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Current Status of Renewable Energies in the Middle East – North African Region



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Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

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List of Abbreviations

ADEME Agency for Environment and Energy Management AFESD Arab Found for Economic and Social Development AECS Atomic Energy Commission of Syria ALECSO Arab League Educational, Cultural and Scientific Organization ALMEE Lebanese Association for Energy and Environment AMU Arab Maghreb Union ANER National Renewable Energies Agency ANME National Agency for Energy Conservation APRUE National Agency for the Promotion and Rationalization of Energy Use ASRT Academy of Scientific Research and Technology AU The African Union BCSR Bahrain Center for Studies and Research CDER Center for Development of Renewable Energies CEDARE Center for Environment and Development for the Arab Region and Europe CNRST National Center of Scientific and Technical Research CRES Center for Renewable Energy Sources CSES Centre for Solar Energy Studies ECA United Nations Economic Commission for Africa ECSSR Emirates Center for Strategic Studies and Research EERC Energy and Environment Research Center ERC Energy Research Center ERI Energy Research Institute ESCWA United Nations Economic and Social Commission for Western Asia ESES Egyptian Solar energy Society EuroMed The Euro-Mediterranean Partnership FEA Federal Environment Agency GCC Cooperation Council for the Arab States of the Gulf GEF Global Environment Facility HBBC Housing and Building Research Center IEF International Energy Foundation ISESCO Islamic Educational, Scientific and Cultural Organization KACST King Abdulaziz City for Science and Technology KFUPM King Fahd University of Petroleum and Minerals KISR Kuwait Institute for scientific Research MAP Mediterranean Action Plan MEDRC Middle East Desalination Research Center MEDREC Mediterranean Renewable Energy Center MENA Middle East North Africa METAP Mediterranean Environmental Technical Assistance Program NARES National Agency of Renewable Energy Sources NEAL New Energy Algeria NEEP National Energy Efficiency Program NERC National Energy Research Center NISTR National Institute of Scientific and Technical Research NRC National

Research Center NREA New and Renewable Energy Authority NREC National Renewable Energy Research Center OEP Organization for Energy Conservation and Planning OME Mediterranean Energy Observatory PEC Palestine Energy And Environment Research Center REC Renewable Energy Center SARC Scientific and Applied Research Center SSRC Scientific Studies and Research Center TREC Trans Mediterranean Renewable Energy Cooperation UNEP ROA UNEP Regional Office for Africa UNEP/ROWA UNEP The Regional Office for West Asia

1. Introduction

Energy is essential for the social and economic progress for any country. This of course will lead to a huge increase in energy demand, which can not be covered by fossil fuel for a long period of time. We are not only facing finite reserve of fossil energies, but also have to deal with the growing climate risks arising from their use. One of the main solutions to this dilemma is to exploit the enormous potentials of renewable energies, and by using manifold opportunities for increasing the energy efficiency with new technological solutions.

Several renewable energy technologies have made significant penetrations in the energy market. These technologies include solar (solar thermal and photovoltaic), wind, biomass, geothermal, hydro, wave, tidal and ocean thermal resources applications. The increased interest and rapid growth in these applications have been stimulated by a significant drop in cost over the previous decades, and technical improvement that have increased their efficiency, reliability and longevity. Other advantages of renewable energy applications are their modularity, large solar potential in developing countries especially in MENA region, favorable land-use features and ease of decommissioning.

The leading technical improvements in this field includes: manufacturing, innovations, improvements in solar system design, conservation, efficiency improvements, aerodynamic advances in wind turbine design and other mechanical and electrical innovations.

In this work, the renewable energy applications and its potentials in MENA region is discussed and the needed steps to exploit and apply these sources in the region is indicated.

2. Objectives

The main objectives of this work is to create awareness among governments, energy planners, policy makers and common people in MENA region to utilize renewable energy sources and to show them the economic, technological and environmental benefits of these resources. This work is concerned with data collection related to renewable energy sources in MENA region. It includes:

- y Brief explanation of the current situation of energy sector in MENA region.
- y Identifying renewable energy technologies applicable in MENA region.
- y Stating the potential assessment of these resources.
- y Identifying the current renewable energy situation in MENA Countries. This include,

RE share in energy budget, national targets for RE technologies share, barriers and constrains to RE deployment, bilateral and international corporation in RE programs, institutional framework, and regulatory and legislative framework.

- y Pointing out the role of United Nations and other international organizations working in this field in MENA region. y Highlighting research institutions, centers, organizations and companies working in this field in MENA region countries. y Presenting recommendations that will enhance renewable energy utilization.

3. Current Situation of MENA Energy Sector

The Middle East and North African region (MENA) play a key role for world energy today and will likely do so for decades to come. MENA region has about 57% of the world's proven oil reserve and 41% of proven natural gas resources. It has also a large electric power sector which is dominated by thermal power generation. On the end-use side, the energy sector is serving all other productive and service sectors, however the highest energy consuming sectors in the region are the transport, residential, then the industrial sector. It should be also needed to

mention that there is a great gap exists in the region between countries rich in natural resources and countries dependent on such resources. The following are some characteristics of this

sector:

- y Huge exploration and production activities counted in 2003 for 545 active seismic teams/month, mostly in Saudi Arabia and Algeria.
- y Thirty six and sixteen crude oil and gas discoveries in 2003, mainly in Egypt and Oman.
- y Large tanker fleet totaled in 2002, 5,170 thousand metric tons mainly in Kuwait, Saudi Arabia, UAE, Libya, Algeria and Iraq.
- y The capacity of oil refinery industry in the region in 2003 was 7.35 million barrels/day, with the highest capacity in Saudi Arabia, Kuwait and UAE.
- y Total oil exports counted for 12 million barrels/day, mostly from Saudi Arabia, UAE, Kuwait, Oman and Iraq.
- y The natural gas industry is considered an important source on the regional and international level where Qatar and Algeria export huge amounts of natural gas through pipelines or liquefaction by tanker to the international markets. This source is also developing in Egypt, Syria and other MENA countries.
- y In 2003, the total reserve of crude oil in the MENA region have reached 650 billion barrel, counting 57% of the world total reserve. However, the growth rate during 1996-2001 was about 0.3% only, compared to a growth of 4.8% for the natural gas reserve in the same period reaching 175,770 million m³.
- y In 2003, the primary energy production was 28.9 million barrels of oil equivalent/day (b.o.e/d). The oil and natural gas shares have reached 77.3% and 22.2% respectively. However the growth rate of N.G production was higher (3.3%) than oil production (2.2%).
- y The total consumed commercial primary energy in 2003 was about 364 million tons equivalent with a growth rate of 4.2% during 1996-2002. The share of energy resources in such consumption were 52.3%, 45.3% and 2.5% for oil, N.G and hydro resources respectively. These figures reflect the gradual increase in the share of N.G in the primary energy consumption during the 1990's.
- y Transport sector is the largest consumer of petroleum products, representing 43% of the total regional consumption.
- y The total electric power installed capacity in 2003 reached 115,828 MW. The highest were in Saudi Arabia (28,500 MW), Egypt (17,822 MW), UAE (12,172 MW) and Kuwait (9,763 MW).
- y The generated electricity in 2003, in the region was about 509.8 GWh, with Saudi Arabia having more than 29.4% of the total generated electricity, followed by Egypt, UAE, Kuwait and Iraq. The electricity consumption reached 443.6 GWh counting 87% of the total generated electricity.
- y Residential sector consume around 55.5% of the total electricity and 17.9% of the total oil consumed in the region.

- y Industrial sector consumes only 26% of generated electricity and 16.7% of total oil consumed.
- y The average primary energy consumption in the region reached 1,196 Kg.o.e/capita, compared to the world average of 1,523 Kg.o.e/capita. At national level, this average varied between as low as 26, 81 and 155 Kg.o.e/capita in Somalia, Sudan and Mauritania respectively and as high as 35,726, 14,536 and 9,532 Kg.o.e/capita in Qatar, Bahrain and UAE.
- y The average electricity consumption reached 1445 kWh/capita in the region compared to 2271 kWh/capita as world average.

4. Renewable Energy Applications and Potentials In MENA Region

MENA region enjoys a very high availability of indigenous, clean and non-depleted renewable energy resources, especially solar, wind, biomass and hydro (in some MENA countries). The benefits of developing renewable energy in MENA region or in anywhere else can be categorized in four headings: sustainability, environment, diversification, and economics. The following are some of these benefits:

- Renewable energies are sustainable sources of energy. Renewable technologies are designed to run on a virtually inexhaustible or replenish able supply of natural fuels. The primary long term benefits of renewable technologies is that once a renewable energy project has been constructed and fully operated, it become a permanent and low cost component of the national energy system.

- Renewable sources promote energy diversification. Development of a diverse portfolio of generation assets reduces a country dependence on any one particular form of technology or fuel.
- Renewable energy resources have the lowest environmental impact of all energy sources. Renewable energy technologies have a very small impact on environment compared to fossil fuel. The discharge of unwanted or unhealthy substance in air, ground and water commonly associated with other forms of energy use can be reduced significantly by using renewable energies.
- Renewable energies have values beyond they generate. Renewable energy systems are modular, flexible and can be installed anywhere and in any size. Investment in locally available renewable energy generates more jobs, greater earnings and higher output. The renewable energy industry provides a wide range of employment opportunities, from high technology manufacturing of PV components to maintenance jobs at solar thermal or wind systems.

Several renewable energy technologies and applications are of relevance to MENA countries. However, local and country-specific conditions including the availability of renewable energy resources, cost of conventional energy, capital cost of equipment, as well as other factors, influence the commercial viability of renewable energy technologies. The following sections present brief description of renewable energy technologies that could be utilized in MENA region and its applications.

4.1 Solar Energy

4.1.1 Solar Energy Applications

Energy from the sun travels to the earth in the form of electromagnetic radiation similar to radio waves, but in a different frequency range. In a clear day, the amount of solar radiation available at earth surface in the direction of the sun is typically $1,000 \text{ W/m}^2$. At any particular time, the available solar energy is primarily dependent upon how high the sun in the sky and the current cloud condition.

There are many ways that solar energy can be used effectively. Applications of solar energy can be grouped into three primary categories: thermal applications, electricity production, and chemical processes. The most widely used applications are for water heating. Uptake of electricity producing solar technologies is increasing for the application of photovoltaic (primarily) and concentrating solar thermal-electric technologies. Due to recent advances in solar detoxification technologies for cleaning water and air, these applications hold promise to be competitive with conventional technologies. The economics of solar energy has witnessed drastic improvements in the past few years. This improvement came especially in the form of increased conversion efficiency, and reductions in the cost of production. Table 1 shows some applications of solar energy, which uses it, and how the energy is obtained.

Table 1: Various applications of solar energy

What is solar energy used for?	Where is it used?	Which solar technologies are used?	Which secondary technologies are used? (where applicable)
Heating water	y Homes	y Glazed flat plate collectors y Batch collectors y Vacuum tube collectors	y Heat exchanger y Hot water tank
	y Commercial	y Liquid-based collectors	y Heat exchanger y Medium-large water tank
	y Agriculture	y Glazed flat plate collectors y Unglazed flat plate collectors	y Heat exchanger y Medium-large water tank
	y Aquaculture	y Unglazed flat plate collectors	y Medium-large water tank
Heating - Swimming Pools	y Outdoor pools	y Unglazed flat plate collectors	
	y Indoor pools	y Glazed flat plate collectors	y Heat exchanger
Heating - Ventilation Air	y All building types	y all Air-based collectors	y By-pass dampers y Make-up air handling units
Heating - Buildings	y Homes/ Commercial	y Advanced windows y Transparent insulation	y Appropriate building materials y Building design
		y Trombe wall	

		y Liquid-based collectors with home heating system	y Heat exchanger y Advanced thermal storage
	y Community-wide	y Liquid-based collectors y large-scale arrays	y Seasonal thermal storage y District heating network
	y Greenhouses	y Transparent insulation	
Cooling - Buildings	y Commercial	y Vacuum tube collectors y Glazed flat plate collectors	y Cooling cycles - various
Daylighting - Buildings	y Homes & Commercial	y Advanced windows y Transparent insulation	y Building design
Crop Drying	y Agricultural	y all Air-based collectors	
Electricity Generation - Off Grid	y Cottages / Seasonal homes	y Photovoltaics – small arrays	y Batteries y Power Invertors y Small wind turbines or microhydro
	y Power for remote equipment	y Photovoltaics – small-medium arrays	
Electricity Generation -Distributed Power	y All building types	y Photovoltaics – building integrated medium-scale arrays	y Power Invertors
	y Remote communities	y Photovoltaics – medium-scale arrays in a hybrid system	y combined with diesel generators on local grid
	y Electric Utilities	y Photovoltaics - large-scale arrays	y Power Invertors y Sun trackers
		y Power tower y Parabolic trough	y Steam turbine y High temperature thermal storage
Detoxifying - Water	y Industrial / Municipal	y Photocatalysts for oxidation	y UV lamps for backup
		y Thermal catalyts for oxidation with concentrating collectors	
Detoxifying - Air	y Commercial / Homes	y Photocatalysts for oxidation	y UV lamps for backup
Cooking food & H2O treatment	y Homes	y Solar cookers	

4.1.2 Solar Energy Potential The potential of solar energy resources is excellent in all MENA countries with an annual global solar radiation varying between 4 to 8 kWh/m². The region also enjoys high direct normal radiation and low average cloud cover.

The biggest resource in MENA is solar irradiance with a potential that is by several orders of magnitude larger than the total world electricity demand. The solar energy irradiated on the ground is equal to 1-2 barrels of fuel oil per square meter and year. This magnitude resource can be used both in solar thermal applications and photovoltaic systems. Thus, both distributed rural and centralized urban demand can be covered by solar energy technologies.

Solar Thermal Potential

Given the abundance of solar radiation resources in the MENA countries, solar water heating has the biggest potential in this region. Some issues such as low electricity tariff in some MENA countries, regulations, awareness, manufacture material pricing, availability of skilled labor...etc. could pose a barrier towards the wide scale adoption of this technology. Some MENA countries have witnessed a surge in the use of solar water heaters. Jordan, Egypt, Tunisia and Morocco are good examples of these countries.

Some international agencies such as Global Environment Facility (GEF) and the different United Nations programs gave financial and technical support which led to a noticeable increase in the sales of solar water heaters in MENA countries.

Producing electricity from concentrating solar power (CSP) has a good potential due to the fact that the incident solar radiation on all MENA region is higher than the required value.

Although CSP is possible at lower values, a threshold of 1,800 kWh/m²/y of annual direct normal

irradiance (DNI) was assumed to define the overall technical potential of CSP. The economic potential was considered to be limited by a DNI of 2,000 kWh/m²/y. This is adequate threshold to achieve in the medium term solar electricity costs competitive with conventional and other renewable energy sources for power generation. Table (2) and Figure (1) show that all MENA countries are qualified to this technology. They have DNI of greater than 2,000 kWh/m²/y.

Table 2: Direct normal and global horizontal irradiant of MENA Countries

Country	Direct normal irradiance kWh/m ² /y (for CSP)	Global horizontal irradiance kWh/m ² /y (for PV)
Bahrain	2,050	2,160
Iraq	2,000	2,050
Jordan	2,700	2,310
Kuwait	2,100	1,900
Lebanon	2,000	1,920
Oman	2,200	2,050
Qatar	2,000	2,140
Saudi Arabia	2,500	2,130
Syria	2,200	2,360
UAE	2,200	2,120
Yemen	2,200	2,250
Algeria	2,700	1,970
Egypt	2,800	2,450
Libya	2,700	1,940
Morocco	2,600	2,000
Tunisia	2,400	1,980

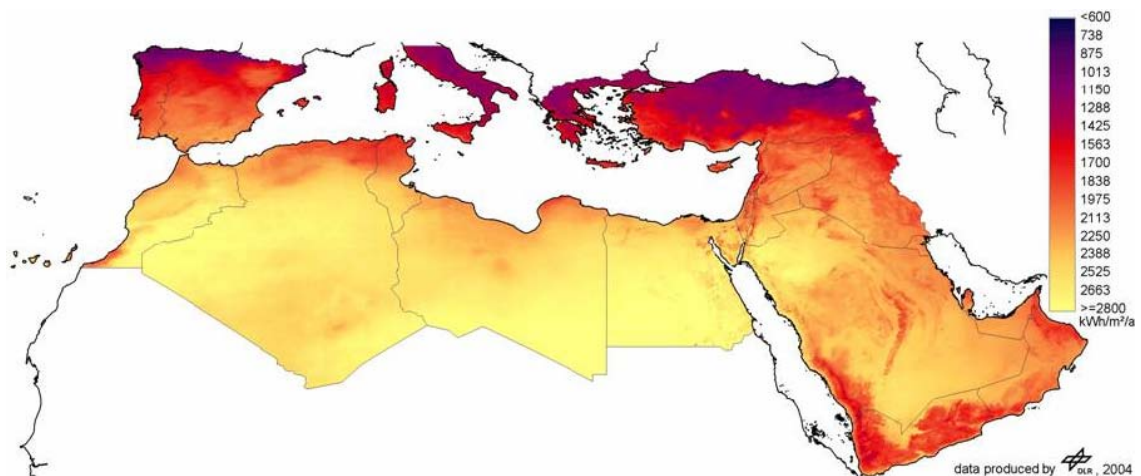


Figure 1: Annual direct normal irradiance of the year 2002.

[http:// www.dlr.de/tt/med-csp](http://www.dlr.de/tt/med-csp)

Photovoltaic Potential

Photovoltaic applications are in principal unlimited. There are no criteria for site exclusion for PV system,

as they can be installed almost everywhere. However, their expansion is still limited by their high investment cost. Studies show that this technology is the most promising technology in MENA countries. Table (2) and Figure (2) show that the global irradiation on surfaces in MENA countries is the highest in the world, which qualify PV system to operate efficiently in this region. All MENA countries have global incidence irradiance above 1,800 kWh/m²/year.

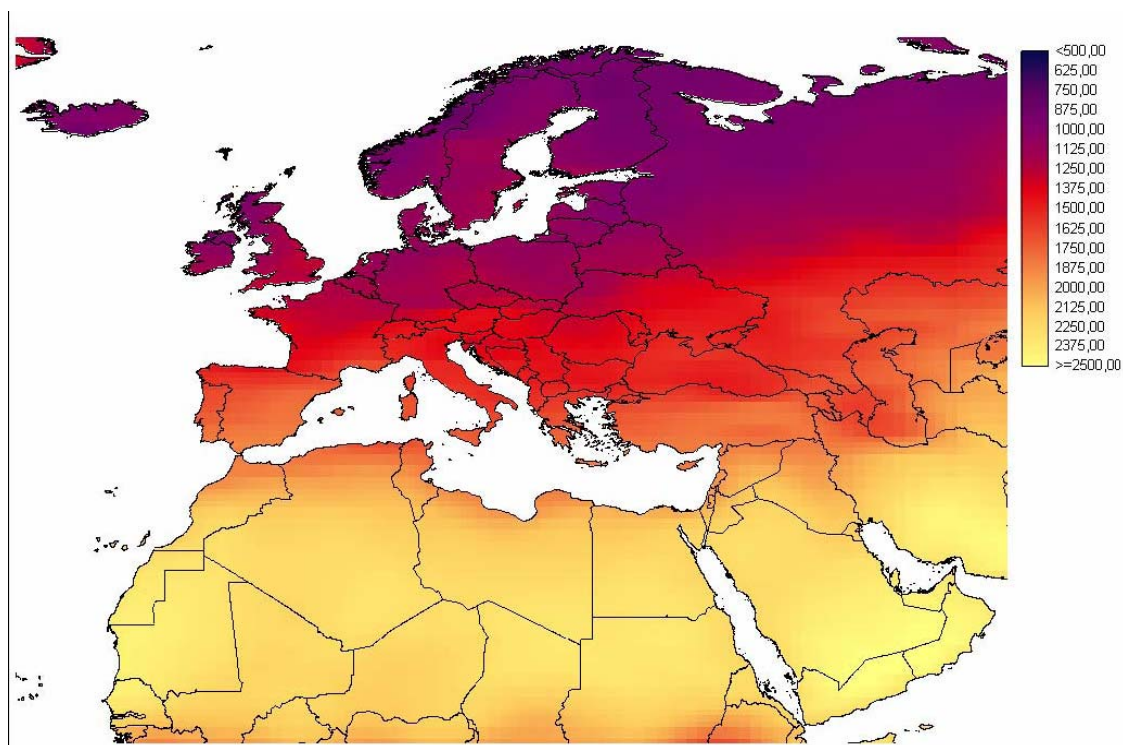


Figure 2: Annual global irradiation on surfaces tilted south with latitude angle in kWh/m²/year. <http://www.dlr.de/tt/med-csp>

PV is currently most competitive against traditional fossil fuel power generation in the case of small, isolated, and dispersed off-grid communities and applications.

In general, solar energy offers many advantages for many sectors in various locations around the world. For example, in villages that are located in remote areas in MENA countries, producing fresh water, heating water, and electricity from solar energy is technically the suitable method for rural life, where usually solar systems need low maintenance, which make them suitable for villages where population is usually poorly educated and can not handle the maintenance of a sophisticated system. The use of solar energy now in rural areas lead to import oil or other fossil fuels needed for conventional power generation, as well as making national budget savings by eliminating the need for extending the national power grid.

Some MENA countries are actively involved in national programs aiming at deployment of solar home systems for rural electrification. Morocco is a good example where there is a local solar PV industry that was established during the 1990's through support from the government. The National Office for Electricity (NOE) in Morocco has launched a solar home systems program that aims at electrifying, by 2007 over 150,000 households situated in isolated, off-grid locations.

PV water pumping may have good potential in several MENA countries. Egypt has one of the biggest water pumps market in the world. Although the market is currently dominated by diesel and electric water pumps, PV water pumps could actually replace conventional pumps in various locations.

With MENA countries, PV for telecommunications and for cathodic protection is widely spread. There are no specific estimates of the total installed capacity for these applications. PV for refrigeration which is used in health units of rural areas, and PV for ice making which could be a useful option for fishing villages located off the grid are good application. Several countries in MENA region are using these systems.

4.2 Wind Energy

4.2.1 Wind Energy Applications

Wind energy converts kinetic energy that is present in the wind into more useful forms of energy such as mechanical energy or electricity. The amount of potential energy depends mainly on wind speed, but is also affected slightly by the density of air, which is determined by the air temperature, barometric pressure and altitude.

For any wind turbine, the power and energy output increases dramatically as the wind speed increases. Therefore, the most cost effective wind turbines are located in the windiest area. Wind speed is affected by local terrain and increases with height above the ground, so wind turbines are usually mounted in tall towers.

Modern wind turbine generators cost about \$ 1,500/kW for wind farm that use multiple-unit arrays of large machines. Small individual unit cost up to \$ 3,000/kW.

The cost of generating electricity from wind is about 5 cents/kWh which is around the costs associated with conventional electrical facility, but wind energy costs are decreasing every year. In remote areas, generating electricity with diesel generators can exceed \$ 0.25/kWh, therefore wind energy in these areas is clearly cost effective.

Wind energy is an ideal renewable energy because it is pollution free, infinitely sustainable form of energy, does not require fuel, does not create greenhouse gasses, and does not produce toxic or radioactive waste. Each megawatt-hour of electricity that is generated by wind energy helps to reduce 0.8-0.9 tons of greenhouse gas emission that are produced by local or diesel fuel generated each year.

Table 3 shows some applications of wind energy, which uses it and how wind energy is obtained.

Table 3: Various applications of wind energy

What is wind energy used for?	Who uses wind energy?	How is wind energy obtained?
Using wind to generate electricity	<ul style="list-style-type: none"> • National and Provincial networks • Communities • Homes and farms • Process industries • Remote communities 	The wind powers a wind turbine that produces electricity.
Using wind to pump water	y Farms	The wind powers a wind pump that pumps water.

4.2.2 Wind Energy Potential

Wind energy is currently the least cost type of renewable energy technology. It is a huge source and according to reports from the United Nations, the total potential for wind energy alone can satisfy the electricity world demand by several times. The economic of wind energy has improved so dramatically in the past few years that in many developed countries today, wind energy is now the least expensive option among all energy technologies.

Several MENA countries, such as Oman, Egypt, and Morocco have good wind energy resources (wind velocity ranges from 8-11 m/sec). The full load hours per year for MENA countries is shown in table (4). Areas with annual full load hours over 1,400 h/y were considered as long-term economic potential. As we can see from table 4 that all MENA countries have good wind energy potential especially Oman, Egypt and Morocco.

Table 4: Wind energy potentials in MENA countries.

Country	Full load hours per year (h/y)
Bahrain	1,360
Iraq	1,789
Jordan	1,483
Kuwait	1,605
Lebanon	1,176
Oman	2,463
Qatar	1,421
Saudi Arabia	1,789
Syria	1,789
UAE	1,176
Yemen	1,483
Algeria	1,789
Egypt	3,015
Libya	1,912
Morocco	2,708
Tunisia	1,789

Energy from wind is directly related to the wind speed. In fact, the power density of wind goes up with the cubic value of wind speed. Therefore, there is a direct relation between leveled cost of energy and wind speed. The higher wind speed is, the more electricity will be produced per wind turbine, and hence the cost of energy per kWh goes down.

In general there are three size ranges of wind turbines used today in the market: grid-connected large turbines (1.5 MW-2 MW per turbine), medium size turbine (25 kW-150 kW) typically used in hybrid systems, and small wind turbines (less than 25 kW) used in remote, standalone applications.

Beside grid connected turbine, one of the most common applications for medium-scale wind energy at the time being is water pumping for remote areas used for agriculture and farming activities.

4.3 Biomass Energy

4.3.1 Biomass Energy Applications

Bio-energy is produced by the release of stored chemical energy contained in fuels made from biomass. Biomass is actually a product of solar energy that has been stored by the photosynthetic activity of plants. The plants remove CO₂ from the atmosphere and combine it with water to grow. Biomass is in many common waste products, such as: agriculture waste, forest waste, municipal waste, and food processing waste. Bio-energy has numerous benefits, among them are: it is a continuous source of energy because plant matter is renewed continuously by photosynthesis in a short re-growth cycle; biomass materials are often waste products from existing industrial activities that would otherwise be disposed of at considerable cost; due to the short replication cycle of biomass, using bio-energy does not increase atmospheric Carbon Dioxide; it has a positive impact on local economy; creating more jobs by growing biomass for use as a source of energy; and you can improve the environment. Table 5 shows some applications of bioenergy, who uses it, and how the energy is obtained.

Table 5: Various applications of biomass energy

Bioenergy Applications	Potential Users	Source of Bioenergy
Process heat and/or electricity	y Industrial	Pulping liquor and wood residues are burned in large boilers. Wood residues are processed using gasification to produce fuel gas. Forestry and agricultural residues are processed using liquifactionpyrolysis to produce Bio-oils.
	y Municipal	Municipal solid waste is burned directly or digested in a landfill to produce landfill gas. Municipal sewage is processed biologically in anaerobic digesters to produce biogas.
Space and water heat	y Residential	Chunk wood or pellets are burned in high-efficiency enclosed fireplaces, box-stoves, furnaces and cook stoves.
	y Commercial	Wood or agricultural residues are burned in furnaces to produce direct heat or to heat water in boilers. The biomass can be made into a more efficient fuel by transforming it into pellets, briquettes and logs.
Automobile fuel	y General Public	Straw and corn Stover are converted to sugars that are fermented to produce Ethanol.
Heavy vehicle fuel	y Trucking Industry	Oilseed is processed using extraction to produce Bio-diesel fuel.

4.3.2 Biomass Energy Potential

Biomass energy is used widely in direct cooking in rural areas of MENA countries. To calculate the potential of electricity yield from agriculture waste biomass a conversion factor of 0.5 MWh/ton was assumed. It was also assumed that 80% of this potential will be used in 2050. A possible increase or reduction in agricultural biomass production was neglected. The result is shown in table (6).

The amount of potentially available municipal waste was calculated in proportion to the growing urban population in each country. Assuming a constant municipal waste productivity of 0.35 ton/capita/year and waste to electricity conservation factor of 0.5 MWh/ton, 80% of this potential was estimated to be used until 2050. This is also shown in table (6).

For solid biomass (mainly wood) potential were assessed from global map of biomass productivity in tons/ha/year and from the existing forest areas of each MENA countries. Therefore, the rate of use of fuel wood potential was assumed to be 40% only until 2050. Annual full load hours are used as performance indicator. From the table we can see that biomass potential form MENA countries is only from municipal waste.

Table (6): Potentials of biomass in MENA countries

Country	Max use Agr. Res.	Max use wood	Max use Mun. Res.	Agr. Reduce Twh/y	Wood Twh/y	Mun Resd.	Total Twh/y
Bahrain	80%	40%	80%	0.0	0.0	0.22	0.22
Iraq	80%	40%	80%	0.0	0.8	7.8	8.6
Jordan	80%	40%	80%	0.0	0.05	1.55	1.60
Kuwait	80%	40%	80%	0.0	0.0	0.85	0.85
Lebanon	80%	40%	80%	0.0	0.0	0.83	0.83
Oman	80%	40%	80%	0.0	0.0	1.08	1.08

Qatar	80%	40%	80%	0.0	0.0	0.15	0.15
Saudi Arabia	80%	40%	80%	0.0	0.75	9.14	9.89
Syria	80%	40%	80%	0.0	0.25	4.41	4.66
UAE	80%	40%	80%	0.0	0.0	0.69	0.69
Yemen	80%	40%	80%	0.0	1.2	7.86	9.06
Algeria	80%	40%	80%	0.0	5.25	6.82	12.07
Egypt	80%	40%	80%	1.53	0.15	13.59	15.27
Libya	80%	40%	80%	0.0	0.2	1.52	1.72
Morocco	80%	40%	80%	0.2	7.5	6.55	14.26
Tunisia	80%	40%	80%	0.0	1.25	1.92	3.17

4.4 Hydroelectric Energy

4.4.1 Hydroelectric Energy Applications

Hydroelectric energy is a renewable energy source dependent upon the hydrologic cycle of water, which involves evaporation, precipitation, and the flow of water due to gravity.

The main components of a hydroelectric facility are the dam, the powerhouse that contains the mechanical and electrical equipment, and the waterways. Water from a lake or a river is controlled by a dam. Water is released from the dam to turn turbines, which drive generators that produce electricity.

Small scale hydroelectric facilities can be developed to provide electricity for a few houses or for small commercial applications. Small scale facilities can be built at relatively low costs.

Hydroelectric energy is a continuously renewable energy source with high efficiency of over 90%, none polluting, no fuel cost needed, low operating and maintenance cost, proven technology that offer reliable flexible operation, and have a long life.

4.4.2 Hydropower Energy Potentials

Hydropower remains the major source of renewable energy generation. Most hydropower is produced at large facilities built by governments. Hydropower production varies from year to year, depending on precipitation. Several countries in MENA region particularly Egypt, Lebanon, Iraq, Syria, Tunisia, Morocco and Algeria have hydro resources. The potentials of some of these countries are much higher than the generated power by this source. Several factors limits the use of this source; among them are constructing dams, reservoirs, canals, penstocks, powerhouses and switch yards, and these factors have a very high initial cost and also have big effects on the nature of the area and on the environment. Table (7) shows the total capacity and electricity generation of hydropower in MENA countries and the present of electricity produced by hydro to the total electricity produced in 2002. Small hydropower has also a potential in these countries.

Table (7): Electricity installed capacity and generation in 2002

Country	Total electricity capacity (million kW)	Hydropower capacity (million kW)	Total electricity generation (billion kWh)	Hydropower generation (billion kWh)	Share of hydro in electricity generation (%)
Bahrain	1.366	0.00	6.841	0.00	0.00
Iraq	5.310	0.91	29.339	0.607	2.04

Jordan	1.661	0.01	7.642	0.052	0.68
Kuwait	9.392	0.00	34.678	0.00	0.0
Lebanon	2.294	0.274	9.114	0.671	7.36
Oman	2.796	0.00	9.711	0.00	0.00
Qatar	1.88	0.00	9.497	0.00	0.00
Saudi Arabia	24.1	0.00	136.84	0.00	0.00
Syria	7.59	1.5	25.815	10.563	40.91
UAE	5.82	0.00	39.622	0.00	0.00
Yemen	0.81	0.00	3.586	00.00	0.00
Algeria	6.4	0.280	25.992	0.056	0.21
Egypt	17.628	2.678	81.621	13.855	16.97
Libya	4.71	0.00	14.424	0.00	0.00
Morocco	4.848	1.3	16.235	0.842	5.18
Tunisia	2.894	0.054	11.14	0.066	0.59
TOTAL	99.529	7.006	462.09	26.712	average 5.78%

4.5 Geothermal Energy

4.5.1 Geothermal Energy Applications

Geothermal energy uses steam or hot water in the earth's crust to power turbines or to heat water. The earth's crust contains a large amount of energy. The lava that flows from a volcano is a vivid example of the energy in the earth's crust. If the local geography has the right features, geothermal facilities can be installed. The facilities capture steam as it escapes from cracks or holes in underground rocks. Geothermal energy requires a source of temperature more than 100°C to drive a generating turbine.

