



GENERAL DIRECTORATE of TURKISH COAL ENTERPRISES(TKİ)

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**“Coal in Turkish Energy Policy and Clean Coal
Technologies”**

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Introduction

Coal policy is determined in accordance with the national energy policy of Turkey. Coal policy is based on developing the exploration and exploitation of coal, and its utilization economically, adequately, reliably and environmentally friendly as one of the main indigenous resources.

In this regard, due importance shall be given to;

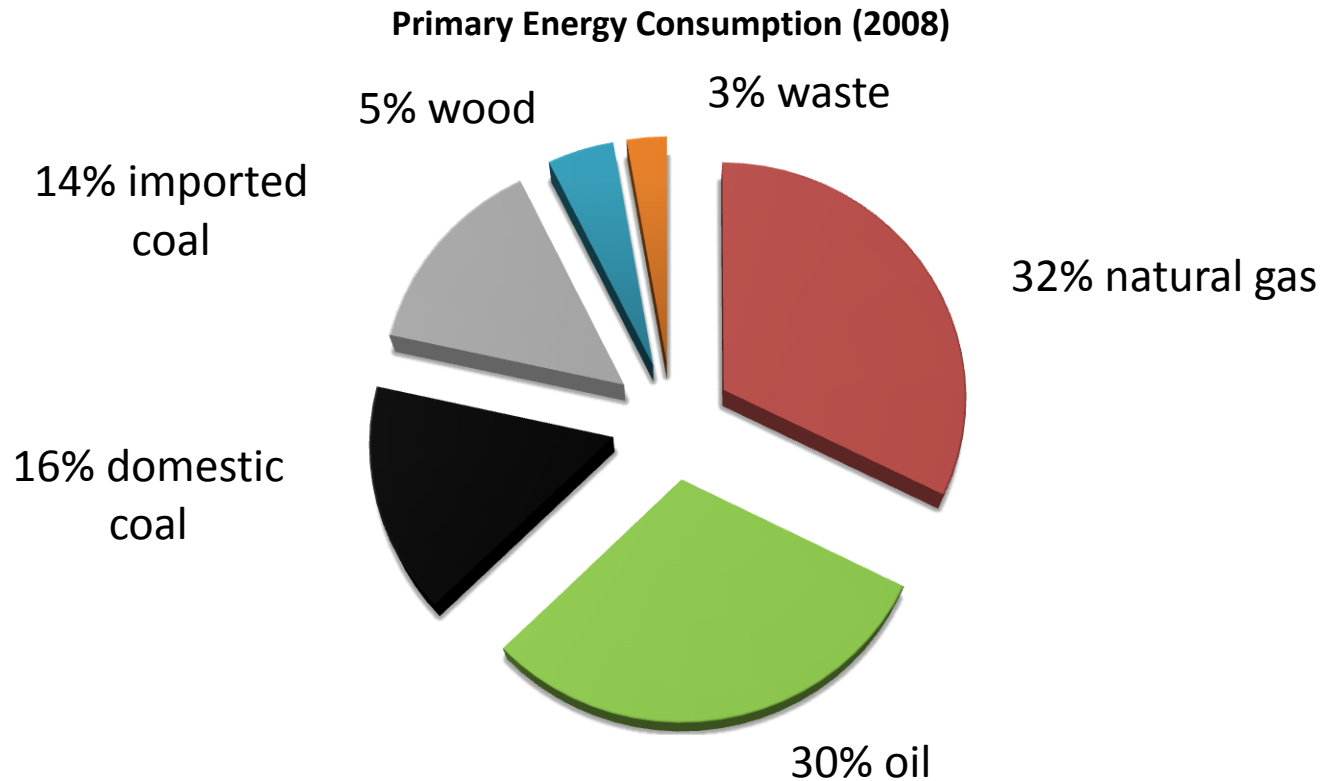
- Developing existing indigenous energy resources especially in the coal sector.
- Restructuring of coal mining sector
- Privatization of some inefficient and inactive coal mines
- Promoting the adoption of clean coal technologies in the utilization of coal in thermal power plants, household and industry.

