



Sector Strategic Paper *GREEN ENERGY AND WATER*

May 2014

Summary

The great potential for Southern Mediterranean and incentives the European Commission in the field of renewable energy (RE) in particular Directive 2009/28, provide a framework for the integration of ER in the Euro-Mediterranean region and offers great opportunities motivating for businesses involved in this sector. The project, proposed by Businessmed, is the state of play of failures and existing opportunities in this sector and offers some guidelines for inclusive strategic, proactive and sustainable action.

Project financed by the European Union, the MedAlliance and the local authorities of Marseille - PACA



Project implemented by the MedAlliance consortium under ANIMA coordination

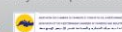


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1 Introduction

This sector project fits into the framework of Mediterranean strategic actions seeking to implement inter-Mediterranean interactions in the field of renewable energies. It should define common regional needs in this area and focus on the level of attractiveness of the southern and eastern Mediterranean for potential investors.

1.1 Green energy: a strategic challenge for the Mediterranean region

Indicators on current context of renewable energy announced a tendency among world policies towards more investment or a third industrial revolution based on renewable energy.

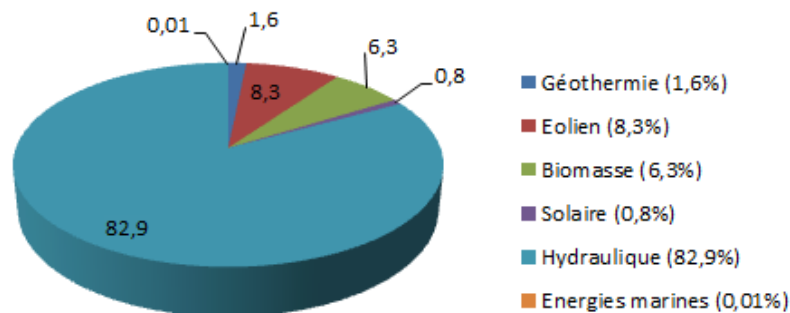
Green energy: a global trend that is accelerating

In the Mediterranean, renewable energy represent a great potential for development. The sector accounts for around 2012 one fifth of the world's electricity production. A proportion which owes much to hydropower. Wind and solar are on the increase, and the market for biofuels for transport as well.

Graphic 1.

Composition of renewable energy in the World (2010)

Partage des énergies renouvelables dans le monde (2010)



Source : <http://methanisation.insa-rennes.fr/>

In the World, Asian countries, especially China and India develop more capacity for electric power generation from renewable energy sources. In China, photovoltaic production increased by 100% in 2012, and the country now has more than a quarter of the installed wind capacity in the World.

Production costs of renewable energies are in decrease

Between 1976 and 2010 , the average price of Watt photovoltaic worldwide dropped from 65 to 1.4 dollars is greater than 46 , while that of onshore wind in Denmark factor fell by 2.6 dollars in 1981 1.4 dollars in 2009, ie a factor of 1.85. The year 2011 has also been marked by a significant milestone with the production of wind power in Spain than that generated by fossil fuels. The feed-in tariff is also being revised because the expected results have been achieved earlier than planned.

Runaway energy consumption in the Mediterranean

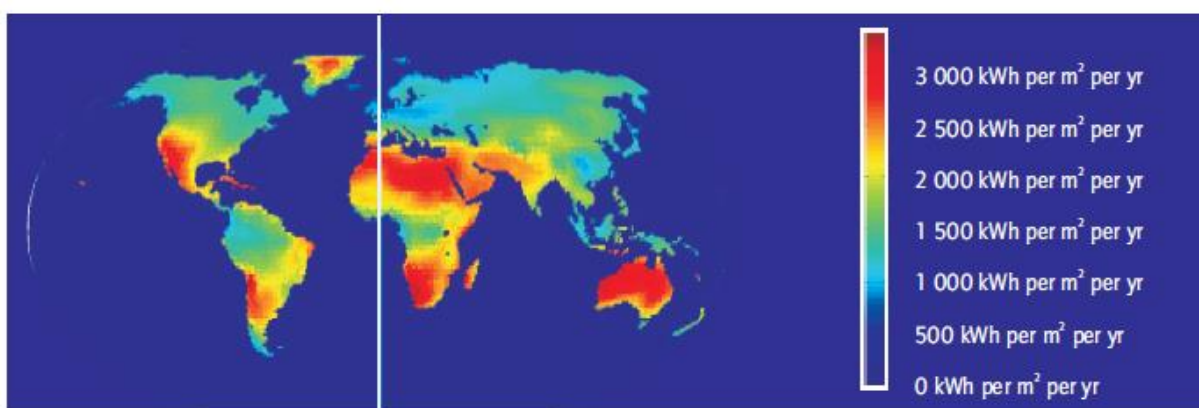
Total energy consumption in the Mediterranean area is around 1000 million tons coal equivalent (toe) and expected to increase to 1.4 billion toe in 2030 (notes of IPEMED 8) . This represents 9 % of the world energy demand. The contribution of renewable energy still remained marginal in the energy mix in the Southern Mediterranean, despite some initiatives in this direction.

In Europe, the objective of the EU is to achieve 20% of its energy from renewable sources by 2020. Renewables include wind, solar, hydropower, energy tidal, geothermal and biomass. More renewable energy will enable the EU to reduce greenhouse emissions and to be less dependent on energy imports.

1.2 What development potential in the Mediterranean?

If we consider the current global figures in terms of renewable energy, the Mediterranean region has a margin wide enough space to catch up all confused industry. On the other hand, sectors with high growth potential, such as solar energy, benefiting from both sides in the Mediterranean of a favourable climate for development, especially in the South. They have abundant deposits of energy resources, mainly with solar and wind energy.

Graphic 2. Weight of solar potential in North Africa and in the World



They receive an equivalent of 1700-2600 kWh / m² / year of solar radiation while the range is 880-1800 kWh / m² / year in Europe. The energy of the radiation received by Km² is equivalent to around 1.5 million barrels of oil. The various laws and directives in the area seem moving towards more convergence to stimulate investment in this sector, for a vital, environmental and strategic reasons.

The role of Mediterranean employers' organizations, industry promotion agencies, agencies and public and private organizations responsible for promoting renewable energy, will be crucial in the search for complementarity and synergy in the region.

2 State of the art of the sector in the EU

Two priorities are expressed in the sector: reversing the situation of energy dependence and installation of sustainable development framework in the Mediterranean through the convergence of interest with the South.

2.1 Energy Independence and more Green Energy to Reverse the Trend by 2020

A study published by Eurostat (Statistical Office of the EU) in 2011 shows that the share of energy from renewable sources accounts for only 13% of the gross final energy consumption in the EU (12.1% in 2010). The highest proportions of renewable energy in total energy consumption reveal a considerable gap in European countries: Sweden is the leading European countries with a share of 46.8 % in 2011. The lowest countries in terms of renewable energy share in energy consumption are: Malta (0.4%), Luxembourg (2.9%), the UK (3.8%), Belgium (4.1%) and the Netherlands (4.3%).

Table 1. Share of RES in gross final consumption of energy in 2011

Country	Part of RE (%)
Sweden	46,8
Latvia	33,1
Finland	31,8
Austria	30,9
Nederlands	4,3
Belgium	4,1
UK	3,8
Luxembourg	2,9
Malta	0,4
EU	13

Source : Eurostat (2011)

The share of Europe in the global renewable energy production remains relatively low margins with slow progression. World production of renewable electricity (including production by Power plants of pumping-turbine) reached 4,699.2 TWh in 2012, well over the threshold of 20% of global electricity production (20.8 %). Fossil fuels remain the core of the global electricity production with more than two thirds of the total.

One should remember, however, that the primary energy production in Europe is insufficient to meet the energy demand of European countries. Without use of new renewable energy sources, energy independence of European countries (ratio production/consumption), 66% in 2000 and 57 % in 2010, could continue to fall until 2020.

Table 2. Primary energy independence in European countries (2010-2020)

	2010	2020
European countries consumption (Mtoe)	1829	1860
Primary energy production in European countries (Mtoe)	1041	988
Energy independence ratio in% (production/consumption)	57%	53%

Source : Eurostat (2012)

Promoting green energy is, in fact, one of the responses of energy policy to climate change. The European Union and some Member States have emphasized the importance of placing the European Union as a global leader in this sector. Italy and Spain may be presented as the main European relay in the Mediterranean due to its proximity to the coast of North Africa.

Although the country is energy deficit, Italy produces only 19.3 % of its energy, the rest being imported, and is a net importer of fossil fuels (oil, gas, coal) and electricity. Italy moves resolutely towards an energy mix built on a maximum of RE with a mix = 60% renewables (including hydro 26.6%) and 40% of fossil energy.

In the energy mix of the country, the share of renewable energy increased from 14 to 24 % between 2005 and 2011. Between 2010 and 2011, the production of renewable bio-energy (biomass, biogas and bioliquids) increased 15% from 9400 to 10900 GW, despite a dramatic decline of bioliquids (mainly from the increase in palm oil prices). The solar industry has meanwhile simply had an exponential growth: +465 % between 2010 and 2011, making Italy the 2nd largest producer of solar energy (18.9 TWh), just behind Germany the first World producer (28 TWh).

As for Spain, it imports 73% of its energy. This energy dependence, which accounts for 2.3% of its GDP, forms partly as a brake on its economic and industrial development. This severe lack of resources also "forced" to surpass Spain in RE: 3rd World Ranking for Wind, 4th World Ranking for Solar Photovoltaic, and 2nd World Ranking for solar thermodynamic (CSP plants such as Desertec project).

The Energy Mix product consists of 44% of renewable energy (including 19% biomass, 19.7% Solar/Wind/geothermal, 5.3% Hydraulic) and 56% of non RE (48% Nuclear and 8% Fossil)

Among the energy from biomass, Spain ranks among the leaders in the production of Bio-Oil (Blue Petroleum) from the culture of microalgae and cyanobacteria.