The temperature of places below the earth surface is used to cool or heat air and water for buildings. For example, a heat pump can extract heat from underneath the ground to heat a building in winter. In summer, the pump can be reversed to provide air conditioning by moving hot air out of the building and down into the ground. Table 8 shows the applications of geothermal energy, explaining what it is used for, who uses it, and how is this energy obtained.

Table 8: Various applications of geothermal energy

What is energy in the earth used for?	Who uses energy in the earth?	How is the energy obtained?
Using the earth or bodies of water to provide heating or cooling	y residential y commercial y industrial	Fluid is channeled through pipes that are installed in the earth. The fluid passes through a heat pump that exchanges heat.
Diverting water from wells or lakes to provide heating or cooling	y residential y commercial y industrial	Water passes through a heat pump that exchanges heat.

Using steam or hot water in the earth's crust to generate electricity	y electrical facilities	Steam or hot water from the earth's crust is used to power turbines.
Using steam or hot water in the earth's crust to heat buildings and water	y municipal y commercial y industrial	Steam or hot water from the earth's crust is passed through pipes to supply heat to a specific location.

4.5.2 Geothermal Energy Potentials

Geothermal resources are very limited in MENA region, and geological explorations have not yet been completed. Only few sites of low potential resources have been identified in Egypt, Jordan, Yemen, Saudi Arabia, Morocco, Tunisia and Algeria.

5. UN Agencies, International, Regional and National Organizations working in the field of Renewable Energy in MENA Region

Most of the national renewable energy activities and implemented projects in MENA region were of R & D type and it is usually done by the academic community. All MENA countries established specialized organizations and research centers in the field and they also included renewable energy subjects in their university programs, but still almost all the activities were done by the support of the United Nations agencies or regional and international organizations. Some of the united nations, international, regional and national organizations are playing a key role in promoting renewable energy utilizations in the area. The United Nations agencies and international organizations and their activities are presented in Appendix1. The regional organizations and their activities are presented in Appendix2. The national organizations and their activities are presented in Appendix3.

6. Assessment of Renewable Energy Status

6.1 World Renewable Energy Status

Rerecord investment in new renewable energy capacity occurred in 2005—\$38 billion, up from \$30 billion in 2004. Almost all the increase was due to increased investment in solar PV and wind power. Germany and China were the investment leaders. The renewable industry captured investor's attention, as the number of renewable energy companies or divisions with market valuation greater than \$ 40 million increased from 60 to 85. The estimated total valuation of companies in this category was \$ 50 billion, double the estimate of 2004. Policies were extended, revised, and added by several EU countries and USA. Some developing countries took new steps in record numbers to incorporate renewables into their energy systems, including programs and new policy development. Among these countries are Brazil, Chile, Colombia, Egypt, India, Iran, Madagascar, Malaysia, Mexico, Morocco, Pakistan, Philippines, South Africa, Thailand, Tunisia, Turkey, and Uganda. Below are some of the world activities:

World Investment in Renewable Energy Technology

Technology shares of the \$38 billion annual investment were wind power (37 percent), solar PV (26 percent), solar hot water (11 percent), small hydropower (11 percent), biomass power and heat (7 percent), and geothermal power and heat (7 percent). An additional \$15–20 billion was invested in large hydropower.

The largest country shares of annual investment were by Germany, China, the United States, Spain, Japan, and India.

Investment in Germany and China increased from \$6 billion each in 2004 to \$7 billion each in 2005, mostly for wind and solar PV in Germany and for small hydro and solar hot water in China. Investment in large hydropower in China was an additional \$10 billion in 2005, with 7 GW of new capacity installed. Thus, counting large hydropower, China's investment was about \$17 billion).

The United States was number three, with about \$3.5 billion, followed by Spain and Japan, with more than \$2 billion each, and then India.

In addition to renewable energy capacity investment, the solar PV and biofuels industries made substantial capital investments in new manufacturing plant and equipment in 2005.

Investment by the solar PV industry in 2005 was an estimated \$6 billion and was expected to reach \$8–9 billion in 2006.

Investment in new biofuels production capacity worldwide exceeded \$1 billion in 2005 and may reach \$2 billion in 2006.

The value of biofuels production plants under construction and announced construction plans through 2008 exceeded \$2.5 billion in the United States, \$3 billion in Brazil, and \$1.5 billion in France.

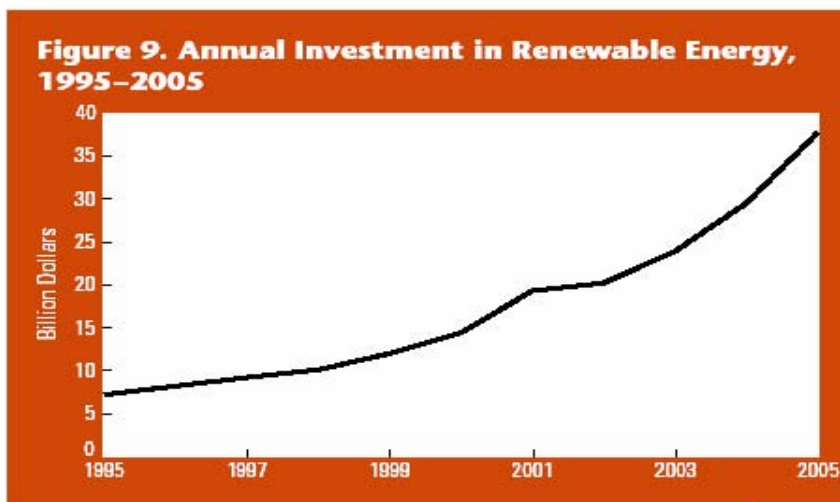
Development assistance for renewables investments in developing countries continued at a slightly faster pace in 2005, as increased commitments and special funds came into play.

German development bank (KfW) committed €137 million (\$170 million) to renewables in developing countries in 2005.

The World Bank Group committed \$150 million to renewables (excluding GEF funds and carbon finance) plus \$420 million for large hydropower, both increases from 2004.

The Global Environment Facility continued as in 2004, with \$100 million committed, about half of that for World Bank projects and the rest for other agencies.

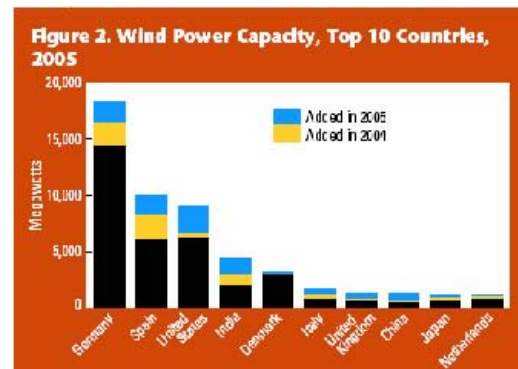
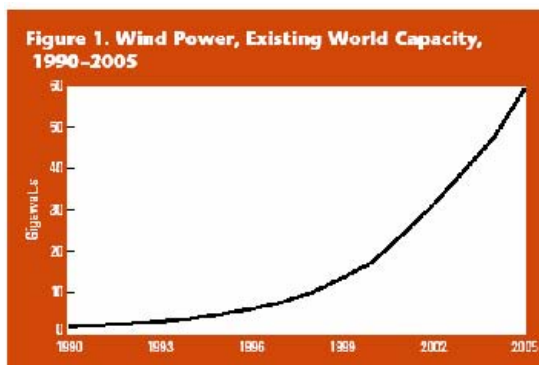
In addition, the “Special Facility for Renewable Energies and Energy Efficiency” announced at the “Renewables 2004” conference by the German government was launched in 2005 with funding of €500 million (\$625 million). This facility will provide concessional loans to public agencies through 2009 for investments in countries



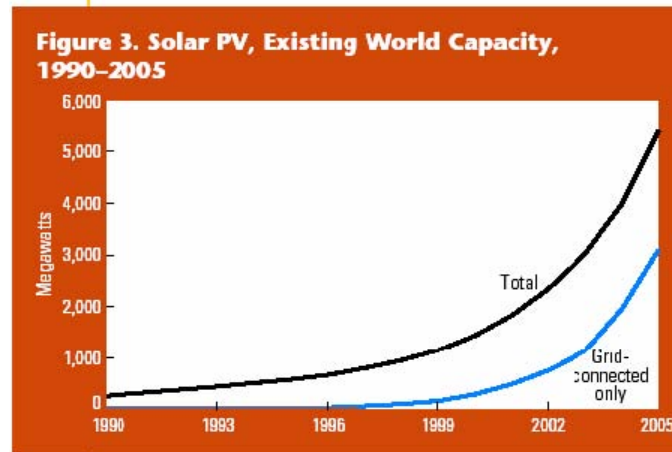
Reference: REN21 renewables global status report 2006 update

World Renewable Energy Market

Wind power registered the second highest added capacity, almost as much as large hydropower, with existing capacity growing 24 percent to reach 59 GW. More than half of global wind power additions were in three countries: the United States (2.4 GW), Germany (1.8GW), and Spain (1.8 GW). India jumped ahead of Denmark into fourth place in terms of total installed capacity, adding 1.4 GW in 2005. Strong growth took place in China, with 0.5 GW added to the previous existing 0.8 GW. Offshore wind installations grew by at least 180 megawatts (MW). Ten countries added over 300 MW of wind, up from five countries that did so in 2004.

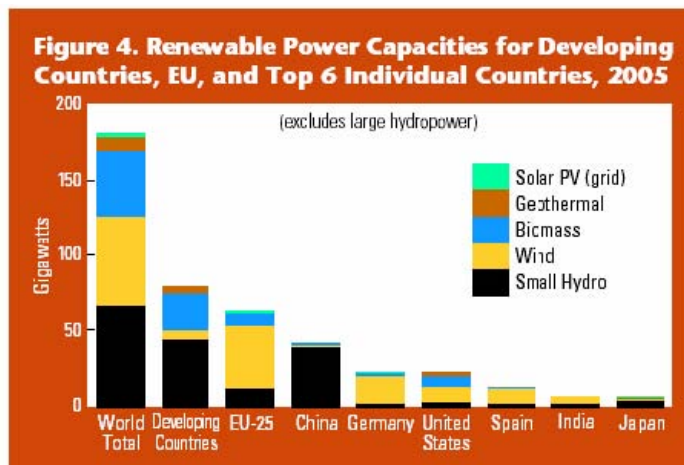


Grid-connected solar photovoltaic (PV) continued to be the fastest growing power generation technology, with a 55 percent increase in cumulative installed capacity to 3.1 GW, up from 2.0 GW in 2004. More than half of the annual global increase occurred in Germany, which saw over 600 MW of PV installed in one year. Grid-connected solar PV increased by about 300 MW in Japan. German cumulative PV capacity exceeded Japan's for the first time. Including off-grid applications, total PV existing worldwide increased to 5.4 GW, up from 4.0 GW in 2004.



Reference: REN21 renewables global status report 2006 update

Overall, renewable power capacity expanded to 182 GW, up from 160 GW in 2004(excluding large hydropower). The top six countries were China (42 GW), Germany (23 GW), the United States (23 GW), Spain (12 GW), India (7 GW), and Japan (6 GW). The capacity in developing countries grew from 70 GW to 80 GW, with China (small hydro) and India (wind) leading the increase. The developing-country share thus remained constant compared to 2004, at 44 percent.

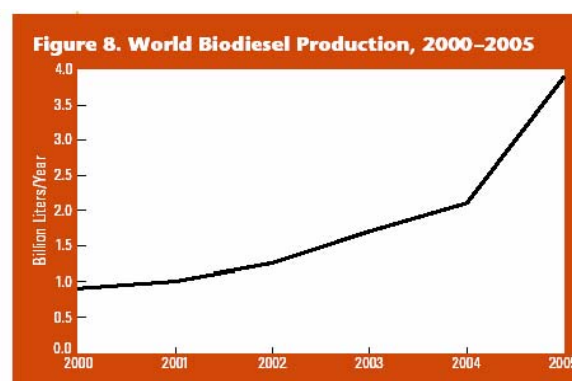
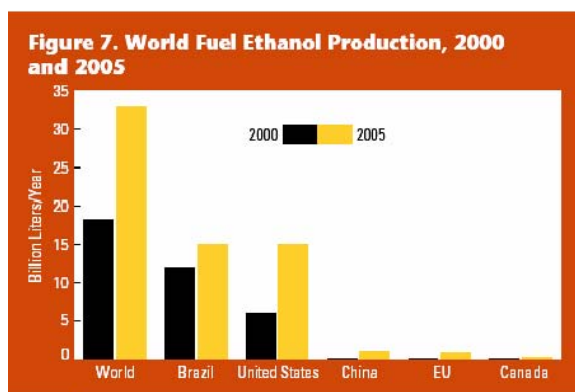


Reference: REN21 renewables global status report 2006 update

Including large hydropower, renewable power capacity reached 930 GW in 2005. Large hydropower

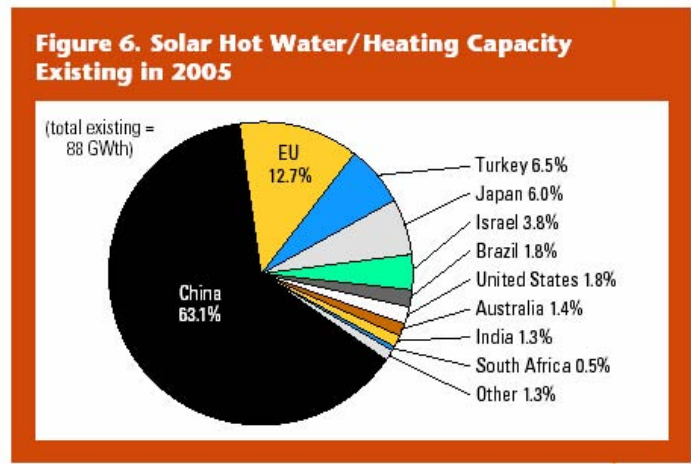
increased by an estimated 12–14 GW in 2005, led by China (7 GW added), Brazil (2.4 GW added), and India (over 1.3 GW added). Small hydro increased by 5 GW to total 66 GW worldwide, with 38.5 GW existing in China alone as the boom in small hydro investment there continued. Geothermal power saw continued growth as well, with contracts for an additional 0.5 GW in the United States and plants under construction in 11 countries.

Biomass power generation and heat supply continued to increase at both large and small scales, with an estimated 2–3 GW power capacity added in 2005, bringing existing biomass power capacity to about 44 GW. Annual increases of 50–100 percent or more in biomass power production were registered for 2004 in several OECD countries, including Germany, Hungary, the Netherlands, Poland, and Spain. Other increases of 10–30 percent were registered in Australia, Austria, Belgium, Denmark, Italy, South Korea, New Zealand, and Sweden. There is an increasing proliferation of small projects in developing countries, such as Thailand’s “small power producers” program, which resulted by 2005 in 50 biomass power projects totaling 1 GW and several small-scale biogas power projects. Ethanol production increased to 33 billion liters in 2005, up from 30.5 billion liters in 2004—an 8 percent increase, with most of this in the United States. Fuel ethanol production in the United States caught up to Brazil’s for the first time, growing by 15 percent in 2005, as both remained the dominant producers. Fuel ethanol consumption in Brazil was fairly stable, supplying 41 percent of all motor vehicle fuel (non-diesel) sold, about the same as in 2004. Brazil’s vehicle market saw the continuing growth of “flex-fuel” vehicles, which attained a 70 percent share of the (non-diesel) vehicle market by 2005. The EU increased fuel ethanol production by 70 percent, although still at low levels relative to Brazil and the United States. Biodiesel growth far outpaced that of ethanol. Global production of biodiesel reached 3.9 billion liters, up from 2.1 billion liters in 2004. Biodiesel production increased by 75 percent in the EU, led by increases in Germany, France, Italy, and Poland, and tripled in the United States. Germany alone accounted for half of global biodiesel production in 2005.



Reference: REN21 renewables global status report Reference: REN21 renewable global status report

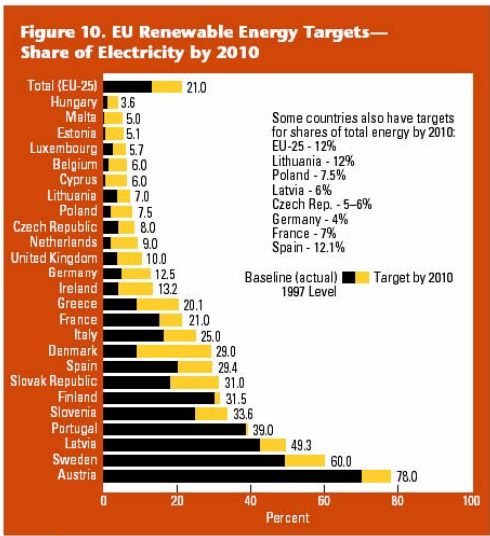
Existing solar hot water capacity increased by 14 percent to reach 88 GW(thermal), up from 77 GW in 2004, excluding unglazed swimming pool heating. 13 GW of new capacity was added in 2005. China installed 80 percent of that new capacity (10.5 GW). Solar hot water use increased by more than 1.3 GW in Europe. India and several other countries saw an acceleration of solar hot water installations.



Reference: REN21 renewables global status report 2006 update

Policy Targets for Renewable Energy

Policy targets for renewable energy were supplemented, revised, or clarified in a number of countries in 2005–06. Several countries revised or supplemented feed-in policies. The United States extended its production tax credit through 2007. A number of countries dramatically stepped up targets for biofuels and at least 10 states/provinces and six countries added blending mandates. Spain became the first country to mandate solar PV in new construction and the second country (after Israel) to mandate solar hot water in new buildings as a national policy. Initiatives for grid-connected solar PV multiplied, including California’s new policy for a million solar roofs by 2017 and programs in several U.S. states, Australia, China, and the EU. New city-level targets appeared, including a proposal by Tokyo to reach a 20 percent share of renewables in primary energy consumption by 2020.



Reference: REN21 renewables global status report 2006

Selected Examples of Government Incentives for Solar Energy

	Year	Incentive
Japan	1992	New Sunshine Program: Established to introduce renewable energy throughout the country. Targets were set and a net metering law enacted.
Japan	1994	70,000 Roofs Program: Initially, 50 percent of PV installation costs were subsidized and the annual budget (for R&D and market incentives) was \$18.3 million. In 2003, the subsidy was reduced to 15 percent and the budget allocation increased to \$186 million.

United States	1997	Million Solar Roofs Initiative: National program designed to facilitate the installation of solar energy systems on one million U.S. buildings by 2010.
Germany	1998	100,000 Roofs Program: Provided 10-year loans with reduced interest rates to buyers of PV systems. It ended early, in 2003, when all targets were met.
Germany	1999	Renewable Energy Sources Act (Feed-In Tariff): Customer applications receive 56¢ per kWh for solar-generated electricity sold back to the grid.
Italy	2001	10,000 Roofs Program: Regions offer different investment subsidies to promote building-integrated photovoltaic applications.
Japan	2003	Renewable Power Portfolio Standard: Requires that renewable energy be provided at a constant percentage of the electric power supply. This legislation aims for renewable energy to be 3.2 percent of the total by 2010.
China	2004	Allocation of \$1.21 billion to adopt solar and wind energy for power generation in remote areas of West China.

Sources: Arnulf Jager-Waldau, **PV Status Report 2003** (Ispra, Italy: September 2003); Paul Maycock, "China PV Booming," **Photovoltaic News**, May 2004; Jane Pulaski and Larry Sherwood, "Power Roofs," **Solar Today**, July/August 2004, pp.36-39; Janet L. Sawin, **Mainstreaming Renewable Energy in the 21st Century**, Worldwatch Paper 169 (Washington, DC: Worldwatch Institute, May 2004).

6.2 Renewable Energy Status in MENA Region

In spite of the high potential of renewable energy resources availability (solar, wind, biomass and hydro) in MENA region, small portions of these resources are exploited at present. However excluding biomass and hydro, renewables are negligible and represent less than 0.1% of the total energy supply and less than 0.3% of the electric power capacity. The current situation of renewable energy applications of MENA countries are as follows:

In Algeria: Renewable energy resources accounted for about 0.1 Mtoe in 2003. This represents 0.3% of total energy supply. It includes basically biomass wood and hydropower. The implemented renewable energy projects include:

- . 500 kW of PV electrification project for sixteen isolated villages in addition to many other small national projects in different PV applications basically in water pumping (Meda Program) and telecommunications.
- . 150 MW (Gas-Solar) power plant based on CSP (concentrating solar power) of which 30 MW is solar thermal.
- . 20 kW solar hydrogen pilot project.
- . 10 MW aero generators (wind energy) project.
- . 1000 m² of solar collectors used in hot water units installed in various parts of the country.

In Egypt: Renewable energy resources represent 11% of total energy supply in 2003. This may seem high, but if we exclude hydro and biomass wood, other renewables represent 0.1% of total energy supply. The total renewable energy generated power reached 2,929 MW (in 2003), 94% of which being large hydro. The rest is composed of 145 MW from wind, 36 MW from biomass, and 3 MW from PV. The renewable energy generated power represents 17.5% of the total electricity installed capacity and the renewable energy power generation was 13.2 TWh, representing about 15% of the total electricity generation. The renewable energy implemented projects include:

- . Preparing a code for energy efficiency in building which improves the thermal performance of buildings by using natural lighting and ventilation.
- . Preparing standards for refrigerators, washers, air conditioning equipment and other appliances.
- . Performing a high efficiency lighting project in Alexandria with the help of European Union.
- . Implementing the first wind farm in 1993 in Karadaqa with a capacity of 5 MW and connect it to the local electrical network.
- . Implementing two wind farms; one with a capacity of 60MW on two stages (30 MW each stage) in cooperation with the Danish Government, and the other one of 80 MW in cooperation with the German government. The total production capacity of these two wind mills in 2004-2005 was 522 MWh at average wind speed of 8.3m/sec. 30% of manufacturing of these two wind farms were done locally.
- . Implementation of a wind farm with a capacity of 85 MW was started in 2003 and completed in 2006. This project was done with the cooperation of Spain.
- . An agreement between Egypt and Japan was signed in 2003 to build a wind farm with a capacity of 120 MW. The project implementation started in 2006/2007.
- . Implementing a lighting project in Abulzain Sons Village which consists of 35 houses by using a hybrid system of wind/diesel. The system consists of 5 units; the capacity of each is 100 kWh.
- . Implementing a pioneer project in solar water heating for medium temperature in cooperation with the African Development Bank. The local manufacturing of this project reached 70%. Solar water heating is currently used in residential, commercial and tourist hotels buildings with varying degree of success. More than 500,000 m² of solar collectors have been installed so far.
- . Implementing an electricity generating project by using a compound cycle thermal system uses natural gas with a total capacity of 126.7 MW. 31.5 MW of this system is produced from concentrating collectors.
- . In biomass application, several projects have been implemented to produce methane from solid waste. Experiments prove that an amount of 120-150 m³ of methane gas could be produced from each ton of solid waste with an average heating value of 5.9 kWh/m³.
- . Several mechanical wind mills were manufactured by the Egyptian solar energy society. These mills were used for irrigation purposes and installed in different parts of Egypt. The capacities and locations of these mills are as follows: 1500 L/h in El-Saff village(Giza) in 1996, 1400 L/h in El-Kanatir El-kairyra in 1997, 700 L/h in Wadi El-Nation in 1998, 2400 L/h in Ras Ghareb in 1998, 3000 L/h in El-Tor Sinai in 1999, 9800 L/h in North Coast in 1999.

In Iraq: The current activities of Iraq in renewable energy field are limited only to hydro power. The actual share of electricity produced from hydropower represent only 2.04% of the total power generated. Several R&D demonstration projects were implemented during the period 1982-1990. Among these are:

- . 120 tons capacity solar cooling system used to cool the energy and environment research center building.
- . 10 tons capacity of solar cooling system of a house.
- . 24 kW of PV system for a vertical drainage pump.
- . 7 kW PV system for drinking water pump.
- . Manufacturing of 200 solar heaters.
- . Solar heating systems of three plastic houses with an area of 500m² each.
- . Numerous small PV installations used in communications and cathodic protection systems.
- . Building a factory for assembling PV modules in 1987 in cooperation, with Siemens Company, with a planned production capacity of 300 kW per year.

In Jordan: The National Renewable Energy Research Center in Jordan is one of the most active centers in the area. In spite of that the renewable energy share of the total energy supply is almost negligible. 7MW of hydropower electricity is currently produced which represent 0.68% of the total electricity production. Numerous renewable energy projects were implemented. Among them are:

- . 320 kW (4x80 kW) wind farm established in 1988 in cooperation with a Danish firm.
- . 1.52MW (5x225 kW) established in 1996 in cooperation with German Government under a program called ELDORADO.

- . 75-90MW wind IPP project is proposed by the Ministry of Energy and Minerals.
- . Locally manufactured mechanical wind mill used for water pumping were installed in different places in Jordan.
- . 30% of the houses in Jordan is equipped with solar water heaters, and a total collector area of 1.35 million square meter was installed until 2002.
- . More than one hundred PV systems were installed in remote areas.
- . 1MW of electricity biogas project is installed and owned, operated by Jordan Biogas Company, and is going to be expanded up to 5MW soon.
- . Completion of wind Atlas in cooperation with Danish experts.
- . In 2002 a feasibility study to install two wind farms, one in Fujiaj / Shobak and Wadi Araba with a capacity of 25 MW each were completed.

In Kingdom of Bahrain: The renewable energy activities are limited only to conferences and workshops. Two R&D research projects were implemented by the energy research center (the center does not exist now). These projects are:

- . A mobile solar powered Reverse Osmosis desalination unit with a capacity of 200 gallons per day.
- . A solar & wind power mobile generator with a capacity of 1.5 kW

In Kingdom of Saudi Arabia: Numerous R&D demonstration projects were conducted by the American-Saudi cooperation program (SOLERAS) during the last two decades of the previous century in the areas of solar cooling, solar desalination, solar thermal electricity and photovoltaic. Saudi Arabia is currently concentrating on energy conservation and management. Among the renewable energy implemented projects are:

- . 350kW PV System (2155MWh), Solar Village, 1981-1987, AC/DC electricity for remote areas.
- . 350kW PV system for hydrogen production (1.6MWh), Solar Village, 1987-1993, demonstration plant for solar hydrogen production.
- . Development of solar cooling laboratory (1981-1987).
- . 1kW solar hydrogen generator, Solar Village, 1989-1993, hydrogen production testing and measurement (laboratory scale).
- . 2kW solar hydrogen (50kWh), KAU, Jeddah, 1986-1991, testing of different electrode materials for solar hydrogen plant.
- . 3kW PV test system, Solar Village, 1987-1991, demonstration of climate effects.
- . 4kW PV system, southern regions of Saudi Arabia, 1996, AC/DC electricity for remote areas.
- . 6kW PV system solar seawater desalination, Solar Village, 1996-1998, PV grid connection.
- . PV water desalination (0.6m³ per hour), Sadous Village, 1994-1999, PV/RO interface.
- . Solar-thermal desalination, Solar Village, 1996-1997, Solar desalination of brackish water.
- . PV in agriculture (4kW), Muzahmia, 1996, AC/DC grid connected.
- . Long-term performance of PV (3kW), Solar Village, since 1990, performance evaluation.
- . Fuel cell development (100-1000W), Solar Village, 1993-2000, hydrogen utilization.
- . Internal combustion engine (ICE), solar village, 1993-1995, hydrogen utilization.
- . Solar radiation measurement, 12 stations, 1994-2000, Saudi solar atlas.
- . Wind energy measurement, 5 stations, 1994-2000, Saudi solar atlas.
- . Solar dryers, Al-Hassa/Qatif, 1988-1993, food dryers (dates, vegetables, etc.).
- . Two solar-thermal dishes (50kW), Solar Village, 1986-1994, Advanced solar stirling engine.
- . Energy management in buildings, Dammam, 1988-1993, Energy conservation studies.
- . Solar collectors development, Solar Village, 1993-1997, domestic, industrial, agricultural.
- . Solar refrigeration, Solar Village, 1999-2000, desert application.

In Kuwait: Numerous R&D renewable energy demonstration projects in solar pond, passive heating and cooling and PV were implemented before the Gulf War 1990. Kuwait now limited the work to energy

efficiency and energy management. Among the implemented projects were:

- . Two projects on solar cooling.
- . Numerous PV systems in street lighting, traffic signs, and communication.
- . Thermal energy storage project to be used during peak load.

In Lebanon: The main renewable energy resources is the hydropower. The total installed capacity of hydropower is 275 MW which represent 7.36% of the total installed electricity. The renewable energy implemented projects are:

- . 15 hydro-electric plants were installed with a total installed capacity of 275MW, but the actual capacity is 211.7MW.
- . 6 wind turbines with a capacity of 2MW were installed in 1999 by a private investor, but none of them were made operational.
- . Promotion of use of solar domestic water heaters is currently going in cooperation between the Ministry of Electricity and Water (MEW) and UNDP.
- . Proposing Energy Conservation Center by both MEW and UNDP.

In Libya: Several studies and R& D projects were implemented. These are:

- . The installation of 8000 units of solar water heaters.
- . A solar desalination project.
- . The experimental wind farm project in Zawara, in participation with the German Institute (GTZ).
- . The study of the real value of wind velocities, a project which covers the coastal area.
- . The installation of a wind system with a capacity of 1000 W.
- . The wind and solar radiation atlas in conjunction with the public electricity company.
- . The use of solar cells for electrical energy generation in conjunction with the General Electricity Company (GEC).
- . The use of heat transfer for generating electricity in conjunction with GEC.

In Morocco: Renewable energy sources represent 25% of the total energy supply. This seems very high in comparison with other countries in the region. However excluding noncommercial biomass and large hydro, renewables represent only 0.1% of the total energy supply. The total renewable energy electricity generation installed capacity reached 1324 MW, more than 93% of which being large hydro. The rest is composed of 30 MW small hydro (2.5%), 53 MW wind (4%), and 3 MW PV (0.5%). A national solar water heater program called PROMASOL was launched in November 2000 to improve quality and encourage the use of solar water heaters. The objective of this program was to increase the actual installed capacity from 60,000 m² to about 400,000 m². Morocco is also planning to build 50 MW solar thermal plant. The other renewable energy implemented projects are:

- . 140MW wind farm at Tangier.
- . 50MW wind farm near Tetouan.
- . 60MW wind facility at Tarfaya.
- . Supplying 16,000 rural homes with solar electricity.
- . Installing 111,332 solar water heaters in 2004.

In Palestine: Several renewable energy projects were implemented with the help of European countries. Among these projects are:

- . Installation of PV energy systems in remote areas. These were implemented with the help of the state of Baden Wurttemberg.
- . Supplying seven isolated clinic and one medical center with required electricity for lighting, refrigeration, and operating small medical equipment.
- . Promotion of PV technologies for electrification of isolated areas in ELDORADO project.
- . Development and optimization of a new process for desalination.
- . Solid waste management project for Azzoon Municipality.
- . Energy conservation and public lighting management in Tubas program.

- . Installation of five metrological stations.
- . Establishment of a biogas digester.
- . Solar water heaters are used in more than 70% of Palestine houses.
- . Implementing an electricity concentration project for encouraging the use of efficient lights (florescent lamps) in Jerusalem area.
- . In biomass application a study assessing the prospects for the use of different biogas technologies for electricity generation was conducted in cooperation with European firms as part of EU-financial project known INTERSIDEM.

In Oman: One R&D project and several small PV application projects were implemented. These are:

- . A solar thermal desalination project which was built to produce 1m³ of fresh water using solar collectors.
- . 352 kW of PV systems used for water pumping, lighting, communications & cathodic protection.

In Qatar: Two R&D projects were implemented. They are:

- . A pilot solar pond system.
- . Testing a solar multi-stage flash fluidized bed (MSF-FB) desalination unit using concentrating collectors.

