Blue Plan Notes
Environment and Development in the Mediterranean
N° 3 May 2006

Energy savings and renewables: very large potential in the Mediterranean

Total demand for primary commercial energy in the Mediterranean[1] may increase of 65% between 2000 and 2025, with the continuation of trends observed for the past 30 years. Although the riparian countries are unequally endowed with energy resources, all of them have room for manoeuvre to improve the efficiency of their energy use, secure their supply sources and contribute to more sustainable energy development.

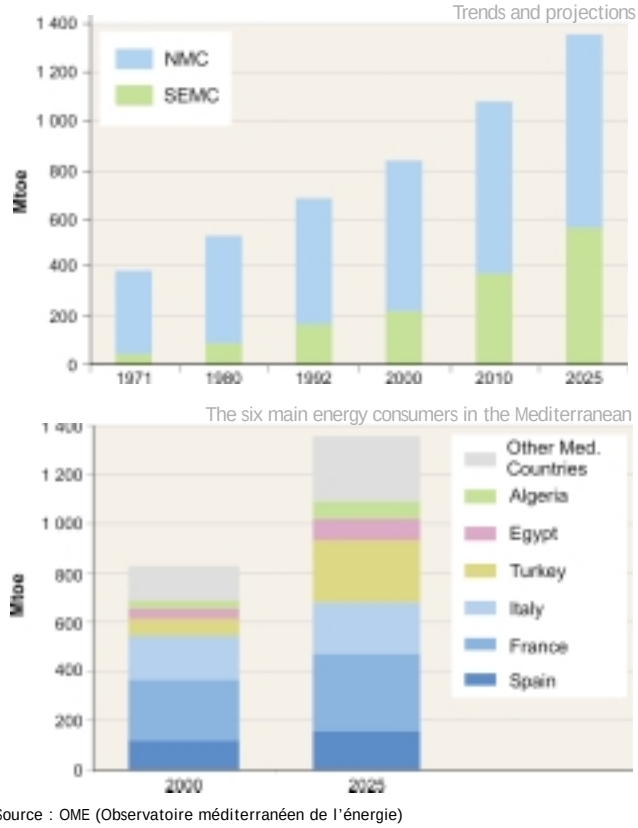
The latest Blue Plan publication "A Sustainable Future for the Mediterranean: The Blue Plan's Environment and Development Outlook" shows the possibility of considerable gains. Indeed, the current oil price escalation emphasizes the need for energy efficiency policies and for developing renewable energy.

Highly contrasting energy situations

Fossil fuels (oil, coal, gas) dominate supply in the Mediterranean, with significant differences between North and South: over 75% of consumption in Northern Mediterranean countries (NMC) and 96% in Southern and Eastern countries (SEMC). Both nuclear power (produced in France and to a lesser extent in Slovenia and Spain) and hydropower account for the rest of energy supply, while renewable energy (hydro, geo-thermal, solar and wind power) represents only 3% (3.1% in NMC and 2.6% in SEMC).

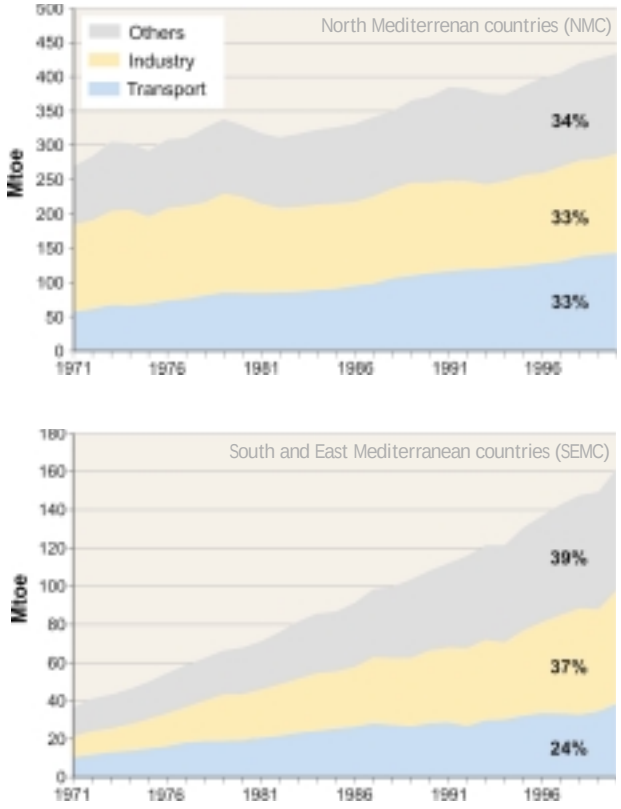
The four Mediterranean hydrocarbon exporting countries – Algeria, Egypt, Libya, and Syria – export 50% of their oil and 90% of their gas to other Mediterranean countries; all the other countries are net energy importers. The Northern-rim countries, poorly endowed with fossil energy resources, account for 2/3 of total energy consumption in the Mediterranean region. Four countries – Spain, France, Italy and Greece – are responsible for nearly 70% of total CO_2 emissions in the region and are striving to diversify their energy supply sources while reducing the environmental impacts of their consumption. In the South and East, with rapid energy growth, the main challenge is to anticipate the

