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for Global Recovery  
and Growth

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## **Round Table**

ARAB REGIONAL PROGRAMME

### **Investing in and financing Green Business**

# Background Paper



UNITED NATIONS  
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## EXECUTIVE SUMMARY

Starting in the United States of America, the financial crisis has developed into a worldwide economical crisis. No region or country in the world seems to be spared. Despite positive developments in both conventional and Islamic financial institutions, the impact of the crisis on the Arab region is beginning to be felt.

Addressing the issue of climate change requires substantial investments in new clean and sustainable technologies, processes and services. These investments are more than merely desirable: they are essential. A key aspect of the development challenge for the coming decades includes the immense need for new energy supplies. The arguments for an economic stimulus focused on energy and carbon are compelling. There are multiple benefits if these investments are targeted towards energy security, low-carbon infrastructures, sustainable development and environmental protection.

Investment requires finance in the form of equity, loans, insurance and other financial instruments. This finance ranges over a broad spectrum of needs – from conventional project finance for large multi-million dollar wind or concentrated solar panel farms, to micro-credit loans for rural populations to purchase efficient cookers or photovoltaic cells for illuminating their homes. Each type of finance comes with its own set of conditions, risks and rewards, and is generally provided by different sections of the financial community.

Energy is a global problem that requires local and regional assistance. But the Arab region is also confronted with other problems that demonstrate the need and potential for environmental technologies and green investments. In the years to come, one of the major challenges for the region, will be the sustainable management of water resources and protection of the environment.

Investments in green technologies are growing fast. Even during the financial crisis, venture funding in green technologies has not faltered. But collectively it is still, in many ways, a small fraction of corporate financing because investors are confronted with different barriers.

The financial sector in the Arab countries traditionally plays a significantly smaller role than in other economies with similar levels of income. Banks and financial institutions are the main source of corporate financing in the Arab countries, but the banking sector does not play a sufficient role in boosting the economic development. The banking sector is relatively conservative in extending loans to private enterprises, especially in countries with state dominated banking sectors.

There is very little if any sustainable green or environmental financing in the Arab region.

The lack of on-the-ground concessional green financing varies among various countries, from being completely unaware of the concept and, therefore, little demand by clients or consumers in some cases to the lack of interest by the regional and/or local banks due to risk management issues.

However, direct public sector involvement at national and regional levels, through creation and introduction of sustainable economic stimulus, can fill this need and appears to be taking place at a steady pace in certain countries.

There are many barriers to clean investments and awareness of investments in sustainable energy<sup>1</sup>. An overview is presented according to three main kinds of barriers at policy, infrastructure and project levels.

Most barriers can be overcome through states implementing concerted actions in cooperation with banks and international organizations. Possible approaches and best practices are available.

The Arab region has considerable potential to be lead in stimulating and financing clean technologies. Activities can vary from creating favorable conditions for green investments, through demonstrating good examples and stimulating Research & Development to projects that can create the necessary critical mass for further take-off.

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<sup>1</sup> Sustainable energy is the provision of energy such that it meets current needs of the present without compromising the ability of future generations to meet their needs. Sustainable energy sources include all renewable sources and technologies that improve energy efficiency. In this report, fossil fuels and any form of nuclear energy are excluded.

## 1 INTRODUCTION

### 1.1 Round table

The main objectives of the Arab Round Table investing in and financing green business are to identify the major challenges and opportunities facing the Arab countries in their efforts to invest in green business<sup>2</sup>. A particular goal will be to define opportunities and challenges for job creation in green industries, energy security, low-carbon infrastructures, sustainable development and environmental protection.

At last the conference on Eco-Cities in the Middle East and North Africa region, in Jordan, in October 2008, one of the conclusions was that there is a strong need for concessional financial tools and market based instruments to promote requisite investments in clean technologies and green industry. At the UNIDO Green Industry Week, in Bahrain, in February 2009, the first steps were made by inaugurating cooperation between UNIDO and the Kuwait Finance House resulting in the Green Technology Fund.

This paper describes the development of green businesses in the context of the current economical and financial crisis. A further investment in clean technologies, which is a virtually untapped sector, may be required to address the crisis.

The specific situation in the Arab region will be discussed and what financial actions, tools and instruments are needed or already in place to develop of clean technologies and who are the facilitators and promoters of this paradigm shift.

### 1.2 Impact of the financial crisis on the Arab region

Starting in the United States of America, the financial crisis has developed into a worldwide economic crisis. No region or country in the world seems to be spared from the impact. Despite positive developments in both conventional and Islamic finance institutions, the impact of the financial crisis on the Arab region is beginning to be felt.<sup>i</sup>

The Saudi Arabian Stock Exchange lost 42%, and the Kuwait stock exchange 30% in 2008. This has put bank share prices under pressure, as there is a strong correlation between share and stock market performance in the Arab region. In general, Arab banks appear to be resisting better the stock market downturn than western banks with a 52-week change of -

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<sup>2</sup> Green business is any industry or business that commits itself to reducing the environmental impact of its processes and products through resource efficiency on a continuous basis. It also refers to industries in the environmental technology, goods and services sector.

32% for Al Rajhi Bank and –15% for Arab Bank, compared to - 72% for Citi Group. Rather than indicating that the financial crisis is moderate in the Arab region, the contrast only means that it is currently not as dramatic as in western financial markets. In the future, the downturn could worsen.

