

**Natural Resources**

## **Transforming the Problems into Opportunities in Energy Sector**

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For energy experts the oil sources in the world except from Middle East and Khazar zone will be exhausted in the next 15 years. In this situation being dependent to outside by oil means that political, economical and ecological problems which focuses on energy'll be the determinative component for world's future.

Most of the countries are looking out new ways for renewable energy sources like solar, geothermal, hydrogen, heave, biodiesel, wind energy. Between these alternatives wind energy and biodiesel are the most promising ones. The process of the energy problems and transforming them into oppotunities is valid for Turkey too.

The aim of the study is to show the the problems due to the heavy usage of fossil fuel, and try to find out how these problems can be transformed into oppurtunities while using renewable energy sources general for world in special for Turkey.

## **Introduction**

The evolution of the society has been mostly depended on quality of the energy sources which they used or enlarged .Energy sources 'll also be forcefull for the societies future . In addition to the several economic indicators, the ratio of per capita energy use has been used for several decades as a socioeconomic development indicator.

While the energy demand is continuesly increasing it is known that the sources can't not be found indefinitely. Scantiness of energy supply causes serious fearness . Both developed and developing countries need energy sources with differant reasons. USA is the biggest global economic power and needs more energy sources to remain being a world leader. But USA couldn't developed new renewable energy sources and this caused to them being dependent to outside especially to Middle East at a high level like %60. Chiana and Indian are the golden stars of future and with their huge population and fastly growing economies they'll bebetween the biggest demanders for energy. Beside USA, the dependence to oil of Chiana's and Indian's are giving the signals that world is going to have serious energy problems.

Nevertheless, there is great potantials transforming the problems into opportunities. At this point renewable energy sources are very important occasion for especially development of rural areas. Biodiesel or wind energy has potential to be a catalyzer to the development of rural.

Most of the countries are making plans about to subsitute their ten percent of electric necessity by wind energy. Additionally they are looking out new ways for renewable energy sources like solar, geothermal, hydrogen, heave, biodiesel. Between these alternatives wind energy and biodiesel are the most promising ones. For this reason, countries encourages programs and provide inducements to improve wind energy and biodiesel technology.

The process of the energy problems and transforming them into oppotunities is valid for Turkey too. Dependence for energy to outside is an important issue, although Turkey is too late for beginning to research the renewable energy sources she has more advantages than most other countries. Turkey has great potential for wind and heave energy and has got wide agricultural areas and appropriate climate for farming kanola, sunflower, cotton exc. which are the raw materials for producing biodiesel.

## **The Problems in Energy Sector Economic Dimension of Energy Problems**

The relationship between energy consumption and income has been a popular issue of debate in economic development and the environment, yet a consensus has been lacking regarding the permanent as well as transitional relationship.

To date, the causality may run in either direction<sup>1</sup>. The results of a unidirectional long-run causal relationship and a uni-directional short-run causal relationship running from energy to GDP show that energy consumption leads economic growth. This implies that energy consumption bears the burden of the short-run adjustments to reestablish the long-run

<sup>1</sup> For example, if there exists causality running from energy consumption to income, then this denotes an energy-dependent economy such that energy is an impetus for income, implying that a shortage of energy may negatively affect income (Masih and Masih, 1998). On the other hand, if there is a reverse chain of causality from income to energy, then this denotes a less energy-dependent economy such that energy conservation policies may be implemented with little adverse or no effects on income (Jumbe, 2004). Finally, the finding of no causality in either direction, the so-called neutrality hypothesis (Yu and Choi, 1985), means that energy conservation policies do not affect income

equilibrium. In other words, high energy consumption tends to have high economic growth, but not the reverse. But it is also known that the oil sources in the world except from Middle East and Khazar zone will be exhausted in the next 15 years (Yetkin, 2006). Knowing this truth urge countries energy conservation but energy conservation may harm economic growth in developing countries regardless of it being transitory or permanent. (Lee, 2005).