Directive 2009/28 EU offers, in this sense, an institutional framework for the development of Euro-Mediterranean relations border flows RES. The Commission also proposed to extend the energy community treaty to Mediterranean Partner Countries (MPC) among measures to deepen economic integration EU-MPC and promote their economic development.

One of the initiatives emanating from Directive 2009/28 on renewable energy, is the launch of the Mediterranean Solar Plan (MSP) by the Union for the Mediterranean (UfM). The objective of MSP is to deploy 20 gigawatts of installed capacity of renewable energy in the region within 2020 with the necessary capabilities for transport and cross-border interconnections, on the one hand, and support the deployment of renewable energies in region to promote energy efficiency in the MPC, on the other hand.

2.2 Complementarity and Convergence of Interests

2.2.1 North-South and South-South complementarity

There are many complementarities between the Mediterranean regions:

- Trade Complementarity between the Southern shore producer -offering in 2050 a potential surplus of renewable energy- and requesting North bank of the green production.
- Technical Complementarity between a South -eager to adopt new technologies for renewable energy- and a more technologically advanced North shore.
- Financial complementarity between Southern partners seeking investments tailored to highly intensive infrastructure projects with long payback on investment, and partners in the North and South who have the capacity for mobilizing the necessary capital (investment funds and operators).

2.2.2 Geopolitics of water and migration if energy and food security

According to several prospective reports developed by independent institutions (report of the 2025 and 2030 NSA) as well as by large strategic consulting firms (Roland Berger as well as the Big Four), issues of water and energy are inextricably related geopolitically.

People in the South are facing both water stress, food scarcity and geopolitical upheavals such as the Arab Spring, can be a volatile cocktail that can weaken a downward spiral in both the North and South by retro-activity.

Common conflict points:

- Rural Exodus;
- Illegal and not mastered South/North Immigration;
- South/North Brain drain;
- Terrorism;
- Increased industrial technological gap between North/South;
- North/South increased security measures.

The issue of water stress, once limited to the countries of the Southern Mediterranean and sub-Saharan Africa takes on a new dimension since the northern countries of the Mediterranean are starting to see the same problems: Italy and Spain for example.

So there are common interests of industrial co-development and socio-economic differences between the two shores of the Mediterranean that can be resolved around issues of water, energy and agriculture in terms of self-sufficiency and/or "co-requisite" water, energy and food.

Solving the triangle "Water/Energy/Agriculture" in the South decreases qualitatively and exponentially geopolitical, security, food and immigration risks. Hence there is a need to invest in a real industrial, economic and human co-development.

3 State of the art of the sector in the Mediterranean

The situation in the Mediterranean area is characterized by the huge development potential. The issue of water resources and the combined "Water / Renewable Energy" will now hand the importance of both sides of the Mediterranean in the next five years.

3.1 A small renewable energy rate but a high potential for development

Two axes of development are to emphasize: the needs to set up systems of renewable power production and the necessity of adapting economies to the standards of the energy efficiency.

3.1.1. Development potential to exploit

If it is estimated that energy demand in the Mediterranean region is expected to grow by 1.5% per year in 2030 (according to the notes of IPEMED, No. 8), the majority of this increase will come from countries of the southern shore, due to the significant needs for their development and for universal access to energy.

The South and East of the Mediterranean (SEMC) are among the countries that use very low green energy, despite some exceptions and some great large-scale initiatives. The average primary energy production in these countries rises in 2010 to 425 Mtoe. It exceeds 24% the production of 2000. This increase is expected to increase by 2020 to meet the high energy demand (+50% between 2010 and 2020).

This increase is more pronounced in the electricity sector: according to figures presented by the Mediterranean Energy Observatory (OME) in 2011, electricity demand in these countries could double by 2020 and triple by 2030. Production will increase from 559 TWh in 2009 to 1,534 TWh in 2030.

Certainly, the contribution of renewable energy has remained marginal in the energy mix in the southern countries, but the relatively high potential, like Morocco, Algeria and Tunisia.

Table 3. Structure electric park and share of RE in 2009 (MW)

	Algeria	Egypt	Libya	Morocco	Tunisia	Soudan*
Thermal power plants	11099	21435	6273	4166	3359	919
Hydraulic %	228 2%	2800 11,3%		1748 28,5%	66 1,9%	1590 63 %
Other RE (wind power)	-	490 (1,9%)	0,21	222 (3,6%)	55 (1,6%)	-
Total	11325	24726	6273	6135	3480	2509
% RE	2%	13,2%	<0,2%	32,1%	3,5%	

Sources: COMELEC, 2009 statistics for UMA's countries, Egyptian Electricity Holding Company, * Soudan: Arab Union of Electricity.

Prospectively, 200 GW of additional power capacity would be needed to meet the needs of this region. In the case of a proactive scenario (development of renewable energy and energy efficiency measures), 155 GW of additional power capacity would be sufficient, but it would require a doubling of the generation of renewable energy (wind and solar) and higher investment amount of about 40 to 50 billion dollars. These obvious investment needs leave a wide margin for innovative European companies.

In the present state of things, the national strategies of southern Mediterranean countries highlight the development of their solar plan.

However, the promotion of renewable energy and energy efficiency research are inseparable and constitute the two pillars of a strategy for sustainable energy development.

3.1.2 . Energy efficiency

The economies of the Mediterranean countries are characterized by a high rate of energy intensity (ie energy consumption per unit of GDP). Technologies implemented in the region in industrial processes, buildings and transport, are far from being the most effective in terms of energy, which results in a waste. There is also a high potential for energy savings in different sectors (industry, housing, tertiary, etc.). By 2020, the energy saving potential in the Mediterranean is estimated at 20% and this estimate would reach 50% in the South and East. That is to say, the first concern should be to find energy savings in all uses. The potential for job creation in this field is also huge: win one toe in saving energy equivalent to about 15 jobs created.

Already the EU is a reduction of 20 % of the annual primary energy consumption in Europe by 2020, the Commission proposed several measures to increase efficiency at all stages of the energy chain. Production processing, distribution and final consumption. The measures focus on public transport and building sectors, where the potential for savings is the most important. Other measures include eg smart meters (which encourage consumers to better manage their energy consumption) and clear labeling.

For Southern and Eastern Mediterranean countries, this should result in:

- The acceleration of the implementation legislation for energy saving
- Introduction of systems for energy management (EMS), which corresponds to ISO 5001, and the spread of new certifications.
- Generalize the implementation of training programs in this field.

3.2 Water and energy: a potential investment for companies

The major socio-economic and industrial challenges of this century, must refer to two main interrelated issues: water and energy. Two approaches both necessary for all life needs, which are:

- The twentieth century: use these resources to exhaustion
- Those in the XXI Century: Use these resources rationally renewing.

Whole problem resolves the question: How can we reconcile both energy needs and food needs of human beings?

The depletion of conventional hydrocarbon resources, fear of the non-mastery of nuclear (Chernobyl / Fukushima), the titanic need for raw materials for industry consumption, crises in some oil producing countries, etc. All these constraints could tip the balance towards "urgent" solutions fueling speculative bubbles, which consequences (the environmental cost) will be much higher than any short-term benefits.

In addition to a woefully inadequate level of agricultural production, the countries of the southern shore of the Mediterranean would suffer from the chronic evil, if the water stress and scarcity did not come to be quickly solved.

The Trend Compendium 2030 final report of strategic consulting firm Roland Berger, talks about:

- A 53% increase in water needs for human activity by 2030 75% of this increase will come from developing countries.
- An increase of 26% of primary energy needs.
- An increase of 27% of food needs.

According to several reports by international NGOs including the UN, in 2025 or in just 10 years, the world population living in a state of water scarcity will increase by 35%, nearly 3 billion people who will be water shortages.

The consequences will be dramatic and extremely disturbing to impossible to master until the famine and civil war migration. The Secretary General of the UN, Ban Ki Moon, said recently at the World Water Day of March 22, 2014: "On this World Water Day, let us pledge to develop policies that will ensure a sustainable access to water and energy to the greatest number, not just the privileged few" (<https://www.un.org/fr/events/waterday/>).

Most countries of the northern shore of the Mediterranean are aware of these issues and include in their priorities the geopolitics of water.

4 Focus on foreign direct investments in the sector

Renewable energies and water are relatively stable sectors for investment in the region, which did not so much suffer from the recent crisis. Over the last decade, it totalled 6.6 billion € of FDI and 125 projects recorded by ANIMA, for an average size of 52 billion €.

Except for a few large project from the US, this sector is dominated by the European investors in the Mediterranean (France, UK and Spain mainly). France in particular originates smaller but more numerous projects than the two others. The job efficiency of these projects are however very low compared to the other sectors addressed by Euromed Invest: 12 jobs per million euro in average compared to 50 jobs in average for Agrifood, Cultural and creative industries and Transport and logistics, and 23 jobs for Tourism. The focus should therefore be on improving this aspect, by moving from large infrastructure by multinational corporations or small experimentations by start-ups to real business activities involving SMEs.

Algeria, Israel, Morocco and Turkey attracted approximately the same level of cumulated FDI over the last decade (between 1.2 and 1.6 B€), although all other countries should represent a potential for these sectors. The business climate in the Mediterranean seems rather favourable despite some challenges. Some important investments are made and others are in progress.

4.1 FDI in the field of green energy: a rather favorable business climate

The year 2012 marks the return to the center stage of "traditional" investments in southern Mediterranean with a strong investor for safe values are, since 2003, energy, banking, telecommunications and construction preference. These four sectors account for two thirds of total FDI announced.

Synthetically, the South Mediterranean countries offer various advantages for FDI that have a positive impact on employment, innovation and the environment. Generally, these investment projects should have a significant effect for host countries:

- Contribute to the achievement of national strategies and policies (priority sectors, regions to develop, skills and technologies to acquire, etc.). The renewable energy sector is one of them obviously.
- Assist in the creation of new jobs and help save energy.