Since Turkey has a candidate country status for European Union(EU) membership, harmonization of Turkish legislation on Coal with EU legislation is underway.



Coal in Turkish Energy Policy

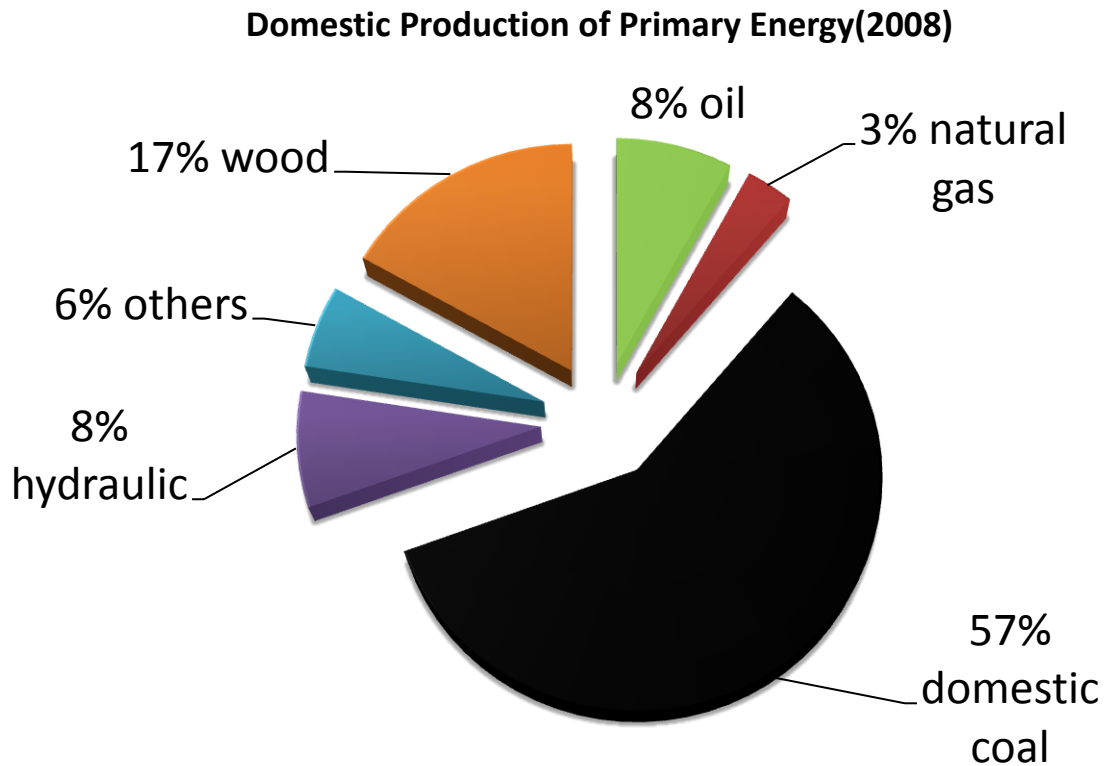
By the end of 2008, total primary energy consumption in Turkey has equaled to 106,3 million tones of oil. Natural gas is in the front rank with 31,8% in the allocation of the said supply to resources. The natural gas consumption is followed by the oil at the rate of 29,9%, domestic coal at the rate of 15,5%, and by 14% at the rate of imported coal.





Coal in Turkish Energy Policy

In 2008, 20% of total energy supply was provided from the domestic sources, whereas 80% was provided from the imported sources. The share of coal within the primary domestic energy generation is 57.1%, which amounts equally to 29.2 million tones of oil.





