6 Socio-Economic Impacts of the MED-CSP Scenario

There is a common believe that renewable energies are expensive. However, they are continuously becoming cheaper by technology learning and by economies of scale in contrary to fuel-based power technologies that are submitted to highly fluctuating and slowly increasing fuel prices /IÖW/ISET 2002/, /IEA/NEA 1998/, /BMWT 2002/, /WETO 2003/. Therefore, it is only a question of time that renewables will take over power generation due to economic reasons.

However, learning curves do not happen spontaneously. Society must invest to achieve continuous learning and lower cost of renewable energy technologies. This is often called subsidization, but it is not, it's an investment into a better – and in the long term cheaper – technology. Real subsidies are only necessary where technologies have become too expensive after having past their economic summit years ago, like e.g. nuclear power plants, steam plants fired with German coal or oil fired plants in many MENA countries. Real subsidies are usually increasing and everlasting if they are not stopped. On the contrary, investments into renewables are limited in time with the goal to achieve benefits in the future.

Most subsidies are hidden /RIVM 2001/. E.g. the cost of damages to health, buildings and the environment caused by fossil fuel based technologies is never charged to the fuel price, but society as a total has to cope with that burden. Most oil producing countries are burning fuel at marginal cost rather than at the world market price, forgetting that once fuel is burned it cannot be sold anymore by them or by later generations. It's just like burning a national treasure.

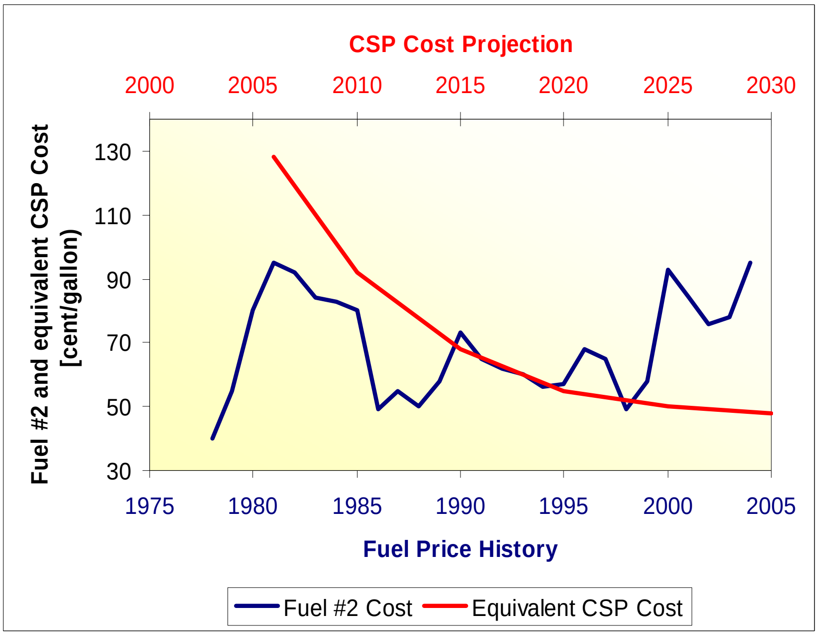


Figure 6-1: The merry-go-round of fossil fuel prices calls for CSP and other renewables to stabilise energy costs. Heating oil prices between 1978 and 2002 and projected equivalent solar energy cost in the time span from 2005 to 2025 (Source: oilnergy.com, historic data from Energy Information Agency and projection by DLR)

The investment cost of almost every technology becomes lower with mass production and technical development. Renewable energy technologies are no exception. The investment of fossil or nuclear plants still becomes lower, too, but at a much slower pace, as they already exist in a very large scale. Secondly, the electricity cost of fossil plants depends mainly on the fuel cost and not so much on investments /EIA 2003/. Renewables are still young technologies. Their cost depends mainly on investments. Therefore, they show strong learning and scale effects. Their operation cost does not depend on volatile fuel prices, but on natural energy sources that are for free.

Figure 6-1 shows the historical course of the heating oil spot prices since 1975 as overlay to the equivalent cost of concentrated solar energy from solar thermal power plants as projected in the scenario until 2030. Figure 6-2 shows the cost projections of heating oil (fuel #2) according to IEA and the learning curve of concentrating solar power as function of the total installed capacity from the MED-CSP scenario. Both comparisons show that after approximately a ten years investment phase, the initially higher solar energy cost would become competitive with fossil fuels. If the development of CSP that started in the mid 80's in California would have been continued, today CSP would already be considerably cheaper than heating oil.

