

ENERGY AND COAL POLICIES OF EUROPEAN UNION WITH SPECIAL REFERENCES TO THE UNITED KINGDOM AND TURKEY

Türkiye ve İngiltere Açısından Avrupa Birliği Enerji ve
Kömür Politikaları

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ABSTRACT

Turkey, as a candidate country of the EU (European Union), is in a period of social and economic adaptation. The UK, on the other hand, is a full member of the EU. In this research, the main energy and coal policies of the EU are analysed to highlight the future projection of Turkey's and the UK's energy and coal policy in the new century. It is expected that in the foreseeable future coal will be one of the most important energy resources of the world. Therefore, the present state of the coal industry of Turkey and the UK is summarised and comments are made on the future energy policies of these countries with regard to the EU's approaches.

ÖZET

Türkiye AB'ne (Avrupa Birliği) aday bir ülke olarak, sosyal ve ekonomik anlamda bir uyum süreci içindedir. İngiltere ise birliğin tam üyesi bulunmaktadır. Bu araştırmada, Avrupa Birliği'yle değişik ilişki düzeyi olan Türkiye ile İngiltere'nin ve Avrupa Birliği'nin bu yüzyıl içerisindeki enerji politikalarını belirleyerek ve özellikle kömürle ilgili temel kriterler ele alınmıştır. Kömürün tahmin edilebilir bir gelecekte dünyanın en önemli enerji kaynaklarından biri olmayı sürdürmesi beklenmektedir. Bu nedenle, Türkiye ve İngiltere'nin kömür endüstrisi ile ilgili mevcut yapısı incelenmiş ve bu ülkelerin gelecekteki enerji politikaları açısından, AB yaklaşımları göz önüne alınarak yorumlar yapılmıştır.

Key Words: Coal, Energy, Coal Policy, Energy Policy, European Union

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1.INTRODUCTION

The EU (European Union) was founded in 1952 as the agreement of European Coal and Steel Union. Since its conception EU energy policies have been built gradually, parallel to the need and benefits of the union's member states. In this century the EU is set to become a major economic power due to the growth of the economies of member countries, the recent launching of the Euro currency and the likelihood of increased membership. In fact, many EU members have profited from being members of the union, including Ireland and Greece.

The EU has been setting many policies, regulations and standards as well as energy policies during its progress. The EU's energy policies are based on the equal and common benefits of the member countries, highlighting the use of cheaper and environmentally safer resources. The policies also encourage the efficient use, delivery and saving on energy applications together with the research activities on new and renewable energy resources.

There are currently three main coal producers within the EU; the United Kingdom, Germany and Spain. Over the past few years, however, most of the EU countries have increasingly preferred imported coal rather than producing it from their own reserves, due to the higher cost of production and environmental problems of mining activities. The trend has been similar in Turkey, with increasing imports of coal and natural gas for domestic and industrial use, although the national income of the country is far much less than the EU countries.

The quality of Turkish lignites is mostly not considered suitable for direct domestic use (Table 1 thru 4). Therefore, efficient coal preparation techniques are needed to reduce higher ash, sulphur and humidity content, thereby increasing the calorific value of Turkish lignites. However, large coal reserves of Turkey are available to be used in power plants for electricity production should the need arise in the future.

Table 1. Ash Content of Turkish Lignites (TMMOB, 1994)

Ash Content Interval (%)	Ratio in Total Reserve (%)
10-15	1.54
15-20	2.19
20-25	52.37
25-30	19.03
> 30	24.87

Table 2. Total Sulphur Content of Turkish Lignites (TMMOB, 1994)

Sulphur Content Interval (%)	Ratio in Total Reserve (%)
0-1	3.70
1-2	68.29
2-3	14.11
3-4	5.86
> 4	8.04

Table 3. Moisture Content of Turkish Lignites (TMMOB, 1994)

Moisture Content Interval (%)	Ratio in Total Reserve (%)
0-10	0.89
10-20	14.25
20-30	14.21
30-40	13.21
> 40	57.44

Table 4. Calorific Values of Turkish Lignites (TMMOB, 1994)

Calorific Value Interval (kCal/kg)	Ratio in Total Reserve (%)
0-1000	1.70
1000-1500	54.96
1500-2000	9.40
2000-2500	9.63
2500-3000	17.16
3000-3500	4.73
3500-4000	0.59
> 4000	1.83

As seen from the tables, most of the Turkish lignites are not suitable for direct heating, especially in conventional burners or stoves. Therefore, coal preparation is essential to prevent environmental pollution caused by the use of Turkish lignites.

