

MEDITERRANEAN ENERGY PERSPECTIVES

2011

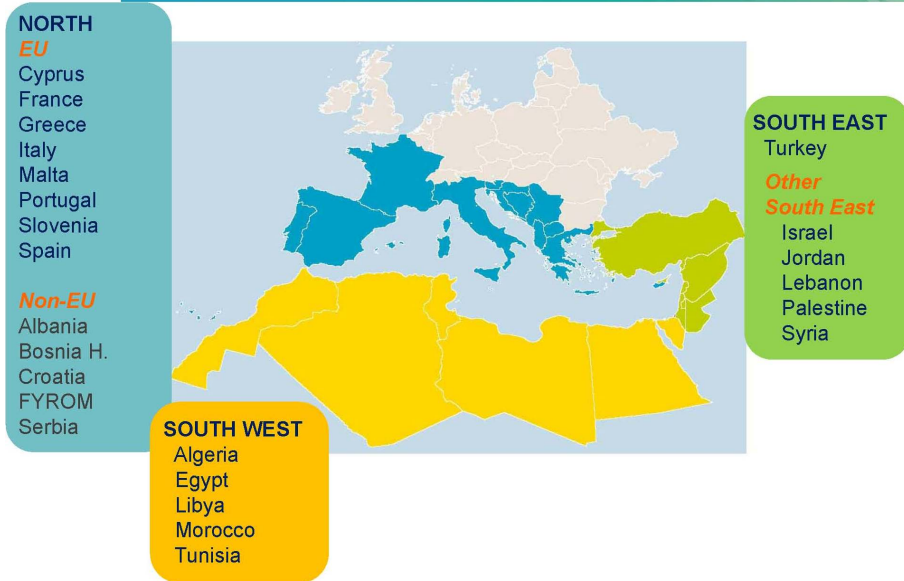
EXECUTIVE SUMMARY



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Observatoire Méditerranéen de l'Énergie

OME Study Geographic Coverage



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EXECUTIVE SUMMARY

MEDITERRANEAN REGION: IMPORTANT CROSS-ROADS FOR GLOBAL ENERGY MARKETS

The Mediterranean is the only region on Earth where three continents meet. It has a long history. Today it holds a rich mosaic of diverse peoples, languages, religions, cultures and natural resource endowments. Mediterranean countries account for 7% of world population and they consume about 8% of the world's primary energy demand. Its geographic situation makes it an important transit corridor for global energy markets. What does the energy future have in store for the 24 Mediterranean countries?

FOUNDATIONS OF THE OUTLOOK TO 2030

Mediterranean Energy Perspectives 2011 provides analysis, detailed data and a view on what that future might look like in the period to 2030. It takes a detailed look at the energy supply and demand balance for the major components of the energy sector. This is the second edition of *Mediterranean Energy Perspectives*: it builds on the analysis from the 2008 edition. This study draws upon the extensive expertise of OME (Observatoire Méditerranéen de l'Energie) and its members.

The outlook to 2030 presents two possible pathways based on different assumptions. Both scenarios are based on the premise that energy demand will be met. Both build from the same assumptions for population, economic growth, and international fossil-fuel prices. The two outlooks are the *Conservative Scenario* and the *Proactive Scenario* based on OME's Mediterranean Energy Model:

- The *Conservative Scenario* takes into account past trends, current policies and ongoing projects, but adopts a cautious approach regarding the implementation of new policy measures and planned projects. It does not assume large-scale efficiency programmes or major efforts for energy conservation.
- The *Proactive Scenario* is based on the implementation of strong energy efficiency programmes and increased diversification in the energy supply mix. This includes more renewable energy sources and the introduction of nuclear power for some South Mediterranean countries. It assumes a decline in oil and coal input to electricity generation capacity and favours clean energy fuels and technologies.

World focus on the Mediterranean Region has been particularly keen since the socio-political upheaval took hold in a number of the region's Arab countries in 2011. As a result, important political changes are in transition in several countries, some of which are significant energy producing and energy transit nations. North Mediterranean countries

are also undergoing a financial crisis which bears repercussions on all sectors of the economy. Energy forecasts presented in this study were made taking these developments into account to the best of our knowledge. While the short to mid-term dynamics in the energy sector may be uncertain, OME expects that they will not have a radical impact on the long-term energy trends presented in *Mediterranean Energy Perspectives 2011*.

FACTORS THAT DRIVE ENERGY SUPPLY AND DEMAND IN THE MEDITERRANEAN

Like everywhere around the world, energy in the Mediterranean serves to fuel economies and enhance living conditions. Energy is a fundamental input to economic activity.

Economic activities have a key influence on the energy outlook. Economic growth in the Mediterranean region has increased steadily over the last two decades: it averaged 2.2% from 1990 to 2009. The North Mediterranean accounts for three-quarters of the Mediterranean gross domestic product while the remainder is divided equally between the South East and the South West sub-regions. There are great disparities in living standards between the North and South Mediterranean. South Mediterranean countries have been making substantial efforts to reduce poverty, yet regional disparities in poverty and other social indicators remain a major concern.