Tunisian investments Code, for example, provides financial and tax incentives for projects related to environmental protection and waste disposal:

- Relief of 50% of revenues or profits reinvested;
- Imposition reduced to 10% of revenue and profit rates;
- Bonus 20% of the value of investments;
- Suspension of VAT on goods of specific equipment.

A new Tunisian law, prepared by the Ministry of Industry and currently being validated by the Parliament, is the creation of a fund to finance energy transition projects energy rationalization and develop energy renewable. The new fund will replace the "National Fund for the mastery of energy."

In Algeria, a new law introduced in April 2014 regarding the purchase price (feed-in-tariff) electricity produced by the private sector from renewable energy sectors. Algeria also has a derogation for investments that contribute to economic development and environmental protection. And for investment in development areas and investments of national interest (structuring effect, environmental protection, job creation, provision of new technologies, energy efficiency, promotion of non-hydrocarbon exports) benefit from benefits related to the content and duration of benefits.

Morocco, meanwhile, offers an integrated strategy to promote investment in solar and wind energy. Law governs the implementation of these programs and the commercialization of production. Energy development fund with approximately \$ 1 billion and an energy investment company were also created. On purchasing rates RES, Morocco practice for two years, the acquisition by the state company ONEE of the electricity produced in renewable energy for the area of high voltage only for the moment.

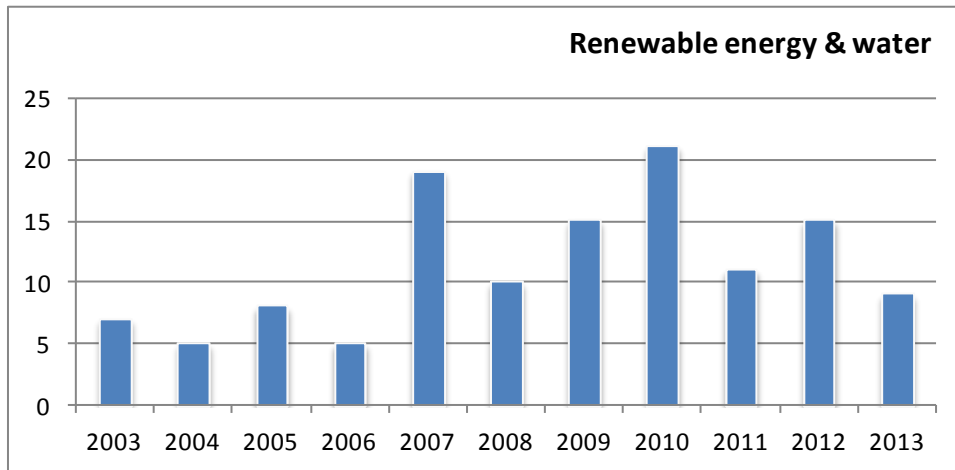
Table 4. Some FDI and prospects for regional integration

Sector	Field of intervention
Renewable Energy and Energy efficiency	Demonstrated experience in energy audits in several countries of the region (Algeria, Tunisia, Morocco, Egypt).
	Production of energy-saving lamps in Tunisia
Solar water heaters	Resellers-Installers in all countries
	<p>- Large-scale manufacturing in Egypt, Tunisia. In the latter SOFTEN (in partnership with Giordano), a leader in the Tunisian market has a production capacity of 35 000 CES / year.</p> <p>- At least 10 manufacturers in Egypt</p>
Photovoltaic energy	Confirmed on experience design and installation in all countries
	Manufacture of electronic and electrical components in several countries (regulators, batteries)
	<p>- Encapsulation Units in Algeria, Algerian PV company to Tlemcen since April 2011, capacity 12 MW. Projects for the manufacture of components (inverters) .</p> <p>- EDIELEC (an Algerian private company): capacity 12 MW (50,000 panels / year capacity of 80 Wp, 160 Wp and 260 Investment hybrid panel provided (electricity and water heating): € 1.5M. An operational unit is scheduled for the end half of 2012. The integration rate is quite high.</p> <p>Flat glass and aluminum are provided by local private companies (Mediterranean Float Glass, a subsidiary of CEVITAL Glass and Satal + for aluminum). Solar cells are imported from Europe. The supply is possible from the unity of the Engineering Company of Electricity and Gas (CEEG) when it is put into service.</p> <p>- Unit production building PV panels of 116 MWp / year Rouiba by the Engineering Company of Electricity and Gas (CEEG), a subsidiary of Sonelgaz. Partnership with German company Centrotherm / Kinetics. Entry into the service is likely from 2013 to 2014.</p> <p>- Call Sonelgaz: expressions of interest for a unit of silicon.</p>
Wind energy	Capacity in Egypt for some components such as towers, blades, mechanical and electrical work.

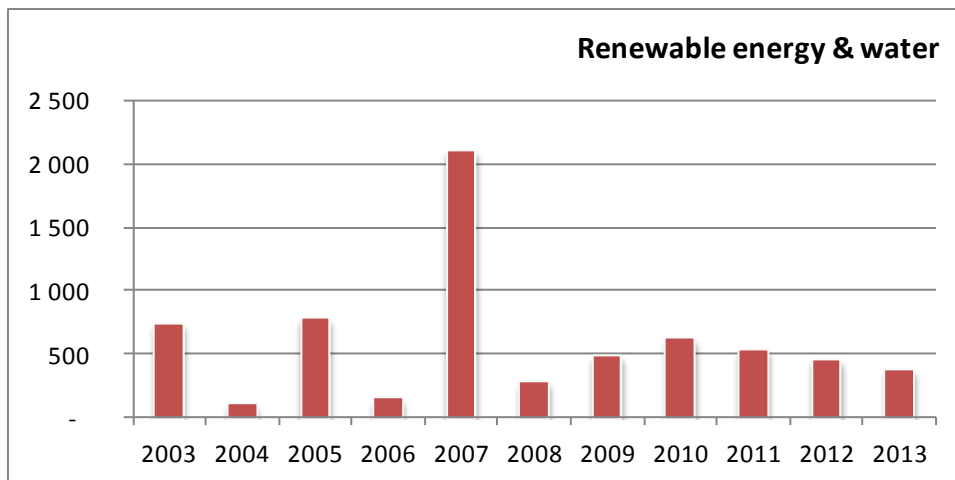
4.2 Foreign Direct Investment (FDI) volumes

The following graphs show the volume of FDI in number and value. All data are extracted from the ANIMA-MIPO observatory.

Graph 3. Number of FDI projects (2003-2013)



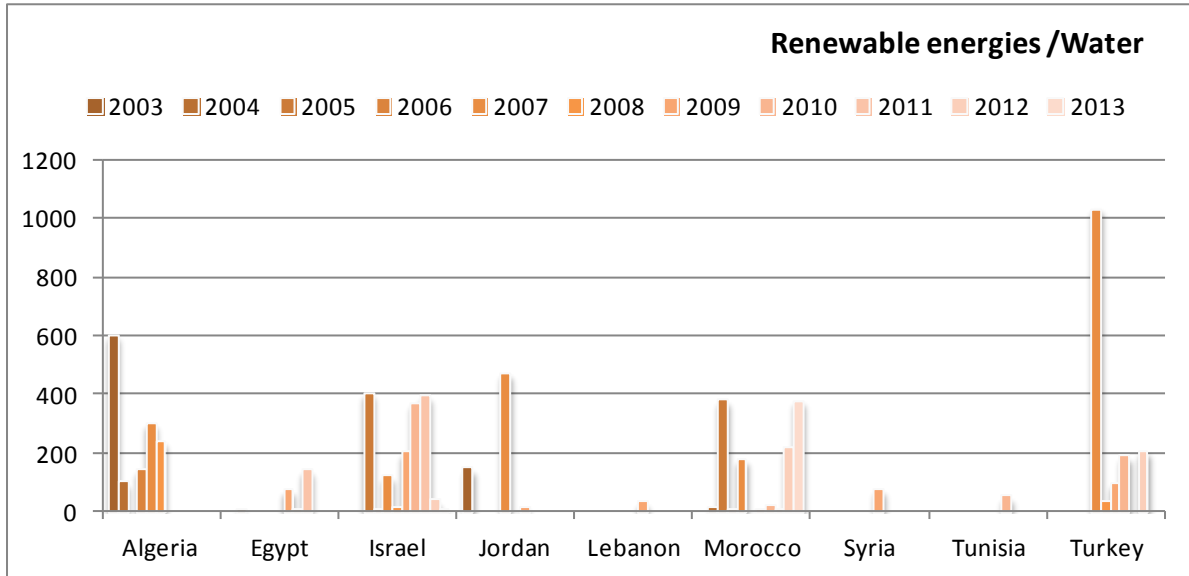
Graph 4. Cumulated FDI amounts per year (2003-2013) in €m