Another problem is the unstable oil prices. Oil prices have been more volatile than prices of most other commodities since the oil crisis in 1973 (Fleming and Ostdiek, 1999; Verleger, 1993). This assumption has been used to justify price and allocation controls and energy efficiency subsidies and recently has been the basis for recommendations for national energy policy to diversify energy sources away from oil (Awerbuch, 2003; Humphreys and McClain, 1998; Lovins et al., 2004, Regnier, 2005).

Because of the scarcity and the rising prices it is guessing that production of the fossil fuel'll drop very low levels at the end of 21 century. But it is forecasting that world have enough reserves for natural gas more than 200 years and for coal 3000 years (.Ministry of Environmental, 1997). Nevertheless coal's contribution to air pollution is so high that coal is seen like "the creator of the problems of environmental". At this context there is essential economic causes for the process of transforming from fossil fuels to non-fossil energy sources but during this process there is also possible costs. Of course developed countries has more chance to compensate these costs than developing countries. But the bigger problem is the deficiency of willpower of the global economy countries like USA than the transformation cost problem. There are two reflections of transforming from fossil fuels to non-fossil energy sources, which we call transformation problem, at the developing countries the problem can be seen like transforming costs but at the developed countries it can be seen like deficiency of willpower.

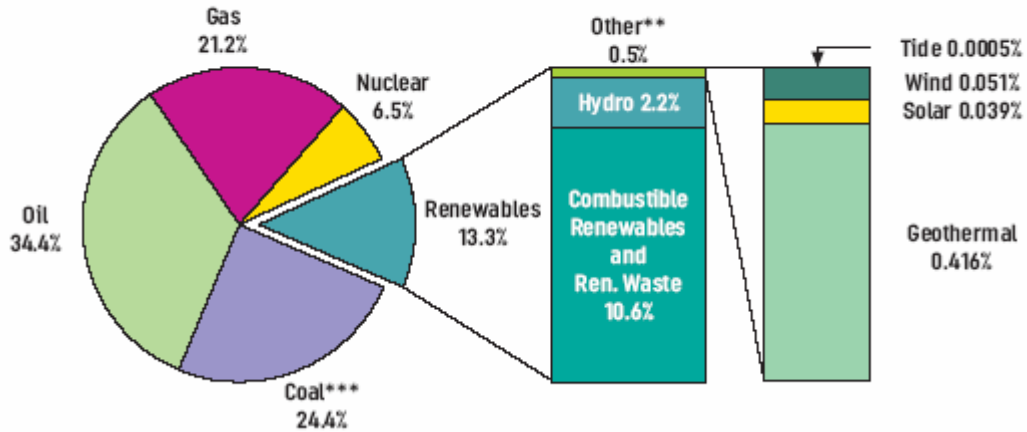
While developing countries like China, Indian, Brazil, Mexico, Turkey are using their economic sources they firstly have to think about the output maximization and cost minimization environmental worries comes later. For these countries the problem is to get a bigger slice from the global pie so they have to minimize the costs to have competitive prices an extra cost like energy transforming investments removes them from target prices.

When we look from developed countries perspective economic cost of energy is in a different structure. USA's "dependence of import fossil oil" was %30 at 1973 when there was a global fossil oil crisis but this ratio increased and at 2005 to %60, also the prices fossil oil per barrel nowadays climbed to 70\$ from 18\$ before 11 September 2000 (Yetkin, 2006). For Europe same progress can be investigated "dependence of import fossil oil" for Europe is %50 but it is forecasting to be %70 in next 20-30 years.

The solution can be found at renewable energies. Renewable energies are essential contributors to the energy supply portfolio as they contribute to world energy supply reducing dependency of fossil fuel resources'll reduce and greenhouse gases mitigating opportunities will be provided.