Economic growth in the Mediterranean region is expected to sustain an average annual growth of 2.5% to 2030. Per-capita income is expected to increase by 41% from current levels. In the South Mediterranean, gross domestic product per capita is forecast to increase by 75%. The income gap between the North and South shores of the Mediterranean will narrow with the income per capita in the South at three times less than that of the North in 2030, down from factor of four.

Population is another key determinant of energy demand. The whole Mediterranean region has about 492 million people; more than half live in four countries: Egypt, Turkey, France and Italy. The regional population increased by 191 million over the last 40 years, an annual average growth of 1.1%. The outlook is for moderate population growth at 0.8% per year to reach 582 million by 2030, with most of the growth in the South Mediterranean. Egypt and Turkey will continue to have the largest populations in the Mediterranean region.

Energy prices are a key parameter in OME's Mediterranean Energy Model. The assumed international oil prices are expected to reach USD 108 in 2020 and USD 123 in 2030 (in year-2009 US dollars).

Policies of a very wide variety are also instrumental in how the energy situation in the Mediterranean plays out in the years ahead. For example, eight of the countries that comprise the North Mediterranean sub-region, which together account for about 63% of energy demand in the whole region, are members of the European Union. Their energy sectors are strongly influenced by European Union directives and regulations that guide their energy markets and set obligatory targets, such as for 20% of final electricity consumption to be sourced from renewable resources and significant gains in energy efficiency by 2020, third-party access to networks and greenhouse-gas emissions reduction

targets. Some countries that are not European Union members are moving their policy frameworks in a direction to be in accord with the European Union in order to expand their market opportunities.

While European nations are developing energy resources within their own borders, there is increasing interest to expand the import of natural gas and oil from the Mediterranean producers and to tap into the South's vast undeveloped solar and wind resource potential. Today the direct energy links between the South and North shores are for hydrocarbons. But grand schemes are under consideration to develop large-scale electricity inter-connections that could lead to a Mediterranean Ring power pool.

While it is too early to determine how the political and governance changes in some countries, such as Egypt and Libya, will influence energy matters; efforts to reduce subsidies, strengthen infrastructure, expand trade and open markets to investors would have a significant impact on the energy landscape in the years ahead.

ECONOMIC DEVELOPMENT AND POPULATION WILL DRIVE DEMAND HIGHER

Today the North Mediterranean accounts for more than two-thirds of primary energy demand, which increased for the whole region by 1.8% per year from 1990 to 2009. In the outlook to 2030, energy demand in the Mediterranean countries increases by less than 1.7% per year on average. Energy demand is higher in the South Mediterranean countries as their economic and population growth is expected to be much stronger over the next 20 years than in the North.

Fossil fuels remain the cornerstone of energy demand and account for 79% of Mediterranean primary energy supply in 2030. Natural gas overtakes oil as the dominant energy source over the outlook period, and some shifts in the fuel mix are expected, particularly a larger share of renewable energy sources. In 2030, in the Conservative Scenario, oil accounts for 34% of the region's primary energy demand, natural gas increases to 36%, renewables provide 11%. The share of fossil fuels falls to 73% in the Proactive Scenario as hydropower and other renewables account for 16% and nuclear for 12% of the energy mix.

Encouraged by incentives, policies and technological advances, non-hydro renewables are expected to continue robust annual growth rates of 3.8% to 2030. Both the North and South Mediterranean experience sustained growth in renewables.

The structure of energy demand has shifted markedly from a concentration in the industry sector to a wider range over the last two decades. Power generation has been taking an increasing share and that trend looks set to continue over the period to 2030.

Overall, energy intensity – the amount of energy needed to generate a unit of gross domestic product – is decreasing in the region, largely related to shifts in the industry and the transport sectors. By 2030, energy intensity is expected to decrease by 15%. Today per-capita energy consumption in the South Mediterranean countries is less than half of the level of that in the countries in the North. By 2030, per-capita consumption in the South

reaches nearly 60% that of the North in the Proactive Scenario and three-quarters in the Conservative Scenario.

The Mediterranean region accounts for about 7% of global carbon dioxide emissions from fuel combustion, some 60% of which originate in the North countries. In the Conservative Scenario, the Mediterranean region still accounts for about 7% of global carbon dioxide emissions in 2030, of which the North's share is about 45% and the South's is 55%. In the Proactive Scenario, each sub-region accounts for 50% of carbon dioxide emissions in the Mediterranean.

The production of fossil fuels across the Mediterranean region increased an average of 1.3% per year in the last two decades. Looking ahead to 2030, it is expected to increase by 2% per year, most of which will occur in the South Mediterranean. Oil production rises to 6 million barrels per day by 2020 and maintains that level in 2030. Natural gas production – the fastest growing – almost doubles.