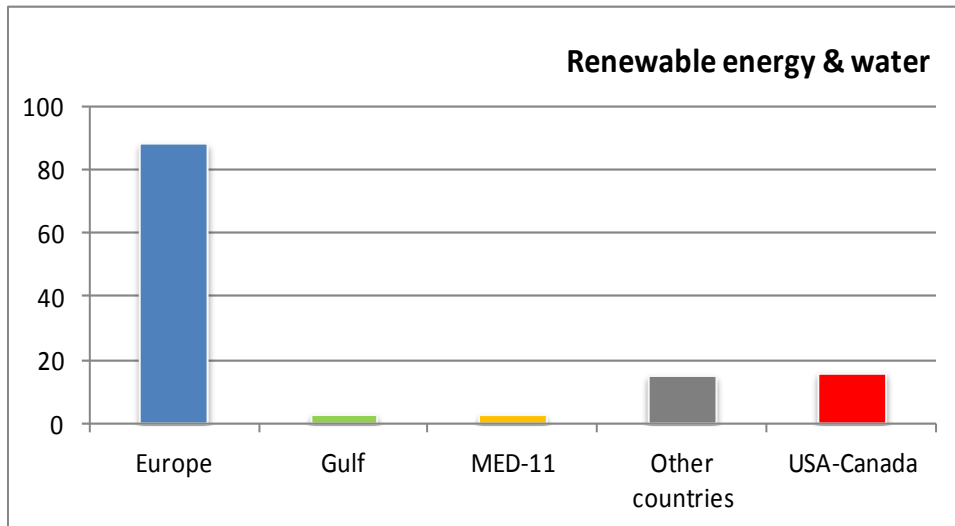
4.3 Origins and destinations

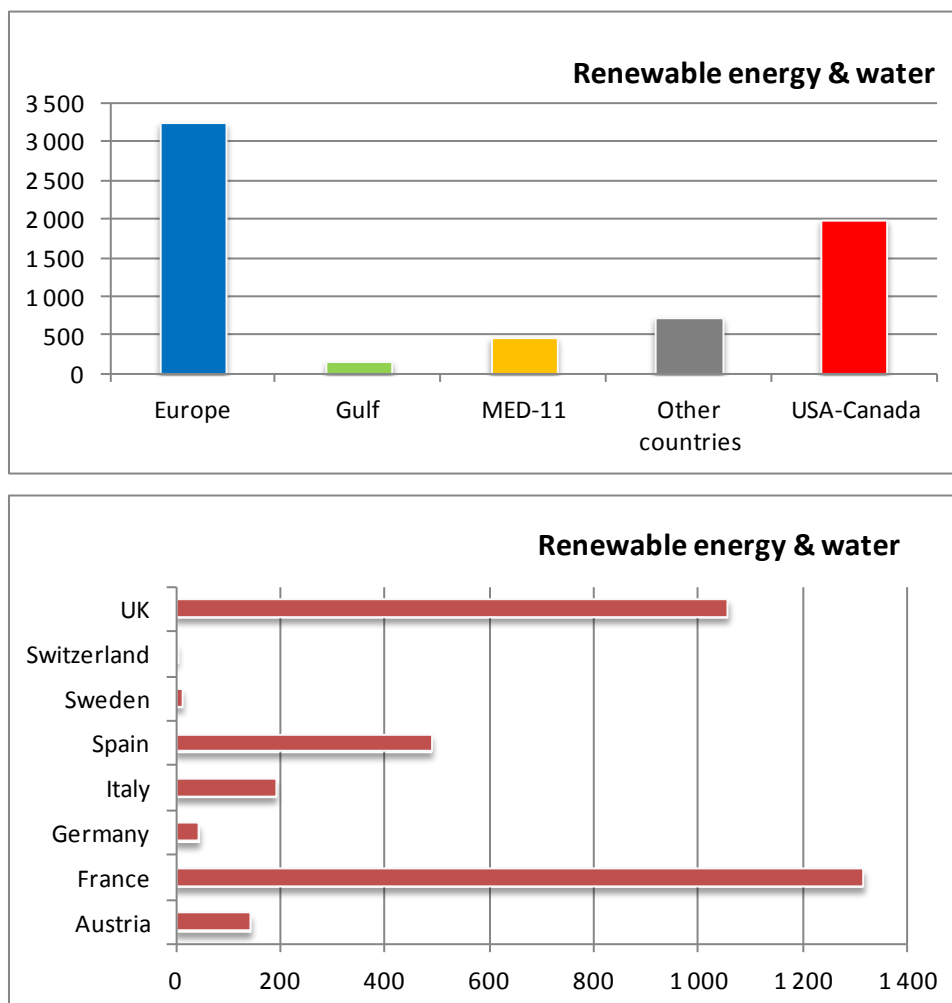
The following graphs reflect the geographical distribution of FDI in the Southern Mediterranean and the origins of the funds invested in the renewable energy sector.

Graph 5. Cumulated FDI amounts per year and per country of destination (2003-2013)



Graph 6. Number of FDI projects (2003-2013)



Graph 7. and 8. Amounts of FDI by region and country of origin (€m)

4.4 Major 15 European FDI projects in the sector (2009-2013)

Host country	Investor	Origin	Project description	FDI (€m)
Israel	Permira	UK	The private equity fund to take a 61% share in Netafim's capital, an Israeli irrigation system manufacturer with 13 plants in 11 countries	383,00
Morocco	Actis	UK	The group to buy from French Veolia the water, wastewater and electricity services operated by Redal in Rabat and Amendis in Tanger and Tetouan	370,00
Israel	Hutchinson Environmental Solutions	UK	Sorek Desalination, a 49/51 JV between the group and local IDE Technologies, to win the BOT tender for the Sorek desalination plant	179,60
Morocco	GDF Suez / International Power	France	The power generation company to set up a 300 MW wind farm in Tarfaya through TAREC, its 50-50 JV with local Nareva, under a 20 year BOT contract	179,00
Egypt	Italcementi / Italgas	Italy	The group's energy subsidiary to get green light from the government to set up the first privately owned Egyptian wind farm in Gabal El Zeit	140,00
Turkey	Verbund / EnerjiSA	Austria	Enerjisa, the 50-50 JV of the group with Sabanci, will develop a 129-MW wind farm in Dagpazari (Mersin), to be completed in 2012	75,00

Turkey	RES - Renewable Energy Systems	UK	The energy group to invest in a 48-MW wind farm in Havza, in the Samsun province, which construction will start mid-2014 and end in 2016	75,00
Egypt	FCC (Aqualia)	Spain	The firm to build and operate a sewage treatment plant in Cairo in JV (50/50) with Orascom Construction Industries through a 20-year BOT concession	71,00
Turkey	EDF / EDF Energies Nouvelles	France	Polat Enerji, a 50%-owned subsidiary of EDF Energies Nouvelles, to develop a wind farm in Soma (Manisa), whose 1st phase will enter production in 2010	50,00
Tunisia	Abengoa / Befesa Agua	Spain	The group to win a 20 year BOT contract for a seawater desalination plant in Djerba in team with local Princesse Groupe	49,00
Turkey	EnBW / Borusan Enerji	Germany	The energy group to expand from 45 to 60 MW its Bandirma wind farm after the acquisition of a 50% stake in local company Borusan in 2009	42,50
Lebanon	Veolia Environnement	France	The group's subsidiary, OTV, to win a contract for the construction and the operation of a new waste water unit in Tyr for 5 years	31,00
Turkey	Verbund / EnerjiSA	Austria	Enerjisa, a 50-50 JV of Turkish Sabanci and Austria's Verbund, to set up a 30-MW wind farm in Mahmudiye (Canakkale), due to enter production in 2011	18,50
Morocco	Veolia Environnement / Amendis	France	The group to further invest in 2012 under its water, wastewater and electricity services management contract in the urban community of Tetouan	14,00
Jordan	Sweco	Sweden	The company to win a 25 year BOT contract to build and manage a water supply system including a 350 km water pipeline from Rum aquifer to Amman	12,70

5 Conclusion & Recommendations

In the Project Euromed Invest, inclusive action is required to access certain activities hitherto little or non-existent in the South Mediterranean countries. It should involve key stakeholders in the activity in each country (state agencies, support structures, etc.) And create the necessary synergies to boost the sector and create more business opportunity.

5.1 Combine Industries and Vital Needs Around Renewable Energy and Water

Some issues for the development of renewable energies and water activities in the South-East Mediterranean, are available below for a three-year action within the framework of this project. These proposals represent a general framework for future action. The debate on more targeted or specific actions remains open and will depend on actors and the type of investment.

Examples of Integrated projects to develop:

Description	Focus	Target territory	Schedule	Synergies
<p><i>Integrated energy plant:</i> <i>Thermal desalination plant,</i> <i>Production of biocarburant *</i> <i>Production of hydrogen</i></p>	<p><i>To opt for new technologies of desalination such as hybride one =thermal+reverse osmosis</i> <i>recover the thermal energy released by desalination operation to produce biocarburant</i> <i>• Reduction of the costs, better profitability</i> <i>Photo-engines at base of micro algae</i> <i>Creation of farms of algae of big and average size (spirulina)</i></p>	<p><i>CARRIED OUT</i> <i>Emirate</i> <i>Sub-Saharan Africa</i></p>	<p>ENER: Mediterranean expo of renewable energies (Tunisia) SONEX (Jordan)</p>	<p>ANME,CSNER (Tunisia)</p> <p>World Ocean Council (USA)</p> <p>AFRE: ASSOCIATION OFF SPANISH TOILETS TECHNOLOGY COMPANIES (Spain)</p> <p>Hydreos - Pole of Water Alsace (France)</p>
<p><i>Technocenter Water, Energy, Environment</i> <i>Energy & Water Valley</i></p>	<p><i>The silicon valley for water and new energies</i> <i>A space of a few km² which will gather organizations, start up and even SME actif in the field</i></p>	<p>MENA+ Mediterranean</p>	<p><i>Mediterranean's day</i></p>	<p>ALME (Lebanon)</p> <p>ANME (Tunisia)</p> <p>CDER (Algeria)</p>
<p><i>Center of Study for antidesertification</i></p>	<p><i>"Buried diffusion" and agriculture off one changes semi desartic Land.</i></p>	<p>MENA+ Africa + Serves zones (Australia, the USA)</p>	<p>ENER Expo (Morocco) Water expo & forum (Morocco)</p>	<p>AMISOLE (Morocco)</p> <p>World Ocean Council (USA)</p> <p>UNCCD</p>

Development of a network of competences in maintenance of the renewable installations operating in all the Mediterranean countries of two banks. It is about a Online exchange of the experiments in O&M (Operating & maintenance) so improving the services and optimizing the operation of the installations	Installations statement and solar-fired heaters Desalination plants of domestic and average size	5 countries of southern bank and 5 countries of Northern bank	Tunisia: day of the energy effectiveness and energies renewable Morocco: Solar Expo France: Energaïa	ANME (Tunisia) ATER (Tunisia) CDER (Algeria) IMEDER (France)
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Examples of needed Projects by sector:

Project profiles	X-ray	Target Territories	Schedule	Synergies
1/ Solar air-conditioning	Public buildings Hospitals Hotels (Opt for BEPOS: positive energy buildings and BEPAS: passive energy buildings)	Tunisia: South Morocco: West + center	Tunisia: EnerSoL Morocco: Solar Expo France: Energaïa Italy: Zero Emission Germany: Intersolar Other: see appendix	Tunisia: ANME, CSNER Morocco: ADEREE, IRESEN France: IMEDER
2/ Valorization of domestic waste	Production of electricity and heat	Urban zones		Algeria: CDER, APER, AUDIT
3 Desalination of water by EnR	Drinking water	Rural zones		
4 Valorization of organic waste	Production of Biogas for electricity and heat	Agricultural zones: breeding and culture		
5 Solar Cooling	Conservation and freezing of the agricultural produce and the sea	Arboriculture, palm plantations, fishing ports		

5.2 Actors and Clusters in the Mediterranean to Consider

5.2.1 Main actors

Among active players (non exhaustive list) in the renewable energy sector in South Mediterranean, we find:

Algeria

UPER : L'union des professionnels des énergies renouvelables Algérie

The UPER main tasks is contribute to the deployment of renewable energies in Algeria and improved institutional and regulatory frameworks, participate in the promotion of vocational training and maximize synergy between institutional, academic and industrial sectors.

Web Site : www.uper.fr/

SONELGAZ

Sonelgaz or National Society of electricity and gas, is a company responsible for the generation, transmission and distribution of electricity and gas in Algeria.

It was created in 1969, replacing the previous entity Algeria Electricity and gas (EGA), and was given a monopoly on the distribution and sale of natural gas in the country, and for the production, distribution, import and export of electricity. In 2002, Presidential Decree No. 02-195, converts it into a Company by SPA shares wholly owned by the State. In 2010, we talk about *Sonelgaz Group*.

Morocco

AMISOLE - Association Marocaine des Industries Solaires et Eolienne

The Moroccan Solar Industries Association and Aeolian (AMISOLE) was created in 1987 to promote the interests of industrial and Moroccan professionals in the renewable energy sector.

It now has forty companies bringing together several hundred employees. This association is open to renewable energy and industrial professionals whose main activity is related to renewable energy.

Web site: www.amisole.com

MAZEN (Moroccan Agency for Solar Energy)

Web site : www.masen.org.ma

ADEREE (Agence Energie Renouvelable et Efficacité Energétique)

Web site : www.aderee.ma

Lebanon

ALMEE - Association Libanaise pour la Maîtrise de l'Energie et pour l'Environnement

ALMEE is an association created in November 1992 with a mission to develop, deepen and promote the national level all the processes and scientific and technical means for a more rational management of energy and thus economies of energy in various fields such as renewable energy: solar, thermal, photovoltaic, wind and biomass and building sectors, transport, etc.

ALMEE offers a wide range of services. It establishes the scientific and techniques for improved energy management studies ; it facilitates the exchange of information with similar organizations and associations in Lebanon and abroad ; it broadcasts a technical review covering different aspects of energy and encourages the publication of books on energy ; organizes courses, seminars, conferences, symposia and congresses on the topic various aspects of the issue of energy and energy savings; and develops clean energy to safeguard the environment and the ecosystem.

Web site: www.almee.org

Tunisia

CSNER - Chambre Syndicale Nationale des Energies Renouvelables de Tunisie

The National Union Chamber of Renewable Energy Association (CSNER) is a non-governmental, non-profit and operates as a meeting place for manufacturers and companies working in the field of renewable energies in general and solar in particular.

Created in July 2003, its primary mission is to build and maintain a sustainable market in the field of renewable and a strong position at the national level for the energy sector representation.

Web site: www.csner-tn.com

5.2.2. Clusters in the South Mediterranean

This table presents the main clusters and start-up support spaces operating in the field of water and green energies or related sectors:

<u>Entity name</u>	<u>Profile</u>	<u>Country</u>	<u>Sector / Sub-sectors (niches)</u>	<u>Website</u>
CDER - Centre de Développement des Energies Renouvelables	TTO	Algeria	Energy / Environment	http://www.cder.dz/
Alexandria University Incubation Center	Incubator	Egypt	Energy / Environment	www.alexu.edu.eg
National Institute of Oceanography and Fisheries	TTO	Egypt	Energy / Environment	www.niof.sci.eg
Kinarot Incubator Ltd	Incubator	Israel	Energy / Environment	www.kinarot.com
Mofet B'Yehuda Venture Accelerator	Incubator	Israel	Energy / Environment	www.mofet.org.il
Rotem Ventures	Incubator	Israel	Energy / Environment	http://www.rotemi.co.il/incubator/
Technopole d'Oujda	Cluster/ technology park	Morocco	Energy / Environment	http://www.medz.ma/index.php?id=13&lang=fr&mod=1&RefCat=2&Ref=149&btn_back
Marobtikar -Université Hassan I de Settat	Incubator	Morocco	Energy / Environment	www.uh1.ac.ma
Incubateur universitaire de Marrakech « INMA » - Cadi Ayyad	Incubator	Morocco	Energy / Environment	http://www.ucam.ac.ma/centres/incubateur-universitaire-de-marrakech-inma-/art-72.php

<u>Entity name</u>	<u>Profile</u>	<u>Country</u>	<u>Sector / Sub-sectors (niches)</u>	<u>Website</u>
Centre D'incubation Et D'accueil D'entreprises Innovante Enim - Ecole Nationale De L'industrie Minerale-	Incubator	Morocco	Energy / Environment	http://www.enim.ac.ma/formation/ciee/incubation_entrep.html
Pole de competitivite de l'Ecopark de Borj Cedria	Cluster/ technology park	Tunisia	Energy / Environment	http://www.ecopark.rnrt.tn/
CDER - Centre de Développement des Energies Renouvelables	TTO	Algeria	Energy / Environment	http://www.cder.dz/
Alexandria University Incubation Center	Incubator	Egypt	Energy / Environment	www.alexu.edu.eg
National Institute of Oceanography and Fisheries	TTO	Egypt	Energy / Environment	www.niof.sci.eg
Kinarot Incubator Ltd	Incubator	Israel	Energy / Environment	www.kinarot.com
Mofet B'Yehuda Venture Accelerator	Incubator	Israel	Energy / Environment	www.mofet.org.il
Rotem Ventures	Incubator	Israel	Energy / Environment	http://www.rotemi.co.il/incubator/
Technopole d'Oujda	Cluster/ technology park	Morocco	Energy / Environment	http://www.medz.ma/index.php?id=13&lang=fr&mod=1&RefCat=2&Ref=149&btn_back
Marobtikar -Universite Hassan I de Settat	Incubator	Morocco	Energy / Environment	www.uh1.ac.ma
Incubateur universitaire de Marrakech« INMA » - Cadi Ayyad	Incubator	Morocco	Energy / Environment	http://www.ucam.ac.ma/centres/incubateur-universitaire-de-marrakech-inma-/art-72.php
Centre D'incubation Et D'accueil D'entreprises Innovante Enim - Ecole Nationale De L'industrie Minerale-	Incubator	Morocco	Energy / Environment	http://www.enim.ac.ma/formation/ciee/incubation_entrep.html
Pole de competitivite de l'Ecopark de Borj Cedria	Cluster/ technology park	Tunisia	Energy / Environment	http://www.ecopark.rnrt.tn/
CDER - Centre de Développement des Energies Renouvelables	TTO	Algeria	Energy / Environment	http://www.cder.dz/
Alexandria University Incubation Center	Incubator	Egypt	Energy / Environment	www.alexu.edu.eg
National Institute of Oceanography and Fisheries	TTO	Egypt	Energy / Environment	www.niof.sci.eg
Kinarot Incubator Ltd	Incubator	Israel	Energy / Environment	www.kinarot.com
Mofet B'Yehuda Venture Accelerator	Incubator	Israel	Energy / Environment	www.mofet.org.il
Rotem Ventures	Incubator	Israel	Energy / Environment	http://www.rotemi.co.il/incubator/

<u>Entity name</u>	<u>Profile</u>	<u>Country</u>	<u>Sector / Sub-sectors (niches)</u>	<u>Website</u>
Technopole d'Oujda	Cluster/ technology park	Morocco	Energy / Environment	http://www.medz.ma/index.php?id=13&lang=fr&mod=1&RefCat=2&Ref=149&btn_back

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FEMIP en collaboration avec OME et UPM, « L'efficacité énergétique dans la région méditerranéenne », *Conférence du 10 décembre 2013 à Bruxelles*.