2.FUTURE OF COAL

According to the World Energy Council's report, the life of world oil and natural gas reserves is estimated at about 40 and 60 years, respectively (WCI; 1998; ES, 1997; WEO, 2001) while coal reserves are estimated to last in excess of 200 years. This picture ensures the importance of coal in the energy policies for more centuries. Even though the use of new and renewable energy resources increases, coal is not considered to lose its place in energy and steel production.

The main advantages of coal are listed below;

- i. Prices of coal has almost been stable for the last 30 years.
- ii. Transportation of coal is easier and done mostly by shipping.
- iii. Almost 60% of the extracted coal all over the world is consumed for electricity production. Energy systems are mostly based on coal.
- iv. 1 ton of steel requires about 620 kg of coke.
- v. Coal has the longest life among the known fossil energy resources.
- vi. Apart from CO₂ emissions causing global warming, the environmental problems or waste products of coal utilization can be controlled.

3.ENERGY POLICIES OF THE EU

In 1952, the European Energy Market was founded. The principles of the market (also known as coal market) were formed by an agreement and has been applied successfully for 50 years, that will end in July, 2002. According to the market regulations, no EU member is restricted in the trade of coal. The aim is to provide a competition and this regulation has resulted in a stable and regular coal price for many years (ATO, 2002; DPT, 2001).

30% of the electricity production of EU countries is generated by coal-powered stations (DPT, 2000). However, due to the limited sources of coal, the EU foresee the necessity of using a variety of energy resources for a continuous energy supply and being independent of a specific energy resource. The EU imports about 50% of its energy needs. 78% of oil and 36% of natural gas are also imported (TÜBİTAK, 1998).

Even though the EU countries are not scarce of energy resources, importing is cheaper for some resources and production is not preferred for the time being.

As mentioned earlier, the EU prefers to vary its energy resources. The main resources considered are;

- oil
- coal
- natural gas
- nuclear
- geothermal
- solar
- wind
- down stream
- peat
- wave
- bio-mass

The main energy criteria of the EU for 2000's are (TÜBİTAK, 1998):

- i. Energy supply should be continuous.
- ii. Energy production and consumption should be environmentally friendly.
- iii. The use of new and renewable energy resources should be increased.
- iv. Energy storing is important.
- v. High technology should be used in energy production.
- vi. Clean-coal production technology is important.
- vii. Rational energy consumption (reducing energy needs for the same work) is important.
- viii. Various scenarios for "environment-economy" relations should be prepared.
- ix. Energy saving and economic use of energy should be imposed.
- x. Storage of energy resources (up to 90 days of need) is important.
- xi. Using a variety of energy resources rather than dependency on one or few resources should be preferred.

Germany is a developed and an industrialised country which consumes energy for its powerful industrial sectors such as automotive, electronics, etc. Her consumption has the

first rank within the EU members. However recently, “Gross Product–Energy Consumption Ratios” decrease as seen in Figure 1 (Tübitak, 1998).

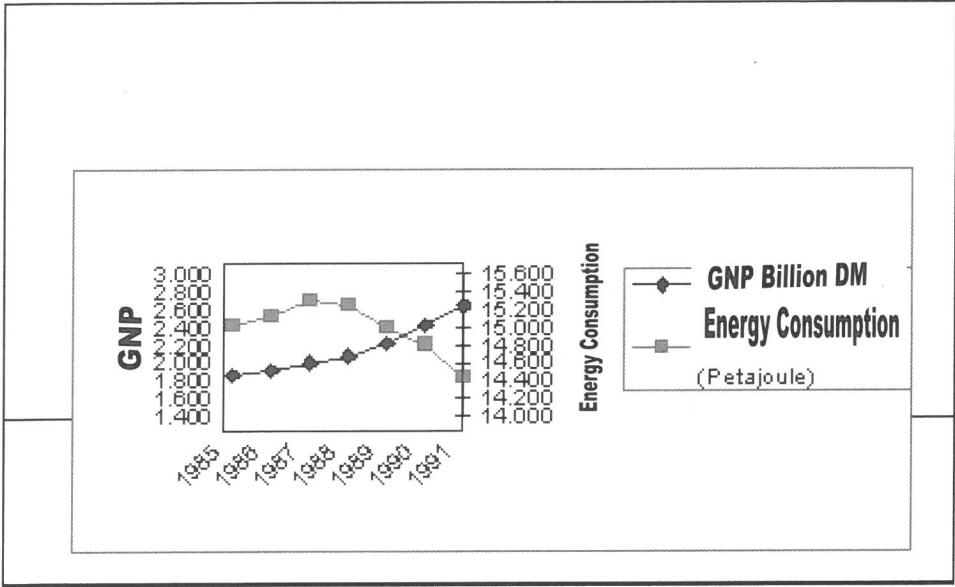


Figure 1. Gross Product-Energy Consumption Ratios for Germany (Tübitak, 1998)

