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**The Energetic Approach in Euro-Mediterranean Relations :**  
**The cooperation from conventional energy to renewable energy**

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**Abstract :**

The aim of this research is to discover the reality of Euro-Mediterranean cooperation in the field of fossil and renewable energies, And to accomplish this study, we adopted a scientific methodology that focuses on the use of the descriptive and analytical approaches. We have reached the conclusion That, the development of renewable energy, is still below the level of cooperation reached by the two parties in fossil energy.

**Key words :** renewable energy, mena region, Solar energy, wind energy, development.

**JEL classifications codes :** Q2, Q3, Q4, Q5, Q56, P28

## **I. Introduction :**

Energy is the main engine of the global economy, since the first emergence of industrial, agricultural and service activities for man through different historical periods.

Since his discovery of fire to coal, then oil and natural gas, man has realized that energy in its various forms and types is indispensable in the process of contributing to the building and development of human civilization.

Based on this reality, countries have sought, in various ways, to secure their sources of energy to ensure the continued growth of their economies and achieve the well-being of their societies, thus transforming this vital substance (energy) into one of the sensitive analytical variables that contribute decisively to determining the trends of international relations and plans for international cooperation between the various actors of the international system .

On this basis, the European continent is considered one of the largest regions in the world in need and consumption of energy, whether natural gas or oil, and this is due to the fact that it contains the most important industrial countries in need of energy in order to continue its industrial production process.

From this standpoint, Europe attaches great importance to energy cooperation between it and the countries of the southern shore of the Mediterranean, whether cooperation in the field of fossil energy or renewable energies.

### **-General problematic :**

What is the reality of Euro-Mediterranean cooperation in the energy field, and what has Europe done to develop cooperation in renewable energy with the countries of the southern and eastern Mediterranean ?

### **-Partial problematic :**

To clarify this problematic, we ask the following sub-questions :

- What are the most important natural potentials that the southern Mediterranean possesses in the field of renewable energy ?
- What are the most important projects launched by the European side to develop renewable energy in the south of the Mediterranean ?
- What are the obstacles that hinder the development of cooperation between Europe and the southern Mediterranean in the field of renewable energy ?

### **-Study hypothesis :**

To answer this problematic, we suppose the following :

- The countries of the southern shores of the Mediterranean, especially Algeria and Libya, contribute a great deal to covering Europe's energy needs.
- The countries of the southern shore of the Mediterranean have huge natural potentials for the development of renewable energy, especially solar energy.
- Europe has started to finance and implement huge projects for the production of renewable energy in the countries of the southern shore of the Mediterranean.

**-Study aims and objectives :** This study aims to discover the level of European-Mediterranean relations in the field of energy in general and the degree of energy importance of the countries of the southern and eastern Mediterranean basin for Europe, as well as trying to discover if Europe has any plans and policies aimed at cooperation with the countries of the southern and eastern Mediterranean for the purpose of exploiting and developing renewable energy in these countries.

**-Research Methodology :** for achieving the previously mentioned objectives of this academic study, we have applied the empirical and scientific methodology that focuses on the use of the descriptive and analytical approaches.

### **1. Definition of energy :**

Which in turn is divided into conventional energy and renewable energies :

#### **1.2. Conventional energy :**

which is energy resulting from materials extracted from the ground, hence the name fossil energy, i.e. that resulting from drilling and exploration in the ground, and it primarily means coal, oil and natural gas, and the origin of these materials is due To the organic animal and plant residues that were buried in the ground since ancient geological times, then, with the passage of millions of years, and under the influence of various factors such as heat and chemical reactions, it turned into the form in which it is currently located (Timothy, 2021).

Energy is generated from fossil materials after burning, as they contain carbon as a basic component and when burned, a chemical reaction occurs between it and oxygen to produce carbon dioxide and other chemicals, and energy is emitted in the form of heat that is used for various purposes.

### 1.3. Renewable energies :

Renewable energy is defined as energy that is generated from natural sources and can be replaced and restored within a short period of time, but Non-renewable energy is that produced from natural sources that are not replaced at all or It can be replaced very slowly in nature and Here is the difference between renewable and non-renewable energy.