Euromed@Change, Opportunités d'affaires en Méditerranée, Fucus sur l'énergie : Tunisie, Maroc, Egypte, Liban, 2013

Web sites :

Agence pour la rationalisation de l'Energie (APRUE, Algérie) : www.aprue.org.dz

Agence pour le développement des énergies renouvelables et de l'efficacité énergétique(ADEREE, Maroc) : www.aderee.ma

African Development Bank (AfDB) www.afdb.org

ANME: Agence Nationale de Maitrise de l'Energie, (ANME, Tunisie) www.anme.nat.tn/

Centre de Développement des Energies Renouvelables, (CDER, Algérie) www.cder.dz

Comité Maghrébin de l'Electricité (COMELEC, Maghreb-UMA) : comelec-net.org/

Egyptian Electricity Holding Company, www.egelec.com/

International Energy Agency (AIE) www.iea.org et pour les statistiques www.iea.org/stats/index.asp

Mediterranean Renewable Energy Centre MEDREC, www.medrec.org

Moroccan Agency for Solar Energy, MASEN, www.masen.org.ma

New and Renewable Energy Authority, (NREA, Egypt), www.nrea.gov.eg

Office National de l'Electricité (ONE, Maroc), www.one.org.ma

Regional Center for Renewable Energy and Energy Efficiency, (RCREEE), www.rcreee.org

Société d'Investissements Energétiques (SIE, Maroc) www.siem.ma

Société Mauritanienne d'Electricité: (SOMELEC, Mauritanie), www.somelec.mr

Société Nationale de l'Electricité du Gaz, Algérie, (SONELGAZ, Algérie), www.sonelgaz.dz

Société Tunisienne de l'Electricité et du Gaz, (STEG, Tunisie), www.steg.com.tn/

Union Arabe de l'Electricité, www.auptde.org

Union du Maghreb Arabe (UMA, Maghreb), www.maghrebarabe.org

United Commission for Africa, (UNECA, Nations Unies) ; voir sous site Bureau régional Afrique du Nord, www.uneca.org/fr/sro/na/default.htm

World Energy Council: (WEC) www.worldenergy.org/

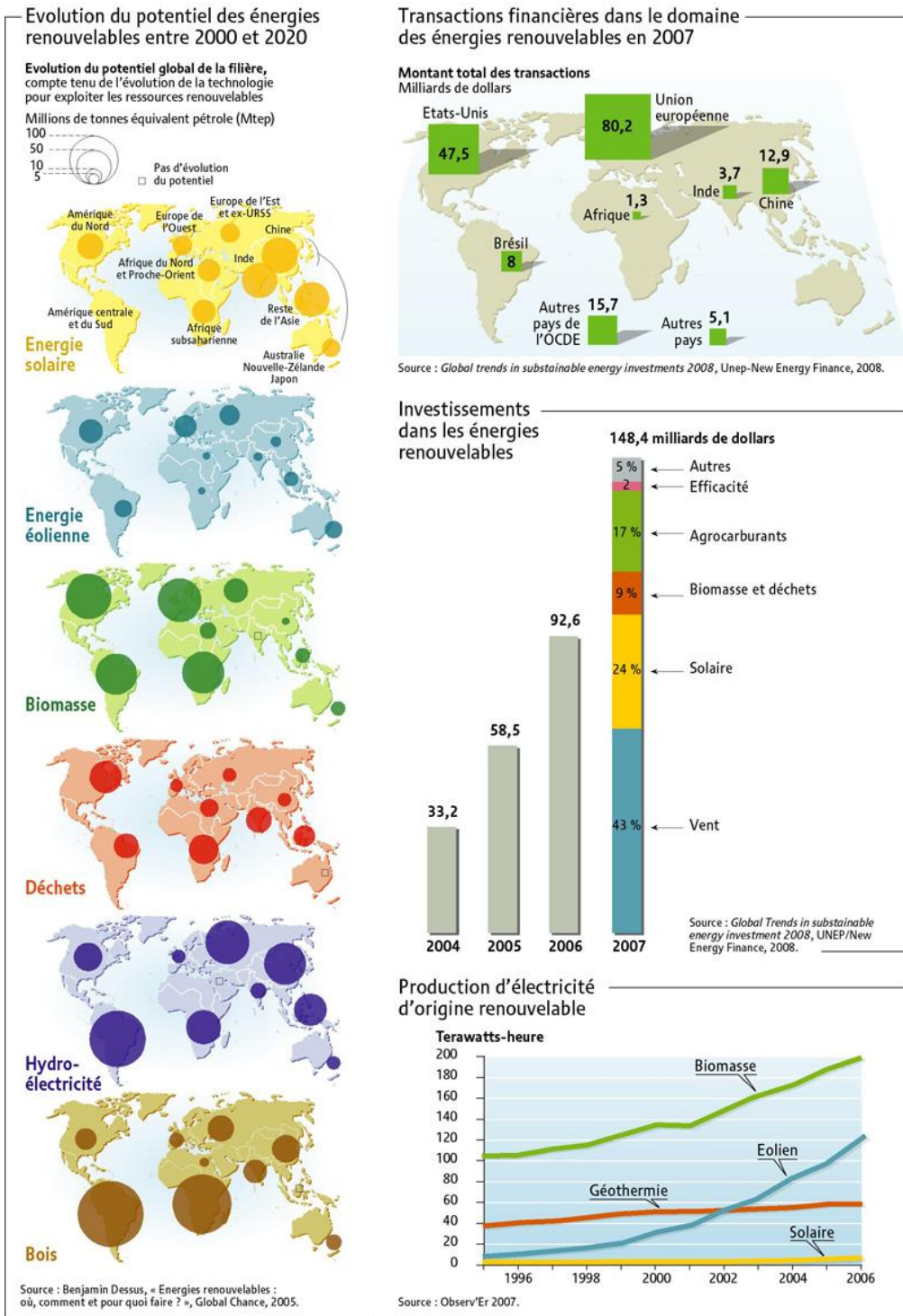
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7 Annexes

Annex 1

Renewable Energies attract Investors Les énergies renouvelables attirent les investisseurs



*Annex 2***The share of renewable energy production
in some Mediterranean countries****Jordan :**

Jordan produces almost all of its electricity from fossil fuels (99.6 % in 2012). Renewable generation (0.4 % of the national mix) relies mainly on hydropower. Wind energy and solar energy sectors provide the Jordanian network barely 5 GWh.

Egypt :

Second largest electricity on the African continent and historical producer of oil and gas consumer, Egypt relies heavily on fossil fuels in the electricity generation: they occupy 90.9 % of the national mix. The additional production comes from renewable sources (9.1%) have tremendous potential, but too little exploited. Like most countries in the region, hydropower is the dominant renewable energy sector (8.2% of the country's total production). It is followed by wind, whose production is today is far from being negligible (1.4 TWh). Finally, the solar sector has two components, photovoltaic and thermodynamic, which produce respectively 11 and 46 GWh.

Syria :

Syria is ranked 10th in the world again at the wealth of renewable energy sources. Although Syria has vast sources of renewable energy, the energy sector in Syria depletes 60% of government revenues, while the loss in the sector of electric power to 38 % in the majority of cities and the domestic consumption of this energy is 36% of total production.

Turkey :

Although fossil fuels remain the majority in the national energy mix (72.7 % in 2012), Turkey is almost an exception to the Mediterranean on the dynamism of its energy market. Significant efforts have been made by the country in recent years to make possible the emergence of renewable energy sectors in order to limit its energy dependence. These alternative sources represent 27.3% of production in 2012. Hydropower is by far the renewable energy sector in the country (24.2%), followed by wind (2.4%), while in the solar is still in its infancy (0.2%).

Tunisia :

The country relies 98.4% on fossil fuels for domestic electricity, although hydrocarbon deposits are much smaller than those of its neighbors Algeria and Libya. Renewable mix, which decomposes between hydrolic, wind and since 2012 - Solar PV , provides the complement (1.6%).

Algeria :

Algeria is based almost exclusively on fossil fuels (99.2%) to meet the growing electricity needs of its population. Renewables occupy only a small share of national electricity mix (0.8%) and their production is shared between the hydraulic sector that generates 389 GWh , or 0.7% of the total, and solar photovoltaic industries (11 GWh) and thermodynamic (58 GWh), which represent about 0.1% of their balance sheet.

Morocco :

In Morocco, renewable energy sources contributed in 2012 to 8.9% of national electricity mix. Most comes from hydro (67.2 % of total renewable), but the wind becomes an increasingly important (30 % in 2012) and solar photovoltaic and divided between its thermodynamic components, achieves 2.8% revolving balance . The country remains so still very dependent on fossil fuels.

*Annex 3***International trade fairs and events in some Southern Mediterranean countries****- TUNISIA**

ENERMED: Exhibition of Renewable Energy. ENERMED is an information platform for all economic players in the renewable energy sector: discover a range of products, services and business innovation at the forefront of technology. Organizes end of June each year by UTICA, Tunis.

Parc des expositions of Sfax :

ENER: Mediterranean Renewable Energy Exhibition in mid-March 2015

Enersol: November of each year. Organizer: Portal Tunisian-Moroccan energy mastery (headquarters in Tunis). 26 to 28 November 2014.

- ALGERIA

Palais des Expositions d'Alger: ELECTRO AUTOMATION, RENEWABLE ENERGY &

International Exhibition of renewable energy, conventional energy, energy efficiency, electrical, automation and lighting (end May 2015)

Palais des Conventions d'Oran : ERA

International Exhibition of renewable energy, clean energy and sustainable development (27 to 29 October 2014)

- EGYPT

Cairo International Convention & Exhibition Centre

ELECTRICX

International exhibition of electrical energy production (December 2014)

- JORDAN

Amman International Motor Show - AIMS

Younes Islam St 9 - Amman 11190 Jordanie Tél+962 5714211 - Fax+962 5715311

AIMSALTERNATIVE ENERGY

International conference on alternative energy and biofuels (annual) - September 2014

JIMEX

Machinery, electromechanical, energy (Annual) - June 2015

SONEX

Exhibition-Forum dedicated to solar technology, solar thermal, solar heating systems, smart energy networks.

- MOROCCO

CICEC (Centre International des Conférences et d'Expositions de Casablanca)

SOLAIRE-EXPO

Salon international de l'énergie solaire (Feb-march 2015)

Office des Foires et Expositions de Casablanca (OFEC)

ENER EVENT

International Exhibition for Renewable Energy and Energy Efficiency

Organised by : Office des Foires et Expositions de Casablanca (OFEC) (Nov. 2014)

PHOTOVOLTAICA

Conference and Exhibition on Photovoltaic Energy. PHOTOVOLTAICA - Conference and Exhibition - is the first international exhibition in Africa dedicated to the development of the market for solar photovoltaic energy

- LEBANON

BIEL - Beirut International Exhibition & Leisure Center

ECORIENT

International exhibition and conference on environmental technologies, sustainable development, alternative energy, water management and clean energy (annual), June 2015.

