



PARLIAMENTARY ASSEMBLY OF THE MEDITERRANEAN
ASSEMBLEE PARLEMENTAIRE DE LA MEDITERRANEE
الجمعية البرلمانية للبحر الأبيض المتوسط

1st Standing Committee
on Political and Security-Related Cooperation

Special Task Force on Energy

Rapporteur: Mr. Mohammed M. Abou El-Enein (Egypt)

*Report on the Energy-Securing Strategy in the Mediterranean [endorsed by
consensus by the 1st Standing Committee at the 3rd Session of the Standing
Committees, 18 September 2008, St. Julians (Malta)]*

Introduction

The Mediterranean region has unique advantages. It is situated at a crossroad between three continents and civilizations, it is one of the richest regions in the world in terms of bio-diversity, habitats, and landscapes, along with history, culture and vast resources.

In spite of its unique natural resources, this region is threatened by climatic change. We are now entering a New Energy Era, when energy security and the relation between energy development and climate change are under consideration. During this new era, the growing demand for energy exceeds the available sources, including fossil fuels. This has driven many nations to adopt policies and strategies for securing future energy supplies.

The Mediterranean region has enormous potential for both conventional and renewable energy. We have to think of the Mediterranean as a region of prosperity. The issue of energy, is not only a challenge, but also an opportunity and engine for development and cooperation, for promoting peace, environmental protection and for bringing together the people of the Mediterranean. To realize these objectives we have to work together, unite our efforts, and share our experiences. We have to coordinate between our markets and our strategies in order to build a Mediterranean Energy strategy, which is strong, effective and sustainable.

No doubt, continuous cooperation with regards to energy between Mediterranean countries will have positive long term results. Cooperation for developing renewable energy in the Mediterranean should be intensified, either through financing, or optimally exploring the enormous potential for hydropower. The objective is to produce energy for export to Europe, which offers promising investment opportunities in the energy sector. A Mediterranean strategy for securing energy projects, including transportation and the storage of energy, is also required. Oil support services related to gas exploration and delivery should be considered. In addition, a series of research programs for wind, solar and biomass energies should be adopted to promote energy security in the Mediterranean region.

In this context, we present this report on “Securing Energy Strategy In the Mediterranean”:

First: The most important challenges facing energy security in the Mediterranean

- I. Energy and Climate Change
- II. Securing Energy Sources and Sustainable Development
- III. Energy and Human Rights

Second: Scenario for Present Mediterranean Energy Cooperation: Potential and Opportunities

- 1) Nordic Countries Win
- 2) Southern Mediterranean Countries Win
- 3) Supporting Elements for this Scenario

Third: Proposed Energy Cooperation Strategy between the Two Sides of the Mediterranean

- 1) New Policies for the Regional Energy Market
- 2) Promoting Reliance on Renewable Energies
- 3) Creating a Balance between New Energy Production and Food Security
- 4) Non-traditional Mechanism Funds for Energy Enterprises
- 5) Legal Frameworks for Rationalizing Conventional Energy and Promoting Renewables
- 6) Efficient Energy Use
- 7) Nuclear Energy Cooperation

First: The most important challenges facing energy security in the Mediterranean.

The World is witnessing a new era in energy. Countries are competing on how to secure energy sources, and concerns are growing about energy security, the relation between energy development, and climate change,

I. Energy and Climate Change:

Energy and the environment are two sides of the same coin. It is well documented that the oil industry plays a serious role in greenhouse gas emissions and air pollution with gases that raise climatic temperatures. This leads to a change in regional climate, desertification of farmland all over the world, the dumping of many coastal cities and islands, and several environmental and humanitarian disasters. There have been international attempts to address these issues through the Framework Convention on Climate Change in 1992, as well as its associated Kyoto Protocol in 1997.

The Mediterranean region enjoys considerable attention with regards to the challenges of climate change. It will experience more climatic change than any other place in the world, and with serious consequences. Rising temperatures will lead to waves of storms, drought and erratic rainfall, and rising sea levels, all with devastating effects on the environment and human beings.

Investment in renewable energy and energy efficiency technologies is one of the best ways to address the long-term challenge of global climate change and contributes to reducing greenhouse gas emissions.

II. Securing Energy Sources and Sustainable Development

This aspect covers the development needs of economic, safe, sustainable and clean energy sources. It is particularly important because it is linked to the following variables and challenges.

1) **Unprecedented rise in oil prices**

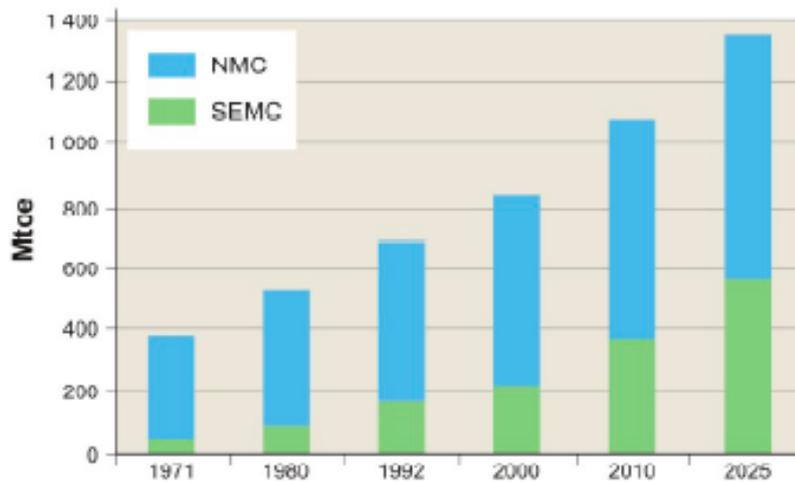
Oil prices are continuously rising to unprecedented highs. The price of a barrel of crude oil reached 129 dollars (Bloomberg, 07/18/2008). It is more than six times the 2002 price, largely due to the growing obsession to secure future supplies to meet the challenge of climate change, to increase global economic growth and address the shortages of petroleum, which would have considerable impact on all global economies, especially the emerging ones.