The pie chart below represents the main fuels in the world total primary energy supply, with a disaggregation of the share of the main renewables categories. In 2003, renewables accounted for 13.3% of the 10 579 Mtoe of World Total Primary Energy Supply (TPES). Combustible renewables and waste (97% of which is biomass, both commercial and non-commercial) represented almost 80% of total renewables followed by hydro 16.2%.

2003 Fuel Shares of World Total Primary Energy Supply\*



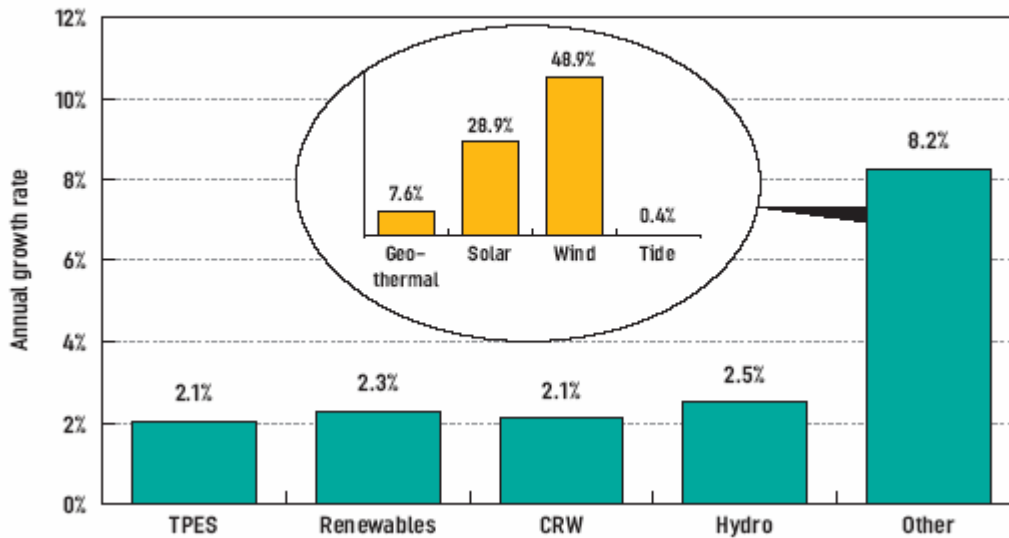
\* TPES is calculated using the IEA conventions (physical energy content methodology). It includes international marine bunkers and excludes electricity/heat trade. The figures include both commercial and non-commercial energy.

\*\* Geothermal, solar, wind, tide/wave/ocean.

\*\*\* Includes non-renewable waste.

Source: IEA, *Renewables In Global Energy Supply 2006*, [www.iea.org](http://www.iea.org)

Annual Growth of Renewables Supply from 1971 to 2003



Source: IEA, *Renewables In Global Energy Supply 2006*, [www.iea.org](http://www.iea.org)

Total renewables supply experienced an annual growth of 2.3% over the last 33 years, marginally higher than the annual growth in TPES. However, the “other” category in the chart above (also referred to as “new” renewables and including geothermal, solar, wind, etc.) recorded a much higher annual growth of 8%. Due to a very low base in 1971 and to recent fast growing development, wind experienced the highest increase (+49% p.a.) followed by solar (+29% p.a.)<sup>2</sup>.

Looking at Turkey’s energy sector same problems can be seen. *Turkey’s energy production is 23,63 Mtoe, net imports is 56,57 Mtoe TPES is made up of indigenous*

production + imports - exports - international marine bunkers  $\pm$  stock changes) is 78,95 Mtoe (Key World Energy Statistics, 2005). This data shows that Turkey gets %72 of its energy needs from outside and it is claiming that if there will be no guard this dependency will rise to %82 in 2020. %95 of imports are fossil oil from Middle East and nature gas from Russia and Iran. This dependency makes fragility on Turkey's economy because of the changing prices and difficulties in procurement. Indeed energy imports is the main reason of the current deficit, which is the biggest problem of Turkish economy. For example, the share of energy import in payments for total Turkish import is around 15–20%, 25–30% in industry sector and 75–80% in the mining sector (UTFT, 2004).