In Syria: The hydropower is the only renewable energy resource which has a significant share in the electricity production. It is providing between 2000GWh and 4000GWh per year of electric power. The total installed power of hydro is about 1500 MW which represent 40.91% of the total installed electricity. In addition to that, The following projects were implemented:

- . Installation of 15,000-20,000 solar hot water systems.
- . Solar wind Atlas of Syria.
- . 80kWp of solar PV systems were installed in the entire country.
- . Technology transfer of 250kW single crystalline R & D and limited production facility, complete with indoor simulator. 15kWp of cells/modules were produced in 1999. The line was originally setup in cooperation with CEL/India.
- . The Japanese government has provided technical assistance for four pilot projects in PV to bring electricity to four villages near Aleppo. The project also includes good quality drinking water through water desalination. The total installed power is about 67kWp.
- . 150kW Nordex machine wind turbine installed at the northern part of AlBaath City in Donaitra area.
- . Wind generators for battery charging, water pumping (750W to 50kW) which are locally manufactured (since 1990) by a private company (SAC) located in Adra near Damascus. The wind generators are fully designed, manufactured and installed by this company.

In Tunis: The renewable energy resources represent 12% of the total energy supply which seems relatively high; however excluding biomass and large hydro, renewables represent only 1% of the total energy supply. Renewables utilization include 110,000 m² of solar water heater installed with the help of GEF, 2 MW of PV systems, 20 MW of wind and 0.1 MW of biomass. In 2003, the total renewable energy based capacity was 85 MW, almost 74% of which being hydro (39% large hydro, and 35% small hydro). This represent around 3% of the total electricity installed capacity. The implemented projects in renewable energy are:

- . Use of PV systems to supply electrification for approximately 10,000 homes and schools in rural areas, and the equipment of about 20 pumping stations.
- . Installing over 110,000m² of solar collectors used for water heating in residential and tertiary sectors.
- . Testing the use of animal excrement produced biogas among 50 family homes and one industrial unit.
- . Installing 10 MW-capacity wind power stations in the Cap/Bon area.
- . Distribution of 10,000 lids for home-made bread baking to reduce wood consumption.

In United Arab Emirates: Numerous small size solar projects for different applications such as telephone cabins, traffic lights, cathodic protection.. etc has been implemented. The government of Abu Dhabi has initiated a special project named MASDER to develop the renewable energy sector in the United Arab Emirates. The following are some of the implemented projects:

- . Build national abilities in utilizing renewable energy sources.
- . Estimate the renewable energy resources in UAE.
- . Provide a medium and long range of strategies for renewable energy use.
- . Promote the utilization of renewable energy in solar water heating and electricity production.
- . Studying the opening of a new renewable energy research center dealing with the promotion and encouraging the utilization of renewable energy sources.
- . Studies on politics, labor, economics, macro-economics, planning, petroleum and energy economic, gulf security and others.
- . Organize training, workshops and conferences in the subjects of interest.
- . Numerous solar energy projects using systems for different applications such as telephone cabins, traffic lights, cathodic protection, broader station...etc.

In Yemen: Several application projects were implemented by different international organizations. These projects include:

- . Telecommunication transmission uses 1200 panels in different parts of Yemen. Total installed peak power has reached 60.4kW.
- . Installing Al-Mahweet water pumping station with a capacity of 600W of PV used to pump 70-100m³/day.
- . About 100kWp of PV used for domestic application in rural areas.
- . A wind generator of 500 W and PV water pumping system of 43 W is performed by the Ministry of Electricity for rural electrification.
- . Electrification of schools and medical clinics by PV systems. The total peak power is around 20kW.
- . A production of about 500 units per month of solar water heater and possible increase up to 750 units is produced by a local solar heating manufacturing company.
- . A biogas project consists of 22 digester (family size), 10 animals sheds connected to digested. The project is installed in Al-Habeel Lahj governorate (Mansorah Village) by the Ministry of Electricity and the assistance of ESCWA.
- . Experimental wind turbine installed in Al-Mukha power station.
- . Small-Scale Household Solar Lamps for Selected Remote Villages in Socotra Island - German Embassy in Sana'a, and the Socotra Conservation Fund (SCF)
- . Care activities- biogas project.
- . Solar warm water heaters (German Embassy & Al Ekha Society, Taiz)
- . Ministry of Water and Environment – and the Geological Survey Authority and the German BGR – GEOTHERM Programme (Geothermal Energy)

From the previous activities we can conclude that:

Some of the regional and international organizations are playing key roles in promoting RE utilization in the MENA countries through their activities such as:

- . Implementing a series of studies on RE assessments, potentials, applications and environmental benefits.
- . Organizing expert group meetings, seminars, trainings, workshops and conferences.
- . Developing project proposals suitable for each country resources potentials and capabilities.
- . Financing some of the pilot and pioneering projects.
- . Formulating regional and sub-regional committees to foster regional cooperation.
- . Providing advisory services and technical consultations.
- . Helping in technology transfer from developed world to MENA countries.

During the past decades, most of the national renewable energy activities in the region were mainly linked to R & D activities of the academic community. Most of the projects were implemented by support of regional and international organizations and were not considered as an element of the national energy plan.

Excluding biomass and hydropower, the other renewable energy utilization shares is almost negligible and represents only 0.1% of the total energy supply and less than 0.3% of the generated electric power.

Biomass (wood for house hold as well as some agriculture waste) used in rural villages of MENA countries represents the main renewable energy source in these areas.

In Urban areas, the solar water heating account for less than 0.01% of the total energy supply. The total numbers of solar heating systems are 1000 m² of solar collectors in Algeria, 500,000 m² in Egypt, 1.35 million m² in Jordan, 8000 units in Libya, 11,332 m² in Morocco, 15000 – 20000 units in Syria, 110,000 m² in Tunis, 500 units per month in Yemen.

For electricity generation, RE resources share is only 7.32% of the total electricity capacity. Hydro power dominate the use of RE in power generation (7.04% of the 7.32%), therefore the share of other renewables (solar, wind & biomass) is 0.28% only. Table (9) shows the RE resources (solar thermal, solar PV, wind, biomass and hydro) share in the installed capacity of electricity generation for MENA countries.

Table (9): R E share in installed capacity of electricity generation for MENA Countries

Country	Total Installed capacity million KW	Total Installed hydro million KW	Other renewable sources Million KW					Total RE	% of Total RE	% of hydro only	% of other RE	Biomass
			Thermal	PV	Wind							
Algeria	6.4	0.28	0.00	0.001	0.01	0.00	0.011	0.291	0.455	0.438	0.171	
Egypt	17.628	2.678	0.00	0.003	0.145	0.036	0.184	2.862	16.23	15.09	1.04	
Iraq	5.31	0.91	0.00	0.00	0.00	0.00	0.00	0.91	2.04	2.04	0.00	
Jordan	1.661	0.01	0.00	0.0001	0.00162	0.001	0.00272	0.01272	0.76	0.60	0.16	
Bahrain	1.366	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Saudi Arabia	24.1	0.00	0.00005	0.0004	0.00	0.00	0.00045	0.00045	0.00186	0.00	0.00186	
Kuwait	9.392	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Lebanon	2.294	0.274	0.00	0.00	0.00	0.00	0.00	0.274	0.1194	0.1194	0.00	
Libya	4.71	0.00	0.00	0.001	0.000001	0.00	0.001001	0.001001	0.02	0.00	0.02	
Morocco	4.848	1.3	0.00	0.003	0.053	0.00	0.056	1.356	27.9	26.8	1.1	
Oman	2.796	0.00	0.00	0.00035	0.00	0.00	0.00035	0.00035	0.012	0.00	0.012	
Qatar	1.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Syria	7.59	1.5	0.00	0.000085	0.0015	0.00	0.001585	1.5015	19.78	19.76	0.02	

Tunis	2.894	0.054	0.00	0.002	0.02	0.0001	0.0221	0.0761	2.6	1.86	0.74
UAE	5.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yemen	0.81	0.00	0.00	0.00018	0.000018	0.00	0.000198	0.000198	0.02	0.00	0.02
Total	99.5	7.066	0.00005	0.011115	0.240	0.0011	0.2794	7.345	7.32%	7.04%	0.28%

6.3 National Targets for Renewable Energy Technologies Share

It is known that the targets are very important to the renewable energy development. It can guide policy makers during decision making and send important signal to investors, entrepreneurs and the public. If targets are met, renewable energy will improve investment, avoid fuel costs, increase revenue from fossil fuel, reduce greenhouses gases emissions, and increase employment rate. Table 10 summarizes the targets set up by some MENA countries. It is worth to say that most targets will not be met due to different obstacles and constrains.

Table 10: Targets for RE future share in some MENA countries

Country	Targets	
Algeria	- 2010 - 2020	5% power generation based on 400 MW solar capacity (for domestic market). 7,500 MW solar capacity (for domestic & export market)
Egypt	- 2010 - 2020	3% power generation from RE 850 MW wind installed capacity 150 MW solar combined cycle power station. 20% power generation from RE 3,500 MW wind installed capacity.
Iraq		No target foreseen at the time
Jordan	2010 - 2020	28% of national primary energy targeted to be met by local energy resources including renewables. 10% PES
Libya		No target foreseen at the time
Lebanon		No target foreseen at the time
Bahrain		No target foreseen at the time
Saudi Arabia		No target foreseen at the time
Qatar		No target foreseen at the time
Oman		No target foreseen at the time
Palestine		No target foreseen at the time
Kuwait		No target foreseen at the time
Syria	- 2010	5% of total energy consumption targeted to be met by solar & wind.
Morocco	- 2010 - 2012	12% contribution of RE technologies to national energy balance. 20% contribution of RE technologies to national energy balance.

Tunis	- 2010 - 2020 - 2030	300,000 m of installed SWH 310 MW of wind 3.5 MW of PV 30 MW of biogas 1,000,000 m of installed SWH 1130 MW of wind 50 MW of biogas 2,200,000 m of installed SWH 1840 MW of wind 80 MW of biogas 222
UAE		No target foreseen at the time
Yemen		No target foreseen at the time

6.4 Barriers and Constrains to RE Deployment in MENA Region

Despite the environmental, social, health and economic (in some applications) benefits of utilizing renewable energy technologies, their utilization in MENA countries is nearly negligible until now. They are facing many barriers and constrains to their large deployment in this region. These include financial, economic, institutional, political, technical and information barriers.

Financial and Economic Barriers

The most important issue is the economic performance of renewable energy technologies compared to the energy sources that presently dominate the energy market. The barriers in this area include:

- High specific cost of renewable energy technologies versus subsidized low fuel prices and electricity tariffs. This will cause a lack of willingness and/or ability to finance expensive investments in renewable energy technology because of high risk premiums.
- Taxes and customs on imported equipment. This will lead to increase the initial cost of renewable energy equipments.
- High transaction costs due to the small-scale and decentralized nature of some renewable energy technology applications. This will discourage the implementation of renewable energy projects.

Institutional and Political Barriers

Most of MENA countries are lack of an adapted and stable institutional and regulatory frame work for renewable energy utilization. These include: -Conflicting objectives and interests among policy-makers. This will shift power to fossil fuel lobbyists, hinder objective policy formulation, and lack of policy coherence.

- Institutions for renewable energy technology promotion are relatively powerless compared to institutions of fossil fuels. This will lead to government concentration on fossil energy.
- Unclear Ministerial responsibilities and insufficient coordination between government agencies responsible for renewable energy technology. This will lead to weak promotion of renewable energy technologies.
- Monopolistic energy market. This will lead to no guaranteed grid access and no fair feed-in tariffs for independent renewable energy power producers which lead to keep renewable energy technologies out of the market.

Technical barrier

The considerable international investment made in renewable energy R&D during the previous three decades has demonstrated the potential and technical availability of some of these technologies. Even though renewable energy technologies are technically proven, additional development is still required to

Palestine								x			x	x	
Qatar											x	x	
Oman											x	x	
Syria					x	x					x	x	x
Tunis	x	x											x
UAE												x	
Yemen											x	x	x

6.6 Institutional Framework

The interest of utilizing renewable energy resources started from the last two decades of the previous century. Most of MENA countries have established specified renewable energy institutions while in others, the renewable energy activities are mainly undertaken by universities, research institutes and in some cases by departments within the competence of different ministries. The situation by countries was shown in section 7.

It appears clearly that few existing national institutions are mandated with renewable energy planning and coordination. They are trying to grade up their capabilities in different fields including education, information, testing and certification, manufacturing and installation and maintenance of renewable energy systems. Among these institutions are CDER (Algeria), NREA (Egypt), CDER (Morocco), ANME (Tunis) and NERC (Jordan). But in general the present situation of the MENA countries institutional framework can be characterized by a lack of sufficient finance, coordination and cooperation between these institutions regionally and also nationally.

For regional and international institution few play an important role in promoting the regional cooperation in the field of renewable energy in the MENA region. Among these are ESCWA, UNEP, some UNDP offices, MEDENER, MEDREC, OME, and the World Bank (GEF).

6.7 Regulatory and Legislative Framework

During the last two decades of the previous century, most of the renewable energy activities in MENA region were mainly linked to R&D activities and were not considered as an internal element of national energy plans. All governments support the deployment of renewable energy technologies and some of them have introduced with various degree of success, national policies and strategies for promotion of renewable energy, however limited strategies and policies were adopted to facilitate the dissemination of renewable energy applications. Except in Algeria, there are no specific laws for promoting renewable energy technologies, but there are tax and fiscal measures and incentives adopted in some of the MENA countries.

In Egypt, Currently there is no legislation significantly promoting the use of renewable energy and no policy instruments or regulations set to promote the adoption of clean energy technologies. However the government has been committed over the years to allocate a budget for the government institutions and its R&D work in the various renewable energy technologies. This is also the case of all Middle East countries.

In Morocco, through a two promulgated laws has reduced (to 2.5%) its import duties on certain components for use in harnessing renewable energies. No other tax incentives or remissions are planned for the time being.

In Tunis, the regulatory framework relating to energy efficiency and to renewable energies in particular has steadily developed for the past two decades and at more rapid pace in recent years. The main tax and

financial incentives related to the development of renewable energies, such as provided by the various regulatory texts are:

- Subsidies to demonstration projects ranging to 50% of the cost with maximum of 100,000 TD.
- Subsidies to investment of 20% with maximum of 100,000 TD for SWH projects.
- Application of minimum custom duties 10% and tax exemption for equipment and products used for energy efficiency to which no similar equipment is manufactured locally.

In Algeria in addition to the law on Research (Law 98-11 on 28/08/98) additional three laws were issued, they are the Demand-side-Management law (Law 99-09 on 28/07/99), and the Electricity and Gas Law (Law 02-01 on 05/02/02) and the Law on Renewable Energy (Law 0409-14/08/04). The description of these laws is summarized in the three text boxes below. Table 12 summarizes the regulatory and legislative framework in MENA countries.

Law on Demand-Side-Management (Law 99-09 on 28/07/99)

The law on Demand-Side-Management provides the legal framework allowing for benefits to projects enhancing energy efficiency and promoting RE. In this context, the National Demand-Side Management Fund supports such projects which can also benefits from financial aid, tax cuts and exemptions from custom duties. RE projects can also draw benefits from the legislation an investments in activities deemed priority projects.

Law on Electricity and Gas Distribution (Law 02-01 on 05/02/02)

The law on Electricity and Gas provide incentives for electricity generated from RE’s and cogeneration. The law mentions preferential tariffs as well as premium to cover part of additional costs incurred from the production of RE’s as well as tax reductions. The law state that the excess cost associated to measures taken by Electricity and Gas Regulatory commission can be financed by the state or can be accounted for in the electricity and gas fund and be imputed by tariffs.

Law on Renewable Energy (Law 04-09-14/08/04)

The Law on Renewable Energy aims to set a concrete targets for the share of RE in energy balance every five years, contribute to the international effort of limiting greenhouse gas emissions, the preservation of fossil fuels to insure sustainable development, exploit local RE sources. To achieve these aims the law plans to set up a national program (up to 2020) that includes a multi-annual evaluation of RE use compared to fossil fuels, to introduce real promotion measures based on providing certification of power generation sources and giving a legal setting for green certificates and certified emission reductions, to create a national observatory in charge of promoting RE.

Table 12: A summary of regulatory and legislative framework in MENA countries

Regulations, Policies, Law	Algeria	Egypt	Morocco	Tunis	Remaining MENA countries

RE specific Law Feed-in tariff Tax and Fiscal incentives R&D RE Fund Subsidies	X X X X				
		X	X X	X X X (for SWH)	X

7. Recommendations

In spite of the high potential of renewable energy resources availability (solar, wind, biomass and hydro) in MENA region, small portions of these resources are exploited at present. However excluding biomass and hydro, renewables are negligible and represent less than 0.1% of the total energy supply and less than 0.3% of the electric power capacity. This is due to many barriers and constrains which affect the renewable energy utilizing processes. These barriers include technological barriers, subsidies for conventional forms of energy, a variety of regulatory and institutional factors, lack of skills or information, high initial cost of RE equipment, poor market acceptance, financing risks and uncertainties, and lack in industrial capabilities. To remove the barriers toward the utilization of renewable energy resources, the following are several suggestions and practical measures which can help in the adaption of renewable energy technologies in MENA countries energy market:

Political Support

The most important step toward the introduction of a comprehensive market for renewable energy technology is the need of a political (governments policy makers and public) support. Even economically competitive renewable energy technologies remain at a competitive disadvantage as a consequence of distortions in energy market created by decades of ongoing financial, political and structural support to conventional energy. Despite many calls for reducing support and subsidies from fossil fuel, in practical this prove politically difficult. Thus the suitable solution have tended to focus on increasing support and subsidies for renewable energy rather than reducing support and subsidies from fossil fuel.

Adopting Feed in Tariffs Standard

This can be provided for electricity from renewable sources that are delivered to the public grid. Normally, the revenues for electricity fed to the grid depend on the prevailing market price of electricity . Feed- in tariffs can take various forms, but the most common is a fixed rate per kWh delivered. Feed in systems for renewable energy sources are in place in various countries, including Denmark, Germany and Spain, and have contributed greatly to the growth of wind and solar electricity production in Europe.

Adopting Renewable Portfolio Standard (RPS)

It is advisable that each MENA country specifies a target of a minimum percentage of energy come from renewable sources. The RPS include two elements, a standard that specifies what percentage of generated electricity must come from renewable sources, and a renewable energy credits that the renewable energy generating company receive payment as a result of producing energy from renewable resources. Renewable energy portfolio standards are placed in the UK and in several states in the USA.

Financial Incentives

Financial incentives can help to get new technologies established in the market place by encouraging early adapters, scale up production levels, improving performance, and reduction of costs. A national renewable energy bank should be established to make long-term, low-interest revolving loans available for renewable energy development.

Adopting Renewable Energy Subsidies

A subsidy is government funding given to a private person or entity, intended to benefit the good of society. Energy subsidies make it cheaper to buy energy to increase access to electricity, providing a higher standard of living to society. To promote utilizing of renewable energy several policies could be adopted in these directions. Among them are:

Public benefits funding

One of the ways of encouraging a switch to renewable resources is to fund specific activities of renewable energy technologies to overcome market barriers and help commercialize new technologies.

Net metering

It is an important way to eliminate penalties for households and small business that elect to generate their own power from renewable sources (with, for instance, small wind turbine or roof top solar system). It allows customers who produce more electricity than they are using at a given moment to feed the surplus back to the utility and only pay for net electricity used over an entire billing period of year.

Fair transmission and distribution rules:

Some renewables can be sited in or around customer buildings where they can not only replace conventional generation, but help avoid transmission and distribution costs. New regulations or incentives could be used to encourage distributed generation.

Tax Incentives

Tax incentives help individuals and corporations justify purchasing, installation and manufacturing renewables energy technologies. Because renewables have high initial capital and installation costs, tax policies compensate investors with tax credits, deductions and all allowances. The tax incentives could include income, property and sales tax incentives. The policy should remain until the new technologies have increased their economy of scale and are cost competitive with alternatives in the sector. Once cost for renewable technologies decline, the tax credit level should decline. Additional examples of tax incentive are:

Production Tax Credit

Production tax credit is a policy driver to promote the development of electricity generated from renewable sources. A production tax credit provide the generator or owner of the renewable energy facility an annual tax credit based on the amount of energy that particular facility produced. The credit is ideally set at a level that makes it more cost effective to produce electricity from renewable resources than from fossil fuel.

Emission (Carbon) Tax Credit

Emission taxes can internationalize the costs caused by emissions into the price of energy. Essentially they make polluters pay for the damage (in the health, safety, security and environment) caused to society from their polluting activities. Carbon taxes have the same effect changing a tax on the quantity of carbon in the energy recourse. Renewables are cleaner because they are not carbon based. So the effect is that producers have the intensive of switch to renewable energy resources.

The Clean Development Mechanism

The clean development mechanism (CDM) is a flexibility mechanism established under the Kyoto Protocol. It allows governments or private entities in industrialized countries to implement emission reduction projects in developing countries and receive credit in the form of certified emission reductions or (CER). The purpose of the CDM shall be to assist developing countries in achieving sustainable development and to assist developed countries to achieve compliance with their quantified emission limitation and reduction commitments. Some MENA countries could benefit from this mechanism.

Research and Development

R&D is critical for maintaining the pipeline of innovative energy supply and end-use technologies. Industrial countries governments funded R&D has helped to advance a number of energy efficiency and renewable technologies during the past twenty years (examples are: wind turbine innovators, electronic lighting ballasts, high efficiency appliances, new window technologies etc). Including renewable energy subjects in the university curricula, supporting R&D activities in the universities and research centers and encouraging the collaboration among renewable energy organizations and research centers in MENA region and between these centers and international centers could have a wide range of benefits. These include cost and risk sharing, faster learning, increase access to global market, and better prospects for rapid deployment of innovative technologies.

Codes and Standards

Maximum greenhouse gases emission rules and minimum equipment efficiency standards are of a great help to energy sustainability. The minimum equipment efficiency standard could be set by either the remove of the least efficient products from the market place, leaving consumers to choose from an array of more efficient products with other desired options and features, or require that all new products meet a certain efficiency level on average. These standards have been successfully adopted in a number of countries for mass produced goods such as domestic appliances, air-conditioning equipment, motors, and lighting products. This should also include renewable energy equipment.

Testing & Labeling

Setting up appliances and renewable energy equipment testing laboratories which include test procedures, and testing and labeling programs can be very useful to inform the consumers about the relative energy efficiency and the environmental benefits of different products.

Energy planning

Energy planning can be used to develop focused or comprehensive energy strategies. To be successful, energy plans should contain suitable measures and actions adequate for achieving the goals, as well as monitoring and evaluation procedures. Selection of power generation technologies play a role in the level of environmental sustainability. Use of renewable energy technologies either to replace conventional off-grid power generation like diesel generator or to complement diesel generation would offer various environmental and economic benefits.

Regulatory and legislative framework

To promote the renewable energy deployment, national policies, strategies and laws should be adopted. These includes: issuing laws and regulations for inclusion of renewable energy technologies in energy budget, demand side management law, allocate budget for institutions working in the field and encouraging R&D in various renewable energy technologies.

Technology Transfer

Renewable energy technology and information transfer was recognized as a barrier to the market penetration of renewable energy technologies and products. The governmental and private sectors in MENA countries should continue efforts to eliminate the information transfer barrier by cooperation with industrial world especially Germany and other European countries in organizing educational programs, printing product literature and other initiatives.

Information, Education and Training

Informing consumers about the sources of power they are purchasing and the level of pollution being emitted can lead to greater consumer demand for cleaner power sources. Information programs would also improve high government officials and bankers awareness and understanding of the economic of renewable energy technologies, which could eventually lead to increased acceptance of the technology among project-financing sectors. Renewable energy organizations, universities and other non-government organizations

should offer training programs at different levels. Such training should include field study tours, lectures, and case studies. Conferences, seminars and workshops should be organized at the national, regional and international level with the purpose of raising awareness in renewable energy, reporting the latest development in the field, exchange information and presenting a success story or a case study.

8. Further Information

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- y Towards harmonization of environmental standards in the energy sector of ESCWA member states E/ESCWA/ENR/1999/21.
- y Regional renewable energy profile E/ESCWA/ENR/2001 (Part 1).
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- y Evaluation of the Algerian photovoltaic market potential. S. Labeled and E. Laven Zo. Progress in photovoltaic research Applications 11:63-72-2003.
- y Renewable Energy and development partnership EU-ME-NA for large scale solar thermal power and desalination in the Middle East and North Africa. Paper submitted to Sana'a Conference 21/22 April, 2004.
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- y Renewable Energy Country Profile for Lebanon. Sami Karaki & Riad Chedid. Paper submitted to Regional Collaboration Workshop on Energy Efficiency and Renewable Energy technology, 26/30 April, 2004. Beirut, Lebanon.
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- y Renewable Energy Potentials in Saudi Arabia. S. Said, I. El-Amin and A. Al-Shehri. Paper submitted to Regional Collaboration Workshop on Energy Efficiency and Renewable Energy technology, 26/30 April, 2004. Beirut, Lebanon.
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- y Renewable Energy in the MEDREC Countries, Current Situation, August 2005.
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- y http://www.eia.doe.gov/emeu/world/country/cntry_A6.html.
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- y http://www.canreue.gc.ca/teah_appl/index
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- y http://www.iset.uni-kassel.de/abt/w3_w/folein/magdeb030901/overview.htm
- y <http://www.dieoff.org>
- y <http://www.worldbank.org/website/external/countries>
- y http://www.nrel.gov/learning/re_basics.html
- y http://www.REN21_renewables_global_status_report2006
- y <http://www.inece.org/mena/>
- y <http://www.arabicnews.com>
- y <http://www.windpower.org/en/tour/wres/euromap.htm>
- y <http://www.solarserver.de/solarmagazin/anlageaugust.htm>
- y Renewables Global Status Report 2006 Update.

Appendix 1

UN Agencies and International Organizations working in Renewable Energy in MENA Region

1. UN Economic Commissions

1.1 United Nations Economic and Social Commission for Western Asia (ESCWA)

Website : <http://www.escwa.org.lb/index.asp>

Contact : P.O. Box 11-8575, Riad el-Solh Square, Beirut, Lebanon
Tel.: (961-1) 981301
Fax: (961-1) 981510

Objectives : ESCWA promotes economic and social development through regional and

sub-regional cooperation and integration and serves as the main general economic and social development forum within the United Nations system for the ESCWA region. It formulates and promotes development assistance activities and projects commensurate with the needs and priorities of the region and acts as an executing agency for relevant operational projects.

Members : Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen

Organizational Structure:

. **Leading staff:** Executive Secretary, Deputy Executive Secretary (subordinated: Statistics Coordination Unit), Secretary of the Commission, Special Assistant, UNIS/UNIC.

. **Governing body:**

-The Ministerial Session, takes place every two years
-The Standing/Preparatory Committee, the main subsidiary body of the commission
-Six specialized subsidiary inter-governmental committees, they report to the ministerial session of the Commission, assist the Commission in formulating its work programme in their respective area of competence, meetings: once every two years.

- . Statistics Committee
- . Committee on Social Development
- . Committee on Energy
- . Committee on Water Resources
- . Committee on Transport (annual meetings)
- . Committee on Liberalization of Foreign Trade and Economic Globalization

Nine Divisions are subordinated to the Deputy Executive Secretary:

-Administrative Services Division
-Conference Services Division
-Programme Planning and Technical Cooperation Division
-Globalization and Regional Integration Division
-ESCWA Centre for Women -Information and Communication Technology Division -Sustainable Development and Productivity Division -Economic Analysis Division -Social Development Division

- . **Advisory Committee:** Consists of heads of diplomatic missions in the host country of the Commission and a high level representative of the host country, works as a major means of communication between the member states and ESCWA Secretariat and

among the member states themselves.

Consultative Committee on Scientific and Technological Development and Technological Innovation, shall be composed of experts from public institutions, private sectors, civil society and research centers, shall convene at least once every two

years.

History : The Economic Commission for Western Asia (ECWA) was established at August 9th 1973 as the successor to the United Nations Economic and Social Office in Beirut (UNESOB). In 1985, the Commission was redesigned the Economic and Social Commission for Western Asia (ESCWA), in order to acknowledge more fully the social aspect of the Commission's activities.

Renewable Energies:

Part of the program of Modern Technologies for Employment Creation and Poverty Reduction is the Small Communities Project (SCP) in which the use of flat bed collectors for water heating is integrated - this program is currently working in three countries (Iraq, Syria, Yemen) (for further information: <http://www.escwa.org.lb/mtecpr/initiatives.asp?title=scp>)

The ESCWA Substantive Division for Sustainable Development and Productivity includes a sub-sector Energy for sustainable development which supports the region in areas of: energy accessibility, renewable energy, energy conservation and efficiency, clean fossil fuels as well as energy in transport (activities: supporting country leaders and decision makers integrating this topic into their policies and to increase their awareness with regard to critical energy issues; providing training materials and programmes on building institutional and human capacities in the management of energy resources and systems, promoting regional cooperation mechanisms for enhancing national and regional capacities in the field of energy), programmes: Regional Promotional Mechanism for Sustainable Energy Systems (RPMSES) (in coordination with UNCSD, all ESCWA members joined the mechanism, objective: to foster sub-regional and regional cooperation among member countries to utilize their mutual capabilities for accelerating the diffusion of renewable energy technologies to field applications, in support to the economic and social development, particularly in rural areas), Project on Disseminating Renewable Energy for Poverty Alleviation in ESCWA Member Countries (to enhance rural development opportunities through renewable energy dissemination, trough: RE assessment studies, an Awareness Campaign for rural areas, developing means for removing barriers facing RE applications, capacity building seminars and workshops, demonstration of RE, financially supported by OPEC).

The ESCWA also releases studies concerning to the prospects of energy efficiency and energy for sustainable development in the region, such as: Energy efficiency and cleaner fossil fuels uses in selected sector in selected ESCWA countries, Energy efficiency.

Energy Efficiency in selected energy-intensive industries, and Regional progress achieved on energy for sustainable development.

links to EU or international processes:

The specialized bodies cooperate with different international organizations such as: Effective Micro-organisms Research Organization of Japan, Federal Institute for Geosciences and Natural Resources of Germany (financial support for a project in the field of water resources), German Institute of Technical Cooperation (jointly organized three workshops in the field of water resources), Institute for Infrastructural, Hydraulic and Environmental Engineering of the Netherlands, WTO.

connections to regional and sub-regional organizations: The League of Arab States (jointly organization of meetings and workshops in the region in preparation for international conferences), Arab Gulf Programme for United Nations Development Organizations (has been financing a project concerned with community development in Arab rural areas and the participation of women and several meetings connected with other topics)

NGOs are also regarded as partners of the ESCWA

1.2 United Nations Economic Commission for Africa (ECA)

Website : <http://www.uneca.org/>

Contact : UN Economic Commission for Africa
Menelik II Ave.
P. O. Box 3001, Addis Ababa, Ethiopia
Tel: 251-1-51-72-00
Cable: ECA ADDIS ABABA
Fax: 251-1-51-44-16 (Addis Ababa)
1- 212-963 4957 (New York)
E-mail: ecainfo@uneca.org

Objectives :

-to support the economic and social development -to foster regional integration -to promote international cooperation for Africa's development

Members : all 53 African states are members

Organizational Structure:

- . ECA is one of five regional commissions under the administrative direction of United Nations (UN) headquarters.

- . Reports to the UN Economic and Social Council (ECOSOC).

- . Organized in six substantive programme divisions: development policy management, economic and social policy, gender and development, sustainable development, trade and regional integration.

- . **Services to support the member states:** policy analysis and advocacy; enhancing partnerships; technical assistance; communication and knowledge sharing; and supporting sub-regional activities.

- . **Five sub-regional offices** (Central-, East-, West-, North-, Southern Africa) – support of integration efforts towards the consolidation of sub-regional economic communities (RECs), attainment of the goals of NEPAD, serve as vital links between policy-oriented analytical work generated at headquarters and policy making at the field level, activities: workshops, training sessions, data collection and knowledge networking, priority issues in each sub-region, cooperation with the main RECs (such as: the Arab Maghreb Union (AMU), the Southern African Development Community (SADC), the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC), the Inter-governmental Authority on Development (IGAD), the Economic Community of West African States (ECOWAS), the Central African Economic and Monetary Community (CEMAC), the Economic Community of Central African States (ECCAS) and the West African Economic and Monetary Union (UEMOA)).

- . **The Big Table** to promote dialogue between African finance ministers and their OECD counterparts.

History : established in 1958

Renewable Energies: UN Energy/Africa two years work programme (cooperation of seven UN Agencies, NEPAD and the African Development Bank) aim: developing energy infrastructure and services in Africa, covers energy access, energy efficiency and rural energy, project examples: African Energy Database, African Power Pooling Assessment and the African capacity building for Clean Development Mechanism 3rd meeting of the economic commission for Africa.