Decrease in energy consumption can be explained by an effective and rational use of energy. This example shows that higher energy consumption does not necessarily mean more work or production.

Briefly, the aim of the EU is to produce less but more efficiently, environmentally friendly and more economic energy from various sources.

3.ENERGY POLICY OF TURKEY

Although Turkey has rich energy resources, she is an energy dependent country ($\approx 70\%$). The main imported item is oil; however, the import rates of heating coal and natural gas has also been increasing recently (Table 5)

Table 5. The Imports of Coal and Natural Gas of Turkey (DPT, 2000)

Year	Oil (Barrel/day)	Coal (10^6 ston)	Natural Gas (10^9 ft ³)
1998	550,000	10.9	350

Turkey has large lignite reserves of low quality, therefore, increasing imports of coal are mainly for domestic use (due to the public awareness of air pollution) and for the steel industry. Coal reserves of Turkey are given in Table 6.

Table 6. Coal Reserves of Turkey (DPT, 2000)

Coal Type	Reserve (1000 t)	Production (1000 t)
Hard Coal	1,126,548.0	2,513.0
Lignite	8,260,000.0	65,200.0

These reserves are greater than those possessed by many EU countries. In other words, Turkey has the fourth largest hard coal reserves after Germany, Hungary and Czech Republic and has the second largest lignite reserves after Germany. Turkey's reserves of coal are also expected to rise with an increase in exploration activities, mainly carried out by the "State Mineral Exploration Institute" (MTA, 1993).

The proposed energy and coal policies of Turkey, parallel to the EU policies, are;

- i. Energy needs for short, medium and long term should be determined according to the rise in population and growth in industrialization.
- ii. As energy consumption increases, waste of energy and losses in distribution etc. must be minimised.
- iii. Energy production and consumption should be modernised so that unit costs can be minimised.

Coal processing should be encouraged to provide clean and high quality coal. This will decrease air pollution faced in most cities and reduce the need for imported coal and natural gas. This will, of course, result in a relief on the national economy.

Environmental aspect of coal mining and other energy consumption should be rehabilitated. Increasing energy need of Turkey should be maintained by using renewable resources as well as increasing coal production. Hydropower energy capacities should be fully utilised. Coal processing should be preferred to importing. Coal reserve exploration activities should be increased. 42% of lignite reserves are deposited in Elbistan and the 3rd unit of the power plant should be completed as soon as possible. New energy technologies such as nuclear, bio-mass, etc., and renewable energy resources such as wind, solar, geothermal, etc. should be evaluated.

5.ENERGY POLICY OF THE UK

Although this paper is mainly concerned with how coal plays its part in UK energy policy, the UK governments policy is to ensure, secure, and diverse sustainable supplies of energy at competitive prices. This means that the UK is seeking to use a wide range of energy sources ranging from fossil fuels to renewables and there are many UK government initiatives to achieve this aim.

There is a very large and growing world market for cleaner coal technologies, particularly for electricity generation. International Energy Agency forecasts have indicated that some 38% of the world's electricity will still be generated from coal by 2020 (IEA World Energy Outlook, November 1998). More efficient and environmental friendly cleaner coal technologies have therefore a major role to play in sustainable development worldwide.

The central theme of UK energy policy specifically related to coal is the Cleaner Coal Technology Programme which aims to maintain strong support for coal related research and development, and to make financial contribution in partnership with UK industry and other funding agencies.

UK government policy is to encourage the development of cleaner coal technologies for application both at home and in overseas markets. The UK signed up to the Kyoto Protocol, to reducing carbon dioxide emissions, and cleaner coal technologies are perceived to have an important role to play in reducing the global environmental impact of coal use in both power generation and industrial applications.