Ministry of Environmental has announced a target for wind energy of %2 of total installed capacity by 2005. There are no other national renewables targets, although greater Ankara Municipality has a local target of providing 10% of its energy needs from renewables (mainly solar heat, PV and wind generated electricity) by 2005. However many developed countries like USA encourage investments for renewable energy such as wind power, solar energy and biomass energy. State support policies are generally based on various incentive tools concerning production of solar heat collectors, wind turbines and energy crops. The EU and many developed countries' state support policies are generally focused on some fiscal and tax regulations for investments, renewable energy domestic consumption prices, new Technologies for obtaining energy from renewable sources and research-development studies (Durak and Caldag, 2003; Reiche and Bechberger, 2004; Upreti and Horst, 2004; Kwant, 2003; Sayın et al, 2005).

### **Ecological Dimension of Energy Problem**

Through the historical aspect, the 20th century was the century of fossil fuels. Especially, at the very beginning of the 20th century, coal, as an important kind of fossil oil, took its place by petroleum with the rapid increase of the automobiles. The excessive consume of fossil (qualified) coal and petroleum introduced significant environmental problems.

Towards the end of the 20th century, the pollution in the cities, the effect of the greenhouses and the global climate changes resulted in new researches. In this case, towards the end of the century, natural gas replaced coal. (Brown, 2003:100) As soon as the global dimensioned environmental problems started threatening the civilization created by the mankind, new researches were inclined to the understanding came out as a new expression of the balance among the economy, society and the environment (Keleş, Hamamcı, 2002:65). Though the concept of the progressive development came into sight before the quarter century, the totalitarian strategies in global dimensions, unfortunately, have not been made real. So as to keep the development progressive, is firstly about the capacity of the renewal of the natural resources. The progressive development is stopped up about the energy. Due to the fact that the fossil (qualified) energy sources will be used up in the near future; however, there is no way to provide the recycling about the alternative energy sources that might possibly be substituted and the expense of this recycling process are the most significant handicaps of the progressive development.

As a significant step on the progressive development, the necessity of recycling of energy was firstly introduced in 1990s. The global environment problems rooted from the fossil fuel sources have given a speed for the enterprises to provide recycling in energy. After the United Nations Environment and Development seminar firstly held in 1992 in Rio de Janeiro, in Brazil, the issue of the precautions to prevent global warming have become an important matter. Moreover, to the Kyoto Agreement signed in 1997, the global target has

been determined to diminish the emission values of carbon, from 2008 to 2012. The target ratio is %5.2 according to 1990. Nevertheless, it seems impossible to reach that the EU (European Union) would not be able to diminish the %8 emission decrease. It is likely to happen the same for the increase over %5.3 in the period assigned. Till now, all over the world, according to 1990, while the emission is %9, this ratio is 18 percent in USA (Özdemir, 2003). As it is seen contrary to the expectations, an increase is observed instead of decrease in the emissions.

Due to the limited energy sources with fossil quality and the global environment problems they caused, the renewable energy sources are paid too much attention with a gradually increasing manner and they are considered as important sources in responding the energy necessity. With this respect, too many countries are planning to meet %10 of their requirement for electric energy from renewable energy sources in 2010.

Among renewable energy sources like wind, solar, geothermal, biomass and wave, the most encouraging renewable source from the point of view electric production is the wind energy. The wind as a clean and nonproblematic energy source has existed an important agenda as a more reasonable choice day by day. On the positive side, no direct atmospheric emissions are released during the operation of wind turbines. The emissions during the production, transport and decommissioning of a wind turbine depend mainly on the type of primary energy used to produce the steel, copper, aluminium, plastics, etc. used to construct the turbine. The energy payback time is comparatively short – usually only three to six months. Electricity from wind turbines has very low external or social costs.