The differences between renewable and non-renewable energy can be summarized in a number of points, which are as follows : (karl, 2022)

- Renewable resources can be used over and over again while not running out, while non-renewable resources are used for limited periods of time.
- Renewable resources have a rate of decomposition higher than their rate of consumption, while non-renewable resources have a rate of consumption higher than their rate of decomposition.
- The sources of renewable resources are biodegradable and their quantities are unlimited, while the sources of non-renewable resources are minerals and human artefacts.
- Renewable resources are considered environmentally friendly because of their low carbon emissions, unlike non-renewable resources with high carbon emissions, which have serious impacts on the environment.
- The maintenance cost of renewable resources is high, while non-renewable resources have a relatively low maintenance cost.
- The need for large areas of land in order to install a renewable energy generation plant, while non-renewable power plants require less space.

### 2. Types of renewable energies :

Renewable energy is divided into several natural sources, all of which share one characteristic, which is that they are inexhaustible, such as fossil energy, and the following are the most important renewable energy sources :

#### 2.1. Solar energy :

Solar energy can be obtained either actively or passively. Active solar energy uses a special technology to capture sunlight. Two basic types of equipment are needed : photovoltaic cells (solar cells) and mirrors that focus sunlight in a specific location. These active solar technologies use sunlight to generate sunlight Electricity, which we use to power lights, heating systems, computers, and televisions (Erric, 2019).

Passive solar energy doesn't need any equipment, it gets energy from the way sunlight changes naturally throughout the day, for example when building houses

the window openings are placed towards the path of the sun, this means that the house will get natural heat from the sun and will use energy Less than other sources of home heating.

Other examples of passive solar technologies include green roofs, cool roofs, and reflective barriers. Green roofs completely covered with plants, for example, can help remove pollutants in rainwater and air and help make the surrounding environment cleaner. As well as the white painted surfaces, they maintain a good degree of coolness because they reflect sunlight better. Reflective screens are made of reflective materials such as aluminum to reflect the sun's heat rather than absorb it. All of these types of roofs help reduce the amount of energy needed to cool or heat buildings (karl, 2022).

## 2.2. Wind Energy :

Since ancient times, humans have used wind energy. Five thousand years ago, the ancient Egyptians made boats powered by the wind, and in 200 BC, humans used windmills to grind grain and pump water. Today, wind energy is obtained using wind turbines that are similar to a windmill. These turbines contain a very tall tower with two or three fan-like blades that are rotated by the wind, and thus the blades drive the generator (which is located inside the tower), which produces electricity.

A group of wind turbines is known as wind farms where wind farms can be found near farmland in narrow mountain passes and in oceans where there are stronger and more steady winds Ocean wind turbines are called offshore wind farms These wind farms provide electricity to homes, schools and other buildings Neighboring (karl, 2022).

## 2.3. Geothermal energy :

The Earth's core is located deep under the Earth's surface and the center of the Earth is extremely hot with a temperature of over 6000°C, and heat is constantly moving towards the surface.

Some of the Earth's heat can be seen when it floats to the surface of the earth. Geothermal energy melts and melts underground rocks and seeps to the surface in the form of lava. Geothermal energy also heats groundwater sources and brings them to the surface. These currents of water are called hot springs (Erric, 2019).

Most of the earth's heat remains underground and makes its way to the surface very slowly, but geothermal heat can be accessed in different ways. One of these ways is the use of (geothermal heat pumps) where water pipes are extended to the

building to be heated from a deep underground layer and water heating occurs due to Underground geothermal energy extends warmth to the building, and geothermal pumps are used to heat homes, sidewalks, and even parking lots.

Another way to use geothermal energy is steam. In some regions of the world there is steam underground and it naturally rises to the surface and the steam is transferred directly to the power plant, but in other parts of the world the land is dry so water is injected underground to generate steam.

#### **2.4. Biomass energy :**

Biomass is any substance produced by plants or microorganisms. Plants obtain energy from the sun through photosynthesis. This energy is stored in plants even after they die. Trees, branches, bark remains, and recycled paper are common sources of biomass energy. Manure, litter, and crops such as corn, soybeans, and sugarcane can also be used as biomass feedstock.