Coal in Turkish Energy Policy

Turkey has approximately 11,6 billion tonnes lignite and 1,3 billion tonnes of hard coal reserves ;

1,3 billion tonnes of hard coal reserves belong to Turkish Hardcoal Enterprises(TTK)

Lignite reserves :

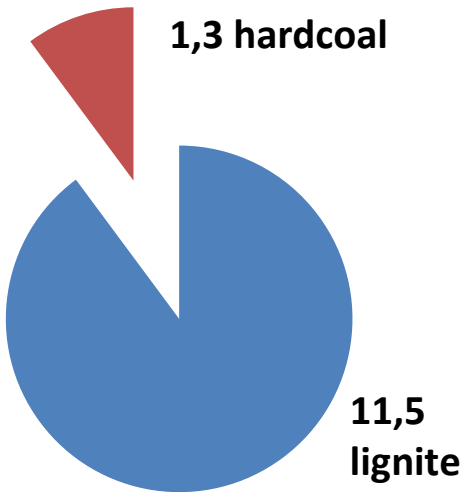
Turkish Coal Enterprises(TKI):2,5 billion tonnes;

Electricity Generation Company(EUAS):4,8 billion tonnes;

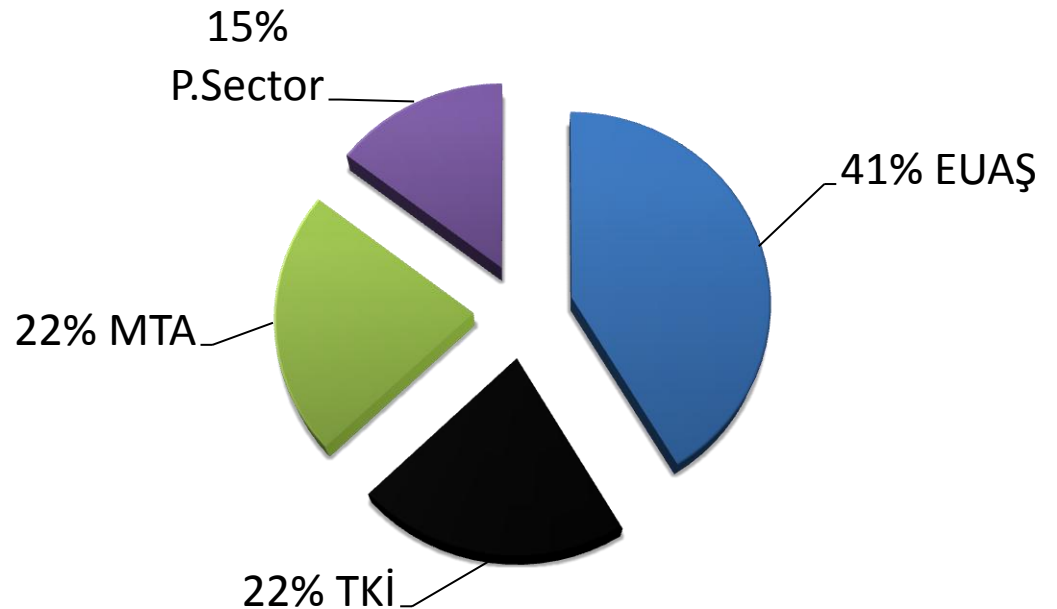
Private Sector:1,7 billion tonnes;

General Directorate of Mineral Research Exploration (MTA): 2,6 billion tonnes.

Coal Reserves(billion tonnes)