Demand for electricity sees robust growth with electricity generation experiencing an average annual growth rate of about 2.8%. This will require the addition of 317 – 383 gigawatts of capacity, more than half of which will need to be built in the South Mediterranean. Electricity production in 2030 continues to be based largely on fossil fuels, with natural gas accounting for the biggest share, yet renewables expand significantly and reach 34% of the generation mix in the Proactive Scenario.

The Mediterranean region is dependent on fossil fuels and has a 44% import dependence ratio, nearly half of which is oil. In the North, more than 90% of fossil fuels are imported while the South enjoys an export capacity of 26%. In the coming decades, under the Conservative Scenario, fossil-fuel import dependence is about 93% in the North; and export capacity would fall to less than 5% in the South. The Proactive case would enable the region to reduce its fossil-fuel imports by 30% and the South Mediterranean to double its export potential.

OIL SET TO LOOSE GROUND BUT WILL REMAIN THE FUEL OF CHOICE FOR TRANSPORT

In 2011, the Mediterranean region's proven oil reserves are 67 billion barrels, 4.6% of the world's proven oil reserves. Three countries - Libya, Algeria, and Egypt – hold 94% of the Mediterranean's oil reserves. Libya accounts for 69%. Many Mediterranean countries have been relatively well explored for hydrocarbons. However, many areas in the South Mediterranean, especially offshore, are either unexplored or under-explored. Current activities related to unconventional hydrocarbons are mainly for resource assessment purposes.

Oil production in the Mediterranean region was slightly over 5 million barrels per day in 2010, 6.1% of world oil production. The three largest oil producers - Algeria, Libya, and Egypt - account for 86% of the region's oil output. An additional 1 million barrels per day will be added to the region's oil production to reach 6 million barrels per day by 2020. Most of the increase will come from Libya. Recent disturbances to oil production in Libya

are not expected to have large impacts on the projected medium- to long-term growth. Regional oil production growth rates will slow after 2020 as oil production in Algeria declines and elsewhere as existing fields are depleted. Libya will continue to increase levels of oil production to 2030, but will struggle to offset the decline in the other countries. Nevertheless, total oil production in the Mediterranean remains above 6 million barrels per day in 2030.

Oil demand in the Mediterranean region has increased more than 65% over the last four decades, increasing on average 1.3% per year from 1970 to 2009. The outlook is for a slower pace of oil demand growth for the Mediterranean region at less than 1% per year to 2030 in the Conservative Scenario. All of the demand increase stems from the South, yet France remains the largest oil consumer in the region. Under the Proactive Scenario, total oil demand in the Mediterranean slightly decreases below 2009 levels by 2030.

Oil for transport grows faster than other sectors to more than 55% of total oil demand by 2030. Oil demand for power generation declines in the region as a whole, down 4% per year in the Proactive Scenario to 2030. In the North sub-region, the share of oil in power generation is less than 1.5% by 2030.

Overall the Mediterranean region relies on oil imports. It will continue to do so. Only Algeria and Libya will remain net oil exporters in the region over the outlook period.

MEDITERRANEAN SET TO MOVE TO THE GAS ERA AFTER 2020

The Mediterranean region has 4.7% of global natural gas reserves. Algeria, Libya and Egypt hold more than 92% of the region's total natural gas reserves. Algeria's share is 50%, yet the country is largely under-explored. In Egypt, natural gas reserves are on the rise and there are still untested areas to be explored. More natural gas reserves could be located in the South West Mediterranean, which remains under-explored or unexplored, and off the South East Mediterranean shore. The development of unconventional gas is just beginning in the Mediterranean region. Current activities are centred on resource assessment and early exploration stages.

Natural gas production in the Mediterranean region increased more than 41% from 137 billion cubic metres in 2000 to 194 billion cubic metres in 2010. It is expected to almost double over the next two decades to reach 364 billion cubic metres, which could represent more than 8% of global natural gas production. Algeria, Libya and Egypt account for 85% of total gas production in the region. Natural gas production in Algeria and Egypt will almost double, and in Libya, more than triple. Based on recent discoveries, gas production in Israel is expected to approach 25 billion cubic metres by 2030, compared with some 3 billion cubic metres today.

In the early 1970s, very few Mediterranean countries used natural gas. Now it constitutes a significant share of the energy balance of almost all of the region's countries. From 1990 to 2009, natural gas demand increased 5% per year, almost three times the growth rate of primary energy supply. The exploitation of newly discovered natural gas resources in the

South Mediterranean and robust growth in gas-based electricity generation pushed the share of natural gas in the Mediterranean energy balance from 15% in 1990 to 28% in 2009. The outlook is for gas to increase further to over 30% by 2030. Egypt becomes the largest gas consumer in the Mediterranean region by 2030. Natural gas markets in the South Mediterranean are increasing more rapidly than those of the North due to strong demand coupled with attractive prices and easy availability.