### 1.3 Climate crisis

Addressing the serious issue of climate change requires substantial investment in sustainable and clean technologies, processes and services. These investments are more than merely desirable, they are essential. Without substantial and sustained investment in sustainable energy as well as new regulatory frameworks and measures to promote such investments, achieving a strong global economy will not be possible.

With a world increasingly focused on climate change, cleaner technologies are increasingly able to capture a growing share of the huge capital investments that will be made over the coming decades to meet the world's growing energy needs. That share is already starting to accelerate. In 2007, for example, an estimated \$117 billion was invested in renewable energy and energy efficiency sectors, 41% more than 2006 and more than four times the 2003 figure of \$28 billion. This investment in renewable energy represents some ten % of existing energy sector investment, with wind energy alone securing \$29 billion in 2006.<sup>ii</sup>

Investment requires favourable financial mechanisms in the form of equity, loans, insurance and other financial instruments. A range of new financial policy instruments are required, from conventional project finance for large multi-million dollar wind farms, to micro-credit loans for rural communities to foster a beneficial investment climate. Each type of financial package comes with its own set of conditions, risks and rewards and is generally provided by different sections of the financial community.

### 1.4 New economic paradigm

During 2009, a strong international consensus emerged in support of the effort to offset the current economic crisis by calling for economic recovery through direct public sector support. By encouraging consumer spending, the accepted assumption is that the economy will grow. There are multiple benefits if these investments are targeted towards energy security, low-carbon infrastructures and environmental protection.<sup>iii</sup> These three issues are priorities areas for the Arab region, as highlighted by the following initiatives.

#### 1.4.1 Global Green New Deal

An interesting initiative is the call for a Global Green New Deal by UNEP<sup>iv</sup>. If the public sector is going to spend money to revive the economy, it be as well to spend it investing in the new green technologies that are needed to address the environmental and resource challenges of the twenty first century?

The opportunity for a Global Green New Deal is characterized itself in three ways. First, as the old financial and economical system no longer works, there is a willingness to consider new solutions. Secondly, the enormous fiscal resources being released can potentially be used to achieve a critical mass of investment and employment in order to kick-start the new, sustainable paradigm. Thirdly, the architecture for the financial system is being re-written while at the same time the next generation framework for global emissions governance will be prepared at Copenhagen, in December 2009. This provides an opportunity to coordinate the two efforts.

#### 1.4.2 OECD Strategic Response

In 2008, the Organization for Economic Co-operation and Development (OECD) launched its strategic response to the financial and economical crisis to support governments to recover from the crisis<sup>v</sup> and to create “a stronger, cleaner and fairer world economy”. OECD states that the crisis is not an excuse to delay tackling climate change and other urgent environmental challenges. Rather, it provides both an opportunity and incentive to improve efficiency in the use of energy and materials, as well as for the development of new green industries and businesses, which can benefit both the economy and environment. Once the recession is over, the global economy should not go back to business as usual, as past practices have proven to be unsustainable. Governments should not only ask how and when to exit the crisis but towards what exit.

Growth should be cleaner and fairer. The crisis offers the opportunity to put the economy onto a low carbon growth path. There are signs that a new, less disruptive economic model could emerge from this crisis, more responsive to the demands of society than interests of shareholders.

#### 1.4.3 Group of Eight Summit

At the July 2009 Summit in L’Aquila, Italy, the Group of Eight welcomed and encouraged the development of responsible investments: “We remain focused on the economic and financial crisis and its human and social consequences. We will continue to work together to restore confidence and set growth on a more robust, green, inclusive and

sustainable path. This will include strengthening standards of integrity, propriety and transparency for economic activities.” The Group of Eight also encouraged OECD, the United Nations and the Global Compact to engage with key stakeholders to further develop practical guidance for business operating in developing countries. The Summit further stressed the contribution that investments can make in tackling the current financial and economic crises by *[improving energy security, agricultural production, technology transfer and development opportunities, which calls for an improved investment framework.]*

### 1.5 Green investments<sup>3</sup>

A strong growth in public green investments can be noticed already. Nevertheless, much more green investment is needed in the public as well as private sectors, at international and national levels. There is also a need for new, innovative financing mechanisms. Market-based financial instruments, such as access to attractive low interest financing, are key drivers to stimulate sustainable investments. Investors are confronted with different barriers.

Most investments in clean technology are currently investments in sustainable energy. The urgency of investments in sustainable energy is considerably stronger worldwide than for other clean technologies. In this paper, the data and financial instruments presented relate mostly to investments in sustainable energy.

The potential and relevance for investment in environmental technologies are at least as significant as investments in the energy sector. Investments in clean technologies have perhaps stronger positive long-term effects than investments in energy sector. The same tools and instruments can be used for investments in both sectors.

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<sup>3</sup> The field of green companies, clean technologies, etc. includes enterprises that develop technology related to water and waste water treatment, air quality, nanotechnology, alternative fuels, manufacturing, recycling and renewable energy.

## 2 GREEN INVESTMENT: ENVIRONMENT AND DEVELOPMENT CHALLENGE

### 2.1 Potential of clean technology investments

In 2007, the worldwide market for clean technologies amounted to Euro 1,400 billion making investments in this sector more significant than in that of machinery.<sup>vi</sup>

| <b>World market volume 2007 in Billions of Euros</b> |       |
|--|-------|
| <b>Electrical industry</b>                           | 2.400 |
| <b>Automotive</b>                                    | 2.000 |
| <b>Environment technique</b>                         | 1.400 |
| <b>Machinery</b>                                     | 1.350 |
| <b>Pharmaceutics</b>                                 | 520   |

Investments in green technologies are still growing fast. Even during the financial crisis, venture funding in green technologies have not faltered. In many ways, they are, however, still a small fraction of total worldwide investments. In research and development (R&D), market introduction and technology transfer, much investment is needed and a considerable potential for growth exists.