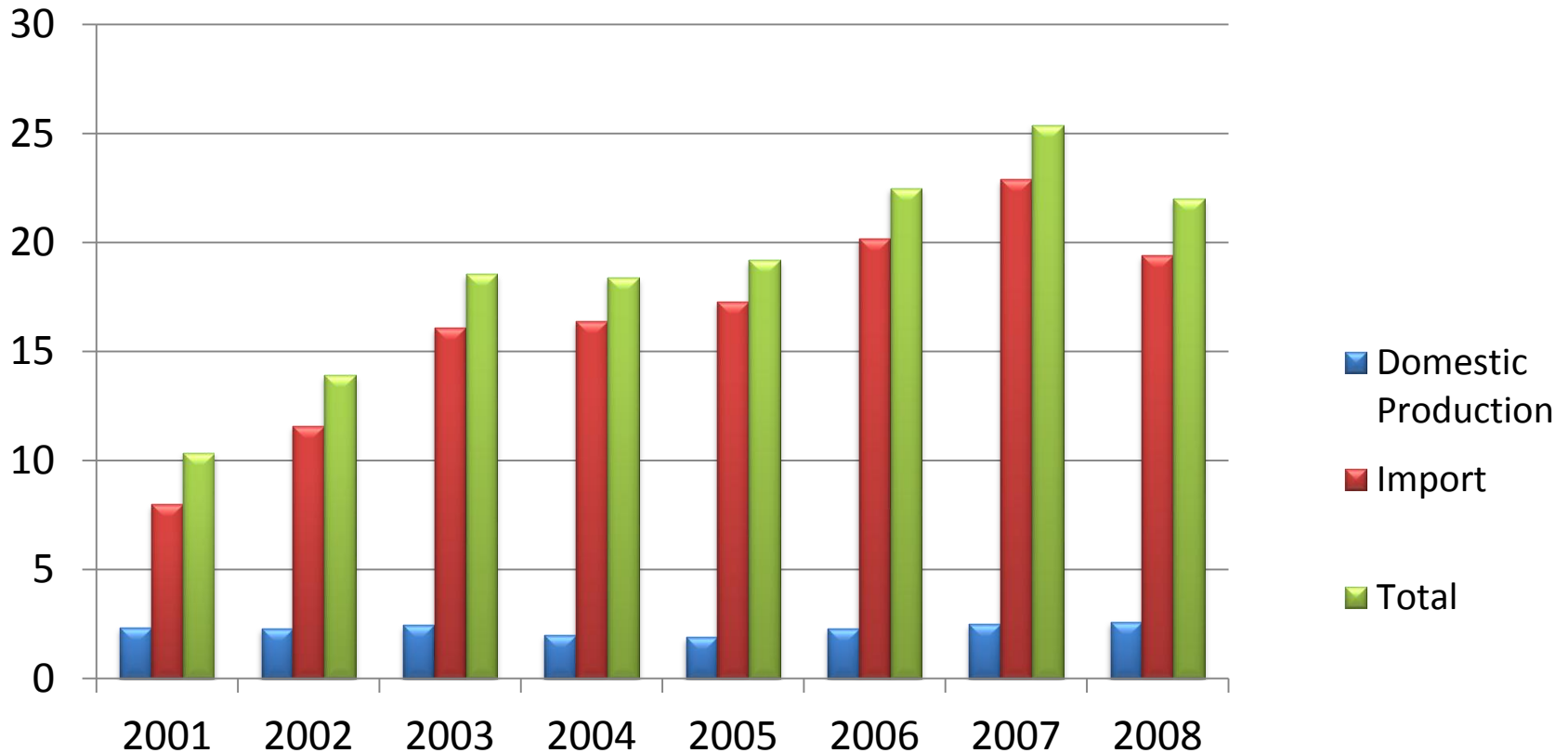
Distribution of lignite reserves (billion tonnes)





Coal in Turkish Energy Policy

While 80% of total country hard coal consumption procured met by the domestic sources in the early 1980s when coal importation gathered speed and again 45% was procured by the domestic source in the late in this year, only 12% of the hard coal consumption come out as 22.720.000 tones was supplied from the domestic sources (production by TTK and in coal fields) in 2008.