Until the late 1990s, natural gas was used mainly in industrial processes and residential heating in the Mediterranean region. But during the 2000s, the situation changed as there was more demand for gas in power generation, which by 2009 was the largest gas-consuming sector at 44%, while industry accounted for 22% and the residential sector for 17% of total gas demand. The outlook expects power generation to remain the largest gas-consuming sector, accounting for half of total gas demand in 2030 in the Conservative Scenario and 46% in the Proactive Scenario.

Currently the Mediterranean region as a whole is a net importer of natural gas. The South West is a net exporter largely due to production in Algeria, Egypt and Libya. But those exports are outweighed by imports in the North and South East countries. The outlook to 2030 foresees that the Mediterranean region will remain a net gas importer. Export and import infrastructure facilities, from pipelines to liquefied natural gas plants and terminals, are expanding significantly in the region.

Algeria, Egypt and Libya will remain net gas exporters over the outlook period. Israel will join the group in the next decade. Taken together, their total gas exports potential will increase from 80 billion cubic metres in 2010 to 140 billion cubic metres - 190 billion cubic metres by 2030, depending on the scenario. Algeria will continue to account for more than half of the total gas exports from the South Mediterranean.

COAL, THE QUIET FORCE

The Mediterranean region contains around 18 billion tonnes of coal reserves, about 2% of the global total. Over 94% of these reserves are located in five countries: Serbia, Bosnia and Herzegovina, Greece, Turkey and Spain. More than 85% of Mediterranean coal reserves are lignite. Hard coal reserves total 2.6 billion tonnes, a third of which are in Spain.

Coal production in the Mediterranean region is 44 million tonnes of oil equivalent, of which 40% is produced in Turkey. Coal production increases by only 1% per year on average over the outlook period. By 2030, coal production increases to 53 million tonnes of oil equivalent with most of the increase in Turkey.

Coal demand has declined strongly over the past 20 years in the North Mediterranean and increased substantially in the South. So overall, coal demand in the region is relatively unchanged since 1990 at around 108 million tonnes of oil equivalent, accounting for 11% of the Mediterranean energy mix. More than three-quarters of it is used in power generation.

Coal demand in the outlook is quite different in the two scenarios. The Proactive Scenario assumes that gas and renewables replace some coal-fired power plants bringing demand down to 92 million tonnes of oil equivalent in 2030. In the South, the Conservative Scenario, with higher electricity consumption levels and no major push for energy efficiency and renewable, would result in greater demand for coal, to reach 137 million tonnes of oil equivalent in 2030, equivalent to 10% of the Mediterranean energy mix. The strongest demand increase stems from Turkey.

The Mediterranean region is a net coal importer. Its import dependence, currently at around 60%, is projected to increase to 64% in the Conservative Scenario and to decrease to 45% in the Proactive Scenario.

MEDITERRANEAN ELECTRICITY BOOM AHEAD

In the North Mediterranean, electricity generation has experienced rather weak growth of around 1.8% per year since 1990. Whereas the South Mediterranean had a robust average annual growth rate of 6.2%, especially in Turkey at 6.6% and Egypt at 6.3% from 1990 to 2009.

The outlook for electricity demand is also quite different across the shores of the Mediterranean. Slow economic and population growth in the North Mediterranean countries will temper growth rates for electricity demand. While in the South Mediterranean economies strive to develop to the level of industrialised ones and to improve living conditions for an expanding population. The outlook is that the gap between the South and the North in electricity consumption on a per-capita basis narrows somewhat, but remains rather high even by 2030. For the entire region, the perspective to 2030 sees electricity generation experiencing an average annual growth rate of about 2.8% (2.1% in the Proactive Scenario) and 4.9% in the South.

Most of the growth in electricity demand is expected in the industrial and residential sectors, primarily in the South. Turkey and Egypt are posed to significantly increase their demand for electricity in the period to 2030. Electricity demand growth could be considerably curtailed with gains in energy efficiency in the coming years according to the Proactive Scenario.

A significant amount of power generation capacity has been installed in the Mediterranean region over the past three decades. In 2009, regional installed capacity stood at 496 gigawatts, of which natural gas accounted for 33%, hydro -18%, nuclear -14%, coal -13%, oil-12% and non-hydro renewables-10%.

In the outlook to 2030, installed capacity for the region increases by 383 gigawatts in the Conservative Scenario and about 317 gigawatts in the Proactive case. Corresponding investments would total EUR 715 billion in the Conservative Scenario and just under EUR 700 billion in the Proactive Scenario. Natural gas-fired power plants account for more than 30% of the new capacity. The most significant change is a substantial increase in the contribution of renewables to power generation. In the North, the increase in renewables generation will be mainly wind power with about

80 gigawatts brought online by 2030. In the South, non-hydro renewables expand to provide 13% - 28% of installed capacity depending upon the scenario. The outlook for new nuclear in the North is unclear in the aftermath of the Fukushima Daiichi nuclear plant accident in 2011, but should stand at around 12% to 15% of total installed capacity in 2030. In the South, nuclear is expected to enter the generation mix in the late 2020s, due to proposed projects, but delays may ensue in response to the recent nuclear problems.