Figure 1 : Primary energy demand, baseline scenario, 1971-2025



Source : OME (Observatoire méditerranéen de l'énergie)

Figure 2 : Final consumption per sector, 1971-2000 (% in 2000)



Source : IEA, Energy Balances of Non OECD countries, 2001 Edition and OCDE

projected high increases in demand, while limiting the environmental impacts.

In all riparian countries, primary commercial energy consumption has more than doubled over the past 30 years, to reach 820Mtoe in 2000.

Energy demand in the SEMC is projected to increase at four times the rate in the NMC between 2000 and 2025. Turkey could become the second largest energy consumer in the Mediterranean in 2025 (Figure 1). Due to the expected economic development and the needs of growing populations, energy consumption in the SEMC would account for 40% of total energy consumption in the region in 2025 against 27% in 2000. Sixteen (16) million Mediterraneans are still deprived of access to electricity, while SEMC populations could increase by 92 million between 2000 and 2025. The residential/tertiary sector is the largest energy consumer, at nearly 40%, and records a spectacular growth in energy consumption (increase of more than 5% per year between 1974 and 1999).

In the NMC, the growth in energy consumption is firstly due to the transport sector, representing nearly 1/3 of the total in 2000 versus 1/5 at the beginning of the 1970s (Figure 2). Growth in traffic and mobility has been well above economic growth and technological progress. Despite significant progress in the car manufacturing industry as regards consumption and polluting emissions per car, the fleet has grown much more quickly and further enhanced the sector's total consumption.

Two scenarios for 2025

The Blue Plan report explores two scenarios up to 2025: a "baseline scenario" and an "alternative scenario". In both cases, the driving force of energy growth is population growth (population stagnating in the NMC, and growing by 40% in SEMC) and economic growth (assumption of average GDP growth at 2.7% per year between 2000 and 2025).

The *baseline scenario* is based on the main orientations defined in energy strategies of the countries and major companies operating in the region; energy policies are dominated by the expectation of considerable increases in energy supply. Energy efficiency is not given priority, even though the scenario integrates technological progress to reduce energy intensity (ratio between a country's energy consumption and its GDP).

In the *alternative scenario*, priority is given to more rational use of energy and faster development of renewable energy.

➤ Rational use of energy aims to enhance the efficiency of current energy systems and to provide the same services while using less energy. Considerable efficiency gains are identifiable in electricity production and distribution (yields, network effectiveness) and in industry (see box); this is also the case in residential and tertiary sectors (construction, hot water production, household appliances, lighting, heating and air conditioning). The transport sector also offers significant energy-saving potential, but merely technical solutions such as hybrid engines and clean fuels may not be sufficient, because of the rapid traffic growth.

Energy savings by clean production technologies

Introducing 'clean' production processes in the industrial sector allows very significant energy savings, at a lower cost. Many examples can be found in the Mediterranean countries.

In Morocco, the implementation of 'clean' production technologies allowed a fish cannery to save the equivalent of 9 tonnes of fuel per year, a saving of 2,200 euros per year, following an initial investment of only 1,740 euros with a return on investment period of only 9 months.

In Spain, a plant for assembling power transmission components reduced its electrical consumption from 465,100kWh/year to 118,200kWh/year. The cost subsequently fell from 50,800 euros/year to only 8,880 euros/year. However, the return on investment period was longer than 3 years.

In Croatia, a dairy factory near Zagreb achieved thermal energy savings of about 500,000kWh/year for a total investment of 31,000 euros. The annual savings are ten times higher: 328,000 euros. The return on investment period was only one month.

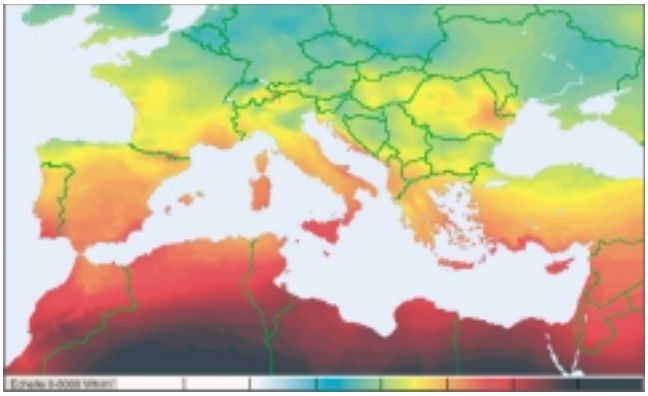
Source: MAP/Regional Activity Centre for Clean Production, Barcelona www.cema-sa.org

➤ The considerable potential of renewable energy (hydro, geothermal, solar and wind power) in the Mediterranean is mostly underexploited, whether for electricity production or for domestic use, accounting for only 3% of energy balance in 2000. Yet, with sun-shining of approximately 5kWh per m^2 per day (Figure 3), the Mediterranean countries have a solar energy potential among the highest in the world. There are many sites suitable to wind farms, considerable geothermal resources,

for example in Turkey, and significant possibilities for developing small hydropower plants.