2) **Rapid growth in energy demand in the Mediterranean**

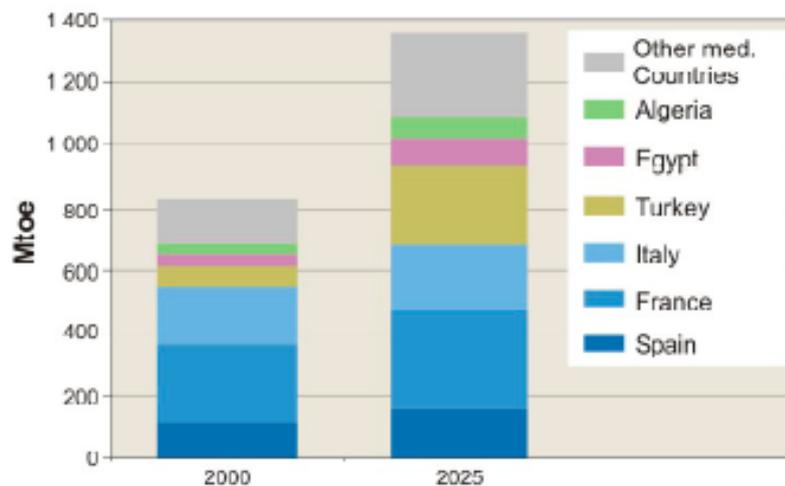
Demand for energy in the Mediterranean region has more than doubled during the last thirty years. It is estimated that energy consumption will increase by 65% in 2025, when the expected consumption will be 1365 million tons of oil (Blue Plan 2006). By comparison, the estimated average of global demand will grow by about 52% between 2000 and 2030. China and India alone will consume roughly 45% (World Energy Outlook Report 2007). Fossil fuels will continue to supply 84% of the world's needs. Oil (32%) will remain the primary source of energy by 2030; the contribution of coal will increase from 23% to 28%, especially in China and India, as the contribution of natural gas will increase from 21% to 22%. Dependence on the Middle East and Russia will also increase to meet the needs of the world's energy. Investments amounting to 22 trillion dollars will be required to secure global energy demand by 2030. The following chart shows the expected increase in demand for energy in the Mediterranean region by 2025.

Figure 10 Primary energy demand: baseline scenario to 2025

Primary energy demand, trends and projections to 2025 (trend scenario)



The six main energy consumers in the Mediterranean



Source: OME (Observatoire méditerranéen de l'énergie)

3) **Competition among Nations for access to energy sources**

The global market is witnessing an increase in energy imports. 'Energy Diplomacy' is being implemented as a way of dealing with this increase. By using energy diplomacy a country develops close ties with another energy producer by investing and limiting trading in energy to this partner. However, excessive deployment of this method will have an impact on the stability of global energy markets; where energy demands will continue to rise.

4) **Decline of available energy supply**

Statistics indicate that the major oil countries have reached a peak output capacity, accompanied by a decline in new oil reserves. The production of oil has decreased in 33 of the 48 largest oil-producing countries. This reflects the low efficiency, (referred to by energy intensity index), which rises to 0.73 in some countries of the south, while it declines in EU countries to between 0.15 0.17^(*) If such trends persist they will increase greenhouse gases in Mediterranean countries by between 7% and 9%.

In the EU as oil and gas reserves decline, a dependence on imports will increase. Thus energy demand will rise, and oil prices soar.

5) **Increasing restrictions on developing energy resources**

Developing energy resources is threatened due to the unprecedented high costs of extraction and production of oil and gas because of the acute shortage and the significantly rising prices of rigs and equipment. In addition, prices of raw materials, particularly iron, have risen globally. World oil contractors are now scarce. The manufacturing of tankers also requires energy. In addition, equipment, safety supplies, and skilled manpower are difficult to obtain. There is a need for huge investments; however, there are doubts about availability, scale and time-frames.

6) **The link between energy and the financial markets**

World energy and the financial markets are interconnected due to the strong flow of investment funds in world markets. Energy markets are investment attracting (for speculators, investors, etc.) Several new phenomena in global financial markets; such as the decline of sub-prime mortgage, the weak dollar, and deferred contracts, have led to energy market instability and price volatility, thus preventing an increase in energy investments in terms of duration and nature.

7) **Fostering Links Between Agricultural commodity and Energy Markets**

Bio-fuel markets have created an increasing demand for some agricultural commodities, such as sugar cane, maize and palm oil. These commodities are mainly

(*) Calculated on the basis of kg of oil equivalent / year for each \$ 1000 of the GDP of the State

used as food or feed. Now they are used as raw materials to produce various types of bio-fuels. With the rise of oil prices, bio-fuels have become important alternatives to oil, increasing the demand for these crops. As a result, food supplies have reduced and their prices have risen.

Some studies estimate that ethanol produced from American corn is considered a rival when the price of a barrel of crude oil reaches \$58. This has prompted some countries, particularly the OECD member countries to subsidize bio-ethanol and bio-diesel products. Subsidies ranged between \$11 - 12 billion in 2006, including credits, investment and import tax incentives, and research funds. They did not include agricultural raw material subsidies.

Table (1) shows the subsidies provided by some countries for each liter produced. Ethanol subsidies range between 29 cents and one dollar per liter, compared to 20 cents and one dollar per liter of bio-diesel.

Table (1)
Subsidy Average of bio-fuel (Liter/\$)

Bio-Diesel	Ethanol	Country
0.67 – 0.54	0.36 – 0.29	USA
0.70	1.00	EU
0.20	0.40	Canada
0.40	0.40	Australia
1.00	0.60	Switzerland

Source: FAO, 2008.

The question is not just the use of food crops in producing bio-fuel. Rather, it is also the use of cultivated lands to grow agricultural raw materials for extracting such fuels, consequently pushing up the future price of food commodities. It is necessary to search for other plants which could produce bio-fuels, such as Hohopa, Jatropha and grass. Such plants require more investment for research and development.

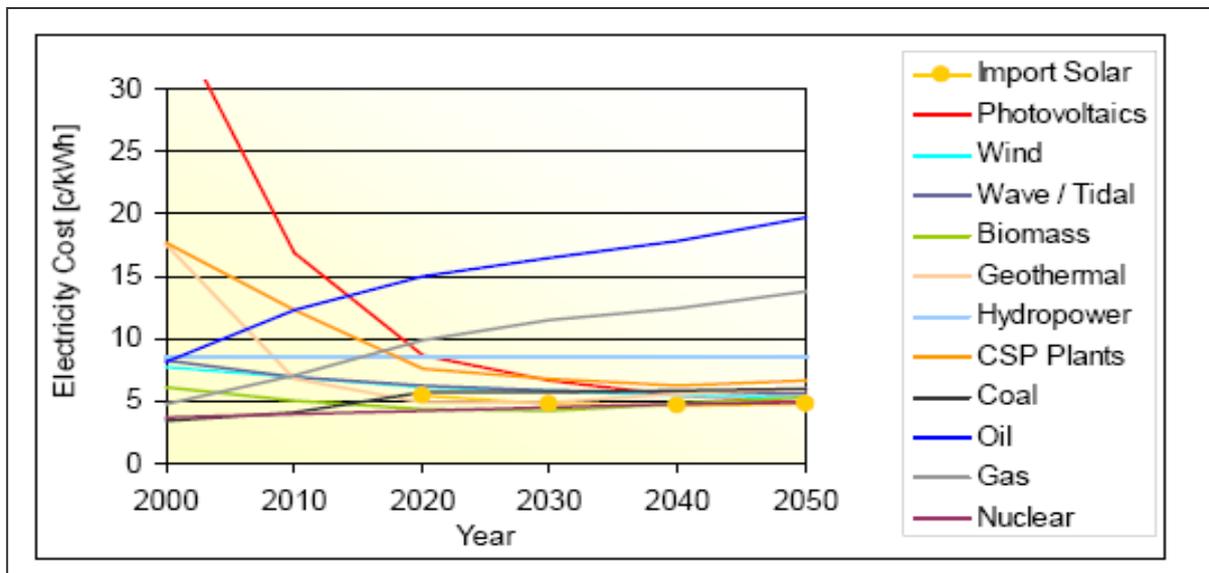
8) Current rise in the cost of extracting energy from renewable sources compared to traditional sources