Energy has been a very important link between the North and the South Mediterranean countries for decades, largely based on hydrocarbons. Opportunities are broadening to include the electricity sector. Tapping into the huge renewable energy potential in the South will be necessary to meet domestic consumption, and some envision bringing electricity through cross-border networks to Europe as well. The "Mediterranean Ring" network concept is intended to connect various electricity corridors in accordance with technical standards and with the necessity of being synchronised. There is complementarity across the Mediterranean shores in terms of economic growth, energy sources and seasonal electricity demand curves that could provide mutual benefits related to energy supply and environmental objectives. Countries in the region would need to expand co-operation to include critical institutional and regulatory elements that foster regional electricity network developments.

Energy generated from renewables in the South will take an increasing share in the electricity mix to meet expected high rates of domestic electricity demand growth. A European Union policy directive which supports importing green electricity from non-member countries is already in place.

RENEWABLES: THE MEDITERRANEAN'S TRUMP CARD

The Mediterranean region has abundant renewable energy resources. Yet, today renewables only account for a limited share of the region's primary energy supply (8% in 2009). Traditionally the most exploited renewable energy sources have been biomass and hydropower. Geothermal energy contributes in a few countries. In recent years, wind and some solar, both for electricity and heat production, have entered the energy mix.

The outlook is for renewables to supply 11% of primary energy supply by 2030 in the Conservative Scenario and 16% in the Proactive Scenario. Non-hydro renewables are expected to continue robust annual growth rates of 3.6% to 2030 to achieve a two-fold increase in the Conservative Scenario and a growth rate of 5.2% for a three-fold increase in the Proactive Scenario. Most of the increase is expected to come from wind and solar photovoltaic. Among the various renewable energy technologies, wind is expected to grow at the fastest pace in both scenarios and all sub-regions.

Hydropower and other renewables were 28% of the region's installed electricity generation capacity in 2009, the second-largest source of electricity after natural gas. Hydropower has been long established. Non-hydro renewables more than doubled their installed capacity from 2005 to 2009, largely with wind turbines. The outlook to 2030 projects renewables at 42% of total installed capacity in the Conservative Scenario and 53% of installed capacity in the Proactive Scenario. In both scenarios, the installed capacity of renewables would be higher than that of natural gas.

Electricity production from renewable energy, primarily hydropower, was 18% of electricity supply, almost 340 terawatt-hours in 2009. The outlook to 2030 is for significant increases in electricity fuelled by renewable resources across the Mediterranean region. Solar is expected to be the fastest growing technology. In particular, solar photovoltaic is expected to grow at a faster pace in the South Mediterranean region and particularly in South Western countries, whose average annual growth rate through 2030 in the Proactive scenario is over 39%. As for concentrating solar power, a significant portion of the electricity supply by this technology, (about 48% in the Proactive Scenario) is expected to be generated in the South Mediterranean region.

The countries across the Mediterranean region have quite different legal and regulatory frameworks that affect renewable energy development and use. The European Union North Mediterranean countries are committed to quite stringent policy objectives through the European Union and have defined regulatory regimes. The non-European Union North Mediterranean countries are implementing the *acquis communautaire* to align their legislative frameworks with the Energy Community requirements. The South Mediterranean countries have less stringent obligations and less co-ordinated frameworks. In the South, part of the impetus for large-scale development of renewables comes from multilateral initiatives and international co-operation such as the Euro-Mediterranean Partnership, international financial institutions and funds, development agencies and bilateral agreements. For example, in response to the launch of the Union for the Mediterranean Solar Plan in 2008, several South Mediterranean countries have defined their own renewable energy plans with a view to achieve energy diversification, meet the increasing internal consumption and export the excess.

MOVING TOWARDS ENERGY EFFICIENCY

The potential for energy efficiency is substantial in the Mediterranean region, particularly in the South. Despite some improvements, energy efficiency still faces many institutional, regulatory and market barriers. Energy subsidies are one of the most important challenges. More effective policies are needed to increase energy efficiency both in the North and the South Mediterranean.

In the North, the European Union has set a target to achieve 20% energy savings by 2020. Although significant progress has been made, the measures undertaken to date are likely to achieve only half of its target. To give new impetus in that path, the European Union has put forward a new directive and those Mediterranean countries that are part of the European Union are being asked to take additional measures to more fully exploit their potential.

In the South, regulatory frameworks have also evolved recently. Discrepancies between efforts and lack of common policies, however, show that the commitment is very different from one country to another. In this context, regional co-operation has an important role to play considering the experience gained in the North and also in some South countries.