Links to EU or international processes: related initiatives: African Development Forum (ADF), African information Society Initiative (AIS), African Water Information Clearinghouse (AWICH), Commission on HIV/AIDS and Governance in Africa (CHGA), ECA Science and Technology Network (ESTNET), Information Technology Center for Africa (ITCA), African Knowledge Networks Forum (AKNF), Population Information Africa (POPIA), Poverty Reduction Strategy Papers-Learning Group (PRSP-LG).

2. UNEP Regional Offices

The Regional Office for West Asia (UNEP/ROWA)

Website : <http://www.unep.org.bh/index.htm>

Contact : Dr. Habib Al-Habr Regional Director & Representative, UNEP/ROWA
P.O. Box 10880, Manama, Bahrain
Tel.: (973) 826600
Fax: (973) 825110/111
E-mail: Habib.El-Habr@unep.org.bh

Objectives : to ensure that the environmental priorities in the West Asia region get adequate representation in the global network programmes carried out by UNEP, and that global focus areas are reflected in the environmental work carried out in the countries of the region.

Members : Bahrain, Jordan, Iraq, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syria, United Arab Emirates.

Organizational Structure: UNEP in West Asia, based in Bahrain, is represented by a number of dedicated, professional experts led by the Regional Director and Representative also working for ROWA: the Deputy Regional Director, the Natural Resources Coordinator, Industry Regional Programme Officer, Ozone Depleting Substance Regional Network Coordinator.

Renewable Energies: Prepared an overview about RE in the Middle East North Africa Region for the MENAREC I conference. No current activities which are connected with RE.

Links to EU or international processes:

- . Close link to the League of Arab States (LAS), the Council of Arab Ministers Responsible for the Environment (CAMRE).
- . The Arab League Liaison Office (ALLO) was established in Cairo.
- . Additional links to: the Regional Organization for the Conservation of the Environment in the Red Sea and the Gulf of Aden (PERSGA), the Regional Organization for the Protection of Marine Environment (ROPME) and the Centre for Environment and Development in the Arab Region and Europe (CEDARE).
- . Supports the work of UNCCD, UNFCCC.

2.2 The Regional Office for Africa (UNEP/ROA)

Website : <http://www.unep.org/roa/index.asp>

Contact : Fax: 254 20 623928
P. O. Box 30552,
Nairobi
Kenya

Objectives :

- . To provide leadership and to encourage partnership in caring for the environment by inspiring, informing and enabling nations and peoples in Africa to improve their quality of life without compromising that of future generations.
- . To coordinate UNEP work in the region

Members : all 53 countries of the continent

Organizational Structure:

Director, Deputy Director, Secretary to AMCEN, Programme Officer, Programme Development Officer,

Natural Resources Officer, Regional Information Officer.

Renewable Energies: there are no projects which are directly connected with RE, but the topic seems to be part of the actions in the area of industry. Released the African Environment Outlook.

Links to EU or international processes:

. Connected to the African Ministerial Conference on Environment (AMCEN) and the New Partnership for African Development (NEPAD).

. There are also contacts existing to: the African Union, the African Development Bank, ECOWAS, the Inter-Governmental Authority on Development (IGAD), the Arab Maghreb Union (AMU).

2.3 United Nations Environment Programme – Mediterranean Action Plan (MAP)

Website : <http://www.unepmap.gr/homeeng.asp>

Contact : United Nations Environment Programme/Mediterranean Action Plan
(UNEP/MAP) 48. Vassileos Konstantinou Avenue, 11635 Athens, Greece Tel. 30
210 7273100 (switchboard) Fax: 30 210 7253196/7 E-mail:
unepmedu@unepmap.gr

Objectives : to meet the challenges of protecting the marine and coastal environment while

boosting regional and national plans to achieve sustainable development.

Members : Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, the European Community, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Morocco, Serbia and Montenegro, Slovenia, Spain, Syria, Tunisia, Turkey.

Organizational Structure:

. The convention and its six protocols constitute the Barcelona System = MAP's legal framework.

. Contracting partners meet every two years on ministerial level.

. National Focal Points are senior officials appointed by MAP member countries to be responsible for the follow-up and coordination of MAP activities both at the regional and the national level – meet every two years to review the progress of MAP.

. Rotating Bureau of six representatives of the Contracting Parties elected at each Contracting Parties meeting, guides and advises the MAP Secretariat in the interim period between meetings

. The Athens-based MAP Coordinating Unit (MEDU) is the Secretariat of the Mediterranean Action Plan - responsible for the follow-up and implementation of the MAP legal documents, performs diplomatic, political and communications roles and activities, supervising the main MAP components as well as all Secretariat duties

. The Mediterranean Commission for Sustainable Development (MCSD) - set up as an advisory body to MAP in 1996, with a unique structure, is a think-tank on policies for promoting sustainable development in the Mediterranean Basin – no special connection to RE (focus on coastal management, managing water demand, indicators, tourism, information/awareness, industry, urban development and trade.

. The Programme for the Assessment and Control of Pollution in the Mediterranean Region (MED POL) - represents a key tool for the reduction of land-based pollution.

. Six MAP Regional Activity Centres (RACs) - each offering expertise in specific fields of action.

History : the “Convention for the Protection of the Mediterranean Sea against Pollution” (Barcelona Convention – adopted in 1976) entered into force in 1978 amended by the Contracting Parties in 1995 and recorded as the “Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean” (entered into force 9 July 2004).

Renewable Energies:

. The main interest is connected with questions of marine and coastal areas, but RE are added as one field of action:

. To identify the best available and environmentally sound techniques and best environmental practices, prioritizing the aspects of availability, accessibility, cost and effectiveness, especially in the production and use of energy,

. To promote the development and application of programmes for the transfer, adaptation of and expertise in appropriate technology, prioritizing clean and safe technologies and taking into account the additional costs involved

. To develop and implement programmes to reduce polluting emissions and monitor industrial residues.

. Promote and facilitate the use of new and renewable sources of energy in domestic, public and private sectors.

Measures:

- Encourage town decision-makers to apply sustainable development policies.
- Promote active urban policies for energy control, non-polluting transport, waste management, sustainable use of water, and the creation of urban amenities, paying greater attention to underprivileged districts.
- Develop and implement programmes for the rehabilitation of zones affected by recent hostilities.

Links to EU or international processes:

- . The Global Environment Facility is one of the main supporters.
- . Connected to different UN actions / organizations, such as UNEP, UNDP, UN Commission on Sustainable Development, UNESCO, UN Secretariat on the Convention to Combat Desertification.
- . Connections to the EU: European Commission Environment Directorate – General, EU-Mediterranean Partnership, SMAP, European Environment Agency.
- . Others: METAP, the Ramsar Convention on Wetlands.
- . And a long list of partner NGOs.

3. UNDP Offices in the MENA Region

(for all UNDP energy projects in the region compare: <http://www.undp.org/energy/projects/arab.htm>)

3.1 UNDP in Algeria

Website : <http://www.dz.undp.org/>

Contact

: 9A Rue Emile Payen Hydra Alger (16035) Algérie E-mail:
registry.dz@undp.org

Objectives : to offer technical help and international know-how to enforce national

capacities to reach the Millennium Development Goals for sustainable development

Organizational Structure:

-Resident Representatives -Programmes section -Administration section -Security section

History : the office opened in 1963

Renewable Energies: some environmental but no RE specialized programs

3.2 UNDP in Bahrain

Website : <http://www.undp.org.bh/undp/>

Contact : UN House 69, Road 1901, Hooraa 319

P. O. Box 26814 Kingdom of Bahrain Tel.: +973 311600 Fax: +973 311500

+973 311441 **Objectives :** focuses on sustainable human development in various

areas, notably in economic management, environmental conservation and human resource development.

Helping nations to build and share solutions in the areas of democratic governance, poverty reduction, energy and environment and HIV/Aids.

Organizational Structure:

-Resident Representative's Office -Operations Unit -Programme Unit -Information and Communication Unit -UN Information Center

History : Established in March 1972

Renewable Energies: -No RE specialized projects but: -Strengthening the capacity of the Environment Research Center at the University of Bahrain - National Environment Strategy and Action Plan for the Kingdom of Bahrain

3.3 UNDP in Djibouti

Website : <http://www.un.org.dj/UNDP/undp-index.html>

Contact : Boulevard Maréchal Joffre Plateau du Serpent République de Djibouti
B.P. 2001 Djibouti
Fax: (253)- 35 05 87
Tel : (253) 35 33 71 / 35 33 72 / 35 43 54
Email : registry.dj@undp.org

Objectives : to support Djibouti on its way towards the Millennium Development Goals.

Organizational Structure: -Resident Representatives -Programmes section -Administration section - Security section

Renewable Energies: No RE projects

3.4 UNDP in Egypt

Website : <http://www.undp.org.eg/default.aspx>

Contact : 1191 Corniche El Nil World
Trade Center
P.O. Box 982
11599 Boulac Cairo, Egypt
Tel.: +20 2 578 4840 6
Fax: +20 2 578 4847

Objectives : To support Egypt on its way towards sustainable development

Organizational Structure: –Resident Representatives Directorate –Human Development Strategies Unit
–Programme Unit –Coordination Unit –Information, Communication and Reporting Unit –
Resource Management and Project Operation Unit –Operations Unit **Renewable Energies:**
one programme to promote energy efficiency in order to reduce green house gas emissions
(1998 – 2005; US \$ 5.9 million, donors: GEF, UNDP and the Egyptian Government).

3.5 UNDP in Iraq

Website : <http://www.iq.undp.org/>

Contact : Focal Points

- . Governance: Annie Demirjian, Annie.Demirjian@undp.org
- . Mine Action: Kent Paulsson, kent.paulsson@undp.org
- . Economy/Employment: Janthomas.Hiemstra, Janthomas.hiemstra@undp.org
- . Electricity: Abdul Aziz, abdul.aziz@undp.org
- . Dredging/Wreck Removal: Paul Clifford, paul.clifford@undp.org
- . Water Sanitation: Rami Baroudi, rami.baroudi@undp.org
- . Health: Rami Baroudi, rami.baroudi@undp.org

Objectives : an in-depth assessment of Iraq’s reconstruction needs was completed by the United Nations Development Group (UNDG) and the World Bank Group, with assistance from the IMF.

Organizational Structure:

–communications officer (Francis Kinnon, Amman) –focal points:
governance, mine action, economy and employment, electricity,
dredging / wreck removal, water sanitation, health

History : since 1976

Renewable Energies: Main point are rehabilitation activities

3.6 UNDP in Jordan

Website : <http://www.undp-jordan.org/>

Contact : UNDP

P. O. Box 941631 Amman 11194
Jordan
Tel.: +962 6 566-8171/7
Fax: +962 6 567-6582
E-mail: registry.jo@undp.org

Objectives : Focus is to help the Hashemite Kingdom of Jordan to build and share solutions to the challenges of: poverty reduction, promoting good governance, protecting the environment and natural

resources.

Organizational Structure:

–20 staff members –Resident Coordinator / Resident Representative –Deputy Resident Representative –Policy Advisor –Programme and Resource Mobilization Manager

History : Since 1952

Renewable Energies: framework: Building Capacity for GHG Emissions Inventory and Action Plans in Response to UNFCCC Communications Obligations (to build Jordan’s capacity to comply with the communications obligations under the UNFCCC; US\$100,000 by UNDP/GEF). Reduction of Methane Emissions & Utilization of Municipal Waste for Energy in Amman (US\$ 5.5 M by UNDP/GEF, Government of Denmark & Government of Jordan).

3.7 UNDP in Kuwait

Website : <http://www.undp-kuwait.org/>

Contact

: UNDP Kuwait P. O. Box 2993, Safat 13030 Kuwait Tel.: (965) 475 1469/1482

(965) 475 1491 (965) 475 1493 Fax: (965) 475 1467 E-mail: registry.kw@undp.org

Objectives : to enlarge choices and meet development challenges, particularly unrealized

Millennium Development Goals, through knowledge, experience and resources sharing **focus:** democratic governance, poverty reduction, crisis prevention and recovery, HIV / Aids.

3.8 UNDP in Lebanon

Website : <http://www.undp.org.lb/>

Contact : United Nations Development Programme

United Nations House

7th Floor

Riad El-Solh Square

P. O. Box: 11-3216 Beirut – Lebanon Tel.: + 961-1-981301 Fax: + 961-1-981521/2 E-mail:

registry@undp.org.lb

Objectives : Enhancing national decision-making capacity for human development. promoting and implementing a rights-based approach to development through the promotion of equity, with a focus on poverty, productive employment, the environment, health and education, and the reduction of disparities between regions and groups.

Organizational Structure:

–Resident Representative / Resident Coordinator (including staff) –Communication Officer –Resource Management Support –Governance Section –Pro Poor Development Section –Energy and Environment Unit –Administration

History : Projects since 1960 resumed after war in 1992

Renewable Energies: the Lebanon Cross Sectoral Energy Efficiency and Removal to ESCO Operation (LCECP) project (total project budget: US\$ 5.4 million).
the Energy Efficiency Buildings project (total project budget: US\$ 494.000).
the Policy Assessment of Electricity Tariffs project

3.9 UNDP in Libya

Website : <http://www.undp-libya.org/>

Contact : 69/71 Turkia Street Tripoli-Libya P.O. Box 358 Tripoli Libya Tel: + 218 21 333 0852 / 56 Fax: + 218 21 333 7349 E-mail: registry.ly@undp.org

Objectives : discussions with the Libyan authorities have led to the identification of

development planning capacities, the structure of the economy and the management of decentralization as the main development challenges and priorities.

focus: capacity-building for sustainable human development and public sector reform, economic diversification, decentralization and local governance.

Organizational Structure:

–Resident Representative / Resident Coordinator –Programme Section –Administrative Section – Finance Section

Renewable Energies: improved national capacity for sustainable environment management and development (US \$ 800.000).

3.10 UNDP in Morocco

Website : <http://www.pnud.org.ma/>

Contact : Angle Avenue Moulay Hassan et Rue Moulay Ahmed Loukili Casier ONU
Rabat Chellah Maroc Tel : 212 (0) 37 70 35 55 Fax : 212 (0) 37 70 15 66 E-mail :
registry.ma@undp.org

Objectives : **focus:** consolidation of national capacities to reach the GDM goals, poverty

reduction, rural development and support of local governance, good governance, to improve the living conditions of the inhabitants through environmental protection and resource management.

Organizational Structure:

–Resident Representatives Office –Programme Section –Operations Section –IT Section

Renewable Energies: strengthening of the capacities in the Maghreb Region to enable the states to reach their Kyoto obligations ten projects to reduce GHG emissions solar heating project (43.270.000 \$) rural electrification, partly through REs (2.000.000\$)

3.11 UNDP Programme of Assistance to the Palestinian People

Website : <http://192.115.229.1/>

Contact : United Nations Development Programme – PAPP 4A, Ya'kubi St.,
P.O. Box : 51359, Jerusalem Tel.: + 972-2-6268200 Fax: + 972-2-6268222 E-mail:
registry.papp@undp.org

Objectives : to work on the fulfillment of the MDGs in the Palestinian Region. **focus:** Democratic Governance, Poverty Reduction, Crisis Prevention and Recovery, Energy and Environmental Policy, Access to Information and Communications Technology.

Organizational Structure: since 1993 average contribution of US \$ 40 per year two fully staffed offices (in Jerusalem and Gaza) implement projects in four main sectors: Environment and Infrastructure, Agricultural and Economic Development, Sustainable Human Development and Governance

History : the programme started in 1978

Renewable Energies: main activities are connected to water supply and water quality. an Environment Action Plan is under implementation. Regional Environmental Monitoring offices and air quality monitoring stations have been established. no information available to which amount REs are included.

3.12 UNDP in Saudi Arabia

Website : <http://www.undp.org.sa/>

Contact : United Nations Building Ibn El-Nafis Street Diplomatic Quarter P.O. Box 94623, Riyadh 11614 Kingdom of Saudi Arabia Tel.: +966 1 488 5301 Fax: +966 1 488 5309 E-mail: registry@undp.org.sa

Objectives : a professional development partner enjoying strong partnerships with and respect of both government and civil society as a knowledge based organization.

Organizational Structure:

–Resident Coordinator/Resident Representative + supporting staff –Programme Coordinators and Associates –Operations Department

History : established in 1965

Renewable Energies: National Energy Efficiency Programme (NEEP), 2003 – 2006, to promote Energy Efficiency, not connected with REs. to support Saudi Arabia in responding to its UNFCCC commitments, US\$ 350.000.

3.13 UNDP in Somalia

Website : <http://www.so.undp.org/>

Contact : Springette, Off Lower Kabete Road, Spring Valley
P. O Box 28832,00200 Nairobi

Sandra Macharia Information Officer Tel:+254 20 4183640/2/3/4 Fax :+254 20 41831641 Email:
sandra.macharia@undp.org

Fatma Awale
Resident Coordination Officer
Tel:+254 20 4183640/2/3/4
Fax :+254 20 41831641
E-mail:fatma.awale@undp.org

Objectives : will seek to promote their fundamental rights both in respect of each other and in respect of the world outside, will in doing so call upon the Somalis themselves to adhere to basic principles of equality, non-violence, non-discrimination, and the dignity of the human person.

Renewable Energies: no activities in the area of REs

3.14 UNDP in Sudan

Website : <http://www.sd.undp.org/>

Contact : UNDP Sudan Gamaa'aa Avenue, House 7, Block 5

P.O. Box 913 Postal Code 11111 Khartoum - Sudan Tel.: (+249) 1 83 783 820 (+249) 1 83 773 121 Fax: (+249) 1 83 783 764 (+249) 1 83 773 128 E-mail: registry.sd@undp.org

Nairobi sub-office:
162 Wispers Av., Nairobi, Kenya
Tel: (254 20) 624831

Objectives : embarks upon implementation of Promotion of Good Governance and Social Inclusion for Peace building and Recovery broad objectives: local government and public administration; Promotion of Rule of Law and Human Security; sustained and inclusive recovery, reintegration and reconciliation, improved natural resource management.

Organizational Structure:

- Resident Representative + supporting staff
- Team Leaders: South Sub-office, Advisory Unit, Natural Resource Management, Governance and Rule of Law, Community Recovery and Reintegration, HIV/Aids

Renewable Energies: Barrier Removal to Secure PV market Penetration in Semi-Urban Sudan (Jan. 2004 – Dec. 2005; US\$ 1.310.000). Development of a National Adaptation Programme of Action (NAPA) (US\$ 250.000; to promote sustainable development paths that improve Sudan's adaptive capacity to future climate change, as well as to its growth in GHG emissions through integration of climate change issues and

concerns into national policies, strategies and development plans).

3.15 UNDP in Syria

Website : <http://www.undp.org.sy/>

Contact : Office of the Resident Coordinator Mezzeh, West Villas, Gazawi Str., No 8, Damascus
Tel: (963-11) 6129811 , (963-93) 214615 Fax: (963-11)6114541 E-mail:
syriawebmaster@undp.org

Objectives : to ensure that international cooperation programmes and internationally agreed development goals are brought in line with national development priorities, simultaneously ensuring that projects meet the twin needs of priority and sustainability.

Organizational Structure:

-Resident Coordinator/Resident Representative + supporting staff -Programme Unit -IT Support, Finance, Administration

History : established in 1962

Renewable Energies: assisted the Syrian Government in formulating the National Environmental Action Plan.

3.16 UNDP in Tunisia

Website : <http://www.tn.undp.org/>

Contact : 61, Boulevard Bab Benat
B.P. 863
1035 Tunis
TUNISIE
Tel : ++ 216 71 564 011
Fax : ++ 216 71 560 094
E-mail : registry.tn@undp.org

Organizational Structure:

-research and coordination unit
-governance and development unit
-natural resources and environment unit
-operations unit.

Renewable Energies: reinforcement of national capacities in the area of climate change (US\$ 300.000).

3.17 UNDP in the United Arab Emirates

Website : <http://www.undp.org.ae/>

Contact : United Nations House Baniyas Street, East 18/2, Plot No. 86 P.O. Box 3490
Abu Dhabi United Arab Emirates Tel.: (971) 2 641 3600 Fax: (971) 2 641 3535
E-mail: registry.ae@undp.org

Objectives : provides technical co-operation in building the human resources, institutions and policies that will help shape the future of the UAE and its people.

Organizational Structure:

-Resident Representative and UN Co-ordination Division -Development Services Division - Operational Support Services Division

Renewable Energies: no RE related activities offered by the Website

3.18 UNDP in Yemen

Website : <http://www.undp.org.ye/>

Contact : P. O. Box 551 Sana'a Yemen Tel.: (+967 1) 448605 Fax: (+967 1) 448841 E-mail: Registry.ye@undp.org

Objectives : playing a leading role in supporting Yemen's development priorities to achieve the Millennium Development Goals promoting good governance, sustainable use of natural resources and a human rights based approach to development.

Organizational Structure:

-UN Resident Coordinator/Resident Representative + supporting staff -programme section -governance and policy units -poverty unit -environment and energy unit -crisis prevention and recovery unit - programme finance monitoring unit -operations -personnel unit -administrative units **Renewable Energies:** currently no RE projects

4. International Organizations

4.1 World Bank

Website : <http://www.worldbank.org/>

Contact : Headquarters The World Bank 1818 H Street, N.W. Washington, DC 20433 U.S.A. Tel.: (202) 473-1000 Fax: (202) 477-6391

Objectives : to fight poverty and to improve the living standards of people in the developing world.

provides loans, policy advice, technical assistance and knowledge sharing services to low and middle income countries to reduce poverty.

Members :

. International Bank for Reconstruction and Development 184 members.

- . International Development Association 165 members.
- . International Finance Corporation 178 members.
- . Multilateral Investment Guarantee Agency 165 members.
- . Centre for the Settlement of Investment Disputes 140 members.

Organizational Structure:

- . The World Bank Group consists of five closely associated institutions, all owned by member countries that carry ultimate decision-making power: International Bank for Reconstruction and Development (IBRD), International Development Association (IDA), International Finance Corporation (IFC), Multilateral Investment Guarantee Agency (MIGA), Centre for the Settlement of Investment Disputes (ICSID).

- . Is run like a cooperative with the member countries as shareholders, the number of shares per country is based on the size of its economy (largest stakeholder: USA, 16.41% of votes).

- . Board of Governors: represents the government shareholders; consists of ministers (of Finance or Development,...); are the ultimate policy makers, meet once a year at the Bank's Annual Meeting.

- . Executive Directors: each of the five largest shareholders (France, Germany, Japan, the United Kingdom, the United States) appoints one Executive Director, the other members are represented by 19 Executive Directors; specific duties delegated by the Board of Governors.

- . The President: national of the largest shareholder, elected for a five year term, chairman of the Board of Directors, responsible for the overall management of the Bank.

Renewable Energies: during the G8 summit in Gleneagles (July 2005) the leaders called on the World Bank Group to work on financing a new framework for climate change, as a long-term perspective beyond 2012, the end of the Kyoto Protocol.

Nov 1994 – June 2004: Solar Water Heating Project in Tunisia (US\$ 20.9 million), GEF Project.

proposed: Solar Based Thermal Plant Project in Morocco.

MENA Environmental Strategy on Energy with monitorable indicators of implementation performance.

Links to EU or international processes: main financier of the GEF

4.2 Global Environment Facility (GEF)

Website : <http://www.thegef.org/index.html>

Contact : GEF Secretariat 1818 H Street, NW Washington, DC 20433 USA Telephone: (202) 473-0508 Fax: (202) 522-3240/3245 E-mail: secretariat@TheGEF.org

Objectives : the GEF is an independent financial organization that provides grants to

developing countries for projects that benefit the global environment and promote sustainable livelihoods in local communities.

issues: Biodiversity, Climate Change, International Waters, Land Degradation, the Ozone Layer, Persistent Organic Pollutants (POPs).

Members : 176 countries

Organizational Structure

- . Projects are managed by GEF Implementing Agencies: UNEP, UNDP, World Bank.
- . Seven Executing Agencies contribute to management and execution of GEF projects: the African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development, Inter-American Development Bank, International Found for Agricultural Development, UN Food and Agricultural Organization, UN Industrial Development Organization.
- . GEF funds are contributed by donor countries, in 2002, 32 donor countries pledged \$3 billion to fund operations between 2002 and 2006.
- . Since 1991, the GEF has provided \$4.5 billion in grants and generated \$14.5 billion in cofinancing from other partners for projects in developing countries and countries with economies in transition.
- . Focal Point – GEF representative, in each member country.
- . GEF Council – main body, 32 members who represent the member countries, all full size projects must be approved by the council
- . GEF Assembly – all member countries, meet every four years.
- . GEF Secretariat – serves and reports to the Assembly and the Council, coordinates the GEF activities.
- . Also: the Scientific and Technical Advisory Panel (STAP), the Monitoring and Evaluation Unit.
- . As well as participation of NGOs in GEF activities

Renewable Energies: the focal area climate change is the second largest group of projects are designed to reduce the risks of global climate change while providing energy for sustainable development:

- . the focal area Climate Change is organized in four areas: -removing barriers to Energy Efficiency and energy conservation -promoting the adoption of Renewable Energy by removing barriers and reducing implementation costs -reducing the long-term costs of low greenhouse gas emitting energy technologies -supporting the development of sustainable transport
- . from 1991 to 2004, GEF allocated \$1.74 billion to climate change projects and enabling activities, which was matched by more than \$9.29 billion in co-financing
- . proposal of three projects in the International Action Programme of the renewables 2004 conference in Bonn:
 - . Data and Structural Analysis on Renewable Energy Markets, Policies and Use in Developing Countries
 - . Finance for the Development of Markets for Renewable Energy in Countries eligible for GEF Support.
 - . Consultation Forum on Renewable Energy
 - . detail search for projects: <http://www.gefonline.org/home.cfm>

Links to EU or international processes: partnership with many bilateral aid agencies (GTZ,

KfW, other development agencies).

connections to the private sector.

big role of NGOs (such as: village organizations and other community based groups, academic institutions and foundations).

4.3 The Renewable Energy and Energy Efficiency Partnership (REEP)

Website: <http://www.reeep.org>

Objectives REEEP is a global public-private partnership that structures policy and regulatory initiatives for clean energy, and facilitates financing for energy projects. The partnership's goals are to reduce GHG emissions, deliver social improvements to developing countries and countries in transition, by improving the access to reliable clean energy services, and by making REES more affordable and to bring economic benefits to nations that use energy in a more efficient way and increase the share of indigenous renewable resources within their energy mix.

Members 212 Partners, comprising inter alia 36 governments (including Tunisia and Yemen), international organisations (including the African Development Bank, UNIDO, UNEP and the European Commission), national institutions (incl. the National Organisation for Development of the Palestinian Authority and the Palestinian Energy and Research Centre) as well as private businesses.

Organizational Structure:

- Meeting of Partners (MoP)** – is the assembly of all Partners and meets every other year. It is the highest decision making body within the REEEP structure. The Governing Board (GB) consists of a minimum of six and a maximum of 19 partners, reflects the multi-stakeholder nature of the partnership, and includes a geographical spread broadly representative of its activities.
- Governing Board:** is responsible for the conduct of the business of REEEP in accordance with its Statutes.
- Finance Committee (FC):** consists of all donors with an annual contribution to REEEP of at least EUR 70,000. It liaises closely with the donor community, business and the financial sector. The FC oversees the finances of REEEP's institutional bodies as laid out in the Financial Rules and Regulations. It gives recommendations to the Governing Board on financial aspects of the REEEP governing structure and work programme, as well as opportunities for fundraising.
- Programme Board (PB):** consists of sustainable energy experts from the REEEP regions together with donors. It defines and revises REEEP's programme prior priorities, offers guidance to the International Secretariat based on the feedback from project implementation and recommends projects to the Finance Committee.
- Steering Committees (SCs)** are groups of stakeholders in the regions consisting of experts, NGOs, governmental representatives and businesses. The Committees' main function is to contribute to the development of the regional REEEP action plans and selection of regional projects for funding.
- International Secretariat (IS)** is the central service hub of the partnership responsible for dissemination of information, servicing the bodies of the governance structure, and providing guidance and support to the regional secretariats.
- Regional Secretariats (RS)** have been established in eight countries. They are contractually bound to provide local support to the partnership, to ensure that regional demand drives the activities of REEEP, and that REEEP objectives are achieved in the regions.
- Regional Focal Points** are voluntary representatives of REEEP.

Renewable Energies:

In MENA countries REEEP is supporting two projects: one is implemented by the International Solar Energy Society (ISES), Italy with the purpose of increasing the use of RE and EE among cooperation programmes of the EU in all of the Mediterranean Area including the Red Sea and Middle East regions. The second project is implemented by Inergia and aims to pilot a trade of Tradable Renewable Energy Certificates (TREC) between Italy and North Africa by establishing the institutional framework for a national TREC system in Tunisia, establishing links to potential TREC buyers in Italy.

In its 6th project cycle to be implemented in 2007/8, REEEP will support two projects under its programme component to be funded jointly by the Governments of Italy and United Kingdom in Algeria, Egypt, Libya, Morocco or Tunisia.

Links to EU or international processes:

REEEP cooperates closely with several international organisations including the European Commission, the OAS, UNEP and UNIDO which are also Partners of REEEP. REEEP has established partnerships with inter alia the IEA, ASEAN, GNESD, MEDREP, GVEP, JREC, CLASP and the WWF. Furthermore, together with the Renewable Energy Policy Network for the 21st Century (REN21), REEEP has developed „reegle“ (www.reegle.info), an internet based information gateway for renewable energy and energy efficiency.

Appendix (2) Regional Organizations

1. League of Arab States

Website : http://www.arableagueonline.org/arableague/index_en.jsp

Objectives : the league has as its purpose the strengthening of the relations between the member-states, the coordination of their policies in order to achieve co-operation between them and to safeguard their independence and sovereignty; and a general concern with the affairs and interests of the Arab countries.

Members : The Hashemit Kingdom of Jordan, United Arab Emirates, Kingdom of Bahrain, Republic of Tunisia, Democratic and Popular Republic of Algeria, Republic of Djibouti, Kingdom of Saudi Arabia, Republic of Sudan, Arab Republic of Syria, Republic of Somalia, Republic of Iraq, Sultanate of Oman, State of Palestine, State of Qatar, Federal Islamic Republic of Comoros, State of Kuwait, Republic of Lebanon, Socialist People’s Libyan Arab Jamahiriya, Arab Republic of Egypt, Kingdom of Morocco, Islamic Republic of Mauritania, Republic of Yemen.

Organizational Structure:

- y **Council** – composed of the representatives of the members, one single vote per member, the task is to achieve the realization of the objectives of the league, decisions about international cooperation in order to create security and peace and to regulate economic and social conditions.
- y **Committees** for: Financial and Economic Affairs, Communications, Cultural Affairs, Nationality, Health, Social Affairs – composed of representatives of the member states to lay down the principles and extent of cooperation.
- y **permanent Secretariat-General**, which shall consist of a **Secretary-General, Assistant Secretaries** and an appropriate number of officials, the Council of the League shall appoint the Secretary-General by the Majority of two thirds of the states of the League, the Secretary-General shall have the rank of ambassador and the Assistant Secretaries that of Ministers Plenipotentiary.
- y **other organs:** Arab Economic and Social Council, Technical Committees, Specialized Ministerial Councils, Arab Specialized Organizations, Arab Unions, Joint Arab-Foreign Chambers of Commerce.

Renewable Energies: No direct information available organs with possible links to RE: Arab Economic & Social Council, Council of Arab Ministers for Electricity, Council of Arab Ministers for Environmental Issues.

Links to EU or international processes: no information available

2. African Union (AU)

Website : www.africa-union.org

Contact : PO Box 3243 Addis Ababa Ethiopia Tel: (251) 1- 51 77 00 Fax: (251) 1- 51 78 44

Objectives : inter alia, to rid the continent of the remaining vestiges of colonization and apartheid; to promote unity and solidarity among African States; to coordinate and intensify cooperation for development; to safeguard the sovereignty and territorial integrity of Member States and to promote international cooperation within the framework of the United Nations.