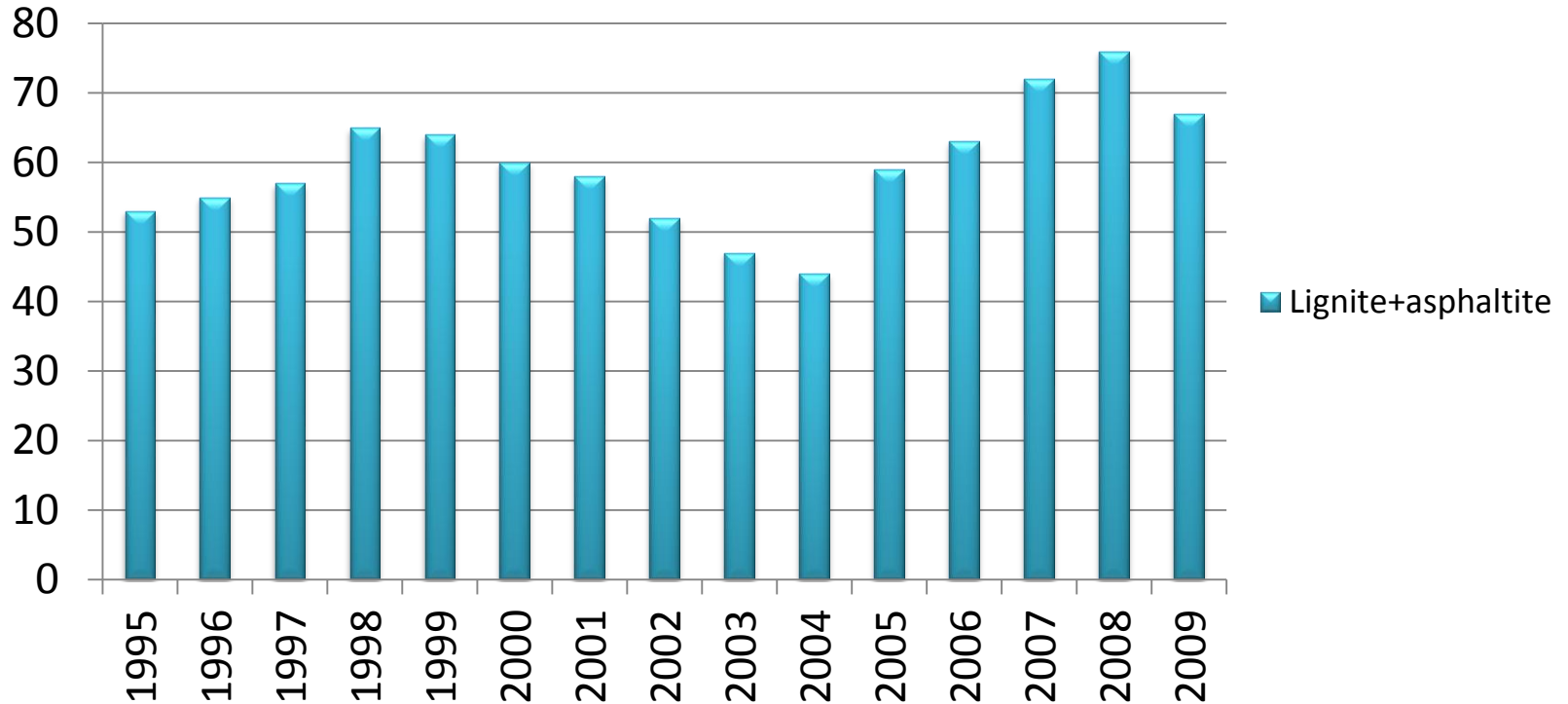




Coal in Turkish Energy Policy

The production as nearly 5,8 million tones of lignite in 1970 was materialized approximately 65 million tones of lignite in 1998. However, the lignite production undergoing a continuous decrement from that date due to natural gas purchase agreements concluded especially by and between the energy administrations reached the lowest level with a quantity of 43,7 million tones in 2004, but an increase was observed after that year again and consequently, production for 2009 was achieved as 66,7 million tones.