- Despite the fact that new investments in clean technology are growing faster than conventional venture capital categories such as computers, health care or retail start-ups, they still remain a tiny fraction, at 3.7 %, of the overall market<sup>vii</sup>.
- Clean technology venture funding is mainly concentrated in the energy and energy efficiency sectors. However, other relevant areas such as natural resources, soil, air, etc have yet to be covered by matching venture capital funding.
- The UN Framework Convention on Climate Change (UNFCCC) estimated that \$200-210 billion in additional investment will be required annually by 2030 to meet global greenhouse gas emissions reduction targets. In 2007, only venture capital in green technologies amounted to only \$ 2.5 billion worldwide.

In September 2009, the World Bank Group announced that its financing of renewable energy and energy efficiency projects and programmes in developing countries rose 24% in the last fiscal year, to reach a record of \$3.3 billion. The total renewable energy and energy efficiency commitments for the year which ended on 30 June 2009 accounted for more than 40% of total World Bank Group energy lending.

During the last five years, the World Bank Group approved 366 renewable energy and energy efficiency projects in 90 countries including 99 projects in 48 countries last year.

Energy needed to feed rapid economic growth in urban centres is also significant. The International Energy Agency (IEA) estimates a need for \$26 trillion dollars, or more than \$1 trillion annually in new energy investment between 2008 and 2030.<sup>viii</sup>

A key aspect of the development challenge for the coming decades is to secure the immense financial resources needed for new and sustainable energy supplies. The argument for an economic stimulus focused on promoting low-carbon sustainable energy sources is formidable.

For many in developing countries, the energy issue is a basic need. Two point four billion persons still use traditional biomass for cooking and heating. One point six billion worldwide have no access to the electricity network, and 80% of those are the rural poor of developing countries.

Bringing forward some of the needed investment and targeting it specifically at renewable energy, low-carbon technologies and energy efficiency could pay massive dividends later. Consequently, massive energy investments must be made in clean, sustainable energy sources, and, more importantly, they must be in those developing countries that are the major source of growth in energy demand.

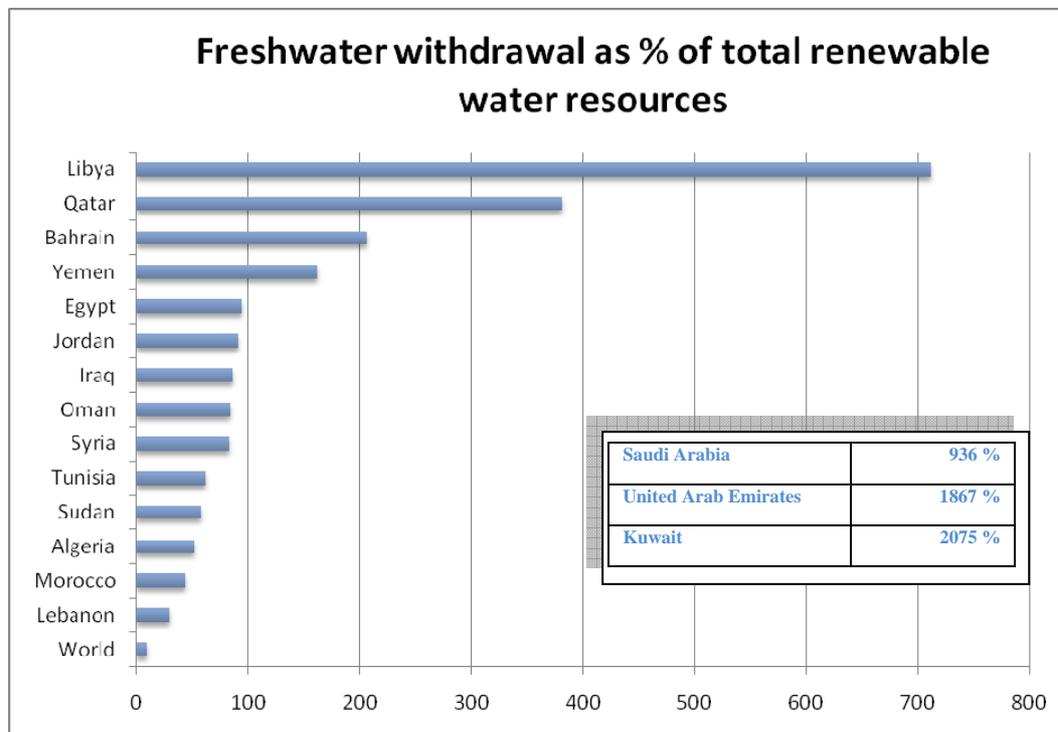
Re-capitalizing the world's energy systems for a low-carbon world will be a major investment challenge over the next 50 years. But if these flows of new investments do not materialize, then, the world will face a development crisis. On the other hand, if they materialize along the lines of business as usual, then, the world will have an environmental crisis. The three challenges -economic, energy and climate- are the most pressing and can only be answered collectively and simultaneously.

## 2.2 Green technology in the Arab region

Energy security is a global concern. In addition, the Arab region is confronted with other challenges that demonstrate the need and potential for environmental technologies and green investment.