Members : all 53 African Countries

Organizational Structure: y the Assembly: composed of heads of state and government or their duly accredited representatives, is the supreme organ of the AU.

y the **Executive Council:** composed of Ministers or Authorities designated by the Governments of Member States, the Executive Council is responsible to the Assembly.

y the **Commission:** composed of the Chairperson, the Deputy Chairperson, eight Commissioners and Staff members; each Commissioner shall be responsible for a portfolio (Peace and Security; Political Affairs; Infrastructure and Energy; Social Affairs; Human Resources, Science and Technology; Trade and Industry; Rural Economy and Agriculture; Economic Affairs).

y the **Permanent Representatives Committee:** composed of Permanent Representatives of Member States accredited to the Union, charged with the responsibility of preparing the work of the Executive Council.

y the **Peace and Security Council (PSC)**

y the **Pan African Parliament:** organ to ensure the full participation of African

peoples in governance, development and economic integration of the Continent

y the **Economic, Social and Cultural Council (ECOSOCC):**

y advisory organ composed of different social and professional groups of the Member

States of the Union.

y the **Court of Justice**

y the **Specialized Technical Committees:** to address sectoral issues at Ministerial

Level (on Rural Economy and Agricultural Matters; on Monetary and Financial Affairs; on Trade, Customs and Immigration Matters; on Industry, Science and Technology, Energy, Natural Resources and Environment; on Transport Communication and Tourism; on Health, Labor and Social Affairs; on Education, Culture and Human Resources).

y **Financial Institutions:** African Central Bank, African Monetary Fund, African Investment Bank.

History :

- on 09.09.1999 the heads of state and government of the Organization of African Unity issued a declaration (Sirte Declaration) calling for the establishment of an African Union.

the Lome Summit (2000) adopted the constitutive Act of the Union.

the Lusaka Summit (2001) drew the road map for the implementation of the AU.

the Durban Summit (2002) launched the AU and convened the 1st Assembly of the Heads of State of the African Union.

Renewable Energies: the Commissions Directorate for infrastructure and Energy adds the connection between environmental issues and activities in the area of transport and energy but no concrete activities are mentioned for the Commissions Directorate on Human Resources, Science and Technologies one field of interest is the research on RE. the **New Partnership for Africa's Development (NEPAD)** in addition to plans connected with the energy supply and transmission the support of RE, especially hydro- and solar power are mentioned as goal in this area; planned RE activities: a task force to recommend priorities and implementation strategies for regional projects, including hydropower generation, transmission grids and gas pipelines; to establish a task team to accelerate the development of energy supply to low-income housing; to broaden the scope of the programme for biomass energy conservation from the Southern African Development Community (SADC) to the rest of the continent.

links to EU or international processes: together with the League of Arab States the AU established an Afro-Arab Cooperation

3. Cooperation Council for the Arab States of the Gulf (GCC)

Website : <http://www.gcc-sg.org/>

Contact : Kingdom of Saudi Arabia

P.O. Box 7153

Riyadh 11462

Tel.:+966 1 482 7777

Fax: +966 1 482 9089

Objectives : to effect coordination, integration and inter connection between the Member States in all fields, strengthening ties between their peoples, formulating similar regulations in various fields such as economy, finance, trade, customs, tourism legislation, administration, as well as fostering scientific antechanical progress in industry, mining, agriculture, water and animal resources, establishing scientific research centers, setting up joint ventures, and encouraging cooperation of the private sector

Members : United Arab Emirates, State of Bahrain, Kingdom of Saudi Arabia, Sultanate of Oman, State of Qatar, State of Kuwait

Organizational Structure:

Cooperation Council:

y highest authority: **supreme council** formed of the heads of member states, rotating presidency, one regular session per year, since 1998 one consultative meeting between the summits.

y **Ministerial Council:** composed of the ministers according to their special fields, Presidency is entrusted with the Member State that presided the last ordinary session of the Supreme Council, the members meet every three month with the possibility for additional meetings.

y **Secretariat General:** Secretary General (appointed by the council for three years, a second period is the maximum possible), including assistants and staff, to support the councils work, follow-up implementation, reports, to prepare the budgets, the whole staff is independent and acts for the joint benefit of the member states.

y **Consultative Commission:** formed of thirty GCC citizens (five from each Member States) chosen according to their experience and qualification for a period of three years, charged with studying matters

referred to it by the Supreme Council.

y **Commission for the Settlement of Disputes:** formed by the Supreme Council for every case on an ad-hoc basis in accordance with the nature of the dispute.

History : founded on May 25th 1981

Renewable Energies: coordination in electricity and water, shall coordinate and establish infrastructure projects, including power stations and water desalination plants, in order to attain joint economic development and link the existing economic activities, cooperation includes rationalization of electric energy and water consumption, unification of electricity and water standards and specifications, operation and maintenance, training, and exchange of information.

links to EU or international processes: GCC – EU joint council- in the joint communiqué of the last meeting (April 2005) environmental issues, the protection of the environment and the protection of natural resources are said to be part of the joint action, but without any specifications no further information about this part due to problems with the Website – will be added later.

4. Arab Fund for Economic and Social Development (AFESD)

Website : <http://www.arabfund.org/ENINDEX.HTM>

Contact : Mr. Abdulatif Yousef Al-Hamad
Director General / Chairman of the board of Directors
P.O. Box 21923 SAFAT
13080 Kuwait
State of Kuwait
E-Mail: HQ@ARABFUND.ORG
Tel.: (965) 48 44 500
Fax: (965) 48 15750/60/70

CABLE: INMARABI KUWAIT
TLX: INMARAB 22153 KT

Objectives : the purpose of the Fund is to contribute to the financing of economic and social development in the Arab states and countries.

Members : Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, Yemen. All members of the League of Arab States.

Organizational Structure: y is an **autonomous regional Pan-Arab development finance organization.** y the **Board of Governors** is the highest authority. y **Board of Directors:** consists of eight **Directors** and eight **Alternate Directors** who are elected by the Board of Governors for a two years period, guides operations in general and exercises powers delegates to it by the Board of Governors.
y **Director General:** chairman of the Board of Directors, elected by the Board of Governors for a five years period, is responsible for the conduct of operations and appointment of staff.

History :

the Economic and Social Council of the League of Arab States adopted the establishing of the AFESD on 16. May 1968.

the agreement was declared effective as of 18. December 1971.
first meeting of the Board of Governors was convened on 6. February 1972.
the Fund commenced operations in early 1974.

Renewable Energies: in 2003 62.2% of the total funding were given to loans connected with energy and electricity projects but there was no information about special RE projects seems to be more active in the area of 'traditional' infrastructures.

links to EU or international processes: connected to the League of Arab States

5. Mediterranean Renewable Energy Center (MEDREC)

Website : <http://www.reegle.ifo/mediterranean-renewable-energy-center>

Contact : Immeuble Abou Sofiane Angle Rues No 8000 et 8003 Montplaisir, BP 213 Tunis 1073 Tunis
Tel: + 216 71 283 477 Fax: + 216 71 284 445

Objectives : the deployment of financing sources and mechanisms' options for the financial support of RE projects; the development of regional competence in the field of RE; the dissemination of information in different sectors; the development of pilot projects and transfer of technology in the field of RE; and the implementation of the efficiency of RE systems.

Members : Algeria, Egypt, Libya, Morocco, Tunisia

Organizational Structure:

- y reference point for the programmes carried out by the MEDREP partners.
- y **steering committee:** the deputy director of the Italian ministry of Environment and Territory, the technical director of the Tunisian National Agency for Energy Conservation and the Deputy Director of: Mediterranean Energy Observatory.
- y **technical staff:-** nine experts: one from each north African country, two from Italy, two from UNEP.

History :

after the Johannesburg World Summit on Sustainable Development (2002) the Mediterranean Renewable Energy Partnership (MEDREP) was launched by Italy aiming for the development of a sustainable renewable energy market in the Mediterranean Region.

MEDREC was established as a center for information, training, dissemination, networking and development of pilot projects in the field of RE in the framework of MEDREP, by the Italian Minister of Environment and Territory, the Minister for Industry and Energy of Tunisia and the Tunisian National Agency for Energy Conservation.

September 27th 2004: official launch.

Renewable Energies: country specific analysis (Algeria, Egypt, Morocco, Tunisia), works as communication tool, regularly updated online version, yearly released printed version projects started in 2004:

- Algeria:** eight projects (biomass, wind, hybrid PV-wind, solar,...)
- Egypt:** three projects (two PV, one Solar Water Heater (SWH))
- Libya:** one PV project
- Morocco:** seven Projects (wind, PV, SWH,...)
- Tunisia:** eight projects (biomass, wind, PV, hybrid PV-wind, SWH)

links to EU or international processes: member of the UNEP Global Network for Sustainable

6. Mediterranean Association of the National Agencies for Energy Conservation (MEDENER)

Website : www.medener.net

Contact : 27, Yue Louis Vicat 75737 Paris Cedex 15,
France Tel: 00 33 14 76 52 488 Fax:
00 33 14 76 52 229

Objectives : to contribute to the development of regional partnership by providing its members an opportunity to exchange their experience and share their know-how in the national utilization of energy, the development of renewable energy sources and the protection of the environment both locally and internationally as far as energy is concerned. To represent its members in international bodies, and defend their points of view about any action in favor of the rational utilization of energy sources and the protection of the environment.

Members : ADEME (France), ADENE (Portugal), ALMEE (Lebanon), ANME (Tunisia), APRUE (Algeria), CDER (Morocco), CRES (Greece), ENEA (Italy), IDAE (Spain), NERC (Jordan), OEP (Egypt), PEC (Palestine).

Renewable Energies: the following points are related to energy in general not specialized for RE: y **exchange of data** between the members of the Association on the one hand, and between the international bodies on the other hand. y **assist the countries** of the Mediterranean region in the creation and implementation of energy conservation policies. y carry out **actions or studies** on matters of energy conservation y to **ensure the dissemination of information** on the national utilization of energy and renewable energy sources on a regional level. y to Work on **joint propositions** and submit them to the national authorities. y to **obtain the necessary funds** for the creation of common programs or projects. y to **establish cooperation links** with regional and international organizations and institutions.

7. Arab League Educational, Cultural & Scientific Organization (ALECSO)

Website : www.alecso.org.tn

Address : ALECSO Mohamed V. Avenue
P. O. Box 1120
Tunis, Tunisia
Tel: (216) 17 84 46 66
Fax: (216) 17 84 965
Telex: 18.825

Mission : ALECSO has given great emphasis to the importance of Arab cooperation in the field of science, culture and education by: y Promoting educational, cultural and scientific activities in the Arab States. y Brining about cultural unity of the various parts of the Arab world through education, culture and science. y Seeking to raise cultural standards in the Arab world in order to fulfill its obligations of making a positive contribution to world civilization. y Developing Arab human resources, educational, scientific and communication standards within the Arab

world. y Promoting Arabic/Islamic culture and the Arab language in the Arab world and abroad. y Building bridges and fostering dialogue and cooperation between Arab culture and other world cultures.

Organizational Structure:

- y General Director
- y Administration & Finance Directorate
- y Culture Programs Directorate
- y Science & Scientific Research Directorate

Renewable Energies: Arab cooperation in the field of utilizing renewable energy resources is one of the main activities of the science department. The following are some of ALECSO activities in this field:

- ¾ Forming a permanent committee comprising directors of renewable energy centers in the Arab countries, which will be run by ALECSO. The committee has seven meetings in different Arab countries since 1982. A large number of reports and research papers were presented at each meeting.
- ¾ In 1978-1979 ALECSO in cooperation with the United Nations, carried out a survey to study Arab potential in renewable energy in the field of research application, specialized framework, equipment, present and future plans, and the possibility of integrating the traditional energy cycle with renewable energy through joint Arab projects.
- ¾ ALECSO laid great importance on the training of personnel to work in the field of renewable energy by expanding technical skills through training programs, organizing technical meetings, field study trips and exchange trips between Arab centers for training and exchange experience.
- ¾ ALECSO providing necessary aid for several projects among them are:
 - . Underground water pumping project using solar power in Jordan.
 - . Solar dryer project for the Sudanese peanut harvest.
 - . ALECSO has participated in setting standards for a number of items of solar energy equipment and has included some other future projects such as solar thermal flat plate collectors, and solar thermal storage.
 - . ALECSO is continuously publishing information about renewable energy in its journal “The Arab Journal of Science”.
 - . ALECSO made five teaching packages in renewable energy technology namely; Solar Thermal, Photovoltaic, Biomass, Wind Energy and Training and Teaching in Renewable Energy.

8. Islamic Educational, Scientific & Cultural Organization (ISESCO)

Website : www.isesco.org.ma

Address : Teen Street

P. O. Box 2275
C.P. 10104 – Rabat
Morocco
Tel: (212) 97 52 71/ 05 53 71
Fax: (212) 58 20 77

Mission : ISESCO is a specialized institution of the Organization of Islamic Conference in the field of Education, Science and Culture.

Organizational Structure:

- y The general conference composed of the responsibilities of ISESCO member states, appointed by their governments.
- y The executive council made up of one representative for each member state.
- y The General Directorate is headed by a director general elected by the general conference for a renewable three-year term.

Sections :

- o Education
- o Science
- o Culture & communication
- o Cooperation
- o Information & document

Objectives : The objectives of the Islamic Organization ISESCO include:

- . To strengthen cooperation among member states in the field of education science and culture.
- . To coordinate the efforts of OIC institutions in the fields of education, science and technology to foster Islamic solidarity.
- . To see to it that curricula at all educational levels are based on Islamic culture.
- . To consolidate authentic Islamic culture and to protect the independence of Islamic thought against all forms of invasion and all factors of cultural alienation, distortion and disfigurement.
- . To consolidate understanding among people to contribute to the achievement of world peace and security through various means, especially education, science and culture.
- . To promote cooperation among member states in the fields of education, culture, development of applied sciences and the use of high technology within the framework of the lofty and perpetual Islamic values and ideas.

Renewable Energies:

- o Support most of the conferences and workshops in the field of renewable energy in the Arab world.
- o Implement some renewable energy projects in different Arab countries.

9. Mediterranean Environmental Technical Assistance Program (METAP)

Website : <http://www.metap.org/>

Contact : The World Bank

Water, Environment, Social and Rural Development Department
Middle East & North Africa Region
Mail Stop H8-801
1818 H Street N.W.,
Washington, D.C. 20433 U.S.A.
Tel: +1 202 473 2194
Fax: +1 202 477 1609
Email: Askmna@worldbank.org

Objectives : strengthening the capacity of the Mediterranean countries to address common environmental issues.

Members : Albania, Algeria, Bosnia-Herzegovina, Croatia, Egypt, Jordan, Lebanon, Libya, Morocco, Syria, Tunisia, Turkey, and West Bank and Gaza.

Organizational Structure:

- o Is an innovative partnership that brings together countries in the Mediterranean region and multilateral donors to assist beneficiary countries in project preparation and strengthen their capacity in regional environmental management.
- o Partnership of the European Investment Bank (EIB), the World Bank (WB), the European Commission(EC), the Finnish Ministry of Foreign Affairs Development Cooperation (FINNIDA), the Swiss Agency for Development and Cooperation (SDC), and the United Nations Development Program (UNDP) as principal donors.

- o capacity building is managed by the METAP Secretary, located in World Bank Headquarter, Washington D.C.
- o the project preparation is managed by the European Investment Bank.
- o each of the member beneficiary countries in METAP nominate a National Focal Point (NFP) in the government ministry, organization or department responsible for dealing with environmental issues.
- o the NFP is responsible for coordinating and facilitating the implementation of METAP activities in his/her country.
- o the METAP Secretariat organizes Annual Meetings, which are attended by all the METAP NFPs, as the representatives of their respective countries, the METAP Partners, and other agencies/organizations collaborating with METAP.

History : founded in 1990 in its fourth phase (2001-2005), METAP activities are divided into two main components: Capacity Building and Project Preparation.

Renewable Energies:

- o the main sectors are: water quality management, municipal and hazardous waste management and policy and legislation tools, realized through knowledge management and local capacity building.
- o although there are some points in the activities of METAP which are related to RE: the Costs of Environmental Degradation program analyzes, as one point of interest, urban air pollution its health impacts and economic costs, to build regional capacity for knowledge acquisition, sharing and use in order to assist the member countries to better achievement of their environmental and sustainable development goals is another action of METAP.

links to EU or international processes: extensive cooperation with the Mediterranean Action plan (MAP).

10 Center for Environment and Development for the Arab Region and Europe (CEDARE)

Website : <http://www.cedare.org.eg/main.aspx>

Contact : CEDARE Building, 2 El-Hegaz St., P.O Box 1057 Heliopolis Bahary, Cairo, Egypt Tel.: 202-4513921/2/3/4 Fax: 202-4513918 E-mail: email@cedare.org.eg

Objectives :

Main mission: Capacity building of its member countries, promoting skills in environmental management, transfer of technologies, environmental education, and development of environmental policies.

Members :

- y **Focal Points:** Albania, Algeria, Bahrain, Croatia, Djibouti, Egypt, France, Greece, Iraq, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Spain, Sudan, Syria, Tunisia, Turkey, United Arab Emirates, Yemen.
- y **Trustees:** Kingdom of Saudi Arabia, Arab Republic of Egypt, United Arab Emirates, Democratic and Popular Republic of Algeria, Yemeni Republic, UNDP, Islamic Development Bank, Abu Dhabi Fund for Development, Arab Fund for Economic and Social Development, Council of Arab Ministers responsible for the Environment, International Fund for Agricultural Development, European Environment Agency, UNEP.

Organizational Structure:

- . **Board of Trustees:** highest governing organ, oversees the Center's function, its budget, and evaluates its performance
- . **Technical Advisory Committee:** a number of specialists who advise the Executive Director on programmes, budget needs and potential sources of financing for each programme

- . **Executive Committee:** appointed among the members of the Board of Trustees
- . **Executive Director:** is the chief executing officer, managing activities and finances, appointing programme leaders and other necessary staff, acts also as a convener of the Technical Advisory Committee and the Board of Trustees
- . **Focal Points** in the member countries
- . **Programmes:**
 - . Environmental Information Unit
 - . Land and Water Resources Management
 - . Marine and Coastal Zone Resources Management
 - . Urbanization and Human Settlements
 - . Socio-Economics of sustainable development

CEDARE was elected the regional coordinator of AMEEN.

CEDARE signed a Memorandum of Understanding and a Contract with the IAE and METAP to implement METAP III Regional Capacity Building Programme.

Renewable Energies:

REs are no specialized field of CEDARE
the Environmental Education and Communication Programme seems to be very experienced in its working field even if it is not handling RE topics at the moment.

during a workshop on Environmental Economics for Sustainable Development (in 1996) the Arab and Mediterranean Environmental Economics Network (AMEEN) was established – problems with the access to the AMEEN Website avoid the.

introduction of further information about the activities of the network.

problems with the access to the AMEEN Website avoid the introduction of further information about the activities of the network.

links to EU or international processes: UNDP and UNEP are part of the leading level of CEDARE

11. Euro - Mediterranean Partnership (EuroMed)

Website : http://europa.eu.int/comm/external_relations/euromed/

Contact : Mr. A. Bassols Soldevila

EuroMed and Regional Issues
Desk Officer Economic and Financial aspects of the Euro-Mediterranean Partnership
Assignment: Commission RELEX F 1
B-1049 Bruxelles
Tel.: +39 2 296 3714
+39 2 2991111 (Brussels Switchboard)

Mr. R. DOCHAO MORENO
EuroMed and Regional issues
Desk Officer Social, Cultural and Human aspects of the Euro-Mediterranean Partnership
Assignment: Commission RELEX F 1
B-1049 Bruxelles
Tel.: +(32) 2 2965726
+39 2 2991111 (Brussels Switchboard)

Objectives :

. the definition of a common area of peace and stability through the reinforcement of political and security dialogue (Political and Security Chapter)

- . the construction of a zone of shared prosperity through an economic and financial partnership and the gradual establishment of a free trade area (Economic and Financial Chapter)
- . the rapprochement between peoples through a social, cultural and human partnership aimed at encouraging understanding between cultures and exchanges between civil societies (Social, Cultural and Human Chapter)

Members : 25 EU Member States, Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestinian Authority, Syria, Tunisia and Turkey.

Organizational Structure:

- . **bilateral dimension** (direct activities between the EU and each country).
- . **regional dimension** (deals with problems that are common to many countries in the region in the fields of economics, politics and culture).
- . the **foreign ministers** meet periodically (in the past: at least once in a year) in order to monitor the application of the Barcelona Declaration and to define actions enabling the objectives of the partnership to be achieved
- . the various activities will be followed by **ad hoc thematic meetings** of ministers, senior officials and experts.
- . **"Euro-Mediterranean Committee for the Barcelona process"** at senior-official level, consisting of the European Union Troika and one representative of each Mediterranean partner, will hold regular meetings to prepare the meeting of the Ministers for Foreign Affairs, take stock of and evaluate the follow-up to the Barcelona process and all its components and update the work programme.
- . the Commission departments are responsible for the follow-up work for the meetings.
- . the **MEDA programme** is the main financial instrument to EuroMed.

History : the Euro-Mediterranean Conference of Ministers of Foreign Affairs, held in Barcelona on 27-28 November 1995, marked the starting point of the Euro-Mediterranean Partnership (Barcelona Process).

Renewable Energies:

- **Programme on regulatory approximation in the fields of neighbourhood policy and completion of the Euro – Mediterranean free trade area** – objectives: gradual integration of the Med partners into the EU internal market and the creation of a Euro
 - Mediterranean free trade area; energy and environment could be covered sectors.
- **Euro – Mediterranean cooperation programme between the cities, local and territorial authorities (MEDACT)** – developing the cooperation, the exchanges and the dialogue between the cities, the local and the territorial authorities, sustainable management of urban environment is one of the offered fields of action.
- **Short and Medium – Term Priority Environmental Action Program (SMAP)** – consistent framework for policy in the field of environment in this region, the management of energy and the reducing of highly polluting emissions are part of this program.

12. Trans Mediterranean Renewable Energy Cooperation (TREC)

Website : <http://www.trec-eumena.org>

Contact : Rissener Landstrasse 193
 D-22559 Hamburg
 Germany
 Tel. +49 40 82290428
 Fax +49 40 82290421
 E-mail: info@trec-eumena.org

Objectives :

- . a project to raise awareness with political and economic decision makers of the necessity, opportunities and advantages of RE for peaceful co-operation for climate, energy and water supply security in the joint regions of Europe, the Middle East and North Africa (EUMENA)
- . to unlock the enormous unused potentials of RE in the EUMENA Region, to this end TREC establishes co-operation as if there were no borders, for pursuing the common goals of: global climate

stability, long term energy and water supply security, economic development in the MENA countries and sustainability as vision uniting the regions of EUMENA.

Members : is an international network of scientists, politicians and experts in the field of renewable energies (RE) and development, from: Bahrain, Oman, Yemen, Jordan, Lebanon, Egypt, Libya, Algeria, Morocco, Spain, The Netherlands, Germany and Austria.

Renewable Energies:

A MENA-wide register of water and power demands by urban centers.

Jointly with the Club of Rome: Initiative for a community of sustainable water and energy security (SWESI) around the Mediterranean, based on continuing cost reduction for RE as way out from rising costs and coming shortages of fossil fuels.

In co-operation with the Global Market Initiative GMI: Plans for market introduction of concentrating solar thermal power (CSP) by cost reduction of this technology thru economies of scale. The successful market introduction of wind technology, which has been supported by several billion € in the past 20 years, lends encouragement to similar efforts with CSP, a further key technology for climate and energy security.

solar thermal power is the main point of action.

links to EU or international processes:

Compiling a comprehensive demand register, in co-operation with the Mediterranean CSP study conducted by DLR for the German ministry BMU.

a EUMENA-wide strategy and finance conference of stakeholders in MENA and EU as follow-up to the MENAREC Sana'a conference, in spring 2005.

13. Mediterranean Energy Observatory (OME)

Website : www.ome.org

Contact : Arche de Dolines 7, rue Soutrane Les Bouillides Garbejaire BP 248 06905 Sophia Antipolis France Tel.: +33 (0) 4 92 96 66 96 Fax: +33 (0) 4 92 96 66 99 E-mail: ome@ome.org

Objectives :

is a non-profit oriented organization whose main objective is to promote the cooperation between the major energy companies operating in the Mediterranean basin.

is a center of studies and information on energy in the Mediterranean area as well as a pole of reflection and a permanent meeting forum between its members.

Members : are energy companies having important activities in the Mediterranean countries, such as: BOTAS, CEPSA (Spain), DEPA (Greece), eDF (France), EDISON, EDL, EEHC, EGPC (Egypt), ENEL (Italy), TOTAL,...

Organizational Structure:

- . **General Assembly**, including Chairman and Vice-Presidents
- . **specialized Committees:** Hydrocarbons Committee; Renewable Energy and Sustainable Development Committee; Electricity Committee; Financing Committee.
- . **General Director**
- . permanent OME **Team of Experts.**

History :

o has been created in 1988 within the "Centre d'Energétique" of the Ecole des Mines de Paris (a prestigious French engineering school) with an important support from the European Commission and particularly from the Directorate General Energy.

o in 1991, at the request of various interested companies, the OME became independent and was transformed into an Association of major Mediterranean energy companies.

Renewable Energies:

is working in order that it becomes the reference for the renewable energy development in the region and in the European Community.

is playing an active role in the significant development of the use of Renewable Energy in the Mediterranean.



supports MEDREP / MEDREC.

the field of activities covers studies and conferences.

14. Mediterranean Renewable Energy Programme Initiative (MEDREP)

Home Page : www.medrep.it

Address : Italian Ministry for the Environment and Territory Department for Environmental Research and Development Via Cristoforo Colombo, 44 00147 Rome, Italy Tel: 00390657228109/8115 Fax: 00390657228175 Email: medrep@minambiente.it

Objectives : The two principal objectives of MEDREP are to:  Provide sustainable energy services particularly to rural populations; and  Contribute to the climate change mitigation by increasing the share of renewable energy in the mix of the region.

Members : The MEDREP Programme currently involve the following Agencies: y Agency for Environment and Energy Management (ADEME) y The International Energy Agency (IEA) y The International Solar Energy Society Italy (ISES Italy) y The Mediterranean Association of the National Agencies for Energy Conservation (MEDENER). y The Mediterranean Energy Observatory (OME). y The Regional Environmental Center for Central and Eastern Europe (REC) y The United Nations Environment Programme (UNEP) y The World Bank (WB) y The Ministry of Industry and Energy of Tunisia, together with the Tunisian National Agency for Renewable Energies (ANER). y The Ministry of Electricity and Energy of Egypt and the Center for Renewable Energy Development (CDER) of Morocco recently become partners of MEDREP.

Organizational Structure: the organizational structure of MEDREP is composed of a steering committee and a secretariat.

The steering committee, initially composed of partner and national agencies, ADEME, IEA, ISES Italy, MEDENER, OME, REC, UNEP, WB. New partners will be invited to take part in the steering committee.

The steering committee, chaired by (IMET) promoter of the MEDREP Initiative, provider for the funding at this stage and responsible for the MEDREP secretariat.

History : The Mediterranean Renewable Energy Program (MEDREP) was launched by Italy as a type II initiative at the world summit on sustainable Development (WSSD) in Johannesburg. MEDREP takes advantage of the co-chairmen report (Italy and United Kingdom) of the G & Renewable Energy Task force and specifically the outlined goal of reducing renewable energy technology costs by expanding markets and building a strong market environment for renewable energy.

Renewable Energies: The program strives to develop a sustainable renewable energy market system in greater Mediterranean region through three main sub-projects:

- o Tailoring financial instruments and mechanisms to support projects.
- o Strong thening policy frameworks and removing barriers to project development. Building stronger private sector infrastructure, considering the positive role of “tradable renewable certificates” and certified emission reductions.

National Organizations/Programs Working With Renewable Energies In The MENA Countries

1. ALGERIA

1.1 Renewable Energies Development Centre (CDER)

Website : www.cder.dz

Address : Route de l'observatoire

P. O. Box 62

Bouzareah

Alger (16340)

Algerie

Tel: (021) 90 15 03/ (021) 90 14 46

Fax: (021) 90 15 60/ (021) 90 46 54

Email: deit@cder.dz

Mission : Working in research related to renewable energy which includes:

- . Launch of pilot projects in cooperation with national and international institutions.
- . Technical assistance of new projects; start up and realization.
- . Quality and conforming tests of systems and components.
- . Expertise and audit of installations in operation.
- . Installation and set-up of energy systems.

1.2 National Agency for the Promotion and Rationalization of Energy Use (APRUE)

Website : www.aprue.org.dz

Address : APRUE 2 Rue Chenova, BP 265 Hydra 16035 – Alger Algeria Tel: (213) 21 60 31 32/ (213) 21 24 46 Fax: (213) 21 48 25 68

Mission :

The mission is to be fulfilled by working in the following:

- . Economic and planning framework.
- . Inventory of energy consumption, its evolutionary trends and significant indicators.
- . Exploration energy demand, evaluation of energy potential and the necessary investment.
- . Overall planning of energy conservation coordination and monitoring of the national energy conservation program.
- . Organization and promotion of the appropriate information for the development of energy conservation.
- . Training in Algeria and abroad.
- . Elaborating of programmes and project proposals in partnerships, taking into consideration technical, economic, environmental and financial dimensions.

1.3 New Energy Algeria (NEAL)

Website : www.mem.algeria.org

Address : New Energy Algeria (NEAL) Program
Ministry of Energy and Mining
Tower A, Vald'Hydra
BP. 677 Alger.Gare

Algiers
Algeria
Tel: (213) 21 60 61 22/ 21 69 33 64
Fax: (213) 21 60 18 44

Mission : NEAL is Algeria's renewable energy agency established in 2002 by the Algerian government and Algeria's national energy companies to encourage domestic production, use, and export of renewable energy. The Algerian Minister of Energy and Mining requested the department of Energy (DOE) of USA assistance in establishing NEAL. The Oak Ridge National Laboratory (ORNL) in Palm Spring California is providing technical assistance to DOE and NEAL to foster international collaboration on renewable energy technologies and introduce U.S. companies to NEAL.

National Links with EU or Other Organizations: MEDENER, MEDREC, OME, GE(WB), EU, Germany, France, Spain, USA, UNDP

Main National Renewable Energies Implemented Projects:

- . Launch of a 500 kWp PV electrification program (16 isolated villages) – second program.
- . Setup of a 150 MWp (Gas-Solar) power plant based on ACS (solar thermal concentrators) of which 30 MWp is solar thermal.
- . Launch of a 20 kWp solar hydrogen pilot project.
- . Installation of a 10 MWp aerogenerator (wind energy).
- . Installation of 1000 m2 solar hot water collectors.
- . Many other national projects are on due that concerns different PV applications basically: water pumping (Meda Program), telecommunications.. etc.
- . In addition private sector has cadence installation of 1-2 MWp/year of PV systems.

Forthcoming programs:

- . The ministry of Agriculture program: furniture of potable water.
- . High Commission for the development of high plateaux: multi applications program.
- . Ministry of Energy and Mines: Replacement of Diesel power plants.
- . Launch of the second renewable energies R/D national program.
- . National target 2015: 5% of the required energy will be from renewable energy sources.

1.4 Renewable Energy Business in Algeria

African Energy

African Energy is a specialized distributor of solar electric and power back-up equipment focusing exclusively on the African market. We sell only to Africa, and concentrate primarily on serving the needs of renewable energy companies based there. Because of our specific focus, we receive exceptional pricing from the manufacturers we represent, and we understand the challenges of doing business in Africa. Door to door shipment, 24-hour service, flexible payment arrangements, and the continent's best prices. We carry Trace, Outback, Kyocera, GE Energy, Morningstar, Steca, Southwest Wind, Surrette, Deka and other fine brands.

- . **Business type:** wholesale supplier, exporter, system sales, specialized retail sales
- . **Product types:** solar electric power systems, wind energy systems (small), wind energy system components (small), photovoltaic modules, photovoltaic systems, solar water pumping systems, solar refrigeration systems, uninterruptable power supplies UPS, Solar Home Systems.
- . **Service types:** system design, training
- . **Address:** Box 12641, Scottsdale, Arizona USA, Tunisia, Morocco, Senegal, Gambia, Guinea (Conakry), Mali, Burkina Faso, Ghana, Nigeria, Cameroon, Chad, Congo (DRC), Angola, Namibia, Zimbabwe, Zambia, Malawi, Rwanda, Tanzania, Kenya, Uganda, Ethiopia, Algeria, Sierra Leone, Liberia, Niger, Gabon, Madagascar, Mozambique, Burundi, Djibouti, Somalia 85267

Tel: 1-480-699-9275
Fax: 1-480-556-6183

Web

Site:

<http://www.africanenergy.net>

Rafidain Business Center

Kyocera solar Energy in Algeria

- . **Business type:** importer
- . **Product types:** photovoltaic systems, Kyocera Solar Energy.
- . **Address:** Palais des exposition pavillon , Algiers, Algiers Algeria 16000

Tel: (213) 021 21 01 04
Fax: (213) 021 21 04 61
Web Site: <http://www.rbcgroup.net>

Unité de Développement de la Technologie du Silicium (UDTS)

mc-Si Directional solidification ingots; cutting and wafering mc-Si ingots. mc-Si cell processing.