Biomass energy is obtained by burning it. Wood, compost, and litter are dried and pressed into small squares too dry to absorb water, stored and burned to generate heat or generate electricity. Biomass can also be converted into biofuel. Biofuel is mixed with gasoline and can be used to power cars and trucks. The result is that the blended biofuel releases less harmful pollutants than raw gasoline (Timothy, 2021).

#### **2.5. Hydroelectricity :**

Hydroelectric power consists of flowing water, and most hydroelectric power plants are located on large dams to control the flow of the river. Dams trap river water and form an artificial lake or reservoir. A certain amount of water is pushed through the tunnels in the dam, and when water flows through the tunnels, it runs huge turbines that generate electricity (karl, 2022).

### **3. Current global energy consumption :**

Several international reports indicate that in 2016, the world's reserves of fossil (conventional) energy, such as oil, coal and uranium, were estimated at about 1067 billion tons, meaning 90 years of consumption at the current global production rate. Reserves differ from one type of conventional energy to another. For oil, the remaining phase of exploitation and consumption for the world is estimated at 51 years to come, 53 years for natural gas, 153 years for coal, and 85 years for uranium (Akans, 2014).



Thus, the global production of energy in 2016, according to the international energy company “BP”, was estimated at 13,276 million tons, which represented an estimated production increase of 16% over the year 2006, with oil representing 33% of this quantity produced, 27% for natural gas and 24.2 % for coal, 4.5% for nuclear energy, and only 10.7% for renewable energies (water energy 6.9%, wind 1.6%, solar energy 0.6%,...) (Akans, 2014).

Since the Industrial Revolution (the second half of the 18th century), global energy consumption has been growing at a continuous pace, as it developed by 101 percent in a period not exceeding 42 years only between 1972 and 2015. This is according to statistics provided by the International Energy Agency. These percentages are consumed by 29% for the industrial sector, 29% for transportation, 2% for agriculture and fishing. In this regard, the emerging economies are responsible for 97% of the global increase in energy consumption annually. Despite the slowdown in the Chinese economy in recent years, it has continued to record a continuous increase in energy consumption. Energy for the fifteenth year in a row (Ritchie, 2022).

The process of energy consumption in the world is mainly related to the percentage of the Earth’s population and its annual growth rate, since for nearly 1800 years, the birth rate in the world has been parallel to the death rate, but thanks to the improvement of the living conditions of the Earth’s population (providing health, food, medicine, etc.) ..), which led to a change in this equation, especially between the years 1800 and 1950, where the population of the earth in this last year (i.e. the year 1950) was three billion people, to reach in 2015 about 7.1 billion people, and to reach about 9.5 billion people in the year 2050 according to expectations The United Nations, and therefore this rapid population growth in the world produced with it a parallel growth in energy consumption across the world (Zuhuri, 2022).

According to the statistics and figures of the American energy company “Exxon Mobil”, in a period not exceeding 110 years, i.e. between 1859 and 1968, the world consumed nearly 200 billion barrels of oil, and in 1968 alone, consumption reached no more than 14.7 billion barrels, rising to 31 billion. barrel in 2013, and thus these figures show and confirm the existence of a steadily increasing global consumption of energy in the world, an increase that has intensified in the last forty-five years.

According to the same aforementioned study, the global consumption of energy for the year 2013, for example, was mainly dominated by oil and coal. This year, the world consumed about 33% of oil from the traditional energy basket, 30%



of coal and 7% of natural gas. Renewable energies, the consumption in it was 7% water energy, 4% nuclear energy, and 2% other types of renewable energies (Seger, 2016).

Through the foregoing, it appears to us, then, that global energy consumption is currently focused mainly on the three basic traditional energy materials, which are oil, coal and natural gas, which is not a candidate for radical and significant change in the foreseeable future, and therefore conventional energy still has a future. The basket of global energy consumption will, for decades to come, be the primary and preferred energy for global consumption, especially with its connection to the rapid population growth in the world, which increased (ie the world's population) between 1990 and 2012 by about 30%, a situation that contributed to the rise in global consumption For conventional energy, which increased by 43% in turn in the same period of time previously mentioned.