*Investments for energy*  
*Stabilizing greenhouse gas concentration at 550 ppm of CO<sub>2</sub>-equivalent is expected to limit the temperature increase by about 3°C, which would in-turn require Green House Gas(GHG) emissions to rise to no more than 33 Gigatons (Gt) in 2030 and, subsequently, fall in the longer term. In other words, the share of low-carbon energy – hydropower, nuclear, biomass, other renewables and fossil-fuel power plants equipped with carbon capture and storage (CCS) – in the global primary energy mix would need to expand from 19% in 2006 to 26% by 2030. This would require an additional \$4.1 trillion worth of investments in energy-related infrastructure and equipment. On the other hand, improved energy efficiency would deliver fuel-cost savings of more than \$7 trillion.*

In the years to come, one of the major challenges for the region will be the integrated management of water resources and protection of the environment. Half of the countries in Arab region already use more than 50% of their renewable water resources and are likely to be extracting more than 100% between now and 2025.



**Graphic 1: Freshwater withdrawal as % of total renewable water resources by country (data: Aquastat FAO, 2009)**

On the other hand the current water availability in the Arab region is some 1,200m<sup>3</sup> per capita annually compared to a world average of 7,000m<sup>3</sup>. Water availability in the Arab region is expected to reach 550m<sup>3</sup> per capita annually in 2050. In some countries, per capita annual consumption is less than 200m<sup>3</sup> putting them at the top ten poorest water countries in the world. Deteriorating environmental conditions will escalate this negative trend.

Demographic growth and urbanisation are important factors. But industrial development, improvement in the standard of living and the growing tourism industry also play a major role in the large increase in water consumption. The growing demand for water will require substantial investments from installing and improving distribution networks, to modernizing agricultural irrigation systems and introducing new technologies such as effluent recycling and water desalination.

Protection of the environment has also become a priority for Arab countries. The growth in industrial activity and boom in urbanization cause environmental damage that

directly threatens the important tourist sector as well as the quality of life of the population. The cost associated with mitigating environmental damage is estimated to reach 25% of the Gross Domestic Product (GDP) in some Arab countries. The need for new eco-friendly technologies and infrastructure for processing various waste streams, as well as for investments to ensure protection and conservation of the environment, are paramount to ensuring sustainable development.

### 2.3 Job creation

A study by the University of California Berkeley estimated that the California state could gain as many as 89,000 new jobs and realize an annual economic benefit of up to \$74 billion by pursuing its climate action targets. Another study in Oregon focused on five clean-energy sectors that provide the best job creation opportunities for Oregon and Washington:

- Solar PV manufacturing (as many as 22,560 jobs in the region by 2025)
- Wind power development (as many as 6,000 jobs)
- Green building design services (as many as 16,834 jobs)
- Sustainable bio-energy (as many as 10,419 jobs)
- Smart-grid technologies (as many as 7,000 jobs)

The study found that these industries have the potential to create more than 63,000 new jobs in the Pacific Northwest by 2025.

According to a survey<sup>ix</sup> among European companies, each 100 Mega Watt (MW) for solar thermo-electric power plants installed will provide 400 full-time jobs equivalent to those in manufacturing, 600 contracting and installation jobs and 30 annual jobs in operations and management. Economic development can benefit a community indirectly, such as increasing demand for local services. It is widely accepted that for each construction job, four service jobs are created to support it when construction is completed, similar operations and management jobs will require local services as well.

*Estimated effects of Masdar city development in Abu Dhabi*  
*Although difficult to measure precisely, the result expected from the Masdar project by 2015 is:*  
*-10,000 new high-quality jobs in the clean energy and sustainable technologies sector in Abu Dhabi*  
*-800 full-time Masters and PhD students at the Masdar Institute specializing in clean energy and sustainable technologies*  
*-a multibillion-dollar expansion of the Abu Dhabi non-oil economy*  
*-creation of a world-class scientific and research hub.*

### 3 FINANCE MECHANISMS FOR CLEAN TECHNOLOGIES

#### 3.1 Access to finance

Overall, the financial sector in the Arab countries plays a significantly smaller role than in other economies with similar levels of income. Banks still are the main source of corporate financing but banking does not play a sufficient role in boosting economic development in general.

The sector is relatively conservative in extending loans to private enterprises, especially in countries with state-dominated banking. In spite of privatizations, government ownership of banks remains at a higher level than in other similar countries.

In some Arab countries, there are high collateral requirements for loans. This causes particular difficulties for start-up enterprises or those with intangible assets. As a result companies, have to rely more on internal funds or seek funding through family and friends.

There is limited competition in the banking sector. The interest rates are, therefore, relatively high, which, in some cases, serves also to compensate for the lack of credit-related information. Only recently has there been a movement to establish credit bureau to bridge this information gap.

So access to attractive financial services remains low, with transaction costs high and limited only to some segments of the population. Micro-finance programmes are expanding rapidly, with the region enjoying one of the highest growth rates as micro-credit outreach has increased from \$750,000 to \$3 million in just three years, mainly in Egypt and Morocco.

#### 3.2 Green financing

There is very little, if any, sustainable green or environmental financing for small-or medium-sized investments in the Arab region. the lack of on-the-ground green financing varies among countries, from being completely unaware of the concept of green financing and, therefore, little demand by clients or consumers in some cases to the lack of interest by the regional and/or local banks due to risk issues. In some countries, the reasons are due to the fact the state-run banks are the only financial institutions and they simply are not yet interested.