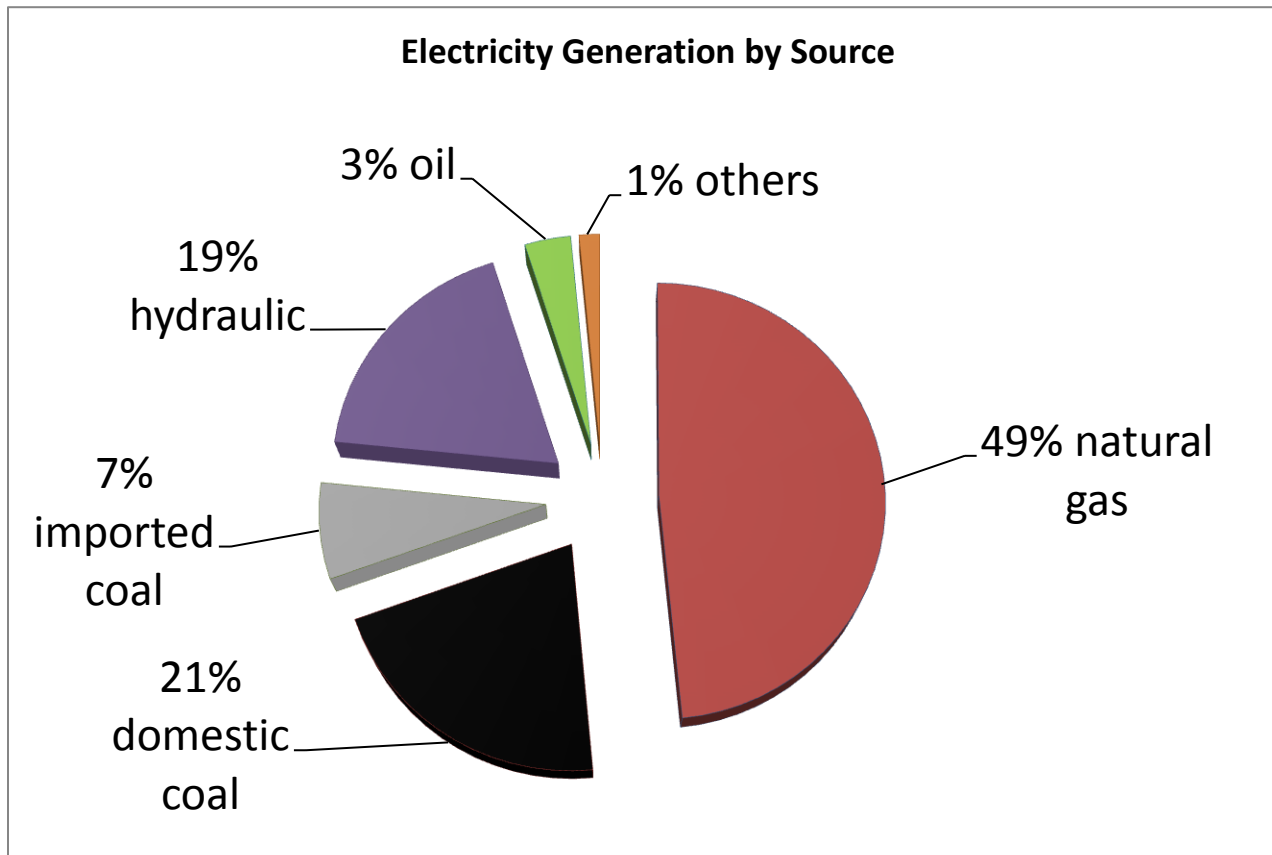
Lignite+asphaltite Production(million tonnes)





Coal in Turkish Energy Policy

In 2009, there was 193 TWh of gross power generation in Turkey. Allocation of the said generation to the sources is 48,5% natural gas, 21% domestic lignite and hard coal, 18,5% hydraulics, 7,1% imported hard coal, 3,4% fuel oils and 1,5% other sources.

