov.lb/index.php?option=com_content&view=article&id=101&Itemid=2>

Ecodit, 2008. The Lebanon Mountain Trail Project: Final Performance Report. [online] Beirut Available at [Accessed 19 July 2012]: <http://pdf.usaid.gov/pdf_docs/PDACL667.pdf>

ECORYS, 2012. Ex-post evaluation of Macro Financial Assistance operations to Lebanon.[online] Rotterdam: European Commission, Directorate General Economic and Financial Affairs Available at [Accessed on 1 August 2012].: <http://ec.europa.eu/economy_finance/evaluation/pdf/evaluation_lebanon_en.pdf>

EEA; 2012: *Green Economy*, European Environment Agency (EEA). Available at [Accessed 30 April 2013]: http://www.eea.europa.eu/themes/economy/intro

EIA; (2012). International Energy Statistics. U.S. Energy Information Administration. Retrieved September 12, 2012, Available at [Accessed 30 April 2013]: < http://goo.gl/o8SjW>

ERF; 2011: *Sustainable Development and Environmental Challenges in the ESCWA Region: Accounting For the Environment in the 21st Century*, Working Paper 592, The Economic Research Forum (ERF).

ERF; 2012: *The Environment and the Economy in the Arab World*, PRR No. 37, The Economic Research Forum (ERF)

ESCWA; 2011-a: *Sustainable Livelihoods and the Green Economy*, United Nations Economic and Social Commission for Western Asia (ESCWA), Beirut, Lebanon.

ESCWA; 2011-b: *Biological Diversity*, United Nations Economic and Social Commission for Western Asia (ESCWA), Beirut, Lebanon.

ESCWA; 2011-c. Environmental Goods and Services in the ESCWA Region: Opportunities for Small- and Medium-Sized Enterprises, United Nations Economic and Social Commission for Western Asia (ESCWA), Beirut, Lebanon.

ESCWA; 2010: *Green Economy Implications of the Sustainable Livelihood Approach for Sustainable Development in the Arab Region*, Expert Group Meeting on "Promoting Best Practices on Sustainable rural Livelihoods in the ESCWA Region", November 24-25, United Nations Economic and Social Commission for Western Asia (ESCWA), Beirut, Lebanon. Available at [Accessed 30 April 2013]:
<css.escwa.org.lb/sdpd/1350/17.pdf>

UN-ESCWA; 2009: *Economic Statistics Compendium*, Report No. E/ESCWA/SD/2009/13, United Nations Economic and Social Commission for Western Asia (ESCWA), Beirut, Lebanon. Available at [Accessed 30 April 2013]:
<www.escwa.un.org/information/publications/edit/upload/sd-09-13.pdf>

ESCWA; 2006: *Technical Cooperation Report 2006*, E/ESCWA/PPTCD/2007/Technical Material. 1 07-0229, United Nations Economic and Social Commission for Western Asia (ESCWA), Beirut, Lebanon.

FAO; 2011: Aquastat Database, Food and Agriculture Organization (FAO). Available at: http://faostat.fao.org/site/544/default.aspx

Flamos, A.; Papadopoulou, A.; Karakosta, C.; 2007: *CDM in MENA countries: Strengths, Weaknesses & Opportunities*, 4th Middle East and North Africa Renewable Energy Conference (MENAREC 4), 21-24 June 2007, Damascus, Syrian Arab Republic.

GCEP; 2001: Jordan's Report about Sustainable Development To Johannesburg Summit 2002, The General Corporation for the Environment Protection (GCEP), The Hashemite Kingdom of Jordan, October 2001, Jordan. Available at [Accessed 30 April 2013]:
<>

Ghadban, R. and Laidler-Kylander, N., 2011. Souk El Tayyeb: Defying the Line between Business and Non-Profit. [online] The Fletcher School, Tufts University Available at [Accessed 8 August 2012]: <http://www.soukeltayeb.com/souk-el-tayeb-defying-the-line-between-business-and-non-profit/>.

ILO (International Labour Organisation) and UNDP (United Nations Development Programme), 2011. Green Jobs Assessment in Lebanon: Synthesis Report. [online] Geneva: International Labour Office Available at [Accessed 18 August 2012]:
<http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_168091.pdf>

IBRD; 2010: Achieving Sustainable Development in Jordan: Country Environmental Analysis, The International Bank for Reconstruction and Development (IBRD) / The World Bank, September 2010, Amman, Jordan.

IEA, 2006: *National Energy Education Development Project*, Intermediate Energy Infobook, Energy Information Administration (EIA).

Mansour, A.; 2011: *Small and Micro Enterprises Development in Yemen and Future Prospects*, Social Fund for Development (SFD).

Merhebi, M., 2011. Legal and Technical Frameworks for Environmental Compliance in Lebanon. In: EFL (Environmental Fund for Lebanon), Training on Environmental Compliance. Beirut, Lebanon 17 June 2011. Available at: <http://www.therefordesign.net/EFL/> [Accessed 3 September 2012].

MCI; 2011: *Annual Industrial Report 2011*, Ministry of Commerce and Industry (MCI), Sultanate of Oman.

MOE (Ministry of Environment), 2012. National Report to the United Nations Conference on Sustainable Development (Rio+20). Sustainable Development in Lebanon: Status and Vision. Republic of Lebanon. Also available online at: <http://www.uncsd2012.org/content/documents/758Lebanon%20RIO+20%20Report%20English.pdf>

MOE (Ministry of Environment) and UNDP (United Nations Development Programme), 2010. State and Trends of the Lebanese Environment. [online] Beirut: Ministry of Environment Available at: <http://www.undp.org.lb/communication/publications/downloads/SOER_en.pdf> [Accessed 30 July 2012].