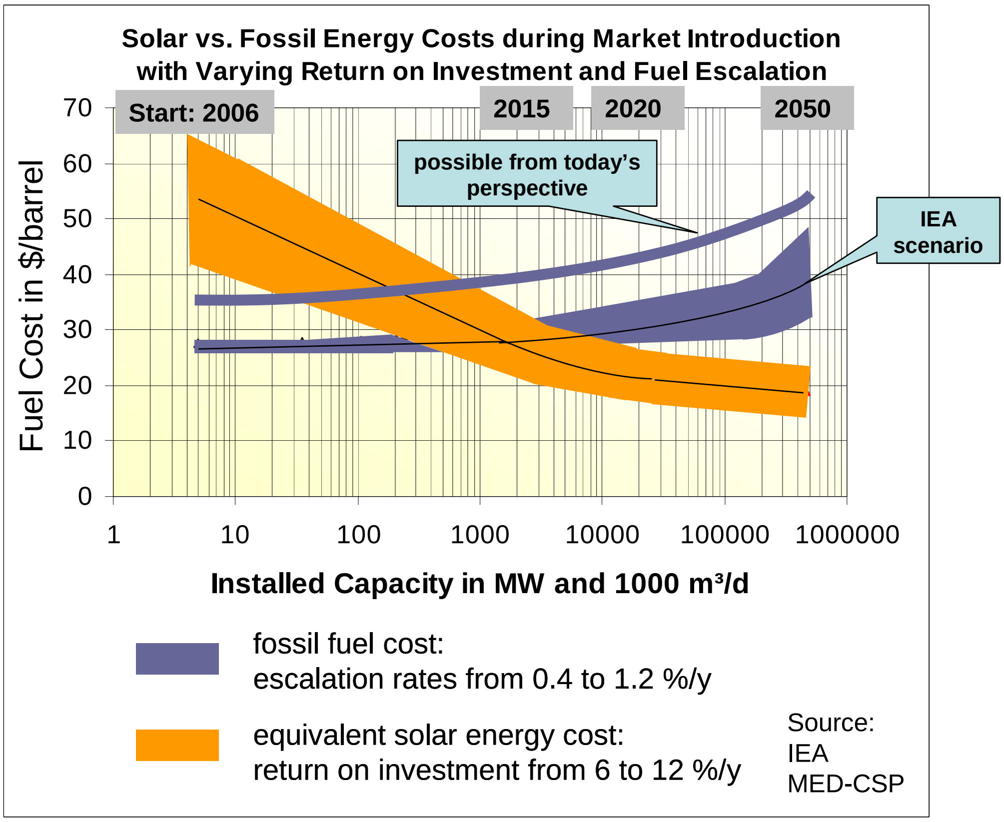


Figure 6-2: Cost of fuel according to IEA expectations and equivalent cost of solar energy from CSP in the MED-CSP scenario as function of installed capacities and time. Under the assumptions of the scenario, the break even of costs may occur between 2010 and 2015 with an installed capacity of around 2000 MW. However, with present fuel costs of well over 30 $/barrel (Figure 6-3), a break even may occur much sooner.

An important reason for introducing CSP and other renewable energies as an alternative to fossil energy resources is to **avoid future cost traps** related to fluctuating and increasing fuel prices. Fuel price fluctuations have become sharper in the past years, and a continuous trend to increase is becoming evident. Today, fuel resources are continuously diminishing and subsequently reduced to a few regions, while their global mid depletion point - this is the point when their extraction rate comes to its summit - is expected to be reached before the 2020's. USA and Europe have already passed beyond their respective regional mid depletion points, and as a consequence, their domestic fuel supply share is reduced year by year, speeding up their dependency on the remaining global resources - which are mainly concentrated in the Middle East /LBST 2000/. Renewables are the only way to considerably reduce the growing public expenses and subsidies into the power sector.

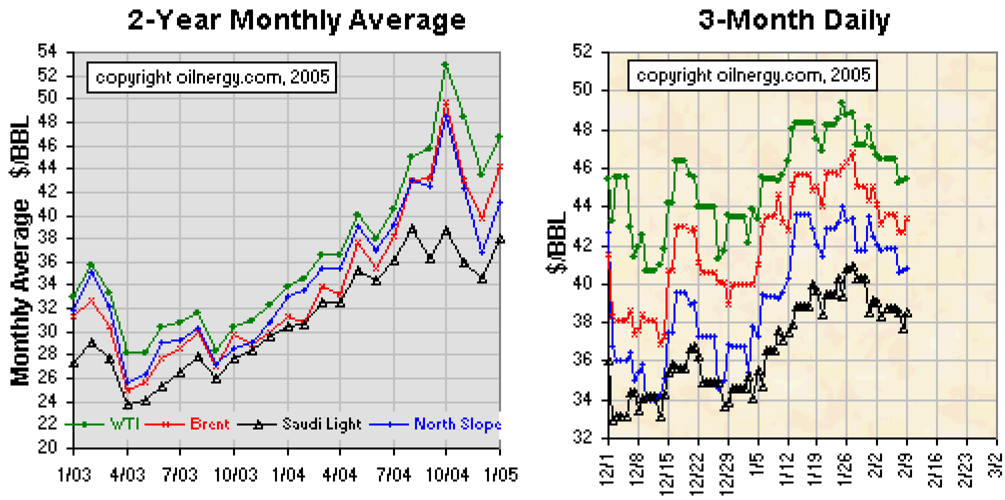


Figure 6-3: Spot prices of various key crude oils from www.oilnergy.com at 10th of February 2005.

One major socio-economic advantage of renewable energies is that they will **relieve the national economies from energy subsidies** /EREF 2004/. The stronger the investments in the renewable energy sector, the sooner this will happen. It makes absolutely no sense to wait, as every year conventional power generation becomes more expensive, increasingly burdening national economies through directly escalating costs and through the damages to health, environment and the global climate caused by those technologies. The initially higher cost of renewable energies will come down to a fully competitive level with fuel based power generation within one decade even not accounting for external environmental or societal costs. After that, renewables will slowly take over the power market due to their better economic performance and stability (Figure 6-4).

At present, we experience increasing pressure on fossil fuel resources on a global scale, and a painful elevation of fuel prices. Renewable energies and in a first place concentrated solar thermal power offers a solution. Renewable energies can relieve the national economies from energy subsidies through:

- lower cost of primary energy
- lower external costs of energy
- income from export of solar electricity
- income from export of saved fuels

- income from emission trading

In the coming decades, the MENA countries are facing an era of strong economic growth. In the long term, this process would place the MENA economies on equal eye level with Europe. However, the increasing scarcity of water and the elevated cost of fossil fuels will burden their economic development just in the critical phase of this period, possibly depriving them from their right to follow this path of economic equalization.

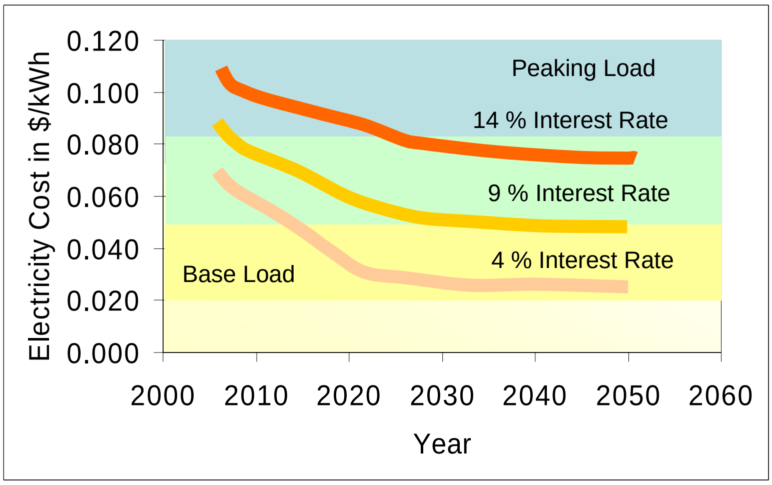


Figure 6-4: Cost of electricity by CSP in cogeneration with Multi-Effect-Desalination for 4, 9 and 14% rate of return, water cost 0.50 $/m³. 8000 full load hours per year, annual irradiance 2500 kWh/m²/y.

