



Medgrid

OPENING

new lines for sustainable electricity



FOREWORD

The fight against climate change and its essential weapon, developing renewable energy sources, requires that ambitious co-development projects be deployed to reduce greenhouse gas emissions, ensure energy security and boost economic growth. This is the aim of the Justice-Climate plan, itself crucial to the success of the venture. Large-scale initiatives are especially needed in the Mediterranean region.

The French government launched a project on 20th November 2009 under the aegis of the Mediterranean Solar Plan (MSP) and the global partnership on access to energy in Africa and less developed countries. The main aim was a feasibility study of direct current transmission lines between the solar and wind power plants planned under the MSP to the places where the electricity will be used on either side of the Mediterranean, and on setting up an industrial partnership. The results of this study have proved very encouraging, and a new industrial phase can now begin with Medgrid.

THE CHALLENGE

Electricity is central to economic and social development and quality of life, and demand is constant growing due to rising populations, industrialization and urbanization.

A range of challenges arise, from exhaustion of fossil-fuel reserves, the rise and volatility of fossil-fuel prices, the effects of greenhouse gas emissions on climate and the need for energy security.

According to the Mediterranean energy observatory (OME), annual growth in demand for electricity may reach 6% by 2025 in countries to the South and East of the Mediterranean¹ - they are faced with the need to improve their production and transmission capacity.

MANAGING THE TRANSITION TO A LOW CARBON WORLD

The EU for its part is building a major strategy to ease the transition to a low carbon economy; improving energy security is also seen as a major aim. The EU has set itself three ambitious targets to be achieved by 2020: to reduce by 20% emissions of greenhouse gases², to increase to 20% the proportion of renewable energy in final energy consumption and to save additional 20% of energy beyond existing measures and structural changes.

The question remains of how best to sustainably meet demand for electricity, fight climate change and improve energy security? The solution is to use complementarities between countries to the North, East and South of the Mediterranean, through an energy co-development strategy.

Two major programs have been deployed to implement this strategy: the creation of a Mediterranean energy network linking Europe to the southern Mediterranean, which is one of the six priority EC projects aimed at strengthening the EU's energy security, and the Mediterranean Solar Plan, one of six major co-development plans chosen by the Union for the Mediterranean (UfM)³ to tackle challenges common to countries on both sides of the Mediterranean.

¹ Morocco, Algeria, Libya, Egypt, Jordan, Israel, Palestinian Territories, Syria, Lebanon and Turkey.

² Compared to 1990 level.

³ The Union for the Mediterranean (UfM) was launched on 13th July 2008 under the French presidency of the EU. UfM promotes a co-development policy for Mediterranean countries and includes 43 countries- Mediterranean rim countries and all EU member States.

ENSURING

a sustainable and co-development energy future in the Union for Mediterranean countries



THE PROJECT...

Sun and wind: the South and East countries of the Mediterranean have enormous potential in solar and wind energy. The Mediterranean Solar Plan, launched in November 2008, anticipates building an extra 20 Gigawatts of renewable power generation there by 2020.

Investments are estimated to stand between 38 and 46 billion Euros, of which 6 billion is earmarked for connecting power plants and for interconnections with Europe.

A proportion of this electricity, 5 GW, will be exported to Europe to raise money and help make Saharan solar power plants more profitable. The EU will thus be able to increase the share of energy from renewables in its final energy consumption, in accordance with its undertakings under the Third Climate and Energy Package. This North-South cooperation also forms part of the Kyoto protocol process, by enabling

southern States and project leaders to generate carbon credits through clean development mechanism projects (CDM).

TRANSMISSION LINES AND INTERCONNECTIONS: VITAL ARTERIES

Bringing electricity to areas where it will be used requires transmission lines and interconnections to link production sites to local and European networks; this is achieved especially via submarine high-voltage direct current cables. To date only one ac interconnection exists linking Africa and Europe via the Gibraltar strait and able to carry 1.4 GW of current; this is not enough. These planned new lines would open up the

European market to renewable electricity produced in the South. Interconnected networks will strengthen the security of power systems in partner countries and will enable southern countries to take part in a large-scale electricity market in order to meet demand at the best possible price. On a more general level, these large infrastructure investments will boost growth, and stimulate the creation of new activities and jobs, thereby contributing to the economic co-development of the Mediterranean.

OUTLINE PLAN OF TRANS-MEDITERRANEAN POWER LINES

- ◆ Local distribution
- Transmission lines



CREATING

new links, facilitating exchanges to share endless solar and wind energy resources



HOW TO ACHIEVE IT...

