



Energy sector in the Mediterranean region, situation and prospective 2025

The combined effect of population pressure and economic growth, the energy system of the Mediterranean region is facing severe constraint, whether of supply, transportation, distribution or consumption. The demand is now covered by more than 80% of fossil fuels. In the Mediterranean, as in all regions of the world, issues of economic development, energy, environment and climate are deeply linked. The growth of consumption and needs requires increased energy supply involving structural investments for the long term production units, transport infrastructure, storage, exchange. Depending on the choices and decisions, the impacts generated can be very different in terms of cost, carbon and greenhouse gas emissions, ecological footprint and socio-economic development.

The enhancement of energy efficiency potential not yet exploited, promoting clean technologies and effective mobilization of renewable energy could be a roadmap for a sustainable development and contribute to the achievement of stated objectives in the "Mediterranean Strategy for Sustainable Development (MSSD)".

Blue Plan Notes Environment and Development in the Mediterranean

N° 13 November 2009

Energy situation in the Mediterranean region

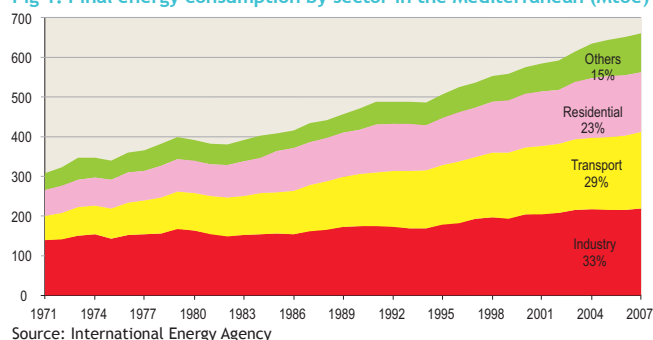
Energy demand

With a total of 955 Million toe (Mtoe), the Mediterranean region accounts for 8% of world energy consumption in 2007. Per capita, consumption is 13% higher than the world average.

Electricity consumption has strongly grown between 1971 and 2007, with a four-fold increase. In terms of consumption per capita, the ratio between North and South has declined from 8 in 1971 to 3.6 in 2007.

The structure of energy demand has changed radically over the last three decades. The Mediterranean has become a more balanced consumption, where transportation and residential sectors have seen their shares grow.

Fig 1: Final energy consumption by sector in the Mediterranean (Mtoe)



The region has emitted nearly 8% of global CO₂ emissions in 2006. The Northern Mediterranean Countries (NMCs) account for 2/3 of emissions, but their growth in the Southern and Eastern Mediterranean Countries (SEMCs) is two times faster than the global rate. The Mediterranean energy mix emits more CO₂ than the European mix.

Fossil fuels account for 80% of supply. Renewable energy (solar, wind, hydro, biomass) represent only 6.7% of regional energy balance.

Energy dependence reached 35% in 2007.

Infrastructure

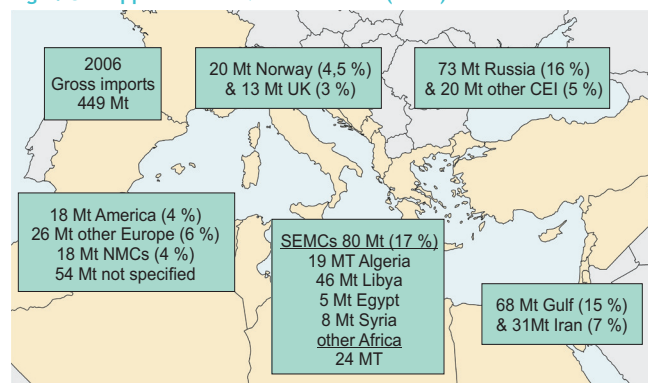
The gas infrastructure consists of 8 gaslines and 7 LNG plants (20% of world capacity). Oil tankers and three oil pipelines bring crude from Caspian Sea, Persian Gulf and Iraq to Mediterranean. Concerning electricity, the Mediterranean is divided into three blocks (West, East, Turkey), and are not yet interconnected.