At the end of the oil-age, the MENA countries must now shift to their more plentiful and long-lasting **domestic energy sources**: renewable energies. This process requires not more than adequate initial investment by the governments of the EU-MENA region. The benefits are numerous: The direct costs of energy production and the external (social) costs of the damages induced by power generation can be reduced. Additional national income can be generated by exporting not only saved fuels, but also renewable electricity to Europe. The availability of fossil fuels will be stretched over centuries and its consumption reduced to a level compatible with the environment. Oil wars will become obsolete. Future generations will still be able to use the valuable oil and gas resources while the MENA region will develop economically. The fact that renewable energies are much more evenly distributed than oil or gas reserves will lead to an eye-level approximation of the national economies of the EU-MENA region. The economic gap between countries like Yemen and Spain will slowly disappear to the benefit of both.

Another benefit is the **diversification of supply** by local renewable energy resources (Figure 6-5, Figure 6-6). Today, many countries like e.g. Morocco have to import large quantities of primary energy carriers like oil, coal and natural gas that represent a major burden for their foreign exchange balance and for their national economy. In view of the quickly growing demand, this **dependency on energy imports** would become unaffordable for many countries in the medium term future. Using a domestic, renewable source will alleviate this burden, and a future export of solar electricity to Europe could even turn the wheel into the opposite direction and create additional income. Diversification also means higher security of supply and redundancy and has a clearly stabilising effect on national energy costs. A primary function of conventional power plants is the stabilisation of the electricity grids. Hybrid CSP plants with solar energy storage can also provide this important function without any constraints.

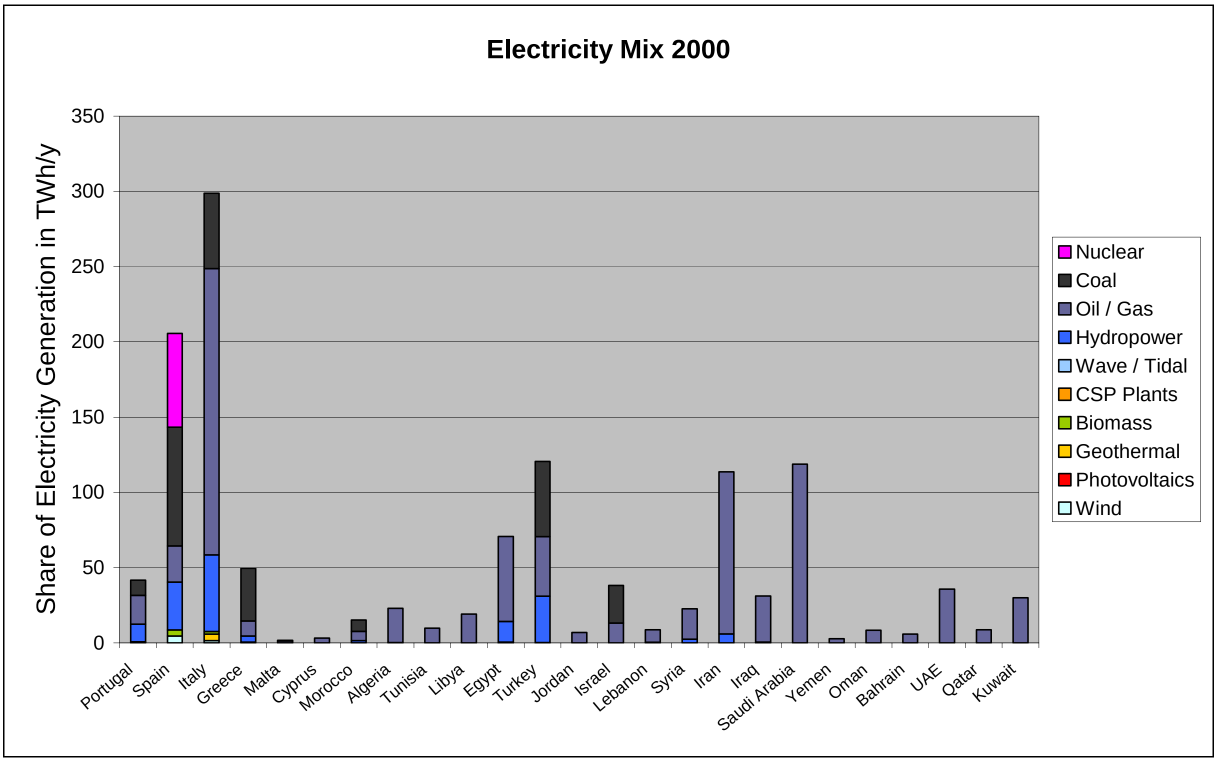


Figure 6-5: Share of different technologies for electricity generation in the year 2000.