Some negative impacts also need to be addressed. Acoustic emissions from wind turbines have both a mechanical and an aero-acoustic component, both of which are a function of wind speed. Reducing noise originating from mechanical components is a straightforward engineering exercise, whereas reducing aeroacoustic noise is a rather difficult process of trial-and-error. In modern wind turbines, mechanical noise rarely causes problems. The acoustic-source noise from wind turbines needs attention because it is one of the main obstacles to siting wind turbines close to inhabited areas. The turbines' visual impact also limits social acceptance. Wind turbines may disturb the habits of birds and other animals, mainly in coastal breeding and resting sites close to migration routes (OECD, 2003).

However, wind is sensitive to variations in terrain topography and weather patterns, and variation may occur from year to year, or season to season, and even during the same day. Hence, some regions are more suitable for the utilization of wind energy. The highest potential for exploitation is in North America, Ukraine, Australia, Denmark, the Netherlands, the north of Gibraltar, Southern France, the United Kingdom, Ireland, Scotland, Greece, Spain and Turkey (Borhan, 1998; Ackermann and Söder, 2000).

In 2003, Germany has become a leader assembling a power station of 14.646 MW overcoming Spain with 6.207 MW up to that date. And Denmark which is the world's most important country in producing turbine, has become the third with 3.24 MW after Germany and Spain. However, Turkey owns an electric energy with totally 20 MW. It is useful to draw attention to the vast usage of this clean energy source in a developed country like Germany. In Europe, not any commercial wind power has existed until recently. The wind power is competing with fossil and nuclear power beginning from now even without taking into consideration the environmental produced from the wind meets %2 of the requirement in Europe. When the whole world is considered, this proportion is only %0.4 (Özdemir, 2003). When it is specified, especially in Europe, the renewable energy sources especially wind energy is commonly accepted and this approach has become prior: In energy policy, convincing the capital group and giving a pioneer role to the interference of the capital group in developed projects. While this period works out successfully in Europe, it is impossible to

say the same thing for USA process on this subject show that USA will have difficulty and it hasn't got a real transformation strategy. The plan "Twenty Years Of America's Energy Economy" published in May,2001 was a great disappointment. The plan resembled the report prepared in the 20th century, not in the 21st century and it is focused to increased the production of fossil fuels. The report also disregarded the wind power potential which will exist a more important part than coal in the USA energy capacity in twenty years. In the world coal consumption, even China's usage of coal, the rival of America has decreased %14 in 1996. It is surprising that this problem has been neglected by those who have prepared the plans.(Brown,2003-99) Yet this table is highly remarkable at showing the rank of USA in providing energy transformation. As it is seen what comes up in today's world, especially the things happening in USA are really at an alarming level because of the changes in climate that have come up after the global warning. In spite of waste of time, some studies have been taken in Turkey too about getting into the renewable energy by giving up those kinds of fossil fuels. Air pollution especially in big cities has been partly reduced by preferring to use gas instead of using coal. Yet it caused us to be more dependent on the other countries to meet the need of energy.

### **International Dimension of Energy Problem**

USA consumes %25 of the total world production of fossil fuel by alone also Europe and Eurasias consumption share is %25 from total production(BP Statistics,2004) Americans lead the world in fossil energy use. An average American consumes about 11,000l of gasoline energy-equivalents each year (USCB, 2004). Because of this high-fossil energy use, plus the lack of adequate domestic sources, the U.S. now imports 62% of its oil. Given the population expansion, the importation of oil will have to increase. Fossil fuels are finite energy resources! Reliable projections are that oil and natural gas reserves of the world will last another 40 years (Salameh, 2005). USA coal is expected to last 50 to 100 years, depending on how fast it is substituted for oil and gas. If there is high dependence ratios for the essential input like energy at developed countries it is not difficult to guess that there will be a great risk for the world safety in the future