The electrical links to Europe follow practically pipeline routes. This lack of global vision can lead to inconsistencies and inefficiencies. Part of the Spanish electricity, generated with Algerian or Libyan gas, is returned to Morocco, with important losses in the transmission lines

Regional trade

The net intra-Mediterranean trade amounted in 2006 to nearly 97 million tons of oil, 74 billion m³ of gas and 70 TWh of electricity. The exporting countries (Algeria, Egypt, Libya & Syria) supply 22% of oil Mediterranean imports, and cover over 35% of gas needs of France, Italy, Spain, Greece, Slovenia and Turkey.

Fig 2: Oil supplies in the Mediterranean (2006)



Source: AIE, Plan Bleu

The electricity trade remains marginal compared to overall consumption. Only one tenth of total intra-Mediterranean, or nearly 7.5 TWh, concern the trade between the SEMCs. These small quantities are due to the limited capacity of existing electrical interconnections.

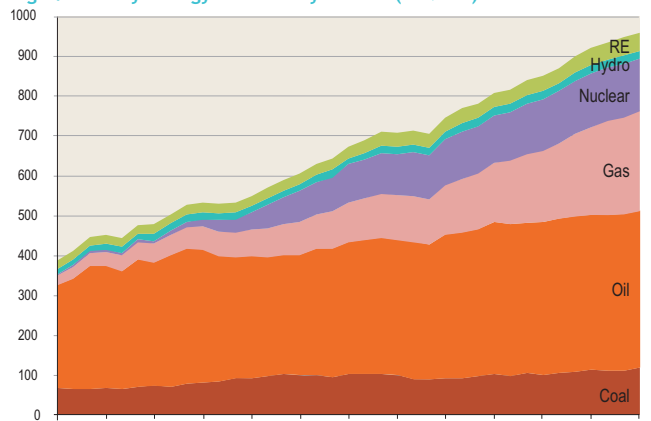
Imbalances that persist

The SEMCs face high population growth combined with rapid urbanization and significant needs of socio-economic development. This is resulting in growth and demand for new services and energy infrastructure. The mature economies of NMCs are marked by a shift towards the services sector and the saturation of energy demand for certain energy services.

The energy dependence has risen for the importing Mediterranean countries.

This status report highlights significant differences between the North and the South, but also between countries in each group. In terms of energy consumption, the imbalance between North and South has narrowed by 88% - 12% in 1971 to 70% - 30% in 2007, but remains significant.

Fig 3: Primary energy demand by source (in Mtoe)



Source : AIE 2009

The 2025 outlook by Plan Bleu

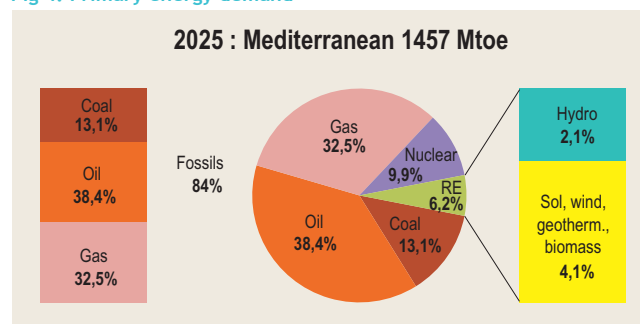
The Plan Bleu report explores two scenarios for 2025: a business as usual (BaU) scenario and an alternative scenario. For each, the drivers of energy demand are economic growth and demographic change: the stabilization of population in the NMCs, an increase of 25% in the SEMCs representing an annual growth of 1.2%.

The Business as Usual Scenario (BaU)

The BaU scenario is based on the main elements drawn from national energy strategies and large companies. The prospect of significant increases in supply dominate energy policies. There is no place for energy demand side management, even if the scenario includes a technological progression inducing a downward trend in energy intensity. The average rate of economic growth is 4% per year.