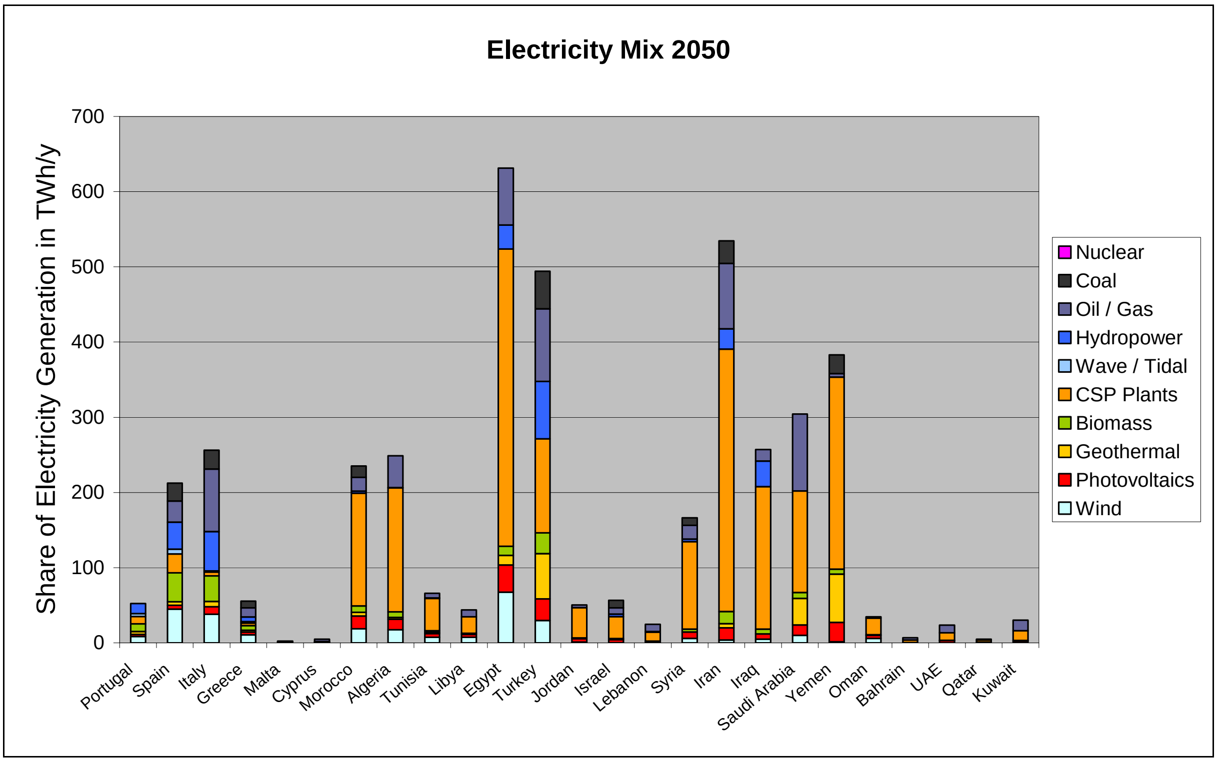


Figure 6-6: Share of different technologies for electricity generation in the analysed countries in the year 2050 according to the MED-CSP scenario.

Renewable energies are characterized by their diversity of resources and technologies and their enormous capacity range from a few Watt to hundreds of Megawatt. They can be adapted to any kind of energy service and closely interlocked with conventional modern energy technologies in order to provide full power availability and security of supply at any time and place. Renewable energy technologies fit very well into modern supply systems that are increasingly relying on **distributed generation** and network integration, like e.g. in "virtual power plants". On the other hand, **intercontinental grid** connections can effectively combine the different regional resources to yield the necessary redundancy of supply and address the sustainability goal of international cooperation (Figure 6-7). Large centres of supply will evolve at sites with very abundant and thus, cost effective renewable energy resources, providing electricity and renewable hydrogen to the regions of demand, i.e. large urban areas in industrialised and developing countries, by means of high voltage direct current (HVDC) transmission and by pipelines, respectively /ABB 2004/. At the same time, such centres will become a regional nucleus of economic development and wealth and will help to stabilise the socio-economic structures. Many of those centres will be established in developing countries, contributing considerably to the positive progress of our developing world /TREC 2004/.

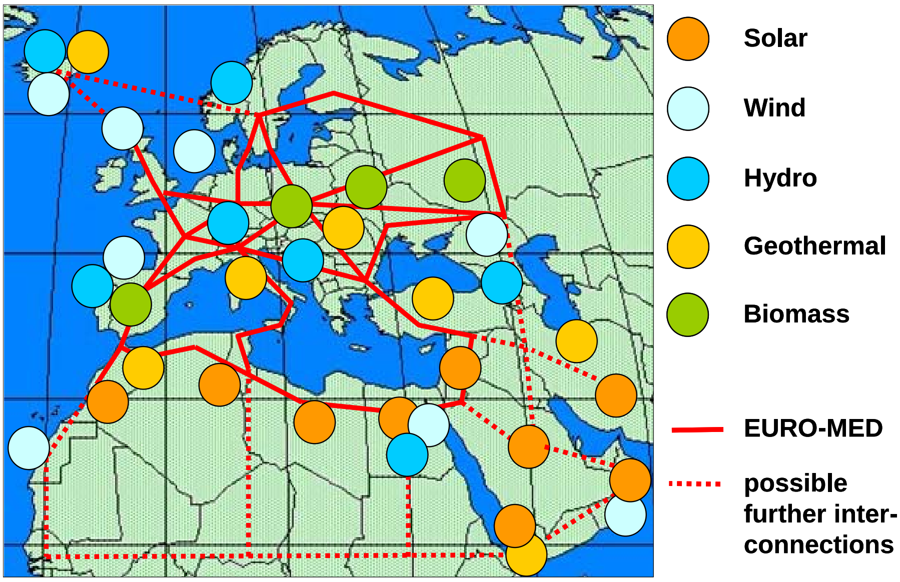


Figure 6-7: Projection of a future Trans-Mediterranean grid interconnecting the best sites for renewable energy use in EU-MENA

Using solar energy means manufacturing machines that use renewable energies. It means replacing minerals from the subsoil by capital goods. Renewable energies require a lot of labour on all industrial levels from base materials like steel, glass and concrete to civil engineering and high tech-applications. Increased industrial activities will create **job opportunities** and reduce the brain-drain from MENA to the industrial countries. Considerable shares of the equipment and construction materials of the solar field and the power block can be produced domestically in many countries with potential CSP deployment. For parabolic trough systems, an evaluation of the supply capability of selected countries like Morocco, Spain and Brazil indicates domestic shares ranging between 40 and 60 % for the first plants. Local supply shares can be increased for subsequent projects if **domestic industries** adopt an increased production of the solar field and power block components.