#### **4. The Energetic Approach in Euro-Mediterranean Relations :**

Which, in turn, is divided into two parts :

##### **4.1. The Cooperation in the field of fossil energy :**

The energy exchanges between the two banks of the Mediterranean, especially the Western Basin, take place between two groups of countries that are considered at the same time among the first countries in the world in energy consumption (the Latin arc countries), as well as among the first countries in terms of reserves and energy production, Algeria and Libya, which are considered among the most important member countries In the Organization of Petroleum Exporting Countries (OPEP), they are ranked 15th and 14th in oil production, or about 4.5% of global oil exports for each, and with regard to natural gas, Algeria has important reserves that made it ranked fourth in the list of natural gas producing countries with a share of 10% of global exports (Estrada, 2018).

As for the northern bank of the Mediterranean, we find that France, Italy and Spain (the Latin Arc countries) alone consume 10% of the world's oil, 14% of the global production of natural gas, and 10% of liquefied natural gas (GNL). Italy alone imports 7.9% of the world production of gas and Spain It imports 5.8% of LNG (Estrada, 2018).

Despite the agreement of all European countries on the importance of natural gas and making it the preferred primary energy due to the advantages it provides in terms of being clean energy and lower prices compared to oil,... European countries lack a common energy strategy so that they build their foreign relations in

this field bilaterally Hence, the European energy space is divided into three regional fronts: the Euro-Mediterranean energy space (the four countries of the Latin arc with Algeria, Libya and Egypt), the Eurasian energy space (the countries of Central and Eastern Europe, Turkey and the Russian Federation), the Euro-Asian energy space (the countries of Central and Eastern Europe, Turkey and the Russian Federation). European-Northern (Britain and Northern European countries).

Through this, we find that the countries of the northern shore of the Mediterranean belong to the Euro-Mediterranean energy space, which means that they are energetically linked (especially in terms of gas) to Algeria, Libya, and somewhat Egypt. After the dispute between Sonatrach and Spanish energy companies such as (RepsolYPF) and (Gaz Naturel), concern arose in the countries of the Latin arc from the law on privatizing hydrocarbons, as well as its support for the idea of establishing a natural gas cartel similar to OPEP. The possibility of these countries returning to the policy of nationalizing hydrocarbons. In fact, we find that the energy security of these countries depends on the continuation of supplies from North African countries, especially Algeria, which exports about 42.42% of its energy to the countries of the Latin Arc.

Thus, Algeria constitutes the pivotal country in terms of securing gas to southern Europe through the Mediterranean pipeline (Algeria → Tunisia → Sicilia → Italy), and the European Maghreb gas pipeline (Algeria → Morocco → Spain → Portugal).

The challenge posed to the countries of the northern shore of the Mediterranean in the face of their limited energy production at a time when they are considered one of the largest consuming countries is to try to achieve their energy security by ensuring external energy sources for them, especially in the countries of the southern Mediterranean (Hamiche, 2015).

Therefore, after presenting the strategic position occupied by Algeria in the European energy map, and in particular the countries of the Latin Arc, Europe, through initiatives of various cooperative and participatory tools, has proposed to the countries of the southern Mediterranean, such as the Euro-Mediterranean Partnership and the European Neighborhood Policy (2004) and more recently The initiative of the Union for the Mediterranean (2008), Europe will seek through it (through these initiatives) to achieve its energy security by exploiting these initiatives and tools. During the visit of former French President "Nicolas Sarkozy" to Algeria in December 2007, for example, he stated in his speech to university students Mentouri told Constantine that France is looking for its energy security in

North Africa, adding to this a statement in charge of foreign and security relations with the former European Union "Benita Ferrero-Waldner" on one occasion when she said that in front of the Russian pressures and bargains that Europe suffers from due to the employment of Russians In order to put pressure on European countries on some political issues, it has become necessary to search for a strategic partnership in the gas sector with Algeria (Estrada, 2018).

This prompted France, during the visit of former French President "Nicolas Sarkozy" to Algeria, to sign energy cooperation agreements amounting to \$05 billion, half of which belonged to Total and the other half belonged to Gas France (GDF).