Launched in July 2010, Medgrid is an alliance of leading industrial partners involved in production, transmission and distribution of electricity, infrastructures financing and climate change services.

Medgrid founding partners are **Abengoa, AFD, Alstom grid, Areva renouvelables, Atos WorldGrid, CDC infrastructure, EDF, Ineo, Nemo, Nexans, Nur Energie, ONE, Pan Med trading and Investment, Prysmian, Red Eléctrica, RTE, Siemens, Soitec, Taqa Arabia, Terna and Walid Elias Establishment.**

Our common vision is to create new lines for sustainable electricity by researching the feasibility of a transmission network between the North and South rims of the Mediterranean, and by developing interconnections between power systems around the whole Mediterranean.

AN INNOVATIVE, OPEN APPROACH

These new links will be concretised by building new electricity transmission lines and improving the integration of

power systems. For them to become reality, we will gather together around innovative and open approaches, in developing the technology, project-building, and in our methods of cooperation.

It is planned that these major projects will encourage many other interested parties to join with us around ambitious industrial and civic projects. Our partnership is open to other companies, especially those in southern Mediterranean countries. Transitioning to electricity from low-carbon sources is an ongoing task with huge potential for everyone. We want to take part and make these projects happen by using our complementaries.



JOINING

our competences, using our complementaries, boosting cooperation



Transitioning to electricity from low-carbon sources is an ongoing task with huge potential for everyone

MEDGRID PARTNERS



OUR MISSION...

Medgrid works closely with public authorities in the countries involved, with the EC, the scientific community, development banks and funds, and with NGOs.

The Medgrid industrial study office has several objectives:

- to design the technical and economical Master Plan for a Mediterranean grid able to carry 5 GW towards Europe by 2020 and leading to real investment projects.

- To promote a regulatory framework that is favourable to investments in and the profitability of projects in southern Mediterranean countries - through feed-in tariffs, auction of emissions certificates, financial incentives, etc...

- To demonstrate the impact on economic growth, economic activity and job creation of investment in infrastructures and electricity exchanges.

- To develop technical and technological cooperations with southern Mediterranean countries over Mediterranean transmission lines projects.

- To promote the place of European technologies and industries in the global marketplace, especially in the fields of electricity from renewable sources, high voltage direct current transmission lines (HVDC) and high voltage submarine power cables.

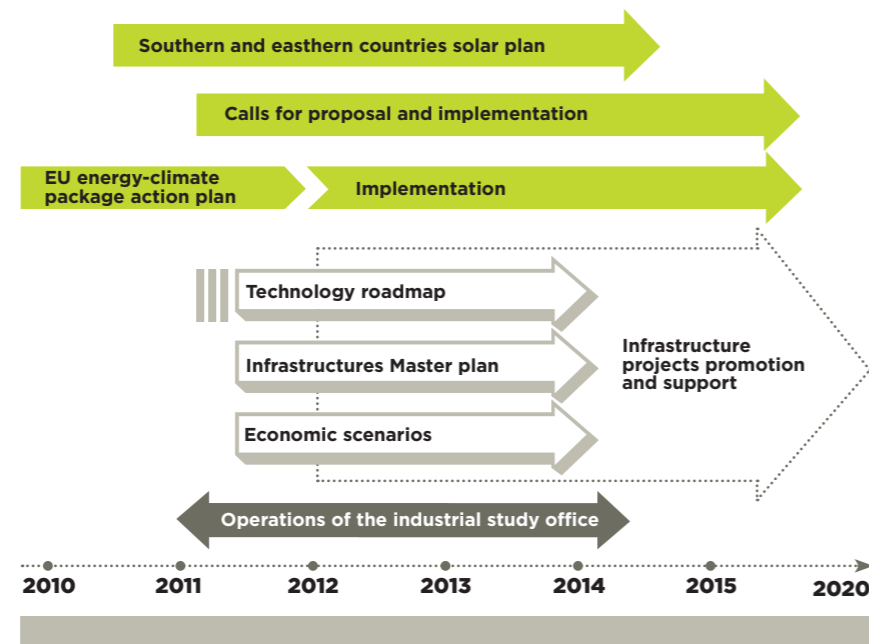
MEDGRID AND DESERTEC, COMPLEMENTARY VENTURES

Medgrid operates in coordination with other Mediterranean Solar Plan projects, with Desertec Industrial Initiative a company that promotes the installation of large-scale wind and solar power

plants in North Africa and the Middle East; this work complements Medgrid's venture in the field of transmission lines.