Middle East and Khazar area will have a monopol power at fossil oil in future in the first instance USA and Europe following the other countries are going to be dependent to the despotic regimes of Middle East. Lack at the transforming to renewable energy sources will cause to lack of the success for both USA and Europe who tries to export democracy to Middle East with the extent of Great Middle East Project have felt that USA's Great Middle East Project bears such a hidden agenda and they will confront and hamper at commercial and politic relations with USA and EU also they have already started trying to gain China's support. This process will bring along the appearance of a vicious cycle. While on the one hand USA and the continental Europe are increasingly become dependent on the Middle East as far as Oil exports are concerned, USA on the other hand, will not hesitate to directly interfere with the region in order to have a smooth, problem free access to the region's energy resources. In the context of this interference, USA herself will permanently settle in the region, and this will give rise to doubt among the despotic regimes, as well as causing the radical elements become harsher and tougher. These developments will bring about a management problem as far as the energy resources of the area are concerned and cause oil prices to increase even more rapidly.

## **Transforming the Problems into Opportunities Moving Towards Renewable Energy Sources for Economic Development**

Moving from fossil oil to renewable energy sources improves the geopolitical energy security. In reality, if geopolitical risks are reduced, this should reduce price volatility of that fuel, (Blyth, Lefèvre, 2004) so that national economies will be more stable. Obeying with the rules of Kyoto Agreement the gas emission will be reduced and the world will be more livable. With the result of reducing the dependence of Middle East's fossil oil the world confusion about Middle East can be disappeared.

More livable world means less healthy problems so that high performance for labor force. On the other hand there will be new and more sectors for employment and high profits.

EU already made plans about the renewable energy sources. EU Sustainable Energy Systems Research Programme aims to: reduce pollution and greenhouse gas emissions; increase security of energy supply; improve energy efficiency and the use of renewable energy; enhance the competitiveness of European industry; improve the quality of life. (Justus, Philibert, 2005); till 2015 rise the consumption level %15 at renewable energy sources and %8 at biodiesel, till 2020 rising the energy saving level %20. EU Commission have a high opinion of R&D about renewable energy for example it is claiming that an invention about the hydrogen energy will be a reevaluation (Kaleağası, 2006).

### **Moving Towards Renewable Energy Sources for Development of Rural**

Moving from fossil oil to renewable energy sources can be used for the development at rural areas. At this content primarily inducements have to be given to the farmers to use wind energy. Revenue from wind energy keeps in the community so that it promotes local revenue, employment and tax revenue. For the farmers to investigate the wind energy is like gushing out fossil oil from the earth. The most attractive speciality of wind energy is tribunes are not a barrier to use the land for farming and stock-breeding. (Brown, 2003:108). So that beside the gains from farming and stock-breeding farmer can earn a special revenue from tribune of wind and public of the region gets more electric energy. By this meaning wind energy sector is a great hope for the development of rural especially in the developing countries.

Production of biodiesel have a great potential for supporting rural development. Soybean, sunflower and canola are the inputs for biodiesel and giving encouragement to the farmers to produce these inputs give a new breath for the agriculture sector. Thus clean and environmental-friendly fuel production will reduce the dependence to fossil oil and promote the rural development.

### **Moving Toward Renewable Energy Sources as a Solutional Instrument of The Ecological Problems**

The civilization which is been created by human being threatens the future especially from the beginning of 20 century. Using intensive fossil energy sources causes local environmental problems but by time the problems has been seen at global size. Air pollution, greenhouse effect, acid rains in cities brings the climate alteration. For the solution of these problem obeying Kyoto Protocol at global dimension is very important because for global threat there has to be global solutions. But USA, who is the most responsible from the greenhouse effect, don't want to sign the protocol. The UNFCCC and its Kyoto Protocol provide a framework for climate change mitigation actions for a number of countries in the developed and developing world. It would be unfair to say that developing countries are not taking steps to develop climate friendly technologies. Many countries have defined such measures, although in most cases for other policy purposes - such as to reduce imports of



fossil fuels from sensitive regions or to reduce air pollution associated with the burning of coal. China, for example, has recently enacted a Renewable Energy Law. It is also part of a number of international cooperation programmes to develop other climate-friendly technologies such as CO<sub>2</sub> capture and storage. India is probably the only country in the world to have a ministry dedicated to the promotion of non-conventional energy sources. Nevertheless, the vast majority of efforts to develop modern alternatives to fossil fuels are concentrated in OECD countries (Lefevre, 2005)