European energy security, then, is the backbone of European-Arab and southern Mediterranean relations in general, and with the Maghreb countries in particular, as Arab reserves represent 58 percent of the world's oil reserves, and the Maghreb countries' share of them is 4 percent.

As for gas reserves, Algeria is the third gas financier to Europe after Russia and Norway.

However, the recent gas and oil discoveries in the eastern Mediterranean have led to opening new horizons in the Euro-Mediterranean region, which will result in redrawing economic relations as well as redrawing the geostrategic map of the region in the future.

Where a report by the US Geological Survey in 2010 estimated the presence of a primary reserve of about 3,455 billion cubic meters of gas, and 1.7 billion barrels of oil, off the coasts of occupied Palestine, Cyprus, Syria and Lebanon, before the same studies confirmed in a new assessment about the Nile Delta Basin the presence of 6,320 cubic meters of gas and 7.6 billion barrels of oil and gas liquids (Hamiche, 2015).

Since the announcement of these energy discoveries, the region has witnessed a realignment and realignment of alliances in the region, in order to reformulate the energy map in the region, and this file is likely to open broad prospects for strengthening the Euro-Mediterranean partnership.

#### **4.2. The Cooperation in the field of renewable energies :**

The European party has tried for several years to expand its energy cooperation with the countries of the southern shore of the Mediterranean to include cooperation in the field of renewable energy. The following are the most important initiatives and projects that reflect this cooperation :

#### 4.2.1. Euro-Mediterranean energy partnership initiative :

To develop industrial sectors in renewable energies, the southern Mediterranean countries will need to acquire the European know-how which requires the ordering of North-South value chains in renewable sectors (Lesaka, 2017).

The Mediterranean rim, mainly the southern and eastern Mediterranean countries, has considerable potential for the development of renewable energies, in particular solar and wind energy. This potential would make it possible both to help meet strong internal demand and to export green electricity to Europe.

The hours of sunshine vary from 2700 to 3400 hours per year and the average annual radiation varies between 1900 Kwh/m/year on the coastal regions and 3200 Kwh/m/year in the south and desert regions. The wind potential is also high. Average wind speeds vary from 6 to 11 m/s (Mallouli, 2009).

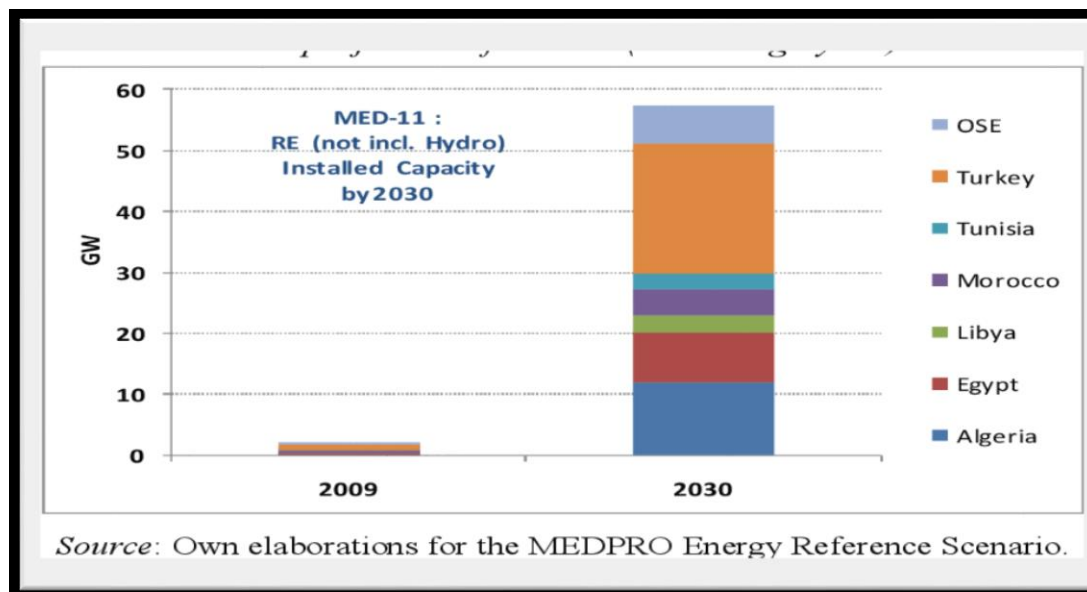
The region also has strong geothermal potential, especially in Algeria and Morocco. Hydraulic resources in Egypt and Morocco have a technical potential estimated at 2470 MW and 2500 MW respectively. The solar sector is of particular interest both at the national level of southern Mediterranean countries and for the development of a Euro-Mediterranean market of renewable electricity.