Compared to conventional energy, electricity production costs from renewable sources are still high. However cost is expected to fall gradually, due to the technological development of production equipment and tools.

Projections indicate that over the next 25 years, prices of conventional energy will continue to rise, while the current cost for producing renewable energies will fall significantly, provided government policies encouraging and stimulating renewable energies continue.

The Figure below shows the current status and future prospects of electricity generation costs from renewable sources compared to traditional sources. Looking toward the future renewable sources will be the least expensive. This requires further work and cooperation, in the Mediterranean region to eliminate problems of renewable energy technology transfer.

Electricity generation cost of new power plants. In the medium term, renewables are the least cost option for power. The curve “Import Solar” starts in 2020.

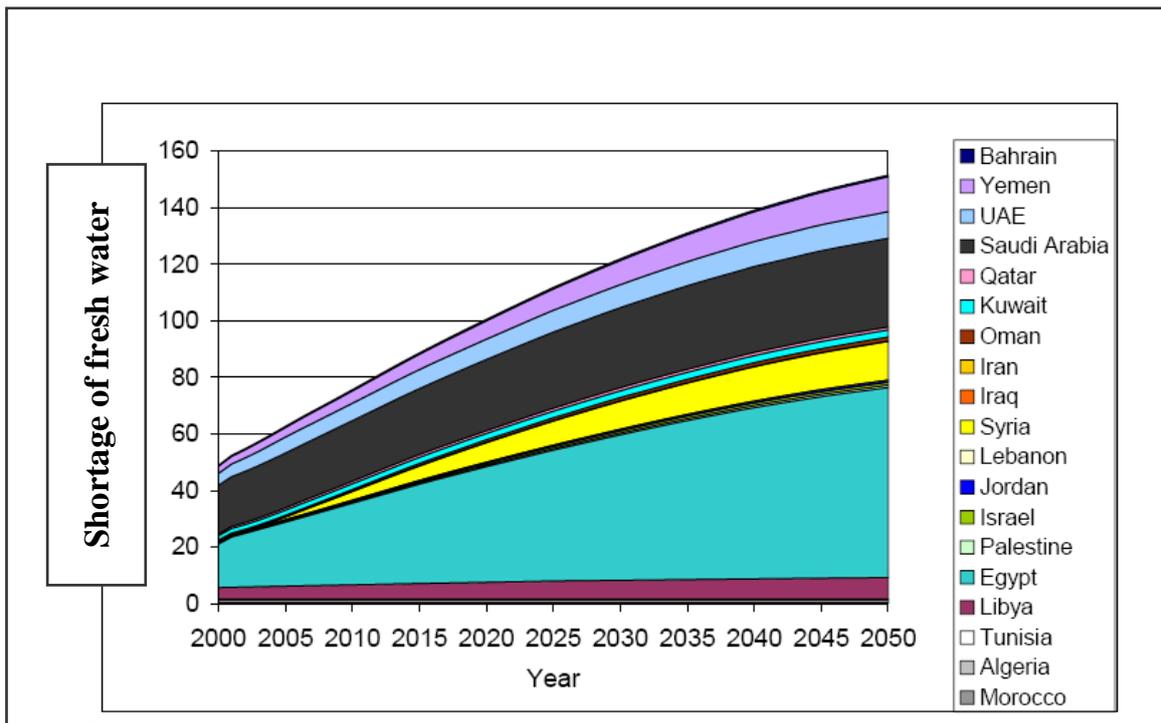


Source: German Aerospace Center (DLR), (June 2006), Trans-Mediterranean Interconnection for Concentrating Solar Power (TRANS-CSP) Report.

9) **Water poverty in some countries of the region, particularly in the south**

Linked to food security, the issue of water is viewed as a time bomb. Unless a water supply is provided with the required quantities, national security in the Mediterranean region could be threatened on many levels. The Center for Environment and Development for the Arab Region and Europe (CEDARE) emphasizes that most Arab countries are suffering from water scarcity. It indicates that 65% of Arab countries depend on water resources from outside their borders. The Center predicted that the number of Arab countries falling under the water poverty line from 2006 would increase to 19 countries. Per capita water quantity will be lower than 1000 cubic meters, (UN index to measure water poverty level). To address this problem, desalination could be considered.