Large-scale development of solar power plants and high-capacity transmission lines will enable solar energy to become competitive. Implementing these plants has huge potential in terms of job creation, industrialisation and economic and social development of partner countries.

TO FIT INTO ENERGY POLICIES TARGETS FOR 2020



DEVELOPING

innovative approaches and engineering the best conditions to make our vision comes true



REFERENCES



The technology already exists.
Europe is a global leader in the field of electricity.

Abengoa, specialist in power transmission, builds and operates, 10,000 km of dc and ac transmission lines. A leader in concentrated solar power technology: 181 MW already up and running, 800 MW under construction.

AFD, (Agence Française de Développement) a financial institution, that is at the heart of the French policy of State funding for developing countries. Its mission is to play a part in financing development.

Alstom grid, a world leader in power transmission. Is currently building the largest hvdc transmission line in the world, in Brazil. Alstom Group is also involved in building wind and solar power plants.

Atos WorldGrid, a pioneer in smart energy. Built RTE's national grid management system, and is set to become a world leader in the very high value-added "smart grid" IT system market. Is committed to greener and lower energy growth.

Areva, world leader in low-carbon power generation, present in more than 100 countries. Is taking its place in the future global concentrated solar power market with ready to run power plants solutions.

CDC infrastructure, a «Caisse des Dépôts» subsidiary company, major investor in infrastructures with low carbon impact and necessary for economic development.

EDF, largest global power utility - with 38 worldwide million clients and 50% of its core business international, EDF invests in sustainable development in all fields of electricity: nuclear and renewable power generation, transmission and distribution, products and services.

Ineo, a subsidiary of GDF Suez, is taking its place as a major player in photovoltaics and is a leader in construction, repairs and maintenance of power transmission and distribution infrastructures both in France and abroad. Ineo offers innovative and low carbon solutions and services.

Nemo, electric highways. Nemo is a company owned by CIE SpA, the energy branch of the Gavio Group and second largest motorways operator in Italy. Nemo's objective is to develop and run hvdc merchant lines between Italy, Northern Europe and Mediterranean countries. As part of the Gavio group, and one of Italy's leading logistics companies, Nemo has all the features to make full use of synergies available in road and rail transport infrastructures.

Nexans, world leader in the cable industry, has successfully linked Sweden to Finland using over 200 km of hvdc submarine power cable (800 MW, 500 kV). Has set a capacity record with its new generation of 420 kV XLPE insulation submarine power cables.

Nur Energie, builds, owns and operates solar power plants around the Mediterranean, and is becoming a supplier of electricity for the region.

L'Office National de l'Electricité is the major Moroccan electric utility. A public-owned industrial and commercial company set up in 1963, ONE's mission is to meet electricity demand in Morocco at the best possible price and quality of service. With nearly 8,800 employees and 4.5 million customers, ONE's core business is focussed on electricity in production, transmission and distribution.

Prysmian Cables & Systems was the first in the world to install the deepest and highest capacity submarine power cable (1GW, 500 kV, 1600 m under the sea) linking Sardinia to Italy. Also fitted the world's first 200 kV XLPE hvdc power cable, under San Francisco Bay.

RED Eléctrica set up the first renewable energies control centre in the world (CECRE). This control centre has enabled the most optimal and safest integration of renewable source energy into the power system.

RTE, is the operator of the French electricity transmission system, and a key actor in the European electricity market. RTE operates, maintains and develops the largest high and very high voltage network in Europe.: 100,000 km of lines up to 400,000 volts, with 45 cross-border lines.

Siemens set a world record for transmission of green electricity (from hydro) in Guangdong province with hvdc lines up to 800 kV and 5000 MW over 1400 km.

Soitec, has, through its Concentrix technology, become one of the world leaders on concentrated solar power. These are highly efficient, modular flexible systems that are very adapted to the demand and requirements of operating in Mediterranean areas, and produce electricity at very competitive prices.

Taqa Arabia, Established in 2005, TAQA Arabia is a full-service energy solutions world group, operating in the MENA region with activities ranging from engineering to distribution and fuel marketing.

Terna, is the first independent transmission grid operator in Europe and the seventh in the world for kilometers of lines with over 62,000 km of high voltage lines throughout the Italian territory. Following the SAPEI project, the longest submarine power cable in the Mediterranean, linking Sardinia with Italian mainland, Terna is now building a new 105km power «bridge» between Sicily and Calabria with the longest submarine ac cable in the world. The Italian power system is linked with other countries through 22 interconnections.





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