Renewable energies in the Mediterranean region represented 36 Mtoe in 1971 and reached 71 Mtoe in 2006, with an average annual growth rate of 1.7%. They are expected to grow at an average annual rate of 1.9% between 2006 and 2025 (from 71 Mtoe in 2006 to 89 Mtoe in 2025) (Bakli, 2020).

Due to the increase in the Mediterranean population, the improvement in the standard of living, urbanization, industrialization and other factors, the demand for energy is growing very rapidly.

The energy transition aims to meet technical challenges, to promote changes in practices, particularly in terms of energy sobriety and efficiency, to stimulate appropriate policies for infrastructure, development and organization of territories. The implementation of the energy transition is based on the deliberate and concerted action of a set of actors (public actors, energy companies, concerned groups from civil society, etc.).

Fig 1 : Chart highlighting the consumption ratios of electric energy by the mena region countries in a year of 2009 and their consumption forecasts in a year of 2030.



Source :hafner tagliapyitra ,outlook for electricity and renewable energy in mena region ,<https://www.semanticscholar.org/paper/Outlook-for-Electricity-and-Renewable-Energy-in-and-Hafner-Tagliapietra/e70eeacdec39bf1b66055afdd140ba7e0d9db34d>.

Thus, it appears, through these chart, that the rate of consumption of electric energy by the countries of this region (MENA) will experience a very large increase in the horizons of 2030, and this is due to the continued rise in population rates and the expansion of cities and urbanization As well as due to economic growth, which is accompanied by high demand for electrical energy

But on the other hand, it is in the interest of the European side to develop energy cooperation with the countries of the southern Mediterranean in the field of renewable energies, for several economic and political considerations, including that the world has reached the consumption of half of the discovered reserves of natural gas and oil., and that the industrialized countries, headed by European countries, should start The search for sustainable alternatives in the field of energy to ensure the continuation of its supply of energy, which is a sensitive material for its economy and national security in general. In addition to this, the European tendency to cooperate with the countries of the southern shores of the Mediterranean in the field of renewable energy is dictated by geopolitical considerations, foremost of which is the European desire to reduce the large energy dependence On the Russian Federation, which uses its exports to the European market as a political card for pressure and bargaining.

The Council of Ministers of the European Union responsible for energy, through its conclusions (24/11/2011), proposes a Euro-Mediterranean energy partnership, centered on electricity and renewable energies, in the framework of the Union for the Mediterranean (UfM) and the Mediterranean Solar Plan (MSP). Within the framework of the Euro-Mediterranean union, some perspectives are envisaged (Sigman, 2015) :

- promote energy efficiency policies by developing common standards and strengthening the network of energy management agencies in the Mediterranean.
- build partnerships between manufacturers, universities and research centers by encouraging more interaction between these players in new sectors and the search for innovative technologies

Several options exist to meet energy needs while addressing concerns about security of supply, reduction of Greenhouse Gaz emissions and the challenges of climate change. These options are : (Diese, 2012)

- exploitation of the very significant existing energy efficiency potential ;
- deployment of clean and efficient energy technologies for the production of electricity ;
- exploitation of renewable energy resources at the local level ;
- carbon capture and storage ;

Non-technological solutions must also be taken into account, in particular in the areas of information, capacity building, tourism, transport or the water sector where changes in behavior are directly linked to the development option (Vidican G. , 2019).