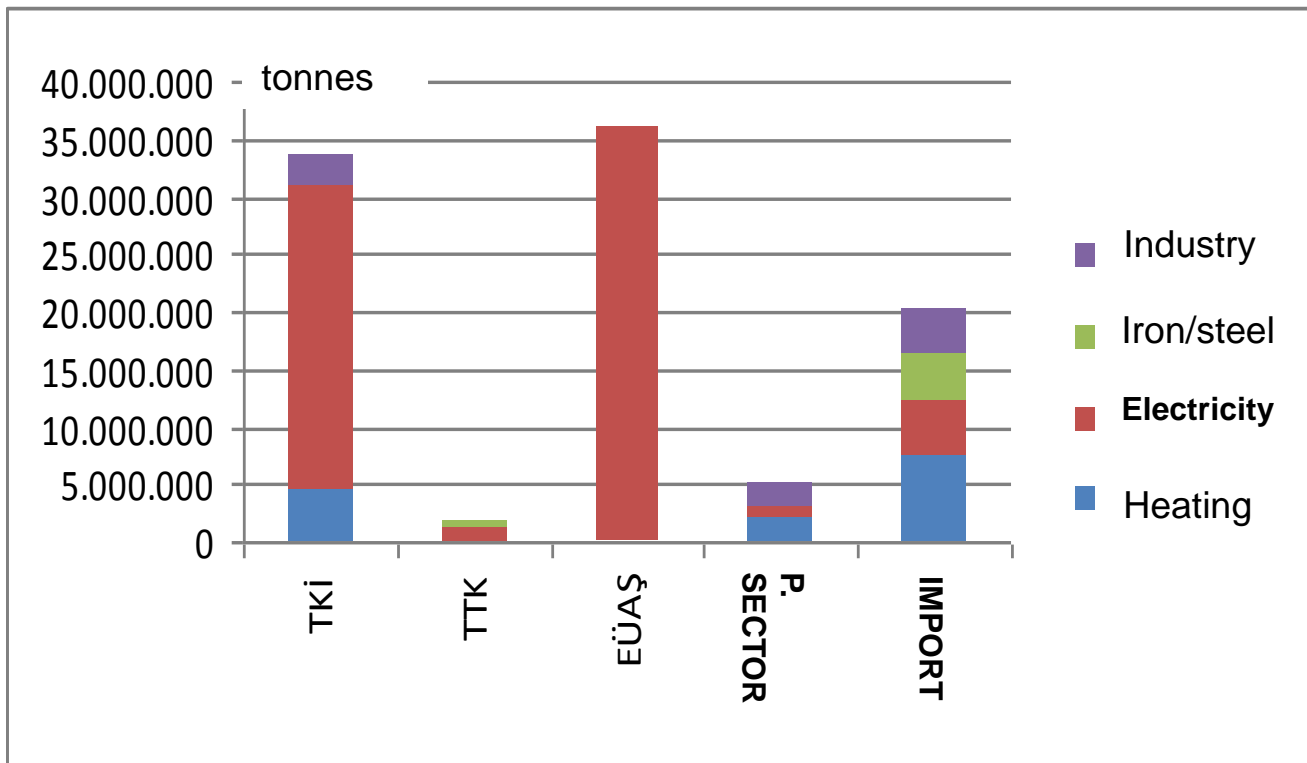




Coal in Turkish Energy Policy

Coal is consumed in four sectors; EUAS production is consumed only for electricity. 75% of TKI production is consumed at power plants and rest of it is consumed for industry and heating.

Coal consumption according to sectors





Clean Coal Technologies

Gasification Projects;

Due to the increasing energy need and deficiency of domestic resources in Turkey, the importance of coal has been increasing. At the same time, CO₂ issues and emissions restrictions became critical.

TKI has accelerated its activities and started projects both in Turkey and abroad.

Several agreements with Turkish universities and research institutions have been made on this subject covering characterization of the production of liquid fuels from coal.

With this respect, a technical visit to USA was realized. During this visit, several meetings was made with experienced institutions. Following this visit, coal samples from important fields were sent to Gas Technology Institute for determination of the gasification characteristics. Besides several experts were invited to Turkey for a workshop on gasification, liquids fuels and hydrogen production from coal.

TKI has also started a project to built a pilot plant which has a capacity of 250 kg/h. This pilot plant would provide the testing of different types of gasifiers, forecasting problems in later stages of gasification and also training of TKI staff on the subject. At the current stage, purchasing of the equipment has been completed. This establishment also serves as an R&D center for liquid fuel, methanol and chemicals production from coal, electricity production by IGCC, capturing and storage of CO₂ etc.



Clean Coal Technologies

Installation of Fluidized-Bed (with 20 Kg/ Hrs Capacity) and Entrained Bed (with 250 Kg/Hrs Capacity) Coal Gasification Pilot Facilities;



Work Packages to be Assigned By ITU Group under the Scope of the Project on Installation of Coal Gasification Pilot Facilities for TKI;

ITU Faculty of Mines Foundation



Clean Coal Technologies

Installation of Laboratory-Scale Plasma Coal Gasification System and Converting the Derived Gas into the Beneficial Chemicals such as Hydrogene, Methanol, etc.;

Beycan İBRAHİMOĞLU(Gazi Universty),Anadolu Plasma Technology Center



Technical, Environmental and Economical Feasibility Analysis of Plasma-Aided Gasification Technology;
İskender GÖKALP (ICARE-CNRS)