According to the Proactive Scenario, 10% of final energy consumption can be saved by 2030 in the whole region. The cumulative potential saving over the period amounts to 1 090 million tonnes of oil equivalent which is equal to the final consumption of the whole region in 2030 in the Conservative Scenario or the final consumption of the South during the last five years.

There are positive signs of decreasing energy intensity across the Mediterranean, mostly stemming from the industry and transport sectors. In 2009, energy intensity was 0.13 tonne of oil equivalent per USD 1 000 of gross domestic product (in 2005 US dollars at purchasing power parity). It is expected to reach 0.11 tonne of oil equivalent per USD 1 000 of gross domestic product under the Conservative scenario and 0.10 tonne of oil equivalent per USD 1 000 of gross domestic product under the Proactive scenario in 2030. Final intensities are also generally decreasing with economic development and converging between sub regions. Nonetheless, these broad trends mask the varied situations between sub-regions and countries.

Electricity intensity is increasing across the Mediterranean region, largely driven by the residential and commercial/services sectors. The cumulative potential savings of electricity demand in the whole region is about 3 800 megawatt-hours over the outlook period, which is 1.4 times the electricity demand consumption of the whole region in 2030 in the Conservative Scenario or the electricity consumption of the South in the last ten years. Electricity intensity is not systematically decreasing with economic development nor converging.

Buildings are the highest energy consuming sector in the region, accounting for more than 30% of total final energy consumption in 2009. Given the outlook for population growth in the South Mediterranean, the building sector should be a top priority in any energy efficient strategy.

ENVIRONMENT CHALLENGES AHEAD

There Energy-related carbon dioxide emissions are projected to increase across the Mediterranean region in both scenarios. Yet carbon intensity, defined here as the quantity of energy used to generate one unit of gross domestic product, is expected to decrease in all of the sub-regions over the outlook period to 2030. This is a positive indicator of moving towards lower carbon economies in both the North and South although important disparities remain between the sub-regions and the countries.

Climate change mitigation efforts under the United Nations Framework Convention on Climate Change's Clean Development Mechanism provide credits for countries with carbon dioxide emissions reduction targets for projects in non-Annex 1 countries. Clean Development Mechanism projects are being developed in twelve Mediterranean countries, although on a worldwide basis they account for only about 1% of Certified Emission Reductions by 2020 and only 2% of the total number of projects registered. Overall, the estimated emission reductions from the implementation of these projects are 167 million tonnes of carbon dioxide equivalent by 2020.

Water is an essential good. It is scarce and unevenly distributed in many parts of the Mediterranean region. Growing populations, rising socio-economic needs and environmental deterioration will contribute more and more to a dramatic decrease of the region's water resources over time.

More than 120 million people in the South Mediterranean are "water-poor", that is with less than 1 000 cubic metres of capacity per year. Those facing serious shortages of water,

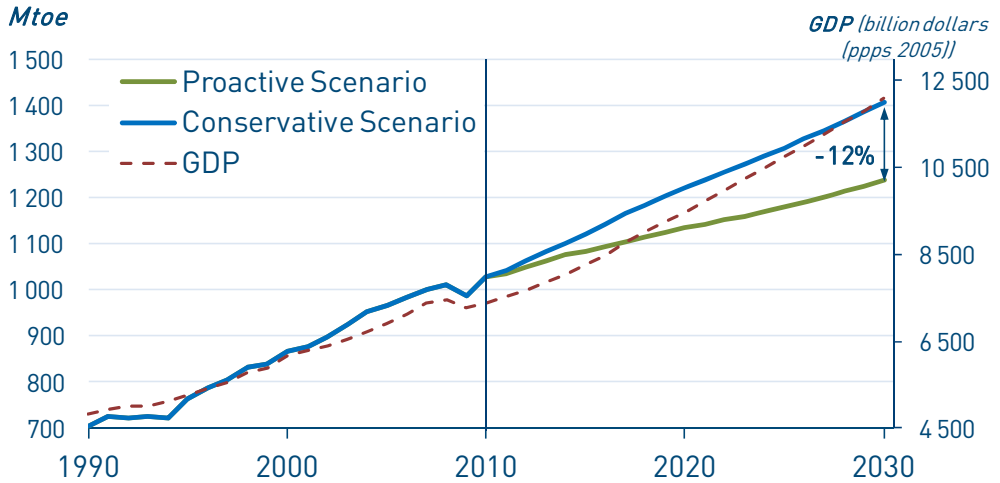
categorised as less than 500 cubic metres per capita per year, number over 60 million. Improving water management is one of the main challenges for the region in the coming decades. Indeed, water use inefficiencies, e.g., leaks in distribution networks and wasteful practices in irrigation and other water uses, account for a high share of water consumed in South Mediterranean countries.