The following chart shows the projected water shortage in some countries

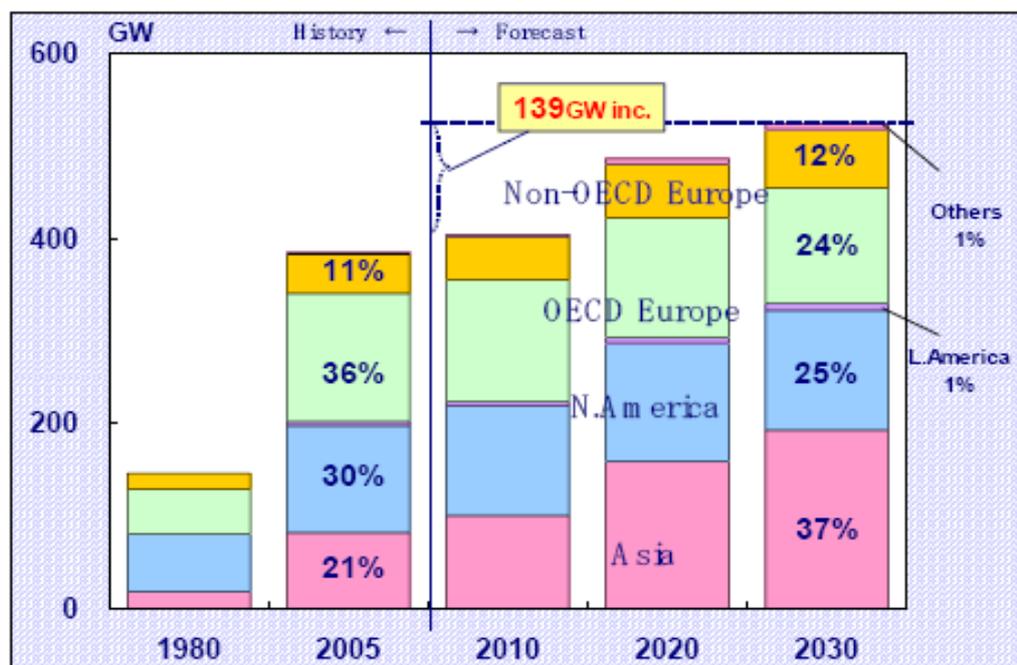


10) Challenges Facing Nuclear Energy

Global markets are increasingly talking about the peaceful uses of nuclear energy; which indicates that there is something called a "Nuclear Renaissance". But there are still many challenges in promoting nuclear energy; for example, the issue of nuclear safety, its competitiveness in the market, waste disposal, and the emerging threat of terrorism. There is a need to draw international attention to this by initiating discussions about nuclear non-proliferation. The nuclear fuel cycle should also be controlled to ensure a working nuclear energy scheme.

The following table shows the increase in the production of nuclear energy by 2030

Outlook for Nuclear Energy Capabilities



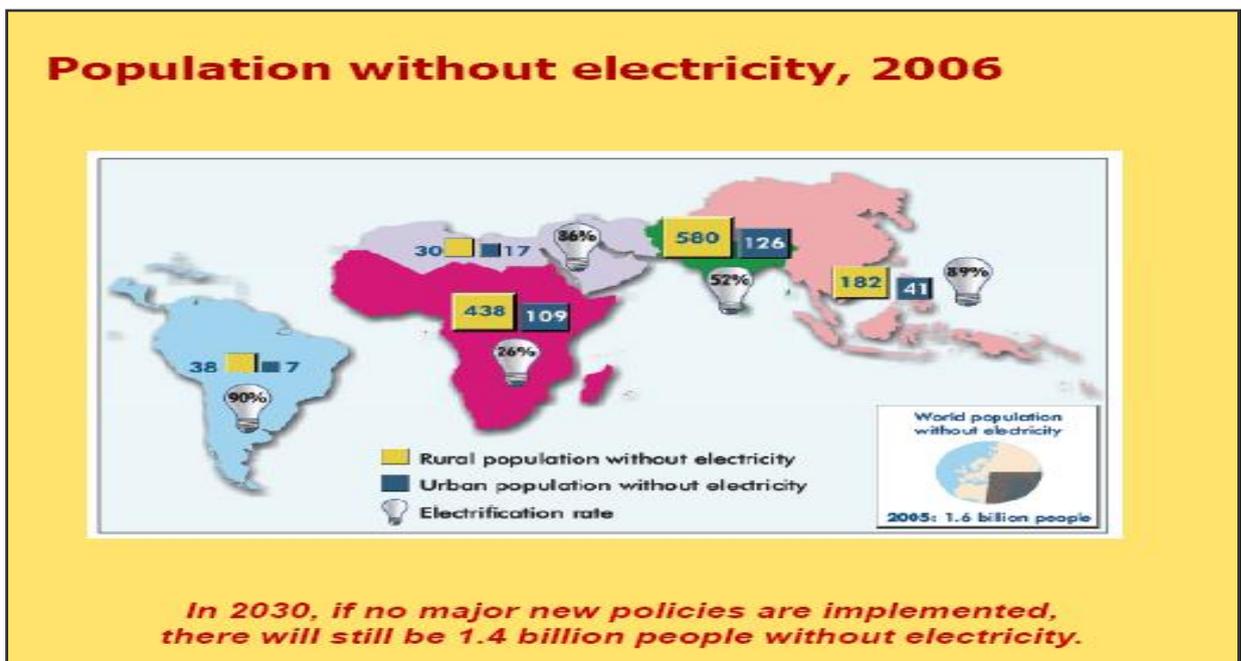
Source: IEEJ (Asia/World Energy Outlook 2007).

III. Energy and Human Rights

Access to safe sources of energy is should be a basic human right. It is directly related to everyone's right to access sustainable energy (the Initiative of Euro-Mediterranean Parliamentary Assembly). Sustainable energy provision would upgrade quality of life and reduce population poverty, especially in rural areas.

Under the current global conditions, prices of energy sources, such as oil and gas, have soared. High prices of hydrocarbons and electricity have resulted in the transference of substantial economic resources from consuming to oil-producing countries. Furthermore, there is an additional restricting factor related to natural gas and electric power. The production and transfer of energy sources are carried out through grids. Given the high costs and growing needs, a large part of the planet's population will gradually suffer poverty in the field of energy.

Estimates indicate that in the case of non-application of effective policies, the number of people without electricity will reach 1.4 billion in 2030. Meanwhile, the number of people using biomass for cooking will increase from 2.5 to 2.7 billion people in 2030, if these policies are not implemented.



Source: World Energy Outlook 2007.

It is essential that the declaration of the PAM plenary meeting should include a recommendation to the UN General Assembly to issue a resolution providing for the access to sources of energy as a human right.

Second: Current Possibilities and Opportunities of the Euro-Mediterranean Cooperation in Energy

Energy security has become a central issue for sustainable economic growth, and stability not only in the Mediterranean but also in the world. The Mediterranean region has enormous potentials for generating renewable energy. We have to think of the Mediterranean as a region of prosperity by building a Mediterranean energy strategy, which is strong, effective and sustainable.

The Mediterranean energy strategy should depend on the integration of the potential on both sides to realize a win-win scenario, based on the following:

1. Benefits for the Nordic Countries

- **Secure their energy requirements, when needed, through multiple sources. The energy they obtain should be clean, sustainable, guaranteed and economically viable. They also will be protected against the risks (political risk and price volatility) related to importing conventional energy fuels, whether uranium, gas, or oil.**
- **Reduce carbon dioxide emissions. Electricity generated from renewable sources should contribute to the reduction of emissions from burning traditional fuels by 70%. Meanwhile nuclear power plants shall be disposed of⁽¹⁾.**
- **Attenuate the growing pressure on fossil fuel resources (oil, gas and coal), used in electrical generation, and saving them for other uses.**
- **Reduce the price of electricity. Conventionally sourced electricity pricing is based on the fuel cost, while rates of electricity from renewable sources are related to investment costs. Given the newness of the renewable technology, the size and learning variables have a significant impact on the steady reduction of costs. It is expected that by 2020 the cost of electricity produced from renewable sources will be less expensive and more stable than that of conventional sources. The introduction of electricity powered by renewable sources will raise the cost of electricity production in the short term, but in the long term prices will decrease⁽²⁾.**