By 2025, regional demand for primary energy is estimated at 1457 Mtoe compared to 955 Mtoe in 2007, representing an average annual growth of 2.4%. In SEMCs, the energy demand growth is four times higher than in the NMCs. Their share of total consumption rises from 30 to 42%.

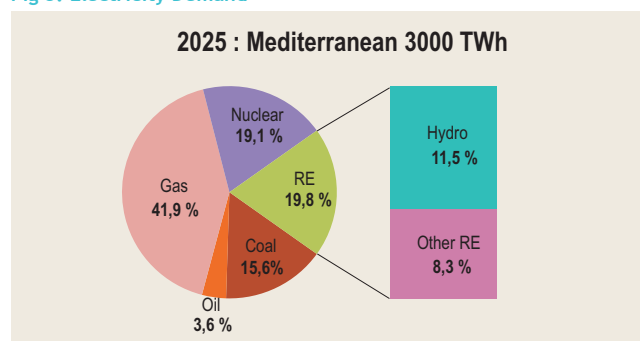
Fig 4: Primary energy demand



Sources: OME, Plan Bleu

Energy demand is also characterized by considerable growth in the electricity consumption, with a three-fold increase for all SEMCs.

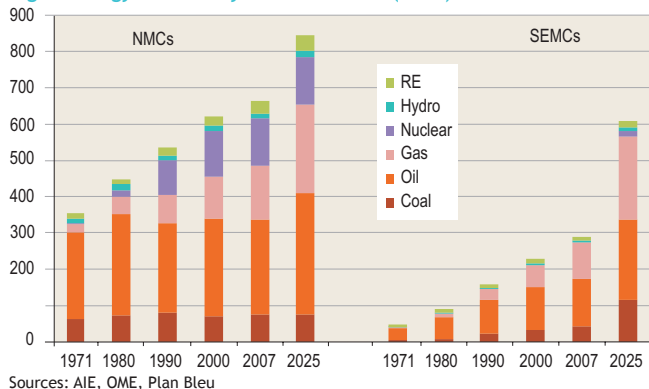
Fig 5: Electricity Demand



Source : OME, Plan Bleu

According to this BaU scenario, the energy prospects of the Mediterranean will essentially be based on fossil fuels accounting for 84% of primary energy needs by 2025. Oil demand continues to increase. The natural gas demand represents 33% of the energy mix. Renewable energies account for only 6.2% of the total primary energy demand.

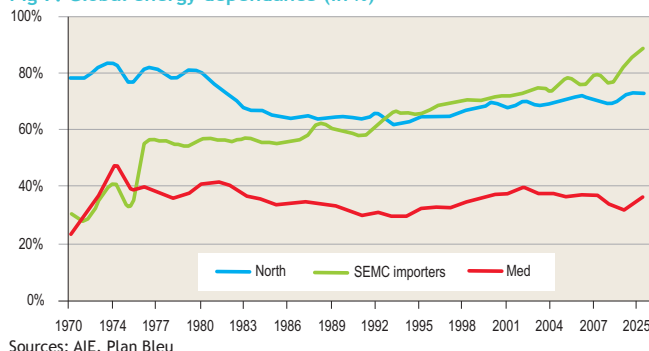
Fig 6: Energy demand by source in 2025 (Mtoe).



The dependence on fossil fuels levels at about 35%. The region has to import 39% of its oil needs and 28% of its natural gas needs.

This predominance of fossil fuels is an important source of GHG emissions and generates significant impacts. For the NMCs, CO₂ emissions are expected to reach 1740 Mt CO₂ by 2025, with a growth rate of 1.1% per year. In the SEMCs, they should double (1550 Mt CO₂).