Carbon emissions per kWh generated already range from around 230 grams per kWh (gC/kWh) for typical sub-critical coal-fired plant to less than 200 gC/kWh for the best available supercritical plant with an efficiency of 45%. Levels are set to fall by as much again with cleaner coal technologies currently under development, and the UK can play a significant part in protecting the global environment by transferring these technologies to developing countries that are major users of coal.

The Foresight programme was first announced in the UK Government's 1993 White Paper, *Realising Our Potential* (UK, 1993). Its aim is to create a sustainable competitive advantage and enhance quality of life in the UK by bringing together business, the science base and Government to identify and respond to emerging opportunities in markets and technologies.

At the present time there is a surplus of existing coal-fired capacity in the UK that uses moderately-efficient 500MW generating units. The potential for future, new, full-scale plant will depend mainly on the competitiveness and reliability of the new technologies, on an increase in electricity demand and on the retirement of other - not necessarily coal-fired - generating plant. At present, the cleaner coal technologies cannot compete in economic terms with existing conventional pulverised fuel technology. Furthermore, none of the cleaner coal technologies is likely to be able to compete on environmental grounds with gas combined cycle plant because of the nature of the fuel chemistries involved.

In October 1998, the UK Government published a White Paper *Conclusions of the Review of Energy Sources for Power Generation and Government Response to the Fourth and Fifth Reports of the Trade and Industry Committee* (UK, 1998). This emphasised the importance of both ensuring the security and of maintaining an acceptable level of diversity of energy supply. During the Government's review of energy sources for power generation, it was suggested that the extraction of coal bed methane and the development of underground gasification technologies should also be considered as energy supply diversification options. Both would allow the UK to make use of inaccessible resources.

6.CONCLUSION

- 1.Coal will hold its importance in the new century. Therefore, Turkey should re-evaluate its coal reserves and increase production using higher technology for reduced production costs.
- 2.Coal preparation is crucial for the lignites and legal regulations or encouragements are needed to impose it.

- 3.Regarding the lignite quality of Turkey, convenient burning technologies should be used both in electricity production and house heating systems to decrease air pollution.
- 4.Energy and coal policies of Turkey should be kept parallel to the EU standards as long as the national benefits fit.
- 5.Air pollution resulted from the use of coal can be overcome by increasing the quality of coal by preparation processes as well as taking measures on better district-heating planning, increasing house insulation quality, updating the burning systems used and improving the operator's quality.
- 6.The UK's main energy policy is to ensure, secure, and diverse sustainable supplies of energy at competitive prices. This means that the UK is seeking to use a wide range of energy sources ranging from fossil fuels to renewables and there are many UK government initiatives to achieve this aim.
- 7.UK government policy is also to encourage the development of cleaner coal technologies to reduce carbon dioxide emissions which will have an important role in reducing the global environmental impact of coal use.

7.REFERENCES

- ATO, Adana Commerce Chamber , 2002.** "EU Energy Policy", ATO Report <http://www.adana-to.org.tr>.
- DPT (State Planning Foundation), 2000.,** "8th Five Years Development Period", Mining Commission Report, Ankara, <http://www.dpt.gov.tr/yeni/giris.asp>.
- DPT (State Planning Foundation), 2001.,** "8th Five Years Development Period", Mining Commission Energy Raw Material Sub-Commission Coal Group Report, Ankara, [http:// plan8.dpt.gov.tr/genelge](http://plan8.dpt.gov.tr/genelge).
- ES, Energy Statistics, 1997.** "7th Energy Congress", World Energy Council Turkish National Committee Report, <http://www.wec.ankara.edu.tr/wec/wec/english.html>
- IEA World Energy Outlook, 1998,** <http://www.iea.org/pubs/studies/files/weo/weo.htm>
- MTA, 1993.** Mineral Exploration Institute Report.
- TÜBİTAK** (Institute of Turkish Scientific and Technical Research), 1998, *Enerji Teknolojileri Politikası Çalışma Grubu Raporu Yönetici Özeti.*
- TMMOB Maden Mühendisleri Odası, 1994.** 2000'li Yıllara Doğru Linyit Sektörümüz Sempozyumu, 14-15 Kasım, Ankara, 229 s.
- UK Government White Paper Realising Our Potential.** 1993.
- UK Government White Paper Conclusions of The Review of Energy Sources for Power Generation and Government response to fourth and fifth Reports of Trade and Industry Committee,** October 1998.
- WCI, 1998,** World Coal Institute Report.
- WEO, World Energy Organisation, 2001.** <http://www.worldenergy.org>