2. Benefits for the Mediterranean countries:

- **Exploring the potential for renewable energy sources, particularly solar and wind power, in generating electricity. Satellite studies by German Aerospace Center (DLR) indicate that less than 0.3% of desert area in the Middle East and North Africa could generate enough electricity to meet growing needs. There are indications that there will be additional energy for export to Europe. Electrical generating plants powered by solar thermal energy could make this viable. Wind power from Egypt's Suez Gulf and from South Morocco could also generate electricity.**

(1) Trans-Mediterranean Renewable Energy Cooperation (TREC)

(2) German Aerospace Center (DLR)

- Estimates⁽¹⁾ indicate that solar radiation in each square kilometer of hot desert in the southern Mediterranean could produce 5 KWh of electricity. This is one of the highest levels in the world. Sunshine in this region ranges between 2650-3400 hours annually, while wind speeds are between 6-11 meters per second. The potential for producing electricity from wind power in Egypt's Suez Gulf, amounts to 20 thousand MW, 6 thousand MW in Morocco, and 12 MW in Turkey. These possibilities have not been explored because of many institutional, regulatory, and financial barriers, etc.
- Meeting their energy needs. It is expected that the Middle East consumption of electricity in 2050 will be equivalent to the consumption of Europe; that is about 3500 TWh/y compared with 1500 TWh/y now. It is expected that the consumption of countries, such as Egypt and Turkey, will exceed that of some European countries such as Italy.
- Secure their needs for water. This can be done through the desalination of seawater, using an available, sustainable economically feasible source of energy, especially solar energy. Fossil and nuclear energies cannot meet these demands. In addition to desalinization, these needs can also be met through the capitation of fresh water in the deep sea.
- Reducing emissions of carbon dioxide. Using renewable energy sources in cooperation with the European Union would reduce these emissions.
- The flow of substantial investment. This could provide many new job opportunities in the renewable energy industry.
- Exporting electricity from renewable sources at a reasonable rate is an important source of income.
- The possibility of producing adequate quantities of hydrogen through clean electrical power. In the long-term this will motivate the transport sector to shift away from oil fuel.
- Transfer of solar energy technology. This will promote the industrial economy in the southern Mediterranean countries and assist in their transition to a knowledge-based economy.

⁽¹⁾ **The Observatoire Méditerranéen de l'Energie (OME), Energy in the Mediterranean: Current Status and Prospects.**

3. Supporting Elements for this Scenario

a) New partnership in the field of renewable energy, particularly for solar energy.

Based on an abundance of renewable energy resources (solar, wind, hydropower, biomass, and geothermal), the north and south Mediterranean have great potential for energy, enough to exceeding their present and future demand. Intensive cooperation between both sides is required to optimally exploit this potential. For example, Europe has plenty of renewable energy sources for power generation. Their total economic potential amounts to about 145% of the expected future electricity demand. However, 60% of this potential comes from wind and solar energy. Both are fluctuating resources that can provide electricity, but they provide no firm power capacity on demand. MENA can provide Europe with a low rate electricity, ranging between 4-5 €-cent/kWh.

Studies indicate that European imports of solar thermal electricity from Middle Eastern countries, via high voltage direct current transmission, may reach 60 TWh/y hours between 2020 and 2025, with low transmission losses of 10-15%. Imports could be subsequently extended to 700 TWh/y hours in 2050⁽¹⁾.

This proposal will create a well-balanced mix of energy sources, (with 80% renewable electricity in 2050), backed by fossil fuels. The mix can provide capacity on demand by quickly reacting through the rapid response of thermal plants to meet peak demand, and by an efficient grid infrastructure to distribute renewable electricity from the best centers of production to the main centers of demand. By 2050 this proposal will provide Europe with about 15% of its needs from electric power, with a low cost of around 5 €-cent/kWh (not accounting for further cost reduction by carbon credits) and their high flexibility for base- intermediate- and peak load operation⁽²⁾.

b) New technology in renewable energy with potential to ensure adequate economic feasibility of renewable energy projects, especially solar energy:

- Estimates indicate that between 2010 and 2020 the cost of renewable electricity in Europe will be less than that of traditional sources. This is because costs are continually declining and markets are growing by more than 25% annually. By contrast, nuclear and fossil energy will have dried up; providing no room for further cost reduction. Prices will continue to rise due to the reliance on depleted and rare fuels. Furthermore, the cost in MENA will be less than in Europe because of the solar radiation intensity. There will therefore be a market for importing guaranteed electricity from MENA to supplement the needs of European sources at an affordable price.
- This partnership will help to implement the goals set by the North and the South Mediterranean, to increase the share of renewable energy and reduce emissions of carbon dioxide. The EU aims to increase power generated from

(1) German Aerospace Center (DLR)

(2) *ibid.*

renewable sources up to 20% in 2020. Egypt has a similar goal, as do some of the southern Mediterranean countries. By 2020 the EU aims to reduce the emission of greenhouse gases by 20%, compared to the levels in 1990.

- To achieve this partnership there should be intensive cooperation between the north and south of the Mediterranean. The renewable energy sources in the Mediterranean countries should work hand-in-hand with the European expertise, capital and technology:
- Use electricity cooperation funds to finance renewable electricity projects, especially with regards to solar thermal energy. Incentives and financial assistance from governments, particularly through Feed-in -Tariffs law or Renewable Portfolio Standards (RPS) could help attract private investment. Such standards require consumers or electricity suppliers to purchase, on their behalf, a given annual percentage of renewable shares which increase annually. Other mechanisms include establishing renewable energy funds to be used to directly finance new investments, to provide low-interest loans, and to strengthen research, development, and training. The Clean Development Mechanism under the Kyoto Protocol allows the sale of carbon certificates. Today, the price of CO₂ certificates is around 25 €/ton, and is expected to rise in the future to up to 70 €/ton in 2020. This will increase the profitability of these projects. Estimates indicate that the export of solar energy electricity from the southern Mediterranean countries to Europe will replace the burning of coal and gas for producing electricity. It is therefore possible that the sale of carbon certificates, which ranges from between 1.5 - 3 €-cents /KWh, could contribute to the reduction of the cost of solar electricity and compensate the cost of transmission, (about 1.5 €-cents). Consequently, the cost of electricity in the European market would offset the cost of production in the MENA countries.
- Establish a legal framework for a Euro-Mediterranean renewable energy free-trade area. This allows MENA's solar or wind energy electricity to benefit from the EU's Feed-in Tariff law. Under the legal framework, renewable energy (like power and hydrogen) and technology can cross any border, duty-free and without administrative restrictions. There will be cooperation on creating the infrastructure. In addition investments can be procured during the initial phases.
- Complete existing infrastructure in order to extend electricity across the Mediterranean, since the electricity transmission lines around the Mediterranean are almost completed. Studies suggest that solar energy electricity could be transferred from the southern Mediterranean through three lines:
 - First Line: Algeria desert-Morocco-Spain, France-Belgium-Germany, length 3099km
 - Second Line: Libyan desert-Tunisia-Italy-France, length 2735km
 - Third Line: Egypt-Jordan, Syria-Turkey, Bulgaria-Romania-Hungary-Austria-Slovenia- Czech- Poland, length 5123km