### **The Energy Problems and Opportunities of Turkey**

At present, Turkey struggles to reach sufficient levels of energy supply, and depends on other countries for certain types of energy like electricity. So as to cope with the increasing demand, electricity is imported from neighboring countries to some extent by causing depletion of already strict foreign exchange reserves. Another equally important issue lies in the country's dependency: As the country is located in a politically "soft" region, therefore, importing electricity from foreign sources may substantially affect the conditions that sometimes may bring instability on the overall energy strategy (Karata, Ekmekçi, 2002).

Turkey has great potential and different combinations for renewable energy sources owing to the presence of different geographic regions. The share of energy from renewable sources in total energy production and consumption in Turkey are around 35% and 13–15%, respectively. This potential provides important advantages for Turkey, particularly in the long term. The renewable energy potential of Turkey consists of 122.3 TWh/year of hydropower, 1.8 mtoe/year of geothermal power, 50 TWh/year of wind power, 32 mtoe/year of biomass and 35.2 mtoe/year of solar energy in usable and/or economic quantities (Kaygusuz, 2003; Sayın et al, 2005).

When it is specified, Turkey has always been lucky with its potential of 'water'. But it is assumed that we are able to make good use of only %25 of this potential. It is also known that we don't take serious steps about energy disposal and productivity and are lack of working seriously on it in Turkey. Scientific researches show that there is the potential of energy disposal upto %30 in Turkey but just %15 of it which doesn't need any expenditures, can be gained with planning and by making people conscious of. Along with it, according to the official figures, the scale of leakage-lose in the electric distribution network is up to %20 (Ulutaş, 2006). Turkish state plans to build new hydro dams, the cost of which is estimated to reach to the level of USD 30 billion for the next 10 years. Although hydropower does not pollute as much as fossil fuels do, inhabitants who are within the construction field are affected substantially. Recently built Birecik dam has covered a large area, and forced inhabitants to leave their agricultural plants. Another negative impact has been observed over the historical monument named as Zeugma, so called the "Second Pompei". The dam water has covered most of the mosaic art (Karata, Ekmekçi, 2002).

Solar energy is one of the available and cheap source for Turkey. The average solar radiation is 309.6 cal/m<sup>2</sup> d and the average sunshine duration is 7.2 h/d. In particular, the southeast Anatolia and the Mediterranean regions are favorable for solar energy use. Generally, solar energy is used for heating and the consumption of solar energy has increased from 5 ktoe in 1986 to 64 ktoe in 1996 [4]. Total geothermal potential of Turkey is 35,600 MW/ year (electric and thermal) and about 4500 MW/year can be used for generating electricity (Oğulata, 2003)

For an alternative energy source nuclear energy has been discussing for a long time in Turkey by two opposite opinions. For the opinion which give support to nuclear energy the aim must be to diversify of the energy sources so that to distribute actual risk (Münir, 2006). For the opposite opinion nuclear energy is not a kind of cheap energy source, the cost of

construction a nuclear santral with the capacity of 1500 megavatt is 5-7 billion Eur .and it can't be an urgent solution for energy need because it takes 15 years the construction of a nuclear santral(Ulutaş,2006). Furthermore there is huge costs from the construction to the closure so that most of developed countries like Germany and USA are planning to closure in a soon time. (Talınlı,2006). As we all know,the responsibility of the nuclear management should be transparent and explained clearly like we do for the other responsibilities.For instance ,during the daily operations of the nuclear powerhouses,there are gases and liquid radioactive throw-outs which have to be released to the atmosphere quite often.These throw-outs which prevent the reactor operations and are highly prized if they are kept in the reactor,are constantly inspected.In Turkey,it takes the goverments quite a long time to adopt such concepts and this may lead it to the dangerous results. Additionally the dependency of energy will not decline with using nuclear energy however it will increase because Turkey has only 600 ton uranium source.