Given the urgency of the water situation, better water management policies need to be implemented and effectively carried out in order to stretch existing resources. In addition, new sources of freshwater are critical in the long term. Water desalination could offer solutions to lower water tensions in the region, though large-scale desalination uses significant amounts of energy and requires specialised and expensive infrastructure. An interesting option could be for Mediterranean countries to develop combined water and electricity production using solar technologies such as concentrating solar power.

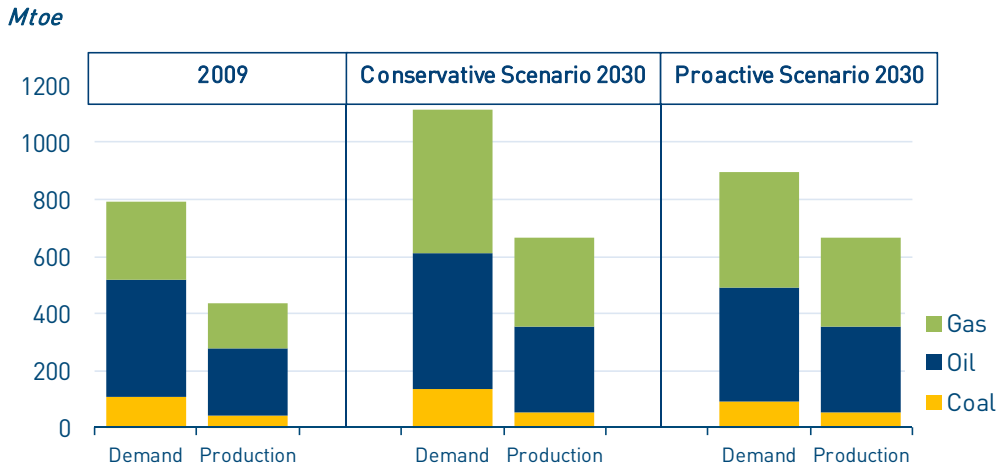
Waste generation represents one of the heaviest environmental pressures that the Mediterranean region has to face. The amount of waste is strictly correlated to economic and demographic growth; decoupling waste generation from economic growth calls for integrated management approaches and an evolution of policies in many Mediterranean countries. Emissions from waste account for about 5% of total greenhouse-gas emissions in the Mediterranean region.

One particular issue of concern is that waste valorisation facilities are not yet an option in most Mediterranean countries: in the European Union North about half of the waste generated is sent to landfills. In the rest of the Mediterranean region, dumping is still a common practice. Waste levels rose notably over the last decade, but waste generation has slowed since 2007 in the European Union North Mediterranean countries. This is a consequence of policies to reduce packaging and the amount of biodegradable waste destined for landfills. Similar approaches are highly needed in the rest of the Mediterranean region. This is particularly the case in the South where the fraction of organic waste is higher than in the North.

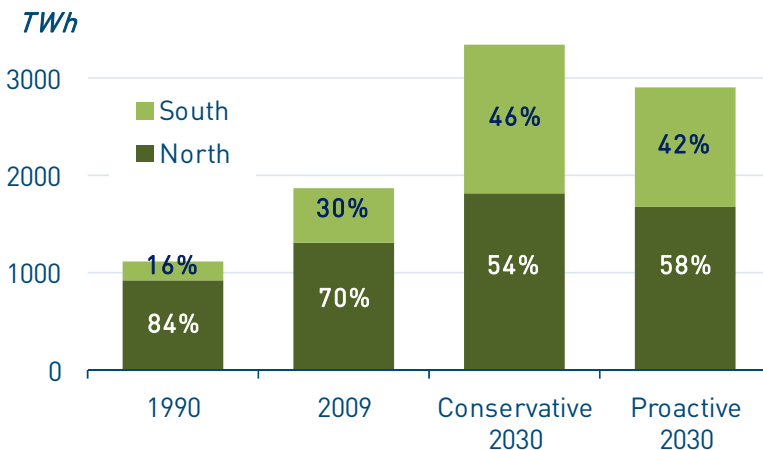
MEDITERRANEAN ENERGY DEMAND OUTLOOK, by Scenarios