- Strengthen legal and regulatory frameworks for stimulating renewable energy projects through several mechanisms and systems in developed countries
- Launch a campaign to educate consumers about the use of renewable energy, particularly in the domestic sector.
- Promote regional centers such as the Regional Center of Excellence for Renewable Energies and Energy Efficiency in Cairo to train and build human cadres in the field of renewable energy.
- Create funding mechanisms to finance specialized energy projects, particularly new energy. This calls for accelerating the establishment of the Euro-Mediterranean Investment Bank.
- Mediterranean partnership countries should participate in EU related programs, especially those programs devoted to exchanging and disseminating information on technologies and clean and effective energy policies, such as Intelligent Energy – Europe II, and the Seventh Framework Program for research and technological development.

c) Cooperation for the sustainable use of oil and gas

Conventional energy sources are available in some of the southern Mediterranean countries, where there are 5% of the global reserves of oil and natural gas in the Mediterranean region, particularly in Algeria, Egypt, Libya and Syria. On the other hand, annual production of the EU's oil and natural gas has declined since 2000 by 25% and 10% respectively. Annual imports of oil and gas have increased by 10 and 30% respectively. The gas imports are responsible for meeting the 80% growth in consumption since 2000. Russia supplies the European Union with about 60% of its gas imports (which cover a quarter of the consumption), followed by Algeria (25%), Libya (3%), Iran (2.2%), and Egypt (1.7%)⁽¹⁾. Some of the southern Mediterranean countries have the potential to export gas to the European Union, especially with the availability of infrastructure for both export pipelines and liquefaction plants.

Areas of cooperation for conventional energy include:

- The Export of gas from the Mediterranean to Europe: lines for gas transportation are the bases for creating a common market for energy in the Mediterranean basin. The most important lines are:
 - MEG pipeline, which transmit the Algerian gas to Spain and Portugal via Morocco (under construction).
 - MedGaz pipeline: between Algeria and Spain
 - Transmed: (underwater) interconnects Algeria-Cecile-Slovenia via Tunisia

(1) **European Gas and Power Markets: *Quest for supply Diversity and Security*, 2007**

- Green Stream: between Libya and Cecile
 - Galsi: Arab pipeline, extending between Egypt, Jordan, and Syria (in future it will be extended to Turkey then Europe).
- Cooperation to use non-conventional sources of oil, particularly oily clay, with European expertise.
 - Setting up joint projects for refining and petrochemicals, fertilizers and strategic industries, relying on conventional energy sources in the southern Mediterranean countries.
 - Promoting the establishment of an effective network. Setting up partnerships with similar EU systems and energy agencies with the Mediterranean partners in the fields of information and best practices. Building on the achievements and activities developed by the Mediterranean Energy Agency Network. Maximizing national plans for promoting exchanges in best practices and technological innovation (including the use of low sulfur fuels and clean combustion technology for the prevention and / or to reduce emissions of nitrogen oxides particles through regional and international initiatives such as the EU Energy Agency, the Blue Plan, the Regional Center for Excellence In Renewable Energy and Energy Efficiency in Cairo, Partnership of Renewable Energy and Energy efficiency, Renewable Energy Policy Network for the 21st Century, Global Village Energy Partnership. Conferences of MENA on renewable energy. The latter should be given more encouragement and support.
 - Setting up regional funds for carbon in Middle Eastern countries to finance the projects of clean energy development and to reduce greenhouse gases.

d) Taking measures to rationalize the use of energy

Measures should be taken to rationalize energy use to meet the growing cost of supplies. The EU has an ambitious target to save 20% of the total primary energy consumption before 2020. There must be intensified cooperation in this area to review the experience gained under the MED-ENEC program related to energy efficiency in the construction sector of the Mediterranean region. A group of energy experts from the Euro-Med energy forum should also be assigned to present new regional and/or sub-regional initiatives, focusing mainly on aspects such as:

- Improving energy performance in buildings, including the procedures for energy efficiency and the use of renewable energy, especially for the purposes of heating and cooling
- Standing transport policies especially clean urban transport networks.
- Improving efficiency in energy conversion, transmission and distribution networks.

- A network widely linked to the production of renewable energy and/or associated with desalination of seawater.

e) Euro-Med-African Energy Triangle

Waterfalls off the Nile River and other African rivers are an important source of hydroelectric energy. Exploring the potential of these waterfalls could generate electricity of up to 230 thousand MW, about 40% of similar sources of energy in other places around the world.

In Africa, there are seven major rivers: the Nile, Niger, Congo, Senegal, Orange, Limbo, and Zambezi. So far these rivers have not been used to their full potential. While they have 10% of the world's hydroelectric capacity, Africa has the least per capita consumption of electricity.

Egypt could be the bridge through which energy exports can be transmitted to Europe. This can be done via an electric grid linking Egypt and other surrounding countries. In the future this grid could be extended to some Nile basin countries and Europe. By directing investments to this source, transmission of energy to Europe and other consumer markets can be facilitated.

Studies indicate that surplus electricity could be exported from Africa to Europe via three axes; two of them are located in Egypt.

- Congo and Central Africa, Sudan, Egypt, Jordan, Syria and Turkey.
- Congo and Central Africa, Sudan, Egypt, Libya, Tunisia and Italy.
- Congo, Gabon, Cameroon, Nigeria, Niger and Mali, Algeria, Morocco then Spain.

Third: Proposed Energy Cooperation Strategy between the Two Sides of the Mediterranean

The global energy market turmoil, the rapid consumption increase, the various uses for energy sources and the depletion of conventional sources, have created a global concern about how to secure the present and future energy needs.

The consumption of Mediterranean Energy has doubled in the past 30 years. According to the Blue Plan estimates, the demand for energy in the Mediterranean region will increase by 65% before 2025. This is largely due to population growth and economic development. A major concern is how to secure energy sources.

An integrated strategy for energy in the Mediterranean region, which secures our present and future energy needs, the diversity of energy sources and the adoption of necessary policies to maximize the utilization of new and renewable energy sources, needs to be adopted.