Technology	Employment during Construction [Person-Years]	Employment during Operation in 20 Years [Person-Years]
Wind Power	14	11
Photovoltaic	19	26
Biomass	9	27
Micro-Hydropower	32	16
Large Hydropower	9	8
Geothermal	8	4
Solar Thermal Power	20	20

Table 6-1: Specific Employment Effects of different renewable energy technologies normalised to an annual production of 2 GWh /BEI 2003/

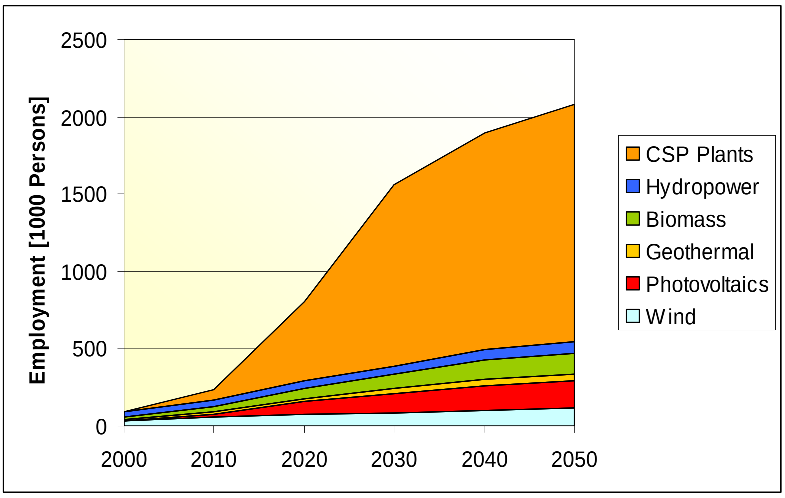


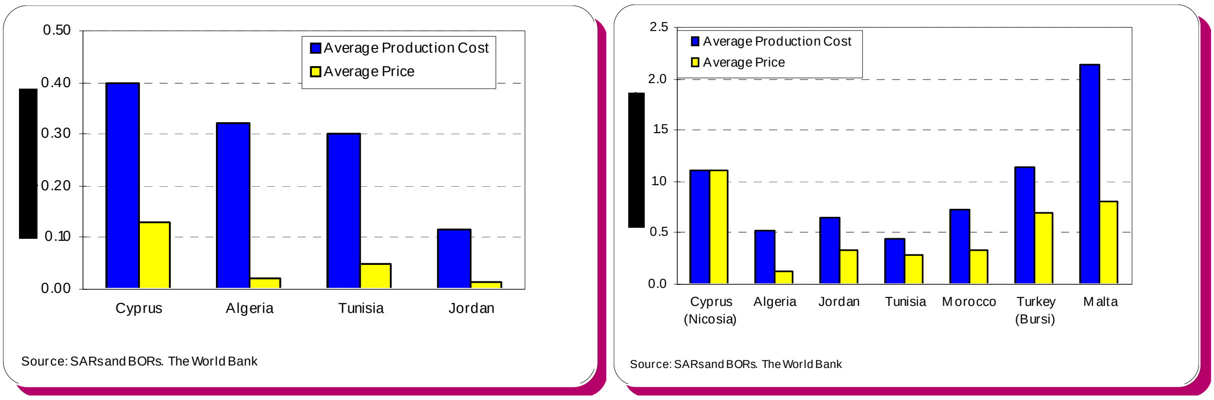
Figure 6-8: First guess of gross employment in the renewable electricity sector in the analysed countries for the MED-CSP scenario based on the specific employment in Germany from Table 6-1 /BEI 2003/

Table 6-1 gives a rough estimate of the **gross employment effects** of renewable energies. Thereby the whole upstream chain is taken into account including direct and indirect gross-employment. The numbers are from /BEI 2003/ who investigated the effects in Germany and use German shares of import, labour productivity and working hours per person. Certainly, these parameters are not the same for any MENA-country and are likely to differ widely. Using this rough estimate for the MED-CSP scenario, a tentative gross employment of 2 million persons in the renewable electricity sector can be expected (Figure 6-8).

Those numbers show gross employment effects. Negative employment-effects of the substituted power generation systems were not subtracted. Cost-differences were not taken into account ether. During the time in which RES-electricity is more expensive it will generally reduce economic activities elsewhere and reduce employment. If RES-electricity is cheaper than alternative technologies, then this effect will become positive. These effects are very hard to estimate. Current studies on employment effects of Germany's Feed-in-tariff show that in the beginning even a negative effect may result. However, as the methods of these studies are under discussion and the quality and quantity of data is not good, the results can't be judged as reliable. Unanimously, the overall employment effect of renewables is estimated to be small as long as no potential exports of RES-technologies are taken into account. This is not surprising as neither the electricity sector nor the increase of the price for electricity is very large in comparison to other sectors.

The **scarcity of freshwater resources** is challenging food independency and social stability of a growing population in MENA. Efficient production and use of freshwater is a vital issue in this region. The pressing need for sea water desalination leads to higher energy demand and to an unavoidable additional burden for the national economies. There is no sustainable solution for water security based on fossil or nuclear energy, and moreover, there is a growing conflict between domestic consumption and export of fossil fuels.

Cost traps in the energy sector originating from fluctuating fuel prices are serious enough, but the traps originating from a future freshwater deficit will be even worse, because water is indispensable even at the lowest economic level of development. With a water deficit equivalent to the Nile expected in 2025, the North African states face a challenge never experienced before in their history. To solve this severe societal problem, they will require large amounts of low cost energy for desalination and, of course, an enhanced water infrastructure and optimal water management (Figure 6-10).



a) Irrigation Sector ***b) Municipal Sector***

Figure 6-9: The present status of water pricing in the MENA Region in $/m³ /Saghir 2003/

Combined solar power and desalination plants will not only tackle the problems related to a sustainable energy supply at a low cost, but also those related to clean water and to the conservation of productive soils. In the world's arid regions, such plants could become the nucleus of a totally new social paradigm: the conservation and recuperation of land endangered by desertification, comparable to the conservation and recuperation of flooded land in the Netherlands. Providing power, water, shadow and foreign exchange from the export of green power and revived agriculture, such plants can provide all what is needed to effectively combat desertification and to regain land for human settlement and agriculture that otherwise would be lost to the desert.

Arable **land resources** in MENA and world wide are disappearing at a speed of several hectares per minute. Concentrating solar multipurpose plants in the margins of the desert could generate solar electricity for domestic use and export, freshwater from seawater desalination and provide shade for agriculture and other human activities. Such plants could turn waste land into arable land and create labour opportunities in the agriculture and food sector. Tourism and other industries could follow. Desertification could be stopped.