Wind energy is the fastest growing energy source in the world and wind power is one of the most widely used alternative sources of energy today. It is a clean and renewable source of electricity. At the end of the year 2001, the total installed capacity of global wind energy exceeded 24,576 MW (Global wind power statistics.,2002) Approximately, 6500 MW of new wind energy generating capacity were installed worldwide in 2001. Today, wind energy projects across Europe produce enough electricity to meet the domestic needs of five million people (Wind energy in Europe. EWEA , 2002;Oğulata,2003). Theoretically, Turkey has 160 TW h a year of wind potential, which is about twice as much as the current electricity consumption of Turkey( Wind energy in Turkey.2002,Oğulata,2003). There are very limited developed projects of the wind energy in question.When it is specified,in Turkey,we have had three powerhouses which produced wind energy since 2000.Two of them are founded in İzmir, Alaçatı.These powerhouses produce 8.8 megawatt energy whereas the other powerhouse in Bozcaada is enable to produce 10.2 megawatt energy. Turkish population is widely spread to rural areas Wind and other renewable sources are very much appropriate for those who need electricity power living in isolated communities. Instead of spending in transmission lines from on-grid electricity sources, making an investment to wind plants, supported by solar power systems will be much beneficial, as these sources do not harm the environment(Karata,Ekmekçi,2002)

## **Conclusion**

It is obvios that both developed and developing countries going to have an energy problem in the future. The problem will to occur in different dimensions like economic, international relations and ecological. The only solution is accomplishing the transition from fossil oil to non fossil oil energy sources.

Wind energy and biodiesel are the most hopeful renewable energy sources. USA and EU already began R&D in renewable energy sources, but the datas shows that the studies are not enough because for today renewable energy supply is only%13.3 of total World Primary Energy Supply. IEA has two scenario for the future; By the opinion of Reference Scenario of IEA, the share of renewables in global energy supply will remain largely unchanged at 14%. Traditional biomass currently accounts for 7% of world energy supply, but its share will fall as developing countries shift to modern forms of energy. World hydropower production will grow by 1.8% per year but its share will remain almost stable at around 2%. Other renewables (including geothermal, solar and wind) will increase most rapidly at 6.2% per year but because they start from a very low base (0.5% share in 2003) they will still be the smallest component of renewable energy in 2030 with a share of only 1.7% of global energy demand (WEO 2005).

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The largest increases in renewables will take place in OECD Europe, driven by strong government policies. Since over a quarter of new power-generating capacity will be based on renewable energy, the cost of development is expected to be \$1.6 trillion (in year-2000 dollars), nearly 40% of power generation investment to 2030. The share of biofuels in global road transportation was 0.6% in 2003. This share is expected to grow to 1.4% by 2030. (WEO 2005)

In the Alternative Scenario, hydroelectric generation in 2030 is 15%, slightly higher than the 13% projected in the Reference Scenario. The share of nonhydro renewables increase much more, from an aggregate 6% in 2030 in the Reference Scenario to 9% in the Alternative Scenario. The biggest increase takes place in OECD Europe, driven by the European Union's strong support for renewables. Electricity generation using non-hydro renewables is almost ten times higher in 2030 in the Alternative Scenario than in 2003, and more than a third higher than in the Reference Scenario (WEO 2005)

Turkey is a developing country and its known that there is a relation from GNP growth to enery and so Turkey's need for energy'll increase in the future. Turkey has great potential and different combinations for renewable energy sources owing to the presence of different geographic regions Government has to give essential importance to the subject and has to promote at the base of institute and individual.

The Scenarios shows that energy of the future is not hopeful every country has to take the guard to get out of the depence of despotic regimes, to have a livable and safe world.

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