#### **4.2.2. The Mediterranean Strategy for Sustainable Development :**

Within the framework of the Mediterranean Strategy for Sustainable Development, several organizations and establishments support efforts (European Commission, BEI, MEDENER, OME, etc.), in order to achieve objectives such as : (Vigotti, 2021)

- promote energy saving policies, as well as renewable and cleaner energies ;
- establish global and sectoral objectives favoring the rational use of energy and renewable energies in national and local strategies for sustainable development;
- encourage economic actors, local authorities and consumers to adopt sustainable behaviors through a pricing policy, targeted subsidies, tax incentives and public awareness campaigns supported by NGOs ;
- promote economic mechanisms, such as renewable energy certificates, and regulations aimed at promoting renewable energies ;



- strengthen regional cooperation and support the implementation of the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol.

Thus, Mediterranean countries must integrate three axes into their energy transition policies, namely social justice, support for research and innovation, and rethink production methods.

And like that The energy transition, in the Mediterranean, will remain an illusion as long as a significant part of the Mediterranean population will have difficulty in heating and lighting. Energy retrofit programs should also target low-income households that cannot afford renovations.

The investments required for the energy transition are colossal. The European Investment Bank recently pledged to no longer support programs involving fossil fuels and to redeploy its financial efforts to renewable energies. All the Mediterranean countries, particularly the SEMCs, must follow this example and gradually switch their research efforts to the transfer of fossil fuels to renewable energies.

#### **4.2.3. Promotion of euromed private and national initiative :**

One of the most ambitious cooperation projects is the so-called Desertec project, which aims to create a network of centers for the production of renewable energy, mainly concentrated solar energy, between Europe and the Middle East and North Africa, with the aim of producing enough electricity to cover a large part of the demand of the countries of the region, as well as 15% of European electricity in 2050 (Poudinah, 2014).

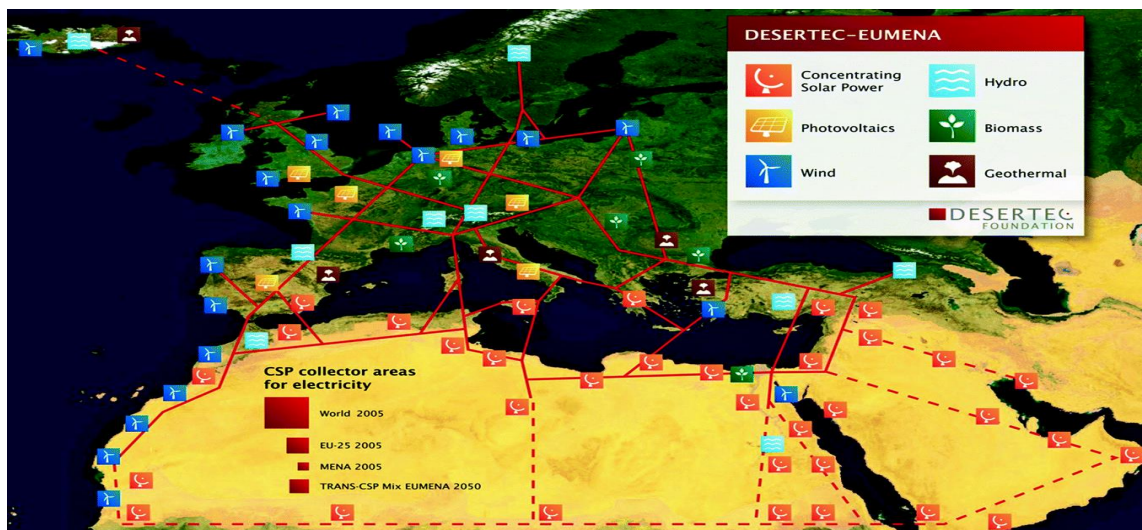
The initiative for this project comes from the Transmediterranean Foundation for Cooperation in Renewable Energies (TREC-EUMENA), and currently 13 private companies from all over the world are involved, including the Spanish Abengoa.

The aim is to provide clean energy for Europe in a fast and economical way through cooperation between European and southern Mediterranean countries. Energy from the deserts, complementary to European renewable energy sources, could accelerate the process of slowing down CO<sub>2</sub> emissions and also help to increase the security of European energy supplies. At the same time it will be able to create jobs, drinking water and improved infrastructure for the southern Mediterranean population (Gisela, 2011).