Solar energy and saltwater are unlimited resources if used in a way compatible with environmental and socio-economical constraints. The economic figures of most renewable energies indicate clearly that within a manageable time span they will become much more cost effective than fossil fuels. Renewable energies are the **least cost option for energy and water security** in MENA. With increasing electricity intensity in a developing world, their importance will steadily grow, being only limited by demand, not by resources.

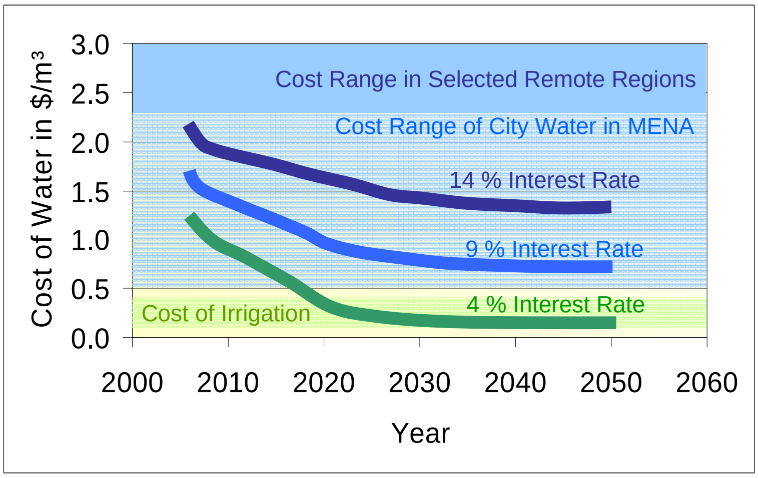


Figure 6-10: Cost of Water desalted by CSP in Cogeneration with MED for 4, 9 and 14% Rate of Return, Electricity Cost 4 ct/kWh. 8000 full load hours per year, annual irradiance 2500 kWh/m²/y.

In a future sustainable energy scheme, renewable fuels like hydrogen may be generated by solar electricity, **expanding renewable electricity markets** beyond the traditional electricity sector into the industrial and mobility sectors. The growth rates of renewable energies are today in the order of 20 – 40 %/y and may be kept at this high level for a decade or more. All in all, the study shows that there are many good reasons to accelerate market expansion of renewable energies in the EU-MENA region:

Energy sustainability can only be achieved with renewable energies

Although climate change is a serious concern, sustainability must also be achieved in terms of economy, affordability, technology, health and social compatibility. A strategy must match the time horizon of sustainability considerations, which is at least 50 - 100 years and more. Strategies optimising a pathway within a smaller time horizon may lead to the wrong direction, because measures necessary to achieve the long-term goal may be ignored or delayed. The sustainability goal proposed by WBGU of emitting 1 ton of carbon dioxide per capita by 2050 to avoid drastic climate change is a challenge, because most MENA countries already show this level of emissions today, but their demand will still grow. Affordable access to energy and water for a growing population is as well a challenge. Both goals together can only be achieved by renewable energies in combination with increased energy efficiency.

A well balanced mix of renewable energies can replace electricity from fossil fuels

Electricity must be delivered on demand. Fluctuations of wind and photovoltaic electricity must be compensated by sources that can deliver power on demand, like biomass, hydropower, geothermal power and solar thermal power plants that can operate on base-, intermediate- and peak load demand. By 2050, fossil fired plants will only be used for peaking demand, while the core electricity will come from renewables. Solar thermal power plants with their capability of thermal energy storage and of solar/fossil hybrid operation are a key element for grid stabilisation and power security in such a mix. Renewable energies will initially need public support but will steadily continue their growth within niche markets. After 2025, electricity from most renewable energies will be cheaper than electricity from fossil fuels.

Renewable energy resources are plentiful in the EU-MENA region

The renewable energy sources in the countries analysed in the MED-CSP study can cope with the growing demand of the developing economies. The wind, geothermal, hydropower and biomass potentials are each about 400 TWh/y. Those resources are more or less locally concentrated and not available everywhere, but can be distributed through the electricity grid if its capacity is expanded in line with the growing demand. The by far biggest resource in MENA is solar irradiance, with a potential that is by several orders of magnitude larger than the total world electricity demand. This resource can be used both in distributed photovoltaic systems and in large central solar thermal power stations. Thus, both distributed rural and centralised urban demand can be covered by renewable energy technologies.

The demand for energy and water will grow by three times until 2050

The growth of population and economy will lead to a considerable growth of energy demand in the MENA countries. By 2050, the MENA countries will achieve an electricity demand in the same order of magnitude as today Europe (3500 TWh/y). Although our scenario considers efficiency gains and moderate population growth or even retrogressive population figures in some of the analysed countries, electricity demand will almost triple from 1500 TWh/y today to 4100 TWh/y in 2050. This is moderate considering that electricity demand has also tripled in the past 20 years.

In many MENA countries and also in some Southern European regions, natural water resources are already now exploited beyond their sustainable yield. In the future, overexploitation of natural water resources must be avoided and growing demand must be additionally covered by seawater desalination. This will require efficient and environmentally compatible desalination technologies and a plentiful, sustainable and affordable energy source. Fossil or nuclear fuels cannot cope with any of these criteria. On the contrary, already today they are subsidised due to their high cost, they are causing serious national and international conflicts and climate change, and oil, gas and uranium are expected to become increasingly scarce and expensive within the next 50 years. A strategy for energy and water security can therefore not be built on fossil fuel resources, but they can be a component of such a strategy.

Energy and water security can be achieved in every country of the EU-MENA region

Every country in EU-MENA has its own specific natural sources of energy and water and very different patterns of demand. The MED-CSP scenario shows one possible way to match resources and demand in the frame of the technical, economic, ecologic and social constraints of each country in a sustainable way. Most MENA countries show a strong economic growth that will lead to an approximation to the European economies by the middle of the century. However, conventional strategies for energy and water would lead to a depletion of fossil fuel and natural water resources within a few years, to unaffordable costs of energy and water and to social conflicts. Economic development would be increasingly burdened by subsidisation and regional conflicts. To this add possible impacts from climate change like desertification, losses of arable land and floods. Due to the increasing lack of water, food imports would increase, but it is unclear how this should be financed. Only a change to renewable energies can lead to affordable and secure energy and water. This will not require long term subsidies like in the case of fossil or nuclear power, but only an initial investment of all EU-MENA countries to put the new renewable energy technologies in place.