In all, by 2025, savings of 20 to 25% (and up to 50% in the SEMC) in total energy demand are quite feasible in all riparian countries, by applying technologies which are already available today.

Figure 3 : Map of average solar radiation on April, 1981-1990



Copyright : This map is issued from the *European Solar Radiation Atlas 2000 (vol 1)*, published by Les Presses de l'Ecole des Mines (www.ensmp.fr/Presses collection sciences de la terre et de l'environnement).

The share of renewable energy could account for 14% of the total primary energy balance in 2025 (excluding biomass) versus 4% in the baseline scenario.

Advantages of the alternative scenario by 2025

The advantages of the alternative scenario versus the baseline scenario are highly significant in terms of energy savings (figure 4) and reduced energy dependence, as well as from economic, financial and environmental standpoints.

Considerable energy savings. The alternative scenario shows that energy intensity in riparian countries would fall twice as quickly (-1.3% per year) as in the baseline scenario. Total energy savings could reach 208Mtoe/year in the entire region in 2025, about half of the projected growth in demand between 2000 and 2025. Approximately 60% of potential savings is in the SEMC and 40% in the NMC. The share of oil would be 34% in 2025 (versus 40% in the baseline scenario), and oil demand would be stabilized at 2000 levels, compared with the baseline scenario projection of a 40% increase in demand (150Mtoe) between 2000 and 2025. A saving of 92 million toe in the demand for natural gas is also achievable, equivalent to half the present demand levels.

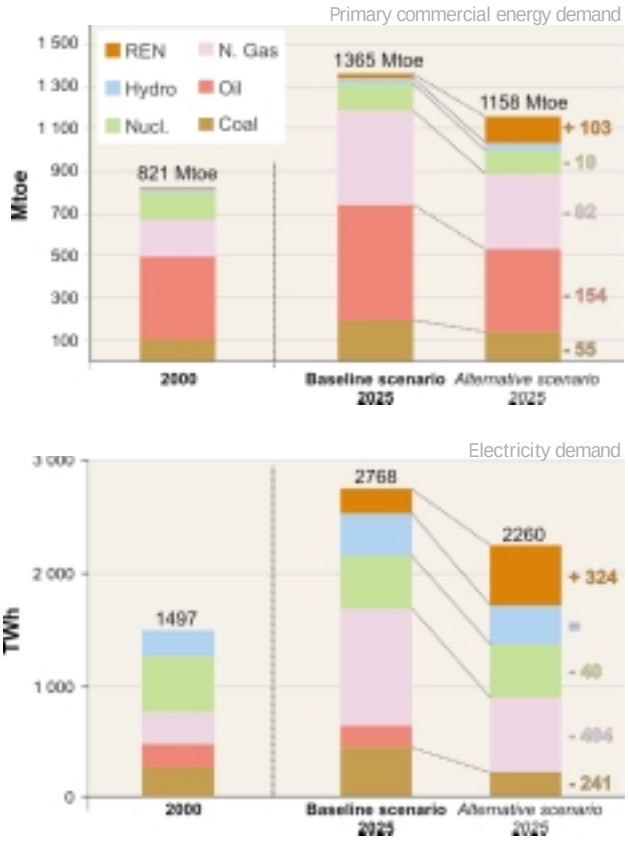
Reduced energy dependency. Such changes in demand would limit the need to hydrocarbon imports accordingly.

Substantial financial savings. Assuming a linear exploitation of the savings potential from 2000 to 2025, the cumulative primary energy saving would be around 2600Mtoe for all Mediterranean countries. With an average price of $60 per barrel, cumulative savings could reach US$1092 thousand million over the period, or US$44 thousand million per year.

Reduced environmental impacts. The construction of many energy infrastructures could be avoided or deferred, and their related environmental impacts and risks reduced accordingly: the construction of 154 power plants (of 500MW), mainly on the Mediterranean coasts, could be avoided, compared with the 400 additional power stations forecast of the baseline scenario. CO_2 emissions in 2025 would be 25% lower (-858Mtonnes) in all countries (Figure 5), which corresponds to 45% of current emissions. The share of the Mediterranean countries in the world's CO_2 emissions by 2025 would be 7% versus 9% in the baseline scenario, and would enable the countries concerned (Northern rim) to get closer to their international Kyoto Protocol[2] commitments.