- . **Business type:** manufacturer
- . **Product types:** photovoltaic cells, photovoltaic cells, Subcontractor mc-Si ingot growth + ingot cutting+ wafering.
- . **Address:** 2Bd Frantz Fanon, BP 399, Algiers, Algeria 16000

Tel: (213) 21 27 98 80/ (213) 21 43 35 11 Fax: (213) 21 43 35 11/ 213 21 43 24 88 Web Site:
<http://www.udts.dz>

Sarl Solartech

- . **Business type:** retail sales
- . **Product types:** photovoltaic systems, solar water pumping systems, solar water heating systems, cathodic protection systems, DC lighting, solar charge controllers, Photovoltaic modules, Lead-acid batteries, DC-AC inverters.
- . **Service types:** design, installation, maintenance and repair services
- . **Address:** 6, Rue Benayad, Bel Ombrage, Djelfa, Wilaya de Djelfa, Algeria

Tel: (213) 21 65 42 88 / (213) 27 87 23 00 **Fax:** (213) 21 65 42 88/ (213) 27 87 23 00

2. EGYPT

2.1 Organization for Energy Conservation & Planning (OEP)

It is a government body created by President Decree 112 1986.

Website : www.ritsec.com.eg/govern/oecp/

Address : 32 Mahmoud Khairy Street P. O. Box 4604 Nasr City Cairo 11717 Egypt Tel:
(202) 26 26 349/ 40 24 311/ 40 30 153 Fax: (202) 40 37 23

Mission : To plan and organize energy policies within the framework of the socio

economic development process by:

- . Provide the supreme council of Energy (SCE) assistance.
- . Integrated energy planning and policy.
- . Energy conservation and energy efficiency improvement.
- . Management to energy information.
- . Energy/environment policy.
- . Technical consultancy.
- . Training.
- . Sensitizing public opinion.
- . Energy audits.
- . Energy conservation projects.
- . Energy conferences and workshops.
- . Technical consultancy and information services.
- . Environment protection and climate change studies.

2.2 New & Renewable Energy Authority (NREA)

Website : www.nrea.gov.eg

Address : Ext. of Abbas El-Akkad
Hay El-Zohour El-Hay El-Sades P. O. Box 4544 Masakin Dobbat Elsaff

Nasr City, Cairo Egypt Tel: (202) 27 13 176/ 27 13 174 Fax: (202) 27 17 173
Email: nre@idsc.net.org

Mission : NREA established in 1986 under the Ministry of Electricity and Energy to

act as a national focal point for expanding efforts to introduce and develop renewable energy technologies to Egypt on commercial scale along with deepening the local capabilities to use, produce and develop its equipment in different applied fields, thus contributing to limit fossil fuel use and protecting the environment from pollution.

NREA is entrusted to plan and implement renewable energy programs in coordination with other concerned national and international institutions.

NREA is working on the development of renewable energy resources particularly solar, wind and biomass through specific measures for development activities. Among them are:

- . Renewable energy resources assessment and planning.
- . Research, development, demonstration and testing of different technologies.
- . Transfer of technology, development of local industry and application of mature technologies.
- . Establishment of testing and certification facilities and development of local standards and codes.
- . Education, training and information dissemination programs.

Taking advantage of renewable energy environmental benefits allowing financial support of its projects implementation through various mechanisms such as clean development mechanism, financing RE incremental cost, soft loans, mixed credits, etc.

2.3 Academy of Scientific Research and Technology (ASRT)

Website : www.asrt.sci.org

Address : 101 Kasr Al-Aini St.

P. O. Box 11516 Cairo, Egypt Tel: (202) 79 21 286/ 79 21 287 Fax: (202) 79 21 270

Mission : ASRT is working on the following fields:

- . Applied science, agriculture, applied physics, construction, energy, environment, genetic engineering and biotechnology, health, information technology, natural resources, transport and communication.
- . Science and technology policies.
- . Social sciences; human settlement, management and planning.

2.4 National Research Center (NRC)

Website : www.nrc.sci.eg

Address : Tahrir St. Dokki Giza, Cairo Egypt Tel: (202) 33 71 010 Fax: (202) 36 01 877

Mission : NRC is the largest multidisciplinary R & D center in Egypt. It was established

in 1956 and is responsible of basic applied research within the major field. It is supervised by the Ministry of Scientific Research. Its activities are to castor research in order to address the national needs more effectively through scientific and technical research. NRC is working on numerous fields such as: textile, food and nutrition, pharmaceutical, mineral resources, all types of engineering, renewable energy, agriculture, medical services, new material, etc. Renewable energy activities and research is part of the Engineering Research Division.

2.5 Housing & Building Research Center (HBRC)

Website : www.hbrc.edu.eg

Address : 87El-Tahrir St.

P. O. Box 1770 Dokki – Giza Cairo, Egypt Tel: (202) 33 56 722/ 33 56 853 Fax: (202) 33 67 179/ 33 61 564

Mission : The center's mission is to do applied research in the following fields: applied science, construction, energy, industry, information and computers, national resources, engineering services, transport and communications.

2.6 Egyptian Solar Energy Society (ESES)

Website : www.soficom.com.eg/eses

Address : P. O. Box 487 Dokki

Cairo, Egypt

Tel: (202) 34 52 850

Fax: (202) 55 61 236

Mission : It is a non-profit, non-government society. Members of society are persons engaged in industry

development, and utilization of renewable energy. ESES holds its trio-annually ASRE international conference since 1986. It also coordinates an international project financed by the United Nations Global Environment Facility for the design and manufacture of wind pumps used for pumping water for irrigation, land reclamation, and drinking water supply. Research and development activities take place through and in cooperation with the Design Center 2002. ESES has introduced a special quality insurance system based on ISO 9001 to guarantee a high quality of its products, delivered by the contracted supplier.

National Links with EU or Other Organizations: Germany, France, Spain, Denmark, Italy, EU, Japan, USA, ESCWA, UNEP, UNDP, MEDENER, MEDREC, OME, GE (WB).

Main National Renewable Energies Implemented Projects:

- . Preparing a code for energy efficiency in building which improves the thermal performance of buildings by using natural lighting and ventilation.
- . Preparing standards for refrigerators, washers, air conditioning equipment and other appliances.
- . Performing a high efficiency lighting project in Alexandria with the help of European Union.
- . Implementing the first wind farm in 1993 in Karadaqa with a capacity of 5 MW and connect it to the local electrical network.
- . Implementing two wind farms; one with a capacity of 60MW on two stages (30 MW each stage) in cooperation with the Danish Government, and the other one with 80 MW in cooperation with the German government. The total production capacity of these two wind mills in 2004-2005 was 522 MWhr at average wind speed of 8.3m/sec. 30% of manufacturing these two wind farms were done locally.
- . Implementation of a wind farm with a capacity of 85 MW was started in 2003 and it is supposed to be finished in 2006. This project is done with the cooperation of Spain.
- . An agreement between Egypt and Japan was signed in 2003 to build a wind farm with a capacity of 120 MW. The project will be implemented in 2006/2007.
- . Implementing a lighting project in Abulzain Sons Village which consists of 35 houses by using a hybrid system of wind/diesel. The system consists of 5 units; the capacity of each is 100 KWhr.
- . Implementing a pioneer project in solar water heating for medium temperature in cooperation with the African Development Bank. The local manufacturing of this project reached 70%.
- . Start using solar electricity producing in applications by adopting an Egyptian project for electricity production by using thermal system with compound cycle which works on natural gas with a total capacity of 126.7 MW. 31.5 MW of this system is produced from concentrating collectors.
- . Erecting about 250,000 solar water heaters in addition to industrial solar water heating systems.
- . Electricity production from PV system has reached 3 MWhr used in street lighting, communications, water pumping, ice production, lighting of remote villages... etc.
- . In biomass application, several projects have been implemented to produce methane gas from solid waste. Experiments prove that an amount of 120-150 of methane gas for each ton of solid waste with an average heating value of 5.9 KWhr/m³.
- . Implementing more than 300 units of gas production from biomass in various villages.

Some Egyptian Solar Energy Society (ESES) wind mills installations:

- . Wind mill erected in 1996 at EL-Saff Village, Giza with a capacity of 1500 l/hr from 32 meter well used for agricultural purposes.
- . Wind mill erected in 1997 at El-Qantar El-Kairyra, Cairo with a capacity of 1400 l/hr at 16m used for a agricultural purposes.
- . Wind mill erected in 1998 at Wadi El-Nation from 80m well with a capacity of 700 l/hr used for agricultural purposes.
- . Wind mill erected in 1998 at Ras Ghareb, Red Sea Coast with a capacity pf 2400 l/hr from 28m well used for agricultural purposes.
- . Wind mill erected in 1999 at El-Tor, Sinai with a capacity of 3000 l/hr from 23 meter well used for drinking purposes.
- . Wind mill erected in 1999 at the North Coast with a capacity of 9800 l/hr from 3m height used for agricultural purposes.

2.7 Renewable Energy Business in Egypt

Solar Energy & Environment Technology (SE)

Solar Energy Solutions

- . **Business type:** manufacturer, retail sales, exporter, importer.
- . **Product types:** solar water heating systems, solar cooking systems, photovoltaic systems, wind energy systems (small), biomass energy systems.
- . **Address:** 9A 275 St, New Maadi, Cairo, Maadi Egypt 11431

Tel: (202) 51 94 358

Fax: (202) 51 94 376

Web Site: <http://www.solaregypt.com>

Egyptian Solar Energy Society

- . **Business type:** manufacturer, nonprofit organization, research institution, engineering
- . **Product types:** water pumps, water pumping windmills.
- . **Address:** P. O. Box 487 Dokki, Cairo, Egypt.

Tel: (202) 34 52 850

Fax: (202) 55 61 236

Web Site: <http://www.soficom.com.eg/eses/>

Middle East Engineering & Telecommunications (MEET)

- . **Business type:** manufacturer, retail sales, wholesale supplier, exporter, importer
 - . **Product types:** photovoltaic systems, photovoltaic modules, DC to AC power inverters, deep cycle batteries, lead acid batteries, DC lighting.
 - . **Address:** 16 Anwar EL-Moufty St. (16 Emad EL-Deen Kamel), Nasr City, Cairo Egypt
- Tel:** (202) 26 38 123 **Fax:** (202) 40 16 849 **Web Site:** <http://www.MEET-Egypt.com>

Arabian Company For Industrial Batteries (HBL Nife Egypt S.A.E.)

- . **Business type:** manufacturer, retail sales, wholesale supplier, importer
- . **Product types:** industrial batteries, UPS, backup power systems, central emergency lighting, nickel cadmium batteries, sealed lead acid batteries, battery chargers, inverters, power supply, solar systems, motor soft starter, and standby power total solution provider.
- . **Service types:** supply, install, after sales service center.
- . **Address:** Factory: 10Th Of Ramadan City, Zone A3- Unit 901. Sales: 21 Dr. Omer Desouky St., New Nozha, Heliopolis - Cairo Egypt 11769 **Tel:** (202) 62 39 755, 62 39 757, 62 47 335, mobile (2012) 23 17 242 **Fax:** (202) 62 39 757

Arabian Solar Energy & Technology Co. (ASET)

- . **Business type:** manufacturer, retail sales, wholesale supplier, service
- . **Product types:** photovoltaic modules (PV modules), nickel cadmium batteries, telecommunication batteries.
- . **Address:** 11 Sherif St., Cairo, Egypt

Tel: (202) 39 36 463/39 53 996

Fax: (202) 39 29 744

BIC for Electronics Environment and Energy

- . **Business type:** manufacturer
- . **Product types:** PV modules, PV systems.
- . **Address:** 9 Marouf Street, Cairo, Egypt 11522

Tel: (202) 57 98 334

Fax: (202) 57 95 744

City Pulse - Trade & Marketing

- . **Business type:** retail sales, exporter, importer
- . **Product types:** solar electric power systems, solar garden lights, solar outdoor lighting systems, solar pool heating systems, solar water heating systems, solar water pumping systems, Solar Street Lights, Military Solar Applications, Aviation & Marine Solar Applications.
- . **Address:** 20, Rd.# 213 Degla, Maadi, Cairo, EG Egypt

Tel: (202) 52 12 078/ 9

Fax: (202) 52 12 076

Eagle For Engineering & Trading Co.

- . **Business type:** Sale , Marketing ,Exporter, Importer
- . **Product types:** Water Pumps, Sewage Pump, Water Pumping Station, All Type Of Pumps-Valves- Flow Meter - Pipes & Fitting - Penstock- .
- . **Address:** 11321 Helmet el Zietoun- Po.box 23 - , Cairo - Egypt , Cairo EGYPT 11321

Tel: (202) 49 52 483

Fax: (202) 49 52 483

Egyptian Solar Energy Systems Company (ESESC)

- . **Business type:** manufacturer
- . **Product types:** solar water heating systems, solar water heating components.
- . **Service types:** design, installation
- . **Address:** 11 El Gamaa St., Giza, Egypt

Tel: (202) 57 37 813

Fax: (202) 57 37 813

Exact Co. For Battery Production

- . **Business type:** manufacturer
- . **Product types:** automotive starting batteries, sealed lead acid batteries, lead calcium batteries.
- . **Address:** 39 New Maadi, Cairo, Egypt

Tel: (202) 70 40 295/7

Fax: (202) 70 25 392

Fadico Interntional For Engineering Projects

- . **Business type:** wholesale supplier, importer
- . **Product types:** water pumps.
- . **Address:** Bader Tower in front of Maadi Hotel Floor 19, Cairo, Egypt 11431

Tel: (202) 38 00 814

IMF

- . **Business type:** wholesale supplier
- . **Product types:** photovoltaic modules, wind energy systems (large).
- . **Address:** 17 A Yehia Ibrahim Street - Zamalek, Cairo, Egypt 11211

Tel: (202) 36 92 39

Fax: (202) 73 54 346

ISI Computer Company

- . **Business type:** wholesale supplier, importer
- . **Product types:** computer and electronic components.
- . **Address:** 3 Mostafa Tomom St. From Elmanialst, Cairo, Egypt 11451

Tel: (202) 53 20 514

Lotus Solar

- . **Business type:** Consulting, manufacturing, contracting, training & retail sales
- . **Product types:** solar energy systems for heating water (domestic, swimming pools & industrial), steam generation and lighting. Wind energy system components (small)..
- . **Address:** Shorook City, Heliopolis, Cairo Egypt 11837

Tel: (202) 68 71 913/ (20) 10 14 80 370

Fax: (202) 29 08 917

MISR America Group For Investments

- . **Business type:** manufacturer, wholesale supplier, exporter
- . **Product types:** solar water heating systems, solar pool heating systems, photovoltaic systems, solar cooking systems.
- . **Address:** 215 El Hegaz St. Heliopolis, Cairo, Egypt 11221

Tel: (202) 62 33 996/ (202) 62 34 140

Solenco

- . **Business type:** service, wholesale supplier, retail sales
- . **Product types:** PV modules.
- . **Address:** 17 Kasr El Nil St., Cairo, Egypt

Tel: (202) 39 37 678

SunPower Company

- . **Business type:** retail sales, wholesale supplier, exporter
- . **Product types:** solar water heating systems, solar water heating systems, solar air heating system components.
- . **Address:** 17 vector emanwail Street , Smoha, 2nd floor, Alexandria, Egypt

Tel: (203) 42 72 517

Fax: (203) 42 72 517

Systems and Technology Co. / SERFILCO

- . **Business type:** manufacturer, retail sales, wholesale supplier, exporter, importer
- . **Product types:** Waste treatment systems, water filtering and purification system components, water filtering and purification systems, water pumps, pumps for chemicals, magnetic coupled pumps, FRP filter chambers, combustion systems, galvanizing kettles, furnaces, heat exchangers, fume scrubbers, baghouse filters, fume extraction, dust collection, filter press, sludge dewatering, metering pumps, dosing pumps..
- . **Service types:** Hot Dip Galvanizing, Electroplating, Electroless, Waste Treatment, Pumps, Filters, Instruments, pH, ORP, Mixers, Agitation, Eductors
- . **Address:** 61 Iran Street, Dokki, Guiza, Cairo, Egypt 12311

Tel: (202) 33 53 664

Fax: (202) 33 70 597

Systems and Technology

- . **Business type:** manufacturer, wholesale supplier, exporter, importer
- . **Product types:** waste treatment systems, water filtering and purification systems, uninterruptable power supplies UPS, water pumps, heat exchangers, air filtering and purification systems, pumps for chemicals, magnetic coupled pumps, FRP filter chambers, combustion systems, galvanizing kettles, furnaces, heat exchangers, fume scrubbers, baghouse filters, fume extraction, dust collection, filter press, sludge dewatering, metering pumps, dosing pumps.
- . **Address:** Iran Street, Dokki, Guiza, Cairo Egypt 12311

Tel: (202) 76 14 150

Technological & Electrical Systems Co. T.E.S.

- . **Business type:** manufacturer
- . **Product types:** wind energy towers and structures (large), water storage tanks, heat exchangers, wind energy towers and structures (small).
- . **Address:** 31-Shak ElSoban Street, Industrial Zone Torah, Cairo, Egypt

Tel: (202)75 41 531

Technopol Egypt for Engineering Industries

- . **Business type:** manufacturer, wholesale supplier, exporter, importer
- . **Product types:** refrigerators and freezers.
- . **Address:** Industrial Zone, A-1, 10th of Ramadan, Cairo Egypt

Tel: (201) 54 10 520

Trust Electronics

Leading company in supplying UPS solutions, wiring devices systems for the projects

- . **Business type:** retail sales, wholesale supplier
- . **Product types:** backup power systems, uninterruptable power supplies UPS, energy efficient lighting, wiring devices systems.
- . **Address:** Buildin 56 , Zahraa Nasr City, Cairo, Egypt **Tel:** 002024481838, MOBILE 0020101035804 **Fax:** (202) 44 81 839

TUV Hessen (Egypt)

- . **Product types:** water pumps, gas turbine electric generators, wind energy system components (large), water filtering and purification system components, meters and measuring equipment, hybrid power systems.
- . **Service types:** testing services
- . **Address:** 20 El Montazah St., El Zamalek , Cairo, Egypt **Tel:** (202) 73 64 979 **Fax:** (202) 73 51 031

Water Technologies & Contracting Company (WATCO)

- . **Business type:** manufacturer, exporter
- . **Product types:** water filtering and purification systems, waste treatment systems.
- . **Address:** 27 sector C hadayek el ahrram el harram - Giza., Cairo, Cairo Egypt 12561 **Tel:** (202) 74 29 945/ (201) 17 78 688 **Fax:** (202) 74 29 946

3. Iraq

3.1 Energy & Environment Research Center (EERC)

Ministry of Industry & Minerals

Website : None yet

Address

: P. O. Box 13026 Jadiriya, Baghdad Iraq Tel: (9641) 77 65 276/ 77 61 990

Mission : The center deals with research on renewable energy, environment and

corrosion control. It carries out research, executes projects, and offers training courses. The center has seven departments dealing with the above mentioned fields, and ten specialized laboratories.

National Links with EU or Other Organizations: UNDP

Main National Renewable Energies Implemented Projects: The national activities were very

limited since 1990, due to the sanction and war status. During the period from 1982-1990, the center performed numerous projects among them are:

- . Cooling the center building with solar energy by using 120 tons of absorption chillers supplied by hot water from evacuated tubes collector.
- . Solar cooling and heating a house using flat plate collectors and two 10 tons absorption chillers.
- . Solar heating of plastic houses projects for agriculture purposes.
- . 24kW peak PV, used for vertical drainage in Baghdad.
- . 7kWp PV, used for drinking purposes in Mousel.
- . Manufacturing hundred units of solar water heaters.

3.2 Renewable Energy Business in Iraq: Areej

Baghdad Co.

Areej Baghdad for Computer & Technology Ltd. Co IRAQI trading company dealing with all kinds of updated modern technology instruments and equipments works by digital, fiber optic, electromagnetic, ultrasonic, laser, atomic fluorescence, absorption spectroscopy, electrophoresis and photovoltaic renewable energy generating systems, hardware and software.

- . **Business type:** retail sales, wholesale supplier, importer
- . **Product types:** photovoltaic systems, solar electric power systems, solar roofing systems, solar outdoor lighting systems, DC to AC power inverters.
- . **Address:** Mansoor - 14 Ramadan St., Aseel Complex - 2nd Floor, Baghdad, Iraq
- . **Tel:** (964) 14 22 42 45
- . **Web Site:** <http://www.areejbaghdad.com>

Jilajil Solar & Alternative Energy House

- . **Business type:** retail sales, importer
- . **Product types:** cathodic protection systems, solar outdoor lighting systems, solar water heating systems, solar cooking systems, solar charge controllers, solar electric power systems.
- . **Address:** District 718 Street 18 building 98 flat 5, Baghdad-Zayona, Iraq Republic, P. O. Box 19100 Baghdad-Hay almothana
- . **Tel:** (964) 79 01 35 31 84

United Co for Mech. & Elec. Ind.

- . **Business type:** manufacturer, exporter, importer
- . **Product types:** water storage tanks, heat exchangers, air cooling systems, waste treatment systems, Oil Field Surface Equipment.
- . **Address:** P. O. Box 2119 AlJadiria, Baghdad, Baghdad Iraq
- . **Tel:** (964) 77 88 839
- . **Fax:** (962) 65 65 03 07

4. JORDAN

4.1 National Energy Research Centre (NERC)

The National Energy Research Center (NERC) founded in 1998 working under the umbrella of the Higher Council for Science and Technology (HCST).

Website : www.nerc.gov.jo

Address : P. O. Box 1945 Al-Jubaiha 11941 Amman, Jordan Tel: (962) 65 33 80 43 Fax: (962) 65 33 80 43

Mission : To promote research and development in the fields of renewable energy,

raising the standards of energy for different economic sectors and energy conservation. To achieve these goals the center is working on:

- . Design solar collectors and solar thermal systems for residential and industrial applications.
- . Testing of solar collector and on site testing thermal systems.
- . Training activities in the field of solar thermal applications.
- . Preparing a wind database and identifying and evaluating the promising site for wind farms.
- . Conducting technical consultations in wind energy utilization for public and private sectors.
- . Manufacturing, installing and maintaining mechanical wind pumping systems for water.
- . Designing and manufacturing small wind turbines and their components and transferring their production technology to the private industry.
- . Conducting energy audits in industry and commercial sector.
- . Consultancy prior to new investment.
- . Promotion of energy saving equipment.
- . Promoting rational use of energy.
- . Establishing an information system.
- . Conducting training courses in the field of energy conservation.
- . Installation, testing, evaluation and testing.
- . Research and development.
- . Organization of training courses, seminars and conferences.
- . Design, simulation and optimization of PV.
- . Conducting studies to determine the feasibility of oil shale utilization.
- . Establishing energy data for Jordan.
- . Energy database management and analysis.

National Links with EU or Other Organizations: Germany, Denmark, USA, ESCWA, UNEP, UNDP, MEDENER, GE (WB).

Main National Renewable Energies Implemented Projects:

- . 320Kw (4x80Kw) wind farm established in 1988 in cooperation with Danish firm.
- . 1.2MW (5x225Kw) established in 1996, in cooperation with German government under a program called ELDORADO.
- . 75-90MW wind IPP project is proposed by the Ministry of Energy and Minerals.
- . Locally manufactured mechanical wind mill used for pumping station were used in different places in Jordan.
- . 30% of the houses in Jordan is equipped with solar water heaters, and a total collector area of 1.35 million square meter was installed until 2002.
- . More than 100 PV systems are installed in remote areas.
- . 1MW of electricity biogas project is installed and owned, operated by Jordan Biogas Company, and is going to be expanded up to 5MW soon.
- . Completion of wind Atlas in cooperation with Danish experts.
- . In 2002 a feasibility study to install two wind farms, one in Fujaij/Shobak and Wadi Araba with a capacity of 25 MW each were completed.

4.2 Renewable Energy Business in Jordan: Modern

Times International For Energy Systems

- . **Business type:** retail sales
- . **Product types:** solar water heating components, solar outdoor lighting systems, remote home power systems, solar air heating systems, solar electric power systems.
- . **Address:** Amman-Sweifeih , Barakeh Centre, Alwakalat Street, Jordan 11195
- . **Tel:** (962) 65 81 18 99

- . **Fax:** (962) 65 82 95 55
- . **Web Site:** <http://www.mties.com>

Solar tracker New solar tracker device (System). It is very cheap compared with the most precise and/or effective computer controlling systems in the world. Maintenance is negligible, due to the accurate design criteria.

- . **Business type:** Solar Tracker
- . **Product types:** Solar Tracker.
- . **Service types:** Invention and Development
- . **Address:** Al.Nuzha, Madaba, Madaba Jordan 17110
- . **Tel:** (962) 79 58 81 517/ 79 57 78 978
- . **Fax:** (962) 53 24 27 45
- . **Web Site:** http://www.geocities.com/new_solar_system_2003/index.html

Greenline Trd.& Contracting Est

- . **Business type:** importer
- . **Address:** 3rd Fl.,Adnan Halawa Complex.Wadi Sir Ind. Zone, Amman, Amman Jordan 11844
- . **Tel:** (962) 65 82 03 95/ 65 82 03 97

Gulf Universal Investment And Trading Co.

- . **Business type:** retail sales, wholesale supplier
- . **Product types:** electric cars, natural daylighting, water pumps, photovoltaic modules, air cooling system components, air heating systems, educational modules, .
- . **Address:** Baghdad Str., Irbid, Jordan 21110
- . **Tel:** (962) 27 27 68 59
- . **Fax:** (962) 27 27 68 59

Ideal Solar Energy Co. Ltd. Hanania

- . **Business type:** manufacturer, retail sales, wholesale supplier, exporter
- . **Product types:** solar pool heating systems, solar water heating components, solar water heating systems, water heating systems.
- . **Address:** Elia Abu Madi Street - Shmeisani, Amman, Jordan 11181
- . **Tel:** (962) 65 66 33 55

Millennium Systems for Advanced Technologies

- . **Business type:** retail sales, wholesale supplier, exporter
- . **Product types:** solar water heating systems, wind energy systems (small), wind energy systems (large), air cooling systems, solar electric power systems, solar pool heating systems, solar cooling system.
- . **Address:** P. O. Box 930, Amman, Jordan 11821
- . **Tel:** (962) 65 35 70 74

5 KINGDOM OF BAHRAIN

5.1 Bahrain Center for Studies & Research (BCSR)

Website : www.bcsr.gov.bh

Address : P. O. Box 496 Manama Kingdom of Bahrain Tel: (973) 17 75 45 25/ 17 75 47 57 Fax: (973) 17 75 40 10

Mission : BSCR is to serve the Bahraini community by conducting applied research and offering consultation to leaders and decision makers in both the public and private sectors in order to:

- . Establish the importance of applied scientific research.
- . Create a cadre of Bahraini researcher in the area of national priority in the area of energy,

environment, economics, social studies, and science and technology policies.

- . Measure and analyze economic and social development and public opinion national issues.
- . Adopt a proactive stance with regard to major issues facing Bahrain.

National Links with EU or Other Organizations: ESCWA, UNEP, UNDP Main

National Renewable Energies Implemented Projects:

- . Implementing a mobile solar powered reverse osmosis desalination unit with a capacity of 200 gallons per day.
- . Solar and wind powered mobile generator with a capacity of 1.5KW.
- . Energy conservation project in Bahrain buildings.

5.2 Renewable Energy Business in Bahrain Al

Khajah Est. & Factories

- . **Business type:** manufacturer, retail sales, wholesale supplier, exporter, importer
- . **Product types:** compact fluorescent lighting.
- . **Address:** P. O. Box 5042, Manama, Bahrain
- . **Tel:** (973) 17 73 08 11
- . **Fax:** (973) 17 73 13 40

Future Technology

- . **Business type:** manufacturer, retail sales, wholesale supplier, importer, exporter, contractor, engineering, energy audit, survey and consultancies
- . **Product types:** air cooling systems, energy efficient appliances, energy efficient homes and buildings, HID lamps, compact fluorescent light bulbs, meters and measuring equipment, Lighting Energy Saving Controllers, Occupancy Sensors, Power Factor Correction Systems..
- . **Address:** 196 Aldakhil Avenue, 321, P. O. Box 3271, Manama, Bahrain
- . **Tel:** (973) 17 71 04 44
- . **Fax:** (973) 17 74 29 60

6 KINGDOM OF SAUDI ARABI

6.1 King AbdulAziz City for Science & Technology (KACST)/Energy Research Institute

Website : www.kacst.edu.sa

Address : P. O. Box 6086 Riyadh 11442
K.S.A. Tel: (9661) 48 83 555 Fax: (9661) 48 83 756

Mission : The institute aims at encouraging utilization of renewable energy by:

- . . . Determining related energy problems and their solutions.
- . . . Transforming and developing energy technologies that are socially and environmentally acceptable for the kingdom. Preparing related studies on energy conservation and its utilization. Assessing renewable energy sources in the kingdom.
- . . . Supporting the private sector for improving the energy uses in various applications.
- . . . Contributing to the development of manpower in the field of energy information and technologies.
- . . . Promoting public awareness in the field of energy efficiency, sources and utilization.

6 .2 National Energy Efficiency Program (NEEP)

Hosted by King AbdulAziz City for Science & technology (KACST) **Website :** www.neep.org.sa

Address : P. O. Box 6086 Riyadh 11442
K.S.A. Tel: (9661) 48 83 555 Fax: (9661) 48 83 756

Mission : It is designed to assist the energy sector in Saudi Arabia to meet the rapidly growing power and energy demand by introducing efficient means of utilization and rational consumption patterns, while protecting the local environment and providing a sustainable alternative to increasing generation, transmission and distribution capacity. NEEP will fulfill its mission by working in the following fields:

- . Energy audit surfaces and industry support.
- . Energy efficiency information and awareness.
- . Local management and time of tariff.
- . Efficient utilization of oil and gas.
- . Promotion of energy services industry.
- . Energy efficiency label and standard for appliances.
- . Energy efficiency codes for design and construction of new building.
- . Technical management training.

6.3 Islamic Foundation for Science, technology & Development (IFSTAD)

Website : www.escwa.org.lb/evdp/resources/details.asp

Address : P. O. Box 9833 Jeddah
21423
K.S.A.
Tel: (9662) 63 22 292
Fax: (9662) 63 22 274

Mission : IFSTAD is a foundation set by the organization of the Islamic Conference (OIC) for promoting science and technical research in the fields of energy, agriculture, computer science, water and soil science in the Muslim world.

6.4 King Fahd University of Petroleum & Minerals (KFUPM)/Research Institute

Website : www.kfupm.edu.sa/ri/

Address : P. O. Box 5040
Dahran 31261
Tel: (9663) 86 02 200
Fax: (9663) 86 03 661

Mission : Serving the nation by utilizing university research to serve the needs of government organizations, local industry and business, adapt imported technologies to Saudi environment. The institute comprises several centers among them are the Center for Engineering Research (includes department of materials, urban area engineering, engineering energy systems), the Center of Environment and Water, and Center for Petroleum and Minerals.

National Links with EU or Other Organizations: USA, ESCWA, UNDP

Main National Renewable Energies Implemented Projects:

- . 350kW PV System (2155MWh), Solar Village, 1981-1987, AC/DC electricity for remote areas.
- . 350kW PV hydrogen production plant (1.6MWh), Solar Village, 1987-1993, demonstration plant for solar hydrogen production.
- . Solar cooling, Saudi, 1981-1987, Development of solar cooling laboratory.