Renewable energies are the key to socio-economic development in MENA

The growth of energy demand in MENA would lead to greenhouse gas emissions equivalent to those of Europe. Rising fuel prices and an additional cost for CO2-sequestration would seriously burden economic development. In contrary to fossil fuels, all renewable energy technologies show degressive costs. This will obviously lead to a replacement of fossil fuels in the power sector. MENA countries will benefit by reducing their energy subsidies. Oil and gas exporting countries will be relieved from burning their export product number one, and in the long term may additionally come to export solar electricity. A strong renewable energy industry in MENA will lead to high qualified labour options and relief MENA from the brain drain occurring today.

Water supply in MENA is critical, as a solution can only be seen in using large amounts of energy for seawater desalination. A strategy based on fossil or nuclear energy would not lead to an affordable and secure water supply system. Again, renewables and in a first place solar thermal power are the key to reduce the conflict potential of energy and water scarcity in MENA.

Renewable energies and energy efficiency are the pillars of environmental compatibility

It is a common misbelieve that renewable energies require large land resources. Among all electricity generating technologies including all nuclear and fossil systems, solar power technologies are those with the smallest land requirements. This is due to the fact that nuclear and fossil power plants not only require the land where they are placed, but additional infrastructure for mining, transport and disposal, which must be considered in an overall lifecycle balance (very long time for nuclear waste), and which is much smaller for solar systems.

Most renewable energy technologies have no emissions at all during operation. On a life cycle basis, emissions occur only during the production of the plants. However, if renewable shares increase in the power sector, also the emissions during construction will be subsequently reduced, as they origin from fossil energy consumption. Fossil power systems show emissions one or two orders of magnitude higher than those of renewables. CO2 sequestration will require extra energy and thus will lead to higher emissions, which must additionally be disposed off, entering a kind of vicious circle.

Goals	**Security of Human Subsistence**	**Conservation of the Social Productivity Potential**	**Preservation of Options for Development**
Rules	Protection of Human Health	Sustainable Use of Renewable Resources	Equal Opportunities of Education, Labour and Information
	Guaranteed Supply of Basic Needs	Sustainable Use of Non-Renewable Resources	Participation in Social Decision Processes
	Security of Self-Dependent Subsistence	Sustainable Use of the Environment as Sink	Conservation of the Cultural Heritage and Diversity
	Fair Access to Environmental Resources	Avoidance of Unacceptable Technical Risks	Conservation of the Cultural Function of Nature
	Compensation of Extreme Differences of Income and Wealth	Sustainable Development of Human, Scientific and Material Resources	Conservation of Social Resources

Directly addressed by the MED-CSP scenario
Indirectly addressed by the MED-CSP scenario
Requires additional political and social measures

Table 6-2: Goals and minimum requirements (rules) of sustainability according to /HGF 2001/.

Table 6-2 shows that the sustainability goals “Security of Human Subsistence” and “Conservation of the Social Productivity Potential” and the corresponding minimum requirements are directly addressed by the MED-CSP scenario /HGF 2001/. The achievement of those goals requires political decisions that aim into the right direction and additional political and social measures to keep the window open for new “Options for Development”.

The Middle East & North Africa Renewable Energy Conference MENAREC 1 in Sana’a, Yemen in April 2004 and the International Conference for Renewable Energies in Bonn, Germany in June 2004 are creating a considerable momentum in this direction, documented by the International Action Programme presented at the conference “renewables 2004” in Bonn.

This must now culminate in concrete actions to be taken in the EU-MENA countries to start renewable energy projects and to include renewable energies in infrastructure planning and expansion.

The Cost of Introducing Renewable Energies

The calculation of the cumulated initial cost leads to a total amount of 75 billion $ needed to bring the renewable energy mix to cost break-even with fossil fuels before the year 2020 (Figure 6-11). From that point until 2050, the analysed region will save 250 billion $ with respect to a business as usual policy scenario. It must be noted that the reference case of a fossil fuel based policy scenario departs from the assumption that fuel prices start at 25 $/bbl for oil and 49 $/ton for coal and escalate by only 1 %/y, which from today's point of view seems to be rather conservative (present fuel prices are at a level of 55 $/bbl and 65 $/ton, respectively, and escalation rates amounted to 40 %/y since 2003).

It is a legitimate question to ask who should afford the initial investments of 75 billon $ required to bring renewables into the market within the 15 years time span needed to reach cost break-even with fuels. In principle, the electricity consumers are those who benefit directly from this strategy. If the initial investment would be equally distributed among all electricity consumers in the region, each of them would have to afford additionally 10 $/y for electricity payments for a period of 15 years in order to finance the total market introduction of renewables. After those 15 years, all consumers will benefit from stable and low electricity costs, avoiding to be exposed to volatile and rather high electricity costs in the case of a business as usual policy. Alternative strategies for finance are given in Chapter 8.

The cost and savings of introducing renewable energies in EU-MENA varies with the parameters assumed in the scenario (Figure 6-12). However, any set of parameters leads sooner or later to a break-even of the renewable energy mix and the fossil fuel system. Even if carbon dioxide would not be an important environmental issue, renewable will result as the cheaper alternative in the medium term future. Energy (and water) cost stability can therefore only be achieved through the massive introduction of renewable energies in the power sector.

The required amount of 75 billion $ during the introduction phase is comparable to the amount of investments needed (and actually spent by the OECD) to develop and build the first commercial nuclear fusion reactor expected for the year 2050. If a first commercial fusion plant is realised by 2050, it will not have avoided any CO_2 by that time, while the renewable energy mix will have avoided 28 billion tons of CO_2 and in addition to that, will have relieved the EU-MENA economies by expenses of about 250 billion $ otherwise required for fossil energies (without accounting for external costs). According to the developers of fusion, the electricity cost of a first commercial reactor would be in the range of 10-12 cent/kWh. This will probably be competitive with fossil fuel plants by 2050, but it is about twice as much as required for the average cost of the renewable energy mix by that time. Therefore, a wise and responsible energy policy must support renewable energies as well.

It is the responsibility of national governments and international policy to organise a fair financing scheme for renewable energies in the EU-MENA region in order to avoid the obvious risks of present energy policies and change to a sustainable path for wealth, development, and energy and water security.