There are several Mediterranean or regional financial assistance programmes, but none cover more than one sector. In some countries, lack of awareness about such regional financial tools are hindering their development.

Financial institutions may also shy away from projects, such as wind farms, if the cost

of preparing and administering the first few loans is too high. Most financiers have a strong tendency to let others go first, and finance yet another thermal power station powered by fossil fuels, rather than something as new as a wind farm.

Considering sustainable energy applications as niche, or boutique, sectors with high-priced market development and initial transaction costs, most financial institutions are unwilling to create the new financial instruments the sector needs to develop. This wait-and-see attitude is compounded by an overall lack of information, experience and tools needed to quantify, mitigate and hedge project and product risks.

Promising sustainable energy initiatives and those who can turn them into viable businesses often need finance and business development support to take their proposals to market. Investing in the early stages of their business development, however, carries a high perceived risk, due to the possibility of failure. Perceiving such risks and market development costs, banks compensate with higher interest rates and more restrictive lending conditions that hinder development of economically sound projects. Smaller entrepreneurs are often seen as too risky to receive any form of financing from a domestic commercial financial institution.

### 3.3 Public financing

Public investment at national and regional level has been on a steady increase. Nevertheless, it is inadequate to investment needs. According to the International Institute for Sustainable Developments (IISD)<sup>x</sup> the private sector is going to have to be the main driver for the levels of investment needed. Now that the private financing sector is in a crisis, the question is how governments can facilitate more of this kind of green investment? The combination of public and private financing will play a more important role in stimulating this sector in the future. The public sector can provide the necessary guarantees on private loans. Public-private partnerships and the like, are important stimuli in this endeavour.

In “Public Finance Mechanisms to Mobilise Investment in Climate Mitigation”<sup>xi</sup>, the Division of Technology, Industry and Economics (DTIE) of UNEP considers the following public financing tools and the context in which they can be used for stimulating green investments:

- Credit lines to local commercial financial institutions (CFI) for providing both senior and mezzanine debt to projects
- Guarantees to share the commercial credit risks of lending to projects and companies with local CFIs

- Debt financing of projects by entities other than CFIs
- Carbon finance facilities that monetize the advanced sale of emissions reductions to finance project investment costs
- Grants and contingent grants to share project development costs
- Loan-softening programmes to mobilize national sources of capital
- Inducement prizes to stimulate R&D or technology development
- Technical assistance to build the capacity of all actors along the financing chain
- Private equity (PE) funds investing money in private equity, often to gain control over companies to restructure them.
- Venture capital (VC) funds investing risk capital in technology innovations for start-up firms and small businesses with exceptional growth potential with managerial and technical expertise often provided

The last two are, in general, private funding tools, which can be used by public organizations or in partnership between public bodies and commercial financial institutions.

A study of ANIMA<sup>4xii</sup> shows a strong growth of Private Equity funds in the Arab region, with 139 in 2008 compared to 30 in 2005. At the same time, the average amount per fund is increasing. The recent trend is towards mega-funds, more designed for project finance or real estate/tourism than for financing SMEs, which is a priority for the region.

*In February 2009, Kuwait Finance House (KFH) Bahrain launched a Clean Technology Fund. The objective of the Fund is to invest in all aspects of clean technology, including R&D companies, equipment manufacturing and clean energy production and generation. Fund Size: Initial capital of \$200 million increasing to \$1 billion, The Clean Technology Fund of KFH Bahrain has been developed and is executed in cooperation with UNIDO.*

A specific kind of venture fund is the so called green capital fund, or green venture fund. This invests venture capital in environmental technologies. The field of green technologies or companies includes enterprises that develop technology related to water purification, air quality, nano-technology, alternative fuels, manufacturing, recycling and renewable energy.

#### 4 OBSTACLES TO GREEN INVESTMENTS

This chapter describes barriers to clean investments and investments in sustainable energy<sup>xiii</sup>, relevant to the Arab region, at policy, infrastructure and project level. The

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4 ANIMA investment network is a multi-country platform supporting the economic development of the Mediterranean. The network gathers around 40 governmental agencies and international networks. The objective of ANIMA is to contribute to a better investment and business climate and to the growth of capital flows into the Mediterranean region.

demarcation is not always strict as many barriers are a combination of different aspects.

#### 4.1 Policy barriers

Many of the policy barriers are at the international level, such as trade agreements. But many barriers also exist at domestic, or national, level. This paper focuses on the national factors that can affect sustainable energy investments.

##### 4.1.1 Clarity of energy policy

Many developing countries lack clearly defined clean and sustainable energy policies with targets or mandates. Energy policies are often in transition or more ad hoc, particularly with regard to distributed sustainable energy systems. The absence of targets or mandates may suggest to external investors that governments are not serious or supportive of sustainable energy investments, which in turn fails to motivate investors, power plant operators and manufacturers to invest in sustainable energy. It is difficult for project developers to plan and finance projects when there are no known and consistent rules.

##### 4.1.2 State monopolies and power purchase agreements

In many countries, particularly developing ones, power utilities have a monopoly on electrical power production, transmission and distribution, supported by the legal framework. As a result, independent power producers may not be able to sell to the utility or third parties through power purchase agreements. This is a widespread and critical barrier to sustainable energy investments.

##### 4.1.3 Subsidies and taxation

Subsidies and taxation favouring nuclear and fossil fuel technologies are a problem globally. Subsidies distort prices, allowing fossil fuel and nuclear energy providers to sell at lower prices putting sustainable energy at a disadvantage.