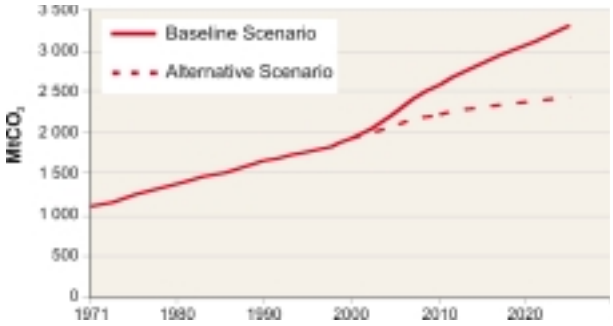
Scenarios for 2025 only give orders of magnitude but clearly illustrate the considerable geopolitical, socio-economic and environmental benefits of alternative strategies. The transition between both scenarios requires strong political resolve to (i) redirect national strategies to energy efficiency and renewable energy, by involving all sectors and actors, (ii) reinforce energy efficiency agencies and investments, (iii) gradually implement reforms in energy taxation and pricing, including cross-subsidy mechanisms between users and/or between privileged and underprivileged areas, and (iv) reinforce and target regional cooperation around these alternative approaches.

Figure 4 : Feasible energy savings with the alternative scenario, Mediterranean countries, 2025



REN : geothermal, wind and solar energy
Source : Plan Bleu & OME

Figure 5 : Total CO_2 emissions according to the two scenarios



Source : OME

The necessary support from international cooperation

International cooperation in the area of energy efficiency and renewable energy is essentially characterized by multiple and isolated projects with inadequate long-term structuring capacity. Following a general trend, Official development assistance (ODA) received by Mediterranean countries for energy fell sharply from 1991 to 2000. And the share of ODA dedicated to energy efficiency and to renewable energy was limited to only 10% between 1973 and 2001.

Within the framework of the Euro-Mediterranean Partnership (funded by MEDA), financial support in favour of energy efficiency and renewable energy has become more significant since 1997, accounting for approximately 35% of total aid to the sector. However, amounts remain low (nearly 24 million euros for seven projects between 1997 and 2003) compared to other investments in the sector (2 thousand million euros in loans from European Investment Bank to the SEMC between 1995 and 2003).

The Euro-Mediterranean cooperation plays a particular role in view of complementarity between both rims: significant potential for renewable energy in the South, with technologies detained essentially by Northern countries; secure hydrocarbon supply in Europe, an opportunity for the SEMCs hydrocarbon producers; potential opportunity for renewable energy exports (green certificates); investments under the clean development mechanism of the Kyoto Protocol.

The objective of promoting energy efficiency and renewable energy is one of the six priorities of the Euro-Mediterranean Partnership launched in 1995; however, focus is still on energy supply. The Euro-Mediterranean dialogue provides an opportunity to promote energy efficiency and renewable energy, through more balanced national and regional MEDA budgets. Success will undoubtedly depend on country's involvement and on the inclusion of these objectives in national strategies.

Euro-Mediterranean cooperation is now a component of the new EU Neighborhood Policy. Within this framework, energy is considered a key area in national action plans being developed together by the Mediterranean countries and the EU. Plans may include initiatives in favour of renewable energy and consumption savings, as is the case today in some SEMCs. The amount of financial resources allocated to the region for the period 2007-2013 will be determined in 2006; if the energy funds are invested in initiatives on energy efficiency and renewable energy, and if the latter is given priority, regional cooperation will fulfill its catalyst role and support the region in the transition between scenarios.

Notes:

[1] The 22 riparian countries and territories in the Mediterranean

Northern Mediterranean countries (NMC): Spain, France, Italy, Greece, Monaco, Malta, Cyprus, Slovenia, Croatia, Bosnia-Herzegovina, Serbia and Montenegro, Albania.

Southern and Eastern countries (SEMC): Turkey, Israel, Palestinian Territories, Syria, Lebanon, Egypt, Libya, Tunisia, Algeria, Morocco.

[2] United Nations Framework Convention on Climate Change. http://unfccc.int/2860.php

Sources:

A Sustainable Future for the Mediterranean. The Blue Plan's Environment and Development Outlook. Edited by Guillaume Benoit & Aline Comeau. Plan Bleu; Earthscan, 2005

Observatoire méditerranéen de l'énergie (OME). *Énergie en Méditerranée*, report for the Blue Plan, May 2002

Grenon Michel et al. *Énergie et environnement en Méditerranée. Enjeux et prospective*. Economica, 1993 (Les Fascicules du Plan Bleu, n° 7)

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