The most important factors in support of this strategy are:

- The Mediterranean countries, particularly in the south, have huge potential for renewable energy estimated by more than double the energy demand in the south and north of the Mediterranean until 2050.
- The potential and the needs of northern and southern Mediterranean countries are integrated. This provides opportunities for gains for all through joint cooperation.
- The challenge is how to complete networks and create a legal framework and policies that encourage investment in the production of electricity from renewable energy.
- The importance of renewable energy in facing the water poverty in some Mediterranean countries through its use in water desalination.
- The establishment of a solar energy station equal in size to Lake Nasser in Egypt can produce an energy equal to the total production of Middle Eastern oil. Furthermore, the solar energy found in the southern Mediterranean can generate electric energy that exceeds the world consumption many thousands of times.
- Through its geographical location, infrastructure and linking lines with the EU and other surrounding countries, Egypt could be a central point for the circulation of energy in the Mediterranean basin. In addition, Egypt has The Arab Gas Pipeline, which transports gas to neighboring Arab countries and which will later export to the EU. Egypt is also considering the electric link with Africa and the Nile basin countries, where the African continent has enormous hydropower sources that account for 40% of this kind of energy.

The main proposed axes of energy security strategy in the Mediterranean region:

1) New policies to create a regional energy market

The establishment of a regional energy market requires action in two main areas:

a. Proposing a number of supportive policies for the establishment of a regional energy market, including:

- PAM fully supports the Hellenic proposal to create a “Euro-Mediterranean Energy Community” previously adopted at the 4th Plenary Session of EMPA (Athens, 28/03/08).
- Policies that expand the integration of energy markets in the Mediterranean region and the completion of infrastructure projects for Mediterranean energy aimed at creating an energy market.
- The provision of legal and advisory frameworks to support the conclusion of an energy agreement at a regional level between Mediterranean countries.
- The provision of supportive policies for mechanisms for financing infrastructure projects.
- Intensifying the cooperation with the Nile Basin countries and Africa to exploit rivers and watersheds, which could generate electricity of up to 230 thousand megawatts.

b. Changing the policies which support a Mediterranean Cooperation Agreement for the production of renewable energy

The challenges witnessed by the energy sector at a global level emphasize the need to move toward renewable energy to provide for the needs of future generations. This requires a strategic plan for cooperation between Mediterranean countries. This plan needs to be translated into a Mediterranean Cooperation Agreement for the production of renewable energy, **focusing on the following points:**

- Identifying strategic goals until 2050.
- Distributing the roles between various parties in light of the potential for Mediterranean countries in terms of technological capabilities, funding and natural renewable sources.
- Determining the capital costs of the proposed projects in the area of renewable energies.
- Determining the most appropriate funding mechanisms necessary to finance the proposed projects.
- Setting a timetable for the implementation of the proposed plan in accordance with the implementation priorities.
- Developing appropriate frameworks for regional cooperation in the fields of scientific research, technical and technological support, training, rehabilitation and raising awareness among Mediterranean countries.
- Providing political support from governments at a regional level through a joint cooperation agreement, where governments are committed to the

obligations that would be agreed upon, in accordance with an implementation timetable.

2) Strengthening the trend towards new and renewable energies

- Calling on the EU to grant incentives to new energy projects abroad, so long as they are allocated for export to European markets.
- Enhancing Research and Development cooperation in new and renewable energy, carbon capture and sequestration.
- Boosting investment in renewable energy, developing promising education and training programs in this vital sector, adopting encouraging policies and legislation and working to drive the private sector to invest in renewable energies.
- Assisting in completing and developing technical standard specifications for new and renewable energies equipment, and establishing modern specialized laboratories to conduct necessary performance tests and issuing equipment certification.
- Assisting in the issuing of special legislation exempting the equipment used in the production of new energy supplies from taxes and customs duties, in addition to giving customs and tax advantages to users of renewable energy equipment.
- The expansion in wind and solar energy projects to benefit from the sale of certificates of thermal emission reductions under the Kyoto Protocol, where they are sold to the world market at good prices (25 Euros per ton of carbon dioxide), and can therefore benefit from the revenues in establishing clean energy projects.
- Facilitating the integration of renewable energy sources, linking them to regional unified networks and providing them with infrastructure.
- Investing in growing energy generating plants, such as Jetropha and Hohopa, which can be cultivated in the vast deserts of the south.
- Concluding joint venture agreements with the manufacturers of equipment for power stations to produce this equipment in the South. Training and appointing skilled staff to work at these stations.
- Promoting thermal solar energy techniques in the Mediterranean desert region. This requires financial assistance from the EU to establish a pilot project, facilitate access across networks and the possible link between transport networks with Europe so that this energy can be integrated in European energy markets.
- Putting forward a vision of trilateral cooperation between Egypt, the EU and African countries to optimize the exploitation of the enormous capabilities of

renewable energies in African countries as available, clean and environmentally-friendly energies.

3) Achieving a balance between the production of new energy and food security

- Adopting a global initiative to coordinate efforts to deal with rising prices. It is important to initiate international dialogue between producers and importers of food and energy from developed and developing countries strategy - in the short, medium and long terms - to deal with development, agricultural production and the production of biofuels.
- Stressing the importance of using agricultural crops for food for human beings and not as fuel for engines. The production of biofuels should be limited to agricultural residues and special crops like the Jatropha plant. An urgent and serious dialogue should be initiated to reconsider the current support for producers of ethanol and biodiesel. Such support should be a subject to world trade rules.
- The importance of supporting the trend towards the joint exploration of the riches available in the Mediterranean region such as the Sahara, which can play an important role in the production of alternative energy sources. These can help maintain a balance between the need for alternative energy production and achieving food security.

4) Non-traditional mechanisms for financing energy projects

- The need for a new perspective to deal with renewable energy, focusing on the sustainability and expansion of markets, the increased demand for new energy products and services, the granting of credit to finance its projects, its suppliers and distributors, its regulatory framework and policies to encourage the private sector.
- Finding specialized financing mechanisms to finance energy projects, especially new energy, necessitating the need to expedite the establishment of a Mediterranean Investment Bank.
- Urging governments in the south to encourage banks to provide long-term loans with low interest rates. These loans should be used by investors for renewable energy power generation.
- Supporting producers of electricity from renewable energies by granting soft loans to support construction phases. These loans will be repaid before the start operating the project. There should be a provision of direct subsidy for each kilowatt-hour of actual production of clean energy delivered to electricity networks. Long-term agreements – ten years for example - should be concluded for the purchase of produced clean energy. This will increase investor confidence.
- The need to grant micro-financing for consumers in rural areas to purchase renewable energy products, as the funding available now is linked to income-

generating activities and for a short period. This funding should not be in the form of grants because that could undermine the market. It should be in the form of some sort of Smart Subsidy for an interim period and for maintaining private sector projects, facility their functionality and obtain a profit that guarantees their continuity.