#### 4.2 Infrastructural and institutional barriers

Close related to policy barriers are those that exist at the lower level of infrastructure. Both technical and organizational infrastructure are considered below.

##### 4.2.1 Lax environmental regulation

Poor environmental standards and lack of or weak enforcement of existing standards are problems in many developing countries. In the absence of stringent environmental regulations or enforcement of them, utilities, power plant operators and manufacturers in developing countries lack motivation to explore ways to make their energy production and

consumption cleaner or more efficient.

#### 4.2.2 Fragmented and immature industry and market

Markets for sustainable energy are new generally as are the new renewable energy technologies that are competing with mature energy on based on conventional fuel sources. As a result, there are information and credibility gaps, lack of technical skills and economies of scale and high transaction costs, which create risks for investors.

#### 4.2.3 Lack of economies of scale and supply chain bottlenecks

Production of sustainable energy technology components has still not achieved economies of scale due to limited demand. Because it is an immature industry, there are also bottlenecks in the supply chains of a number of sustainable energy sectors. Silicon is a bottleneck for photovoltaic production, with prices ranging from \$9 per kilo in 2000 to \$150 in 2006<sup>xiv</sup>.

#### 4.2.4 Administrative barriers

There may be restrictions on planning and construction for sustainable energy technologies such as wind turbines, solar photovoltaic (PV) and biomass combustion facilities, due to concerns relating to noise, unsightliness and safety, particularly in urban areas. Planners and officials are often unfamiliar with sustainable energy technologies. This adds to uncertainty as to project approval difficulties projects may face and commissioning time, all of which make investors cautious.

### 4.3 Project and financial barriers

Barriers in this category vary from project to project although closely related to the policy and infrastructural and institutional barriers.

#### 4.3.1 Knowledge and credibility gaps

Consumers, lenders, developers, utility companies and planners, in developed and developing countries, often lack information about sustainable energy. They fail to understand the link between climate change and business opportunities. Additionally, they may lack information regarding energy savings potentials by applying energy-efficiency regimes. In addition, sustainable energy technologies still face substantial credibility gaps among consumers, utility companies, government agencies and investors. As utilities seldom consider starting projects with unfamiliar or recently commercialized technology, they do not put them in their planning frameworks.

#### 4.3.2 Lack of awareness, knowledge and technical skills

For installation, operation and maintenance of sustainable energy technologies in developing countries are often lacking local technical skills. As well as absence of local skills, the awareness may be lacking from where clean technologies can be acquired. Internationally available techniques and suppliers may be unknown. Technical skills are also wanting for marketing and acquisition of financing and creation of joint venture partnerships.

#### 4.3.3 Higher costs of sustainable energy

The costs per Kilowatt per hour from sustainable energy sources are often higher than those from conventional technologies. These are a result of a combination of many incremental costs beginning with higher capital costs, higher transaction costs and the higher cost of buying foreign technology, which eventually results in an higher kWh cost for the consumer or end user. On the other hand, the mitigation costs associated with the impact on the environment and health are not internalized in the kWh cost from conventional or nuclear energy sources.

#### 4.4 Lack of access to finance

Most of these lead to the conclusion that the financial risks for clean sustainable energy projects are estimated higher than for conventional projects. This is related to the fact that they emerge in the form of new companies without financial track records or creditworthiness, have longer payback periods and face regulatory uncertainties.

To overcome the disadvantage placed on clean technologies, highest priority must be given at the national level to address risk management, financial barriers, access to sustainable technology and regulatory shortfalls, in cooperation between public and private institutes.

### 5 FINANCIAL RESPONSES

This chapter describes instruments and approaches that have been successful in overcoming these barriers to financing.

*The association Al Amana for the Promotion of Micro-Enterprises Morocco is an unusually successful microfinance institution (MFI) registered as a non-profit organization in Morocco. Starting in 1997, with capital provided by USAID, it has grown to become the leading MFI in Morocco and the broader MENA region. It has seen rapid growth in clients and assets while reaching a level of financial sustainability uncommon among MFIs. The Association provides loans for as much as €4,500 and has more than a million beneficiaries, of which more than 60% are women). The repayment rate of the loans is 99%.*

## 5.1 Micro finance

Micro-credit is a financial innovation that is considered to have originated with the Grameen Bank in Bangladesh. In that country, it has enabled extremely impoverished persons to engage in self-employment projects that allow them to generate income and, in many cases, begin to build wealth and exit poverty. Due to the success of micro-credit, many in the traditional banking industry have begun to realize that such borrowers should more correctly be categorized as pre-bankable: Microcredit is, thus, gaining increasingly credibility in the mainstream finance industry. Many traditional large finance organizations are contemplating microcredit projects as a source of future growth, although larger development organizations discounted the likelihood of success of micro-credit when it began. The United Nations declared 2005 the International Year of Micro-credit.

## 5.2 Credit guarantee schemes

In situations where banks hesitate to finance because there is a lack of knowledge and experience, credit agencies can commit to reimburse a lender if the borrower fails to repay a loan. The lender pays a guarantee fee. Like an insurance company the credit agency covers the perceived risk for the bank. The tool is meant to take the edge off a risk-averse attitude of commercial banks.