- . 1kW solar hydrogen generator, Solar Village, 1989-1993, hydrogen production testing and measurement (laboratory scale).
- . 2kW solar hydrogen (50kWh), KAU, Jeddah, 1986-1991, testing of different electrode materials for solar hydrogen plant.
- . 3kW PV test system, Solar Village, 1987-1991, demonstration of climate effects.
- . 4kW PV system, southern regions of Saudi Arabia, 1996, AC/DC electricity for remote areas.
- . 6kW PV system solar seawater desalination, Solar Village, 1996-1998, PV grid connection.
- . PV water desalination (0.6m³ per hour), Sadous Village, 1994-1999, PV/RO interface.
- . Solar-thermal desalination, Solar Village, 1996-1997, Solar desalination of brackish water.
- . PV in agriculture (4kWph), Muzahmia, 1996, AC/DC grid connected.
- . Long-term performance of PV (3kW), Solar Village, since 1990, performance evaluation.
- . Fuel cell development (100-1000W), Solar Village, 1993-2000, hydrogen utilization.
- . Internal combustion engine (ICE), Solar village, 1993-1995, hydrogen utilization.
- . Solar radiation measurement, 12 stations, 1994-2000, Saudi solar atlas.
- . Wind energy measurement, 5 stations, 1994-2000, Saudi solar atlas.
- . Solar dryers, Al-Hassa/Qatif, 1988-1993, food dryers (dates, vegetables, etc.).
- . Two solar-thermal dishes (50kW), Solar Village, 1986-1994, Advanced solar stirling engine.
- . Energy management in buildings, Dammam, 1988-1993, Energy conservation.
- . Solar collectors development, Solar Village, 1993-1997, domestic, industrial, agricultural.
- . Solar refrigeration, Solar Village, 1999-2000, desert application.

6.5 Renewable Energy Business in Saudi Arabia

Power Technologies Trading Est.

We are specialist in battery field in kingdom of Saudi Arabia and keep stock of battery for immediate requirement. Specially we are providing home and w/h shop security system.

- . **Business type:** retail sales, wholesale supplier, importer
- . **Product types:** rechargeable batteries, solar electric power systems, solar outdoor lighting systems, automotive starting batteries, DC to AC power inverters, battery chargers, lead acid batteries and nickel cadmium, safety and security system.
- . **Address:** King Fiasal Street, Cross - 19 / 20, Al-Khobar, , Eastern Province Kingdom Of Saudi Arabia 31952
- . **Tel:** (966) 38 67 01 63 / 38 98 46 00
- . **Fax:** (966) 38 97 75 18

A1 Solar Prince (GET)

- . **Business type:** retail sales, wholesale supplier, service, importer, exporter
- . **Product types:** Solar water heating systems, solar electric power systems and accessories, solar pool heating systems, DC lighting, aerogenerators & wind energy components, Solar Airconditioning units, PV panels & accessories .
- . **Service types:** system installation, system design, maintenance and repair
- . **Address:** P. O. Box 6934, Dammam 31452, Saudi Arabia
- . **Tel:** (966) 38 39 03 69
- . **Fax:** (966) 38 39 15 21

Abdulla H Al Mutawa Sons Co.

Interested to associate a trade house firm who can supply us spare parts for GE/westinghouse/Gas Turbine spares other precision instruments, valves, pressure & temperature gauges etc on a competitive prices.

- . **Business type:** retail sales, importer
- . **Product types:** gas turbine electric generators, steam turbine electric generators.
- . **Address:** King Faisl Street, Dammam, Eastern Province Saudi Arabia 31413
- . **Tel:** (966) 38 56 11 69
- . **Fax:** (966) 38 50 25 57

Al Raheeb Electronics Est.

Business type: wholesale supplier Product types: lead acid batteries, deep cycle batteries, rechargeable batteries, electric vehicle batteries, marine batteries, automotive starting batteries. **Business type:** retail sales, wholesale supplier, exporter, importer

- . **Product types:** Volta Fiamm-GS batteries.
- . **Address:** Yanbu Street Crose no 19/20 Thuqba, Al Khobar, Saudi Arabia Saudi Arabia 79349
- . **Address:** P. O. Box 79349
- . **Tel:** (966) 38 98 46 00
- . **Fax:** (966) 38 97 75 18

Al Raheeb Electronics

- . **Business type:** wholesale supplier, exporter, importer
- . **Address:** Yanbu Street Cros No 19/20 Thuqba, Al Khobar, 31952 Saudi Arabia 79349
- . **Tel:** (966) 38 98 46 00
- . **Fax:** (966) 38 97 75 18

Al-Afandi Solar Wafers and Cells Factory

- . **Business type:** manufacturer, exporter of multi-crystalline solar wafers 4 and 5 inch wafers
- . **Product types:** High quality 4, 5 and 6 inches solar wafer for sale. Efficiency after conversion to solar cells 15% Resistivity 1-3 ohm cm. Thickness 270-300 micron or 330-370 micron.
- . **Address:** P. O. Box 452, Jeddah, 21411, Saudi Arabia
- . **Tel:** (966) 26 63 44 42
- . **Fax:** (966) 26 65 75 97

Al-Ziadi for Trading & Contracting

- . **Business type:** manufacturer
- . **Product types:** cathodic protection systems.
- . **Address:** Sidqi Street, Makkah, Makkah Saudi Arabia 6269
- . **Tel:** (966) 25 50 20 07

Alafaq for Solar Equipment

- . **Business type:** wholesale supplier, exporter, importer
- . **Product types:** solar water pumping systems, solar water heating systems, remote home power systems, solar garden lights.
- . **Address:** 1 Saba Masajid Street, Madina, Madina Saudi Arabia
- . **Tel:** (966) 59 28 63 39

Alwahah Cooler Factory

- . **Business type:** manufacturer, wholesale supplier, exporter, importer
- . **Product types:** air cooling system components, air cooling systems, water heating systems, refrigerators and freezers, water cooling systems, appliances.
- . **Address:** Al Karj Roda, P. O. Box.2956, Riyadh 11461, Saudi Arabia
- . **Tel:** (966) 14 95 18 82
- . **Fax:** (966) 14 95 38 06

Building Lighting Est.

- . **Business type:** retail sales, wholesale supplier, exporter
- . **Product types:** solar outdoor lighting systems, solar garden lights, led lighting, solar water pumping systems, solar roofing systems, dc lighting, solar traffic light solar road stud speed humps traffic light.
- . **Address:** Al Hasse St., Riyadh, Riyadh Saudi Arabia P. O. Box 7541 Riyadh 11472
- . **Tel:** (966) 14 78 51 02

. **Fax:** (966) 14 76 02 29 **Commercial Services Center (CSC) Saudi Turbines**

- . **Business type:** wholesale supplier, importer

. **Product types:** We sale , buy gas & steam turbines hot gas path components - and combustion components, include: complete turbine bladed rotors for (MW501G) MW(301G) and blades (W191) (TG16) etc ,1st, 2nd and 3rd 4th stage buckets; 1st, 2nd and 3rd stage blades; 1st, 2nd and 3rd stage nozzles; combustion liners; transition pieces; cross fire tubes for the following gas turbines, MW501G, MW301G, W501D, W251, W191, TG16, TG20Bs, GE,FR 7, 5 , 3 etc , all parts in hands ready for shipment. .

. **Service types:** Gas, steam turbine spare parts seller, buyer
. **Address:** King Khakid St Al-jomaih BlgSweet (402) Dammam, EP. K.S.A, Dammam , EP Kingdom of Saudi Arabia 31422
. **Tel:** (966) 38 32 61 54/ (966) 38 34 26 90
. **Fax:** (966) 38 34 42 76

Gulf Chain Trading Est

. **Business type:** wholesale supplier, exporter, importer
. **Product types:** gas turbine electric generators, backup power systems, defense,industrial plants ,equipments and spares.
. **Address:** Ali Bin Abi Talib Road/ P. O. Box 41056, Riyadh, Central Kingdom Of Saudi Arabia 11521
. **Tel:** (966) 14 46 15 33

Hitec Modeco

. **Business type:** manufacturer, retail sales, wholesale supplier, exporter
. **Product types:** battery chargers, lead acid batteries, DC lighting, nickel cadmium batteries, uninterruptable power supplies UPS, telecommunications power systems.
. **Service types:** consulting, design, installation, construction, project development services, contractor services, maintenance and repair services
. **Address:** P. O. Box 93711, Riyadh, 11683 Saudi Arabia 11683
. **Tel:** (966) 14 19 64 25
. **Fax:** (966) 14 19 64 17

International Telecommunication System Operation

. **Product types:** flooded lead acid batteries, dc powered appliances, uninterruptable power supplies ups, flooded lead acid batteries.
. **Address:** Industrial Area III, P. O. Box 88522, Riyadh, Saudi Arabia 11672
. **Tel:** (966) 12 17 90 11
. **Fax:** (966) 12 17 90 22

M.A. Raheem Khan

. **Business type:** wholesale supplier, importer
. **Product types:** air filtering and purification system components, water pumps, water filtering and purification systems, air cooling system components, gas turbine electric generators, waste treatment systems.
. **Address:** King Abdul Aziz Street on 10th Cross, Al-Khobar, Eastern Saudi Arabia 31952
. **Tel:** (966) 38 65 10 94
. **Fax:** (966) 38 98 39 72

Mohammed A. Al Faddaghi & Partners

. **Business type:** Manufacturer, Wholesale Supplier, Exporter, Importer
. **Product types:** Fuel powered electric generators, backup power systems, MAN, SCANIA GENSETS.
. **Address:** P. O. Box 26162, Riyadh, Kingdom of Saudi Arabia 11486
. **Tel:** (966) 14 95 30 00
. **Fax:** (933) 14 95 40 00

Mohammed S Aboud Al Amoudi Est

. **Business type:** wholesale supplier, importer

- . **Product types:** fluorescent light bulbs/ switches sockets.
- . **Address:** Southern Shopping Center Main Road, Jeddah, Saudi Arabia 21474
- . **Tel:** (966) 26 48 43 50

OLAYAN - General Contracting Co

- . **Business type:** retail sales, wholesale supplier, exporter, importer
- . **Product types:** fuel powered electric generators, wind turbines (large), wind energy systems (large).
- . **Address:** P. O. Box 1227, Jeddah, Saudi Arabia 21431
- . **Tel:** (966) 26 93 15 25/ (966) 38 82 08 88

Rowad National Plastic Company Limited

- . **Business type:** manufacturer, wholesale supplier, exporter
- . **Product types:** battery containers, battery components.
- . **Address:** P. O. Box 29452, Riyadh 11457, KSA Saudi Arabia
- . **Tel:** (966) 12 65 19 66
- . **Fax:** (966) 12 65 19 73

Satellites Trading Est.

- . **Business type:** wholesale supplier
- . **Product types:** lead acid batteries, deep cycle batteries, rechargeable batteries, electric vehicle batteries, marine batteries, automotive starting batteries.
- . **Address:** King Khalid Street 5th/6th Cross, AL-Khobar, Saudi Arabia 31952
- . **Tel:** (966) 38 94 11 20

Saudi Solar Heaters Factory

- . **Business type:** manufacturer, retail sales, wholesale supplier
- . **Product types:** solar water heating systems.
- . **Service types:** consulting, design, installation, engineering, maintenance and repair services
- . **Address:** P. O. Box 68935, Riyadh 11537, Saudi Arabia
- . **Tel:** (966)12 65 2031
- . **Fax:** (966) 14 62 46 20

Shuwayer Electrical Engineering Systems

- . **Business type:** manufacturer, retail sales
- . **Product types:** energy efficient homes and buildings, home automation, meters and measuring equipment, uninterruptable power supplies UPS, solar electric power systems, solar garden lights, LV/MV Distribution & Control/Relay Panels, Synchronization Panels, Custom Built Panels.
- . **Address:** P. O. Box 11152, Dammam 31453, Saudi Arabia
- . **Tel:** (966) 38 46 83 58
- . **Fax:** (966) 38 42 65 14

WALCO

- . **Business type:** wholesale supplier, exporter, importer
- . **Product types:** home automation-construction-interior design-IT.
- . **Service types:** consulting, installation, engineering, project development services, maintenance and repair services
- . **Address:** P. O. Box 66381, Riyadh 11576, Saudi Arabia
- . **Tel:** (966) 14 66 16 72/87
- . **Fax:** (966) 14 66 17 02

7. KUWAIT

7.1 Kuwait Institute for Scientific Research (KISR)

Website : www.kisr.edu.kw

Address : P. O. Box 24885
Safat 13109
Kuwait
Tel: (965) 48 36 100/ 48 16 988
Fax: (965) 48 46 891/ 48 36 637

Mission : KISR promotes and coordinates development of science and technology in Kuwait by carrying out applied scientific research. This will advance the industry, preserve the environment, and improve the energy and water resources.

National Links with EU or Other Organizations: UNDP

Main National Renewable Energies Implemented Projects: Kuwait executes numerous number of projects in the area of renewable energy during the 80th of the previous century, but it has limited its research now to the area of energy on conventional energy (petroleum, natural gas, petrochemical, refining, etc.), energy conservation and environment. Some of the implemented projects are:

- . Two projects on solar cooling.
- . Numerous applications of PV in street lighting, traffic signs, communication.
- . Project on thermal energy storage to be used during peak load.

7.2 Renewable Energy Business in Kuwait:

Al Tafoog International

- . **Business type:** wholesale supplier, importer
- . **Product types:** lead acid batteries, rechargeable batteries, fluorescent lighting .
- . **Address:** P.O.BOX : 1465 , SAFAT , KUWAIT KUWAIT 13015
- . **Tel:** (965) 48 20 083/ 7
- . **Fax:** (965) 48 20 085

Bashaer Al Salam Trad Est

- . **Business type:** retail sales, wholesale supplier, importer
- . **Product types:** fluorescent light bulbs, compact fluorescent light bulbs, compact fluorescent lighting fixtures and ballasts.
- . **Address:** Office # 4- 3rd Floor - Dubai Complex Center , Jaleeb Al Shouwaikh , Kuwait Kuwait 92400
- . **Tel:** (965) 43 13 506
- . **Fax:** (965) 43 18 163

8 LEBANON

8.1 The Lebanese Association for Energy Control & Environment (ALMEE)

It is a non-political and a non-profit association

Website : www.almee.org.lb

Address : P. O. Box 50184 Beirut,
Lebanon Tel: (961) 13 85 043
Fax: (961) 13 83 908

Mission : To develop, increase and promote all the scientific and technical methods and means that allow a better management of energy as well as related economic on national level in the following fields:

- . Renewable energies: solar energy, wind power energy, biomass, wood, etc.
- . Exploitation of the electrical energy.
- . Building; installation, glazing.

- . Air conditioning, heating.
- . Heat pump.
- . Transportation.
- . Industrial method.
- . Environment waste.

8.2 National Renewable Energy Research Center (NREC) Website :

www.cnrs.edu.lb/erg_ctr.htm

Address : NREC via LNCSR

P. O. Box 11-8281
Beirut, Lebanon
Tel: (961) 18 22 670
Fax: (961) 18 22 639

Mission : The center is working on the following field in order to fulfill its objectives:

- . Building up a solar map and wind map of Lebanon.
- . Establishing standards for solar heaters of water, implementing a pilot plant for mini hydroelectricity.

National Links with EU or Other Organizations: France, EU, ESCWA, GE (WB)

Main National Renewable Energies Implemented Projects:

- . 15 hydro-electric plants were installed with a total installed capacity of 283.1MW, but the actual capacity is 211.7MW.
- . 6 wind turbines with a capacity of 2MW were installed in 1999 by a private investor, but none of them were made operational.
- . Promotion of use of solar domestic water heaters is currently going with cooperation of Ministry of Electricity and Water (MEW) and UNDP.
- . Proposing Energy Conservation Center by both MEW and UNDP.

8.3 Renewable Energy Business in Lebanon Issam

Bou Nahed Harb

- . **Business type:** wholesale supplier, exporter, importer,
- . **Product types:** alternative homes and buildings.
- . **Address:** Hboub - Sara , Jbail, Jabal Lubnan Lebanon 00961
- . **Tel:** (961) 37 80 102

Kinana S.A.R.L

- . **Business type:** importer
- . **Product types:** lead acid batteries.
- . **Address:** Tripoli, Lebanon
- . **Tel:** (961) 34 44 498
- . **Fax:** (961) 62 01 807

SETRI sarl

Our Company is specialized in turnkey industrial, Petroleum & power plant and mainly working in Lebanon, Middle East, Central Asia & Africa.

- . **Product types:** biomass energy systems, alternative fuel vehicles, wind energy system components (large), meters and measuring equipment, gas turbine electric generators, waste treatment systems, Turnkey Petroleum Projects, Bio Fuel Projects, fuel powered electric generators, gas turbine electric generators, hydro energy systems (large), packaged power systems, remote home power systems, Power Generation Switchgear, Gas Fired Power Generation, Steam and gas Turbines, Wind and Hydro..
- . **Address:** 27 Badaro str, Beirut, LEBANON 961
- . **Tel:** (961) 13 80 061

Fax: (961) 13 80 126

9. LIBYA

9.1 Center for Solar Energy Studies (CSES) Website :

www.nasrlybia.net/researchcenters.htm

Address : P. O. Box 12932

Bab Ben Ghasheer

Tripoli, Libya

Mission : The center carries out studies and research programs in the field of solar energy and proposes plans for wider usage of solar energy as well as providing a better understanding of this vital field. This center is currently combined with the Water Technologies Research Center and became Renewable Energy and Desalination Research Center.

9.2 International Energy Foundation (IEF) Website :

www.eco-web.com/register04617.html

Address : P. O. Box 83617

Tripoli, Libya

Tel: (218) 21 33 31 832

Fax: (218) 21 33 31 831

Email: lef-ngo@ief.ngo.org

Affiliations: ECOSOC/GEF/UNIDO/MAP

Mission : Dissemination of Information in the field of energy, contribution to the development of the field, establishment of contracts among people and affiliations working in the field, cooperation with relevant individuals and firms.

National Links with EU or Other Organizations: Not Known

Main National Renewable Energies Implemented Projects:

- . Solar desalination project.
- . The practical field project for solar water heaters.
- . The experimental wind farm project in Zawara, in participation with the German Institute (GTZ).
- . The study of the real value of wind velocities, a project which covers the coastal area.
- . The installation with a wind system with a capacity of 1000 W.
- . The wind and solar radiation atlas in conjunction with the public electricity company.
- . The use of solar cells for electrical energy generation in conjunction with the General Electricity Company (GEC).
- . The use of heat transfer for generating electricity in conjunction with GEC.

10 MOROCCO

10.1 Centre for Development of Renewable Energies (CDER)

CDER is a public, industrial and commercial institution attached to the Ministry of Energy and Mining.

Website : www.cder.org.ma

Address

: BP, 509, Rue Machaar, AlHaramissil Marrakech, Morocco Tel: (004) 30 98 22
Fax: (004) 30 97 95

Mission : The center is promoting renewable energy by:

- . Research and development of Renewable Energy Sources.
- . Training and consultancy.
- . Promotion and information.
- . Certification and evaluation.
- . Monitoring of projects and programs.
- . Energy supply security.
- . Access to energy.
- . Protection of the environment.
- . Electricity production by using wind parks, solar thermal projects.
- . Decentralized rural electrification by using PV.
- . Wind energy output reached 2003 GWh in 2003 compared to 194 GWh in 2002.

10.2 Centre National Pour la Recherche Scientifique et Technique (CNRST) Website :

www.cnr.ac.ma

Address : 52 Avenue, Omar Bin El-Khattab BP. 8027 Nations Unies, 10102 Rabat Morocco Tel:
(212) 37 77 42 15/37 77 07 96 Fax: (212) 37 68 63 87

Mission : One of the various tasks of the National Center of Scientific and Technological research (CNRST) is to develop energy sources by conserving the conventional sources and promoting renewable energy ones.

National Links with EU or Other Organizations: Germany, Spain, MENDENER, MEDREC, OME, GE (WB)

Main National Renewable Energies Implemented Projects:

Morocco is one of the Arab Countries who achieved reasonable success in implementing renewable energy projects. Among these projects are:

- . 140MW wind farm at Tangier.
- . 50MW wind farm near Tetouan.
- . 60MW wind facility at Tarfaya.
- . Supplying 16,000 rural homes with solar electricity.
- . Installing 111,332 solar water heaters in 2004.

10.3 Renewable Energy Business in Morocco:

African Energy

African Energy is a specialized distributor of solar electric and power back-up equipment focusing exclusively on the African market. We sell only to Africa, and concentrate primarily on serving the needs of renewable energy companies based there. Because of our specific focus, we receive exceptional pricing from the manufacturers we represent, and we understand the challenges of doing business in Africa. Door to door shipment, 24-hour service, flexible payment arrangements, and the continent's best prices. We carry Trace, Outback, Kyocera, GE Energy, Morningstar, Steca, Southwest Wind, Surette, Deka and other fine brands.

- . **Business type:** wholesale supplier, exporter, system sales, specialized retail sales
- . **Product types:** solar electric power systems, wind energy systems (small), wind energy system components (small), photovoltaic modules, photovoltaic systems, solar water pumping systems, solar refrigeration systems, uninterruptable power supplies UPS, Solar Home Systems.

- . **Service types:** system design, training
- . **Address:** Box 12641, Scottsdale, Arizona USA, Tunisia, Morocco, Senegal, Gambia, Guinea (Conakry), Mali, Burkina Faso, Ghana, Nigeria, Cameroon, Chad, Congo (DRC), Angola, Namibia, Zimbabwe, Zambia, Malawi, Rwanda, Tanzania, Kenya, Uganda, Ethiopia, Algeria, Sierra Leone, Liberia, Niger, Gabon, Madagascar, Mozambique, Burundi, Djibouti, Somalia 85267
- . **Tel:** 1-480-699-9275
- . **Fax:** 1-480-556-6183
- . **Web Site:** <http://www.africanenergy.net> **Al Hadika Al Khadra**
- . **Business type:** service
- . **Product types:** alternative construction, energy efficient appliances, portable power systems, Eco-Holidays.
- . **Service types:** education and training, research and development, system design
- . **Address:** Cap Spartel, Tanger, Morocco B.P.1223,90000

Azaghar Sun

- . **Business type:** wholesale supplier, importer
- . **Product types:** photovoltaic modules, solar water heating systems, fluorescent lighting fixtures and ballasts, alkaline batteries, compact fluorescent lighting fixtures and ballasts, compact fluorescent lighting fixtures and ballasts.
- . **Address:** 153, Bloc D Riad Essalam, Agadir, Agadir Morocco 80000
- . **Tel:** (212) 48 22 75 64
- . **Fax:** (212) 48 22 22 31 **Hamas Snc**
- . **Business type:** retail sales, importer, Installater, contractor, Engineering, Counsel, Agent, Assistance
- . **Product types:** wind power plants, solar electric power systems, photovoltaic module mounting systems, solar electric power systems, wind turbines (small), telecommunications power systems, études et constructions, assistance.
- . **Address:** 17 NÁ 104 Yacout. Ain Choc, Casablanca, Morocco 20150
- . **Tel:** (212) 64 31 44 27

ISTICHAR

- . **Business type:** Consulting
- . **Product types:** energy efficient homes and buildings, photovoltaic systems, solar water heating systems, solar water pumping systems.
- . **Service types:** Business to Business
- . **Address:** 485, rue Amr Bensalama - Issil, Marrakech, Marrakech Morocco 40000
- . **Tel:** (212) 44 30 61 87
- . **Fax:** (212) 44 31 08 78

MENELSI

- . **Product types:** hydro energy systems (large), wind energy towers and structures (small), photovoltaic module manufacturing equipment, Assistance-Collaboration.
- . **Address:** 17 Nj 104 Yacout. AIN CHOC, CASABLANCA, Morocco 20150
- . **Tel:** (212) 64 31 44 27

Noor Web

- . **Business type:** retail sales, wholesale supplier, importer
- . **Product types:** charge controllers.
- . **Service types:** big scale SHS Program operator, installation, engineering, project development
- . **Address:** 12, Boulevard Moulay Abdallah, Marrakech, Morocco 40000
- . **Tel:** (212) 44 31 04 27/ 44 31 05 72
- . **Fax:** (212) 44 31 04 99

Sahara Wind Inc.

- . **Product types:** Wind Energy Project (large), Investment and financial services, Industrial

integration of wind energy system components, Large Wind Farm planning, High Voltage DC transfer Infrastructure, complementary energy systems, applications, etc....

- . **Address:** 32, Rue Lalla Meryem Souissi, Rabat, Morocco 10100
- . **Tel:** (212) 61 33 20 68
- . **Fax:** (212) 37 65 08 41

Seeck Contact Research

- . **Product types:** alternative home and building construction materials, solar water heating systems, water filtering and purification systems, air heating systems, air cooling systems.
- . **Service types:** consulting, project development services
- . **Address:** B.P.1723 R.P. El Ouedghiri, Rabat, Morocco
- . **Tel:** (212) 17 80 910

SMARTEL

- . **Business type:** retail sales
- . **Product types:** water pumps, water heating systems, DC to AC power inverters, appliances.
- . **Address:** 56 amal 4 CYM , RABAT, Morocco 62003
- . **Tel:** (212) 61 37 22 02
- . **Fax:** (212) 37 29 17 99

SMITE

- . **Product types:** photovoltaic systems, solar cooking systems, solar air heating systems, solar water pumping system components, biomass energy systems, cogeneration systems, Photovoltaic irrigation systems.
- . **Address:** Bd Allal El Fassi, Imm. 12, App. 5, SINE, Marrakech, Morocco 40000
- . **Tel:** (212) 61 58 22 76

STEMA, Sarl - Société Technique Maintenance

- . **Business type:** retail sales, installation, importer
- . **Product types:** air cooling systems, air heating systems, heat pumps, solar water heating systems, water pumps, water filtering and purification systems, swimming pools.
- . **Address:** Ave. Mouquaouama, Agadir, Morocco 80000
- . **Tel:** (212) 48 23 97 43
- . **Fax:** (212) 48 23 97 44

UMASOLAR sa

- . **Business type:** distributor, service
- . **Product types:** solar water heaters, photovoltaic modules (PV modules), solar pool heating systems, microhydro powered electric generators, water pumping products.
- . **Service types:** consulting
- . **Address:** Tour Atlas Place Zellaga , Casablanca, MOROCCO
- . **Tel:** (212) 23 05 260

11 PALESTINE

11.1 Palestine Energy & Environment Research Center (PEC)

Website : www.planet.com/~perc/

Address : P. O. Box 85 Rafidia Street, Nablus Palestine Tel: (972) 9 38 48 03/ 38 48 04/ 38 48 05 fax: (972) 9 23 44 13 88

Mission :

It is a national institution responsible for research and implementation of renewable energies and energy efficiency in Palestine. PES was established in 1993 to foster the development of renewable energy, rational use of energy and energy conservation. Its mission includes abatement of gases emissions and clean of the environment. The center services include:

- . Conduct studies and research related to energy and its influence on the local environment in Palestine.
- . Develop and implement national programs for energy conservation, rational use of energy, and implement national programs for utilization of renewable energy.
- . Develop energy conferences, workshops, seminars, awareness and training programs for upgrading human capacities and technical skills and for promotion of clean and efficient technologies.
- . Present Palestine in international conferences and workshops concerned with energy optimization.
- . Cooperation with local and international energy agencies for development of Palestine.
- . Cooperation with national institutions and universities for the development research laboratories that support the standardization and regulation related to renewable energy equipment.

11.2 Energy Research Center (ERC)

An-Najah National University

Website : www.najah.edu

Address : P. O. Box 7 Nablus, West Bank Palestinian Authority Tel: (972) 9 23 86 167 Fax: (972) 9 23 87 982

Mission : It is concerned with research, development, system design, feasibility studies

and training in all conventional and renewable energy fields, energy management, energy conservation and the impact of energy on environment, health and social development. The center is working to fulfill:

- . Conduct scientific research studies and experiments in various conventional and renewable energy fields, and to provide the results to public and private institutions that may need in development projects.
- . Coordination and cooperation with all Palestinian authorities, local universities, industry and others who are interested in applications, research and development of conventional and renewable energy systems and environment.
- . Promote energy efficiency methods and utilization of available energy resources especially renewable energy in feasible projects.
- . Increase public awareness on the best use of energy, energy conservation, and on the feasible renewable energy applications appropriate especially for rural development.
- . Provide professional consultations to local institutions and to conduct projects in the various energy sectors.
- . Build strong scientific relations with Arab and international centers related to energy studies as well as to perform technology transfer.

National Links with EU or Other Organizations: ESCWA, UNDP, MEDENER, MEDREC

Main National Renewable Energies Implemented Projects:

- . Installation of isolated PV energy systems in remote area. It is implemented with the help of the state of Baden Wurttemberg.
- . Supplying seven isolated clinic and one medical center with required electricity for lighting, refrigeration, and operating small medical equipment.
- . Promotion of PV technologies for electrification of isolated areas in (ELDOR ADO project).
- . Development and optimization of a new process for desalination.
- . Solid waste management of Azzoon Municipality.
- . MEDA program.
- . Energy conservation and public lighting management in Tubas program.
- . Established fire metrological stations.
- . Establishment of a biogas digester.
- . Solar water heaters are used in more than 70% of Palestine houses.
- . Implementing an electricity concentration project on encouraging the use of efficient lights (florescent lamps) in Jerusalem area.

12 QATAR

12.1 Scientific & Applied Research Centre (SARC)

Website : www.qu.edu.qa/English/sarc.htm

Address

: P. O. Box 2713 Doha, Qatar Tel: (974) 48 69 950 Fax: (974) 48 60 680

Mission : SARC's main objectives are to include developing experience in scientific,

industrial and agriculture fields, and to contribute to the transfer of technology and adapt it for application in Qatar.

National Links with EU or Other Organizations: UNEP, ESCWA, UNDP

Main National Renewable Energies Implemented Projects: Researchers of the centre have participated in more than 140 workshops, meetings, and conferences. Basic research is concentrated on industries. Research other than industry includes ecology, water, remote sensing, agriculture, and energy resources.

13 SYRIA

13.1 Renewable Energy Center (REC)

Website : www.escwa.org.lb/erdp/resources/details.asp

Address : Ministry of Electricity The Syria Ministerial Cabinet Koualty Street Damascus, Syrian Arab Republic Tel: (963) 11 22 23 086

Mission : REC coordinates, plans and identifies implementation priorities such as:

- . Energy policy planning
- . Resource assessment
- . Energy audits
- . Training and information dissemination
- . Project implementation

13.2 Scientific Studies & Research Center (SSRC)

Website : www.escwa.org.lb/erdp/resources/details.asp

Address : P. O. Box 4470 Damascus, Syrian Arab Republic Tel: (963) 11 77 26 03 Fax: (963) 11 22 37 71 Telex: 41 13 74 SERS SY

Mission : Promote scientific research through the work of the following:

- . Research and development
- . Resource assessment
- . Demonstration and field testing
- . Standardization and code
- . Technology transfer and local manufacturing
- . Testing and certification
- . Training and information dissemination
- . Project implementation

13.3 Atomic Energy Commission (AECS)

Website : www.escwa.org.lb/erdp/resources/details.asp

Address : P. O. Box 6091 Damascus, Syrian Arab Republic Tel: (963) 11 61 11 92 617 Fax: (963) 11 61 12 289

Mission : Develop and promote at national level the use of renewable energy and a better energy management through:

- . Energy policy planning
- . Research and development
- . Resource assessment
- . Training and information dissemination
- . Project implementation

13.4 Syrian Arab Organization for Standardization and Measurement

Website : www.escwa.org.lb/erdp/resources/details.asp

Address : P. O. Box 11836 Damascus, Syrian Arab Republic Tel: (963) 11 44 50 538 Fax: (963) 11 44 13 913 Telex: 92 44 19 99 SASMO Telegram: SYSTAND

Mission : The mission is to develop standards and codes for RE equipment.

National Links with EU or Other Organizations: Italy, Holland, ESCWA, UNEP, UNDP, GE(WB)

Main National Renewable Energies Implemented Projects:

- . Installation of 15,000-20,000 solar hot water systems.
- . Solar wind Atlas of Syria.
- . About 80KWp of solar PV system are installed in the entire country.
- . Technology transfer of 250KWp single crystalline R & D and limited production facility, complete with indoor simulator. 15KWp of cells/modules were produced in 1999. The line was originally setup in cooperation with CEL/India.
 - . The Japanese government has provided technical assistance for four pilot projects in PV to bring electricity to four villages near Aleppo. The project also includes good quality drinking water through water desalination. The total installed power is about 67KWp.
 - . 150KW Nordex machine wind turbine installed at the Northern part of AlBaath City in Donaitra area.
 - . Wind generators for battery charging, water pumping (750W to 50KW) which are locally manufactured (since 1990) by a private company (SAC) located in Adra near Damascus. The wind generators are fully designed, manufactured and installed by this company.
 - . Hydro-power is the only significant renewable energy contribution to Syria energy supply

at current time, providing between 2000GWh and 4000GWh per year.