From satellite studies carried out by the Aeronautical and Space Center (DLR) it demonstrated that by occupying less than 0.3% of the entire desert surface of the MENA region (Middle East and North Africa), solar thermal power plants will be able to produce enough electricity and freshwater to meet current demands in Europe and the southern Mediterranean, and increases in demand expected in the future, Using the winds in Morocco and on land around the Red Sea would generate additional electricity supplies, Solar and wind power can be distributed in MENA and be transported by high voltage direct current (HVDC) lines to Europe with total transmission losses not exceeding 10-15%. The Club of Rome and The Trans-Mediterranean Cooperation for Renewable Energy (TREC) both support the "DESERTEC" concept which is to bring technology and deserts to the service of energy, water and climate security. . Countries such as Algeria, Egypt, Jordan, Libya, Morocco and Tunisia have already shown interest in this kind of cooperation (Pena, 2018).

Fig 2 : desertec project Scheme.



Source : nicollette pompo vanzil, desertec eumena, [http://www.desertec-uk.org.uk/articles/nature\\_news\\_2007-11-27.html](http://www.desertec-uk.org.uk/articles/nature_news_2007-11-27.html).

And as it appears through this map that the project does not only include the exploitation of solar energy, but also includes the exploitation of wind energy in the coasts of North Africa and Europe overlooking the Atlantic Ocean, as well as the exploitation of other energy sources such as water The Nile River.

For its part, the Mediterranean Solar Plan, a project proposed by the European Commission, envisages the financing of solar energy projects, particularly in Morocco and Tunisia. In the area of research and technological cooperation, the establishment in Egypt of the Regional Center of Excellence for Renewable Energy

and Energy Efficiency (RCREEE), a think tank jointly funded by the EU and Arab countries that analyzes and studies the development of renewable energies renewable energies in the Euro-Mediterranean region (Vidican G. , 2019).

In recent years, various international and multilateral funding channels have been opened with the aim of financing renewable energy projects in North African countries. The EIB, the ADB, various Arab sovereign funds, as well as European cooperation agencies (including Spain) are now allocating significant funds to the development of this new sector in the North African region.

Among the projects, it appears that the World Bank allowed at the end of 2009, through the Clean Technology, a total of 5,500 million dollars to accelerate the development of renewable energies in North Africa , and especially the development of concentrated solar energy, The World Bank plan envisages launching projects in Algeria, Egypt, Morocco, Tunisia, as well as Jordan. A total of 11 generation plants are intended to be financed over the next five years. The World Bank believes that these investments will provide the necessary foundation to attract and engage private companies in the renewable energy sector (Dialga, 2019).

## **II. Conclusion :**

Through this study, we reached a set of the following results :

Europe considers the countries of the southern and eastern Mediterranean (MENA region) to be a very important source for them in terms of supplying traditional energy, led by natural gas. For example, Algeria is considered the third largest supplier of natural gas to Europe after the Russian Federation and Norway.

Algeria controls more than 10 percent of Europe's natural gas needs and more than 30 percent of the needs of European countries bordering the Mediterranean, such as Spain, France and Italy.

With the increasing need of the world for energy due to the high percentage of the population, economic growth, etc., and with the scarcity of energy resources in the world due to the world's consumption of half of the fossil energy reserves in just a century, as well as due to the Russian state linking its gas exports to Europe to the political conditions and pressures, The energy importance of the southern and eastern Mediterranean countries has increased in the eyes of Europe.

The countries of the southern and eastern Mediterranean possess very large natural potentials in the field of renewable energy. The Great African Sahara, for

example, is considered the most sun-received region in the world, in addition to other equally important sources such as wind, water and others.

The European party is well aware of the importance of these natural resources and capabilities for developing renewable energy in the countries of the southern and eastern Mediterranean, which made it the initiative to launch several ideas and projects aimed at exploiting these potentials and strengthening energy cooperation in the field of renewable energy with the countries of the southern Mediterranean.

However, due to many challenges and obstacles, both political and financial, the embodiment of these ideas and projects on the ground remains below the required level.

Despite the passage of several years since the initiative of desertec, for example, its embodiment remains absent on the ground. Therefore, the European-Mediterranean cooperation in the field of renewable energy, despite its existence, It remains less important in comparison with cooperation in the field of fossil energy, led by natural gas.

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