Meetings and seminars

- The IMEDER (Mediterranean Institute of RE) organizes two annual events in March and October (exact dates to communicate)

1. « Journée de la Méditerranée »
2. « Derbi » in collaboration with the Chambre de commerce et d'industrie de Perpignan

Both events are organized in turn in one of the Mediterranean countries. The dates will be announced later.

- The ATER (Tunisian Association of renewables) with the School of Science and Technology of Hammam Sousse organize every year in May the «Journée de l'efficacité énergétique et des énergies renouvelable » in Sousse.

Annex 5.**EU: Main clusters operating in the field of water and green energies or related sectors**

Source: ECCP

<u>Entity name</u>	<u>Profile</u>	<u>Country</u>	<u>Sector / Sub-sectors (niches)</u>
ECO WORLD STYRIA	Cluster	Austria	Environment/Green Technologies
Cluster Renewable Energies Tyrol	Cluster	Austria	Energy
Oekoenergie-Cluster	Cluster	Austria	Energy
Environment Technology Cluster - Network Energy Efficiency	Cluster	Austria	Environment/Green Technologies
ACQUEAU	Cluster	Belgium	Environment/Green Technologies
Plastics Recyclers Europe	Cluster	Belgium	Environment/Green Technologies
Ghent BioEnergy Valley	Cluster	Belgium	Energy
Cluster Déchets Solides (Val+)	Cluster	Belgium	Environment/Green Technologies
Tweed	Cluster	Belgium	Environment/Green Technologies
Green Synergy Cluster	Cluster	Bulgaria	Energy
Czech Pellets Cluster	Cluster	Czech Republic	Environment/Green Technologies
CREA Hydro&Energy	Cluster	Czech Republic	Environment/Green Technologies
Vindmølleindustrien	Cluster	Denmark	Energy
Copenhagen Cleantech Cluster	Cluster	Denmark	Environment/Green Technologies
Innovation network for Cleantech	Cluster	Denmark	Environment/Green Technologies
Innovation Network for Environmental Technology	Cluster	Denmark	Environment/Green Technologies
International Cleantech Network	Cluster	Denmark	Environment/Green Technologies
Water in Urban Areas - Partnership for Climate Adaption and Innovation	Cluster	Denmark	Environment/Green Technologies
Renewable Energy Network	Cluster	Denmark	Energy
Innovation network for Biomass	Cluster	Denmark	Environment/Green Technologies
Offshore Center Danmark	Cluster	Denmark	Energy
Lean Energy	Cluster	Denmark	Environment/Green Technologies
Wind Power Cluster	Cluster	Estonia	Energy
EnergyVaasa	Cluster	Finland	Energy
Finnish Cleantech Cluster	Cluster	Finland	Environment/Green Technologies
Lahti Region Development LADEC Ltd	Cluster	Finland	Environment/Green Technologies
Secondary materials in construction – Finland	Cluster	Finland	Environment/Green Technologies
E2IA	Cluster	France	Environment/Green Technologies
Wind for Future	Cluster	France	Energy

<u>Entity name</u>	<u>Profile</u>	<u>Country</u>	<u>Sector / Sub-sectors (niches)</u>
Nov&atech	Cluster	France	Environment/Green Technologies
Derbi	Cluster	France	Energy
Pôle Environnement Limousin	Cluster	France	Environment/Green Technologies
Hydreos - Pôle de l'Eau Alsace / Lorraine	Cluster	France	Environment/Green Technologies
Cluster Water Sensors & Membranes	Cluster	France	Environment/Green Technologies
CD2E	Cluster	France	Environment/Green Technologies
Pôle TEAM ²	Cluster	France	Environment/Green Technologies
Éa éco-entreprises	Cluster	France	Environment/Green Technologies
Cluster Rhône-Alpes Eco-énergie	Cluster	France	Energy
Tenerdis	Cluster	France	Energy
REI	Cluster	France	Environment/Green Technologies
biomastec - Technologies for the Efficient Use of Biomass	Cluster	Germany	Energy
Cluster GreenCity Freiburg	Cluster	Germany	Environment/Green Technologies
Netzwerk Umwelttechnologie	Cluster	Germany	Environment/Green Technologies
Cluster Energietechnik	Cluster	Germany	Energy
KUMAS-Kompetenzzentrum Umwelt e.V.	Cluster	Germany	Environment/Green Technologies
Umweltcluster Bayern	Cluster	Germany	Environment/Green Technologies
FEE - Fördergesellschaft Erneuerbare Energien e.V.	Cluster	Germany	Energy
TSB Berlin	Cluster	Germany	Energy
Cluster Energietechnik Berlin-Brandenburg	Cluster	Germany	Energy
Energiewirtschaft/Energietechnologie – EWET	Cluster	Germany	Energy
Renewable Energy Hamburg	Cluster	Germany	Energy
CLEO	Cluster	Germany	Energy
deENet	Cluster	Germany	Energy
Baltic Green HealthCare Cluster	Cluster	Germany	Environment/Green Technologies
Eco4Life	Cluster	Germany	Environment/Green Technologies
CEF.NRW / Cluster Energieforschung	Cluster	Germany	Energy
ENA-Duisburg	Cluster	Germany	Energy
EnergieImpuls OWL e. V.	Cluster	Germany	Energy
EnergieRegion.NRW	Cluster	Germany	Energy
Rhein Ruhr Power	Cluster	Germany	Energy

<u>Entity name</u>	<u>Profile</u>	<u>Country</u>	<u>Sector / Sub-sectors (niches)</u>
SmartGrids	Cluster	Germany	Energy
CleanTechNRW	Cluster	Germany	Environment/Green Technologies
Umwelttechnologien.NRW / Green Technology Cluster North Rhine-Westphalia	Cluster	Germany	Environment/Green Technologies
Solavis	Cluster	Germany	Energy
SpectroNet	Cluster	Germany	Energy
Thermie Network	Cluster	Germany	Energy
Bioenergy and Environment Cluster of Western Macedonia	Cluster	Greece	Energy
Blue Economy Innovation Cluster	Cluster	Hungary	Energy
NAUTILUS Cluster for Sustainable Lifestyle	Cluster	Hungary	Environment/Green Technologies
Energy Cluster	Cluster	Hungary	Energy
Pannon-Tér Energy and Environmental Management Cluster	Cluster	Hungary	Energy
R/E Cluster	Cluster	Hungary	Energy
GreenTech Renewable Energy Cluster	Cluster	Hungary	Environment/Green Technologies
Archenerg Renewable Energy Cluster	Cluster	Hungary	Environment/Green Technologies
Green Energy and ECO Architecture	Cluster	Hungary	Energy
Dorottya Pék	Cluster	Hungary	Environment/Green Technologies
The Green Way	Cluster	Ireland	Environment/Green Technologies
Energy@Cork	Cluster	Ireland	Energy
Lombardy Energy Cluster	Cluster	Italy	Energy
POLIGHT	Cluster	Italy	Environment/Green Technologies
Luxembourg EcolInnovation Cluster	Cluster	Luxembourg	Environment/Green Technologies
Amsterdam Green Metropole	Cluster	Netherlands	Environment/Green Technologies
Bio-energiecluster Oost-Nederland	Cluster	Netherlands	Energy
Wielkopolska Renewable Energy Cluster	Cluster	Poland	Environment/Green Technologies
Dolnośląski Ekoenergetyczny Klaster	Cluster	Poland	Environment/Green Technologies
SIDE - CLUSTER	Cluster	Poland	Environment/Green Technologies
Lubelski Ekoenergetyczny Klaster	Cluster	Poland	Energy
Wschodni Klaster Energetyczny (Eastern Energetic Cluster)	Cluster	Poland	Energy

<u>Entity name</u>	<u>Profile</u>	<u>Country</u>	<u>Sector / Sub-sectors (niches)</u>
Mazowiecki Sojusz Energetyczny	Cluster	Poland	Environment/Green Technologies
Baltic Eco-Energy Cluster (IMP-BKEE)	Cluster	Poland	Energy
Śląski Klaster ECO ENERGIA	Cluster	Poland	Energy
Euro Centrum Cluster of Energy Saving Technologies	Cluster	Poland	Environment/Green Technologies
Śląski klaster wodny	Cluster	Poland	Environment/Green Technologies
Podkarpacki Klaster Energii Odnawialnej	Cluster	Poland	Energy
Warmińsko-Mazurski Klaster Razem Ciepłej	Cluster	Poland	Energy
Zielona Lokomotywa	Cluster	Poland	Energy
Baltic Sea Cluster sEaENERGIA	Cluster	Poland	Environment/Green Technologies
Bioenergy for the Region	Cluster	Poland	Energy
Świętokrzysko-Podkarpacki Energy Cluster	Cluster	Poland	Energy
EnergyIN – Competitiveness and Technology Cluster for Energy	Cluster	Portugal	Energy
Geothermal Energy Cluster	Cluster	Romania	Energy
TREC Transnational Renewable Energies Cluster	Cluster	Romania	Energy
Romanian Water Cluster	Cluster	Romania	Environment/Green Technologies
Green energy cluster	Cluster	Romania	Energy
REN ERG Cluster	Cluster	Romania	Energy
REGIOFA Cluster	Cluster	Romania	Environment/Green Technologies
Romanian Sustainable Energy Cluster - ROSENC	Cluster	Romania	Energy
Narodny energetický klaster	Cluster	Slovakia	Energy
Cluster for Green and Innovative Technologies Support	Cluster	Slovakia	Environment/Green Technologies
ACLIMA	Cluster	Spain	Environment/Green Technologies
Clúster Urbano para Uso Eficiente del Agua	Cluster	Spain	Environment/Green Technologies
ZINNAE	Cluster	Spain	Environment/Green Technologies
Consortio Tecnológico de la Energía de Asturias	Cluster	Spain	Energy
Cluster de Energía de Euskadi	Cluster	Spain	Energy
ACLIMA - Basque Country's Environmental Industry's Cluster Association	Cluster	Spain	Environment/Green Technologies
AEI-Cluster RICAM	Cluster	Spain	Energy
AVEBIOM	Cluster	Spain	Energy
Clúster d'Eficiència Energètica de Catalunya	Cluster	Spain	Energy