Fig 7: Global energy dependence (in %)



The alternative scenario

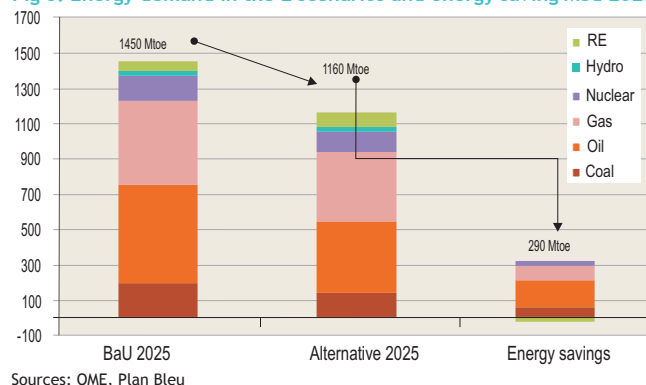
In the alternative scenario, it is assumed that economic growth is more sustained than in the BaU scenario: 5% by year for SEMCs, 2.1% for the NMCs. Other scenario elements are integrated: the progress of national policies on energy efficiency, the rapid development of renewable energies, development of regional cooperation, notably through the launch of the Mediterranean Solar Plan and technological developments.

By 2025, primary energy demand will be limited to almost 1160 Mtoe with electricity demand at less than 2280 TWh. The regional energy consumption would be reduced by 20% compared to BaU scenario and electricity consumption by 23%, with more than half the reductions occurring in SEMCs. Oil's share reaches 35%, which when applied to a reduced overall demand will be equivalent to the stabilization at 2007 levels, when the BaU scenario estimates a 43% increase on 2007. Concerning natural gas, this is equivalent to savings of more than 100 billion m³ of gas demand, almost a third of current demand.

The renewable energy policies of this scenario assume a deep penetration of electricity based on renewable sources in the region. In SEMCs, this scenario would develop 2.5 times

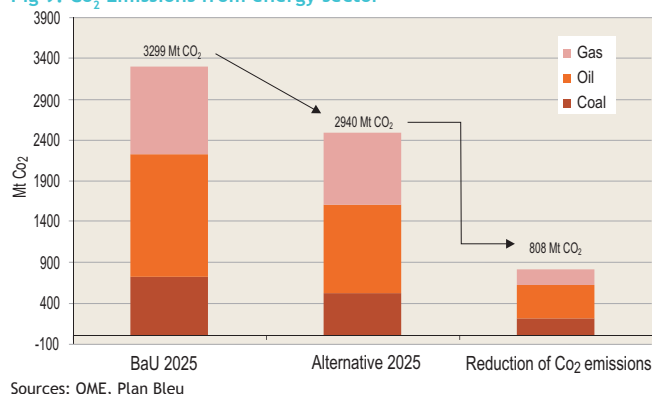
the generation capacity for renewable sources (excluding hydropower) in the order of 35,000 MW, which would bring to 10% share of renewables.

Fig 8: Energy demand in the 2 scenarios and energy saving Med 2025



The total energy savings achieved could reach 290 Mtoe/yr. This fall in energy demand implies reductions of hydrocarbon imports equivalent to a 10 point drop of the index of dependency throughout the Mediterranean countries.

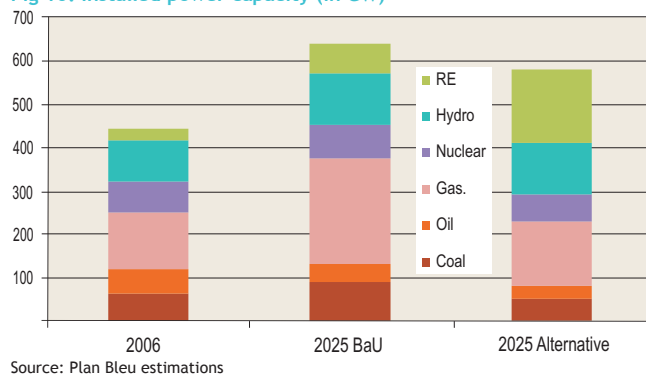
Fig 9: CO₂ Emissions from energy sector



Environmental impacts would be significantly reduced. GHG emissions drop by 25% compared to the BaU scenario, or 808 Mt CO₂ emissions avoided. The contribution of the region to global CO₂ emissions would remain below 7%.