MOET (Ministry of Economy and Trade), 2012. Selected Macro‐Economic Indicators. [online] Available at: <http://www.economy.gov.lb/public/uploads/files/1888_1706_8717.pdf> [Accessed 25 August 2012].

MOEW (Ministry of Energy and Water), 2010. National Water Sector Strategy. [online] Beirut Available at: <http://intellisoft.me/Docs/NWstrategy_BaselineWaterSectorInfrastructure_en.pdf> [Accessed 19 August 2012].

MOF (Ministry of Finance), 2007. Recovery, Reconstruction and Reform. In: the International Conference for Support to Lebanon, Paris, France January 2007. Available at: <http://www.finance.gov.lb/en-US/finance/DonorCoordination/Documents/Donor%20Coordination/Aid%20Coordination/International%20Conferences/Paris%20III%20(25%20January%202007)/Paris%20III%20Conference%20Document/Paris%20III%20Final%20Document%20(English).pdf> [Accessed on 18 August 2012].

MOI (Ministry of Industry), 2010. The Lebanese Industrial Sector: Facts and Findings 2007. [online] Lebanon: MOI, UNIDO and ALI Available at: <http://www.industry.gov.lb/Documents/Publications%20and%20studies/Study%202007.pdf> [Accessed on 5 September 2012].

MOSA (Ministry of Social Affairs), 2011. The National Social Development Strategy of Lebanon. [online] Republic of Lebanon Available at: <www.socialaffairs.gov.lb/nsds.doc> [Accessed 5 September 2012]

Nicola, M.; 2009: *Middle East - The rising importance of SMEs*, Special Report GR_20Jul09, Standard Chartered Bank, Dubai.

OECD, 2011: Towards Green Growth: Monitoring Progress – OECD Indicators,

PCM (Presidency of the Council of Ministers), 2010. Economic Accounts of Lebanon 2009. [online] Lebanese Republic Available at: <http://www.economy.gov.lb/public/uploads/files/NationalAccount/NA2009EN.pdf> [Accessed on 5 August 2012].

PCM (Presidency of the Council of Ministers), 2009. Economic Accounts of Lebanon 2008. [online] Lebanese Republic Available at:

<http://www.economy.gov.lb/public/uploads/files/NationalAccount/NA2008EN.pdf> [Accessed on 5 August 2012].

PCM (Presidency of the Council of Ministers), 2008. Economic Accounts of Lebanon Retrospective 1997-2007. [online] Lebanese Republic Available at: <http://www.economy.gov.lb/public/uploads/files/NationalAccount/NA1997-2007.pdf> [Accessed on 5 August 2012].

RAC/CP: 2011; *State of the Art of Green Entrepreneurship in Tunisia*, Regional Activity Centre for Cleaner Production (RAC/CP).

Stevenson, L.; 2010: *Private Sector and Enterprise Development: Fostering Growth in the Middle East and North Africa*, International Development Research Centre (IDRCt.

UNDESA, 2012; A guidebook to the Green Economy; Issue 1: Green Economy, Green Growth, and Low-Carbon Development - history, Definitions, and a Guide to Recent Publications. United Nations Division for Sustainable Development (UNDESA). Aavailable at: <http://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=634&menu=35>

UNDP-POGAR; 2013: Arabstat, datbase managed by the UNDP's Program on Governance in the Arab Region (UNDP-POGAR). Available at: <www.arabstats.org www.arabstats.org>

UNEP; 2007: *Life Cycle Management: A Business Guide to Sustainability*, United Nations Environment Programme (UNEP).

UNEP; 2012: *Green Economy in a Blue World,* United Nations Environment Programme (UNEP).

UNIDO; 2011: *UNIDO Green Industry Initiative for Sustainable Industrial Development*, United Nations Industrial Development Organization (UNIDO), October 2011, Vienna, Austria.

UNSD; 2011: *International Recommendation on Energy Statistics (IRES)*, Statistical Commission Background document, 42nd session, 22-26 February 2011, United Nations Statistics Division (UNSD)

UNDESA (United Nations Department of Economic and Social Affairs) and ESCWA (Economic and Social Commission for Western Asia), 2011. Strengthening Capacity to Utilize Sustainable Development Principles in National Policy-Making in Lebanon. In: Stakeholder Consultation Workshop. Beirut, Lebanon September 6-7, 2011. [online] Beirut: UN House Available at: <http://www.un.org/esa/dsd/dsd_aofw_nsds/nsds_pdfs/agenda-lebanon.pdf> [Accessed 18 August 2012].

UNDP (United Nations Development Programme), 2011. Human Development Report 2011: Sustainability and Equity, A Better Future for All. [online] UNDP, New York: UNDP Available at <. http://hdr.undp.org/en/reports/global/hdr2011/download/> [Accessed on 5 September 2012].

UNDP, UNEP and Institut Basil Fleihan, 2011. The Final Report on the Legal Framework of Sustainable Public Procurement in Lebanon. Beirut, Lebanon.

World Bank; 2011. Republic of Lebanon Country Environmental Analysis. [online] Available at: <http://test.moe.gov.lb/Documents/WB%20-%20Final%20CEA.pdf> [Accessed 15 August 2012].

World Bank; 2009.Lebanon: Social Impact Analysis - Electricity and Water Sectors. [online] Available at: <http://siteresources.worldbank.org/INTPSIA/Resources/490023-1120841262639/Lebanon_electricity_water.pdf> [Accessed on 15 August 2012].

World Bank; 2008: Republic of Lebanon Electricity Sector Public Expenditure Review. [online] Available at:

<http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2008/04/17/000333037_20080417083720/Rendered/PDF/414210REPLACEM1closed0April01502008.pdf> [Accessed on 15 August 2012].