*The Jordan Loan Guarantee Corporation facilitates borrowing from participating banks up to 75% of the amount. Rather than conventional collateral, which is often not available, the guarantee is based on the feasibility of projects and on expected cash flow.*

## 5.3 Alternative financing

Alternative financing tools can play a role in financing high-growth and innovative enterprises, which may have difficulty accessing capital markets, due to size of bank and lack of collateral. These tools are considered an alternative model to the normal loans regarding collateral, risk sharing, ownership, monthly payback periods and the like. They are able to channel funds from international investors.

Venture or risk capital funds invest risk capital in technology innovations for start-up firms and small businesses with exceptional growth potential. Managerial and technical

*The Bedaya Investors Network in Amman, Jordan was launched in May 2009. The founding institutions are: the Queen Rania Centre for Entrepreneurship, iPark business incubator and Arab Science and Technology Foundation, with support from the European programme Medibikar. The goal is to offer national financing for innovative business start-up, with a focus on science and technology.*

expertise are often provided. An angel or informal investor is an affluent individual who provides capital for a business start-up, usually in exchange for convertible debt or ownership

equity. A small, but increasing, number of angel investors organize themselves into angel groups or networks to share research and pool their investment capital.

#### 5.4 Legislative framework

Certain countries have weak property rights that create difficulties for firms to claim property as collateral. Bankruptcy laws can be tedious, favour the creditor and hinder collection of delinquent payments.

These situations discourage lenders from loaning funds to businesses. A potential solution is to modify relevant legislations.

International reference points, such as the World Bank Principles for Effective Insolvency and Creditor Rights Systems and United Nations Commission on International Trade Law (UNCITRAL) Legislative Guide

on Insolvency, could be of assistance to Arab jurisdictions interested in strengthening their insolvency systems in line with recognized standards.

There is no uniform insolvency model suited to all countries. Insolvency systems embody different policy choices on risk allocation and need to take into account the strengths and limitations of institutional infrastructure, level of economic development and existing social traditions.

Unless policy makers acknowledge the benefits of sound insolvency systems for the efficient reallocation of resources, they will fail. By contrast, the absence of a well-functioning insolvency regime may precipitate capital flight, destroy value in the corporate and financial sector, frustrate creditors and discourage domestic and international investors.<sup>xv</sup>

#### 5.5 Financial education

In many cases there is a lack of financial knowledge and awareness. Companies, especially SMEs, are often unaware of financial products offered by banks and other lending organisations. Many SMEs are unskilled in developing business plans, which is a key for presenting business objectives and growth to lending agents.

*A recent review in Egypt led to the establishment of a National Law Commission, with the mandate to assess commercial statutes, regulations and legal acts, against a set of criteria, such as predictability, coherence, equity and compliance with international guidelines. A special section of the Commission looks into the insolvency legislation with the objective to formulate specific recommendations. A set of problem areas have already been identified.*

*The Citigroup Financial Education Programme: created a small business guide entitled "Becoming an Entrepreneur", to provide information on developing business ideas, writing business proposals, approaching financial agents, maintaining sound financial management skills, and the like. It also explains financing options available to SMEs.*

## 5.6 CDM projects

At international level, under the Kyoto protocol, there are three mechanisms to reduce greenhouse gas emissions: the Clean Development Mechanism (CDM), joint implementation (JI) and International Emissions Trading Scheme.

CDM is targeted towards projects in developing countries. It allows emitters of greenhouse gasses to develop low or carbon free projects in developing countries to generate emission reduction credits. These are tradable and can be used for compliance with emission commitments and, thus, create a financial incentive for large-and medium-sized investments in clean and sustainable energy projects and energy efficiency. The positive impacts of CDM projects will have on stimulating effect on renewable

*Together with the Italian Government, UNEP developed a programme to finance solar water heaters in Tunisia (PROSOL). The core of the project was a financial scheme, where local citizens could have a loan over five years and repayment would be made through the utility bill. The Government supplies a subsidy of 20%. Initially this was a temporary measure which was funded by Italy. In 200, it was turned into legislation and taken over by the Tunisian Government. It includes provision for a Value Added Tax (VAT) exemption and reduced custom duties. The project has created at least 300 jobs and contributes to climate mitigation. The industry and market in Tunisia for solar boilers has given considerable impetus and the project is now expanding into industry and the hotel sector.*

energy and energy efficiency projects. Presenting such projects and impacts to the designated national authorities poses a challenge to CDM project development.

Developed countries such as Denmark, Italy, the Netherlands and Spain have initiated special CDM funds. The funds invest in carbon-reduction projects in developing countries.

## 5.7 Public financing

Public-sector financial interventions ranges from institutional to legal frameworks. In order to generate the desired economic outcome, these incentives and instruments must be well adjusted to suit the local economy and stimulate the required market response, remain sustainable after these instruments are phased out, be cost effective and target the intended economic sectors.

### 5.7.1 Subsidies

States can be creative and substantial in providing finance for sustainable clean investments. One general factor hindering the private sector investment in renewable energy is the low electric tariff, as a result of government subsidies in many Arab countries. Exit scenarios have to be developed from this expensive and inefficient system. Guaranteed feed-in tariffs for electricity from renewable sources have proven successful in many countries,

with some Arab countries now implementing these principles.

Governments can give direct subsidies to mobilize the market or for covering first investment risk, as well as offer such fiscal incentives as tax credits, tax reductions and accelerated depreciations.

#### 5.7.2 Institutional measures

To overcome the knowledge gap, countries can set up special agencies to promote clean investments, such as those for energy efficiency and renewable energy promotion, as in the case of the Lebanese Centre for Energy Conversation Project (LCECP).