Methanol Derived from Synthesis Gas Project;
Prof.Dr. İsmail BOZ (Istanbul University)



Clean Coal Technologies

USTDA Coal Gasification Project;
Worley Parsons Group, Inc. and GAMA

Research and Analysis of Gasifying the Underground Coal in the Laboratory Environment;
Prof.Dr. Karol Kostur (Slovak Köstice Technical University Berk Faculty)

Site Selection for UCG (Underground Coal Gasification) Process and Feasibility Study ;
Lawrence Livermore National Laboratory (Department of Energy)

Methane Derived from Coal Project;

Examination of Coal Combustion Behaviors;
TÜBİTAK MAM – EE

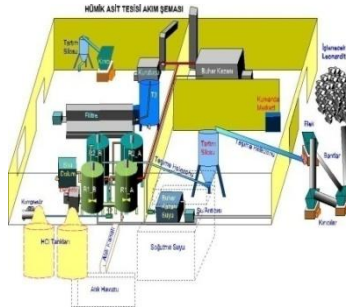


Clean Coal Technologies

Humic Acid Projects;

Humic acid is one of the major components of humic substances and contributes soil chemical and physical quality.

TKI has decided to investigate the possibility of production of humic from its lignites and leonardites. After successful laboratory studies, a pilot plant was established. Then, this plant was converted to a pilot production plant which has a capacity of 1250Kg/day. The product is now marketed under the trade name of TKI HUMAS



TKI HUMAS Plant -Konya/Ilgın

Greenhouse and Field Trials for Organic Soil Trimmer; Prof. Dr. Sait GEZGİN (Konya University, Faculty of Agriculture) Selçuk



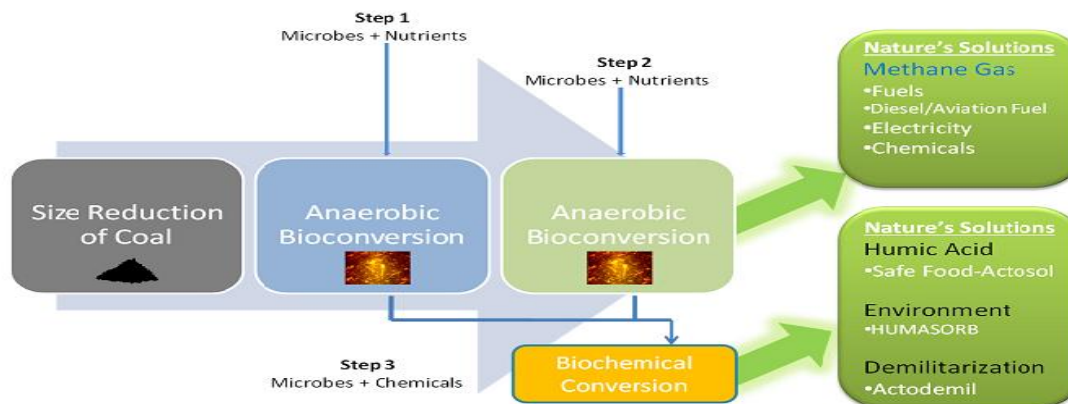


Clean Coal Technologies

Development of Humic Acid Based Adsorbent and Other Alternative Agents at Laboratory Scale; **TÜBİTAK MAM-KE**

Preparatory Work for Biological Humic Acid Production from Coal; **TÜBİTAK MAM-GMBE**

MicGas Coal Biotechnology Project; **USA-ARCTECH, Inc.**





Conclusion

Under this scope, it is essential to generalize clean coal technologies in our country in order to consume the coal in a more productive and environment-friendly manner.

TKI has been redefining its role to become a clean fuel producer rather than just a mining company ensuring the diversification of primary energy resources, reducing the import dependency and increasing the share of indigenous for supply security.

Clean coal technologies and chemical studies will be speeded up.

A multi disciplinary environment and close cooperation of the parties is essential for the success,

TKI will continue its leading role to achieve these goals.

THANK YOU ALL !