MEDITERRANEAN FOSSIL FUEL DEMAND AND PRODUCTION OUTLOOK

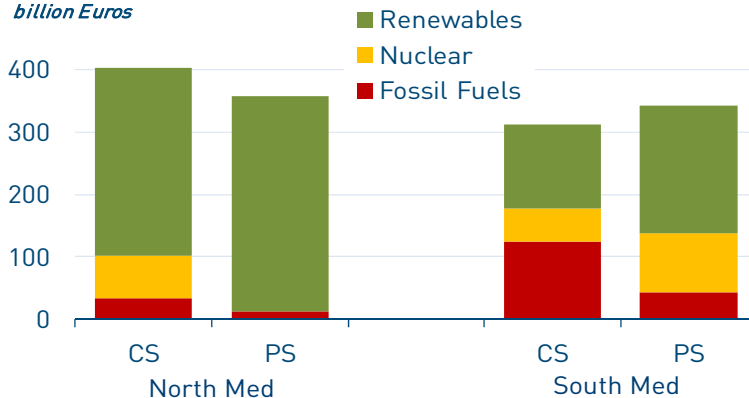


MEDITERRANEAN ELECTRICITY GENERATION



POWER GENERATION INVESTMENTS

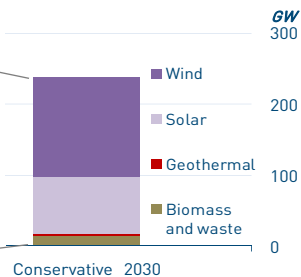
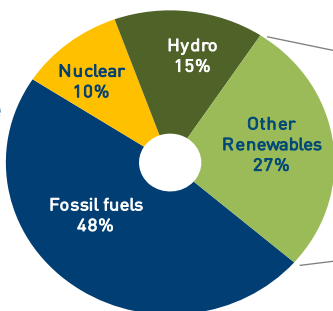
billion Euros



RENEWABLES FOR POWER GENERATION, INSTALLED CAPACITY

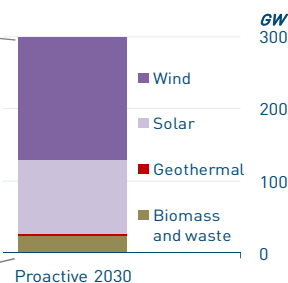
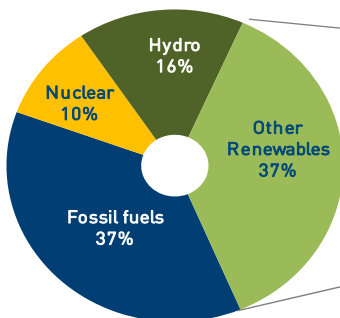
Conservative Scenario

878 GW



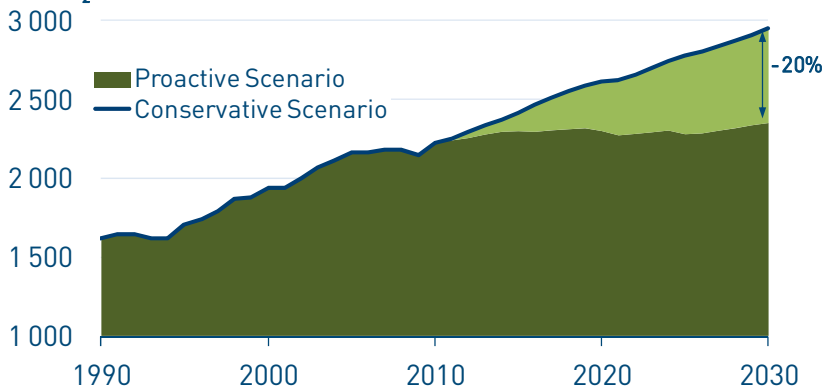
Proactive Scenario

812 GW



MEDITERRANEAN CO₂ EMISSIONS

Mt CO₂



MEDITERRANEAN ENERGY PERSPECTIVES

Mediterranean Energy Perspectives 2011 provides insights into the energy situation today and over the next two decades in the Mediterranean region. Its detailed data and analyses are of interest to stakeholders on both the supply and demand sides of the energy equation. This is the third edition in the MEP series, which highlights the extensive work of OME (Observatoire Méditerranéen de l'Énergie). This outlook draws upon the expertise of OME and its members.

MEP 2011 provides a unique and comprehensive analysis of the energy sector in the Mediterranean. It presents data ranging from the early days of the region's energy industry to the situation today and an outlook to 2030, based on OME's supply and demand model, the Mediterranean Energy Model. Current efforts related to renewable energy sources and energy efficiency are carefully considered as they are key issues for the Mediterranean energy sector and for the whole economic and environment future of the region.

MEP 2011 presents:

- A description of the Mediterranean countries in a global context.
- Historical and forecast data on the supply and demand balance for each segment of the Mediterranean energy sector.
- Energy demand to 2030, including two cases: the Conservative and Proactive Scenarios.
- Trends in past, present and future oil and natural gas production and development.
- Existing and planned oil and gas infrastructure.
- Evolution of electricity generation and installed capacity.
- Developments in innovative and renewable energy sources.
- In-depth analysis of energy efficiency measures and policies.
- Prospects for CO₂ emissions and sustainable development.

MEP 2011 has been prepared by a joint-team of OME experts supported by related companies and independent expertise. Bringing this expertise together provides an important reference for industry analysts and investors who wish to get a complete picture of the energy industry and markets in the Mediterranean, the way they operate and their long-term perspectives.

Because its forecasts can be easily compared with outlooks available elsewhere, MEP is an indispensable source for policymakers, researchers and members of the business community.

150€