Through public-private partnerships, governments can actively support energy service companies and energy performance contracting.

With investment promotion agencies common in many Arab states, they should be aware of new investment opportunities concentrated on specific sectors or branches.

#### 5.7.3 Fiscal incentives

Fiscal incentives are considered a direct financial instrument designed to provide positive market-based incentives. Either through tax exemptions for desired developments or by penalty taxes for unwanted developments, states can directly influence investments.

In Syria, there has been an income tax exemption scheme for some seven years for enterprises committed to environmental protection by installing eco-technologies.

In Tunisia, favourable tax rules are in place for companies concerned with waste treatment or energy efficiency.

#### 5.7.4 Labelling

In Syria, national energy efficiency labelling was developed three years ago by the Ministry of Energy and National Energy Research Commission to promote energy conservation. Unfortunately, this was not integrated with a financial incentive mechanism for consumers.

#### ***VAT & Custom duty exemptions***

*In 2008 Jordan introduced a bold sales tax and custom duty exemption scheme for all sales and importation of RE & EE equipment and systems in to the country as an incentive for investors and consumers to reduce their fossil fuel dependence and to minimize the country's import of crude oil. Jordan energy imports account for nearly 10% of GDP. Under the Jordanian Energy Master Plan, the proportion of energy from renewable resources will increase to 10% in the primary energy mix by 2020.*

*Tunisia has a combined arrangement of tax advantage and soft loan. Environmentally friendly investments, which are specified in the regulation, can have a tax exemption or direct subsidy of 20% . At the same time, 50% of the investments can be financed with a soft loan.*

### 5.7.5 Energy fund

The German Kreditanstalt für Wiederaufbau Bank (KfW) currently provides €25 million for an Egyptian fund for energy efficiency in a form of a low interest loan programme by Government for the private sector.

Energy contracting represents another private-sector tool that is being used successfully in Egypt.

## 5.8 Improving the business environment

In 2007 and 2008, the Arab countries continued to make important business reforms, with two-thirds of its economies affected. Once known for prohibitive entry barriers, the region has seen bold reforms in Saudi Arabia, Tunisia and Yemen, which have eliminated the minimum capital requirement for starting a business. Jordan reduced its requirements by 96% in 2008. Yemen has launched a one-stop shop to make it easier to start a business. Egypt's property registry reform has led to increased title registration and a 39% increase in revenues from property registration. For the region overall, property registration takes about 37 days from start to finish, considerably lower than elsewhere, with East Asia and the Pacific at 113 days, Europe and Central Asia at 59 days, Latin America and the Caribbean at 66 days, South Asia at 106 days, and sub-Saharan Africa at 97 days.

## 5.9 International organizations and financial tools

International organizations are supporting states in solving financial barriers, with UNIDO among them. Another example is the International Renewable Energy Agency (IRENA). The main objective of IRENA is to support governments when drafting policies and action programmes for promotion of renewable-energy, energy-efficiency and energy-saving measures. It cooperates with financing institutions to develop and support new and innovative financing mechanisms for renewable energy applications.

Investors can also make use of international funds, often specialized and targeted to a specific country and/or sector. In partnership with the Tunisian National Agency for Environmental Protection (ANPE), in 2009, the French Agency for Development (AFD) launched a credit fund of €40 million aimed at financing investments in the areas of decontamination and energy control. The World Bank estimates that 80% of infrastructure investment in the next few decades will be urban. Therefore, OECD works with national governments in order to create awareness of the role of city authorities in design and delivery of cost-effective mitigation solutions integrating climate change into urban development planning.

A new initiative that brings together mayors, municipalities, local governments, private sector and financial institutions is the Eco-cities initiative. Launched in Jordan in 2008 by the Ministry of Environment, UNIDO and USAID/ SABIQ the Eco-cities initiative aims to facilitate and introduce clean, sustainable technologies, energy efficiency, waste management, efficient mobility, green buildings and the like through creating a network of eco-cities as well as exchanging information on issues related to creating and transforming urban cities into healthy, cleaner ones.

Finally, under the current UNFCCC, there are some financial mechanisms including the Global Environmental Facility (GEF), special climate fund, adaptation fund and least developed countries fund. These are targeted towards countries, rather than individual enterprises.

## 6 CONCLUSIONS

The global financial and economical crisis has also affected the economies of the Arab region. Next to its negative economic impacts, recovery programs offer a possible turning point for the global economy. The general answer to the economic crisis is to increase public investments in order to create sustainable economic growth and jobs. Investments in clean technology, renewable energy and environmental technologies offer a sustainable way out of the economical crisis and the climate crisis, and prepare the way for a new kind of economy.

Environmental technology, renewable energy and energy efficiency have an enormous economic potential. Despite the strong growth in recent years, the development and investment in clean technologies have just only begun.

The Arab region lags behind in these developments. The banking sector is relatively conservative with few green investments in the region. Although banks are normally the first to initiate (green) financing, in the current economic crisis, a strong signal from governments is needed. This paper outlines what types of market-based instruments governments can implement proactively and create the necessary catalyzing financial and regulatory frameworks and initiatives. Activities can vary from creating favourable conditions for green investments, through demonstration of good examples and stimulating R&D to funding projects in order to create critical mass for further economical development.

This paper shows that there are many initiatives in the region and that the Arab region starting from an under-developed position has the potential to become a global leader in green technologies and investment tools.

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