Many energy supply infrastructures could be avoided or postponed: 117 thermal power plants of 500 MW capacity each, several oil pipelines and/or tankers with a total capacity of 154 Mt, several gaslines and/or LNG carriers of about a hundred billion m³.

Fig 10: Installed power capacity (in GW)



The resulting figures from both the BaU and alternative scenarios, set the tone of the challenges and efforts that lie ahead for a more sustainable energy future in the Mediterranean. Under the alternative scenario, the potential for energy savings are considerable: more than half the additional demand for energy and CO₂ emissions expected between 2007 and 2025 could be avoided.

These magnitudes have no predictive value. They simply illustrate quantitatively the potential benefits of alternative strategies that simultaneously reduce countries' vulnerability to geopolitical risks, and socioeconomic and environmental pressures.

The transition to a larger share of renewable energies toward greater energy efficiency could be accelerated by public policies more inclined to finding the delicate balance between demand side management and diversified supply, while reducing investments and pollution. Such strategies require persistence and determination but also an accumulation of knowledge. Beyond national policies, the Mediterranean Cooperation will play a major role.

Renewables minimize the risks of increased dependence on energy and the impact on global warming and without presenting new technology risks. In the Mediterranean, their huge potential is untapped when it could dramatically improve the livelihood of millions of people.

The strengthening of electrical interconnections and the near completion of the "Mediterranean Ring" enable greater electricity trade growth and help to exploit the potential of renewable resources in the SEMCs.

The Union for the Mediterranean (UfM), through the Mediterranean Solar Plan associated to the four Immediate Action Plans (IAP), could be the platform for cooperation in the field of renewable energy and energy efficiency untapping synergies and mutually beneficial opportunities towards more sustainable development paths in the region.

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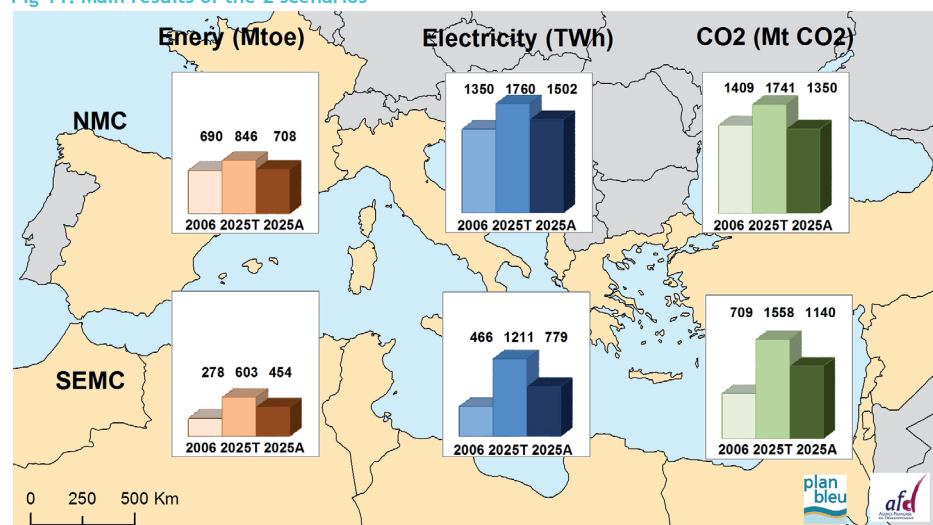
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Fig 11: Main results of the 2 scenarios



Source : Plan Bleu, AFD

Blue Plan Notes



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