- **Establishing a fund to support renewable energy development aimed at:**
 - Establishing renewable energy projects for domestic use in rural areas.
 - Building independent renewable energy systems in remote areas and islands.
 - Creating funding mechanisms to finance the energy projects, particularly new energy.

5) **Setting up legislative frameworks to guide the development of conventional energy and encourage the use of renewable energy**

After monitoring some countries' experiments, it is clear that the legislative tools are used to reduce the thermal emission resulting from the use of conventional energy.

Some southern Mediterranean countries need to apply a law to control the use of energy for the benefit of consumers, the economy and the environment. It should include all measures and actions to rationalize the use of energy, develop renewable energy, minimize bad effects on the environment and encourage investment in the rationalization of energy.

6) **Energy efficiency**

With the current situation of high oil prices, energy efficiency is the most effective way for energy consumption rationalization. This requires seeking to establish a Mediterranean partnership for cooperation in the area of energy efficiency, including regional initiatives aimed at developing a new framework to facilitate procedures of energy rationalization and the transfer of related technology, **by focusing on:**

- Seeking to establish a regional center for energy efficiency to serve the Middle East, North Africa and the rest of the Mediterranean basin.
- The cooperation in changing patterns of production and consumption by encouraging the development of techniques and systems of energy consumption rationalization and raising energy efficiency in different economic and service sectors.
- Joint cooperation between scientific research institutions to accelerate the development of techniques for producing energy and reducing emissions from its use.
- Launching a lending program for energy efficiency projects to provide concessional loans.
- Encouraging the adoption of effective national strategies to achieve the principle of energy efficiency, establish training centers for efficiency and organizing conferences and exhibitions to promote these strategies.
- Developing appropriate pricing policies in oil, gas and electricity sectors would provide incentives to increase consumption efficiency.
- Improving the performance of energy in buildings, including procedures for energy efficiency and the use of new and renewable energy, especially for purposes of heating and cooling.
- Standing transport policies, especially clean urban transport networks.

7) **Cooperation in the field of nuclear energy**

- Strengthening Mediterranean cooperation in the area of nuclear research and technology, and building peaceful reactors through the establishment of joint centers of safety standards.
- Cooperation in protecting the environment from the risks of using nuclear fuel and waste, while preparing a plan for radiation safety and disposal of nuclear waste.
- Developing a Mediterranean program to introduce nuclear technology to the south and to establish nuclear industries. The Egyptian industry can contribute to the establishment of nuclear reactors, either in civil or construction work, with the aim that most of the plants' parts will be manufactured in Egypt.

References

I-Arabic References

- المركز الألماني لشئون الطيران ومجال الفضاء، تقرير ربط دول حوض البحر الأبيض المتوسط لنقل الطاقة من محطات الكهرباء الشمسية الحرارية، (يوليو 2006).
- الإسكوا، تحسين كفاءة استخدام الطاقة من منظور إقليمي في دول الإسكوا، (E/ESCWA/ENR/1997/13).
- الإسكوا، تحسين كفاءة الطاقة في الصناعات كثيفة الاستهلاك للطاقة، E.ESCWA/SDPD/2005/1 (part).
- المرصد المتوسطي للطاقة، الطاقة في منطقة المتوسط: الموقف الحالي والتوقعات المستقبلية، (2008).

II-English References

- Commission of the European Communities, "**Green Paper: A European Strategy for Sustainable, Competitive and Secure Energy**", Brussels, 2006.
- Dim. Mavrakis, **Trans-European Energy Networks and their extensions to Southern and Eastern Mediterranean Countries**, Athens 26 September 1995.
- European Commission, **The Euro-Mediterranean Energy Partnership, Latest developments**, Casablanca 21st March 2008.
- Euro-Mediterranean Energy Forum, **Brief Overview of the Energy Sector in Mediterranean Partner countries (Maghreb and Mashrek)** Implemented policies and reforms, perspectives for 2012, co-operation and financing requirements. 5th Draft following the Experts Group Meeting of 26 April, 2007 (as of 4 July 2007).
- **FAO, 2008.** USDA at the FAO High-Level Conference on World Food Security: the Challenges of Climate Change and Bioenergy Rome, Italy, June 3-5.
- Giacomo Luciani, **Euro-Mediterranean Energy Co-operation**, NATO PA Groupe Spéciale Méditerranée Seminar Rome, Senato della Repubblica, 4-5 July 2008.
- German Aerospace Center (DLR), **Trans-Mediterranean Interconnection for Concentrating Solar Power (TRANS-CSP) Report**, (June 2006).
- **IEEJ (Asia/World Energy Outlook 2007).**
- International Energy Agency, **World Energy Outlook 2007: China and India Insights, 2007.**
- International Energy Agency, **World Energy Outlook 2007 - China and India Insights.**

- -----, **The World Energy Outlook 2006- Maps Out a Cleaner, Cleverer and More Competitive Energy Future.**
- -----, **The World Energy Outlook 2006- Middle East and North Africa Insights.**
- Ken Koyama, PhD, **Challenges for Global Energy Security**, IEA, Energy, June 30th, 2008.
- **Mediterranean Energy Observatory meeting begins in Algeria.** People's Daily online- <http://english.people.com.cn/>
- Mediterranean Commission on sustainable Development, **Energy and Sustainable Development in the Mediterranean**, Auditorium Rainier III, Monaco, 29 and 30 March 2007.
- Observatoire Méditerranéen de L'Energie, **Annual Report 2005.**
- Observatoire Méditerranéen de L'Energie, **Global Energy for the Mediterranean**, Bi-annual publication No 2 – December 2007.
- Observatoire Méditerranéen de l'Energie (OME), **Energy in the Mediterranean, Situation and Perspectives, ENERPRESSE 2008,NICE**
- Plan Bleu, **Climate Change and Energy in The Mediterranean**, July 2008.
- Sustainable Energy Finance Initiative, **Global Trends in Sustainable Energy Investment 2007: Analysis of Trends and Issues in the Financing of Renewable Energy and Energy Efficiency in OECD and Developing Countries**, United Nations Environment Program and New Energy Finance Ltd, Renewable Energy Policy Network for the 21st Century, 2007.
- UNEP, **Global Trends in Sustainable Energy Investment 2008: Analysis of Trends and Issues in the Financing of Renewable Energy and Energy Efficiency**,
- United Nations Environment Program, Mediterranean Action Plan, Plan Bleu – Regional Activity Center, **A Sustainable Future for the Mediterranean The Blue Plan's Environment and Development Outlook**, July 2006.