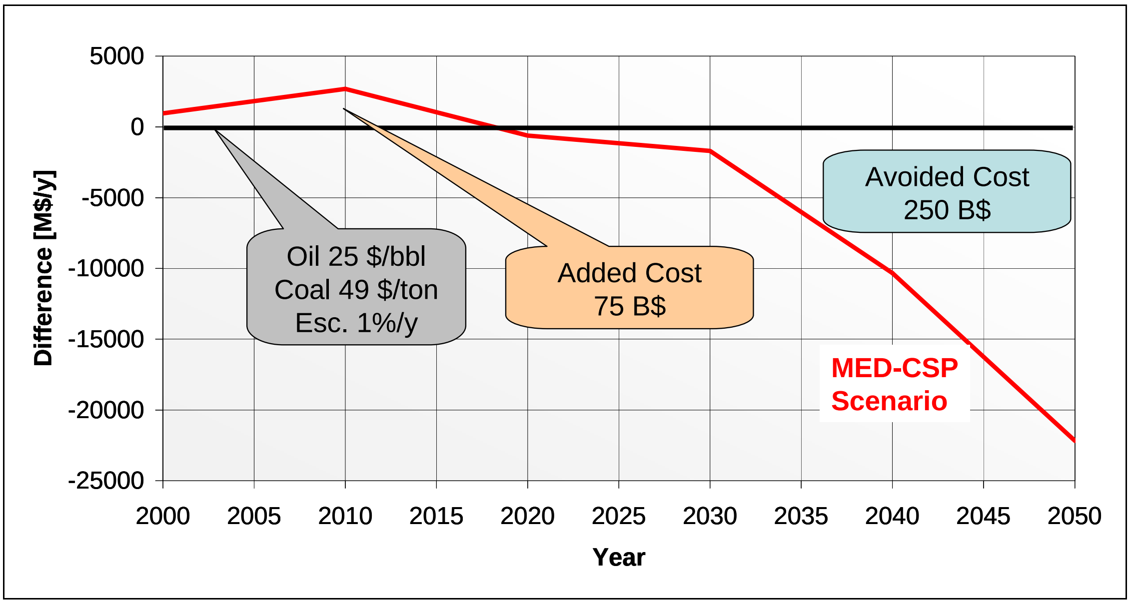


Figure 6-11: Total annual difference of electricity expenses between the MED-CSP scenario and a business as usual policy scenario based primarily on fossil fuels, summarised for all countries analysed in the study. Positive values = initial additional cost, negative values = avoided cost with respect to a business as usual policy. The cumulated initial cost amounts to 75 billion $, while 250 billion $ are avoided until 2050. The added and avoided costs vary with different assumptions made for fuel prices, escalation rates, CO_2-policy, etc. which are described in the main report. However, the break-even of renewable energies and fuels is achieved sooner or later under all variants.

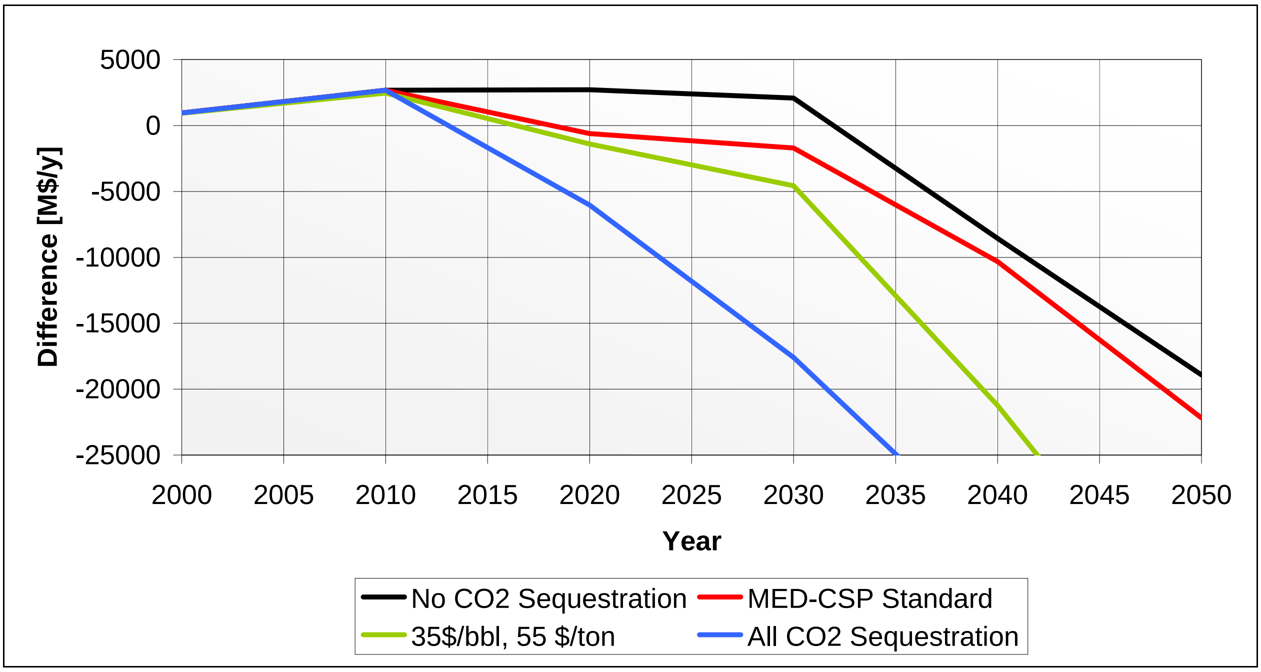


Figure 6-12: Calculation like in Figure 6-11, but varying the parameters of the scenario. "No CO2 Sequestration" is calculated as if CO_2 would not lead to any external costs in no country. "MED-CSP Standard" is calculated with CO_2 sequestration in Europe, initial oil price of 25 $/bbl and initial coal price of 49 $/ton, escalating with 1 %/y. The scenario "35 $/bbl, 55 $/ton" is calculated with those prices, sequestration only in EU and the scenario "All Sequestration" assumes that all countries have to introduce CO2 sequestration, while prices remain like in the standard scenario.