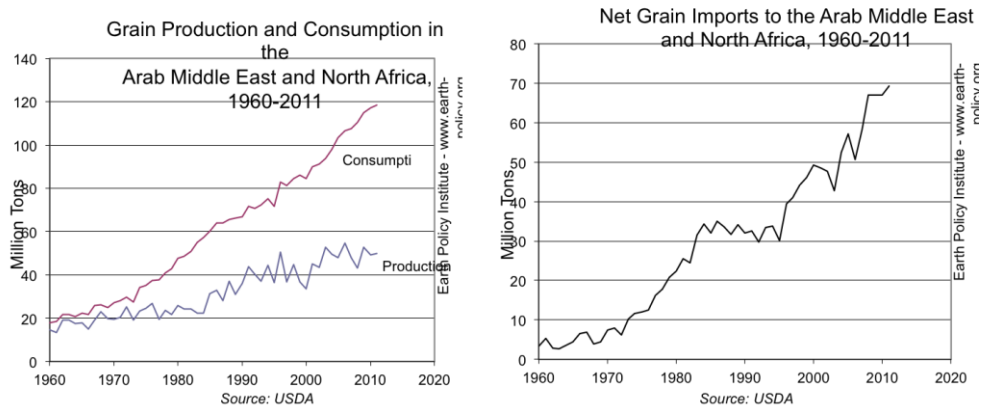
<u>Entity name</u>	<u>Profile</u>	<u>Country</u>	<u>Sector / Sub-sectors (niches)</u>
Catalan Water Partnership	Cluster	Spain	Environment/Green Technologies
Extremadura Energy Cluster	Cluster	Spain	Energy
Acluxega	Cluster	Spain	Energy
Galician Renewable Energy Cluster (CLUERGAL)	Cluster	Spain	Energy
Madrid Sustainability and Renewable Energy Cluster	Cluster	Spain	Energy
AFRE: ASSOCIATION OF SPANISH WATER TECHNOLOGY COMPANIES	Cluster	Spain	Environment/Green Technologies
SPANISH WATER TECHNOLOGY PLATFORM	Cluster	Spain	Environment/Green Technologies
CLUSTER SOLAR DE NAVARRA	Cluster	Spain	Environment/Green Technologies
AVAESEN - The Valencian Energy Industries Cluster	Cluster	Spain	Energy
CECV	Cluster	Spain	Energy
Cluster de Energia	Cluster	Spain	Energy
INNOVALL Cluster	Cluster	Spain	Environment/Green Technologies
SP- Water Technology Centre	Cluster	Sweden	Environment/Green Technologies
Sustainable Construction Material Management Sweden (S-CoMMS)	Cluster	Sweden	Environment/Green Technologies
BioFuel Region	Cluster	Sweden	Energy
Sustainable Business Malardalen	Cluster	Sweden	Environment/Green Technologies
Biogas West	Cluster	Sweden	Energy
SP Water Technology Centre	Cluster	Sweden	Environment/Green Technologies
EEEGR	Cluster	United Kingdom	Energy
Peterborough Cleantech Cluster	Cluster	United Kingdom	Environment/Green Technologies
Water Innovation Network	Cluster	United Kingdom	Environment/Green Technologies
Dorottya Pék	Cluster	Hungary	Environment/Green Technologies
The Green Way	Cluster	Ireland	Environment/Green Technologies
Energy@Cork	Cluster	Ireland	Energy
Lombardy Energy Cluster	Cluster	Italy	Energy
POLIGHT	Cluster	Italy	Environment/Green Technologies
Luxembourg EcoInnovation Cluster	Cluster	Luxembourg	Environment/Green Technologies
Amsterdam Green Metropole	Cluster	Netherlands	Environment/Green Technologies
Bio-energiecluster Oost-Nederland	Cluster	Netherlands	Energy
Wielkopolska Renewable Energy Cluster	Cluster	Poland	Environment/Green Technologies
Dolnośląski Ekoenergetyczny Klaster	Cluster	Poland	Environment/Green Technologies
SIDE - CLUSTER	Cluster	Poland	Environment/Green Technologies

<u>Entity name</u>	<u>Profile</u>	<u>Country</u>	<u>Sector / Sub-sectors (niches)</u>
Lubelski Klaster Ekoenergetyczny	Cluster	Poland	Energy
Wschodni Klaster Energetyczny (Eastern Energetic Cluster)	Cluster	Poland	Energy
Mazowiecki Sojusz Energetyczny	Cluster	Poland	Environment/Green Technologies
Baltic Eco-Energy Cluster (IMP-BKEE)	Cluster	Poland	Energy
Śląski Klaster ECO ENERGIA	Cluster	Poland	Energy
Euro Centrum Cluster of Energy Saving Technologies	Cluster	Poland	Environment/Green Technologies
Ślaski klaster wodny	Cluster	Poland	Environment/Green Technologies
Podkarpacki Klaster Energii Odnawialnej	Cluster	Poland	Energy
Warmińsko-Mazurski Klaster Razem Ciepłej	Cluster	Poland	Energy
Zielona Lokomotywa	Cluster	Poland	Energy
Baltic Sea Cluster sEaNERGIA	Cluster	Poland	Environment/Green Technologies
Bioenergy for the Region	Cluster	Poland	Energy
Świętokrzysko-Podkarpacki Energy Cluster	Cluster	Poland	Energy
EnergyIN – Competitiveness and Technology Cluster for Energy	Cluster	Portugal	Energy
Geothermal Energy Cluster	Cluster	Romania	Energy
TREC Transnational Renewable Energies Cluster	Cluster	Romania	Energy
Romanian Water Cluster	Cluster	Romania	Environment/Green Technologies
Green energy cluster	Cluster	Romania	Energy
REN ERG Cluster	Cluster	Romania	Energy
REGIOFA Cluster	Cluster	Romania	Environment/Green Technologies
Romanian Sustainable Energy Cluster - ROSENC	Cluster	Romania	Energy
Narodny energetický klaster	Cluster	Slovakia	Energy
Cluster for Green and Innovative Technologies Support	Cluster	Slovakia	Environment/Green Technologies
ACLIMA	Cluster	Spain	Environment/Green Technologies
Clúster Urbano para Uso Eficiente del Agua	Cluster	Spain	Environment/Green Technologies
ZINNAE	Cluster	Spain	Environment/Green Technologies
Consortio Tecnológico de la Energía de Asturias	Cluster	Spain	Energy
Cluster de Energía de Euskadi	Cluster	Spain	Energy
ACLIMA - Basque Country's Environmental Industry's Cluster Association	Cluster	Spain	Environment/Green Technologies
AEI-Cluster RICAM	Cluster	Spain	Energy

<u>Entity name</u>	<u>Profile</u>	<u>Country</u>	<u>Sector / Sub-sectors (niches)</u>
AVEBIOM	Cluster	Spain	Energy
Clúster d'Eficiència Energètica de Catalunya	Cluster	Spain	Energy
Catalan Water Partnership	Cluster	Spain	Environment/Green Technologies
Extremadura Energy Cluster	Cluster	Spain	Energy
Acluxega	Cluster	Spain	Energy
Galician Renewable Energy Cluster (CLUERGAL)	Cluster	Spain	Energy
Madrid Sustainability and Renewable Energy Cluster	Cluster	Spain	Energy
AFRE: ASSOCIATION OF SPANISH WATER TECHNOLOGY COMPANIES	Cluster	Spain	Environment/Green Technologies
SPANISH WATER TECHNOLOGY PLATFORM	Cluster	Spain	Environment/Green Technologies
CLUSTER SOLAR DE NAVARRA	Cluster	Spain	Environment/Green Technologies
AVAESEN - The Valencian Energy Industries Cluster	Cluster	Spain	Energy
CECV	Cluster	Spain	Energy

Annex 6.

Asymmetry of food needs in the Middle East and North Africa



Grain Production, Consumption, and Net Imports in the Arab Middle East and North Africa by Population, 2011

Country	Population Millions	Production Thousand Tons	Consumption Thousand Tons	Net Imports	Imports as a Share of Consumption Percent
Egypt	82,5	19 210	34 620	15 450	45
Sudan	44,6	4 983	7 018	2 030	29
Algeria	36,0	4 291	13 600	9 785	72
Iraq	32,7	3 369	8 474	5 050	60
Morocco	32,3	8 624	14 159	5 575	39
Saudi Arabia	28,1	1 545	13 700	12 955	95
Yemen	24,8	715	4 257	3 435	81
Syria	20,8	4 679	7 814	3 150	40
Tunisia	10,6	2 001	4 750	2 750	58
Somalia	9,6	51	388	300	77
United Arab Emirates	7,9	n.a.	1 480	1 480	100
Libya	6,4	210	2 745	2 370	86
Jordan	6,3	55	2 105	2 128	101
Lebanon	4,3	158	1 126	975	87
Mauritania	3,5	168	643	475	74
Oman	2,8	n.a.	385	380	99
Kuwait	2,8	n.a.	935	935	100
Qatar	1,9	n.a.	n.a.	n.a.	n.a.
Bahrain	1,3	n.a.	75	75	100
Djibouti	0,9	n.a.	40	40	100

Note: n.a. = data not available.

Sources: Compiled by Earth Policy Institute from United Nations Population Division, *World Population Prospects: The 2010 Revision*, electronic database, at <http://esa.un.org/unpd/wpp/index.htm>, updated 3 May 2011; and U.S. Department of Agriculture, *Production, Supply, & Distribution*, electronic database, at www.fas.usda.gov/psdonline, updated 10 April 2012.

Annex 7

World map of the solar potential