13.5 Renewable Energy Business in Syria:
Dynamo Industrial Power Engineering

Dynamo power engineering - Syria - specialized in Diesel generating sets- power station over head transmission lines- synchronizing panels- electric distribution boards- lighting- street lighting

- . **Business type:** manufacturer, retail sales, importer
- . **Product types:** DG Diesel generators importing, synchronizing panels, power station, Over Head transmission line.
- . **Address:** Damascus - syria,
- . **Tel:** (963) 93 22 23 94
- . **Fax:** (963)11 45 25 040
- . **Web Site:** <http://www.dynamo-power.com>

Al Sahmat Co.

We are a leading importer for house ware products for more than 40 years and we are interested to start a new business "the solar energy" for water pumping and farm houses electricity.

- . **Business type:** importer
- . **Product types:** solar electric power systems.
- . **Address:** P. O. Box 307, Damascus, Damascus Syria 11
- . **Tel:** (963) 11 22 12 800/ 22 23 610
- . **Fax:** (963) 11 22 10 146

International Business Center, IBC

- . **Business type:** Projects, Technical Studies, Consultancy, Realization and Provision of Materials.
- . **Product types:** Generators, Backup Power Systems (UPS), Industrial Batteries (Nickel Cadmium and Lead Acid), DC to AC Power Inverters, Automatic Voltage Stabilizers, Solar Systems (Photovoltaic Cells, Chargers and Inverters), Wind Energy Systems, DC Power Supply and Chargers, Lightning Protection, Lighting Devices, Voice Communication Systems (PBX and accessories)..
- . **Address:** Victoria Street, Al-Jandali Bldg., Damascus, Syria P. O. Box 4908
- . **Tel:** (963) 11 61 19 935/ (963) 11 61 29 935
- . **Fax:** (963) 11 61 20 416/ (963) 11 23 16 483

International Trade Center

- . **Business type:** wholesale supplier, importer
- . **Product types:** HID lamps, compact fluorescent lighting fixtures and ballasts, fluorescent lighting fixtures and ballasts, compact fluorescent light bulbs, ballast for the fluorescent lamps, hid lamps, all kind of lighting.
- . **Address:** Damascus, Syria, Victoria St, Damascus, Syria 12363
- . **Tel:** (963) 11 22 44 288

REC Renewable Energy Center

- . **Business type:** manufacturer, exporter, importer
- . **Product types:** wind energy systems stand-alone & grid conneted, solar cooking systems, photovoltaic systems, Solar water heating, Biogas plant, wind machines for frost protection..
- . **Service types:** Free Annual and monthly wind and solar energy evaluation for any site by internet
- . **Address:** Salhia, Al Shouhada, Al Souk Al Dawli, B1.28, 3rd floor, Ady Office, Damascus, Syria
- . **Tel:** (963) 11 44 53 007
- . **Fax:** (963) 11 44 53 007

14.1 The National Agency for Energy Conservation (ANME)

It is a public organization created in 1985, under the supervision of the Ministry of Industry, Energy and Small enterprises.

Website : En Cours d'elaboration

Address : 3, 8000 street, Montplaisir, BP 213 1073 Tunis – Beleedere Tunisia Tel: (216) 71 78 77 00 Fax: (216) 71 78 46 24

Mission : Implementation of the state policy in the field of energy conservation through

the promotion of renewable energy, energy efficiency and clean technologies for all energy resources and in various sectors for consumer benefit>

Toward a sustainable development prospect, ANME undertakes all initiatives and actions relating to the reduction of greenhouse gas emissions due to the use of energy by:

- . Participation in the development and implementation of national programmes for energy conservation.
- . Realization of exploitation and strategic studies.
- . Preparation of the institutional framework and the fiscal financial incentives for the energy sector.
- . Supportive actions concerning public awareness, information, education and training or renewable energy and rational use of energy.
- . Realization of research, development and demonstrate projects.
- . Support of the development and the reliability of renewable energy and energy efficiency industry in Tunis.

Promotion of renewable energy while ensuring balance between economic interest, quality of life and environmental protection by:

- . Promotion of PV systems for the electrification of decentralized rural areas.
- . Development of the solar water heaters for the domestic use.
- . Energy valorization of the biomass and optimization of the use of fire wood.
- . Development of wind power.

Adopting rational use of energy by:

- . Conduct of obligatory and periodic energy audit.
- . Promotion of energy efficient and environment- friendly equipment.
- . Technical assistance to small and medium enterprises.
- . Realization of projects concerning legislative issues standards and the promotion of new technologies.
- . Elaboration and management of projects aiming at the substitution and the optimization of energy resources.
- . Organizing of training activities aiming at the target groups.
- . Realization of media campaigns for energy consumers.
- . Planning and conducting activities aiming at public awareness.
- . Organization of symposiums, exhibitions and seminars.
- . Implementation of programs for environmental education.

14.2 National Agency of Renewable Energy Sources (NARES) Website :

www.nares.tn

Address : Centre Urbain Nord
Imm ICF – 2080
Ariana
Tunisie

Mission : NARES is supervised by Tunisian Ministry of the Environment and Land Planning (MELP) with two technical departments; Renewable Energy Sources and Rational use of Energy Sources.

Activity covers a wide field of actions namely:

- . Elaborating adequate programmes encouraging a rational use of the energy and the development of renewable energy sources.
- . Elaborating institutional, legal and financial mechanisms aiming at promoting a rational use of energy and at developing renewable energy sources.
- . Seeking investment projects related to energy control in particular, these benefiting from specific existing assistance mechanisms and ensuring their follow up.
- . Achieving pilot projects and demonstrating ones aiming at the most promising energy sections.
- . Carrying out prospective and retrospective studies relative to the analysis of energy demand and to the impacts of energy control programs.
- . Organizing awareness campaigns and training in the field of energy control.

14.3 National Institute of Scientific & Technical Research (NISTR)

It is part of the Ministry of Scientific Research and Technology (MSRT).

Website : www.mes.tn/tech-borj-cedria/index.html

Address : Technopole Borj Cedria P. O. Box 95 2050 Hammam – Lif – Tunisia Tel: (216) 71 43 02 15 Fax: (216) 71 43 09 34

Mission : Among its various tasks, NISTR is in charge of the development of alternative

energy sources. The research centre on Energy technologies, which is part of NISTR, is located in the Techno Park of Borj Eedria. This Techno Park aims at being the catalyst between research and development activities and industrial ones on renewable energy, water and environment and plant biotechnology. UNEDO has assisted the Techno Park in its initial stage and more extensively on the planning engineering phase of the incubate and to assist international tie-ups with foreign institution.

National Links with EU or Other Organizations: France, UNDP, MEDENER, UNEDO, MEDREC, OME, GE (WB)

Main National Renewable Energies Implemented Projects: Some of the achievements on the field of renewable energy in Tunis:

- . Use of PV systems to supply electrification for approximately 10,000 homes and schools in rural areas, and the equipment of about 20 pumping stations.
- . Installing over 60,000m² areas for the heating of sanitary water in residential and tertiary sectors.
- . Testing the use of animal excrement produced biogas among 50 family homes and one industrial unit.
- . Installing 10 MW-capacity wind power station in the CAP BON area.
- . Distribution of 10,000 lids for home-made bread baking to reduce wood consumption.

14.4 Renewable Energy Business in Tunis: African Energy

African Energy is a specialized distributor of solar electric and power back-up equipment focusing

exclusively on the African market. We sell only to Africa, and concentrate primarily on serving the needs of renewable energy companies based there. Because of our specific focus, we receive exceptional pricing from the manufacturers we represent, and we understand the challenges of doing business in Africa. Door to door shipment, 24-hour service, flexible payment arrangements, and the continent's best prices. We carry Trace, Outback, Kyocera, GE Energy, Morningstar, Steca, Southwest Wind, Surrette, Deka and other fine brands.

- . **Business type:** wholesale supplier, exporter, system sales, specialized retail sales
- . **Product types:** solar electric power systems, wind energy systems (small), wind energy system components (small), photovoltaic modules, photovoltaic systems, solar water pumping systems, solar refrigeration systems, uninterruptable power supplies UPS, Solar Home Systems.
- . **Service types:** system design, training
- . **Address:** Box 12641, Scottsdale, Arizona USA, Tunisia, Morocco, Senegal, Gambia, Guinea (Conakry), Mali, Burkina Faso, Ghana, Nigeria, Cameroon, Chad, Congo (DRC), Angola, Namibia, Zimbabwe, Zambia, Malawi, Rwanda, Tanzania, Kenya, Uganda, Ethiopia, Algeria, Sierra Leone, Liberia, Niger, Gabon, Madagascar, Mozambique, Burundi, Djibouti, Somalia 85267
- . **Tel:** 1-480-699-9275
- . **Fax:** 1-480-556-6183
- . **Web Site:** <http://www.africanenergy.net>

ENOVE

- . **Business type:** manufacturer
- . **Product types:** zinc air batteries, carbon zinc batteries, zinc chloride batteries, R6, R14, R20, 3R12, AA, C, D, 6AS4, 6AS6.
- . **Address:** 28 rue 8601, Tunis - Carthage, Tunisia 2035
- . **Tel:** 21671788100
- . **Fax:** 21671788792
- . **Web Site:** www.groupebismuth.com/enove

Energy Engineering Maintenance Service

- . **Business type:** importer
- . **Product types:** photovoltaic module mounting systems, solar water pumping systems, refrigerators and freezers, solar pool heating systems, photovoltaic systems, solar garden lights.
- . **Address:** 26 Rue Imri El Kais, Hammam-Chatt, Tunisia 1164
- . **Tel:** 216 71 420 674

15 UNITED ARAB EMIRATES

15.1 Emirates Center for Strategic Studies & Research (ECSSR)

Website : www.ecssr.ac.ae

Address : P. O. Box 4567 Abu Dhabi U.A.E. Tel: (971) 26 42 70 00/ 26 42 86 66 Fax: (971) 26 42 88 99/ 26 42 88 122

Mission : Promote scientific investigation of political , economic and social issues

related to the United Arab Emirates. The research is focusing on strategic studies, and economic and social studies.

15.2 Department of Renewable Energy

Ministry of Energy, Electricity & Water

Website : www.uae.gov.ae/moew/

Address : P. O. Box 99979 Dubai, U.A.E. Tel: (971) 42 94 55 55 Fax: (971) 42 94 50 05 **Mission :**
To encourage the use of renewable energy sources especially on electricity production.

National Links with EU or Other Organizations: UNEP, ESCWA

Main National Renewable Energies Implemented Projects:

- . Estimate the renewable energy resources in UAE.
- . Build national abilities in utilizing renewable energy sources.
- . Provide a medium and long range of strategies for renewable energy use.
- . Promote the utilization of renewable energy in solar water heating and electricity production.
- . Studying the opening of a new renewable energy research center dealing with the promotion and encouraging the utilization of renewable energy sources.
- . Studies on politics, labor, economics, macro-economics, planning, petroleum and energy economic, gulf security and others.
- . Organize training, workshops and conferences in the subjects of interest.
- . Numerous solar energy projects using systems for different applications such as telephone cabins, traffic lights, cathodic protection, broader station...etc.

15.3 Renewable Energy Business in U.A.E.: Green

Energy LLC

Green Energy is one of the Middle East's premier suppliers of energy-efficient solar products. We offer the best renewable energy solutions at the most competitive prices and are committed to be the "lowest cost per watt" provider of PV solutions to customers worldwide. Green Energy offers a range of complete solar power systems to meet power requirements. We provide reliable and cost effective solar solutions for road, airport, marine, industrial (oil and gas, telecommunication), commercial, government, military, rural development, residential and customized applications. We offer products that are proven to work under rugged weather environments and meet the highest industry standards. All sales orders are processed / executed within...

- . **Business type:** manufacturer, retail sales, wholesale supplier, exporter, importer
- . **Product types:** photovoltaic modules, backup power systems, renewable energy system batteries, energy efficient lighting, DC to AC power inverters, solar water pumping systems, solar airport lights, solar marine lights, solar traffic lights, solar obstruction lights, solar transit lights, solar powered advertising billboards, solar street lights, solar PV systems for telecommunication and custom applications, solar home lighting kits, solar components like charge controllers, DC lights.
- . **Address:** Dubai, United Arab Emirates 120599
- . **Tel:** (971) 43 96 50 52
- . **Fax:** (971) 43 96 59 29
- . **Web Site:** <http://www.gesolar.net>

International Energy Resources (IER)

International Energy Resources (IER) assists clients with the purchase or sale of a wide range of power generating equipment. Staff well experienced in the international market, provide guidance for clients' total spare parts requirements and for the acquisition of parts for projects such as turbine upgrades, overhauls and maintenance. Our comprehensive spare parts and used/refurbished complete gas turbines inventory provides all gas turbine customers with an alternative source for parts and services. We are able to offer very competitive prices and delivery of spare parts for most types of gas turbine. Considerable savings can be achieved.

- . **Business type:** exporter
- . **Product types:** gas turbine electric generators, steam turbine electric generators, fuel powered electric generators.
- . **Address:** P. O. Box 61460 Jebel Ali Free Zone, Dubai, United Arab Emirates
- . **Tel:** (971) 48 83 07 70
- . **Fax:** (971) 48 83 07 71

. **Web Site:** <http://www.ierfzco.com>

Boma Pipe Ltd

Specialist suppliers of OCTG (API and Premium Casing and Tubing) to the oil, gas, geothermal and water industries. Ex stock or new mill rolling in sizes from 2.3/8" to 36" in API and gas tight premium connections.

- . **Business type:** retail sales, wholesale supplier
- . **Address:** P. O. Box 17716, Dubai, United Arab Emirates
- . **Tel:** (971) 48 81 48 84
- . **Fax:** (971) 48 81 59 85
- . **Web Site:** <http://www.bomapipe.com>

Hydroturf International Company

- . **Business type:** retail sales, wholesale supplier
- . **Product types:** deep cycle batteries, lead acid batteries, marine batteries, industrial batteries.
- . **Address:** Shk Zayed Road 4th Interchange, Bur Dubai, Dubai United Arab Emirates
- . **Tel:** (971) 43 47 94 79
- . **Fax:** (971) 43 47 92 95
- . **Web Site:** <http://www.hydroturfinternational.com>

Marketing Home

Online building materials store, hardware, sanitary, kitchen accessories, kitchen sinks

- . **Business type:** manufacturer, retail sales, wholesale supplier, exporter, importer
- . **Product types:** Online building materials store, hardware, sanitary, kitchen accessories, kitchen sinks.
- . **Address:** Al Ittihad Street, Ajman, UAE United Arab Emirates 315 Ajman
- . **Tel:** (971) 67 44 82 02
- . **Fax:** (971) 67 44 82 12
- . **Web Site:** <http://www.marketinghome.ae>

Monodraught Sun Pipe (Middle East)

- . **Product types:** tubular skylights, energy efficient lighting, natural daylighting.
- . **Address:** P. O. Box 17130, Dubai, United Arab Emirates
- . **Tel:** (971) 48 81 81 40
- . **Fax:** (971) 48 81 81 39
- . **Web Site:** <http://www.sunpipe.ae> , www.sunpipe.co.uk

Water Life Technology L.L.C

Water Life Technology LLC is United Arab Emirates based manufacturer and distributor of water purification and water filtration processes systems, located in Dubai. "Water Life Technology is dedicated to encompass state of the art water processing technology to serve the wide range applications of Residential, Commercial and Industrial Water purification. Our broad product range includes Reverse Osmosis Systems, Numerous Water Filtration Systems, UV Water Filtration Systems, UV Sterilizers, Water Softeners, Fine Sediment removal, Fine Media and Specialty Cartridges, many other replacement products and accessories.

- . **Business type:** manufacturer, wholesale supplier, exporter
- . **Address:** Deira, Dubai, United Arab Emirates P. O. Box 172507
- . **Tel:** (971) 42 29 84 77
- . **Fax:** (971) 42 29 84 99
- . **Web Site:** <http://www.waterlifetech.com>

Aerospace Consumerist Consortium FZCO

- . **Business type:** manufacturer, wholesale supplier
- . **Product types:** wind turbines (large), Gas Turbine cleaner, Compressor Cleaner.
- . **Address:** P. O. BOX 17951, Jebel Ali Freezone, Dubai, United Arab Emirates 17951

- . **Tel:** (971) 48 81 80 84
- . **Fax:** (971) 48 81 60 22

AIG FZE

- . **Business type:** wholesale supplier
- . **Product types:** solar cooking systems.
- . **Address:** P.O. BOX 86293, Dubai, UAE United Arab Emirates 39339
- . **Tel:** 971 50 686 9189
- . **Fax:** 971 4 222 4056
- . **E-mail:** [Send Email to AIG FZE](#)

Al-Owais Group

- . **Business type:** manufacturer, wholesale supplier, exporter
- . **Product types:** wind energy systems (small), solar water heating systems, water pumping windmills.
- . **Address:** Al-Mina Road, Ajman, United Arab Emirates 290
- . **Tel:** (971) 67 44 36 67
- . **Fax:** (971) 67 44 69 39

Almadah General Contracting

- . **Business type:** retail sales, wholesale supplier
- . **Product types:** solar tracking systems, sun concentrating photovoltaic systems, air cooling systems, solar roofing systems, water cooling systems, solar pool heating systems, solar energy cooling system.
- . **Address:** Abu Dhabi Musafah M38, Abu Dhabi, United Arab Emirates

Atlas Solar Products

- . **Business type:** Wholesaler and Retailer (Online Shopping Site)
- . **Product types:** Provider of solar residential and commercial products such as solar outdoor lighting systems, solar street light, solar obstruction light, solar traffic light, solar court yard light, solar parking light, solar sign, solar billboard, solar spot light, solar garden light, solar tile, solar house number, solar flashlight, Solar in-house lighting system, etc..
- . **Address:** 3402 Saeed Tower II, Sheikh Zayed Rd, Dubai, United Arab Emirates 1111
- . **Tel:** (971) 43 43 85 00
- . **Fax:** (971) 43 43 55 75

Bin Brook General Trading LLC

- . **Business type:** retail sales, wholesale supplier, exporter, importer
- . **Product types:** water pumps, water filtering and purification systems, waste treatment systems, water filtering and purification system components, fuel powered electric generators, Farming System.
- . **Address:** Um Alnar Str., Abu Dhabi, United Arab Emirates 879
- . **Tel:** (971) 25 58 46 00
- . **Fax:** (971) 25 58 46 77

BSS Tech

- . **Business type:** manufacturer, retail sales, wholesale supplier, exporter, importer
- . **Product types:** cathodic protection systems, Remote Monitoring and Control for any Cathodic protection & Corrosion Control .
- . **Address:** P. O. Box 33464, Abu Dhabi, Abu Dhabi United Arab Emirates 33464
- . **Tel:** (971) 24 46 07 00

E-Solar Middle East

- . **Business type:** Solar Energy products developers and manufacturers
- . **Product types:** photovoltaic modules, solar systems, backup power systems, solar water pumps, solar batteries, charge controllers, solar refrigeration, DC-AC inverters.

- . **Address:** P. O. Box 16770, Jebel Ali Free Zone, Dubai, United Arab Emirates
- . **Tel:** (971) 48 81 99 80
- . **Fax:** (971) 48 87 29 90

Emes Marketing

- . **Business type:** buyer of solar tech generators, turbines and house paneling.
- . **Product types:** energy efficient appliances, SOLAR turbine solar generators, hydroelectric turbines (large), compact fluorescent lighting fixtures and ballasts.
- . **Address:** 202-C Johar Town, Sarjah, UAE United Arab Emirates 54000
- . **Tel:** 0092-42-5174815
- . **Fax:** 0092-42-5201373

Emirates Applied Solar Energy (EASE)

- . **Business type:** service
- . **Service types:** consulting services, contractor services, system installation
- . **Address:** P. O. Box 28827, Sharjah, United Arab Emirates
- . **Tel:** (971) 65 73 93 11
- . **Fax:** (971) 65 73 93 100

Emirates Pumps Industry (Waterstone)

- . **Business type:** manufacturer
- . **Product types:** WaterStone Brand name: Stainless Steel submersible pumps, all type of submersible water pumps, We also make submersible motors from 1HP to 225HP.
- . **Address:** P. O. BOX 33044, SHARJAH, United Arab Emirates
- . **Tel:** (971) 65 43 08 08
- . **Fax:** (971) 37 62 35 77

Emirates Techno Casting LLC

- . **Business type:** manufacturer
- . **Product types:** cathodic protection systems, Design, manufacture, supply, install, surveys and audits of all kinds of cathodic Protection Systems.
- . **Address:** P. O. Box 2895, Ajman, United Arab Emirates
- . **Tel:** (971) 67 43 36 69
- . **Fax:** (971) 67 43 76 35

Fiber Technology Corporation

- . **Business type:** manufacturer, retail sales, wholesale supplier, exporter, importer
- . **Product types:** water storage tanks, waste treatment systems, thermoforming, high pressure polyurethane injection, contract manufacturing, hand lay, hot press, cold press, VRTM, SMC.
- . **Service types:** Import, Export, Manufacture,
- . **Address:** P. O. Box 17448 JAFZ, Dubai, United Arab Emirates 0004
- . **Tel:** (971) 48 81 34 85
- . **Fax:** (971) 48 81 34 75

Fibre Pros

- . **Business type:** exporter, importer
- . **Product types:** LED lighting, natural daylighting, tubular skylights, energy efficient lighting.
- . **Address:** P. O. Box 23682, Dubai, United Arab Emirates
- . **Tel:** (971) 43 47 73 30

Gulf Solar Technologies

- . **Business type:** manufacturer, wholesale supplier, exporter, importer
- . **Product types:** renewable energy system batteries, DC to AC power inverters, compact fluorescent lighting fixtures and ballasts, photovoltaic cells, solar electric power systems, solar water heating systems.

. **Service types:** consulting, design, installation, construction, engineering, project development services, education and training services, research services, site survey and assessment services, architectural design services, contractor services, maintenance and repair services

. **Address:** P. O. Box 50901, Dubai, United Arab Emirates

. **Tel:** (971) 43 35 29 93/ (971) 56 53 28 29

. **Fax:** (971) 43 35 29 94/ (971) 43 36 85 00

Jubilee Stores

. **Business type:** Trading, Import/Export, Projects commissioning

. **Product types:** SHARP, GE, ISOFOTON Solar (PV) panels, STECA, XANTREX solar charge controllers and electronics, Inverters, VRLA Deep cycle batteries, DC Lamps, DC Fans, DC Fridges, Solar Garden Lights, Solar STREET LIGHTS (SOX/CFL: types), VARTA consumer batteries, rechargeable batteries, solar electric power systems, lithium ion batteries, primary batteries, photovoltaic systems, photovoltaic modules, binoculars .

. **Address:** P. O. Box 14837, Dubai, United Arab Emirates

. **Tel:** (971) 42 23 11 85

Mac Lighting

. **Business type:** manufacturer, retail sales, wholesale supplier, exporter, importer

. **Product types:** fluorescent lighting, compact fluorescent lighting, energy efficient lighting.

. **Address:** Al Karama, El Nakhel Building, Dubai, United Arab Emirates

. **Tel:** (971) 43 35 93 77

Masaood Power Systems

. **Business type:** wholesale supplier, importer

. **Product types:** fuel powered electric generators, marine power systems, water pumps, solar electric power systems, heat pumps, backup power systems.

. **Address:** P. O. Box 322, Abu Dhabi, Abu Dhabi United Arab Emirates

. **Tel:** (971) 26 42 42 22

Power Developments International

. **Business type:** exporter

. **Product types:** gas turbine electric generators.

. **Address:** P. O. Box 17204, Dubai, United Arab Emirates

. **Tel:** (971) 48 87 18 91

Power Developments International

. **Product types:** gas turbine electric generators.

. **Address:** P. O. Box 17204, Dubai, Jebel Ali, Dubai United Arab Emirates SN5 6PB

. **Tel:** (971) 48 87 18 91

. **Fax:** (971) 48 8718 69

Rubber World Industries

. **Business type:** manufacturer, exporter, importer

. **Product types:** air cooling system components.

. **Address:** P. O. Box 2435, Ajman, United Arab Emirates 2435

. **Tel:** (971) 67 43 41 76

Sbh Trading (W.L.L)

. **Business type:** wholesale supplier, importer

. **Product types:** photovoltaic modules, photovoltaic systems, solar garden lights, wind energy system components (small), wind energy systems (small), solar outdoor lighting systems, We are Main Dealer of Garden Lights , Wind / Solar Powered systems..

. **Address:** 36 F - Ajman FreeZone, Ajman Free Zone, United Arab Emirates

. **Tel:** (971) 67 45 37 22

Smarter Group Trading L.L.C.

- . **Business type:** retail sales, wholesale supplier, importer
- . **Product types:** solar outdoor lighting systems, solar garden lights, solar charge controllers, air filtering and purification systems.
- . **Address:** P. O. Box 72541, Dubai, United Arab Emirates
- . **Tel:** (971) 43 39 49 40

Sole UAE

- . **Business type:** manufacturer
- . **Product types:** solar water heating systems, solar air-conditioning systems, solar pool heating systems, solar air heating systems components, air cooling systems, solar water heating components.
- . **Address:** Zayed, Dubai, Arabian Gulf United Arab Emirates 12228
- . **Tel:** (971) 42 69 91 60/ (971) 54 41 69 54
- . **Fax:** (971) 42 69 89 70

Solstice International

- . **Business type:** retail sales, service
- . **Product types:** photovoltaic modules (PV modules, solar panels), Charge controllers, DC CF & LED Lights, small wind powered electric generators.
- . **Service types:** small system installation, system design
- . **Address:** P. O. Box 74397, Dubai, United Arab Emirates
- . **Tel:** (971) 43 31 74 58
- . **Fax:** (971) 43 31 40 71

Specialized & Interactive Systems LLC

- . **Business type:** manufacturer, retail sales, wholesale supplier, exporter, importer
- . **Product types:** photovoltaic systems, DC to AC power inverters, photovoltaic modules, solar charge controllers, solar water pumping systems, solar water heating systems, Power Backup Systems, DC-DC Converters, DC Lighting, Solar Garden Lights, Solar Outdoor Lighting, AC & DC Refrigerators & Freezers, Batteries, Cathodic Protection Systems, Portable Power Systems, Remote Home Power Systems, Aviation Obstruction Lighting, Intelligent Traffic Systems, Custom Designed Systems.
- . **Address:** Showroom # 4 Plot # 795, Aripport Road, Garhoud Area, Dubai - strongtk@emirates.net.ae, Dubai United Arab Emirates P.O. Box 20374
- . **Tel:** (971) 42 86 80 02
- . **Fax:** (971) 42 82 33 97

Strong Plant & Supplies FZE

- . **Business type:** retail sales, service, wholesale supplier
- . **Product types:** solar water heating, DC to AC inverters, photovoltaic modules (PV modules, solar panels), small wind powered electric generators, complete PV systems, solar lighting, home kits..
- . **Service types:** system design, consulting, supply
- . **Address:** P. O. Box 61017, Dubai, United Arab Emirates
- . **Tel:** (971) 48 83 55 31
- . **Fax:** (971) 48 83 59 14

Technologies Dubai

- . **Business type:** manufacturer
- . **Product types:** renewable energy system batteries, cogeneration systems, hydro energy system components (small), hydroelectric turbines (small), LED lighting, DC lighting, Water turbine battery charger 12 volts 5 watts.
- . **Address:** 5th Floor, Al Hai bldg, C/ Alpha 55, Dubai, United Arab Emirates 51239
- . **Tel:** (971) 42 94 84 20/ (971) 50 55 92 978
- . **Fax:** (971) 42 94 84 29

Tradeways Tyres Services LLC

- . **Business type:** retail sales, wholesale supplier, exporter, importer
- . **Product types:** automotive starting batteries.
- . **Address:** P. O. Box 21749, Dubai, United Arab Emirates
- . **Tel:** (971) 42 85 35 20
- . **Fax:** (971) 42 85 35 22

UB Emirates LLC

- . **Business type:** wholesale supplier, exporter, importer
- . **Product types:** compact fluorescent lighting, fluorescent lighting fixtures and ballasts, compact fluorescent light bulbs, fluorescent light bulbs, fluorescent light bulbs.
- . **Address:** Garhoud, Dubai, Dubai United Arab Emirates 20196
- . **Tel:** (971) 42 82 29 99

UNACOMM

- . **Product types:** backup power systems, deep cycle batteries, emergency backup batteries, DC to AC power inverters, photovoltaic systems, solar electric power systems.
- . **Address:** Arab Tower, Hamdan Street, Abu Dhabi, United Arab Emirates 25567
- . **Tel:** (971) 26 76 99 22

Vision Gate Electronics

- . **Business type:** retail sales, wholesale supplier, exporter, importer
- . **Product types:** computer and electronic components, meters and measuring equipment, refrigerators and freezers, cordless power tools, appliances, telecommunications power systems, control equipments .
- . **Address:** Shk. Hamdan Colony, Dubai, United Arab Emirates 28839

16 YEMEN

16.1 Solar Energy Center

Website : www.alnadeem.com.bh/ust/solar.htm

Address : University of Science & Technology P. O. Box 15201 Sana'a, Yemen Tel: (967) 12 34 520 Fax: (967) 12 34 519

Missionenergy : The center aims at increasing and encouraging the utilization of renewable by:

- . Promotion of applied research in solar energy and its potentials in the country.
- . Use of solar energy in the preservation and enhancement of the quality of the environment and the health community.
- . Economic development and prosperity of new renewable industry.
- . Provision for the education needs in solar technology for now and future generation.
- . Provide the essential base for the advancement of knowledge and understanding of utilization solar energy in our part of the world.

16.2 Science & Technology Center

Website : www.y.net.ye/aden_university/

Address : Aden University

P. O. Box 11038 Aden, Yemen Tel: (967) 22 34 428 Fax: (967) 22 34 426

Mission : Strengthening science and technology contributions to the development of Yemen in the sectors of energy, agriculture and water resources, environment, health science, medical technology, industry and mineral resources and information technology.

16.3 Public Electricity Corporation/Training Center

Website : www.yemen.gov.ye/egov/elewater

Address

: Al-Mansoura, Training Center, Aden, Yemen Tel: (967) 23 49 847 Fax: (967) 23 49 847

Mission : It is a research institute owned by the government working in the fields of

solar water heating systems, solar PV systems, solar water pumping systems, and solar air heating systems. It was established in 1987 with the assistance of a French firm EDF, yet it coordinates and maintains a very impressive array of research projects, and one prime importance in the solar energy utilization for commercial use of electrical power.

National Links with EU or Other Organizations: ESCWA, UNEP, UNDP, France.

Main National Renewable Energies Implemented Projects:

- . Telecommunication transmission uses 1200 panels in different parts of Yemen. Total installed peak power has reached 60.4KW.
- . Installing Al-Mahweet water pumping station with a capacity of 600Wp of PV used to pump 70-100m³/day.
- . About 100KWp of PV used for domestic application in rural areas.
- . A wind generator of 500 W and PV water pumping system of 43 Wp is performed by the Ministry of Electricity for rural electrification.
- . Electrification of schools and medical clinics by PV systems. The total peak power is around 20KW.
- . A production of about 500 units per month of solar water and possible increase up to 750 units is produced by a local solar heated manufacturing company. The market is going on significantly successful.
- . A biogas project consists of 22 digester (family size), 10 animal sheds connected to digested. The project is installed in Al-Habeel Lahj governorate (Mansorah Village) by the Ministry of Electricity and the assistance of ESCWA.
- . Experimental wind turbine installed in Al-Mukha power station.
- . Small-Scale Household Solar Lamps for Selected Remote Villages in Socotra Island - German Embassy in Sana'a, and the Socotra Conservation Fund (SCF)
- . Care activities – biogas (needs to be double checked with Care int. office in Sana'a)
- . Solar warm water heaters (German Embassy & Al Ekha Society, Taiz)
- . Ministry of Water and Environment – and the Geological Survey Authority and the German BGR – GEOTHERM Programme (Geothermal Energy)

16.4 Renewable Energy Business in Yemen: Technical Supplies center Ltd

Renewable Energy Systems Integrators and Telecommunications Solutions

- . **Business type:** retail sales, wholesale supplier, importer
- . **Product types:** hybrid power systems, telecommunication batteries, backup power systems, DC to AC power inverters, photovoltaic systems, Renewable Energy Systems Integrators & Telecommunication Solutions.
- . **Address:** Moh'd Ad-Durra Str, East Awqaf Complex, Sana'a, Republic of Yemen 7186 Sana'a
- . **Tel:** (967) 14 47 550/ 14 47 660

- . **Fax:** (967) 14 40 431
- . **Web Site:** <http://www.tsc.com.ye>